ADDRESSING CHEMICALS OF CONCERN IN PLASTICS THROUGH MULTILATERAL ENVIRONMENTAL AGREEMENTS

Secretariat of the Basel, Rotterdam and Stockholm Conventions

BASEL | ROTTERDAM | STOCKHOLM CONVENTIONS

UN environment programme

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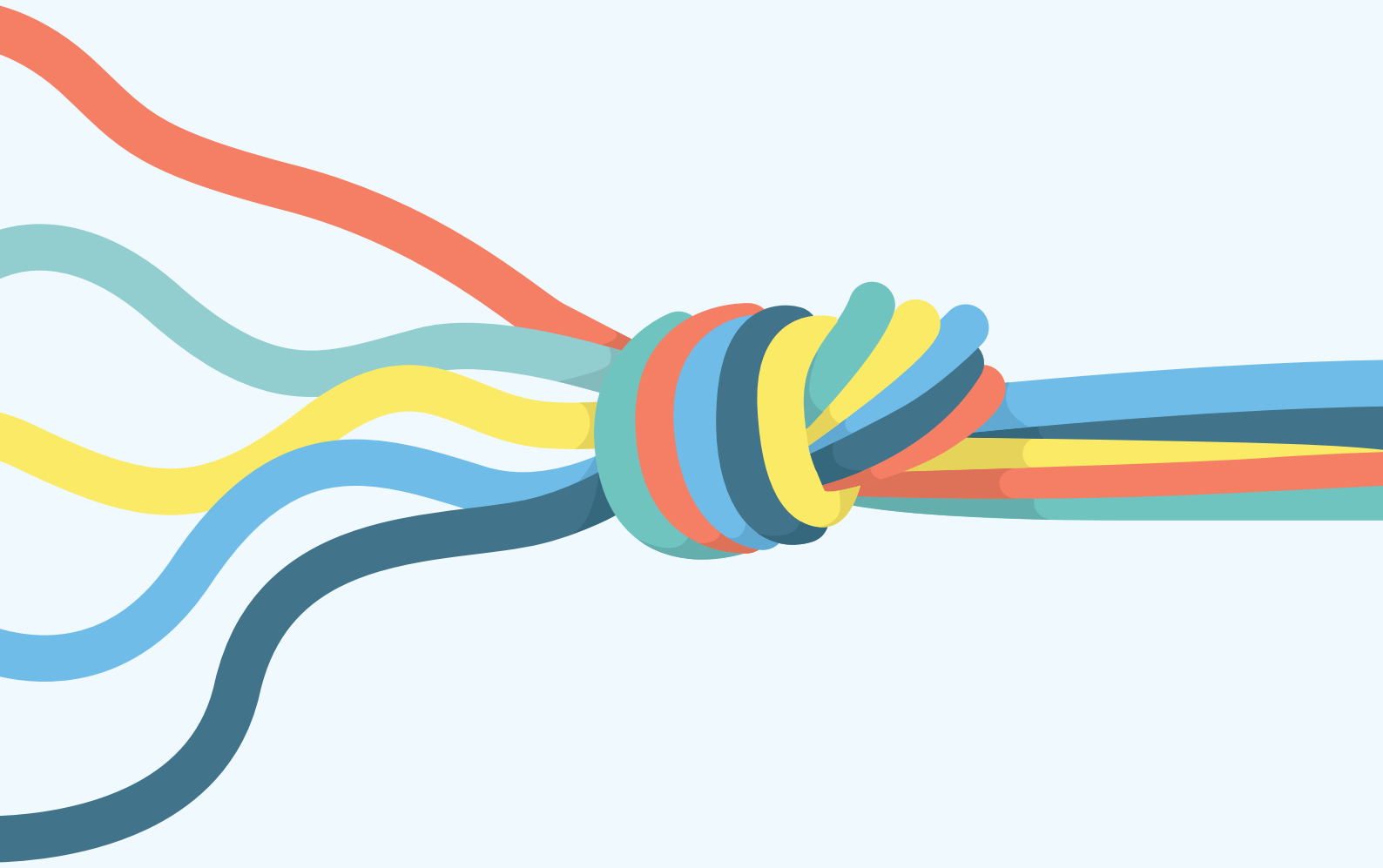
Abbreviations

BRS	Basel, Rotterdam and Stockholm conventions
CFCs	Chlorofluorocarbons
COP	Conference of Parties
CRC	Chemical Review Committee
decaBDE	Decabromodiphenyl ether
DP	Dechlorane Plus
EEAP	Environmental Effects Assessment Panel
EPR	Extended producer responsibility
EPS	Expanded polystyrene
GEF	Global Environment Facility
HBB	Hexabromobiphenyl
HBCD	Hexachlorobutadiene
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
IFCS	Intergovernmental Forum on Chemical Safety
INC	Intergovernmental Negotiating Committee
LRET	Long-Range Environmental Transport
MEA	Multilateral environment agreement
NIAS	Non-intentionally added substances
ODSs	Ozone-depleting substances
PBDDs	Polybrominated dibenzo-p-dioxins
PBDEs	Polybrominated diphenyl ethers
PBDFs	Polybrominated dibenzofurans
PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans
PCBs	Polychlorinated biphenyls

PCNs	Polychlorinated naphthalenes
PCP	Pentachlorophenol
PE	Polyethylene
PEP	Polyfluoroethylene propylene
PET	Polyethylene terephthalate
PFAS	Per- and polyfluoroalkyl substances
PFHxS	Perfluorohexane sulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
PFOSF	Perfluorooctane sulfonyl fluoride
PIC	Prior Informed Consent
POPRC	Persistent Organic Pollutants Review Committee
POPs	Persistent organic pollutants
PP	Polypropylene
PRTR	Pollutant Release and Transfer Register
PTFE	Polytetrafluoroethylene
PUF	Polyurethane foam
PVC	Polyvinyl chloride
PVDF	Polyvinylidene fluoride
SAP	Scientific Assessment Panel
SCCPs	Short-chain chlorinated paraffins
TAC	Triacetyl cellulose
TEAP	Technology and Economic Assessment Panel
UPOPs	Unintentional persistent organic pollutants
VCM	Vinyl chloride monomer
WHO	World Health Organization
XPS	Extruded polystyrene

SUMMARY



Summary

Objective of the report

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.

Existing global regulatory framework for controlling chemicals in plastics

Existing MEAs regulate plastics chemicals as follows:

- **The Stockholm Convention on Persistent Organic Pollutants** offers a robust instrument for regulating some chemicals in plastics due it its focus on the elimination and reduction of POPs. It governs the production, use and trade of both individual chemicals with plastic applications, such as hexachlorobutadiene (HBCD) and UV-328, and groups of chemicals like polybrominated diphenyl ethers (PBDEs), polychlorinated biphenyls (PCBs), short-chain chlorinated paraffins (SCCPs), polychlorinated naphthalenes (PCNs), and several per- and polyfluoroalkyl substances (PFAS) subgroups. It also aims to reduce releases from unintentional production of persistent organic pollutants (UPOPs), including broad groups like polychlorinated dibenzo-p-dioxins and furans (PCDDs/Fs) produced, inter alia, from plastic waste incineration and open burning. Polybrominated dibenzo-p-dioxins and polybrominated dibenzofurans (PBDDs/Fs) and their mixtures with PCDDs/Fs, as well as medium-chain chlorinated paraffins and another set of PFAS, long-chain perfluorocarboxylic acids (PFCAs), their salts and related compounds are currently under review.

- **The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal** regulates the transboundary movement of hazardous wastes and other wastes, including plastic waste. It puts in place a control procedure to ensure prior informed consent for proposed transboundary movement of certain categories of wastes, and requires environmentally sound management of such wastes, and promotes their prevention and minimization. Parties have the right to define or consider as hazardous additional wastes not listed as such in the Convention. Parties can also exercise their right to prohibit the import of hazardous or other wastes, as well as impose additional requirements consistent with the provisions of the Convention and in accordance with international law to protect human health and the environment. Through annexes, trade in waste under the scope of the Convention is controlled but chemicals in plastics are not specifically regulated, although their presence in plastics

may cause the waste to display hazardous characteristics listed in Annex III, making such waste subject to the relevant Basel Convention control measures. Mixtures of non-hazardous plastics may also be subject to trade restrictions.

- **The Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous chemicals and pesticides in international trade** promotes shared responsibility and cooperative efforts in international trade of hazardous chemicals. It operates through the Prior Informed Consent (PIC) procedure, facilitating information exchange about and ensuring that countries can make informed decisions about hazardous chemicals before their import and take appropriate measures to ensure exporters comply with such decisions. Unlike the Stockholm Convention, it does not provide for bans or restriction controls on production and use but focuses on facilitating informed decision-making regarding international trade in hazardous chemicals listed in Annex III to the Convention.

- **The Minamata Convention on Mercury** includes measures to control the supply and trade of mercury, mercury-added products, and manufacturing processes in which mercury or mercury compounds are used. . This includes restrictions on certain manufacturing processes involving mercury, such as those related to PVC and polyurethane production, though not the plastic products themselves. It also applies to some mercury-added products that may happen to have plastic components. However, it does not cover other metals, such as lead, chromium, antimony, tin, cadmium, or nickel, which are commonly used in plastics as additives (e.g., stabilizers, colorants) and as processing agents, including catalysts in plastic production.

- The **Montreal Protocol** controls the production and consumption of groups of chemicals such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs), primarily for their ozone-depleting and climate effects. Some of these chemicals have been used in plastics, mainly as blowing agents for foam products, but are now regulated by the Protocol. However, the Protocol maintains exemptions for the use of controlled substances as processing agents or feedstocks in certain plastics production processes, provided that controls are in place to minimize emissions.

Existing MEAs have developed scientific and technical mechanisms, many of which have been institutionalized as subsidiary bodies, such as the Technology and Economic Assessment Panel (TEAP) of the Montreal Protocol and the Persistent Organic Pollutants Review Committee (POPRC) of the Stockholm Convention. These mechanisms provide important guidance for developing a scientifically informed mechanism to identify and recommend the listing of chemicals of concern used in plastics to be controlled. Experience shows that an effective review process can produce a comprehensive risk profile that incorporates socio-economic considerations, where the mandate provides for the collection of such information, enabling the governing bodies and Parties to these MEAs to make informed decisions.

Opportunities for cooperation among MEAs, including the new plastics instrument

In addition to providing for cooperation between the respective governing bodies and Secretariats, and subject to the respective governing bodies deciding accordingly, the following MEA-specific areas of cooperation could be explored:

Stockholm Convention

- Collaboration with the POPRC: If a mechanism related to identification and recommending the listing of chemicals in plastics were established under the new plastics instrument, close cooperation with the POPRC would be essential to avoid duplication, facilitate information sharing and ensure coherence.

- Global database development: Collaboration between the scientific and technical bodies of the Stockholm Convention and any such body established in the plastics instrument could facilitate the collection of information that contributes towards establishing a global, unified database on the identity, occurrence, and toxicity of chemicals in plastics. It could build on existing mechanisms to identify, categorize, and regulate chemicals of concern on a global scale, adding to the coherence and complementarities of existing chemical listings across different MEAs by harmonizing its categorization of chemicals based on traits that align with the mandates and scopes of each convention.

Basel Convention

- Applying existing definitions: If the new plastics instrument addressed issues covered by the Basel Convention, it could consider adopting existing definitions from that MEA, such as those for "wastes", "environmentally sound management", and "transboundary movement". This approach would align with provision for similar cooperation and coordination with other international agreements such as Art. 11.1 of the Minamata Convention and Art. 6 of the Stockholm Convention.

- Collaboration with technical bodies: The possible technical bodies of the new plastics instrument could work closely with the relevant technical bodies of the Basel Convention and other pertinent organizations, for instance regarding the possible determination of thresholds for chemicals in plastic wastes, similar to the relationship between the technical bodies of the Basel Convention and those of the Stockholm and Minamata Conventions.

- Implementation and review of guidelines: Any scientific and technical body of the plastics instrument could collaborate with similar bodies of the Basel Convention to develop, implement and review guidelines relevant to the plastic life cycle.

Montreal Protocol

- Narrowing exemptions: The Montreal Protocol excludes the amount of controlled substances produced, exported or imported and used entirely as feedstocks or as process agents, including for fluoropolymer production, from the calculation of production and consumption. Emissions may result from residuals in products and fugitive leaks during production, storage, or transport (UNEP, 2021). Scholars recommend narrowing these exemptions and controlling vinyl chloride and its feedstock, ethylene dichloride, to reduce polyvinyl chloride (PVC) production (Andersen et al., 2021).

Rotterdam Convention

- Enhancing information exchange on chemicals: Art. 14 of the Rotterdam Convention requires each Party to facilitate the exchange of scientific, technical, economic and legal information concerning the chemicals within the scope of the Convention, including toxicological, ecotoxicological and safety information. The new instrument could leverage the information available under the Rotterdam Convention for relevant chemicals.

- Collaboration with Chemicals Review Committee (CRC): Cooperation and coordination between the CRC and the possible subsidiary scientific and technical body of the plastic instrument would be necessary in order to streamline the evaluation and listing of chemicals of concern in plastics.

The UNECE Kyiv Protocol on Pollutant Release and Transfer Registers (PRTRs)

- Tracking releases: The PRTR Protocol mandates the establishment of PRTRs to track releases from production of plastic and several associated chemicals, and recovery or final disposal operations. The plastics instrument could collaborate with the PRTR Protocol to include chemicals used in plastics under national registers, while acknowledging that non-Parties would be exempt. Alternatively, the plastics instrument could mandate the development of national "plastic pollution release and transfer registers" to provide more detailed, accessible data, building on existing structures (UNECE, 2022).

1 BACKGROUND AND OBJECTIVE

1. Background and objective

During negotiations for the development of an international legally binding instrument on plastic pollution (hereinafter referred to as "the plastics instrument"), the importance of cooperation, coordination, promoting complementarity and avoiding duplication among relevant instruments, including the Basel, Rotterdam and Stockholm (BRS) Conventions, has been raised but not yet substantively discussed by the intergovernmental negotiating committee (INC). The study aims to clarify:

1. Opportunities for the multilateral environment agreement (MEAs) to complement the objective, scope and control measures of the plastics instrument;

2. The feasibility of regulating chemicals of concern associated with plastics under the BRS Conventions.

Further to this, the report also highlights processes and mechanisms under existing MEAs that may not be directly applicable to plastics, but which may be considered in the event the new plastics instrument intends to regulate chemicals in plastics.

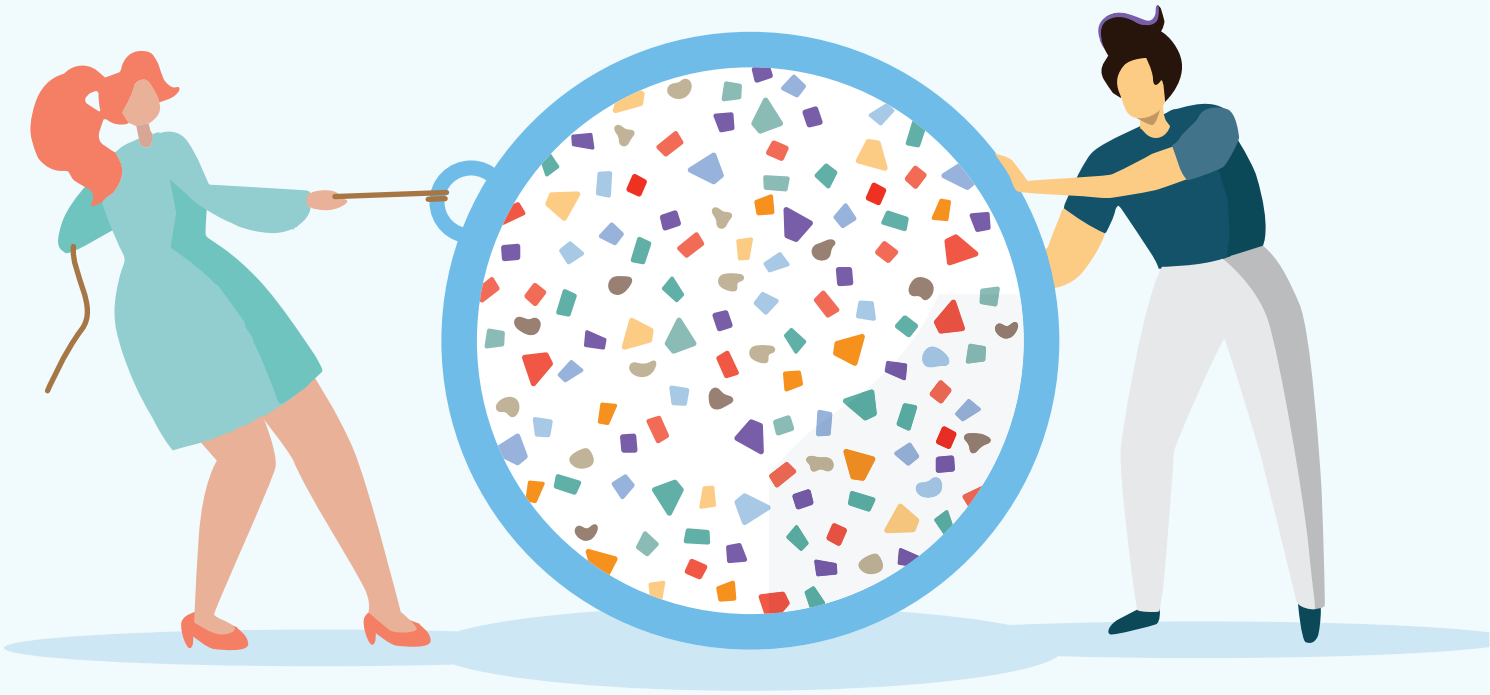
Provisions in the following MEA have been analyzed[1]:

- Stockholm Convention (186 Parties)
- Rotterdam Convention (166 Parties)
- Basel Convention (191 Parties)
- Montreal Protocol (198 Parties)
- Minamata Convention (151 Parties)
- Kyiv Protocol on PRTRs (38 Parties)

This study elaborates on procedural aspects of key governance areas related to chemicals and polymers of potential concern, building on and complementing the 2023 report titled "Global governance of plastics and associated chemicals" by the Secretariat of the BRS Conventions (BRS Secretariat, 2023).[2]

1 Number of Parties as of 26 October 2024
2 UNEP/CHW.16/INF/58–UNEP/FAO/RC/COP.11/INF/41–UNEP/POPS/COP.11/INF/59.

2 KEY OBLIGATIONS UNDER RELEVANT MEAs TO CONTROL CHEMICALS OF CONCERN



2. Key obligations under relevant MEAs to control chemicals of concern

This section describes the control measures within the selected MEAs for eliminating and restricting chemicals of concern, as well as minimizing their release to the environment. Control measures for the trade of chemicals and related wastes are also taken into consideration. Control measures that make use of information exchange are outlined and where obligations specifically address aspects related to plastics, these are discussed. The section concludes with a summary of measures that specifically address chemicals in plastic products. It is not intended as a comprehensive description of the provisions of the selected MEAs, but rather to highlight relevant provisions therein.

