

Exploratory Study on Interlinkages between the Montreal Protocol on Substances that Deplete the Ozone Layer and the Basel, Rotterdam and Stockholm Conventions

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List of acronyms

ASTM	American Society for Testing and Materials	MCTOC	Medical and Chemical Technical Options Committee
BAT	Best Available Techniques	MEAs	Multilateral Environmental Agreements
BEP	Best Environmental Practices	MEPS	Minimum Energy Performance Standards
BRS	Basel, Rotterdam and Stockholm conventions	NIP	National Implementation Plan
BRS-GAP	Basel, Rotterdam and Stockholm conventions - Gender Action Plan	NOU	National Ozone Units
CFCs	Chlorofluorocarbons	NGOs	Non-Governmental Organizations
COP	Conference of the Parties	ODS	Ozone Depleting Substances
CRC	Chemical Review Committee	OECD	Organisation for Economic Cooperation and Development
CTC	Carbon Tetrachloride	PACE	Partnership for Action on Challenges relating to E-waste
CUE	Critical Use Exemptions	PFAS	Polyfluoroalkyl Substances
CUN	Critical Use Nomination	PFHxS	Perfluorohexane Sulfonic Acid
DGD	Decision Guidance Document	PFOA	Perfluorooctanoic Acid
ECHA	European Chemical Agency	PFOS	Perfluorooctane Sulfonic Acid
ENFORCE	Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic	PFOSF	Perfluorooctane Sulfonyl Fluoride
EU	European Union	PIC	Prior Informed Consent
FAO	Food and Agriculture Organization of the United Nations	POPs	Persistent Organic Pollutants
GHGs	Greenhouse Gases	QPS	Quarantine and Pre-shipment
GWP	Global Warming Potential	RACHP	Refrigeration, Air conditioning, and Heat Pump
HBFCs	Hydrobromofluorocarbons	SDGs	Sustainable Development Goals
HCBD	Hexachlorobutadiene	SHPF	Severely Hazardous Pesticide Formulation
HCFCs	Hydrochlorofluorocarbons	TBM	Transboundary Movements
HFCs	Hydrofluorocarbons	TEAP	Technology and Economic Assessment Panel
HFOs	Hydrofluoroolefins	UN	United Nations
IPPC	International Plant Protection Convention	UNEA	United Nations Environment Assembly
ISPMs	International Standards for Phytosanitary Measures	UNEP	United Nations Environment Programme
ISO	International Organization for Standardization	UV	Ultraviolet
MB	Methyl Bromide	UV-B	Ultraviolet-B
MBTOC	Methyl Bromide Technical Options Committee	WCO	World Customs Organization

Executive Summary

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention), the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention), the Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention) and the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol) play crucial roles in addressing global pollution by regulating hazardous chemicals, including ozone-depleting substances (ODS) and hydrofluorocarbons (HFCs), and hazardous wastes and other wastes requiring special consideration. This report explores the interlinkages between these agreements and their contributions toward environmental protection, enhanced cooperation, and enforcement.

Key findings



REGULATORY OVERLAPS AND SCOPE

The **Montreal Protocol** controls the production and consumption of ODS and HFCs towards their phase out (ODS) or phase down (HFCs) when they are in use as products. The **Basel Convention** includes in its scope wastes which consist, contain or are contaminated with these hazardous chemicals, as Parties to the Basel Convention may classify some ODS and HFCs and the products containing or contaminated with them as hazardous wastes. The present study provides information on how the Basel Convention may apply to the controlled substances under the Montreal Protocol when becoming wastes, and identifies opportunities for cooperation between these agreements to support Parties in implementing them in a mutually supportive manner.

Though the **Rotterdam and Stockholm conventions** do not share yet direct chemical listings with the **Montreal Protocol**¹, they provide frameworks for managing hazardous chemicals with opportunities to be explored for an integral approach to hazardous chemicals management. Furthermore, some of the substances have similar uses, and there is potential for cooperation in the identification of alternatives that are beneficial to the implementation of all these agreements.



CURRENT COOPERATION AND INITIATIVES

Through the efforts deployed by the Customs community, the World Customs Organization's (WCO) **DEMETER Operations** have since 2009 monitored the enforcement of the provisions of the **Basel Convention**, and, since 2019, have also monitored that of the provisions of the **Montreal Protocol**. Over the years, these global operations have aimed at intercepting illegal shipments of hazardous wastes, as well as ODS and HFCs that contribute to global warming and environmental degradation.

The United Nations Environment Programme (UNEP) **Green Customs Initiative** has built capacity for strengthened border enforcement for controlled substances under multiple Multilateral Environment Agreements (MEAs).

The **Partnership for Action on Challenges relating to E-waste (PACE II)** under the **Basel Convention** has addressed the environmentally sound management of electronic waste, which may contain ODS and HFC based refrigerants and blowing agents.

Representatives involved in the work of the Minamata Convention on Mercury, the Montreal Protocol on Substances that Deplete the Ozone Layer, the Intergovernmental Negotiating Committee to develop a legally binding instrument on plastic pollution, the Strategic Approach for International Chemicals Management (SAICM) and the Global Framework on Chemicals were provided an opportunity to participate in the **2023 and 2025 trainings for potential chairs and negotiators of BRS meetings**.

Collaboration between the secretariats in the development of **publications** such as "Addressing Chemicals of Concern in Plastics through MEAs" (2024) and "Global Governance of Plastics and Associated Chemicals" (2023) have contributed to raising awareness on the relevance of current MEAs for the current negotiations to develop an international legally binding instrument on plastic pollution, including in the marine environment.

¹ UNEP/EA.4/RES.8 Sound management of chemicals and waste, <https://docs.un.org/en/UNEP/EA.4/Res.8>.



SPECIFIC INTERLINKAGES IN HAZARDOUS CHEMICAL AND WASTE MANAGEMENT

Methyl Bromide is controlled under the Montreal Protocol for its ozone-depleting potential, and its management as a waste may fall under the scope of the Basel Convention. The Conference of the Parties to the Rotterdam Convention at its twelfth meeting in 2025 deferred further consideration on whether to list methyl bromide in its Annex III, which would subject the chemical to the Prior Informed Consent (PIC) Procedure under this Convention and could enhance trade transparency. This could support the efforts of the Montreal Protocol in identifying and addressing unreported uses of methyl bromide.

Halons, widely used in fire suppression, are controlled under the **Montreal Protocol**. Due to the lack of alternatives to some halons in the aviation and military sectors, and its phase out by the Montreal Protocol, the international trade of recovered and recycled halons has been necessary to ensure Parties have access to the halons needed for their fire safety. Once recovered/recycled and if intended for reuse, these are not wastes controlled under the Basel Convention, unless if a Party decides that halons are to be disposed of by the provisions of the national legislation. In this case, the provisions of the Basel Convention may apply to their transboundary movement.

Per- and polyfluoroalkyl substances (PFAS), including those used as halon alternatives in fire suppression, are under increasing scrutiny due to their environmental persistence and health risks. Currently, none of the PFAS alternatives to halons are controlled by the **Stockholm Convention**. Alternatives to POPs PFAS and halons in the fire-fighting sector would be beneficial to the implementation of these two agreements.



ILLEGAL TRADE AND ENFORCEMENT CHALLENGES

The Parties to the **Montreal Protocol and the Basel Convention** face similar challenges in combating **illegal traffic** in ODS and HFCs and hazardous wastes and other wastes requiring special consideration, including mislabelling, fraudulent declarations, and smuggling.

Strengthening cooperation between customs authorities, environmental agencies, and MEA Secretariats can improve enforcement mechanisms and detection strategies.



FURTHER OPPORTUNITIES FOR COOPERATION

The **Montreal Protocol** Secretariat could benefit from becoming an observer of the Basel Convention Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic (**ENFORCE**), in light of the mandate of this subsidiary body to promote Parties' compliance with the provisions of the Basel Convention pertaining to preventing and combating illegal traffic in hazardous wastes and other wastes through the better implementation and enforcement of national law.

Cross-convention collaboration can enhance **capacity-building efforts**, particularly in developing countries, through joint training, technical guidance, and policy alignment.

Integrated approaches to **refrigerant management, e-waste, and fire suppression agents** can ensure a more sustainable transition from harmful substances to environmentally friendly alternatives.

The present study underscores the importance of **synergy** in the implementation of MEAs to ensure **effective global governance** of hazardous chemicals and wastes and other wastes requiring special consideration, enhance enforcement actions, and promote sustainable environmental practices.

1.

Background Information

1.1 Introduction

Member States of the United Nations (UN) and Parties to Multilateral Environmental Agreements (MEAs) have increasingly promoted integrated action to address global environmental issues. For instance, the United Nations Environment Assembly (UNEA), through its [Resolution UNEP/EA.4/RES.8](#), recognised that the achievement of the Sustainable Development Goals (SDGs) is threatened by an array of escalating and mutually reinforcing environmental risks, and that, given the interlinkages between climate change, biodiversity loss, land degradation, and air, water and soil pollution, it is essential to address these problems in an integrated manner consistent with the mandates and priorities of existing MEAs. At its sixth session, the UNEA adopted [Resolution UNEP/EA.6/RES.6](#), which calls for advancing national efforts to address global environmental challenges through increased cooperation between UNEA, UNEP and MEAs. Strengthened cooperation is expected to enhance effective implementation at the national level, including through means of implementation; and lead to greater coherence and coordination of global assessments undertaken within the UN system and in cooperation with relevant international bodies and secretariats of the MEAs ([Resolution UNEP/EA.4/RES.23](#)).

The Conferences of the Parties (COPs) to the Basel, Rotterdam, and Stockholm (BRS) conventions have, since 2008, adopted decisions to enhance cooperation and coordination among these three conventions, also called “[synergies decisions](#)”. The BRS COPs also have a long standing practice of mandating the Secretariat to cooperate with a range of other international bodies and MEAs², including through the development of [forward-looking studies](#).

Parties to the Montreal Protocol, in [Decision XVI/34](#), also welcomed the enhanced cooperation between the Secretariat of the Montreal Protocol and the Secretariats of other conventions and international organizations.

The objective of the present study is to contribute to these efforts by identifying the interlinkages between the scope (i.e., the chemicals and waste streams covered), the rights and obligations of the Parties, and the governance structures (including convention bodies and their operations) of the Basel, Rotterdam and Stockholm conventions and the Montreal Protocol. Additionally, the study seeks to identify opportunities for enhanced cooperation and integrated implementation of these four agreements in a coordinated and mutually supportive manner.

² The most recent COPs decisions are decisions BC-16/22, RC-11/9 and SC-11/21 on international cooperation and coordination with other organizations.

2.

Hazardous Chemicals and Wastes-Related MEAs

2.1 The Vienna Convention for the Protection of the Ozone Layer

The Vienna Convention was adopted in 1985 and reached universal ratification in 2009. It is a framework agreement that establishes general obligations upon the Parties to protect the ozone layer and emphasizes the need for international cooperation.³ Its objective is to protect human and environmental health against adverse effects resulting or likely to result from human activities which modify or are likely to modify the stratospheric ozone layer.

2.1.1 The Ozone Layer

Ozone is a naturally occurring molecule made up of three oxygen atoms (O₃). The ozone layer is a region of high concentration of ozone that is found in the stratosphere between 15 and 30 km above the earth's surface. It covers the entire planet and acts as an invisible shield and provides protection from harmful ultraviolet (UV) radiation from the sun, especially ultraviolet-B (UV-B), which causes sunburn.⁴

Long-term exposure to high levels of UV-B threatens human health and damages most animals, plants and microbes, hence the ozone layer protects all life on Earth.⁹ Exposure to UV-B is linked to skin cancer, cataracts, genetic damage and immune system suppression in living organisms, and reduced productivity in agricultural crops and the food chain.⁵



³ <https://ozone.unep.org/facts-and-figures-ozone-protection>.

⁴ <https://ozone.unep.org/ozone-and-you>.

⁵ <https://www.dcceew.gov.au/environment/protection/ozone/ozone-science/ozone-layer>.



2.1.2 Ozone Depleting Substances

Ozone is being produced and destroyed all the time in the stratosphere through different natural reactions. The natural processes happening at the stratosphere maintain a consistent ozone concentration. Unfortunately, human activities have disturbed these natural processes by increasing the concentration of substances that deplete the ozone layer, and hence shifting the balance, especially gases containing halogens.

In the mid-1980s, scientists discovered a “hole” in the ozone layer above Antarctica, the region of Earth’s atmosphere with severe depletion. Manmade halogen containing chemicals, known as ozone depleting substances (ODS), were determined to be the main cause of ozone loss. The destruction of the ozone layer by ODS lead to more UV-B radiation reaching the earth which has negative impacts to human and environmental health.⁶

2.2 The Montreal Protocol

The Montreal Protocol on Substances that Deplete the Ozone Layer (referred to as the Montreal Protocol) was adopted in 1987 and has been universally endorsed. The Protocol has deadlines for the phase out of ODS that are listed in the Annexes of the Protocol.

2.2.1 The scope of the Montreal Protocol

The Montreal Protocol controls 96 manufactured ODS, referred to as controlled substances. Chlorofluorocarbons (CFCs) and halons were the first ODS controlled by the Montreal Protocol. CFCs (Annex A Group I and Annex B Group I) were commonly used as refrigerants, foam blowing agents, and aerosol sprays. Halons (Annex A Group II) were used primarily as fire extinguishing agents, both in built-in systems and in portable fire extinguishers.⁷ Other controlled substances have been added following amendments to the Montreal Protocol.

“ A **protocol**, in the context of treaty law and practice, has the same legal characteristics as a treaty. The term protocol is often used to describe agreements of a less formal nature than those entitled treaty or convention. Generally, a protocol amends, supplements or clarifies a multilateral treaty. A protocol is normally open to participation by the Parties to the parent agreement. However, in recent times States have negotiated a number of protocols that do not follow this principle. The advantage of a protocol is that, while it is linked to the parent agreement, it can focus on a specific aspect of that agreement in greater detail (UN Treaty Handbook).

⁶ <https://www.dcceew.gov.au/environment/protection/ozone/ozone-science/ozone-layer>.

⁷ <https://ozone.unep.org/treaties/montreal-protocol/articles/annex-controlled-substances>.

The first four amendments to the Montreal Protocol: the London Amendment (1990), Copenhagen Amendment (1992), Montreal Amendment (1997) and the Beijing Amendment (1999) added new ODS and have all been ratified by 197 out of 198 Parties. These amendments added carbon tetrachloride (CTC) and methyl chloroform (Annex B), hydrochlorofluorocarbons (HCFCs) and hydrobromofluorocarbons (HBFCs) and bromochloromethane (Annex C), methyl bromide (MB) (Annex E) to the Protocol's list of controlled substances. The **Kigali Amendment (2016)**, which is the fifth amendment, added 18 hydrofluorocarbons (HFCs) to the list of controlled substances (Annex F). Although HFCs do not deplete the ozone layer, as do the chemicals they replace, HFCs are powerful greenhouse gases (GHG).⁸ The Kigali Amendment is a landmark in addressing both ozone depletion and global warming.

“**Controlled substance**”, under the Montreal Protocol, means a substance in Annex A, Annex B, Annex C, Annex E or Annex F to this Protocol, whether existing alone or in a mixture. It includes the isomers of any such substance, except as specified in the relevant Annex, but excludes any controlled substance or mixture which is in a manufactured product other than a container used for the transportation or storage of that substance (Article 1, paragraph 4).

2.2.2 Control measures

The Montreal Protocol includes control measures to restrict the use and production of ODS and HFCs, control of trade, consideration of the special situation of developing countries, timelines for reductions, exemptions, financial

assistance, transfer of technology, monitoring and reporting and a non-compliance mechanism.

2.2.2.1 Restrictions of use and production

Parties to the Montreal Protocol shall ensure that the consumption of ODS decreases until phase out, according to agreed timelines and against the baseline (calculated in accordance with **Article 3**: calculation on control levels). Developing countries (referred to as “**Article 5 Parties**”) have deferred phase-out and phase-down schedules compared to developed countries (referred to as “**non-Article 5 Parties**”).

Some of the controlled substances have **essential use exemptions**. In the context of the Montreal Protocol, for a use to qualify as essential, it must be crucial, with no viable alternatives available, and efforts must be made to minimize its use and emissions. Additionally, existing stocks should be considered, and any production allowed must complement basic needs before the phase-out.

Carbon tetrachloride, for instance, play a significant role in laboratory and analytical processes for which alternatives are not yet available. The Montreal Protocol, through **Decision IX/17**, established an exemption for essential uses of this ODS in laboratory and analytical applications. Within the framework of the Montreal Protocol, laboratory activities encompass equipment calibration, the use of extraction solvents, diluents, or carriers for chemical analysis, biochemical research, inert solvents for chemical reactions, and other critical analytical and laboratory functions. The production of these laboratory and analytical chemicals is permitted as long as they consist solely of controlled substances produced to very high purity standards.⁹

Criteria for the **critical use of methyl bromide** in agriculture are established, and a use is deemed “critical” if the lack of methyl bromide for that application would lead to substantial market disruption. Furthermore, there must be no

⁸ https://ozone.unep.org/system/files/documents/Workshop-12-2_MOP-35-10E.pdf.

⁹ <https://ozone.unep.org/treaties/montreal-protocol/meetings/seventeenth-meeting-parties/decisions/decision-xvii13-use-carbon-tetrachloride-laboratory-and-analytical-uses-parties-operating-under>.