2.1 Summary of core control measures for eliminating production and use of chemicals of concern

This section outlines the mechanisms for eliminating production and use of chemicals of concern under the select MEAs, including products containing listed chemicals as appropriate. Where reference is made to lists, see Section 3 for listing mechanisms of each MEA.

2.1.1 Stockholm Convention

Main provisions:

- Parties are required to prohibit and/or take the legal and administrative measures necessary to eliminate the production and use of the chemicals listed in Annex A (Art. 3.1a).
- Parties may register for specific exemptions for chemicals listed in Annex A (Art. 4.3–4).
- For non-listed chemicals, where Parties regulate and assess new pesticides and industrial chemicals, they should take measures with the aim of preventing their production and use should they exhibit the characteristics of persistent organic pollutants (POPs), taking into consideration the criteria in Annex D, paragraph 1.

Figure 1 summarizes main provisions for eliminating production and use of chemicals, including those in plastics, under Annex A to the Stockholm Convention.

Figure 1: Main provisions for phasing out production and use of chemicals in plastics under Annex A to the Stockholm Convention

Relevance to plastics:

- The Convention includes 13 entries that aim to eliminate the production and use of chemicals used in plastics (among many other uses), including flame retardants, plasticizers, and surfactants. This includes five entries for single chemicals and eight entries for groups of chemicals. A major obstacle in fully assessing the use of POPs and other chemicals in plastics is the lack of transparency regarding the chemical content in plastic products. Additionally, only recently has a global database has been established for cataloging these substances, yet it has not been formalized within an international treaty or process.[3] Below are examples of chemicals used in plastics that are listed in Annex A to the Stockholm Convention for elimination:

  - **Decabromodiphenyl ether (decaBDE):** Chemical used as a brominated flame retardant, heat stabilizer, intermediates, lubricant, odor agent, biocide, colorant, filler, and other processing aids. DecaBDE is listed with several specific exemptions, including for parts for use in vehicles, aircraft, certain textile products, certain additives in plastic products, and polyurethane foam (PUF) for building insulation. The amendment listing this chemical in Annex A to the Convention entered into force for most Parties on 18 December 2018.[4]

3 https://plastchem-project.org/
4 For more information about dates of entry into force of amendments to Annexes A, B and C to the Stockholm Convention, please see https://chm.pops.int/Countries/StatusofRatifications/Amendmentstoannexes/tabid/3486/Default.aspx

- **Other polybromodiphenyl ethers (PBDEs):** Group of chemicals used as brominated flame retardants. Recycling of articles that contain or may contain these chemicals, as well as the use and final disposal of articles manufactured from recycled materials with these chemicals, is allowed for registered Parties until no later than 2030, although the need for specific exemptions is regularly reviewed by the governing body. The amendments listing this group of chemicals in Annex A entered into force for most Parties on 26 August 2010. Note that this includes two entries covering 1) commercial mixture of octaBDE represented by four main congeners of hexa and heptaBDE, and 2) commercial mixture of pentaBDE represented by two main congeners of tetra and pentaBDE.
- **Dechlorane Plus (DP):** "Dechlorane Plus"TM technical mixture is a commercially available polychlorinated flame retardant, originally developed as a replacement for the flame retardant and insecticide dechlorane, also known as Mirex, applied to plastics, rubber, paint, paper, and electrical goods from 1959 to 1972. Mirex (CAS No. 2385-85-5) was sold as a flame retardant under the trade name Dechlorane. DP is listed with several specific exemptions, including for aerospace, space and defense applications, medical imaging and radiotherapy devices, motor vehicles, stationary industrial machines, marine, garden, forestry and outdoor power equipment, analytical instruments, and certain medical devices. The amendment listing this chemical enters into force for most Parties on 26 February 2025.
- **Hexabromobiphenyl (HBB):** Chemical used as a brominated flame retardant, listed without specific exemptions. The amendment entered into force on 26 August 2010 for most Parties.
- **Hexabromocyclododecane (HBCD):** Chemical used as a brominated flame retardant including in insulation materials such as expanded polystyrene (EPS) and extruded polystyrene (XPS). The amendment entered into force for most Parties on 26 November 2016. Although specific exemptions were initially available for this chemical, following a decision of the COP, no new registrations may be made since the tenth meeting of the Conference of Parties (COP).
- **Pentachlorophenol (PCP) and its salts and esters:** Group of chemicals used as a biocide and colorant. The amendment entered into force for most Parties on 15 December 2016. Similarly to HBCD, specific exemptions were initially available for this chemical but following a decision of the COP, no new registrations may be made since the tenth meeting of the COP.

- **Perfluorohexane sulfonic acid (PFHxS), its salts, and PFHxS-related compounds:** This group of chemicals belong to PFAS family and is listed as a group of chemicals. The latest version of the indicative list[5] of substances covered by the listing of PFHxS, its salts and PFHxS-related compounds includes 176 chemicals, although the entry is often counted as 1 chemical. PFHxS is used in the manufacturing of plastics, coatings, and sealants to provide durability, chemical resistance, and non-stick properties. It was listed without specific exemptions and entered into force for most Parties on 16 November 2023.
- **Perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds:** This group of chemicals also belong to PFAS family and is listed as a group of chemicals. The latest version of the indicative list of substances covered by the listing of PFOA, its salts and PFOA-related compounds includes 369 chemicals, although the entry is often counted as 1 chemical. The most recent amendment to Annex A regarding PFOA has several specific exemptions available to Parties, including semiconductors, photographic coatings, certain textiles, certain medical devices, manufacture of polytetrafluoroethylene (PTFE) and polyvinylidene fluoride (PVDF) for certain uses, manufacture of polyfluoroethylene propylene (FEP) for certain uses, manufacture of fluoroelastomers for certain uses. This amendment entered into force for most Parties on 3 December 2020.
- **Polychlorinated biphenyls (PCBs):** Group of chemicals used as plasticizers and flame retardants. Its primary use has been in electrical equipment such as transformers and capacitors, but it is also used or unintentionally present in open applications like paints and sealants. It is one of the initial 12 POPs. Note that PCBs are a group of 209 congeners, but they are typically treated as one entry.
- **Polychlorinated naphthalenes (PCNs):** Group of chemicals used as plasticizers and flame retardants in plastics, electrical insulation materials, such as in cables and wiring. PCNs consist of 75 congeners, categorized in eight homologue groups. These groups covered in the listing range from dichlorinated naphthalenes to octachlorinated naphthalenes, often counted as one entry. This amendment entered into force for most Parties on 15 December 2016.

5 No production and use activities or specific exemptions have been defined yet for this list.

- **Short-chain chlorinated paraffins (SCCPs):** Group of chemicals used as colorants, fillers, flame retardants, lubricants, other processing aids, and plasticizers. It was listed with several specific exemptions, including rubber, lubricants, adhesives and secondary plasticizers in flexible polyvinyl chloride (PVC), except in toys and children's products, although since no new registrations may be made as of 18 December 2023 and all previous exemptions have expired. The amendment entered into force for most Parties on 18 December 2018.
- **UV-328:** Chemical used as UV stabilizer, UV-328 is the first non-halogenated POP listed with several specific exemptions, including its use in parts of motor vehicles, certain industrial coating applications, triacetyl cellulose (TAC) film in polarizers, liquid crystal displays in certain instruments. The amendment will enter into force for most Parties on 26 February 2025.

2.1.2 Minamata Convention

Main provisions:

- Parties are required to phase-out primary mercury mining within timelines set by Art. 3.3-4.
- Parties are required to phase out manufacturing, import and export of products that contain mercury or mercury compounds ("mercury-added products") listed in Part I of Annex A by the phase-out date specified for each except where exclusion is specified in the Annex (Art. 4.1), or the Party has a registered exemption pursuant to Art. 6.
- Art. 4.1 requires Parties to not allow the manufacture, import or export of mercury-added products listed in Part I of Annex A after the phase-out date specified for those products. As an alternative, Art. 4.2 allows Parties to implement different measures or strategies to address products listed in Part I of Annex A under certain conditions listed in the same paragraph.
- Parties are required to phase out manufacturing processes that make use of mercury listed in Part I of Annex B by the phase-out date specified for each in that Annex (Art. 5.1-2). This excludes processes using or manufacturing mercury-added products, or processing of mercury-containing waste.
- Parties may register for exemptions for phase-out dates for (sub-)categories listed in Annexes A and B, as per Art. 6.

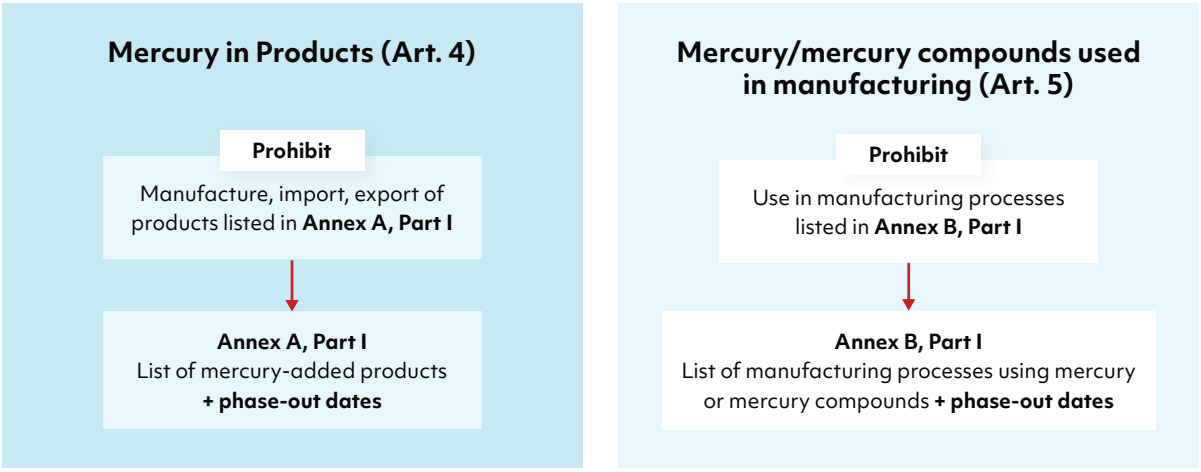


Figure 2: *Main provisions for phasing out production and use of chemicals in plastics in the Minamata Convention*

Relevance to plastics:

- Mercury and mercury compounds are primarily used as catalysts in plastics production, involving a total of 23 related substances (Plast Chem, 2024). For instance, mercury chloride is used as a catalyst for manufacturing vinyl chloride from acetylene.
- Under the Minamata Convention, the following plastics-related prohibitions are outlined:
  - Manufacturing processes: Annex B lists manufacturing processes related to plastic production:
    - Mandatory reduction and other requirements when mercury catalysts are used in the production of vinyl chloride monomer (VCM), a key precursor for producing polyvinyl chloride (PVC).
    - Phase out production of polyurethane using mercury-containing catalysts by 2025.
  - Mercury-added products: Although Part I of Annex A does not explicitly list plastics products, it includes many products that could have plastics components, such as batteries, switches and relays and certain types of lamps (e.g. fluorescent lamps).

2.1.3 *Montreal Protocol*

Main provisions:

The Protocol includes targets for phasing-out the production and consumption of ozone-depleting substances (ODSs) listed in Annexes A, B, C and E (Arts. 2 to 2I).

Relevance to plastics:

- These chemicals are primarily used as refrigerants in cooling and refrigeration, but many are used as blowing agents in the production of extruded-polystyrene and polyurethane foams. Some of these substances are also used as aerosol propellants, in fire extinguishing and fumigation applications, as well as feedstocks and process agents in the production of other chemicals including fluoropolymers. ODSs used as feedstocks are currently exempted from phase-out control measures of the Montreal Protocol. The Protocol phases out the following ODSs used in plastics (Plast Chem, 2024):
  - **CFC-12:** Annex A, phased out in 2010. Plastic uses unspecified.
  - **CFC-113:** Annex A, phased out in 2010. Used as blowing agent, intermediate and solvent in plastics.
  - **Carbon Tetrachloride:** Annex B, phased out in 2010. Used as a colorant, processing aid and solvent in plastics.
  - **Methyl chloroform:** Annex B, phased out in 2015). Used as an intermediate in plastics production.
  - **HCFC-22:** Annex C, to be phased-out in 2030. Used as a blowing agent, filler and intermediate.
  - **HCFC-123:** Annex C, to be phased-out in 2030. Plastic uses unspecified.
  - Certain ODSs, such as HCFC-22, CFC-11, CFC-12, CFC-113, CFC-113a, CFC-114a, Trichloroethane, HCFC-141b, HCFC-142b, are used as feedstocks in plastic production, which qualifies them for specific exemptions (Andersen et al., 2021).
- Allowances are provided to non-Article 5 (developed) parties for the period 2020-2030 and for the Article 5 (developing) parties for the period 2030-2040 for certain uses.[6]

6 These uses do not involve plastics. See page 41 of the Montreal protocol Handbook at: https://ozone.unep.org/sites/default/files/Handbooks/MP-Handbook-2020-English.pdf

2.1.4 Rotterdam Convention

- Although the Convention does not directly regulate the production and use of chemicals, Art. 10.9b establishes an obligation for Parties that decide not to consent to the import of a chemical to simultaneously prohibit or make subject to similar conditions domestic production of the chemical for domestic use.

2.2 Summary of core control measures for restricting the production and use of chemicals in plastics

This section outlines the mechanisms for restricting production and use of chemicals under the select MEAs. This implies that the substance is not completely eliminated but rather limited in its production or use. Where reference is made to lists, see Section 3 for listing mechanisms of each MEA.

2.2.1 Stockholm Convention

Main provisions:

- Parties are required to restrict the production and use of the chemicals listed in Annex B in accordance with the provisions of that Annex (Art. 3.1b).
- Parties may register for specific exemptions (time-limited) or acceptable purposes (without a time limit) listed in Annex B.
- For non-listed chemicals, where Parties regulate and assess new pesticides and industrial chemicals, they should take measures with the aim of preventing their production and use should they exhibit the characteristics of POPs, taking into consideration the criteria in Annex D, paragraph 1.

Figure 3 summarizes the main provisions for restricting the production and use of chemicals, including in plastics, under the Stockholm Convention.

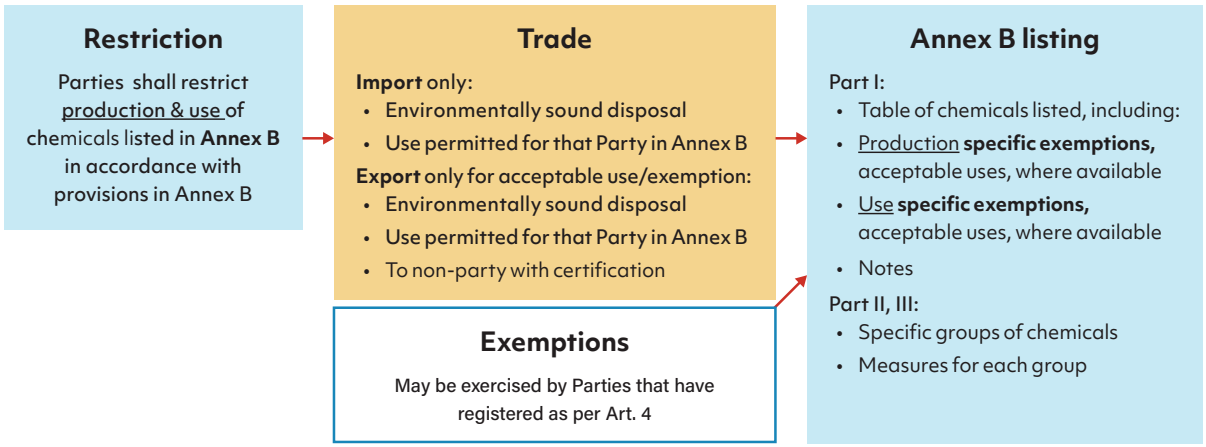


Figure 3: Main provisions for phasing down the production and use of chemicals in plastics under the Stockholm Convention

Relevance to plastics:

- The Convention lists applications of chemicals that lack alternatives in **Annex B** for restriction, allowing acceptable purposes (exemptions without an expiry date but subject to a review process). Currently, there are only 2 sets of chemicals listed in Annex B from which only the following is relevant for plastics:

  - **Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF):** Used as surfactants and in various industrial applications, including fire-fighting foams, metal plating, semiconductor, color printers, hydraulic fluids, and coatings for rubber and plastics, paper and packaging, leather and apparel, textiles and upholstery. PFOS was first listed in Annex B by decision SC-4/17 in 2009 and later amended by decision SC-9/4 in 2019, which significantly reduced the number of specific exemptions and acceptable purposes. Currently only one acceptable purpose and two specific exemptions remain, neither of which is related to plastics applications. Although the listing covers all 96 PFOS precursors, the entry is often counted as 1 chemical. At least four of these have known uses in plastics (Plast Chem, 2024).

2.2.2 *Minamata Convention*

Main provisions:

- Parties are required to restrict the manufacture of products that contain mercury ("mercury-added products") listed in Part II of Annex A (Art 4.3). Part II of Annex A applies to dental amalgam only and has little relevance to plastics.
- Parties must take measures to prevent the incorporation of mercury-added products into assembled products (Art. 4.5).
- Parties are required to restrict the use of mercury in manufacturing processes that make use of mercury listed in Part II of Annex B (Art. 5.3).

Figure 4 summarizes main provisions for phasing down the production and use of chemicals in plastics in the Minamata Convention.

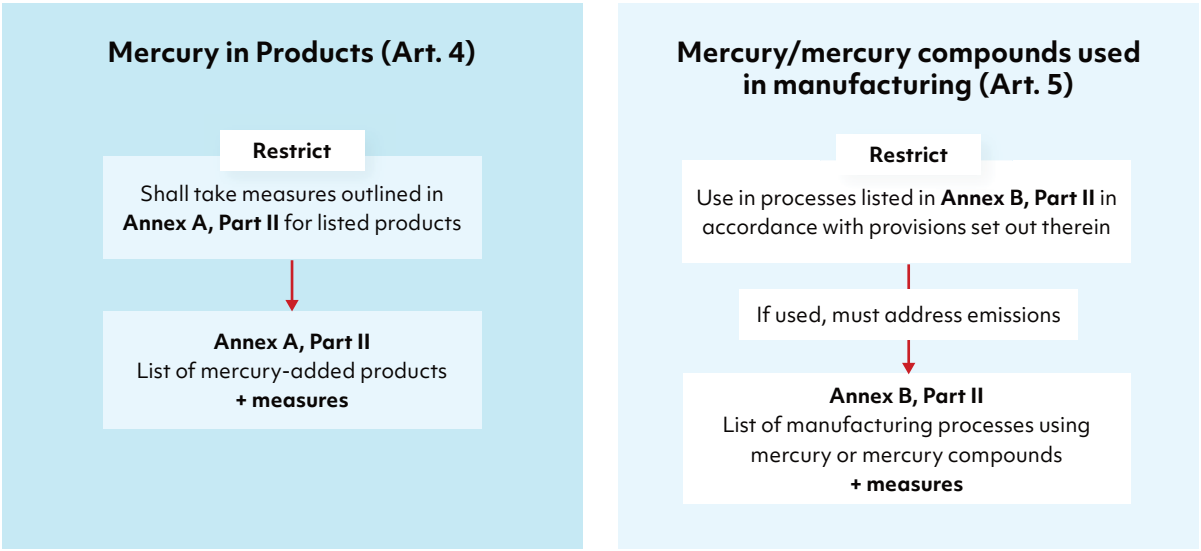


Figure 4: Main provisions for phasing down the production and use of chemicals in plastics in the Minamata Convention[7]

7 While Part II of Annex A only addresses dental amalgam, which has little relevance to plastics, it is included in the figure to provide a complete overview of the main provisions of the Convention

Relevance to plastics:

- Manufacturing processes: Part II of Annex B lists manufacturing processes related to plastic production where mercury use restrictions apply:

  - VCM production: VCM, the precursor for PVC, falls under mercury restrictions whereby mercury use in VCM production will be phased out five years after the COP determines that mercury-free catalysts are technically and economically viable. While the COP has yet to make this determination, a separate requirement has reduced the amount of mercury used per unit of production by 2020. It is important to note that the Minamata Convention only regulates the use of mercury in VCM production, not the PVC plastic products themselves.

2.2.3 *Montreal Protocol*

Main provisions:

- The Kigali Amendment to the Montreal Protocol includes measures and targets for phasing down the production and consumption of hydrofluorocarbons (HFCs) listed in Annex F (Art. 2J).[8]
- Each Party shall ensure their production and consumption of substances listed in Annex F does not exceed the limits and progressive phase-down dates specified in Annex F. Methods for calculating consumption are provided (Art. 3: Calculation of controlled levels).

Relevance to plastics:

- HFCs are greenhouse gases that contribute to global warming. They are used, among other applications, as blowing agents in the production of extruded-polystyrene and polyurethane foams, providing the necessary expansion and insulation properties. They are also used as feedstocks and process agents in the production of other chemicals including fluoropolymers. ODS and HFCs used as feedstocks are currently exempted from phase-down control measures of the Montreal Protocol. The Protocol phases down the use of the following HFCs with uses in plastics:

8 162 Parties to the Montreal Protocol have ratified the Kigali Amendment (as of 12 November 2024).

- HFC-152a: In addition to its use as blowing agent, it has been used in plastics as a biocide, colorant, filler, light stabilizer, lubricant, odor agent, and other processing aid (Plast Chem, 2024).
- Certain HFCs, such as HFC-143a, HFC 134a, HFC-125, HFC-245fa, HFC-125 and HFC-32, are used as feedstocks in plastic production, which qualifies them for specific exemptions (Andersen et al., 2021).

2.2.4 Basel Convention

Main provisions:

- Each Party is to take appropriate measures to, amongst other things (Art. 4.2.):
  - Ensure that the generation of hazardous wastes and other wastes within it is reduced to a minimum, taking into account social, technological and economic aspects.
  - Ensure the availability of adequate disposal facilities for the environmentally sound management of hazardous wastes and other wastes, that shall be located, to the extent possible, within it, whatever the place of their disposal.
  - Ensure that the necessary steps are taken by persons involved in the management of hazardous wastes or other wastes to prevent pollution by hazardous wastes and other wastes resulting from the management thereof. Should such pollution occur, the consequences for human health and the environment must be minimized.
  - Ensure that transboundary movement of hazardous wastes and other wastes is reduced to the minimum towards environmentally sound and efficient management of such wastes, and is conducted in a manner that protects human health and the environment against the adverse effects which may result from such movement.
- Parties shall co-operate with each other in order to improve and achieve environmentally sound management of hazardous wastes and other wastes (Art. 10).

Relevance to plastics:

- In addition to a number of hazardous waste streams listed in Annex I, plastic wastes could be classified under a number of entries under the Basel Convention:
  - Annex II (Wastes requiring special consideration and subject to the PIC procedure): Entry Y48 covers all plastic waste, including mixtures, except those excluded.
  - Annex VIII (Hazardous waste subject to the PIC procedure): Entry A3210 covers plastic waste, including mixtures, contaminated with Annex I constituents (e.g. Y24 Arsenic and arsenic compounds; Y26 Cadmium; cadmium compounds; Y27 Antimony and antimony compounds; Y31 Lead and lead compounds) to the extent that it exhibits hazardous characteristics listed in Annex III.
  - Annex IX (Non-hazardous waste not subject to the PIC procedure): Entry B3011 covers plastic waste destined for environmentally sound recycling, almost free from contamination.
- Parties can also define or classify as hazardous wastes other than those in Annexes I or II under their national legislation. These national definitions of hazardous wastes are notified to the Secretariat and published on the Convention website.[9]

2.3 Summary of control measures for minimizing emissions and releases of chemicals

2.3.1 Stockholm Convention

Main provisions:

- Parties are required to pursue the goal of their continuing minimization and, where feasible, ultimate elimination of releases of unintentional POPs (UPOPs) listed in Part I of Annex C (Art. 5), including through the development and subsequent implementation of an action plan.

9 https://www.basel.int/Countries/NationalDefinitions/NationalDefinitionsofHazardousWastes/tabid/1480/Default.aspx

- Parties are required to implement best available techniques (BAT) and best environmental practices (BEP) for the sources listed in Annex C, Parts II and III (Art. 5d). The Convention requires Parties to phase in BAT for new sources of UPOPs in the categories listed in Part II of Annex C — including waste incinerators —as soon as practicable but no later than four years after the entry into force of the Convention for that Party (Art. 5d).
- Proposals to construct new facilities or significantly modify existing facilities using processes that release UPOPs, should prioritize alternative processes, techniques or practices that have similar usefulness, but which avoid the formation and release of UPOPs, including through the control of incineration temperature or residence time (Annex C, Part V, section B, paragraph b).

Figure 5 summarizes the main provisions for minimizing emissions and releases of chemicals in plastics under the Stockholm Convention.

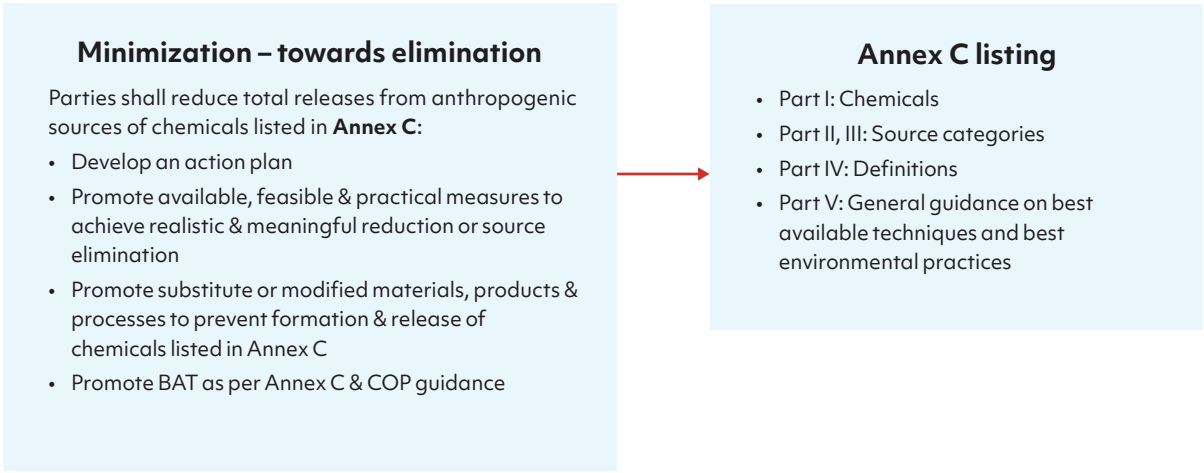


Figure 5: Main provisions for minimizing emissions and releases of chemicals in plastics under the Stockholm Convention

Relevance to plastics:

- All UPOPs listed in Annex C are relevant for plastics – as of 26 October 2024, these are:
  - Hexachlorobenzene (HCB)
  - Hexachlorobutadiene (HCBD)
  - Pentachlorobenzene (PeCB)
  - Polychlorinated biphenyls (PCB)
  - Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDDs/Fs)
  - Polychlorinated naphthalenes (PCNs)
- Sources of UPOPs of relevance to plastics listed in Part II and III of Annex C include:
  - Thermal processes involving organic matter and chlorine due to incomplete combustion or chemical reactions, including waste incinerators, and
  - Open burning of waste, including burning of landfill sites.

2.3.2 *Minamata Convention*

Main provisions:

- Parties are required to control both emissions of mercury to the atmosphere (Art. 8.3) and releases of mercury to land and water (Art. 9.4).
- Measures for restricting the emissions and releases from the use of mercury in the manufacturing processes are defined in Part II of Annex B (Art. 5.3). Parties with one or more facilities with manufacturing processes listed in Annex B must address their mercury emissions and releases (Art. 5.5a).

Relevance to plastics:

- Manufacturing processes listed in Part of Annex B of relevance to plastics include:
  - Vinyl chloride monomer production;
  - Production of polyurethane using mercury containing catalysts.

2.3.3 Montreal Protocol

Main provisions:

- Each Party that manufactures substances listed in Annex C, Group I (HCFCs), or Annex F (HFCs) shall ensure that from 1 January 2020 and each year thereafter, its emissions of Annex F, Group II (HFC-23) substances generated in each production facility that manufactures HCFCs, or Annex HFCs are destroyed to the extent practicable using technology approved by the Parties in that year (Art. 2J.6).
- Each Party shall ensure that any destruction of HFC-23 generated by facilities that produce HCFCs, or HFCs shall occur only by technologies approved by the Parties (Art. 2J.7).[10]

2.3.4 Basel Convention

- Although not specifically regulated through direct control measures within the Basel Convention, certain disposal operations require controls under the Convention and contribute to the minimization of emissions and releases of relevant chemicals.

10 A list of destruction technologies for controlled substances pursuant to decision XXXV/5 is available here: https://ozone.unep.org/resources?term_node_tid_depth%5B857%5D=857

2.4 Summary of control measures on international trade and transboundary movements of chemicals and waste

2.4.1 Stockholm Convention

Main provisions:

- Parties have an obligation to take measures to ensure import and export of chemicals listed in Annex A and Annex B are subject to only occur under specific restrictive conditions (Art. 3.2), namely:
  - Imported only for the purpose of environmentally sound disposal (as per Art. 6.1d), or for a use or purpose which is permitted for that Party under Annex A or Annex B.
  - Where an exemption for production or use (as per Art. 4) is in effect, taking into account any relevant provisions in existing international prior informed consent instruments, the chemical is exported only:
    - For the purpose of environmentally sound disposal (as per Art. 6.1d), or
    - To a Party which is permitted to use that chemical under Annex A or Annex B, or
    - To a State not Party to this Convention which has provided an annual certification to the exporting Party (see Art. 3.2b.iii) for certification requirements).

2.4.2 Minamata Convention

Main provisions:

- Parties are required to restrict the import and export of products that contain mercury ("mercury-added products") listed in Part II of Annex A (Art 4.3). Part II of Annex A applies to dental amalgam only and has little relevance to plastics.
- Art. 3 of the Minamata Convention establishes that Parties may only export mercury to other Parties or non-Parties with written consent, subject to certain requirements listed in paragraphs 6 to 8 of the same article.
- Mercury waste shall only be recovered, recycled, reclaimed or directly re-used for a use allowed to a Party under the Convention or for environmentally sound disposal pursuant to paragraph 3a (Art. 11. 3b).

- Where Parties to the Minamata Convention are also Parties to the Basel Convention, they are required to ensure that mercury waste is not transported across international boundaries except for the purpose of environmentally sound disposal in conformity with the Convention and the guidelines of the Basel Convention (Art. 11.3c).
- Where transport across international boundaries involves a country not Party to the Basel Convention, a Party to the Minamata Convention shall allow the transport of mercury waste only after taking into account relevant international rules, standards, and guidelines (Art. 11.3c).

2.4.3 Montreal Protocol

Main provisions:

- Parties are required to ban the import and export of any controlled substances in Annexes A, B, C and E from or to any State not Party to the Protocol (Art. 4).
- From 1 January 2033, Parties will be required to ban the import and export of controlled substances in Annex F from or to any Party for which the Kigali Amendment has not yet entered into force (Art. 4.2 sept and 4.5 to 4.8 in relation to Art. IV(2) of the Kigali Amendment).
- If a Party is unable cease production of a controlled substance for domestic consumption after the applicable phase-out date, other than for uses agreed by the Parties to be essential, it must ban the export of used, recycled and reclaimed quantities of that substance, except for destruction purposes (Art. 4A).
- Parties must 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 (Art. 4B). Each Party shall, within three months of the date of introducing its licensing system, report to the Secretariat on the establishment and operation of that system (Art. 4B.3).

2.4.4 Rotterdam Convention

Main provisions:

- The control measures under the Rotterdam Convention center around the prior informed consent procedure and the obligation to transmit export notifications.
- All importing States have an obligation to implement appropriate measures to ensure that they take timely decisions about whether they wish to consent to the future import of the chemicals listed in Annex III (Art. 10).

- Exporting Parties also have a shared responsibility, with an obligation to take measures to ensure exporters comply with import responses and to ensure that chemicals listed in Annex III are not exported to any importing Party that, in exceptional circumstances, has failed to transmit a response or has transmitted an interim response that does not contain an interim decision, unless:

  - It is a chemical that, at the time of import, is registered as a chemical in the importing Party; or
  - It is a chemical for which evidence exists that it has previously been used in, or imported into, the importing Party and in relation to which no regulatory action to prohibit its use has been taken; or
  - Explicit consent to the import has been sought and received by the exporter (Art. 11.2).

- When a chemical that is not listed in Annex III, but is banned or severely restricted by a Party, is exported from its territory, that Party shall notify each individual importing Party before prior to the first shipment export following adoption of this action and before the first export in any calendar annually year thereafter (Art. 12.1-2).

Relevance to plastics:

- The following hazardous chemicals or groups of chemicals with relevance to plastics (alongside other uses) have been listed in Annex III to the Rotterdam Convention (BRS, 2023):

  - PFOS, its salts and PFOSF
  - PBDEs[11]
  - SCCPs
  - HBCD
  - DecaBDE
  - PFOA, it salts and PFOA-related compounds
  - Tributyltin compounds (tributyltin chloride, tributyltin methacrylate and bis(tributyltin)oxide)
  - PCB

11 Tetrabromodiphenyl ether, pentabromodiphenyl ether, hexabromodiphenyl ether and heptabromodiphenyl ether

- The Convention has listed several chemicals used in plastics as pesticides (Ethylene dichloride, Ethylene oxide, 1,2-dibromoethane, mercury compounds) and one as a severely hazardous pesticide formulation (Thiaram) (Wiesinger et al., 2021). Additionally, Tributyltin compounds are listed in both pesticide and industrial categories.

2.4.5 Basel Convention

Main provisions:

- The control measures under the Basel Convention center around the control procedure set out in Art. 6, based on notification, consent and issuance of the movement document, transboundary movement and finally confirmation of disposal.
- Parties must prevent the import of hazardous wastes and other wastes if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner (Art. 4.2g).
- The export of such wastes shall only be allowed if the State of export does not have the technical capacity and the necessary facilities, capacity or suitable disposal sites to dispose of the wastes in an environmentally sound and efficient manner; or the wastes are required as a raw material for recycling or recovery industries in the State of import (Art. 4.9a-b).
- Parties are not to allow such wastes to be exported to or imported from a non-Party (Art. 4.5) unless an agreement/arrangement is in place as per Art. 11 that does not derogate from the environmentally sound management required by the Convention.
- Parties must not allow the export of hazardous wastes and other wastes to Parties which have prohibited the import of such wastes (Art. 4.2e).
- The State of export shall not allow the transboundary movement to commence until it has received written confirmation that the notifier has written consent of the State of import and that the notifier received from the State of import confirmation of the existence of a contract between the exporter and the disposer specifying environmentally sound disposal of the wastes (Art. 6).
- Where a transboundary movement of wastes controlled under the Convention will transit through non-Party States, such States must be notified (Art. 7).

- The **Ban Amendment**,[12] requires each Party listed in Annex VII[13] to prohibit all transboundary movements to States not listed in Annex VII of: wastes covered by the Convention which are destined for final disposal; or of all transboundary movements of hazardous wastes covered under Art. 1.1a which are intended for recovery operations.
- Should Parties otherwise prohibit the import of hazardous wastes or other wastes for disposal or develop a national definition of hazardous wastes that goes beyond the scope of Article 1.1a, notification shall be given to other Parties (Art. 4.1).
- If a transboundary movement to which consent has been given as set out in the Convention cannot be completed in accordance with the terms of the contract, the State of export has an obligation to ensure that the wastes in question are taken back into the State of export, by the exporter, if alternative arrangements cannot be made for their disposal in an environmentally sound manner within the deadlines set out in Art. 8.

Relevance to plastics:

- Plastic wastes may fall into certain of the hazardous waste streams listed in Annex I or Annex VIII and Annex IX provide specific details on the types of plastic wastes covered by their entries, while Annex II provides a broad entry intended to capture all other plastic waste, including mixtures of waste. These are summarized below and detailed in Appendix 1:
  - **Annex II (Wastes requiring special consideration and subject to the PIC procedure)**
    - **Entry Y48:**[14] All plastic waste, including mixtures of such waste, except for those set out in Annex II.
  - **Annex VIII (Waste considered hazardous and subject to the PIC procedure)**
    - **Entry A3210:** Plastic waste, including mixtures of such waste, containing or contaminated with Annex I constituents, to an extent that it exhibits hazardous characteristics listed in Annex III.

12 The Ban Amendment entered into force in 2019 (Decision III/1). For information on which Parties have agreed to be bound by the Ban Amendment, please see https://www.basel.int/Countries/StatusofRatifications/BanAmendment/tabid/1344/Default.aspx
13 Parties and other States which are members of the OECD, EC, Liechtenstein
14 Parties can impose stricter requirements in relation to this entry.

- **Annex IX (Waste presumed <u>not</u> to be hazardous and not subject to the PIC procedure)**
    - **Entry B3011:** Plastic waste listed below, provided it is destined for recycling[15] in an environmentally sound manner and almost free from contamination and other types of wastes:[16]

As of 1 January 2025, all electronic and electrical waste (e-wastes) will fall within the scope of the Basel Convention, whether considered hazardous or non-hazardous. The amendments include:[17]

- **Annex II (Wastes requiring special consideration and subject to the PIC procedure)**
    - **Entry Y49:**[18]
        - All e-wastes, components thereof and wastes resulting from e-waste processing (e. g. fractions from shredding), unless covered by another entry in Annex II or by an entry in Annex IX.
- **Annex VIII (Waste presumed to be hazardous and subject to the PIC procedures).**
    - **Entry A1181:**
        - Hazardous e-wastes, components thereof and wastes resulting from e-waste processing (e. g. fractions from shredding).
- **Annex IX (Waste presumed not to be hazardous and is not subject to the PIC procedures)**
        - Entries B1110 and B4030 removed.

15 Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B) or, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.
16 In relation to "almost free from contamination and other types of wastes", international and national specifications may offer a point of reference.
17 E-waste Amendments adopted in decision BC-15/18.
18 While entry Y49 does not directly cover plastics, it is relevant because e-waste often includes plastics waste.