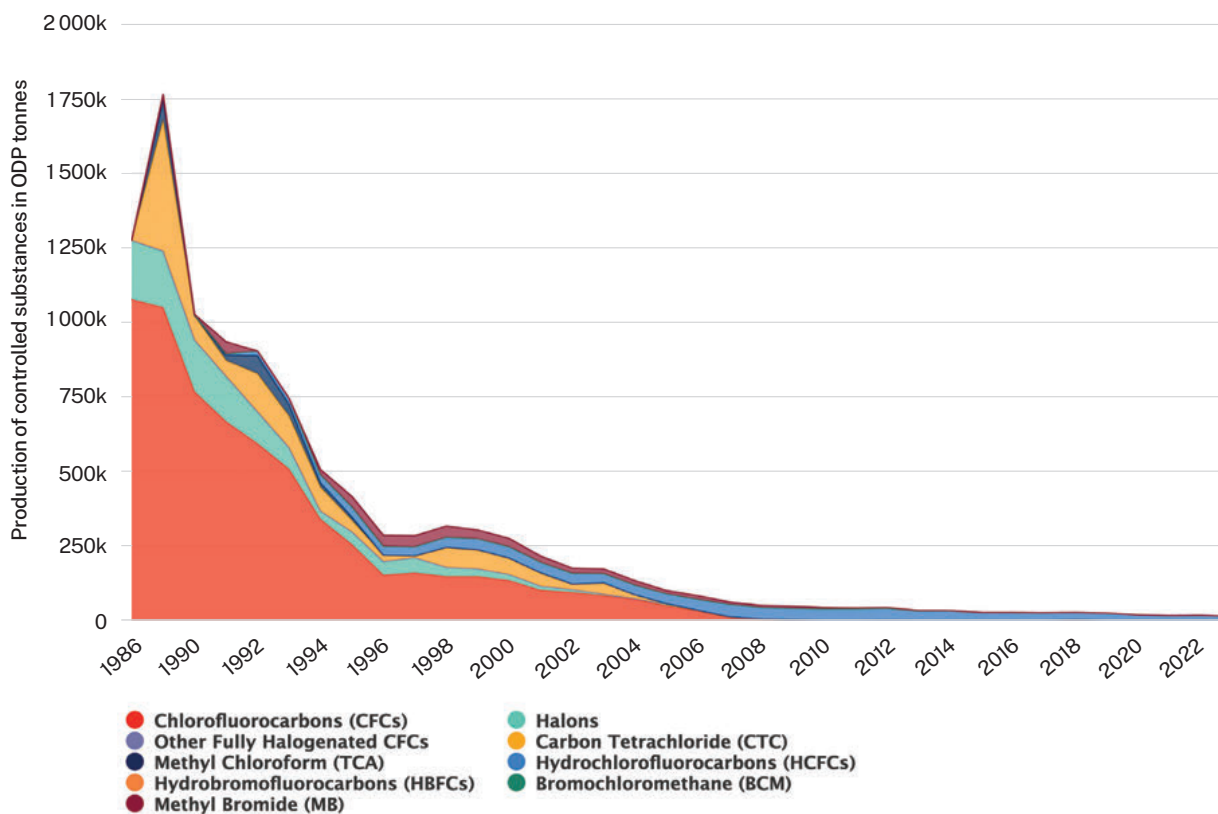
acceptable alternatives that are technically or economically viable, taking health and environmental concerns into account and suitable for the crops and conditions. Production should also be permitted if there is insufficient methyl bromide available from current stocks, especially considering the requirements of developing countries.¹⁰ Additionally, there should be initiatives in place to reduce the use and emissions of methyl bromide during both production and consumption.

The Montreal Protocol has been globally recognised as a remarkable success for its uniqueness in nearly solving a major global

environmental problem.^{11,12} For instance, the implementation of the Montreal Protocol has led to the phase-out of 99% of ODS globally (Figure 1). As a result, the concentration of naturally occurring ozone in the stratosphere is expected to return to 1980 levels by about 2070.¹³

For HFCs (Annex F), the production peaked in 2022 (Figure 2) and is expected to decrease gradually as countries implement their phase down plans.

Figure 1: Production of controlled ODS reported by Parties to the Montreal Protocol¹⁴



¹⁰ <https://ozone.unep.org/treaties/montreal-protocol/meetings/first-extraordinary-meeting-parties/decisions/decision-exi3-critical-use-exemptions-methyl-bromide-2005>.

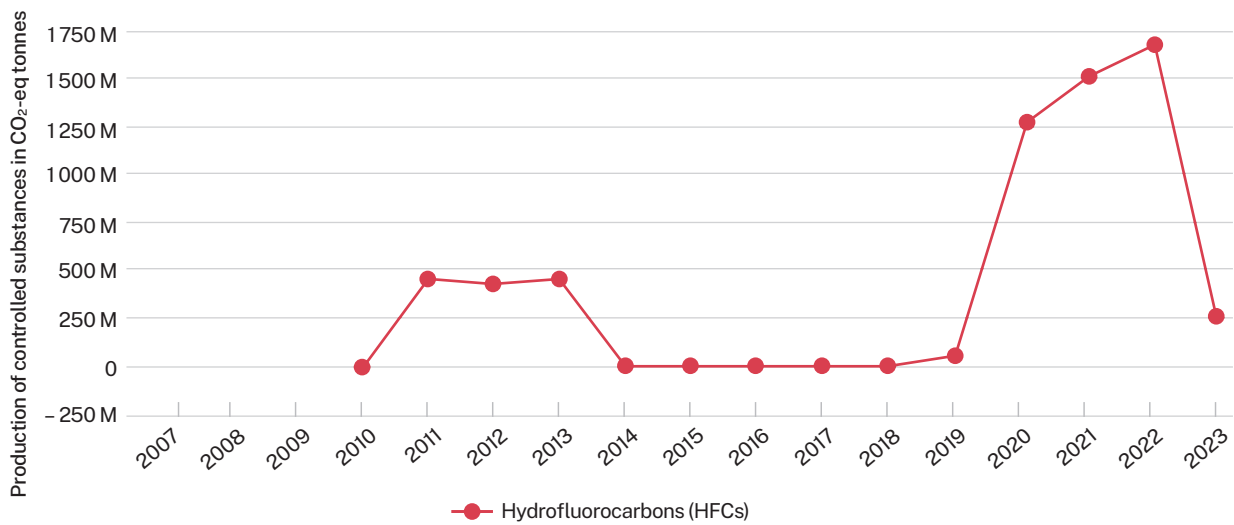
¹¹ Newman, P. A. The way forward for Montreal Protocol science. *Comptes Rendus-Geoscience* 350, 442–447 (2018).

¹² Jacobs, J. R. The precautionary principle as a provisional instrument in environmental policy: The Montreal Protocol case study. *Environ Sci Policy* 37, 161–171 (2014).

¹³ Maione, M. et al. Ten years of continuous observations of stratospheric ozone depleting gases at Monte Cimone (Italy) -Comments on the effectiveness of the Montreal Protocol from a regional perspective. *Science of the Total Environment* 445–446, 155–164 (2013).

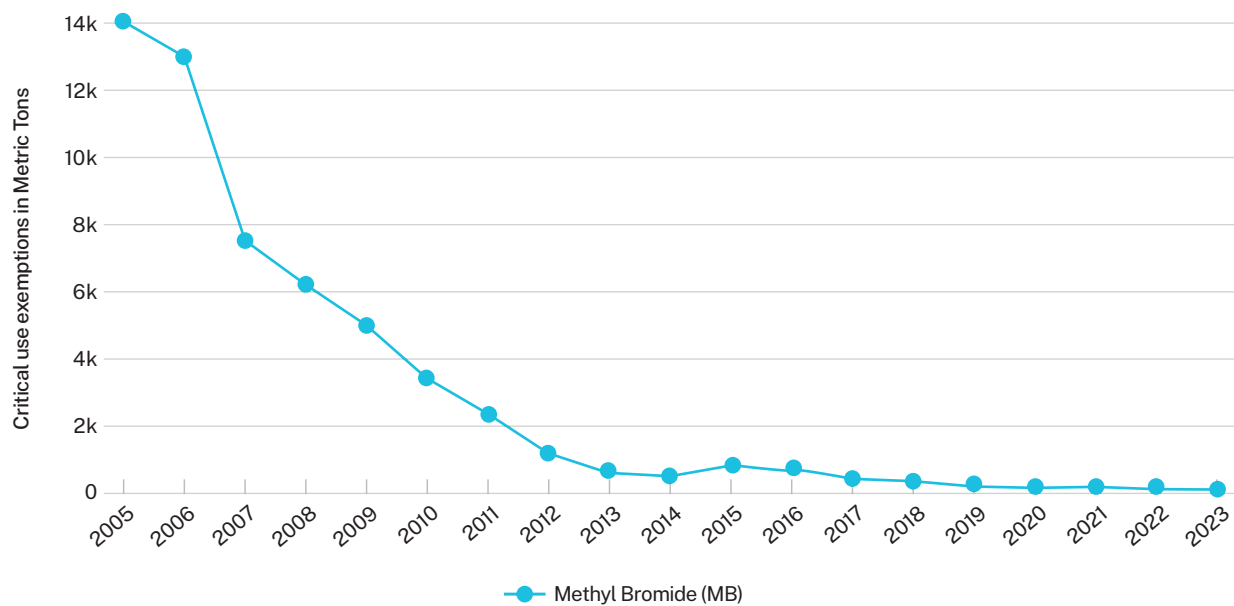
¹⁴ https://ozone.unep.org/countries/data?report_type=1&period_start=1986&period_end=2023&output_type=odp-CO2e-tonnes.

Figure 2: Production of controlled HFCs reported by Parties to the Montreal Protocol¹⁵



Critical use exemptions (Figure 3)¹⁶ as well as essential use exemptions (Figure 4)¹⁷ have also seen a decrease over the years, hence decreasing the production and consumption of these controlled substances over time.

Figure 3: Critical use exemptions reported by Parties to the Montreal Protocol

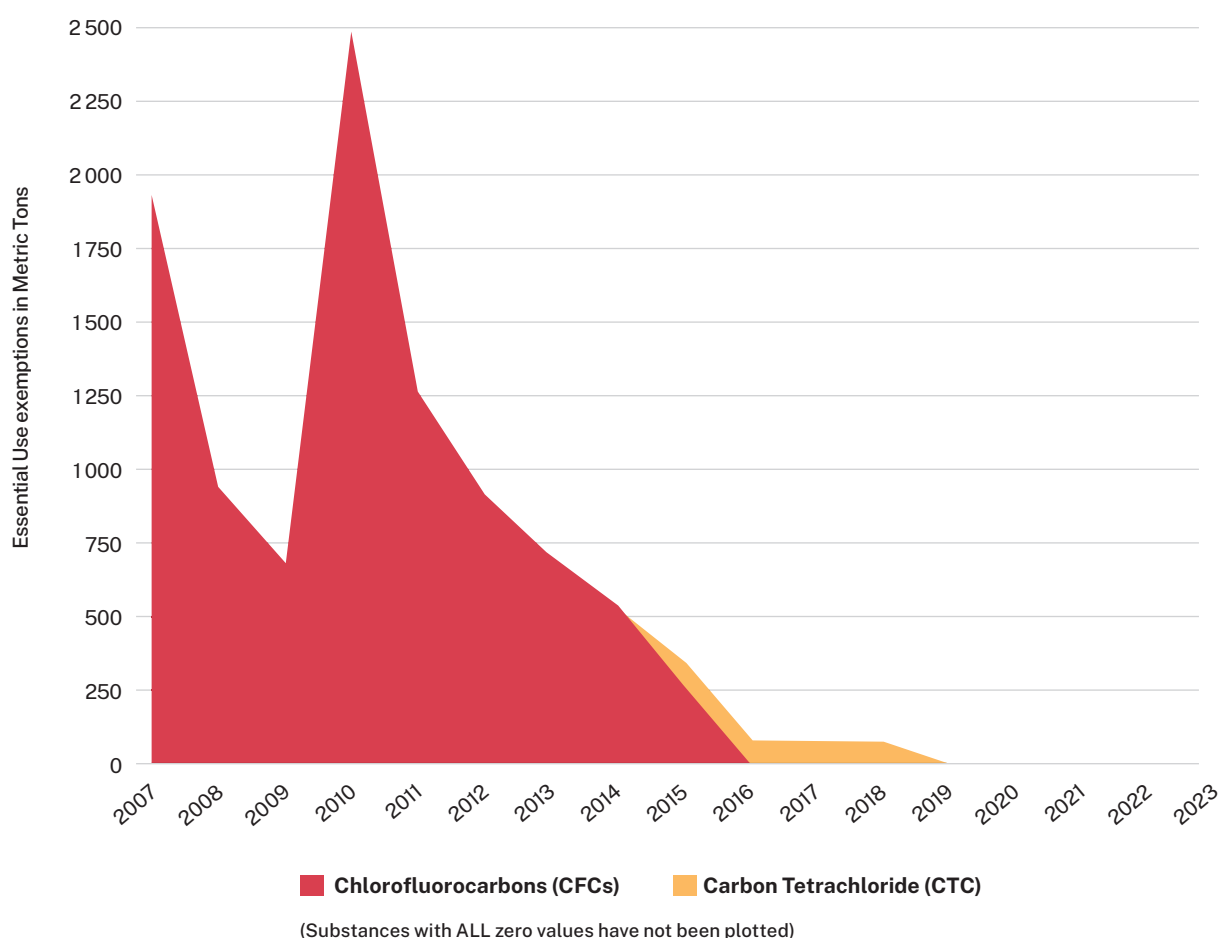


¹⁵ https://ozone.unep.org/countries/data?report_type=8&period_start=1986&period_end=2023&output_type=metric-tonnes.

¹⁶ https://ozone.unep.org/countries/data?report_type=8&period_start=1986&period_end=2023&output_type=metric-tonnes.

¹⁷ https://ozone.unep.org/countries/data?report_type=7&period_start=2007&period_end=2023&output_type=odp-CO2e-tonnes.

Figure 4: Essential use exemptions



2.2.2.2 Trade control

The Montreal Protocol controls trade of ODS through provisions outlined in [Article 4](#) (Control of trade with non-Parties) and [Article 4A](#) (control of trade with Parties). It sets deadlines for **banning trade of controlled substances** listed in the various Annexes with non-Parties, unless the Meeting of the Parties determines that those non-Parties are in compliance with the Protocol.¹⁸ This is particularly relevant for the Kigali Amendment which has not yet achieved universal ratification and in relation to which the provision on trade with non-Parties will enter into force on 1 January 2033.

Article 4 (Control of trade with non-Parties) also mandates that Parties **ban the import of products containing or manufactured with ODS** from non-Parties. Additionally, it discourages the import and export of technology related to the production or use of controlled substances listed in Annexes A, B, C, E and F to non-Party States.

Trade between Parties is generally permissible, except in cases where a Party is unable to cease production of controlled substances that have reached their phase-out date. In such cases, production is allowed only for domestic consumption. Exports between Parties are also permitted for uses deemed essential by the Parties or for the export of controlled

¹⁸ This is done by evaluating requests sent to the Meeting of the Parties, for example Decision V/3 of the Meeting of the Parties.

substances intended for destruction. This includes used, recycled and reclaimed quantities of the controlled substances.

The Montreal Protocol also establishes **licensing obligations** for Parties under [Article 4B](#) (control of trade with Parties), which is a key mechanism for monitoring, enforcing compliance, and preventing illegal trade. This should cover new, used, recycled and reclaimed controlled substances. This provision requires each Party to establish and implement a system for licensing the import and export of new, used, recycled and reclaimed controlled substances in Annexes A, B, C, E and F. The Protocol had also given an allowance of a few years to developing Parties that needed more time to implement the licensing system for these controlled substances following the entry into force of the relevant amendments.

The purpose of creating a licensing system is to assist Parties in collecting adequate information to comply with [Article 7 of the Protocol \(reporting of data\)](#) and associated decisions, while also preventing the illegal traffic in controlled substances through notifications and reporting between exporting and importing nations, along with enabling information cross-checks. The Secretariat and the Implementing Agencies of the Multilateral Fund for Implementation of the Montreal Protocol provide support to Parties in the development and implementation of these national licensing systems. Furthermore, [Article 5](#) Parties may seek assistance from the Multilateral Fund in this respect.

Licensing systems for controlled substances require importers and exporters to be accredited and registered with the appropriate authority, usually the National Ozone Units (NOU) or any equivalent entity that is identified by the Party. These systems typically incorporate a **quota** allocation mechanism that limits the amount of controlled substances allowed for import or production to comply with the Montreal Protocol's targets. Quotas are granted annually based on historical data, with

an amount reserved for new companies and emergencies. Companies that do not utilize their quotas may forfeit them in the following year. The national ozone unit, often the licensing authority for Article 5 Parties, manages and allocates these quotas, which are essential for importing controlled substances.

Although controlled substances or mixtures contained in manufactured products—other than containers used for transportation or storage—fall outside the scope of the Montreal Protocol, Parties to the Montreal Protocol have adopted several decisions over the years to encourage Parties to monitor and regulate the import and export of products and equipment containing controlled substances.

For instance, **Article 4** of the Protocol (Control of trade with non-Parties) restricts trade in controlled substances and products containing them between Parties and non-Parties. This measure ensures that all participating countries comply with ODS phase-out obligations and prevents the dumping of obsolete, high-emission technologies into nations with weaker regulations.

“Article 4: Control of trade with non-Parties

3. By 1 January 1992, the Parties shall, following the procedures in Article 10 of the Convention elaborate in an annex a **list of products containing controlled substances in Annex A**. Parties that have not objected to the annex in accordance with those procedures **shall ban**, within one year of the annex having become effective, **the import of those products from any State not party to this Protocol**.
- 3 bis. Within three years of the date of the entry into force of this paragraph, the Parties shall, following the procedures in Article 10 of the Convention, elaborate in an annex a **list of products containing controlled substances in Annex B**. Parties that have not objected to the annex in accordance with those procedures **shall ban**, within one year of the annex having become effective, **the import of those products from any State not party to this Protocol**.
- 3 ter. Within three years of the date of entry into force of this paragraph, the Parties shall, following the procedures in Article 10 of the Convention, elaborate in an annex a list of products containing controlled substances in **Group II of Annex C**. Parties that have not objected to the annex in accordance with those procedures **shall ban**, within one year of the annex having become effective, **the import of those products from any State not party to this Protocol**.
-
4. By 1 January 1994, the Parties shall determine the feasibility of banning or restricting, from States not party to this Protocol, the import of products produced with, but not containing, controlled substances in Annex A. If determined feasible, the Parties shall, following the procedures in Article 10 of the Convention, elaborate in an annex a list of such products. Parties that have not objected to the annex in accordance with those procedures shall ban or restrict, within one year of the annex having become effective, the import of those products from any State not party to this Protocol.
- 4 bis. Within five years of the date of the entry into force of this paragraph, the Parties shall determine the feasibility of banning or restricting, from States not party to this Protocol, the import of products produced with, but not containing, controlled substances in Annex B. If determined feasible, the Parties shall, following the procedures in Article 10 of the Convention, elaborate in an annex a list of such products. Parties that have not objected to the annex in accordance with those procedures shall ban or restrict, within one year of the annex having become effective, the import of those products from any State not party to this Protocol.
- 4 ter. Within five years of the date of entry into force of this paragraph, the Parties shall determine the feasibility of banning or restricting, from States not party to this Protocol, the import of products produced with, but not containing, controlled substances in Group II of Annex C. If determined feasible, the Parties shall, following the procedures in Article 10 of the Convention, elaborate in an annex a list of such products. Parties that have not objected to the annex in accordance with those procedures shall ban or restrict, within one year of the annex having become effective, the import of those products from any State not party to this Protocol.