2.5 Summary of control measures on environmentally sound management of waste

2.5.1 Stockholm Convention

Main provisions:

- Stockpiles of chemicals listed either in Annex A or Annex B, after they are no longer allowed to be used according to any specific exemption specified in Annex A or any specific exemption or acceptable purpose specified in Annex B, shall be deemed to be waste and shall be managed in accordance with subparagraph (d). This does not apply to stockpiles that are allowed to be exported according to Art. 3.2.
- Parties must take measures to ensure that a chemical listed in Annex A or B is imported only for the purpose of environmentally sound disposal as per Art. 6.1d (Art. 3.2a.i).
- Requires Parties to manage stockpiles in a safe, efficient and environmentally sound manner and take measures so that products and articles upon becoming wastes—consisting of, containing or contaminated with a chemical listed in Annex A, B or C—are disposed so that the POP content is destroyed or irreversibly transformed or otherwise disposed of in an environmentally sound manner (Art. 6.1c-d). This does not apply when destruction or irreversible transformation does not represent the environmentally preferable option, or the POP content is low.
- The amendments listing PBDEs[19] include provisions that allow recycling of articles that contain or may contain PBDEs and the use and final disposal of articles manufactured from recycled materials that contain or may contain PBDEs if certain conditions are met, including that the recycling and final disposal is carried out in an environmentally sound manner and does not lead to recovery of PBDEs for the purpose of their reuse.

The Convention makes explicit provision for cooperation with the appropriate bodies of the Basel Convention in respect of stockpiles and wastes.

19 Hexabromodiphenyl ether, heptabromodiphenyl ether, tetrabromodiphenyl ether and pentabromodiphenyl ether.

2.5.2 Minamata Convention

Main provisions:

- A definition for mercury waste is provided in which thresholds are determined in collaboration with the Basel Convention (Art. 11.2). In addition, relevant definitions of the Basel Convention apply to those Parties who are also Party to the Basel Convention, whereas the Basel Convention definitions shall be used as guidance for Parties to the Minamata Convention that are not also Parties to the Basel Convention (Art. 11.1).
- Parties must take measures to ensure that excess mercury from decommissioned chlor-alkali facilities is disposed of in an environmentally sound manner, as per the guidelines in Art. 11.3a, without resorting to recovery, recycling, reclamation, direct re-use, or alternative uses (Art. 3.5b).
- Guidelines developed under the Basel Convention must be taken into account.
- All Parties shall, as appropriate, take appropriate measures so that mercury waste is managed in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with requirements adopted by the COP (Art. 11.3a).
- Mercury waste shall only be recovered, recycled, reclaimed or directly re-used for a use allowed to a Party under the Convention or for environmentally sound disposal pursuant to paragraph 3a (Art. 11.3b).
- Where Parties to the Minamata Convention are also Parties to the Basel Convention, they are required to ensure that mercury waste is not transported across international boundaries except for the purpose of environmentally sound disposal in conformity with the Convention and the guidelines of the Basel Convention (Art. 11.3c).
- Where transport across international boundaries involves a country not Party to the Basel Convention, a Party to the Minamata Convention shall allow the transport of mercury waste only after taking into account relevant international rules, standards, and guidelines (Art. 11.3c).

2.5.3 Montreal Protocol

Main provisions:

- Parties manufacturing Annex C, Group I, or Annex F substances are required to ensure that emissions of Annex F, Group II substances generated in such facilities are destroyed to the extent practicable using technology approved by the Parties (Art. 2J.6-7).

2.5.4 Basel Convention

Main provisions:

- Parties are required to take measures to ensure that the generation of hazardous wastes and other wastes is reduced to a minimum (Art. 4).
- This should be achieved in terms of quantity and/or hazard potential (Preamble).
- Under Art. 4, Parties also have a series of general obligations to ensure the environmentally sound management (ESM) of wastes. These obligations include, among other things, taking appropriate measures to: ensure the availability of disposal facilities for ESM that shall be located to the extent possible within the territory of the Party; ensure the reduction to the minimum of transboundary movement of hazardous wastes and other wastes; and to prevent the import of hazardous and other wastes if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner.
- Parties have also developed and adopted Technical Guidelines for the management of various types of waste streams, including Technical Guidelines on the environmentally sound management of plastic wastes. Other technical guidelines include those related to wastes consisting of, containing or contaminated with:[20]
  - Mercury or mercury compounds
  - UPOPs
  - General POPs
  - PBDEs
  - PCP and its salts and esters
  - PFOS, its salts and PFOSF; PFOA), its salts and PFOA-related compounds; and PFHx), its salts and PFHxS related compounds
  - SCCPs
  - PCBs
  - PCNs or PBBs, including HBB
- A Framework for the ESM of hazardous wastes and other wastes has been adopted, to establish a common understanding of what ESM encompasses and identify tools and strategies to promote the implementation of ESM.[21]

20 See all adopted guidelines at: https://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/TechnicalGuidelines/tabid/8025/Default.aspx
21 Decision BC-11/1; https://www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/Overview/tabid/3615/Default.aspx

Relevance to plastics:

The following guidelines related to plastics have been adopted by the Conference of the Parties to the Basel Convention:

- Technical guidelines on the ESM of plastic wastes have been developed and adopted.[22]
- Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention (E-waste).

2.6 Summary of control measures for alternatives and regrettable substitutes

2.6.1 Stockholm Convention

Main provisions:

- Proposals may be submitted by Parties to amend Annexes A, B or C and list a chemical therein. The proposals must contain the information specified in Annex D and the process for listing a chemical in Annexes A, B and C is set out in Art. 8 to the Convention.
- In the POPRC's review of proposals submitted and subsequent preparation of a risk management evaluation in accordance with Annex F, information is to be provided on socio-economic considerations including on alternatives (products processes): technical feasibility; costs, including environmental and health costs; efficacy; risk; availability; and accessibility (Annex F, para b). This information also includes any national or regional control actions taken, including information on alternatives must also be considered (Annex F, paragraph g).
- The COP shall encourage each Party using PFOS, its salts, and PFOSF to phase out these uses when suitable alternative substances or methods are available (Annex B, Part III, paragraph 4a).

22 UNEP/CHW.16/6/Add.3/Rev.1

- For unintentional production of POP emissions,
  - Annex C, Part A provides general guidance to Parties on preventing or reducing releases of Annex C chemicals, including improved waste management with the aim of cessation of open and other uncontrolled burning of wastes and that consideration should be given to alternatives when considering proposals to construct new waste disposal facilities (Annex C, Part A, paragraph f).
  - Part B on best available techniques also considers alternatives, with special consideration to be given to a number of factors, including general release reduction measures. When considering proposals to construct new facilities or slightly modifying existing facilities, priority consideration should be given to alternative processes, techniques or practices with similar functionality which also avoid the formation and release of chemicals listed in Annex C (Annex C, Part B, paragraph b).

- Parties must take appropriate measures to ensure that wastes, including products and articles upon becoming wastes, are not permitted to be subject to disposal operations that may lead to alternate uses of POPs (Art. 6.1d.iii).
- Each Party must facilitate or undertake information exchange on alternatives to POPs, including information relating to their risks and their economic and social costs (Art. 9.1b).
- Research, development and monitoring must be encouraged and/or undertaken within Parties' capabilities, where relevant on alternatives and candidate POPs, including on their (Art. 11.1):
  - Sources and releases into the environment;
  - Presence, levels and trends in humans and the environment;
  - Environmental transport, fate and transformation;
  - Effects on human health and the environment;
  - Socio-economic and cultural impacts;
  - Release reduction and/or elimination;
  - Harmonized methodologies for making inventories of generating sources and analytical techniques for the measurement of releases.

- In recognition of the possibility of regrettable substitutes, Art. 3.3 requires Parties to regulate towards preventing the production and use of new pesticides or new industrial chemicals that exhibit the characteristics of a POP by taking into consideration the criteria in Annex D, paragraph 1, where Parties have related regulatory and assessment schemes in place, and ensure that the when conducting relevant assessments, the criteria of Annex D, paragraph 1 are also considered (Art. 3.4).

2.6.2 Minamata Convention

Main provisions:

- The information provided by Parties on mercury-added products and their alternatives, or processes that use mercury or mercury compounds and their alternatives, must be collected, maintained and made publicly available by the Secretariat (Art. 4.4, Art. 5.4).
- A proposal submitted by a Party for listing a mercury-added product in Annex A, or the listing of a manufacturing process in Annex B, must include information on non-mercury alternative products that relate to their availability, technical and economic feasibility and environmental and health risks and benefits (Art. 4.7, Art. 5.9).
- In reviewing Annex A or Annex B, the COP must take into account the availability to Parties of mercury-free alternatives that are technically and economically feasible, as well as their environmental and human health risks and benefits (Art. 4.9, Art. 5.11).
- Parties are encouraged to exchange information on economically and technically feasible mercury-free alternatives related to the use of mercury and mercury compounds in manufacturing processes listed in Annex B (Art. 5.8).
- Dental amalgam is listed in Annex A, Part II and the associated measures to be taken by Parties to phase down its use shall include two or more of the listed measures. These include promoting the use of cost-effective and clinically effective mercury-free alternatives for dental restoration; encouraging sectoral education and training on the use of mercury-free dental restoration alternatives; and encouraging insurance policies and programmes that favor quality alternatives for such purposes (Annex A, Part II, Dental amalgam, paragraphs iii, v, vii).
- Measures taken by the Parties to reduce sodium or potassium methylate or ethylate shall include but not be limited to reporting to the COP on efforts to develop and/or identify alternatives to mercury use (Annex B, Part II, Sodium or Potassium Methylate or Ethylate, paragraph vi).
- For artisanal and small-scale gold mining, Parties may cooperate as appropriate to promote research into sustainable non-mercury alternative practices (Art. 7.4c).
- Parties must facilitate the exchange of information on economically viable alternatives to mercury-added products, manufacturing processes in which mercury or mercury compounds are used and activities and processes that emit or release mercury or mercury compounds. This should include information on the health and environmental risks and economic and social costs and benefits of such alternatives (Art. 17.1c).

- Parties must promote and facilitate the provision of information to the public on alternatives to mercury and mercury compounds within the capabilities of Parties (Art. 18.1a).

Relevance to plastics:

- Measures taken by the Parties to reduce mercury use in VCM production shall include but not be limited to reporting to the COP on efforts to develop and/or identify alternatives to mercury use (Annex B, Part II, Vinyl chloride monomer production, paragraph vi).

2.6.3 *Montreal Protocol*

Main provisions:

- Article 2F on HCFCs requires Parties to endeavor to ensure that the use substances listed in Annex C, Group I is limited to applications where other more environmentally suitable alternative substances or technologies are not available (paragraph 7a).
- Parties must also cooperate in promoting research, development and exchange of information on possible alternatives to controlled substances, to products containing such substances, and to products manufactured with them, where this is consistent with national regulatory frameworks and practices, and taking into account the needs of developing countries (Art. 9.1b).
- Not specified in the Protocol, but in support of these references to alternatives within the Montreal Protocol, the following applies to alternatives:
    - Submissions by Parties for amendments to Annexes A, B, C, E and F must include information as outlined in section 3.1.3l. In addition to this information the Technology and Economic Assessment Panel (TEAP) will also consider the availability and performance of alternatives, amongst other considerations.
    - Decision XXVI/9, paragraph 1a provides the following criteria for alternatives for ODSs in various sectors and subsectors, differentiating between parties operating under Art. 5.1 and parties not so operating, considering energy efficiency, regional differences and high ambient temperature conditions: 1) commercially available; 2) technically proven; 3) environmentally sound; 4) economically viable and cost-effective; 5) safe to use in areas with high urban densities considering flammability and toxicity issues, including, where possible, risk characterization; and 6) easy to service and maintain.

2.6.4 Rotterdam Convention

Main provisions:

- Parties submitting a notification of a final regulatory taken in their country regarding the phasing out or severe restriction of a chemical may include information where available on alternatives and their relative risks (Annex I, paragraph 2 (d) (ii)).
- When deciding to list a severely hazardous pesticide formulation in Annex III, the Secretariat shall collect relevant information relating to the formulation, including alternate pest-control practices (Annex IV, Part 2, paragraph h).
- Parties must ensure to the extent practicable that the public has appropriate access to information on alternatives for chemicals listed in Anne III that are safer for human health or the environment (Art. 15.2).

2.7 Summary of control measures for the right to access to information

2.7.1 Aarhus Convention

- The Aarhus Convention and its Protocol on PRTRs empower people with the rights to access information, participate in decision-making and to seek justice in environmental matters, including on plastics. Both treaties are open for accession by any UN Member State. The Aarhus Convention includes three main components: the right to know, the right to participate in decision-making and the right to redress or review.
- The Aarhus Convention requires Parties to establish mandatory systems so that there is an adequate flow of information to public authorities about proposed and existing activities which may significantly affect the environment. The Parties shall encourage operators whose activities have such effect to inform the public regularly of the environmental impact of their activities and products and develop mechanisms with a view to ensuring that sufficient product information is made available to the public in a manner which enables consumers to make informed environmental choices.

- The Convention grants the public rights and imposes on Parties and public authorities' obligations regarding:
  - Effective access to environmental information, including on chemicals, products and wastes (Art. 2.3, 4 and 5).
  - Public participation in decision-making on projects, plans, programmes, policies and legislation (Art. 6, 7 and 8).
  - Access to justice to challenge flaws in access to information and public participation or illegal decisions, acts or omission of public authorities and private persons (Art. 9).
- Parties also shall promote public participation in international decision-making processes (Art. 3.7) and protect environmental defenders exercising the above rights from penalization, persecution or harassment for their involvement (Art. 3.8).

2.7.2 Protocol on PRTRs

- The Protocol on PRTRs contribute to the prevention and reduction of pollution through the establishment of coherent and integrated PRTR systems (Art. 1). Parties to the Protocol have started to consider the use of PRTR portals to address plastic pollution related issues, including integrated reporting and data dissemination related to the production, use and recovery and disposal of several pollutants associated with plastics.
- The Protocol covers relevant reporting by operators and owners on the production of plastics, as well as reporting on disposal and recovery operations. Pursuant to activities listed under Annex I to the Protocol, operators and owners of production facilities of basic plastic materials (polymers, synthetic fibres and cellulose-based fibres), synthetic rubbers, surface-active agents and surfactants are required to report on releases and transfers. [23] Other relevant activities, such as for the surface treatment of substances, objects or products and activities related to the end of life of products, such as wastewater treatment plants, waste incineration and landfills, are also covered under the Protocol's annexes.

23 The scope of the register and reporting requirements are provided through the Protocol's articles 6 and 7, respectively. Its annexes I, II and III specify, respectively, activities, pollutants and disposal or recovery operations. See https://unece.org/environment-policy/public-participation/prtrs-protocol-text.

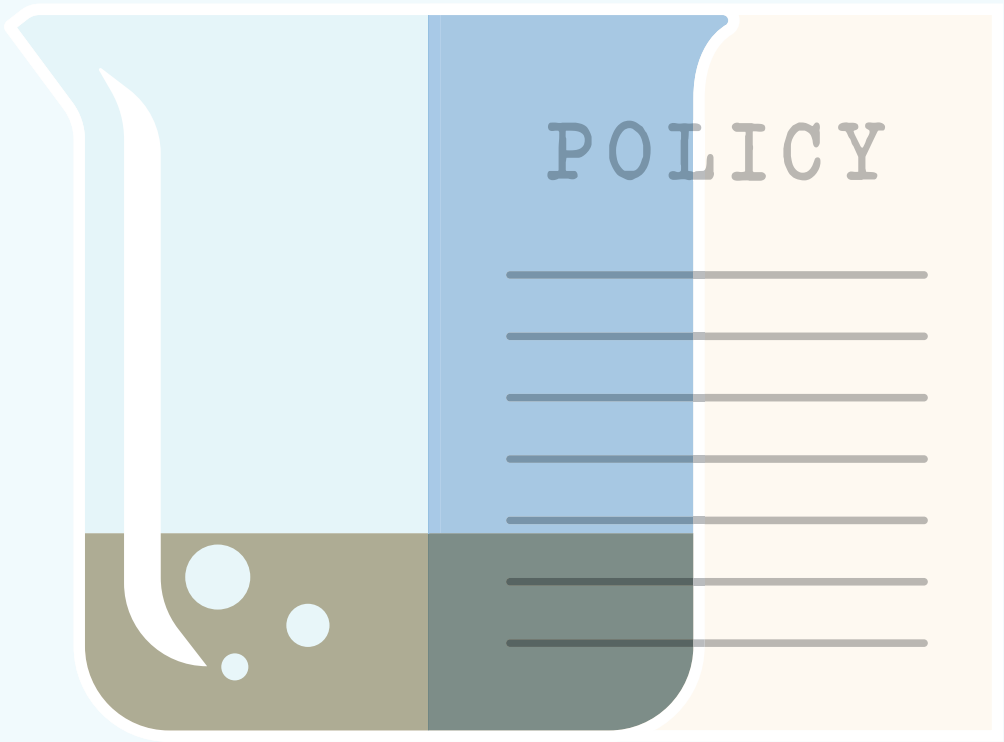
- Production of plastic and associated substances are listed in the Protocol's annexes, with the obligation to report and disseminate data on related releases and transfers. Pollutants listed in Annex II to the Protocol and that are used in the production of plastic include:
  - 1,2-dichloroethane
  - Benzene
  - Brominated diphenylethers (PBDE)
  - Chloro-alkanes, C10-C13
  - Cyanides (as total CN)
  - Di-(2-ethyl hexyl) phthalate (DEHP)
  - Ethyl benzene
  - Ethylene oxide
  - Hydrogen cyanide (HCN)
  - Naphthalene
  - Nonylphenol ethoxylates (NP/NPEs) and related substances
  - Organotin compounds (as total Sn)
  - Polychlorinated biphenyls (PCBs)
  - Vinyl chloride
  - Xylenes

- Other substances (for example, national PRTR systems may include further substances of relevance to the topic, such as hexabromobiphenyl in the European PRTR or styrene in the Czech Integrated Pollutant Register.[24]
- In addition to the above-listed reporting obligations for reporting by operators and owners (Art. 7.1-2) and 7.5), any significant releases of hazardous substances from plastic products can be covered as releases from diffuse/small point sources in PRTRs (Art. 4 and Art. 7.4 and Arts. 7.7-8).[25]

24 See also Organisation for Economic Co-operation and Development (OECD), Harmonized List of Pollutants for Global Pollutant Release and Transfer Registers (PRTRs), Series on Pollutant Release and Transfer Registers No. 26, ENV/CBC/MONO(2022)5, available at www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV-CBC-MONO(2022)5%20&doclanguage=en and www.oecd.org/chemicalsafety/pollutant-release-transfer-register/harmonised-list-reporting-sectors.xlsx. A list of substances associated with plastics covered in PRTR systems can be prepared based on input from Parties' national focal points and stakeholders. Examples can be shared through the secretariat. Please contact the secretariat at prtr.survey@un.org.