5. Each Party undertakes to the fullest practicable extent to discourage the export to any State not party to this Protocol of technology for producing and for utilizing controlled substances in Annexes A, B, C, E and F.
6. Each Party shall refrain from providing new subsidies, aid, credits, guarantees or insurance programmes for the export to States not party to this Protocol of products, equipment, plants or technology that would facilitate the production of controlled substances in Annexes A, B, C, E and F.
7. Paragraphs 5 and 6 shall not apply to products, equipment, plants or technology that improve the containment, recovery, recycling or destruction of controlled substances, promote the development of alternative substances, or otherwise contribute to the reduction of emissions of controlled substances in Annexes A, B, C, E and F.
8. Notwithstanding the provisions of this Article, imports and exports referred to in paragraphs 1 to 4 ter of this Article may be permitted from, or to, any State not party to this Protocol, if that State is **determined, by a meeting of the Parties, to be in full compliance with Article 2, Articles 2A to 2J and this Article, and have submitted data to that effect as specified in Article 7.**
9. For the purposes of this Article, the term “State not party to this Protocol” shall include, with respect to a particular controlled substance, a State or regional economic integration organization that has not agreed to be bound by the control measures in effect for that substance.
10. By 1 January 1996, the Parties shall consider whether to amend this Protocol in order to extend the measures in this Article to trade in controlled substances in Group I of Annex C and in Annex E with States not party to the Protocol.”

To strengthen these controls, **Decision VII/32** (1995) encourages Parties to adopt additional measures against the export and import of products and equipment containing ODS, reinforcing the goal of eliminating their circulation.

“Decision VII/32: Control of export and import of products and equipment containing substances listed in Annexes A and B of the Montreal Protocol

The Seventh Meeting of the Parties decided:

1. To **recommend** that each Party **adopt legislative and administrative measures**, including labelling of products and equipment, **to regulate the export and import, as appropriate, of products and equipment containing substances listed in Annexes A and B of the Montreal Protocol** and of **technology used in the manufacturing** of such products and equipment, in order to avert any adverse impact associated with the export of such products and equipment using technologies that are or will soon be obsolete because of their reliance on Annex A or Annex B substances and which would be inconsistent with the spirit of the Protocol, including Decision I/12C of the First Meeting of the Parties to the Protocol, held in Helsinki in 1989;
2. To recommend that Parties report on action taken to implement the present decision at future Meetings of the Parties.”

Decision IX/9 (1997) further supports this effort by urging Parties to review their national policies to ensure they align with the Protocol’s trade restrictions.

“Decision IX/9: Control of export of products and equipment whose continuing functioning relies on Annex A and Annex B substance

The Ninth Meeting of the Parties decided:

1. To recommend that each Party adopt legislative and administrative measures, including labelling of products and equipment, to regulate the export and import, as appropriate, of products, equipment, components and technology whose continuing functioning relies on supply of substances listed in Annexes A and B of the Montreal Protocol, in order to avert any adverse impact associated with the export of such products and equipment using technologies that are or will soon be obsolete because of their reliance on Annex A or Annex B substances and which would be inconsistent with the spirit of the Protocol, including Decision I/12 C of the First Meeting of the Parties to the Protocol, held in Helsinki in 1989;
2. To recommend to non-Article 5 Parties to adopt appropriate measures to control, in cooperation with the importing Article 5 Parties, the export of used products and equipment, other than personal effects, whose continuing functioning relies on supply of substances listed in Annexes A and B of the Montreal Protocol;
3. To recommend to Parties to report to the Tenth Meeting of the Parties on actions taken to implement the present decision.”

Recognizing the importance of limiting the spread of outdated technologies, **Decision X/9** (1998) specifically **encourages Parties to prohibit the import of used refrigeration and air-conditioning equipment containing ODS**. This prevents developing countries from becoming repositories for phased-out substances, ensuring a more effective global transition to environmentally friendly alternatives.

“Decision X/9: Establishment of a list of countries that do not manufacture for domestic use and do not wish to import products and equipment whose continuing functioning relies on Annex A and Annex B substances

The Tenth Meeting of the Parties decided:

1. To recall that Decision IX/9 recommends:
 - (a) That each Party adopt legislative and administrative measures, including labelling of products and equipment, to regulate the export and import, as appropriate, of products, equipment, components and technology whose continuing functioning relies on supply of substances listed in Annex A and Annex B of the Montreal Protocol, in order to avert any adverse impact associated with the export of such products and equipment using technologies that are or will soon be obsolete because of their reliance on Annex A or Annex B substances and which would be inconsistent with the spirit of the Protocol, including Decision I/12 C of the First Meeting of the Parties to the Protocol, held in Helsinki in 1989;
 - (b) That non-Article 5 Parties adopt appropriate measures to control, in cooperation with importing Article 5 Parties, the export of used products and equipment, other than personal effects, whose continuing functioning relies on supply of substances listed in Annex A and Annex B of the Montreal Protocol;
2. To note that in order for such export measures to be effective, both importing and exporting Parties need to take appropriate steps;
3. To note that the products and equipment listed below* constitute categories of products and equipment whose continued use relies on the supply of substances listed in Annex A or Annex B;
4. To invite, on a voluntary basis, those Parties that do not manufacture for domestic use products and equipment in a category listed below* and that do not permit the importation of such products and equipment from any source, to inform the Secretariat, if they so choose, that they do not consent to the importation of such products and equipment;
5. To request the Secretariat to maintain a list of Parties that do not want to receive products and equipment from one or more categories listed below.* This list shall be distributed to all Parties by the Secretariat at the Eleventh Meeting of the Parties and updated on an annual basis thereafter;
6. To acknowledge that the issue of imports and exports of products and equipment whose continued functioning relies on Annex A and Annex B substances should be further considered at the Eleventh Meeting of the Parties with a view to addressing more specifically the concerns of countries in the process of phasing out production of those products and equipment;

* Products and equipment containing a controlled substance specified in Annex A or B of the Montreal Protocol: 1) Automobile and truck air conditioning units (whether incorporated in vehicles or not); 2) domestic and/or commercial refrigeration and air conditioning/heat pump equipment (when containing controlled substances in Annex A or Annex B as a refrigerant and/or in insulating material of the product) (e.g. refrigerators, freezers, dehumidifiers, water coolers, ice machines, air conditioning and heat pump units); 3) transport refrigeration units; 4) aerosol products, except medical aerosols; 5) portable fire extinguisher; 6) insulation boards, panels and pipe covers; 7) pre-polymers.”

In more recent developments, **Decision XXXIV/4** (2022) highlights the continued need for vigilance in controlling trade in equipment containing ODS, urging Parties to strengthen their monitoring mechanisms and enforcement strategies to **prevent illegal trade and unintended emissions**.

“Decision XXXIV/4: Illegal import of certain refrigeration, air-conditioning and heat pump products and equipment

The Thirty-Fourth Meeting of the Parties decides:

1. To invite parties that have restricted the manufacture and/or import of certain refrigeration, air-conditioning and heat pump products and equipment containing or relying on controlled substances, including with respect to energy efficiency, and that do not want to receive such products and equipment from other parties against payment or free of charge, to submit to the Secretariat by 1 May 2023 the information listed below:
 - (a) The types of products and equipment concerned, including their codes in the Harmonized Commodity Description and Coding System, where applicable;
 - (b) The specific domestic restrictions on the controlled substances (i.e., maximum global warming potential of hydrofluorocarbons (HFCs) permitted to be used) for each category of product and equipment;
 - (c) The minimum energy efficiency performance standard permitted under domestic legislation for each category of product and equipment;
 - (d) Any attempted illegal imports of such restricted products and equipment to their countries.
2. To consider this issue at the Thirty-Fifth Meeting of the Parties and include the item on the agenda of the forty-fifth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol, taking into account the information requested in paragraph 1 of the present decision.

2.3 Basel Convention

The Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal (referred to as the Basel Convention) was adopted in 1989 in response to public outcry over the discovery of toxic waste deposits in Africa and other developing regions, which had been imported from developed countries. The Basel Convention is intended to protect human health and the environment against the adverse effects which may result from the generation and management of hazardous wastes and other wastes requiring special consideration.¹⁹

2.3.1 The scope of the Basel Convention

The Basel Convention defines wastes as substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of under national law, as set out in [Article 2](#) (definitions) and [Annex IV](#) (disposal operations). [Annex I](#) (categories of wastes to be controlled) to the Convention lists wastes classified as hazardous and subject to the control procedures outlined in the Convention, while [Annex III](#) to the Convention provides a list of hazardous characteristics. [Annexes VIII and IX](#) further clarify which wastes are presumed to be hazardous ([Annex VIII](#)) and non-hazardous ([Annex IX](#)). [Annex II](#) (categories of wastes requiring special consideration) identifies wastes requiring special consideration, hereinafter called “other wastes”, such as household waste, residues from the incineration of household waste, certain plastic wastes, and non-hazardous electrical and electronic waste. Parties may also notify the Convention Secretariat of additional wastes, other than the waste listed in [Annexes I and II](#) to the Convention, that are considered to be or defined as hazardous wastes under their national legislation including any specific

requirements regarding transboundary movement procedures for these wastes. These hazardous wastes and other wastes are subject to the control procedures of the Basel Convention.²⁰

2.3.2 The Basel Convention Amendments

The Basel Convention amendments represent international efforts to adapt the Convention to address challenges identified by Parties subsequently to the adoption of the Convention. Among these amendments, the Ban Amendment and the Electrical and Electronic Waste Amendments (E-waste Amendments) are directly relevant to the Montreal Protocol.

2.3.2.1 The Ban Amendment

The [Ban Amendment](#) entered into force on 4 December 2019 and provides that Parties and other States that are members of the Organization for Economic Cooperation and Development (OECD), European Union (EU - legal successor to the European Community) and Liechtenstein which are listed in [Annex VII](#) **shall prohibit all transboundary movements to States not included in [Annex VII](#) of hazardous wastes covered by the Convention that are intended for final disposal, and of all transboundary movements to States not included in [Annex VII](#) of hazardous wastes covered by [Article 1, paragraph 1 \(a\)](#) of the Convention that are destined for reuse, recycling or recovery operations.**²¹ As of January 2025, 104 Parties were bound by the Ban Amendment.

2.3.2.2 The E-waste Amendments

As a result of the [E-waste Amendments](#), which entered into force on 1 January 2025 for most Parties to the Convention²², all e-waste subject to transboundary movement is subject to the Prior Informed Consent procedure under the Basel Convention, either as hazardous waste or as other wastes. The E-waste Amendments added to [Annex II](#) (categories of wastes

¹⁹ <https://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx>.

²⁰ See Article 6 (Transboundary Movement between Parties).

²¹ <https://www.basel.int/Implementation/LegalMatters/BanAmendment/Overview/tabid/1484/Default.aspx>.

²² For information on Parties that decided to not accept the E-waste Amendments, see: <https://www.basel.int/Countries/StatusofRatifications/EwasteAmendments/tabid/10103/Default.aspx>.

requiring special consideration) the entry Y49 which covers non-hazardous electrical and electronic wastes, its components and wastes from the processing of e-waste (e.g. fractions from shredding), except for e-waste covered by entry A1181 (in [Annex VIII](#)). In [Annex VIII](#), the new entry A1181 was added, covering hazardous e-wastes, its components and wastes from the processing of e-waste (e.g. fractions from shredding), while the existing entry A1180 was deleted. Previous e-waste entries B1110 (e-wastes) and B4030 (single-use cameras) were removed from [Annex IX](#).²³

Table 1: Changes to Annexes II, VIII and IX
(as per [decision BC-15/18](#))

Basel Convention annexes	Subject to the PIC procedure	New entry	Deletion of entry
Annex VIII	Yes	A1181	A1180
Annex II	Yes	Y49	
Annex IX	No		B1110
			B4030

2.3.3 Control measures

The general obligations under the Basel Convention (set out in [Article 4](#) (general obligations)) centre around the following principal aims:

- (a) The reduction of the generation of hazardous wastes and other wastes and the promotion of their environmentally sound management, wherever the place of disposal;
- (b) The reduction of transboundary movements of hazardous and other wastes to a minimum consistent with environmentally sound management; and
- (c) The control of transboundary movements of hazardous and other wastes.

2.3.3.1 Environmentally Sound Management

Waste management encompasses the collection, transport and disposal of hazardous wastes and other wastes, including the aftercare of disposal sites ([Article 2, paragraph 2](#)). The Basel Convention includes provisions aimed at preventing and minimizing the generation of hazardous and other wastes, which is a core aspect of environmentally sound management under the Convention.

2.3.3.2 Transboundary Movement

Under the Basel Convention, Parties are obligated to control the transboundary movement of hazardous wastes and other wastes. This includes, among other things, taking appropriate measures to ensure that transboundary movements are reduced to the minimum consistent with the environmentally sound and efficient management of the wastes and is conducted in a manner that safeguards human health ([Article 4, paragraph 2 \(d\)](#)). This applies to both recycling/recovery and final disposal operations.

“ Transboundary movement: this refers to any movement of hazardous wastes or other wastes from an area under the national jurisdiction of one State to or through an area under the national jurisdiction of another State or to or through an area not under the national jurisdiction of any State, provided at least two States are involved in the movement ([Article 2, Basel Convention](#)).

²³ <https://www.basel.int/Implementation/Ewaste/EwasteAmendments/Overview/tabid/9266/Default.aspx>.

Parties to the Convention are required to **take the appropriate measures to ensure that transboundary movements of hazardous wastes and other wastes are only allowed if the State of import has the technical capacity and the necessary facilities, capacity or suitable disposal sites in order to dispose of the wastes in question in an environmentally sound manner; or if the wastes in question are required as raw material for recycling or recovery industries in the State of import; or if the transboundary movement in question is in accordance with other criteria decided by the Parties and adopted by the Conference of the Parties (Article 4, paragraph 9).**

Parties can also exercise the **right to prohibit import of hazardous wastes or other wastes for disposal**, with Parties that are States of export obliged to prohibit or not permit export to those Parties when notified of such a prohibition ([Article 4, paragraph 1\(b\)](#)).

If a transboundary movement of hazardous wastes and other wastes takes place, the Basel Convention requires that only persons authorized or allowed to transport or dispose of wastes undertake such operations and that wastes subject to a transboundary movement be packaged, labelled and transported in conformity with generally accepted and recognized international rules and standards. These obligations and rights form the foundation of the Prior Informed Consent (PIC) procedure, which establishes strict requirements for the transboundary movement of hazardous and other wastes.

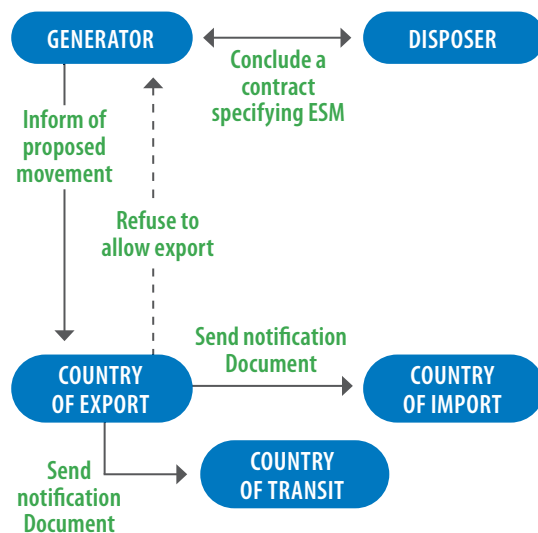
2.3.3.3 The Prior Informed Consent (PIC) Procedure

The transboundary movement procedure under the Basel Convention consists of four key stages ([Article 6](#) (Transboundary Movement between Parties)):

- (a) Notification;
- (b) Consent and issuance of movement document;
- (c) Transboundary movement;
- (d) Confirmation of disposal.

Notification

The process begins with a **notification** from the State of export, or the generator or exporter through the competent authority of the State of export, who must inform the importing Party, through the competent authorities of the involved Parties, of any proposed transboundary movement of hazardous and other wastes. The notifications must include the declarations and information specified in [Annex V A](#) (information to be provided on notification), written in a language acceptable to the State of import.

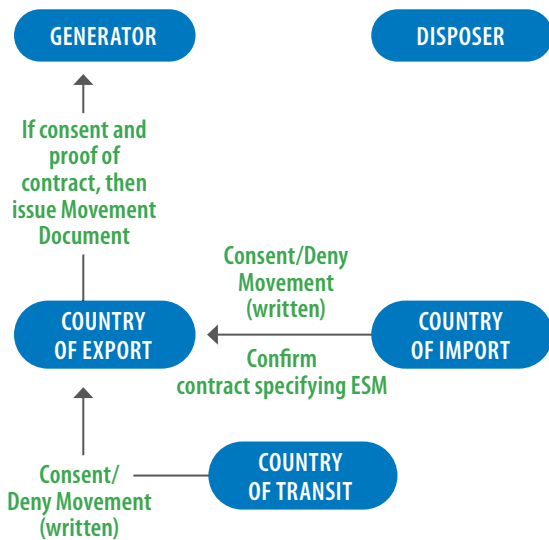


Consent and issuance of movement document

The State of import must respond to the notifier in writing regarding the proposed movement. The State may grant **consent** with or without conditions, **deny permission**, or **request additional information**. A copy of the final response must be sent to the competent authorities of all the states concerned that are Parties to the Convention.