25 See also OECD, Resource Compendium of PRTR Release Estimation Techniques Part II: Summary of Techniques for Non-Point (Diffuse) Sources, Series on Pollutant Release and Transfer Registers No. 24, ENV/JM/MONO(2020)30; and OECD, Resource Compendium of PRTR Release Estimation Techniques Part IV: Summary of Techniques for Estimating Releases of Chemicals from Products, Series on Pollutant Release and Transfer Registers No. 20, ENV/JM/MONO(2017)2. Available at www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2020)30&doclanguage=en and www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2017)2&doclanguage=en, respectively.

3 SCIENCE POLICY INTERFACE FOR REVIEWING AND ADDING NEW CHEMICALS



3. Science-policy interface for reviewing and adding new chemicals

This section describes mechanisms and criteria for identification and inclusion of chemicals in MEAs, as well as describes the subsidiary scientific and technical bodies responsible for reviewing the chemicals. Table 1 provides an overview of main mechanisms for listing chemicals under MEAs.

3.1 Criteria for identification and inclusion of chemicals of concern under the MEAs

The criteria for identification and inclusion of chemicals under MEAs differ greatly and their subsequent control measures range from complete bans to information exchange through the PIC procedure. Criteria are used in the following MEAs:

- **The Stockholm Convention** establishes criteria for the identification of POPs to be eliminated or restricted, which are applied by the POPRC to review chemicals proposed for listing using the process set out in Art. 8 and the related Annexes to the Convention.
- **The Montreal Protocol** includes lists of controlled substances in Annexes A (8 listings), B (12 listings), C (75 listings), E (1 listing) and Annex F (18 listings) based on scientific information provided by the Protocol's Assessment Panels and taking into consideration other factors including the availability of suitable alternatives and resources to facilitate the transition to ozone- and climate-friendly alternatives. Although the Protocol has not defined specific criteria, the panels commonly use ozone-depleting potential and global warming potential when providing recommendations for listing.
- **The Rotterdam Convention** establishes criteria that is applied by the Chemical Review Committee in determining whether notifications of final regulatory actions by Parties meet the criteria to include the chemical in Annex III to the Convention and therefore make it subject to the PIC procedure. There is also information exchange between Parties concerning chemicals that may be of concern through the provisions on export notification and through information exchange under Art. 15 of the Convention.
- **The Basel Convention** provides characteristics in Annex III for the determination of hazardous wastes, in addition to the list in Annex I as further elaborated within Annexes VIII and IX. There is also a procedure for the review or adjustment of the lists of wastes contained in Annexes VIII and IX to the Basel Convention, as adopted by

the Conference of the Parties.[26] The Open-ended Working Group of the Convention considers and reviews applications for placement or removal of wastes in Annexes VIII and IX, which must be based on sound scientific assessment. The Basel Convention expert working group on the review of Annexes is currently reviewing Annexes I and III with a view to developing recommendations on possible amendments thereto[27].

3.1.1 Stockholm Convention

Figure 6 summarizes the main information requirements in Annexes D, E and F for listing chemicals in the Convention.

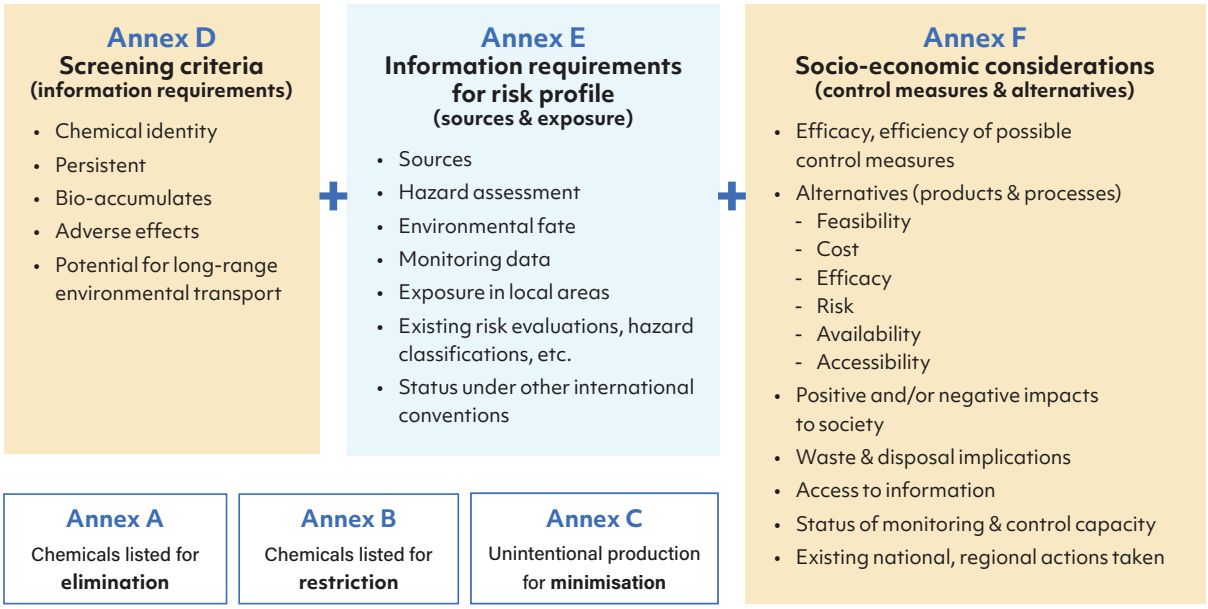


Figure 6: Annexes of the Stockholm Convention

26 Decision BC-VI/35
27 See https://www.basel.int/Implementation/LegalMatters/LegalClarity/Meetings/6thRAEWGmtg/tabid/9633/Default.aspx

Box 1 includes the screening criteria from Annex D to the Stockholm Convention, which are used to examine proposals by Parties for chemicals to be listed in Annexes A, B, and/or C to the Convention. These criteria are based on persistence, bio-accumulation, adverse effects and the potential for long-range environmental transport.

Box 1: Annex D to the Stockholm Convention: Information Requirements and Screening Criteria

1. "A Party submitting a proposal to list a chemical in Annexes A, B and/or C shall identify the chemical in the manner described in subparagraph (a) and provide the information on the chemical, and its transformation products where relevant, relating to the screening criteria set out in subparagraphs (b) to (e):

(a) Chemical identity:

(i) Names, including trade name or names, commercial name or names and synonyms, Chemical Abstracts Service (CAS) Registry number, International Union of Pure and Applied Chemistry (IUPAC) name; and

(ii) Structure, including specification of isomers, where applicable, and the structure of the chemical class;

(b) Persistence:

(i) Evidence that the half-life of the chemical in water is greater than two months, or that its half-life in soil is greater than six months, or

(ii) that its half-life in sediment is greater than six months; or

(iii) Evidence that the chemical is otherwise sufficiently persistent to justify its consideration within the scope of this Convention;

(c) Bio-accumulation:

(i) Evidence that the bio-concentration factor or bio-accumulation factor in aquatic species for the chemical is greater than 5,000 or, in the absence of such data, that the log Kow is greater than 5;

(ii) Evidence that a chemical presents other reasons for concern, such as high bio-accumulation in other species, high toxicity or ecotoxicity; or

(iii) Monitoring data in biota indicating that the bio-accumulation potential of the chemical is sufficient to justify its consideration within the scope of this Convention;

(d) Potential for long-range environmental transport:

(i) Measured levels of the chemical in locations distant from the sources of its release that are of potential concern;

(ii) Monitoring data showing that long-range environmental transport of the chemical, with the potential for transfer to a receiving environment, may have occurred via air, water or migratory species; or

(iii) Environmental fate properties and/or model results that demonstrate that the chemical has a potential for long-range environmental transport through air, water or migratory species, with the potential for transfer to a receiving environment in locations distant from the sources of its release. For a chemical that migrates significantly through the air, its half-life in air should be greater than two days; and

(e) Adverse effects:

(i) Evidence of adverse effects to human health or to the environment that justifies consideration of the chemical within the scope of this Convention; or

(ii) Toxicity or ecotoxicity data that indicate the potential for damage to human health or to the environment.

2. The proposing Party shall provide a statement of the reasons for concern including, where possible, a comparison of toxicity or ecotoxicity data with detected or predicted levels of a chemical resulting or anticipated from its long-range environmental transport, and a short statement indicating the need for global control.

3. The proposing Party shall, to the extent possible and taking into account its capabilities, provide additional information to support the review of the proposal referred to in paragraph 6 of Article 8. In developing such a proposal, a Party may draw on technical expertise from any source."

Once the Secretariat verifies the proposal includes all the required information as per Annex D, it forwards the proposal to the POPRC. The Committee prepares a draft risk profile based on the requirements in Annex F to the Convention. The information required on sources and exposure is listed in Box 2.

Box 2: Annex E to the Stockholm Convention: Information Requirements for the Risk Profile

"The purpose of the review is to evaluate whether the chemical is likely, as a result of its long-range environmental transport, to lead to significant adverse human health and/or environmental effects, such that global action is warranted. For this purpose, a risk profile shall be developed that further elaborates on, and evaluates, the information referred to in Annex D and includes, as far as possible, the following types of information:

(a) Sources, including as appropriate:

  (i) Production data, including quantity and location;

  (ii) Uses; and

  (iii) Releases, such as discharges, losses and emissions;

(b) Hazard assessment for the endpoint or endpoints of concern, including a consideration of toxicological interactions involving multiple chemicals;

(c) Environmental fate, including data and information on the chemical and physical properties of a chemical as well as its persistence and how they are linked to its environmental transport, transfer within and between environmental compartments, degradation and transformation to other chemicals. A determination of the bio-concentration factor or bio- accumulation factor, based on measured values, shall be available, except when monitoring data are judged to meet this need;

(d) Monitoring data;

(e) Exposure in local areas and, in particular, as a result of long-range environmental transport, and including information regarding bio- availability;

(f) National and international risk evaluations, assessments or profiles and labelling information and hazard classifications, as available; and

(g) Status of the chemical under international conventions."

After preparation of the risk profile in accordance with Annex E, the POPRC prepares a risk management evaluation, based on the information requirements set out in Annex F to the Stockholm Convention. The information on control measures and alternatives is replicated in Box 3. The Committee, based on the risk profile and the risk management evaluation, recommends whether the chemical should be considered for listing and classified as a POP for the purposes of the Convention. The COP, taking into account the recommendations, including any scientific uncertainty, decides in a precautionary manner whether to list the chemical and specify its related control measures.

Box 3: Annex F to the Stockholm Convention: Information on Socio-Economic Considerations

"An evaluation should be undertaken regarding possible control measures for chemicals under consideration for inclusion in this Convention, encompassing the full range of options, including management and elimination. For this purpose, relevant information should be provided relating to socio-economic considerations associated with possible control measures to enable a decision to be taken by the Conference of the Parties. Such information should reflect due regard for the differing capabilities and conditions among the Parties and should include consideration of the following indicative list of items:

(a) Efficacy and efficiency of possible control measures in meeting risk reduction goals:
  (i) Technical feasibility; and
  (ii) Costs, including environmental and health costs;

(b) Alternatives (products and processes):
  (i) Technical feasibility;
  (ii) Costs, including environmental and health costs;
  (iii) Efficacy;
  (iv) Risk;
  (v) Availability; and
  (vi) Accessibility;

(c) Positive and/or negative impacts on society of implementing possible control measures:
  (i) Health, including public, environmental and occupational health;
  (ii) Agriculture, including aquaculture and forestry;
  (iii) Biota (biodiversity);
  (iv) Economic aspects;
  (v) Movement towards sustainable development; and
  (vi) Social costs;

(d) Waste and disposal implications (in particular, obsolete stocks of pesticides and clean-up of contaminated sites):
  (i) Technical feasibility; and
  (ii) Cost;

(e) Access to information and public education;

(f) Status of control and monitoring capacity; and

(g) Any national or regional control actions taken, including information on alternatives, and other relevant risk management information."

3.1.2 Minamata Convention

The Convention restricts specifically elemental mercury and mercury compounds. Art. 2 defines mercury compounds. The term "mercury compounds" in Art. 3 refers to specific compounds, including Mercury chloride, Mercury oxide, Mercury sulfate, Mercury nitrate, Cinnabar and Mercury sulfide.

The Minamata Convention specifies the types of information that must be provided by a proponent of an amendment to add products or processes to Annex A or B, respectively, in order to demonstrate the mercury-added product or the manufacturing process should be listed. The Convention restricts specifically elemental mercury and mercury compounds. Art. 2 defines mercury compounds. The term "mercury compounds" in Art. 3 refers to specific compounds, including Mercury chloride, Mercury oxide, Mercury sulfate, Mercury nitrate, Cinnabar and Mercury sulfide.

The Convention allows for the listing of mercury compounds in an additional annex and evaluating whether such compounds should be subject to trade restrictions (Art 3.13), but does not specify criteria to be used in such evaluation.

Moreover, Art. 26.1-2 of the Convention allows for adoption and amendment of Annexes. This also applies to Annex A, which includes lists of mercury-added products, and Annex B, which includes lists of manufacturing processes that use mercury and mercury compounds. Although adoption by consensus is the preferred option for adopting amendments, the Convention also resorts to a three-fourths majority voting (Art. 26.3). Figure 7 outlines the main composition of lists included in Annexes A and B of the Minamata Convention.

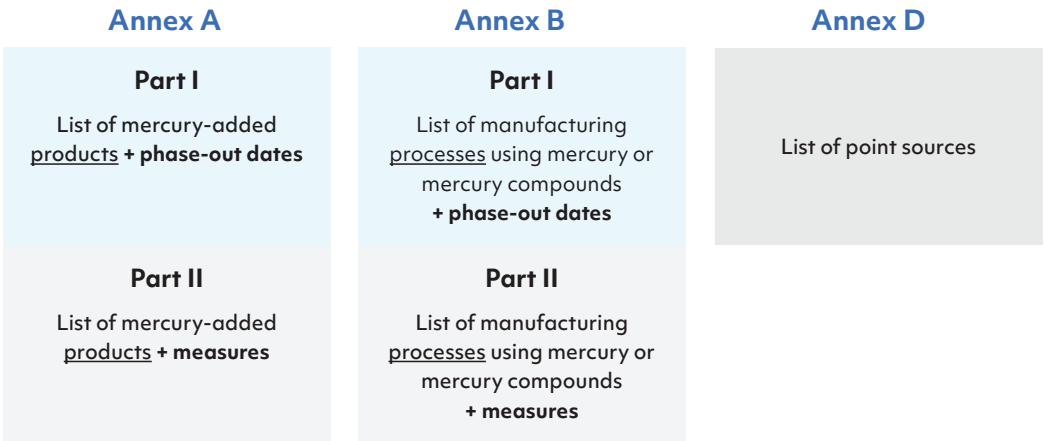


Figure 7: Main composition of lists included in Annexes A and B of the Minamata Convention

3.1.3 Montreal Protocol

The Montreal Protocol controls groups of ODSs in Annexes A, B, C and E and HFCs in Annex F. The inclusion of these substances under the Montreal Protocol is based on the Parties' consideration of scientific information including the ozone-depleting potential, the global warming potential, the atmospheric lifetime of these substances and the associated effects on human health and the environment as well as other key factors such as the availability of suitable alternatives and necessary resources to facilitate the transition to those. Amendments have been agreed by the Meetings of the Parties five times,[28] most recently adding the phase-down of HFCs in 2016. While a two-thirds majority of the Parties to the Protocol that are present and voting suffices for the adoption of an amendment (Article 9.4 of the Vienna Convention), all five amendments have been adopted by consensus. Several adjustments to the Montreal Protocol have also been agreed by Meetings of the Parties over the years.[29]

Decisions of the parties to amend or adjust the Montreal Protocol are informed by the assessments of the Protocol's three assessment panels, which also include information on the ozone depleting potential,[30] global warming potential[31] and atmospheric lifetime[32] of the chemicals concerned.

3.1.4 Rotterdam Convention

A notification by Parties in two different prior informed consent regions triggers a process by which the notifications are reviewed to determine whether to recommend to the COP that the chemical is made subject to the PIC procedure and listed in Annex III to the Convention.

Box 4 lists the information that Parties are required to include in their notification to the Secretariat on final regulatory action. The Secretariat verifies whether the notification contains the information required by Annex I and if so, it forwards to all Parties a summary of the information received. When the Secretariat has received at least one notification from each of two PIC regions regarding a particular chemical that are verified to meet the Annex I requirements, it forwards them to the CRC.

28 https://ozone.unep.org/treaties/montreal-protocol/amendments.
29 https://ozone.unep.org/treaties/montreal-protocol/adjustments-montreal-protocol.
30 Ozone depleting potential: A measure of the relative impact a chemical can have on ozone depletion compared to an equal mass of trichlorofluoromethane (CFC-11), which has an ODP reference value of 1.
31 Greenhouse warming potential: A measure of the relative climate forcing of 1 ton of a gas emitted to the atmosphere over a specific period, compared to 1 ton of carbon dioxide (CO_2), which has a GWP reference value of 1
32 Atmospheric lifetime: The time to remove or convert about 63% of a gas is often called its atmospheric lifetime.

Box 4: Rotterdam Convention Annex I: Information Requirements for Notifications Made Pursuant to Article 5

"Notifications shall include:

1. Properties, identification and uses

(a) Common name;

(b) Chemical name according to an internationally recognized nomenclature (for example, International Union of Pure and Applied Chemistry (IUPAC)), where such nomenclature exists;

(c) Trade names and names of preparations;

(d) Code numbers: Chemical Abstracts Service (CAS) number, Harmonized System customs code and other numbers;

(e) Information on hazard classification, where the chemical is subject to classification requirements;

(f) Use or uses of the chemical;

(g) Physico-chemical, toxicological and ecotoxicological properties.

2. Final regulatory action

(a) Information specific to the final regulatory action:

(i) Summary of the final regulatory action;

(ii) Reference to the regulatory document;

(iii) Date of entry into force of the final regulatory action;

(iv) Indication of whether the final regulatory action was taken on the basis of a risk or hazard evaluation and, if so, information on such evaluation, covering a reference to the relevant documentation;

(v) Reasons for the final regulatory action relevant to human health, including the health of consumers and workers, or the environment;

(vi) Summary of the hazards and risks presented by the chemical to human health, including the health of consumers and workers, or the environment and the expected effect of the final regulatory action;

(b) Category or categories where the final regulatory action has been taken, and for each category:

(i) Use or uses prohibited by the final regulatory action;

(ii) Use or uses that remain allowed;

(iii) Estimation, where available, of quantities of the chemical produced, imported, exported and used;

(c) An indication, to the extent possible, of the likely relevance of the final regulatory action to other States and regions;

(d) Other relevant information that may cover:

(i) Assessment of socio-economic effects of the final regulatory action;

(ii) Information on alternatives and their relative risks, where available, such as:

– Integrated pest management strategies;

– Industrial practices and processes, including cleaner technology."

Box 5 replicates the criteria set out in Annex II to the Convention – the CRC reviews the information in the notifications and, in accordance with the Annex II criteria, recommends to the COP whether the chemical in question should be made subject to the PIC procedure and accordingly be listed in Annex III.