States of transit must also be notified of the proposed movement, and can also grant consent with or without conditions, deny permission, or request additional information.

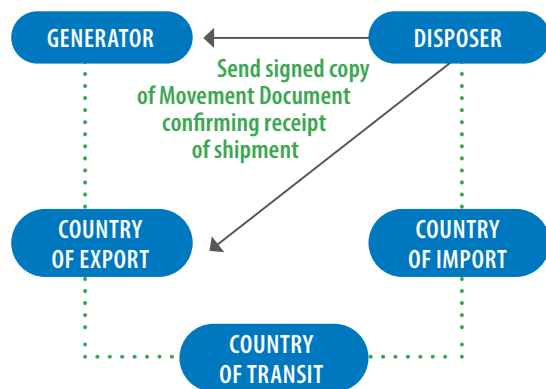
The movement of hazardous wastes and other wastes cannot begin until consent is obtained from both the State of import and all states of transit. In certain circumstances, set out in [Article 6, paragraph 4](#), the State of transit may decide not to require consent. In such circumstances, notification still needs to take place but if no response is received by the State of export within 60 days of the receipt of a given notification by the State of transit, the State of export may allow the export to proceed as set out in that provision.



Transboundary movement

The State of export shall not allow the generator or exporter to commence the transboundary movement until it has received written confirmation that:

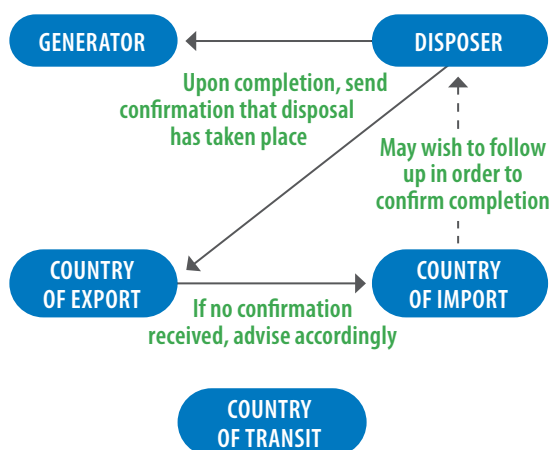
- The notifier has received the written consent of the State of import; and
- The notifier has received from the State of import confirmation of the existence of a contract between the exporter and the disposer specifying environmentally sound management of the wastes in question.



Confirmation of disposal

For wastes classified as hazardous only by the State of export, the importer or disposer is required to inform both the exporter and the competent authority upon receiving the waste and provide confirmation of its disposal. If this information is not received, the competent authority of the State of export must notify the competent authority of the State of import. If a State of transit only classifies the waste as hazardous, export cannot proceed until consent is obtained from that State of transit ([Article 6, paragraphs 3 and 4](#)).

If the waste is deemed hazardous by the importing State or States of import and transit that are Parties, the requirements of notification, consent and related to general notifications set out in [Article 6, paragraphs 1, 3 and 6](#), apply to the exporter and State of export. They must notify both the State of



import and the State(s) of transit and cannot initiate the movement until consent is received in accordance with those provisions.

It is important to note that the Basel Convention mandates that any transboundary movement of hazardous or other wastes must be covered by insurance, a bond or another form of financial guarantee, as required by the State of import or any State of transit that is a Party to the Convention (Article 6, paragraph 11).

2.3.3.4 Illegal traffic

The Basel Convention obligates all Parties to enact legislation that prevents and punishes illegal traffic. Illegal traffic is defined as the transboundary movement of hazardous wastes or other wastes that occurs under any of the following conditions (Article 9, paragraph 1):

- Without notification pursuant to the provisions of the Convention to all States concerned;
- Without the consent of a State concerned;
- Through consent obtained by falsification, misrepresentation or fraud;
- That does not conform in a material way with the documents;
- That results in deliberate disposal (e.g. dumping) of hazardous wastes in contravention of the Convention and of general principles of international law.²⁴

The Parties consider that illegal traffic is criminal (Article 4, paragraph 3), and each Party is to introduce appropriate national/domestic legislation to prevent and punish illegal traffic (Article 9, paragraph 5). Each Party is to provide information about closed cases of illegal traffic in its annual national report to the Basel Convention, while a specific form is available for transmitting information on confirmed cases of illegal traffic. Additionally, Parties can seek assistance from the Secretariat in identifying instances of illegal traffic. In these situations, the Secretariat is to circulate immediately to the Parties concerned, namely the State of import, export and any State of transit, any information it has received regarding illegal traffic.

2.4 Rotterdam Convention

The rapid growth in chemical production and trade over the past three decades has heightened concerns about the risks posed by hazardous industrial chemicals and pesticides, particularly in countries lacking the infrastructure to adequately monitor their import and use. In response to these needs, the Food and Agriculture Organization of the United Nations (FAO) and UNEP took action, each developing and promoting voluntary information exchange programmes. In 1985, FAO introduced the International Code of Conduct on the Distribution and Use of Pesticides, while UNEP launched the London Guidelines for the Exchange of Information on Chemicals in International Trade in 1987.

In 1989, these two organizations collaborated to incorporate the voluntary PIC procedure into both instruments, enhancing global cooperation and safety in the trade and management of hazardous industrial chemicals and pesticides.

The Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade (referred to as the Rotterdam Convention) was adopted in 1998

²⁴ <https://www.basel.int/Implementation/LegalMatters/IllegalTraffic/Overview/tabid/3421/Default.aspx>.

and its objective is to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals to protect human health and the environment from potential harm through the PIC procedure and by facilitating information exchange. This is achieved by providing for a national decision-making process on their import and by disseminating these decisions to Parties.

2.4.1 Scope

The Convention covers pesticides and industrial chemicals that have been banned or severely restricted for health or environmental reasons by at least two Parties from at least two different PIC regions,²⁵ and which the Conference of the Parties has decided to subject to the PIC procedure. Additionally, any Party that is a developing country or a country with an economy in transition may propose the listing of a severely hazardous pesticide formulation (SHPF) if it is experiencing problems caused by the SHPF under conditions of use in its territory, as outlined in [Article 6, paragraph 1](#).

2.4.2 Control measures

2.4.2.1 Information exchange

The Convention promotes the exchange of information between Parties, including ([Article 14](#) (information exchange)):

- (a) Information about actions taken to ban or severely restrict chemicals at national level;
- (b) Notification by the exporting Party of exports from its territory of a chemical that is banned or severely restricted. In this case the exporting Party must inform the importing Party before the first export after such a ban or severe restriction and thereafter before the first export in any calendar year;

- (c) Information to accompany exported chemicals including requiring exports of chemicals included in the PIC procedure, as well as for other chemicals that are banned or severely restricted in the exporting country are subject to labelling requirements that ensure adequate availability of information on risks and/or hazards to human health or the environment;
- (d) An up-to-date safety data sheet that follows an internationally recognised format setting out the most up-to-date information available, that is shared with the importer when exporting chemicals that are to be used for occupational purposes.

2.4.2.2 Prior Informed Consent (PIC) procedure

The PIC procedure is a mechanism for formally obtaining and disseminating the decisions of importing Parties on whether they wish to receive future shipments of those chemicals listed in [Annex III](#) to the Convention (chemicals subject to the prior informed consent procedure) and for ensuring compliance with these decisions by exporting Parties. For each chemical included in [Annex III](#), a “Decision Guidance Document” (DGD) is prepared ([Article 7, paragraph 1](#)). It sets out the scope of the chemical subject to the PIC procedure and contains basic information on the chemical, including the hazard classification, additional sources of information on the chemical and information on possible alternatives. The DGD is circulated to all Parties and made available on the Convention website.

Parties are thus required to transmit a response to the Secretariat regarding the future import of a chemical within the timeframes established by the Convention as outlined in [Article 10](#) (obligations in relation to imports of chemicals listed in Annex III). This response may be a final decision – either consenting to the import, refusing consent, or consenting with specified conditions – or an interim response. Any decision to refuse import or to allow import

²⁵ The seven PIC regions for the Rotterdam Convention are Africa, Asia, Europe, Latin America and the Caribbean, Near East, North America, and Southwest Pacific.

under specific conditions must be trade neutral, meaning it must apply equally to domestically produced chemicals for domestic use and to imports from any source.

The import responses are circulated by the Secretariat to all Parties, and exporting Parties are obliged under the Convention to take appropriate measures to communicate these responses to relevant stakeholders within their jurisdiction. Additionally, they must ensure that exporters within their jurisdiction comply with the decisions outlined in each response.²⁶

2.5 Stockholm Convention

The Stockholm Convention on Persistent Organic Pollutants (POPs), adopted on 22 May 2001, is designed to protect human health and the environment from the harmful effects of POPs. These chemicals possess characteristics that make them particularly hazardous: they remain intact for exceptionally long periods (persistent), can be widely distributed across the environment through natural processes involving soil, water, and especially air (long range transport), accumulate in living organisms (bioaccumulate), and are found in higher concentrations as they move up in the food chain (bioaccumulate).

POPs are toxic to both humans and wildlife²⁷ with adverse effects that can include cancer, allergies, developmental issues, damage to the central and peripheral nervous systems, reproductive disorders, endocrine disruption and immune system impairment.

2.5.1 Scope

The scope of the Stockholm Convention covers chemicals which have been identified to have the characteristics of POPs and are listed in the [Annexes A, B and/or C](#) to the Convention.

2.5.2 Control measures

2.5.2.1 Elimination ([Annex A](#))

The production and use of POPs listed in [Annex A](#) to the Stockholm Convention must be prohibited and/or eliminated, although certain time-limited [specific exemptions](#) for production and/or use may be available for some POPs within that Annex. The import and export of chemicals listed in [Annex A](#) are strictly regulated and may only occur under specific conditions outlined in [Article 3, paragraph 2](#). These conditions allow for trade only for the purpose of environmentally sound disposal or for a use or purpose that is permitted for that Party under the exemptions provided in [Annex A](#).

2.5.2.2 Restriction ([Annex B](#))

The Stockholm Convention mandates the restriction of the production and use of POPs listed in [Annex B](#), with similar controls on their import and export. These POPs can only be imported or exported for environmentally sound disposal or for a use or purpose permitted for the Party under [Annex B](#).

Any Party that has a specific exemption ([Annex A or B](#)) or an acceptable purpose ([Annex B](#)) must take appropriate measures to ensure that any production or use under these exemptions or purposes is carried out in a manner that prevents or minimizes human exposure and release to the environment ([Article 3, paragraph 6](#)).

²⁶ <https://www.pic.int/Procedures/PICProcedure/tabid/1364/language/en-US/Default.aspx>.

²⁷ <https://chm.pops.int/TheConvention/ThePOPs/tabid/673/Default.aspx>.

2.5.2.3 Unintentional production (Annex C)

The Convention also addresses releases that are unintentionally produced from anthropogenic activities of POPs listed in [Annex C](#) to the Stockholm Convention.

In accordance with [Article 5](#) of the Stockholm Convention (measures to reduce or eliminate releases from unintentional production), Parties are required to identify, characterize, and address the releases of unintentional POPs. Parties also have an obligation to, amongst other things, develop an action plan for this purpose, which must include certain elements listed in [Article 5, paragraph a](#).

“Article 5: Measures to reduce or eliminate releases from unintentional production

Each Party shall at a minimum take the following measures to reduce the total releases derived from anthropogenic sources of each of the chemicals listed in Annex C, with the goal of their continuing minimization and, where feasible, ultimate elimination:

- (a) Develop an action plan or, where appropriate, a regional or subregional action plan within two years of the date of entry into force of this Convention for it, and subsequently implement it as part of its implementation plan specified in [Article 7](#), designed to identify, characterize and address the release of the chemicals listed in [Annex C](#) and to facilitate implementation of subparagraphs (b) to (e). The action plan shall include the following elements:
 - (i) An evaluation of current and projected releases, including the development and maintenance of source inventories and release estimates, taking into consideration the source categories identified in Annex C;
 - (ii) An evaluation of the efficacy of the laws and policies of the Party relating to the management of such releases;
 - (iii) Strategies to meet the obligations of this paragraph, taking into account the evaluations in (i) and (ii);
 - (iv) Steps to promote education and training with regard to, and awareness of, those strategies;
 - (v) A review every five years of those strategies and of their success in meeting the obligations of this paragraph; such reviews shall be included in reports submitted pursuant to [Article 15](#);
 - (vi) A schedule for implementation of the action plan, including for the strategies and measures identified therein”.

2.5.2.4 Stockpiles and wastes

Parties also have obligations to take measures to reduce or eliminate releases from stockpiles and wastes ([Article 6](#)). Parties must develop appropriate strategies for the identification and environmentally sound management of stockpiles consisting of or containing chemicals listed either in Annex A or Annex B and wastes, including products and articles upon becoming wastes, consisting of, containing or contaminated with a chemical listed in [Annex A, B or C](#) ([Article 6, paragraph 1](#)).

In addition, Parties have to take appropriate measures so that such wastes, including products and articles upon becoming wastes, are handled, collected, transported and stored in an environmentally sound manner. Parties also have to ensure that the disposal of POPs

chemicals and articles containing or contaminated with POPs is in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of POPs. Alternatively, the disposal of these items must be done in an environmentally sound manner when destruction or irreversible transformation does not represent the environmentally preferable option or the persistent organic pollutant content is low, considering international rules, standards, and guidelines. Chemicals listed in [Annex A and B](#) and articles containing or contaminated with these chemicals cannot be subjected to disposal operations that may lead to recovery, recycling, reclamation, direct reuse or alternative uses of persistent organic pollutants.

3.

**Current cooperation
between the BRS
conventions and
the Montreal Protocol**

The BRS conventions and the Montreal Protocol have already collaborated to combat the illegal trade and traffic of hazardous chemicals and wastes, as well as to promote the environmentally sound management of e-waste, as follows:

3.1 The DEMETER operations

The DEMETER operations, whose first edition dates back to 2009, are aimed at intercepting illegal shipments of hazardous and other wastes, including plastic wastes and e-wastes, as well as ODS and HFCs.²⁸ Over the years, the Secretariat of the Montreal Protocol and the OzonAction Network have been partners in Global Operations on Monitoring and Control of Illegal Transboundary Movement of Wastes and Illegal Trade in ODS, organized and coordinated by World Customs Organization (WCO) in close cooperation with the General Administration of Customs of China. The target commodities are covered by both the Basel Convention and the Montreal Protocol, and this also brings opportunities for collaboration between the Secretariats.

3.2 Green Customs Initiative

The UNEP Green Customs Initiative, launched in 2004, enhances the capacity of customs and border control officers to enforce and foster compliance with trade-related conventions, MEAs, and corresponding national legislation.²⁹ The commodities include ODS, hazardous chemicals and wastes, endangered species, and living-modified organisms.

The Basel Convention and the Montreal Protocol have undertaken training workshops for customs administrations who are beneficiaries of the WCO through the Swedish International Development Cooperation Agency programme on “Trade Facilitation and Customs Modernization Programme for Sustainable Development in Sub-Sahara Africa”.

3.3 The Partnership for Action on Challenges relating to E-waste under the Basel Convention

The Partnership for Action on Challenges relating to E-waste, abbreviated PACE II, is a multi-stakeholder platform established to resolve challenges related to the environmentally sound management of e-waste. The Partnership focuses on used and waste mobile phones, computing equipment, TV screens, audio and video equipment, refrigerators, cooling and heating equipment, as well as on policies and regulations for the environmentally sound management of e-waste. The Partnership is supported by a working group, comprised of representatives of equipment manufacturers, recyclers, international organizations, academia, non-governmental organizations (NGOs), municipalities, Parties and Signatories to the Basel Convention and Basel regional and coordinating centres for training and technology transfer. The terms of reference include the goal, scope of work, tasks, financial arrangements, and the structure of PACE II. The Partnership was launched as a follow-up partnership to PACE (the Partnership for Action on Computing Equipment) at the fourteenth meeting of the Conference of the Parties to the Basel Convention (COP). It became PACE II at the fifteenth meeting of the COP, when the scope and the terms of reference of the Partnership were adopted, in [Decision BC-15/22](#).

²⁸ <https://www.wcoomd.org/en/media/newsroom/2022/december/operation-demeter-viii.aspx>.

²⁹ <https://www.greencustoms.org/>.

3.4 Training of potential chairs for meetings of the Basel, Rotterdam and Stockholm conventions

The BRS Secretariat has cooperated with the Secretariat of the Montreal Protocol in the organization of training of potential chairs and negotiators for meetings of various bodies. Representatives involved in the work of the Minamata Convention on Mercury, the Montreal Protocol on Substances that Deplete the Ozone Layer, the Intergovernmental Negotiating Committee to develop a legally binding instrument on plastic pollution, the Strategic Approach for International Chemicals Management (SAICM) and the Global Framework on Chemicals were provided an opportunity to participate in the 2023 and 2025 trainings for potential chairs of BRS meetings. In 2023, the conferences of the Parties to the BRS conventions welcomed the cooperation between the Secretariat of the Basel, Rotterdam and Stockholm conventions and the secretariats of other multilateral environmental agreements and processes in the chemicals and waste cluster, including the Minamata Convention on Mercury, the Montreal Protocol on Substances that Deplete the Ozone Layer, the intergovernmental negotiating committee to develop an international legally binding instrument on plastic pollution, including in the marine environment, and the Strategic Approach to International Chemicals Management, in the training of potential chairs and negotiators for meetings of various bodies, and requested the Secretariat, subject to the availability of resources, to continue implementing such training. These trainings have expanded the number and diversity of trained, confident and willing chairs for the various meetings in the chemicals and waste cluster.