Box 5: Annex II Criteria for Listing Banned or Severely Restricted Chemicals in Annex III

"In reviewing the notifications forwarded by the Secretariat pursuant to paragraph 5 of Article 5, the Chemical Review Committee shall:

(a) Confirm that the final regulatory action has been taken in order to protect human health or the environment;

(b) Establish that the final regulatory action has been taken as a consequence of a risk evaluation. This evaluation shall be based on a review of scientific data in the context of the conditions prevailing in the Party in question. For this purpose, the documentation provided shall demonstrate that:

  (i) Data have been generated according to scientifically recognized methods;

  (ii) Data reviews have been performed and documented according to generally recognized scientific principles and procedures;

  (iii) The final regulatory action was based on a risk evaluation involving prevailing conditions within the Party taking the action;

(c) Consider whether the final regulatory action provides a sufficiently broad basis to merit listing of the chemical in Annex III, by taking into account:

  (i) Whether the final regulatory action led, or would be expected to lead, to a significant decrease in the quantity of the chemical used or the number of its uses;

  (ii) Whether the final regulatory action led to an actual reduction of risk or would be expected to result in a significant reduction of risk for human health or the environment of the Party that submitted the notification;

  (iii) Whether the considerations that led to the final regulatory action being taken are applicable only in a limited geographical area or in other limited circumstances;

  (iv) Whether there is evidence of ongoing international trade in the chemical;

(d) Take into account that intentional misuse is not in itself an adequate reason to list a chemical in Annex III."

Additionally, there is another mechanism whereby Parties to the Rotterdam Convention that are developing countries or countries with economies in transition experiencing problems caused by a severely hazardous pesticide formulation under conditions of use in their territory may propose to the Secretariat the listing of a severely hazardous pesticide (Art. 6). The proposal does not require notification by Parties in two different regions, as for banned or severely restricted chemicals under Art. 5.

Once the requirements in Article 6.2-3 are fulfilled—meaning the proposing Party submits necessary documents (Annex III, Part I) and the Secretariat gathers additional information (Annex III, Part II)—the proposal is forwarded to the CRC.

The CRC then reviews the information, applying the criteria for listing severely hazardous pesticide formulations in Annex III as outlined in Annex IV, Part 3 (see Box 6), and makes a recommendation to the COP on whether to make the formulation subject to the PIC procedure and list it in Annex III.

Box 6: Criteria for listing severely hazardous pesticide formulations in Annex III (Part 3)

"In reviewing the proposals forwarded by the Secretariat pursuant to paragraph 5 of Article 6, the Chemical Review Committee shall take into account:

(a) The reliability of the evidence indicating that use of the formulation, in accordance with common or recognized practices within the proposing Party, resulted in the reported incidents;

(b) The relevance of such incidents to other States with similar climate, conditions and patterns of use of the formulation;

(c) The existence of handling or applicator restrictions involving technology or techniques that may not be reasonably or widely applied in States lacking the necessary infrastructure;

(d) The significance of reported effects in relation to the quantity of the formulation used;

(e) That intentional misuse is not in itself an adequate reason to list a formulation in Annex III."

3.1.5 Basel Convention

The scope of the Basel Convention covers transboundary movements of hazardous wastes set out in Annex I to the Convention (as elaborated by Annexes VIII and IX), unless they do not contain any of the hazardous characteristics contained in Annex III; wastes considered or defined as hazardous under national legislation and notified to the Secretariat; and other wastes requiring special consideration belonging to any category contained in Annex II.

Box 7 lists the characteristics that wastes may exhibit, making them hazardous for the purposes of this Convention. Where wastes are listed as hazardous under the Basel Convention, assessment against the hazardous characteristics in Annex III may demonstrate the wastes are not to be considered hazardous. Conversely, where wastes are listed as non-hazardous under the Basel Convention, assessment against the hazardous characteristics in Annex III may demonstrate the wastes are to be considered hazardous. Assessment and classification of the wastes is determined by Parties to the Convention. Figure 9 illustrates this process, highlighting with an asterisk those annexes that contain entries specific to plastics (see Box 8 for a full list of entries in Annex I and section 2.4.5 for discussion on entries specific to plastic wastes).

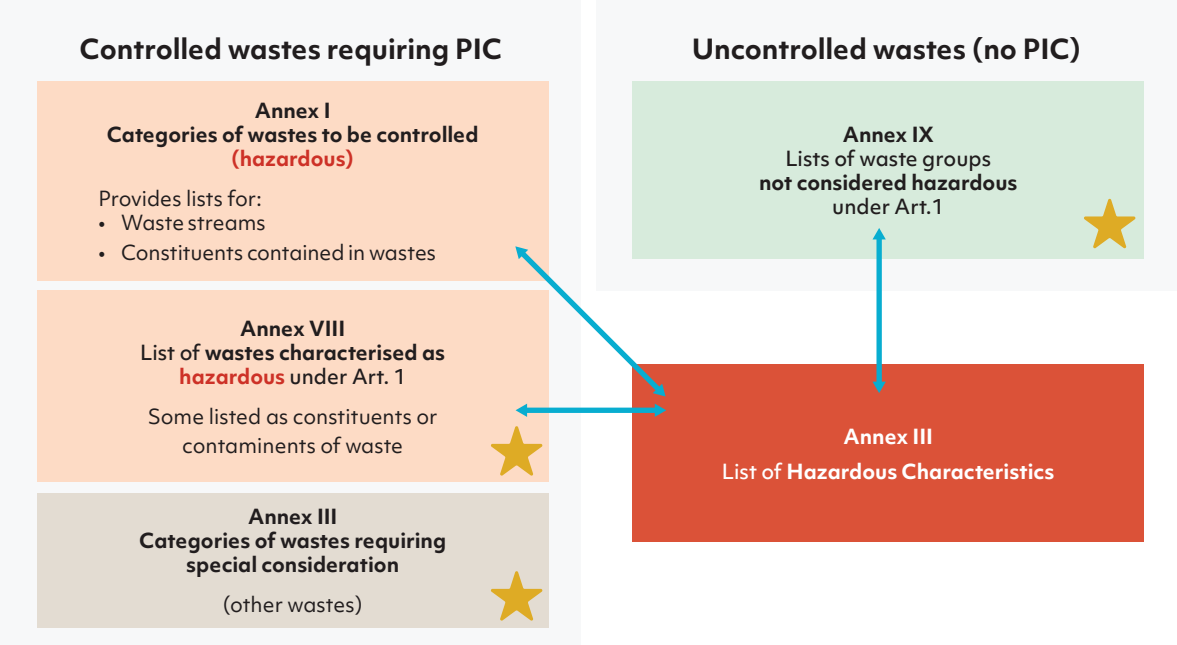


Figure 8: *Determination of hazard under the Basel Convention*

Box 7: Annex III List of Hazardous Characteristics for the purposes of the Basel Convention

Listings are linked to the hazard classification system included in the United Nations Recommendations on the Transport of Dangerous Goods (ST/SG/AC.10/1Rev.5, United Nations, New York, 1988):

1. **Explosive** – An explosive substance or waste is a solid or liquid substance or waste (or mixture of substances or wastes) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings.
2. **Flammable liquids** – The word "flammable" has the same meaning as "inflammable". Flammable liquids are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (for example, paints, varnishes, lacquers, etc., but not including substances or wastes otherwise classified on account of their dangerous characteristics) which give off a flammable vapour at temperatures of not more than 60.5oC, closed-cup test, or not more than 65.6oC, open-cup test.

3. **Flammable solids** – Solids, or waste solids, other than those classed as explosives, which under conditions encountered in transport are readily combustible, or may cause or contribute to fire through friction.
4. **Substances or wastes liable to spontaneous combustion** – Substances or wastes which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up on contact with air, and being then liable to catch fire.
5. **Substances or wastes which, in contact with water emit flammable gases** – Substances or wastes which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.
6. **Oxidizing** – Substances or wastes which, while in themselves not necessarily combustible, may, generally by yielding oxygen cause, or contribute to, the combustion of other materials.
7. **Organic Peroxides** – Organic substances or wastes which contain the bivalent-o-o-structure are thermally unstable substances which may undergo exothermic self-accelerating decomposition.
8. **Poisonous (Acute)** – Substances or wastes liable either to cause death or serious injury or to harm human health if swallowed or inhaled or by skin contact.
9. **Infectious substances** – Substances or wastes containing viable micro organisms or their toxins which are known or suspected to cause disease in animals or humans.
10. **Corrosives** – Substances or wastes which, by chemical action, will cause severe damage when in contact with living tissue, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport; they may also cause other hazards.
11. **Liberation of toxic gases in contact with air or water** – Substances or wastes which, by interaction with air or water, are liable to give off toxic gases in dangerous quantities.
12. **Toxic (Delayed or chronic)** – Substances or wastes which, if they are inhaled or ingested or if they penetrate the skin, may involve delayed or chronic effects, including carcinogenicity.
13. **Ecotoxic** – Substances or wastes which if released present or may present immediate or delayed adverse impacts to the environment by means of bioaccumulation and/or toxic effects upon biotic systems.
14. **Capable, by any means, after disposal, of yielding another material**, e.g., leachate, which possesses any of the characteristics listed above.

Box 8 lists the categories of wastes that are considered hazardous and controlled under the Basel Convention, which are listed in Annex I.

Box 8: Annex I - Categories of wastes to be controlled for the purposes of the Basel Convention

Waste streams:

Y1 Clinical wastes from medical care in hospitals, medical centers and clinics

Y2 Wastes from the production and preparation of pharmaceutical products

Y3 Waste pharmaceuticals, drugs and medicines

Y4 Wastes from the production, formulation and use of biocides and phytopharmaceuticals

Y5 Wastes from the manufacture, formulation and use of wood preserving chemicals

Y6 Wastes from the production, formulation and use of organic solvents

Y7 Wastes from heat treatment and tempering operations containing cyanides

Y8 Waste mineral oils unfit for their originally intended use

Y9 Waste oils/water, hydrocarbons/water mixtures, emulsions

Y10 Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)

Y11 Waste tarry residues arising from refining, distillation and any pyrolytic treatment

Y12 Wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish

Y13 Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives

Y14 Waste chemical substances arising from research and development or teaching activities which are not identified and/or are new and whose effects on man and/or the environment are not known

Y15 Wastes of an explosive nature not subject to other legislation

Y16 Wastes from production, formulation and use of photographic chemicals and processing materials

Y17 Wastes resulting from surface treatment of metals and plastics

Y18 Residues arising from industrial waste disposal operations

Wastes having as constituents:

Y19 Metal carbonyls

Y20 Beryllium; beryllium compounds

Y21 Hexavalent chromium compounds

Y22 Copper compounds

Y23 Zinc compounds

Y24 Arsenic; arsenic compounds

Y25 Selenium; selenium compounds

Y26 Cadmium; cadmium compounds

Y27 Antimony; antimony compounds

Y28 Tellurium; tellurium compounds

Y29 Mercury; mercury compounds

Y30 Thallium; thallium compounds

Y31 Lead; lead compounds

Y32 Inorganic fluorine compounds excluding calcium fluoride

Y33 Inorganic cyanides

Y34 Acidic solutions or acids in solid form Y35 Basic solutions or bases in solid form

Y36 Asbestos (dust and fibres)

Y37 Organic phosphorus compounds

Y38 Organic cyanides

Y39 Phenols; phenol compounds including chlorophenols

Y40 Ethers

Y41 Halogenated organic solvents

Y42 Organic solvents excluding halogenated solvents

Y43 Any congenor of polychlorinated dibenzo-furan

Y44 Any congenor of polychlorinated dibenzo-p-dioxin

Y45 Organohalogen compounds other than substances referred to in this Annex (e.g. Y39, Y41, Y42, Y43, Y44)

3.1.6 Summary of criteria

Table 1 provides a summary of screening criteria and their application to a selection of chemicals commonly used in plastics.

It is important to note that the criteria listed in Annex D to the Stockholm Convention are for screening purposes only and do not by themselves determine a chemical to be a POP. The classification of a chemical as a POP for the purposes of the Convention requires additional assessment of the information required in Annexes E and F (see section 4.1), as well as consideration by the COP.

Table 1: *Summary of screening criteria and their application to a selection of chemicals commonly used in plastics*

Stockholm Convention (Annex D, E, F)	Montreal Protocol (non-exhaustive list)	Minamata Convention	Rotterdam Convention (Annex II - Criteria for listing banned and severely restricted chemicals in Annex III)[33]	Basel Convention (Annex III – Hazardous Characteristics)
Annex D: Information requirements and screening criteria[34] • Persistence • Bio-accumulation • Potential for long-range environmental transport • Adverse effects[35] (incl. potential for damage to human health or environment **Annex E Information requirements for the risk profile** • Sources • Hazard assessment • Environmental fate • Exposure in local areas • Existing risk evaluations, hazard classifications, etc. • Status under other international conventions	• Ozone depleting potential • Global warming potential • Atmospheric lifetime • Effects on human health and the environment • Availability and performance of alternatives • Other	• No criteria • Focus on Elemental mercury and mercury compounds	• **Final regulatory action taken to protect health or the environment** • **Risk evaluation conducted supporting final regulatory action** – Data generated uses recognized scientific methods – Data reviews follow recognized scientific standards – Action is based on risk evaluation involving prevailing conditions in the Party taking the action • **Final regulatory action provides a broad basis for listing** – Action significantly decreases the quantity of the chemical used or its number of uses – Health or environmental risks are actually reduced or expected to significantly reduce – Action applies only to a specific areas or limited circumstances • **Ongoing international trade in the chemical is evident** • **Intentional misuse alone does not justify listing**	• Explosive • Flammable liquids • Flammable solids • Liable to spontaneous combustion • Emit flammable gases when in contact with water • Oxidizing • Contain Organic Peroxides • Poisonous (Acute) • Infectious substances • Corrosives • Liberation of toxic gases on interaction with air or water • Toxic (Delayed or chronic) • Ecotoxic • Can yield another material possessing any of the above characteristics

33 In addition, Annex IV to the Rotterdam Convention provides information and criteria for listing severely hazardous pesticide formulations in Annex III.
34 Information requirements for Annex D also include chemical identity.
35 While the convention itself does not explicitly list specific types of toxic effects, regulatory agencies and scientific bodies commonly assess carcinogenicity, mutagenicity, reproductive toxicity, and other adverse effects during chemical assessments when determining whether a chemical meets the criteria for listing as a POP.

3.2 Subsidiary scientific and technical bodies for listing chemicals of concern

3.2.1 Stockholm Convention Persistent Organic Pollutants Review Committee (POPRC)

POPRC serves as a scientific body for reviewing proposals to list new chemicals under the Stockholm Convention as POPs, in accordance with the process set out in Art. 8 and the information requirements specified in Annexes D, E and F to the Convention. Any Party to the convention may propose a chemical for inclusion in Annex A (elimination), Annex B (restriction) and/or Annex C (UPOPs) based on screening criteria detailed in Annex D. This is followed by an evaluation of significant adverse effects on human health and the environment outlined in Annex E, and concludes with consideration of control measures and socio-economic aspects per Annex F. The review of chemicals takes a number of meetings to conclude as it includes three steps: screening, risk profile, and risk management evaluation.

Figure 9 provides an overview of the process for listing chemicals under the Stockholm Convention. The steps are described below:

1. A Party submits a proposal to list a chemical under the Stockholm Convention, meeting Annex requirements (Art 8.1).
2. The Secretariat verifies the proposal's compliance with Annex D and forwards it to the POPRC if satisfied (Art. 8.2).
3. In its initial meeting, the POPRC reviews how the proposal meets the initial screening criteria listed in Annex D (persistence, bioaccumulation, long-range environmental transport and adverse effects) that justify consideration of the chemical within the scope of the Convention (Art 8.3).
4. The POPRC then aims to help evaluate whether the chemical is likely, as a result of its long-range environmental transport, to lead to significant adverse human health and/or environmental effects, in accordance with Annex E (Art 8.4). Annex E builds upon the screening initiated in Annex D by extending it through the development of a detailed risk profile. This risk profile provides a more comprehensive evaluation of the chemical's potential for significant adverse effects on human health and the environment. Information requirements for the risk profile outlined in Annex E include sources, hazard assessment for the endpoint or endpoints of concern, environmental fate, monitoring data, national and international risk evaluations, assessments or profiles and labelling information and hazard classifications, and status of the chemical under international conventions.

5. Subsequently, the POPRC evaluates the information on socio-economic considerations associated with possible control measures to enable a decision to be taken by the COP (Art. 8.6). The POPRC takes into account, inter alia, efficacy and efficiency of possible control measures in meeting risk reduction goals, alternatives, positive and/or negative impacts on society of implementing possible control measures, waste and disposal implications, access to information and public education, status of control and monitoring capacity; and any national or regional control actions taken.
6. The risk profile, including the socio-economic considerations, is submitted to the COP for a final decision on global control under the Stockholm Convention (Art 8.9).

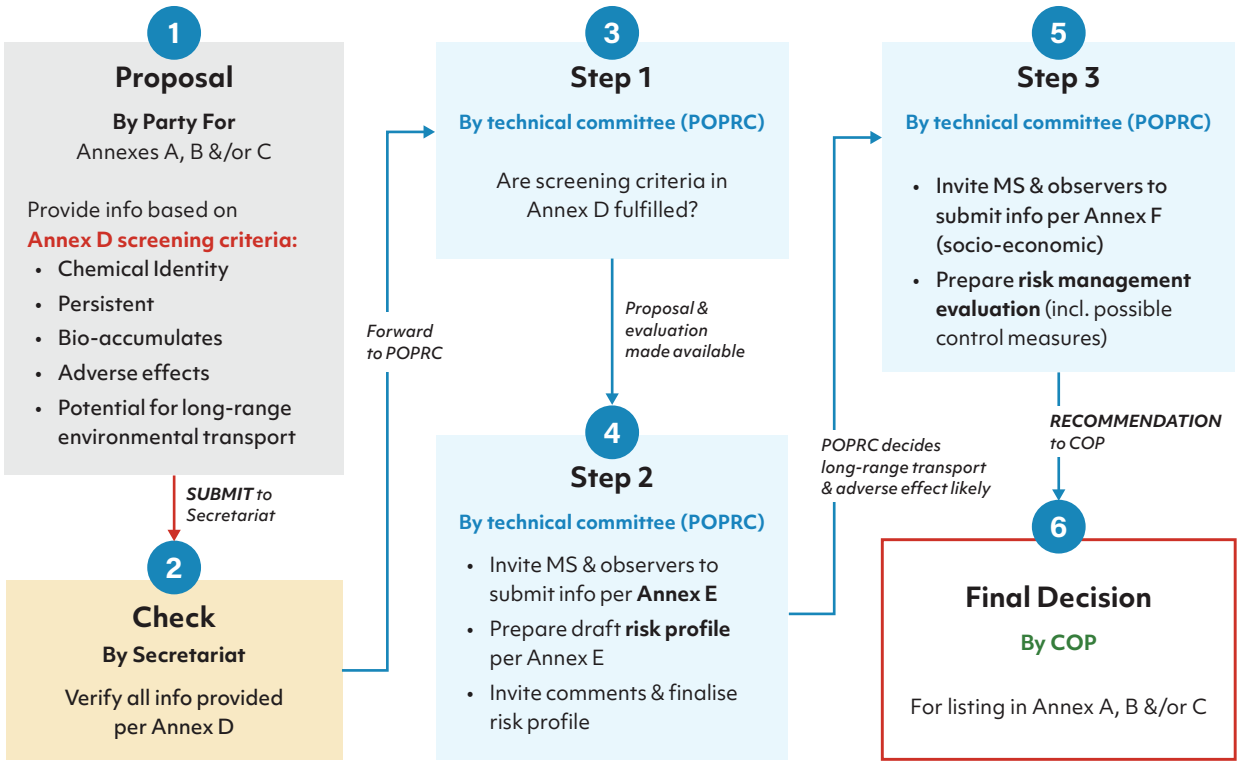


Figure 9: Process under the Stockholm Convention for listing chemicals

Note that the initial 12 chemicals listed in Annexes A and B were identified prior to the start of the Intergovernmental Negotiating Committee, i.e., before the criteria for listing under the Stockholm Convention were determined. The criteria were later negotiated, taking into account the properties of these 12 chemicals. These chemicals were assessed by the Intergovernmental Forum on Chemical Safety (IFCS) in June 1996, which concluded that the available information was sufficient to demonstrate that international action, including a global legally binding instrument, was required to minimize the risks from the 12 POPs through measures to reduce and/or eliminate their emissions or discharges.

3.2.2 *Minamata Convention ad hoc working groups*

The Convention states Annexes A and B must be kept under continuous review (Art. 23.5f). These annexes, which list mercury-added products and manufacturing processes subject to phase-out and phase-down requirements, can be amended based on Party proposals in accordance with Articles 4 and 5. The Convention does not specify criteria or other bases for the listings.

Figure 10 outlines the process for amending Annexes A and B of the Minamata Convention. The steps are described below:

1. A Party submits a proposal to the Secretariat to amend the list of mercury-added products in Annex A (Art. 4.7) and B (Art. 5.9). Information requirements include availability, technical and economic feasibility and environmental and health risks and benefits of the non-mercury alternatives to the product (Art. 4.7, 5.9).
2. The COP decides whether or not to list the mercury-added product.

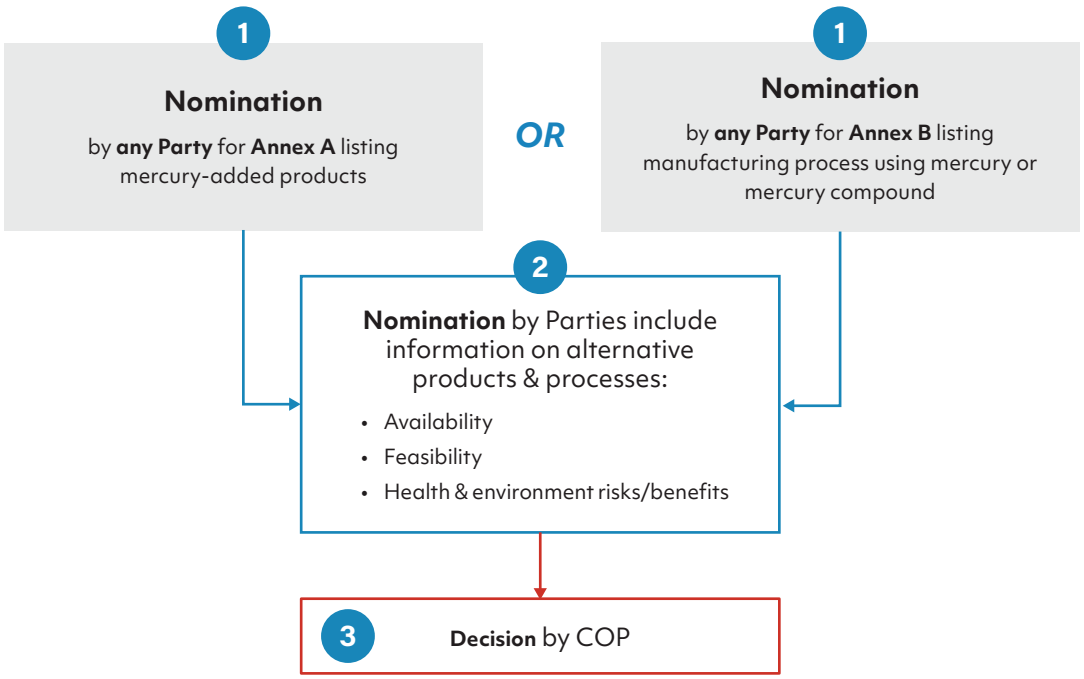


Figure 10: *Process for listing under Annexes A and B of the Minamata Convention*

3.2.3 Montreal Protocol Assessment Panels

Art 6. of the Montreal Protocol sets out provisions for quadrennial assessment of control measures provided for in Art. 2, based on best available scientific, environmental, technical and economic information. It states that Parties shall convene appropriate panels at least one year before the assessment and report to the Parties of progress. Consequently, three assessment panels have been established to form the scientific and technical basis of the Protocol.

Figure 11 outlines the process for listing chemicals under the Montreal Protocol. The steps are described below:

1. In accordance with Art. 6 of the Protocol, the SAP, TEAP and EEAP conduct quadrennial assessments, including updated information on ozone science, the effects of ozone depletion, UV radiation and interactions with climate change and on technology and economic aspects of transition to ozone- and climate-friendly alternatives and technologies.
2. The Parties review these quadrennial assessment reports during their meetings and consider whether any substances should be added to or removed from the annexes of the Protocol. Art. 2.9 governs decisions on adjustments relating to existing controlled substances, including their phase-out schedules, while Art. 2.10 specifically addresses amendments by the addition or removal of substances based on these assessments. Amendments are binding only on those Parties that ratify, accept or approve them, whereas adjustments are binding on all Parties.
3. Based on these quadrennial assessments, the Parties may decide whether any adjustments should be made to the following: 1) the ozone depleting potentials specified in Annex A, Annex B, Annex C and/or Annex E; 2) the global warming potentials specified in Group I of Annex A, Annex C and Annex F; and 3) adjustments and reductions of production or consumption of the controlled substances including the scope, amount and timing thereof (Art. 2.9).
4. TEAP also prepares annual progress reports providing updates on, technical and economic issues related to controlled substances and ozone- and climate-friendly alternatives and technologies that could be employed.
5. Based on the above-mentioned reports of the Assessment Panels, Parties take informed decisions.

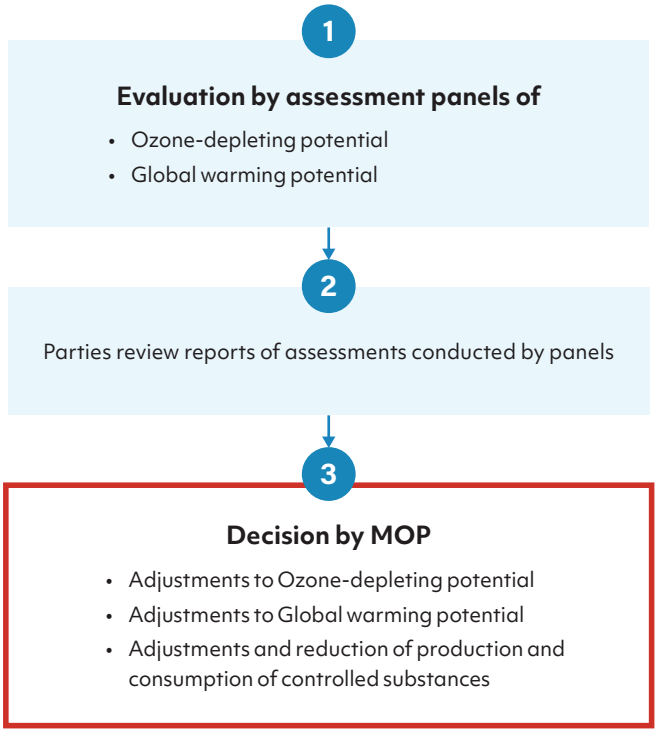


Figure 11: *Process for listing chemicals under the Montreal Protocol*

Figure 12 illustrates the structure of the three assessment panels of the Montreal Protocol. The panels are:

- **The Scientific Assessment Panel (SAP):** The Panel assesses the status of ozone layer depletion and relevant atmospheric science issues.
- **The Technology and Economic Assessment Panel (TEAP):** The panel provides technical information on sustainable alternatives.
- **Environmental Effects Assessment Panel (EEAP):** The panel evaluates the diverse impacts of ozone layer depletion.

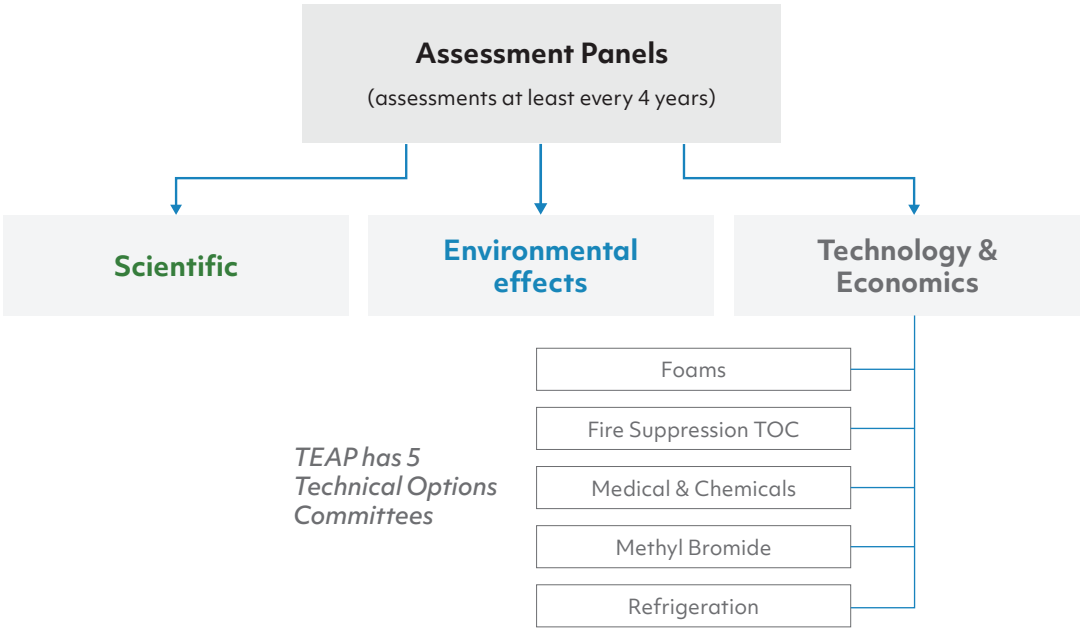


Figure 12: *Assessment panels of the Montreal Protocol*

3.2.4 Rotterdam Convention Chemical Review Committee (CRC)

CRC serves as the scientific body of the Rotterdam Convention. The CRC carries out its reviews under following two complementary procedures:

a) Under Art. 5 for the notifications of hazardous chemicals that have been banned or severely restricted by Parties, and

b) Under Art. 6 for severely hazardous pesticide formulations that have caused problems under conditions of use in developing countries or countries with economies in transition.

If the criteria are met, a draft decision guidance document is prepared based on Annex I (for banned or restricted chemicals) or Annex IV (for severely hazardous pesticide formulations). The COP then considers any recommendation from the CRC for listing in Annex III together with the draft decision guidance document (Art. 7), and decides whether to make the chemical subject to the PIC procedure (Art. 5.6, Art. 6.5).

Under Art. 5 the process for listing **banned or severely restricted chemicals** includes:

1. A Party submits a notification to the Secretariat about a chemical that has been banned or severely restricted and within ninety days of regulatory action taking effect (Art. 5.1).
2. Within six months, the Secretariat verifies the notification for required information based on Annex I and notifies the Party if the information does not comply (Art 5.3).
3. At least two Parties in 2 different PIC regions are needed to trigger consideration for listing (Art. 5.5).
4. Notifications are published in the PIC Circular every six months (Art. 5.4).
5. The CRC reviews the notifications based on Annex II criteria. If criteria are met, the CRC recommends the chemical for listing in Annex III (Art. 5.6).
6. The COP decides whether to include the chemical in Annex III, subjecting it to the PIC procedure (Art. 5.5).

Figure 13 summarizes the processes for listing banned or severely restricted chemicals in Annex III (Art. 5).

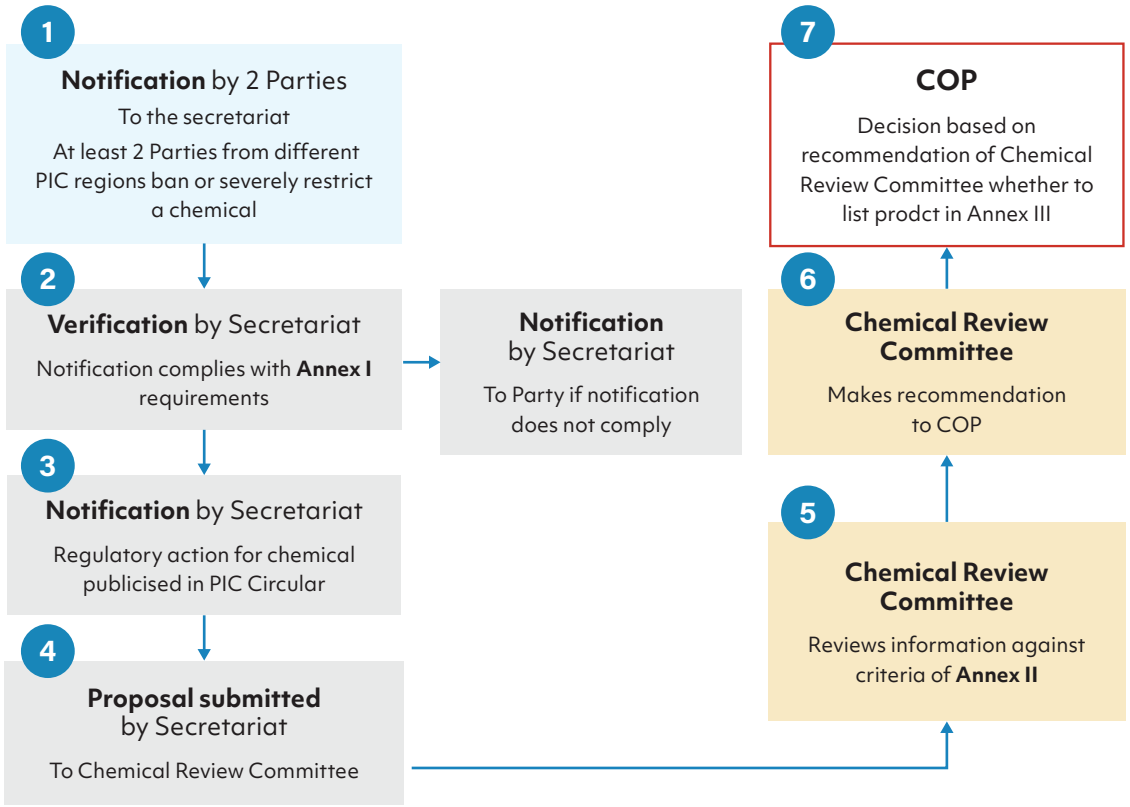


Figure 13: *Process for listing chemicals under the Rotterdam Convention*

Note: The PIC regions of the Rotterdam Convention do not correspond to the UN regions.

Under Art. 6 the process for listing **severely hazardous pesticide formulations** listing includes:

7. Parties that are developing countries or with an economy in transition may submit a proposal based on Annex IV, Part 1 regarding a severely hazardous pesticide formulation that has resulted in problems under conditions of use in their territory (Art. 6.1).
8. If the proposal contains the required information, the Secretariat provides all Parties with a summary (Art. 6.2) and collects the additional information required in Annex IV, Part 2 (Art. 6.3).
9. All information is then forwarded to the CRC (Art. 6.4) for review based on the criteria set out in Annex IV, Part 3 before making a recommendation to the COP.
10. The COP decides whether to include the chemical in Annex III, subjecting it to PIC procedure (Art. 6.5).

Figure 14 summarizes the processes for listing severely hazardous pesticide formulations under Annex II.

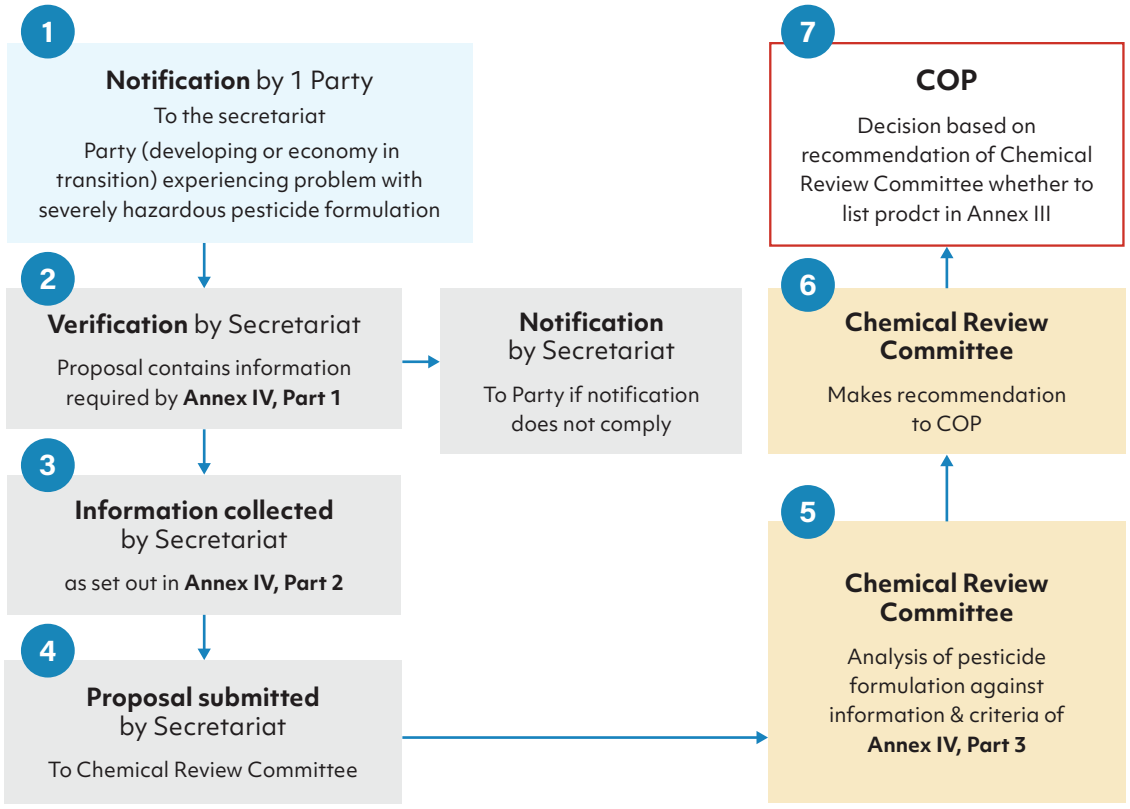


Figure 14: *Processes for listing severely hazardous pesticide formulation under Annex III to the Rotterdam Convention*

The Rotterdam Convention provided for a voluntary prior informed consent procedure prior to the first meeting of the COP. Except where chemicals were included in Annex III at adoption, the Convention required that those in the voluntary prior informed consent procedure be listed in Annex III by a decision at the first meeting of the COP subject to all the required information being provided (Art. 8).