3.5 Publications

The Secretariat of the Basel, Rotterdam and Stockholm conventions and the Ozone Secretariat collaborated on the development of the following reports:

Addressing Chemicals of Concern in Plastics through MEAs (2024)³⁰

The objective of this report is to assess how the current global regulatory framework addresses chemicals in plastics, and to explore how the plastics instrument could cooperate with existing multilateral environment agreements (MEAs) in areas of common concern. Additionally, the report also examines the scientific and technical mechanisms involved in listing chemicals under these MEAs.

Global Governance of Plastics and Associated Chemicals (2023)³¹

The main objective of the study is to map the global governance of plastics and associated chemicals, identify governance gaps, and identify complementarities with existing multilateral instruments in particular the Basel, Rotterdam and Stockholm (BRS) conventions, in the context of ongoing intergovernmental efforts to end plastic pollution. In addition, the study discusses the role of international sustainability criteria for plastics and associated chemicals.

³⁰ <https://www.basel.int/Portals/4/download.aspx?e=UNEP-FAO-CHW-RC-POPS-PUB-MEAsPlastics-2024.English.pdf>.

³¹ <https://www.basel.int/Portals/4/Basel%20Convention/docs/plastic%20waste/UNEP-FAO-CHW-RC-POPS-PUB-GlobalGovernancePlastics-2023.pdf>.



4.

**Interrelations between
the Basel, Rotterdam
and Stockholm
conventions and the
Montreal Protocol**

4.1 Interlinkages in the scope of the different MEAs

Although there are currently no hazardous chemicals in common between those listed in the Annexes of the Montreal Protocol, the Stockholm Convention and the Rotterdam Convention,³² there are operational interlinkages between these conventions and potential for cooperation. There are also operational interlinkages between the Montreal Protocol and the Basel Convention and opportunities for cooperation.

These interlinkages are explored in more details in the present study through the following topics:

- (a) Interlinkages between the Montreal Protocol and the Basel and Rotterdam conventions in relation to the control of methyl bromide;
- (b) Interlinkages between the Montreal Protocol and the Basel Convention in the control of halons; and between the Montreal Protocol and the Stockholm Convention in relation to the control of per- and PFAS and halons in the firefighting sector;
- (c) Interlinkages between the Montreal Protocol and the Stockholm Convention in relation to the control of carbon tetrachloride;
- (d) Interlinkages between the Montreal Protocol and the Basel and Stockholm conventions in relation to the environmentally sound management of equipment containing refrigerants, and the refrigerants themselves;
- (e) Illegal trade and traffic of hazardous chemicals and wastes under the Basel Convention and the Montreal Protocol;
- (f) Gender.

4.2 Interlinkages in the scope of the different MEAs

4.2.1 Methyl bromide and the Montreal Protocol

Methyl bromide has been commercially used as a fumigant since the 1930s. Known for its versatility, methyl bromide is widely applied to control soilborne pests, including nematodes, fungi, weeds, and insects in high-value crops. Additionally, it has been extensively employed for managing pests such as insects and rodents in structures, transportation, and stored commodities.

What makes methyl bromide particularly effective is its gaseous form, which allows it to penetrate effectively across a broad temperature range. Its quick action and ability to dissipate rapidly from treated environments result in minimal disruption to both crop production and commercial operations. This combination of features has made methyl bromide a widely adopted and essential fumigant across various industries.

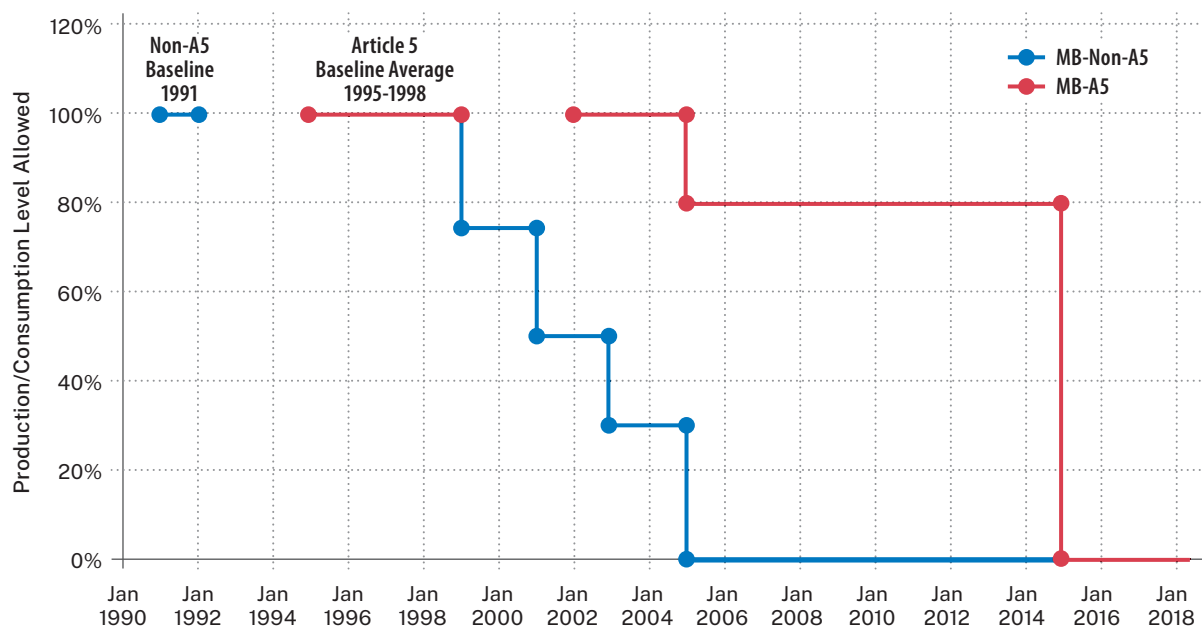


³² The Conference of the Parties to the **Rotterdam Convention** at its twelfth meeting in 2025 deferred further consideration on whether to list methyl bromide in its Annex III, which would subject the chemical to the **Prior Informed Consent (PIC) Procedure** under this Convention and could enhance trade transparency. This could support the efforts of the Montreal Protocol in identifying and addressing unreported uses of methyl bromide.

Methyl bromide was classified as a “controlled substance” under the Montreal Protocol in 1992 (Decision IV/1).³³ This decision arose from growing concerns not only about its **contribution to ozone depletion, but also its toxicity, safety risks, negative impacts on biodiversity, and potential for water pollution.**

The decision called for a comprehensive assessment of the potential for reducing methyl bromide use and phasing it out. The decision also underscored the importance of evaluating feasible alternatives and ensuring that their use would not lead to additional environmental or health issues.

Figure 5: Production/consumption reduction schedule of methyl bromide³⁴



The Protocol outlines four main categories of methyl bromide applications, each subject to different legal requirements. However, Parties to the Montreal Protocol need to report all uses of methyl bromide under the reporting framework of Article 7:

- Non-Quarantine and Pre-Shipment (QPS) fumigant uses - critical uses criteria in Decision IX/6;
- Laboratory and analytical (L&A) uses - global exemption (conditions set in Decision VI/9);
- QPS fumigant uses not included in the calculation of “production” and “consumption” (Articles 2H (methyl bromide) and 5 (special situation of developing countries));
- Methyl bromide as a feedstock for manufacturing other chemicals and not included in the calculation of “production” and “consumption” (Decision VII/3 (further adjustments and reductions: controlled substances listed in Annexes C and E to the Protocol)).

³³ https://ozone.unep.org/Meeting_Documents/mop/04mop/MOP_4.shtml.

³⁴ <https://ozone.unep.org/treaties/montreal-protocol/annex-e-group-i-methyl-bromide> (Accessed 23 March 2024).

Critical uses of methyl bromide: non-QPS fumigant uses and L&A uses

In 1995 and 1997, control schedules were established for two categories: non-QPS fumigant uses and L&A uses, as specified under [Articles 2H](#) and [5](#) of the Montreal Protocol. These control measures included allowances for [critical use exemptions \(CUE\)](#), where necessary.

Critical and emergency uses of methyl bromide may be permitted after its phaseout, provided they meet agreed [criteria](#). Among others, Parties nominating critical-use exemptions are requested to report data on stocks of methyl bromide using the accounting framework agreed on by the Sixteenth Meeting of the Parties to the Montreal Protocol; and in licensing, permitting or authorizing the production and consumption of methyl bromide for critical uses, take into account the extent to which methyl bromide is available in sufficient quantity and quality from existing stocks of banked or recycled methyl bromide ([Decision XXXV/15](#)).³⁵

For emergency uses, up to 20 metric tonnes may be allowed under [Decision IX/7](#). In such cases, Parties are encouraged to utilize existing methyl bromide stocks for critical uses, which must be reported to the Ozone Secretariat when a critical use nomination (CUN)³⁶ is submitted.

Phase-out of critical uses of methyl bromide is reported to be virtually complete. Parties report that more than 99.8 percent of the baseline consumption of 66,428 tonnes for such critical uses had been phased out by 1 January 2023.

This means that methyl bromide is currently used almost exclusively for QPS applications, with consumption remaining generally stable at 10,000 tonnes per year and concentrated in about 17 consuming countries.³⁷

Uses of methyl bromide not included in the calculation of “production” and “consumption” – QPS fumigant uses, and feedstock for manufacturing other chemicals.

QPS uses,³⁸ as well as methyl bromide used as a feedstock, are not included in the calculation of “production” and “consumption” of controlled substances but remain subject to reporting requirements under the Protocol. Article 2H specifically exempts methyl bromide used for QPS treatments, which are generally applied to commodities traded between countries or across quarantine regions within a country. QPS treatments with methyl bromide serve several purposes: eliminating quarantine pests³⁹ on perishable and durable commodities, rendering goods “practically free”⁴⁰ of noxious pests and other organisms prior to shipment, and controlling exotic⁴¹ organisms of quarantine significance in soils, structures, and commodities.

³⁵ Critical-use exemptions for methyl bromide for 2024.

³⁶ https://ozone.unep.org/treaties/montreal-protocol/meetings/sixteenth-meeting-parties/decisions/decision-xvi3-duration-critical-use-nominations-methyl-bromide?source=decisions_by_issue&args%5B0%5D=415&parent=3025&nextParent=3016.

³⁷ <https://ozone.unep.org/sites/default/files/2023-08/MOP-35-8E.pdf>.

³⁸ The definition of “quarantine” found in the Protocol follows closely the definition of quarantine used by the International Plant Protection Convention (IPPC). However, the concept of “pre-shipment” is specific to the Montreal Protocol.

³⁹ A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled [FAO, 1990; revised FAO, 1995; IPPC 1997]. https://www.ippc.int/largefiles/adopted_ISPMs_previousversions/en/ISPM_05_2007_En_2007-07-26.pdf.

⁴⁰ Of a consignment, field, or place of production, without pests (or a specific pest) in numbers or quantities in excess of those that can be expected to result from, and be consistent with good cultural and handling practices employed in the production and marketing of the commodity [FAO, 1990; revised FAO, 1995]; https://www.ippc.int/largefiles/adopted_ISPMs_previousversions/en/ISPM_05_2007_En_2007-07-26.pdf.

⁴¹ Not native to a particular country, ecosystem or eco area (applied to organisms intentionally or accidentally introduced as a result of human activities). As the Code is directed at the introduction of biological control agents from one country to another, the term “exotic” is used for organisms not native to a country [ISPM No. 3, 1996] https://www.ippc.int/largefiles/adopted_ISPMs_previousversions/en/ISPM_05_2007_En_2007-07-26.pdf.

These treatments are usually approved through extensive bilateral or regional negotiations, which can take years to finalize. Such a process ensures a high level of protection against the introduction of damaging pests. Replacing methyl bromide for quarantine treatments can be challenging, as it has long been a proven, cost-effective, and readily available solution.

The International Plant Protection Convention (IPPC) develops International Standards for Phytosanitary Measures (ISPMs),⁴² which are guidelines and recommendations recognized by the World Trade Organization. Some of these standards include procedures that can replace or avoid methyl bromide uses in quarantine (i.e. are suitable alternatives), whilst others seek to minimise methyl bromide use. The Protocol and the IPPC cooperate to ensure that their shared objectives are met and that the information on the existing alternatives for QPS purposes is shared among Parties.

Over the years many countries have published regulations that include non- methyl bromide treatments, and ongoing research is encouraging the adoption of alternative QPS treatments. Economically and technically **feasible alternatives** are available for QPS and could replace about 40 percent of current uses. **Recapture and/or recycling methyl bromide** could avoid about 70 percent of methyl bromide emissions arising from QPS use; however, this **technology is costly** and there is little incentive to adopt it.

Reduction in emissions for all remaining uses of methyl bromide for QPS, together with **identification and stopping any unreported uses**, are considered important factors for returning concentrations in the atmosphere to natural levels.

Owing to the relatively short lifetime of methyl bromide in the atmosphere (0.7 years), adoption of any suitable alternatives and in some cases adoption of recapture/destruction would have an immediate benefit in reducing its atmospheric concentration.⁴³

The Parties to the Montreal Protocol are required to report by September 30 of each year on the production, import, export, consumption, feedstock uses and destruction of all ODS, including methyl bromide produced or consumed for QPS purposes from the previous year.

Finally, Parties to the Montreal Protocol have periodically requested the Technology and Economic Assessment Panel (TEAP)⁴⁴ to assess destruction technologies. Based on these assessments, Parties have taken a number of decisions to approve destruction technologies for the purposes of Montreal Protocol requirements. The list of destruction technologies approved by Parties has been updated in a sequence of decisions, with the most recent list contained in the Annex to **Decision XXIII/12**. An **updated assessment** was released in 2022, which includes methyl bromide.⁴⁵

⁴² <https://www.ippc.int/en/core-activities/standards-setting/ispms/>.

⁴³ <https://ozone.unep.org/sites/default/files/2023-08/MOP-35-8E.pdf>.

⁴⁴ In 1990 the Technology and Economic Assessment Panel was established as the technology and economics advisory body to the Montreal Protocol Parties. The Technology and Economic Assessment Panel (TEAP) provides, at the request of Parties, technical information related to the alternative technologies that have been investigated and employed to make it possible to virtually eliminate use of Ozone Depleting Substances that harm the ozone layer (<https://ozone.unep.org/science/assessment/teap>). The Methyl Bromide Technical Options Committee (MBTOC) is one of the five Technical Options Committees of the Technology and Economic Assessment Panel. MBTOC assesses the use and phase-out of methyl bromide as fumigants in agriculture and in structures and commodities: for some of those applications there are no suitable alternatives. Quarantine and pre-shipment uses of methyl bromide are exempted from control measures but the Committee monitors those uses (<https://ozone.unep.org/taxonomy/term/538>).

⁴⁵ The list of approved destruction technologies pursuant to decision XXXV/5 is available on the Ozone Secretariat website: <https://ozone.unep.org/node/1941>.

Figure 6: Methyl bromide in the scope of the Basel Convention



4.2.2 Methyl bromide and the Basel Convention

The international trade of methyl bromide for use as a product for critical and emergency uses under the Montreal Protocol, or for uses not controlled by the Montreal Protocol, e.g. for QPS fumigant uses or as a feedstock for manufacturing other chemicals, falls outside the scope of the Basel Convention.

Methyl bromide waste is usually considered to be, or defined as, hazardous waste by Parties for the purpose of the Basel Convention when subject to transboundary movement. It can be classified in entry Y4 in [Annex I](#) (categories of wastes to be controlled) “Wastes from the production, formulation and use of biocides and phytopharmaceuticals; and may possess at least one [Annex III](#) characteristic e.g. H6.1 (Poisonous (acute)) or H12 (Ecotoxic).

The general obligations described in [Articles 4 and 4A](#) of the Basel Convention apply to it.

4.2.3 Methyl bromide and the Rotterdam Convention

The Chemical Review Committee reviewed the information provided in the notifications of final regulatory action submitted by Parties to the Convention and, in accordance with the criteria set out in [Annex II](#), recommended to the Conference of the Parties that the chemical be listed in [Annex III](#)⁴⁶ and made subject to the Prior Informed Consent procedure under the Convention.

A draft Decision Guidance Document for methyl bromide was prepared by the Chemical Review Committee and, together with the recommendation to list methyl bromide in [Annex III](#) to the Convention as a pesticide, has been forwarded for consideration by the Conference of the Parties at its twelfth meeting in May 2025.⁴⁷

Some Parties to the Montreal Protocol and the Rotterdam Convention have raised concerns about unreported uses of methyl bromide, which may partly explain its current concentrations in the atmosphere. Including methyl bromide in [Annex III](#) to the Rotterdam Convention could provide a valuable opportunity to gather additional information on its international trade. This, in turn, may support efforts to identify and enhance control over these unreported uses.

The Conference of the Parties to the **Rotterdam Convention** at its twelfth meeting in 2025 deferred further consideration on whether to list methyl bromide in its [Annex III](#), which would subject the chemical to the **Prior Informed Consent (PIC) Procedure** under this Convention.

4.2.4 Opportunities for cooperation

Listing of methyl bromide in [Annex III](#) of the Rotterdam Convention could provide additional information on international trade in the chemical, helping to strengthen its control under the Montreal Protocol.

⁴⁶ Decisions CRC-18/3 and CRC-19/1.

⁴⁷ <https://www.pic.int/TheConvention/Chemicals/Recommendedforlisting/Terbufos/tabid/9470/language/en-US/Default.aspx>.

The Conference of the Parties to the Basel Convention has not yet developed guidelines for the environmentally sound management of methyl bromide. In the absence of these technical guidelines, Parties may refer to the list of destruction technologies adopted by Parties to the Montreal Protocol, as outlined in the TEAP recommendations under the Montreal Protocol regarding alternatives to methyl bromide and emission reduction technologies.

4.3 Interlinkages between the Montreal Protocol and the Basel Convention in the control of halons and between the Montreal Protocol and the Stockholm Convention in relation to the control of per- and polyfluoroalkyl substances (PFAS) and halons in the firefighting sector

4.3.1 Halons and the Montreal Protocol

Halons are powerful ozone-depleting chemicals containing bromine, controlled under the Montreal Protocol, which has measures for their phase-out, restrictions on production and consumption, and protocols for their safe management ([Article 2B](#)). Halons have been widely used in fire suppression, particularly in occupied spaces and critical operations.



While most land-based and commercial maritime applications have transitioned to alternatives,⁴⁸ halons remain in use in aviation, military applications, nuclear power stations, and the petrochemical industry. Aviation, the second-largest user after the military, is experiencing growing demand for halons.

- (a) **Halon 1211:** Used in handheld fire extinguishers for aviation cabins;
- (b) **Halon 1301:** Used in in-built lavatory trash receptacle extinguishers (lavex), engine nacelles, auxiliary power units, and cargo compartments on aircraft.

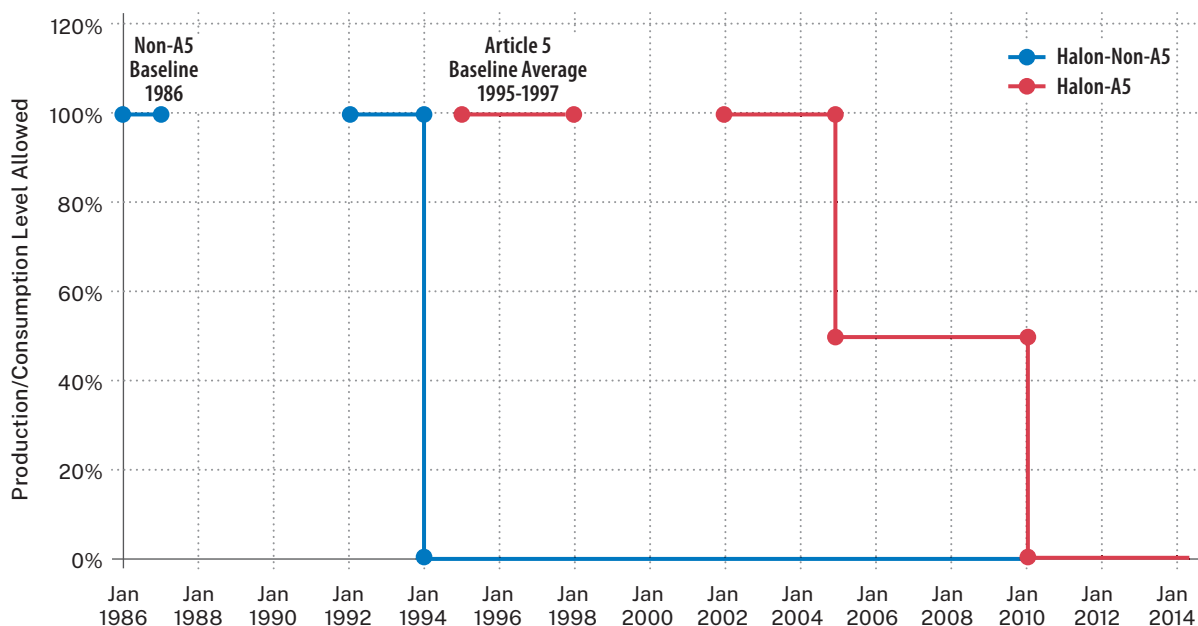
Recycled halons, recovered from decommissioned systems like shipping and computer rooms, supply ongoing needs, particularly in aviation.

Montreal Protocol Measures

The Montreal Protocol phased out halon production, import and export for non-Article 5 Parties in 1994 and in [Article 5](#) Parties in 2010 ([Figure 7](#)). **These control measures apply to newly manufactured halons, not to recycled halons. Recycling remains the sole source of halons for fire protection applications where alternatives are still under development or legacy systems are in transition, as in aviation.**

⁴⁸ https://ozone.unep.org/sites/default/files/assessment_panels/HTOC_technical_note1_2018.pdf.

Figure 7: Production/consumption reduction schedule for halons⁴⁹



Essential use exemptions for halon production are granted only in exceptional circumstances and are decided on eligibility against strict criteria. **Halons 1211 and 1301 have not qualified for production exemptions because recovered and recycled halons have been available in sufficient quantity and quality for continued use in aviation.**

Search for alternatives

Efforts to replace halons in aviation began over 25 years ago, but face significant challenges including stringent safety requirements, certification and commercialization. Following extensive research and development, replacements are available for halon 1211 for cabin handheld extinguishers and for halon 1301 for in-built lavatory trash receptacle extinguishers on aircraft. Non-halon fire protection agents are being installed in new and retrofitted aircraft. However, **acceptable substitutes for larger fire protection systems (e.g., engine nacelles/APUs, cargo compartments) remain unavailable.**

Potential alternative agents are in the early stages of qualification. However, there is no guarantee of success.

Besides, **alternatives to halons in aviation include high global warming potential HFCs like HFC-227ea and HFC-236fa, which are used in some applications but are subject to phase-down under the Kigali Amendment.**

Table 2: Major on-board commercial aircraft applications and availability of non-halon alternatives

Major on-board commercial aircraft applications	Non-halon alternatives
Lavatory waste compartment extinguishers	Available
Hand-held extinguishers	Available
Engine nacelles/auxiliary power units (APUs)	Not available
Cargo compartments	Not available

⁴⁹ <https://ozone.unep.org/treaties/montreal-protocol/annex-group-ii-halons-halon-1211-halon-1301-and-halon-2402>.

Global Halon Management Challenges

Recycled halons, the sole supply source, are diminishing. Reserves face:

- (a) **International Trade Barriers:** Recovered halons encounter shipping restrictions due to their classification as hazardous waste under the Basel Convention by some Parties;
- (b) **Contamination Issues:** Recycling contaminated halons requires costly purification, with strict international standards (ISO 7201 for Halon 1211 and ASTM D 5632 Type 2 for Halon 1301). Best practice management by airlines and their contractors is needed to avoid halon contamination during servicing of fire protection equipment;⁵⁰
- (c) **PFAS Regulation Impact:** Many halon alternatives, including approved substitutes, are considered threatened by proposed PFAS regulations. For instance, the European Chemical Agency (ECHA) member states preparing the proposal for the PFAS regulation have indicated an intent to **define PFAS broadly as any molecule with a fully fluorinated methyl (-CF₃) or methylene (-CF₂) groups. This definition would encompass halon replacements already in use or development.**⁵¹

Restrictions also target PFAS-based firefighting foams, essential for airport firefighting, creating further strain on firefighting product availability.⁵²

4.3.2 Halons and the Basel Convention

The control procedure detailed in [Article 6](#) of the Basel Convention would apply to the TBM of wastes under the scope of the Convention. To determine how this would apply to the TBM of halons, a number of questions are relevant.

1) Is it waste?

This is the first question to be answered when considering halons from the angle of the Basel Convention. **The international trade of recovered or recycled ODS, which includes halons, does not fall under the scope of the Basel Convention if the recovered or recycled ODS is not considered as waste under the scope of the Convention.**

The international trade of halons destined for operations which may lead to resource recovery, recycling reclamation, direct re-use or alternative uses can be subject to the controls under the Basel Convention, including its PIC procedure, **if the halon is considered or defined as hazardous wastes by at least one of the Parties involved.**

“Article 6: Transboundary Movement between Parties

1. The State of export shall notify, or shall require the generator or exporter to notify, in writing, through the channel of the competent authority of the State of export, the competent authority of the States concerned of any proposed transboundary movement of hazardous wastes or other wastes. Such notification shall contain the declarations and information specified in Annex V A, written in a language acceptable to the State of import. Only one notification needs to be sent to each State concerned.

⁵⁰ https://www.icao.int/Meetings/a41/Documents/WP/wp_096_en.pdf.

⁵¹ PFAS in the scope of this restriction intention have the following structural formula: X-(CF₂)_n-X' with n equal to or larger than 1 and X, X' not being H (thus including X-CF₃), meaning fluorinated substances that contain at least one aliphatic carbon atom that is both, saturated and fully fluorinated, i.e. any chemical with at least one perfluorinated methyl group (-CF₃) or at least one perfluorinated methylene group (-CF₂-), including branched fluoroalkyl groups and substances containing ether linkages, fluoropolymers and side chain fluorinated polymers.

⁵² https://www.icao.int/Meetings/a41/Documents/WP/wp_096_en.pdf.

According to the Basel Convention, [Article 2 paragraph 1](#), “Wastes” are substances or objects *which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law*”. According to [Article 2 paragraph 4](#) “Disposal” means any operation specified in Annex IV to this Convention”.

Annex IV sets out disposal operations which:

- (A) do not lead to the possibility of resource recovery, recycling, reclamation, direct re-use or alternative uses; and
- (B) may lead to resource recovery, recycling reclamation, direct re-use or alternative uses.

2) Are countries involved Parties to the Basel Convention?

This is the second question, as it has implications on whether the TBM is allowed or not. According to [Article 4 paragraph 5](#), “A Party shall not permit hazardous wastes or other wastes to be exported to a non-Party or to be imported from a non-Party.”

If one of the countries is not a Party, then a bilateral, multilateral or regional agreement must be in place, according to [Article 11](#) (bilateral, multilateral and regional agreements) of the Basel Convention.

According to Article 11:

- “1. Notwithstanding the provisions of Article 4 paragraph 5, Parties may enter into bilateral, multilateral, or regional agreements or arrangements regarding transboundary movement of hazardous wastes or other wastes with Parties or non-Parties provided that such agreements or arrangements do not derogate from the environmentally sound management of hazardous wastes and other wastes as required by this Convention. These agreements or arrangements shall stipulate provisions which are not less environmentally sound than those provided for by this Convention in particular taking into account the interests of developing countries.
2. Parties shall notify the Secretariat of any bilateral, multilateral or regional agreements or arrangements referred to in paragraph 1 and those which they have entered into prior to the entry into force of this Convention for them, for the purpose of controlling transboundary movements of hazardous wastes and other wastes which take place entirely among the Parties to such agreements. The provisions of this Convention shall not affect transboundary movements which take place pursuant to such agreements provided that such agreements are compatible with the environmentally sound management of hazardous wastes and other wastes as required by this Convention.”

If the transboundary movement is from a Party through States which are not Parties, then the Convention provides that:

“Paragraph 1 of Article 6 of the Convention shall apply mutatis mutandis to transboundary movement of hazardous wastes or other wastes from a Party through a State or States which are not Parties” (Article 7).

“The State of export shall notify, or shall require the generator or exporter to notify, in writing, through the channel of the competent authority of the State of export, the competent authority of the States concerned of any proposed transboundary movement of hazardous wastes or other wastes. Such notification shall contain the declarations and information specified in Annex V A, written in a language acceptable to the State of import. Only one notification needs to be sent to each State concerned.” (Article 6 paragraph 1).

3) How do Parties involved in the transboundary movement of halons classify them?

This is the third question. If both Parties concur on the classification of the halons, then the prior informed consent procedure detailed in Article 6 would apply, subject to the Ban Amendment (see in question 4).

It may however happen that the States concerned have a different classification of a specific waste that is the object of a TBM, with one considering that the waste in question is not “hazardous” while another considers that it is. In relation to halons, although halons could be considered in the entry Y45, Annex I (categories of wastes to be controlled) “Organohalogen compounds other than substances referred to in this Annex (e.g. Y39, Y41, Y42, Y43, Y44)”, countries may differ in relation to how they classify or define these halons, noting that classification of wastes under the Basel Convention is the prerogative of Parties.

If the halon is considered as non-hazardous waste by the Parties to the Basel Convention involved in the transboundary movement, then

the transboundary movement may be determined as not falling under the scope of the Basel Convention.

If the halon is considered or defined as hazardous waste by only one Party to the Basel Convention involved in the transboundary movement, then the following provision of the Basel Convention applies:

“In the case of a transboundary movement of wastes where the wastes are legally defined as or considered to be hazardous wastes only:

- (a) By the State of export, the requirements of paragraph 9 of this Article that apply to the importer or disposer and the State of import shall apply mutatis mutandis to the exporter and State of export, respectively;
- (b) By the State of import, or by the States of import and transit which are Parties, the requirements of paragraphs 1, 3, 4 and 6 of this Article that apply to the exporter and State of export shall apply mutatis mutandis to the importer or disposer and State of import, respectively; or
- (c) By any State of transit which is a Party, the provisions of paragraph 4 shall apply to such State.” (Article 6 paragraph 5).

In addition, the following provisions of the Convention would apply:

“The Parties shall require that each person who takes charge of a transboundary movement of hazardous wastes or other wastes sign the movement document either upon delivery or receipt of the wastes in question. They shall also require that the **disposer** inform both the exporter and the competent authority of the State of export of receipt by the **disposer** of the wastes in question and, in due course, of the completion of disposal as specified in the notification. If no such information is received within the State of export, the competent authority of the State of export or the exporter shall so notify the **State of import.**” (Article 6, paragraph 9).

“The State of export shall notify, or shall require the generator or exporter to notify, in writing, through the channel of the competent authority of the State of export, the competent authority of the States concerned of any proposed transboundary movement of hazardous wastes or other wastes. Such notification shall contain the declarations and information specified in Annex V A, written in a language acceptable to the State of import. Only one notification needs to be sent to each State concerned.” (Article 6, paragraph 1).

“The State of export shall not allow the generator or exporter to commence the transboundary movement until it has received written confirmation that:

(a) The notifier has received the written consent of the State of import; and

(b) The notifier has received from the State of import confirmation of the existence of a contract between the exporter and the disposer specifying environmentally sound management of the wastes in question.” (Article 6, paragraph 3).

“Each State of transit which is a Party shall promptly acknowledge to the notifier receipt of the notification. It may subsequently respond to the notifier in writing, within 60 days, consenting to the movement with or without conditions, denying permission for the movement, or requesting additional information. The State of export shall not allow the transboundary movement to commence until it has received the written consent of the State of transit. However, if at any time a Party decides not to require prior written consent, either generally or under specific conditions, for transit transboundary movements of hazardous wastes or other wastes, or modifies its requirements in this respect, it shall forthwith inform the other Parties of its decision pursuant to Article 13. In this latter case, if no response is received by the State of export within 60 days of the receipt of a given notification by the State of transit, the State of export may allow the export to proceed through the State of transit.” (Article 6, paragraph 4).

“The State of export may, subject to the written consent of the States concerned, allow the generator or the exporter to use a general notification where hazardous wastes or other wastes having the same physical and chemical characteristics are shipped regularly to the same disposer via the same customs office of exit of the State of export via the same customs office of entry of the State of import, and, in the case of transit, via the same customs office of entry and exit of the State or States of transit.” (Article 6, paragraph 6).

4) Does the Ban Amendment apply to the TBM?

This is the fourth question that may affect the obligations in dealing with the TBM. As of 5 February 2025, 104 Parties to the Basel Convention are bound by the Ban Amendment.

The Ban Amendment would only apply to movements from Parties listed in Annex VII to States not listed in Annex VII. It would not apply to South-South TBM of halons, for example. It is also important to check if the State of export is a Party that has agreed to be bound by the Ban Amendment. If so, then a TBM from an Annex VII Party to a non-Annex VII Party of hazardous wastes under the scope of the Convention would be prohibited under Article 4A (general obligations). If the State of Export is an Annex VII Party but has not agreed to be bound by the Ban Amendment, it would not have obligations under the Amendment, although other provisions may apply. For example, Parties may exercise their right to prohibit the import of hazardous or other wastes for disposal and notify the other Parties of their decision, which leads to an obligation on Parties to prohibit or not permit the export to Parties which have prohibited the import of such wastes when notified (Article 4, paragraphs 1 and 2).

ARTICLE 4A of the Basel Convention

“General Obligations⁵³

1. Each Party listed in Annex VII shall prohibit all transboundary movements of hazardous wastes which are destined for operations according to Annex IV A to States not listed in Annex VII.
2. Each Party listed in Annex VII shall phase out by 31 December 1997, and prohibit as of that date, all transboundary movements of hazardous wastes under Article 1(1)(a) of the Convention which are destined for operations according to Annex IV B to States not listed in Annex VII. Such transboundary movement shall not be prohibited unless the wastes in question are characterized as hazardous under the Convention.”

ANNEX VII⁵⁴

“Parties and other States which are members of OECD, EC, Liechtenstein”.

4.3.3 PFAS and the Stockholm Convention

Per- and polyfluoroalkyl substances (PFAS) are chemicals that have partially or completely fluorinated carbon chains of varied lengths. These substances are used in almost all industry branches and many consumer products.⁵⁵ The most-studied PFASs are perfluorooctane sulfonic acid (PFOS), perfluorooctanoic acid (PFOA), and perfluorohexane sulfonic acid (PFHxS).

In 2009, the Conference of the Parties listed PFOS, its salts and perfluorooctane sulfonyl fluoride (PFOSF) in Annex B to the Stockholm Convention ([Decision SC-4/17](#)). In 2019, following the evaluation of the continued need for PFOS, its salts and PFOSF, the Conference of the Parties amended Annex B to remove several of the specific exemptions and acceptable purposes for PFOS, its salts and PFOSF ([Decision SC-9/4](#)).

In 2019, the Conference of the Parties listed PFOA, its salts and PFOA-related compounds in Annex A to the Stockholm Convention ([Decision SC-9/12](#)). The Secretariat, in consultation with the POPs Review Committee, developed an indicative list of substances covered by listing of PFOA, its salts and PFOA-related compounds. The list is updated periodically.

In 2022, the Conference of the Parties listed PFHxS, its salts and PFHxS-related compounds in Annex A to the Stockholm Convention ([Decision SC-10/13](#)). The Secretariat, in consultation with the POPs Review Committee, is preparing an indicative list of substances covered by listing of PFHxS, its salts and PFHxS-related compounds, also to be updated periodically.

The POPs Review Committee has recommended listing other PFASs to the Convention.

⁵³ The Conference of the Parties adopted Decision III/1 at its third meeting to amend the Convention by adding, inter alia, a new Article 4A. This amendment entered into force on 5 December 2019 (depository notification C.N.420.2019). For information on the status of individual Parties in relation to the amendment/s, please see the Status of Ratifications page on the Basel Convention website.

⁵⁴ The amendment whereby Annex VII was added to the Convention entered into force on 5 December 2019, in accordance with Article 17 (5) of the Convention (depository notification C.N.420.2019), reflecting decision III/1 adopted by the Conference of the Parties at its third meeting.

⁵⁵ Glüge J, Scheringer M, Cousins IT, DeWitt JC, Goldenman G, Herzke D, Lohmann R, Ng CA, Trier X, Wang Z. An overview of the uses of per- and polyfluoroalkyl substances (PFAS). *Environ Sci Process Impacts*. 2020 Dec 1;22(12):2345-2373. doi: 10.1039/d0em00291g. Epub 2020 Oct 30. PMID: 33125022; PMCID: PMC7784712.

As of today, potential replacements for halons include:

- (a) Iodotrifluoromethane, CF₃I. CF₃I is chemically very close to Halon 1301, CF₃Br, and has been considered a potential replacement for many years;
- (b) 2-bromotrifluoropropene (CF₃CBr=CH₂), or 2-BTP - already in use as a Halon 1211 replacement in handheld fire extinguishers;
- (c) HFC-227ea (CF₃CHF₂CF₃) and HFC-236fa (CF₃CH₂CF₃) have both been used as replacements for Halon 1301 in lavatory waste compartment fire protection.⁵⁶

None of the above are POPs PFASs listed in the Stockholm Convention.

4.3.4 Opportunities for cooperation

Opportunities for cooperation are as follows:

- (a) Joint capacity building activities with Parties to the Basel Convention and the Montreal Protocol to ensure the obligations under each agreement and relevant national legislation are well understood. This may involve building capacity to implement the PIC procedure under the Basel Convention, and support in establishing bilateral agreements with non-Parties to the Basel Convention in accordance with [Article 11](#);
- (b) Strengthening of information exchange on national legislation, in particular whether Parties to the Basel Convention have national definitions of ODS, particularly halons, hazardous wastes. Additionally, the Parties to the Basel Convention may continue exploring ODS in the context of the ongoing work on the review of [Annexes I and III](#) to the Convention;
- (c) Cooperation between the Stockholm Convention and the Montreal Protocol on sharing scientific knowledge, research findings, and technology transfer related to the management of halons and PFAS. This can support the identification of best practices, alternative substances, and effective regulatory measures;

- (d) Cooperation between the Stockholm Convention and the Montreal Protocol on providing technical assistance and capacity-building programs for countries in managing halons and PFAS in the firefighting sector. This includes training on recovery, recycling, and safe handling practices to minimize environmental impacts.

4.4 Interlinkages between the Montreal Protocol and the BRS conventions in relation to the control of carbon tetrachloride

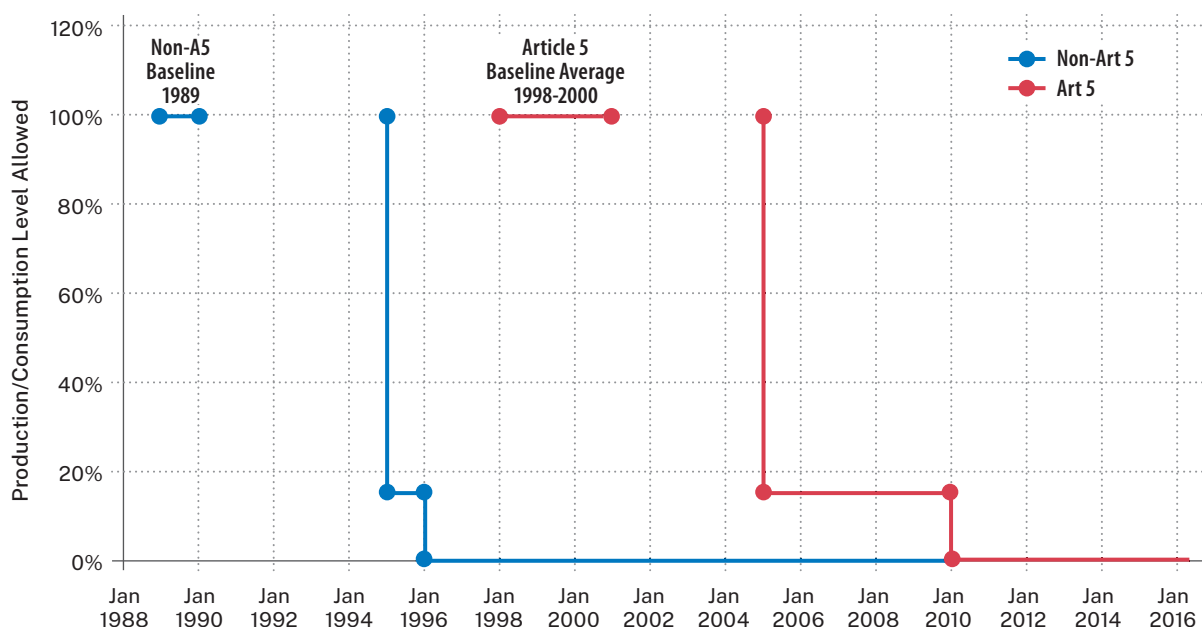
4.4.1 Carbon tetrachloride and the Montreal Protocol

Carbon tetrachloride is a synthetic compound that was historically used as a solvent, in the production of other chemicals (like chlorofluorocarbons or CFCs), as a cleaning agent, and in fire extinguishers. When carbon tetrachloride is released into the atmosphere, it breaks down and releases chlorine atoms that can deplete ozone molecules, contributing to the thinning of the ozone layer. It was listed as an ozone-depleting substance under the Montreal Protocol through the [London Amendment of 1990](#), which added Annex B to the Protocol, requiring the gradual reduction and eventual phase out of the production and consumption of, among other substances, carbon tetrachloride, in line with the control measures outlined in the Protocol.

The Protocol specified that developed countries needed to reduce their production and consumption of carbon tetrachloride by 85% by 1995 relative to 1989 levels and for developing countries by 85% by 2005 (**Figure 8**). Later adjustments called for complete phase-out by 2010.

⁵⁶ https://www.icao.int/Meetings/a41/Documents/WP/wp_096_en.pdf.

Figure 8: Production/consumption reduction schedule for carbon tetrachloride⁵⁷



There have been provisions allowing for “acceptable uses” under strict controls for certain essential applications where no feasible alternatives exist. These provisions are aimed at ensuring that essential needs are met while protecting the ozone layer, such as:

- (a) Laboratory and Analytical Applications: Carbon tetrachloride can still be used in laboratory settings for specific analytical purposes where its use is necessary, and no viable substitute is available. These uses must be well-documented and approved by the relevant regulatory authorities;
- (b) Production of Other Chemicals: In some cases, carbon tetrachloride is used as an intermediate in the production of other chemicals. However, this use has been restricted, and approvals are only granted for cases where no alternative process or material is suitable.

Although only a few essential uses of carbon tetrachloride are still allowed under the Montreal Protocol, increasing market demand of hydrofluoroolefins (HFOs)⁵⁸ is driving a more recent increase in carbon tetrachloride feedstock use.⁵⁹ The demand for the major carbon tetrachloride-based products HFO-1234yf, HFO-1234ze, and HCFO-1233zd has been predictably increasing due to the Kigali-driven phase-down of HFCs in non-Article 5 Parties and in regions where they are regulated.⁶⁰

In addition, 7.5 ktonnes (5–10 ktonnes) are estimated from anthropogenic legacy carbon tetrachloride emissions (historic landfill, industrial sites, and contaminated soil). The Medical and Chemical Technical Options Committee (MCTOC) is unaware of alternatives to carbon tetrachloride or alternative processes that would not disturb the vital isomer distribution of the major HFOs and HCFOs.

⁵⁷ <https://ozone.unep.org/treaties/montreal-protocol/annex-b-group-ii-carbon-tetrachloride>.

⁵⁸ HFOs are new-generation refrigerants developed to replace older refrigerants (like HCFCs and HFCs) with high global warming potential (GWP) and ozone depletion potential (ODP).

⁵⁹ <https://ozone.unep.org/system/files/documents/TEAP-May2024-Progress-Report.pdf>.

⁶⁰ <https://ozone.unep.org/system/files/documents/TEAP-May2024-Progress-Report.pdf>.

4.4.2 The interlinkages with the BRS conventions

The relationship with the Basel Convention is consistent with the details provided for halons in section 4.3.2 of this report.

Regarding the Stockholm Convention, the production of carbon tetrachloride involves processes such as chlorination, oxychlorination, and pyrolysis, which generate by-products, including chemicals listed in Annex C of the Stockholm Convention such as hexachlorobutadiene (HCBd). These by-products can be separated from the final product through distillation and collected in a fraction known as “heavy ends”. Historically, heavy ends were often disposed of in landfills. However, since the 1970s, hazardous waste incineration—specifically, thermal destruction with the recovery and reuse of HCl—has become the predominant method of treatment.

In accordance with [Article 6, paragraph 1\(a\)\(ii\)](#) of the Stockholm Convention, Parties are required to develop appropriate strategies for identifying products and articles in use and wastes consisting of, containing or contaminated with a chemical listed in [Annex A, B or C](#).

In accordance with [Article 5](#) of the Stockholm Convention, for the minor existing sources of releases of unintentional persistent organic pollutants, such as HCBd, Parties need to promote the implementation of BAT and BEP if it's a priority source category in the country.

4.4.3 Opportunities for cooperation

1. Opportunities for cooperation are as follows:
 - (a) The efforts by the Montreal Protocol to phase out carbon tetrachloride may contribute to the reduction of releases of HCBd;
 - (b) Cooperation in the identification and management of contaminated sites between the Montreal Protocol and Stockholm Convention can be useful to identify sites, such as landfills,

contaminated with HCBd unintentionally produced during the production of carbon tetrachloride. Collaboration can thus facilitate the exchange of data on carbon tetrachloride and HCBd. This can help both conventions develop comprehensive risk assessments and mitigation strategies.

4.5 Interlinkages between the Montreal Protocol and the Basel and Stockholm conventions in relation to the environmentally sound management of equipment containing refrigerants, and the refrigerants themselves

4.5.1 Refrigerants and the Montreal Protocol

ODS used as refrigerants are primarily **chlorofluorocarbons (CFCs)** and **hydrochlorofluorocarbons (HCFCs)**, with **halon-1211 (bromochlorodifluoromethane)** also having limited applications in refrigeration.

The **production and consumption** of CFCs in **Annex A- Group I** (CFC-11, CFC-12, CFC-113, CFC-114 and CFC-115) and **Annex B – Group I** (CFC-13, CFC-111, CFC-112, CFC-211, CFC-212, CFC-213, CFC-214, CFC-215, CFC-216, CFC-217) were completely phased out in 2010 (**Figure 9 and 10**). Similarly, the production and consumption of halons 1211, 1301, and 2402 were phased out with only a few exemptions, as shown in **Figure 7**.

Figure 9: Production/consumption reduction schedule for CFCs, Annex A/I⁶¹

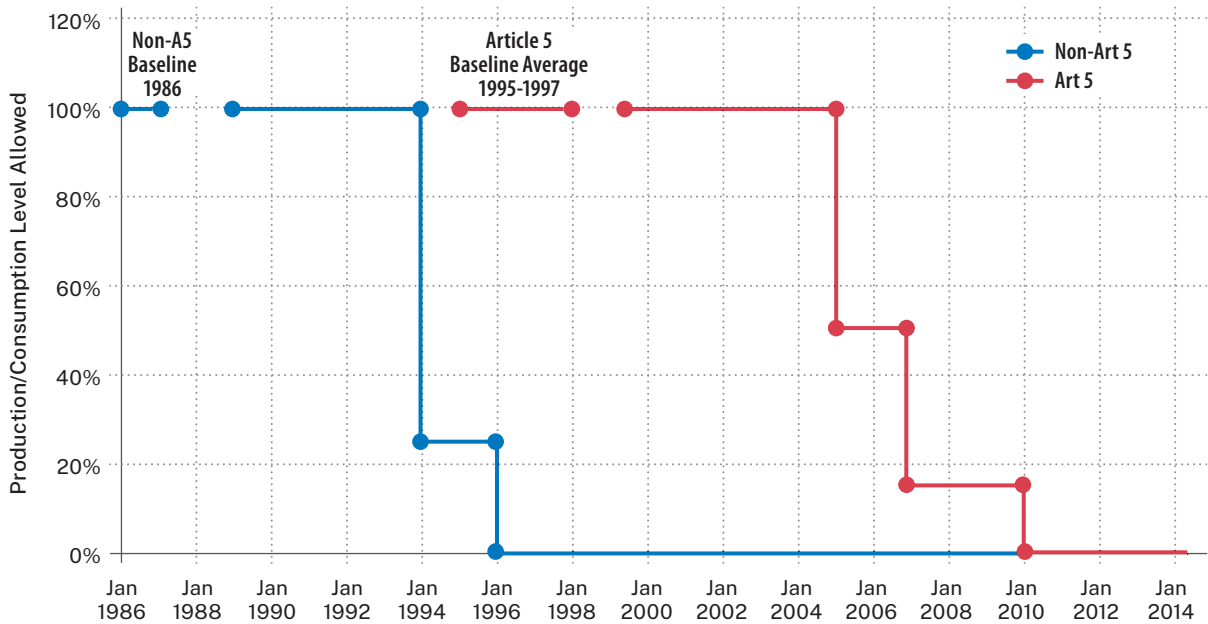
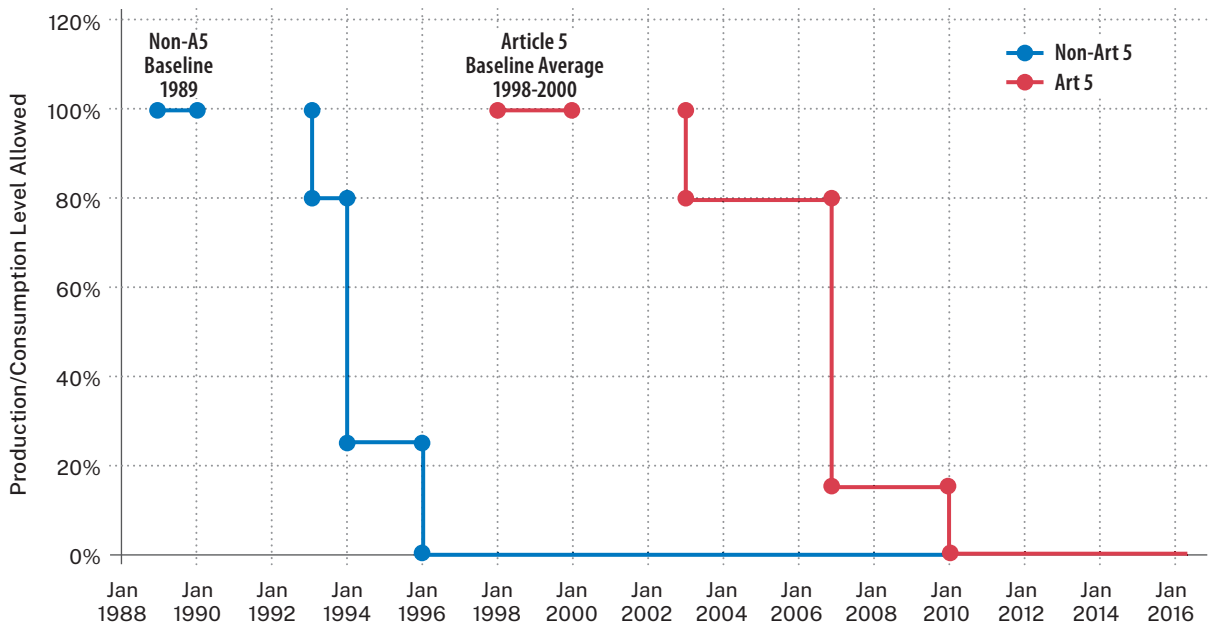


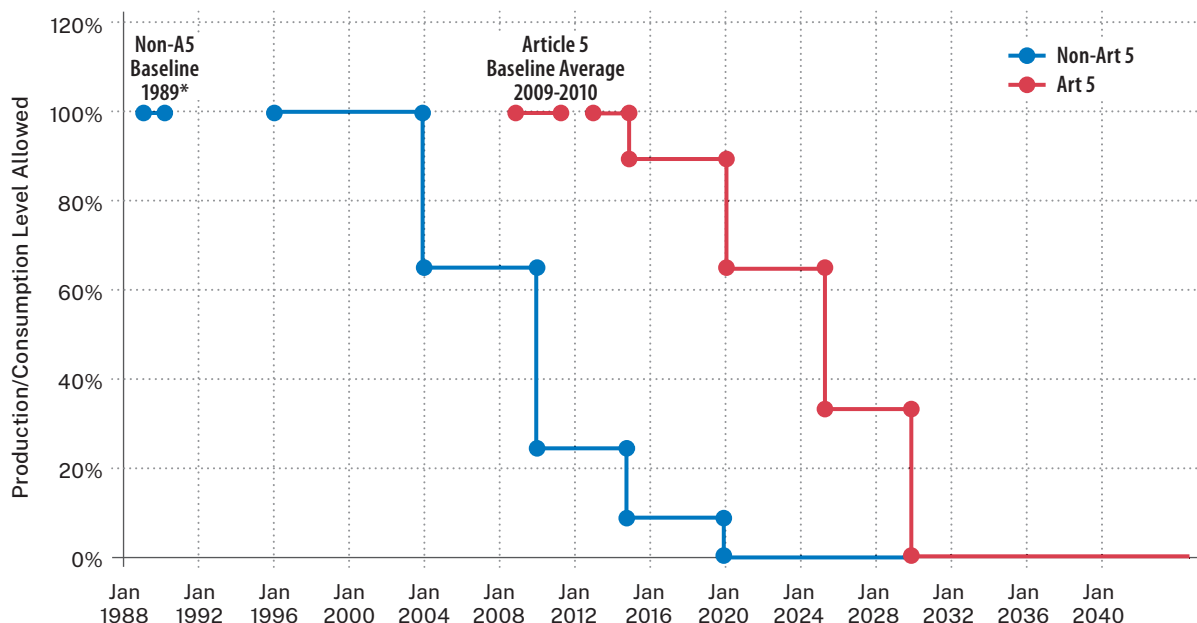
Figure 10: Production/consumption reduction schedule for CFCs, Annex B/I⁶²



⁶¹ <https://ozone.unep.org/treaties/montreal-protocol/annex-group-i-chlorofluorocarbons-cfc-11-cfc-12-cfc-113-cfc-114-and-cfc-115>

⁶² <https://ozone.unep.org/treaties/montreal-protocol/annex-b-group-i-other-fully-halogenated-cfcs-cfc-13-cfc-111-cfc-112-cfc-113>

Figure 11: Production/consumption reduction schedule for HCFCs⁶³



* Baseline calculated as 1989 HCFC consumption + 2.8 per cent of 1989 CFC consumption.

For **hydrochlorofluorocarbons (HCFCs)**, listed under **Annex C – Group I**, complete phase out of production and consumption is targeted for 2040 (Figure 11).^{64,65,66}

The direct consequence of these phase-outs is the replacement of existing equipment with new models that do not rely on the phased-out substances, resulting in an increased generation of e-waste.

During servicing and at end of the equipment’s life cycle, the TEAP encourages Parties to manage equipment containing refrigerants to prevent ODS leakage. Recovery of refrigerants is recognized as essential for reducing both

ODS and GHG emission reductions from RACHP (Refrigeration, Air conditioning, and Heat pump) equipment. Recovered refrigerants can be reused through either **(a) recycling** or **(b) reclamation**:

- (a) Recycling involves basic cleaning to remove impurities;
- (b) Reclamation entails processing to achieve a specified purity standard.

Under the Montreal Protocol reused refrigerants do not count toward consumption targets, making reuse a strategic tool for achieving compliance.

⁶³ <https://ozone.unep.org/treaties/montreal-protocol/annex-c-group-i-hcfc-consumption>.

⁶⁴ For consumption: for Article 5 Parties allowance of 2.5 per cent of base level consumption when averaged over ten years 2030-40 until January 1, 2040 for servicing of refrigeration and air conditioning equipment existing on 1 January 2030; for non-Article 5 Parties, Allowance of 0.5 per cent of base level consumption until January 1, 2030 for servicing of refrigeration and air-conditioning equipment existing on 1 January 2020.

⁶⁵ For production: for Article 5 Parties, January 1, 2030, and thereafter –allowance of 2.5 per cent of baseline production when averaged over ten years 2030–2040 until January 1, 2040 for the uses defined in Article 5 paragraph 8 ter (e) (ii) and –possible essential use exemptions; for Article 5 Parties January 1, 2020, and thereafter –allowance of 0.5 per cent of baseline production until January 1, 2030 for the uses defined in Article 2F paragraph 6(b) and –possible essential use exemptions.

⁶⁶ Allowance of 0.5 per cent of base level consumption until January 1, 2030 for servicing of refrigeration and air-conditioning equipment existing on 1 January 2020.

Challenges to Recovery, Reuse, and Destruction:

There are many challenges to refrigerant recovery, reuse and destruction. One of the challenges is that many Article 5 Parties **lack infrastructure** for reclamation and destruction of ODS refrigerants, necessitating the export of refrigerants to countries with appropriate facilities for reclamation, separation or testing.⁶⁷

The TEAP also highlights that **barriers to transboundary movement** of refrigerants are a major challenge for smaller Article 5 Parties. These barriers arise from:

- (a) Limited national capability for destruction;
- (b) High transaction costs and administrative burden, for relatively small quantities of end-of-life refrigerants, which are attributed to the Basel Convention's prior informed consent process, that requires sequential approvals from multiple jurisdictions.⁶⁸
- (c) For instance, Pacific Island Parties, lacking destruction capacity, would face significant obstacles in exporting recovered refrigerants for reclamation or destruction under Basel Convention regulations. Fiji, for example, has a cement kiln but has not undergone a proper assessment to destroy fluorocarbons at TEAP-required levels. Neighbouring Parties such as New Zealand and Australia, which possess argon plasma arc destruction technology, could potentially assist in managing EOL ODS/HFCs from neighbouring small island states.

Refrigerants, climate change and the carbon market

Refrigerants play a significant role in modern cooling technologies, such as air conditioning, refrigeration, and heat pumps, but they also contribute to global warming. Many traditional refrigerants, such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), have been phased out due to their high ozone-depleting potential. However, their replacements, hydrofluorocarbons (HFCs), though ozone-friendly, are potent greenhouse

gases with high global warming potential (GWP). When released into the atmosphere, these substances can trap heat far more effectively than carbon dioxide, contributing significantly to climate change. As a result, there is a global push to transition to alternative refrigerants with low GWP, such as hydrofluoroolefins (HFOs) or natural refrigerants like ammonia and carbon dioxide. This shift is critical for mitigating the environmental impact of cooling systems while maintaining their essential role in everyday life.

The carbon market offers a mechanism to incentivize the reduction of ODS emissions by allowing companies to earn carbon credits for safely destroying or replacing ODS with environmentally friendly alternatives. These credits can be traded or sold to entities seeking to offset their carbon footprints, creating economic incentives for mitigating ODS-related environmental harm.

4.5.2 Refrigerants and the Basel Convention

The relationship with the Basel Convention is consistent with the details provided for halons in section 4.3.2 of this report.

4.5.3 Opportunities for cooperation

Replacing less energy-efficient equipment containing phased-out ODS with more energy-efficient alternatives that use low-GWP refrigerants presents opportunities to achieve greater environmental benefits by protecting the ozone layer and mitigating climate change. **However, this transition may lead to an increase in the generation of e-waste, ODS banks, and the illegal trade of less energy-efficient equipment, particularly to developing countries.** Strengthened cooperation between the Basel Convention and the Montreal Protocol in managing e-waste and ODS banks in an environmentally sound manner would support the effective implementation of both agreements, safeguarding human health and the environment from the harmful effects of ODS and hazardous and other wastes.

⁶⁷ <https://ozone.unep.org/system/files/documents/TEAP-May2024-DecXXXV-11-TF-Report.pdf>.

⁶⁸ <https://ozone.unep.org/system/files/documents/TEAP-May2024-DecXXXV-11-TF-Report.pdf>.

4.6 Illegal trade and traffic of hazardous chemicals and wastes under the Basel Convention and the Montreal Protocol

The international trade of ODS falls under the scope of the Montreal Protocol when they are classified as products, while they may be regulated under the Basel Convention once they become waste, as defined by the Basel Convention ([Article 2, paragraph 1](#)). Both have been subject to illegal trade (chemicals) and illegal traffic (hazardous wastes), which could be measured by the DEMETER operation X in 2024.⁶⁹ The operation has also identified key trends, including the types of wastes and ODS being exported, major exporting countries and destinations, transportation methods, and the tools and approaches used for detection.

The methods used for the illegal import and export of ODS are similar to those used in the case of the illegal traffic of waste under the Basel Convention. These methods include:

- (a) Importing ODS without the required authorization or proper documentation;
- (b) Mislabelling ODS shipments;
- (c) False declaration of contents (misdeclaration);
- (d) Concealing ODS within shipments;
- (e) Illegally importing equipment containing ODS.

4.6.1 Opportunities for cooperation

Opportunities for cooperation are as follows:

- (a) The Demeter operation X has been essential in identifying trends for the illegal traffic and trade of hazardous chemicals and wastes under the scope of the Basel Convention and the Montreal Protocol. This intelligence could be used to develop joint approaches and capacity building tools to address the illegal trade and traffic of hazardous chemicals and wastes.
- (b) The Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic (ENFORCE) was established at the eleventh meeting of the Conference of the Parties to the Basel Convention ([BC-11/8](#)). Its mission is to enhance compliance with the Basel Convention by supporting Parties in preventing and combating the illegal traffic of hazardous and other wastes. Through a network of relevant experts, ENFORCE promotes better implementation and enforcement of national laws. The Montreal Protocol Secretariat could explore the possibility of joining ENFORCE as an observer to leverage its resources and expertise. This would strengthen cooperation and coordination with relevant entities that provide capacity-building activities and tools for preventing and addressing illegal traffic.

4.6.2 Case Study – Ghana⁷⁰

Ghana is a Party to the Montreal Protocol and to the Basel, Rotterdam and Stockholm conventions.

In response to [Decision XXXIV/4](#) of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol, Ghana submitted a report to the Ozone Secretariat in 2023 regarding shipments of inefficient refrigeration, air conditioning, and heat pump (RACHP) equipment that contain or rely on ODS and HFCs.

⁶⁹ <https://www.wcoomd.org/en/media/newsroom/2024/november/operation-demeter-x.aspx>.

⁷⁰ <https://ozone.unep.org/sites/default/files/additional-reported-information/decisionXXXIV4/Decision%20XXXIV-4.Response%20from%20Ghana.pdf>.

Ghana has implemented restrictions on the manufacture and importation of certain RACHP products that do not meet energy efficiency standards, and it has established Minimum Energy Performance Standards (MEPS) to prevent the entry of outdated refrigerants like R12.

Ghana's main concerns include the **illegal** importation of unwanted RACHP equipment, which complicates the transition to low global warming potential refrigerants under the Montreal Protocol. The country faces significant challenges from the dumping of used appliances, which lead to economic strain due to high energy consumption, financial burdens on individuals with escalating electricity bills and maintenance costs, and environmental hazards linked to the disposal of such equipment.

The increased demand for electricity from inefficient appliances puts pressure on the economy to increase its generation capacity which requires the building of more power plants, and this can lead to higher fossil fuel emissions and hinders investment in essential sectors. Moreover, Ghana's commitment to achieving net-zero carbon emissions by 2070 emphasizes the need to ban the importation of inefficient and sub-standard appliances.

While Ghana is registered with the OzonAction's informal prior informed consent procedure (iPIC) to enhance awareness of its import laws, it believes the platform alone cannot adequately inform vulnerable countries about the high global warming potential products being shipped to that country. Ghana seeks cooperation from exporting nations to address the issues of dumping and information sharing more effectively.

Inefficient refrigeration, air conditioning, and heat pump (RACHP) equipment that contain or rely on ODS and HFCs are not in the scope of the Basel Convention if not considered to be or defined as hazardous or other wastes by at least one of the Parties involved in the transboundary movement.

Under paragraph 1 (b) of Article 1 of the Convention to the Basel Convention Parties have the right to define as "hazardous wastes" wastes other than those listed in the Annexes of the Convention. In doing so, Parties **extend the scope of application of the Convention**. According to information provided by Ghana to the Ozone Secretariat, more than 60% of the Parties exporting used refrigerators and air conditioners to Ghana were Annex VII Parties, according to the Basel Convention, and bound by the Ban Amendment. Ghana could also be protected by the Basel Convention against the unwanted import of RACHP equipment.



4.7 Gender

Gender mainstreaming is a crucial component in the implementation of the BRS conventions as well as the Montreal Protocol. Gender mainstreaming ensures that the different needs and perspectives of men and women are taken into account in the decision-making process. Women and men are affected differently by hazardous chemicals and waste, and gender inequalities can exacerbate these differences. Gender mainstreaming also ensures that women are represented in decision-making processes, which is essential for promoting gender equality and achieving sustainable development and this has been shown to lead to better environmental outcomes, as they often bring unique perspectives and experiences to the table.⁷¹

The Basel, Rotterdam and Stockholm conventions developed the Gender Action Plan (BRS-GAP) which was developed to ensure that the principles of gender equality are firmly embedded in activities undertaken by the Basel, Rotterdam and Stockholm conventions' Secretariat in line with applicable UN and UNEP gender policies.

UNEP OzonAction also promotes gender equality and mainstreaming in line with UN policy and, more specifically, UNEP's Policy and Strategy for Gender Equality and the Environment and the Multilateral Fund's Operational Policy on Gender Mainstreaming for Multilateral Fund-supported Projects.⁷²

4.8 Summary of interlinkages

The analysis of the scope, rights/obligations and implementation requirements for the four conventions led to the identification of interlinkages between the BRS conventions and the Montreal Protocol. These interlinkages, together with opportunities are summarised in **Table 3**.

⁷¹ <https://www.brsmeas.org/Implementation/Gender/Overview/tabid/3651/language/en-US/Default.aspx>.

⁷² <https://www.unep.org/ozonaction/ozonaction-and-gender-mainstreaming>.

Table 3: Scope, obligations and implementation of the different Multilateral Environmental Agreements

Summaries on:	Basel Convention	Rotterdam Convention	Stockholm Convention	Montreal Protocol	Interlinkages	Opportunities
Scope	Hazardous wastes and other wastes (Article 1)	Industrial chemicals and pesticides that are: <ul style="list-style-type: none"> Chemicals banned or severely restricted to protect human health or the environment SHPF – causing problems under conditions of use in developing countries or countries with economies in transition (Article 2) 	POPs listed in Annex A, B and C	ODS and HFCs (Annexes A, B, C, D, E, F)	<ul style="list-style-type: none"> End-of-life ODS classified as hazardous waste under the Basel Convention End-of life equipment containing ODS refrigerators Methyl bromide (MB). PFAS and halons in the firefighting sector 	<ul style="list-style-type: none"> Parties to the Basel Convention may consider taking measures to clarify whether end of life ODS are required to be disposed of by national law, and whether they are classified as hazardous waste when subject to TBM The expert working group on the review of Annexes of the Basel Convention could continue exploring whether substances covered by the Montreal Protocol, when becoming wastes, are covered by Annexes I and III to the Convention Listing MB in Annex III of the Rotterdam Convention could provide additional information on MB unreported uses Information sharing between the Secretariats on destruction technologies for end-of-life chemicals, chemical alternatives and emission reduction technologies

Summaries on: Rights/ obligations of Parties	Basel Convention	Rotterdam Convention	Stockholm Convention	Montreal Protocol	Interlinkages	Opportunities
	<ul style="list-style-type: none"> • Reduce hazardous wastes generation and promote its environmentally sound management • Restrict TBM of hazardous wastes except where in accordance with its environmentally sound management • Regulatory system applying to cases where TBM is permissible 	<ul style="list-style-type: none"> • Information exchange • PIC Procedure • Responsibilities of importing and exporting Parties 	<ul style="list-style-type: none"> • Eliminate Annex A POPs • Restrict Annex B POPs • Register for specific exemptions listed in Annex A or Annex B • Register for acceptable purposes for chemicals listed in Annex B • Restrict and eliminate emissions of unintentionally produced POPs in Annex C • Submit a report to the Secretariat justifying its continuing need for registration of that exemption 	<ul style="list-style-type: none"> • Phase out use of ODS refrigerants by 2030 • Phase down use of HFC refrigerants by 2045 to 20% of baseline 	<ul style="list-style-type: none"> • Phase out of ODS refrigerants/phase down of HFC refrigerants and the replacement of cooling equipment by more energy efficient ones lead to increased e-waste generation • MB import responses (Rotterdam Convention) and the MB control by the Montreal Protocol • Production of carbon tetrachloride and release of unintentional POPs • Contaminated sites as a potential hotspot of emissions of carbon tetrachloride and unintentional POPs • Trade control under the Basel and its impacts on the recycling and reclamation of ODS • Illegal traffic and trade of waste and chemicals controlled by the Basel, Rotterdam and Stockholm Conventions and the Montreal Protocol 	<ul style="list-style-type: none"> • Development of comprehensive national legal frameworks to implement MEAs • Collaborations between the Montreal Protocol and the Rotterdam Convention in the control of MB • The production of CTC brings additional elements for the identification of POPs contaminated sites • BAT and BEP for the production of ODS can contribute to reduce the emissions of UPOPs • TEAP reports relevant for the life cycle management of substances controlled by the Montreal Protocol and environmentally sound management under the Basel Convention • Partnerships under the Basel Convention (ENFORCE, PACE II) and technical assistance activities by the Basel, Rotterdam and Stockholm conventions and the Montreal Protocol

Summaries on:	Basel Convention	Rotterdam Convention	Stockholm Convention	Montreal Protocol	Interlinkages	Opportunities
<p>Implementation at the national level and governance</p> <ul style="list-style-type: none"> • Designate competent authorities and focal points • Take appropriate legal, administrative and other measures to implement and enforce the Convention • Control international trade e.g. measures to implement the PIC procedure • Ensure the environmentally sound management of hazardous and other wastes as clarified by the technical guidelines and guidance documents • Cooperation and coordination between national stakeholders e.g. customs and border control • Capacity building • Awareness raising 	<ul style="list-style-type: none"> • Designate national authorities & official contact points • Implement appropriate legislative or administrative measures • Communicate import responses and ensure compliance by exporters in jurisdiction • Cooperation and coordination between national stakeholders e.g. customs and border control • Awareness raising • Capacity building 	<ul style="list-style-type: none"> • Appoint an official contact point and a national focal point for exchange of information • Establish legal and administrative measures in conformity with the obligations of the SC • Develop and regularly update its National Implementation Plan (NIP) • Facilitate or undertake the exchange of relevant information • Developed Parties to provide technical & financial support to developing Parties and Parties with economies in transit • Parties to provide financial support and incentives in relation to national activities to achieve the Convention's objectives • Awareness raising 	<ul style="list-style-type: none"> • Set National Ozone Units (NOU) • Establish national legislation & regulations • Set baseline • Set out quota system • Licensing of importers • Train technicians, customs & enforcement officers • Registrations of importers • Awareness raising • Annual reporting on consumption • Inventories • TEAP guidance on life cycle management of refrigerants, including their destruction 	<ul style="list-style-type: none"> • Designate national authorities – all MEAs • Develop legal frameworks – all MEAs • Enforcement of legal instruments – all MEAs • Capacity building – all MEAs • Development of policies for the establishment of schemes for life cycle management of refrigerants and the repair, refurbishment of used and the environmentally sound management of waste refrigerators, cooling and heating equipment 	<ul style="list-style-type: none"> • Joint capacity building activities, where possible and where there are overlaps • Joint data collection activities/systems 	

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