3.2.5 Basel Convention

The Convention provides that the annexes can be amended, and that such amendments shall take due account, inter alia, of relevant scientific and technical considerations. The process for amending the Annexes under the Basel Convention is provided in Articles 17 and 18 of the Convention, and once adopted by the COP (Art. 17.2), amendments to annexes become binding for all Parties six months from the date of communication of the adoption by the Depositary, except for those Parties that have submitted a notification of non-acceptance.

A procedure has been adopted to review or adjust the lists of wastes contained in Annexes VIII and IX to the Basel Convention. Applications are submitted to the Secretariat by Parties, following steps for consultations with other Parties within set deadlines, before the consideration and review by the Open-ended Working Group. The applications must be based on sound scientific assessment in accordance with Article 1, paragraph 1 (a), of the Basel Convention. The Open-ended Working Group subsequently forwards its decisions on the placement or removal of wastes on lists contained in Annexes VIII and IX to the Conference of the Parties. This process (Figure 15) is outlined in the annex to Decision VIII/15.[36]

There is an ongoing process to review Annexes I, III and IV to the Convention. The expert working group on the review of Annexes is reviewing Annex I (waste constituents and waste streams considered hazardous) and Annex III (hazardous characteristics), including whether any additional constituents in relation to plastic waste should be added to Annex I and whether any additional characteristics in relation to plastic waste should be added to Annex III. The expert working group on the review of Annexes is mandated to develop recommendations on possible amendments to the annexes. Any Party may propose an amendment to Annexes I and III taking into account the recommendations from the expert working group. Should such an amendment be proposed and require further discussion, the Conference of the Parties may decide to entrust the expert working group with preparing revised amendment proposals for its consideration and possible adoption.

36 Decision VIII/15: Revisions to the procedure for the review or adjustment of the lists of wastes contained in Annexes VIII and IX and the status of decision VII/21

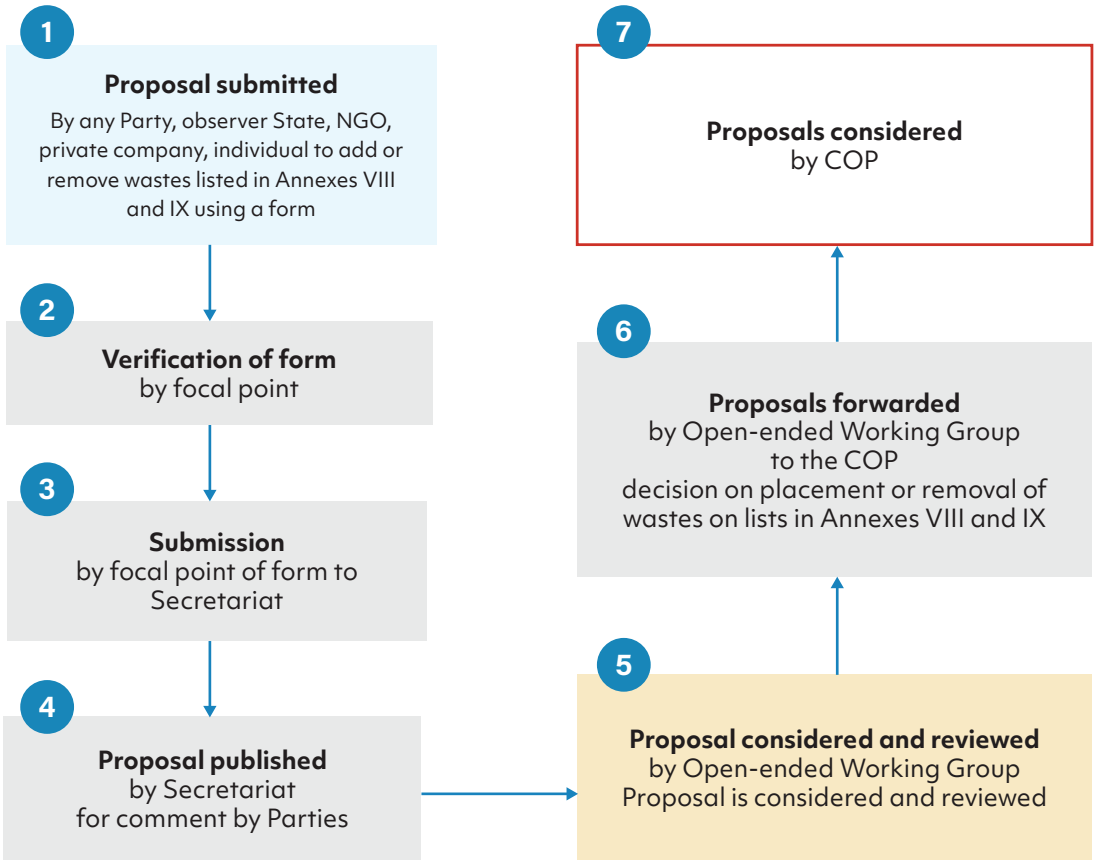


Figure 15: *Process for the review of listings in Annexes VIII and IX under the Basel Convention*

3.2.6 Summary of main mechanisms for listing of chemicals

Table 2 provides a summary of main mechanisms for listing chemicals under MEAs. In addition, waste constituents or streams can be added to the Basel Convention.

Table 2: *Main mechanisms for listing chemicals under MEAs*

MEA	Criteria and characteristics	Lists	Chemicals controlled (as of 2024)	Subsidiary body
Montreal Protocol	Screening criteria include ozone depleting potential (ODP) and global warming potential (GWP)	Ozone depleting substances targeted for phase out (Annexes A, B, C, and E). Hydrofluorocarbons targeted for phase-down (Annex F)	114 chemicals	Scientific Assessment Panel (SAP) consists of numerous scientists from around the world Environmental Effects Assessment Panel (EEAP) consists of approximately 30 experts Technology and Economic Assessment Panel (TEAP) consists of approximately 18-22 government-nominated experts, supported by five sector-specific Technical Options Committees (TOCs) with 10-40 members each.
Stockholm Convention	Screening criteria, consisting of three hazard criteria (persistence, bioaccumulation and adverse effects) and potential for long-range environmental transport (Annex D) Information requirements for the risk profile, focusing on assessment of significant adverse effects on human health and the environment (Annex E) Information on socio-economic considerations, focusing on identifying possible control measures (Annex F)	POPs targeted for elimination (Annex A) POPs targeted for restriction (Annex B) Unintentional POPs with the goal of their continuing minimization and, where feasible, ultimate elimination (Annex C)	34 entries including mixtures or groups of chemicals	The Persistent Organic Pollutants Review Committee (POPRC) has 31 experts in chemical assessment or management nominated by governments and appointed by the COP
Rotterdam Convention	Annex II (chemicals) Annex IV (severely hazardous pesticide formulations).	Annex III, making listed chemicals subject to the PIC procedure	55 chemicals, mixtures or groups of chemicals	The Rotterdam Convention Chemical Review Committee (CRC) has 31 experts in chemicals management nominated by governments and confirmed by the COP.
Basel Convention	Annex III (hazardous characteristics)	Annex I - categories of wastes to be controlled Annex II - categories of waste requiring special attention Annex XIII – wastes considered hazardous* Annex IX – wastes not considered hazardous**	Does not specifically list chemicals but regulates hazardous and other wastes under various annexes with certain chemicals specified in Annex I, such as PCB, mercury, and phenols.	The Basel open-ended working group (OEWG) is open to participation by all Parties

* As per Annex XIII, "Wastes contained in this Annex are characterized as hazardous under Article 1, paragraph 1 (a), of this Convention, and their designation on this Annex does not preclude the use of Annex III to demonstrate that a waste is not hazardous."
** As per Annex IX, "Wastes contained in the Annex will not be wastes covered by Article 1, paragraph 1 (a), of this Convention unless they contain Annex I material to an extent causing them to exhibit an Annex III characteristic."

3.3 Lessons learned

Ensuring that the identification and inclusion of chemicals in MEA are informed by the best available science in a proactive and forward-looking manner is essential. At present, most MEAs identify and control chemicals of concern that are already in widespread use rather than prior to market entry. When established, the science-policy panel on chemicals, waste and pollution prevention could leverage its early warning function to guide the identification of chemicals of concern at an earlier stage. This approach could contribute to an earlier consideration of these chemicals by the subsidiary scientific and technical bodies of the relevant MEAs.

Global action to control chemicals is key for driving change and generating a level playing field, but it can be approached in various ways. Listing under the Stockholm Convention provides a comprehensive and rigorous mechanism for restricting the use of POPs, as it relies on the development of a complete risk profile for the chemicals involving three steps starting from screening for hazardous properties (Annexes D and E), to sources and exposure (Annex E), and finally to control measures and alternatives, including socio-economic considerations (Annex F). This method is robust and requires a number of different meetings of the scientific subsidiary body with some chemicals progressing more slowly if additional time is needed to collect and review relevant information. In contrast, the Rotterdam Convention relies on existing data on risk assessment developed at the national level, providing a streamlined bottom-up mechanism for listing chemicals. However, this can be a lengthy process because it relies on Parties in at least two different PIC regions taking regulatory action at the national level to prohibit or severely restrict the same chemical.

Adopting a life cycle approach provides a comprehensive approach for controlling chemicals of concern. Both the Stockholm Convention and the Minamata Convention cover the production, use, environmentally sound disposal and trade of chemicals of concern. To ensure regulatory alignment, both conventions defer environmentally sound waste management and disposal aspects to the Basel Convention, which specializes in controlling transboundary movements and disposal of hazardous wastes and other wastes. Experience has also shown that addressing releases and emissions across the life cycle is critical to minimizing environmental and health impacts from chemicals of concern.

Moving towards a grouping of chemicals approach and emphasizing the early identification of chemicals and polymers of concern has the potential to avoid regrettable substitutions. The Stockholm Convention has adopted a grouping of chemicals approach. To date, two group-listing approaches have been taken under the Convention, including grouping of congeners (e.g., PCBs, PCNs, PCDDs/PBDFs) or isomers (e.g., hexachlorocyclohexane, endosulfan), and grouping of precursors and transformation end products (e.g., PFOA and related compounds) (Wang et al., 2022).

Managing everyday chemicals is possible but often requires flexibility, for example through the availability of exemptions. The Stockholm Convention. originally focused on legacy chemicals like the "dirty dozen," now addresses widely used industrial chemicals, presenting new challenges, particularly in balancing socio-economic considerations during risk management. For example, fire-fighting foams containing PFOA posed a dilemma between their critical role in public safety and the environmental and health risks of PFOA contamination, leading to the foam's inclusion in the Convention in 2019 with an exception due to the high cost of replacement. These consumer product studies show toxic chemicals that have been banned under international chemicals conventions are being recycled from old waste into new consumer products, even when now exemptions apply (IPEN, 2022).

The criteria for listing chemicals of concern are most effective when they are meaningful, fit-for-purpose, and open to review. The Rotterdam and Stockholm Conventions allow for amendments to the Convention, including its annexes and potentially the criteria for listing chemicals for reviewing and updating its criteria. Implications of the updates to the criteria can be assessed and advised by the possible subsidiary scientific and technical body of the plastics instrument.

The subsidiary scientific and technical bodies play a key role in enabling agreements to identify and make recommendations about control of new chemicals within the scope of their mandates. Experience from the Stockholm Convention shows that an effective review process produces a comprehensive risk profile that incorporates socio-economic considerations, enabling the COP to make informed decisions.

MEAs addressing chemicals in products provide valuable precedents for regulating chemicals in plastics. The Stockholm Convention regulates industrial POPs used in various products such as textiles, plastic foams, and electronics, with the POPRC's risk profiles critically incorporating socio-economic considerations, including the availability of alternatives. Similarly, the Minamata Convention lists mercury-added products under Annex A, mandating phase-out or phase-down based on risk assessments and socio-economic evaluations conducted by ad hoc expert groups.

The **distinction between wastes and non-wastes** has been explored under the Basel Convention regarding e-Wastes. Part III of the Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention[37] provides general guidance on the distinction, as well as situations where used equipment should either be considered as waste or should not be considered as waste. Considerations include transboundary movement of equipment intended for reuse, repair, refurbishment and recycling, as well as the level of damage and the availability of a regular market for the equipment. This guidance may be considered guidelines be developed under the plastics instrument, including for the determination of problematic and avoidable plastic products.

37 UNEP/CHW.12/5/Add.1/Rev.1

4 CHEMICALS OF CONCERN IN PLASTICS

4. Chemicals of concern in plastics

This section examines approaches for managing chemicals of concern in plastics, particularly through a grouping strategy. It includes discussions on polymers of concern and microplastics, with an additional focus on chemicals found in plastic waste.

4.1 Controlling chemical and groups of chemicals used in plastics

4.1.1 Overview of current global control of chemicals of concern in plastics

The role of MEAs in regulating chemicals used in plastics can be summarized as follows:

- **The Stockholm Convention** regulates certain chemicals in plastics due it its focus on POPs. It governs the production, use and trade of individual chemicals with plastic applications that have been identified as POPs, such as HBCD and UV-328, and groups of chemicals like PFAS subgroups, PBDEs, PCBs, chlorinated paraffins, and PCBs. It also regulates unintentional POPs, including broad groups like dioxins and furans and PCBs produced from waste incineration and open burning. However, many chemicals found in plastics may not meet all the criteria for POPs, required for listing in Annexes A, B and C to the Convention.
- **The Basel Convention** regulates the transboundary movement of hazardous waste and other wastes, including plastic waste. Through annexes, the control procedure is applied to international trade in waste, including in plastic waste. Chemicals in plastics are not specifically regulated, although their presence in plastics may mean that they are considered or defined as a waste or may cause the waste to display hazardous characteristics set out in Annex III, making the waste subject to relevant control measures of the Basel Convention.
- **The Rotterdam Convention** operates through the PIC procedure, ensuring that Parties are informed about hazardous chemicals before import and that there is a shared responsibility to disseminate information on decisions about whether to consent to import and with ensuring compliance with those decisions. Unlike the Stockholm Convention, it does not provide for bans or restriction controls but focuses on facilitating informed decision-making regarding international trade in hazardous chemicals listed in the Annexes.

- The **Montreal Protocol** controls the production and consumption of groups of chemicals such as CFCs, HCFCs, and HFCs, primarily for their ozone-depleting and climate effects. Some of these chemicals have been used in plastics, mainly as blowing agents for foam products, but are now regulated by the Protocol.
- **The Minamata Convention** includes measures to control the supply and trade of mercury, mercury-added products, and manufacturing processes in which mercury or mercury compounds are used. This includes restrictions on certain manufacturing processes involving mercury, such as those related to PVC and polyurethane production, though not the plastic products themselves. It also applies to some mercury-added products that may happen to have plastic components. However, it does not cover other metals, such as lead, chromium, antimony, tin, cadmium, or nickel, which are commonly used in plastics as additives (e.g., stabilizers, colorants) and as processing agents, including catalysts in plastic production.

4.1.2 Scientific insight to addressing groups of chemicals in plastics

The Norwegian Research Council project "State-of-the-art review on hazardous substances in plastics" identified 16,325 known chemicals used in plastics, including monomers, additives, processing aids and NIAS (Plast Chem, 2024). Of these, 4,218 (26%) are classified as chemicals of concern based on persistence, bioaccumulation, mobility and toxicity, while 10,726 (66%) lack hazard data. This expands on a UNEP/BRS Conventions' technical report that list 13,000 chemicals in plastics from which 3,200 are identified as chemicals of potential concern based on existing hazard types (UNEP, 2023; BRS, 2023; Aurisano et al., 2021; Wiesinger et al., 2021).

According to the Plast Chem database, the production and use of 2.7% of all plastics chemicals is controlled globally by global MEAs, including the Stockholm Convention, Montreal Protocol and Minamata Convention[38] While scientific understanding is evolving and many chemicals in plastics remain unassessed, this figure represents the most comprehensive academic estimate to date.

The Plast Chem report (2024) identifies several groups of chemicals of major concern in plastics, categorizing them by molecular structure rather than function, with concern driven by the high proportion of hazardous chemicals in each group. The members within each group often share some common properties, often related to their molecular structure and interactions with biological systems, ranging from antimicrobial, endocrine disruption, to cytotoxicity and mutagenicity.

38 his number differs from the one in the Plast Chem report (2024) because it excludes MEAs that are not global or solely address waste management, based on their database.

The production and use of 13 of these groups of chemicals of major concern are unregulated at the global level, including aromatic amines, aralkyl aldehydes, alkylphenols, salicylate esters, aromatic ethers, bisphenols, phthalates, benzothiazoles, benzotriazoles, PAHs, parabens, azodyes, and aceto- and benzophenones. In contrast, the production and use of eight groups of chemicals have been regulated either partially or fully at the global level, including chlorinated paraffins, DDT, dioxins and furans, mercury and mercury compounds, PFAS, PBDEs, and PCBs.

4.1.3 Potential for the Stockholm Convention to address select groups of chemicals in plastics

There is limited understanding to what extent the Stockholm Convention has potential to address unaddressed chemicals of concern in plastics. A study by Scheringer et al. (2012) applied the screening criteria outlined in Annex D to the Stockholm Convention to a set of 93,144 chemicals and found that 510 chemicals (or about 0.5%) met the criteria for POPs. The vast majority of these chemicals (98%) are halogenated chemicals. However, it is important to note that more research is needed to understand the potential application of the Stockholm Convention in such circumstances.

Table 3 provides the authors' assessment of the potential extent the Stockholm Convention could address the groups of chemicals outlined in UNEP/BRS Conventions' technical report (2023). The report identified 10 groups of chemicals, combining both structural groupings (alkylphenols and alkylphenol ethoxylates, bisphenols Per- and polyfluoroalkyl substances, and phthalates) and functional groupings (biocides, flame retardants, metal and metalloids, non-intentionally added substances, polycyclic aromatic hydrocarbons, and UV stabilizers). The purpose of this table is not to preempt the work of the POPRC, but to provide a general overview of groups of chemicals that may have limited potential to regulated under the Stockholm Convention. For instance, metals and metalloids as inorganic materials are beyond the scope of the convention. Similarly, phthalates break down quickly in the environment through biodegradation, photodegradation, and anaerobic degradation, limiting their suitability for regulation under the Stockholm Convention's persistence criteria.

Table 3: *Overview of the potential extent of the Stockholm Convention to address select groups of chemicals.*

Groups of chemicals	Persistence	Bioaccumulation	Adverse effects	Long-range environmental transport (LRET)
Alkylphenols and alkylphenol ethoxylates (APEOs)	APEOs, particularly alkylphenols like nonylphenol, are persistent in the environment. (Zoller, 2006)	Ability to bioaccumulate in aquatic biota in the environment is low to moderate (Zoller, 2006)	APEOs, particularly nonylphenol and octylphenol, are well-known endocrine disruptors (Zoller, 2006)	APEOs have a limited potential for long-range environmental transport, except when associated with plastic debris
Biocides	Many biocides, particularly organochlorine pesticides are chemically stable and resist degradation	Many biocides such as DDT and Lindane are known to bioaccumulate	Many biocides have shown significant adverse effects on human health and the environment	Many biocides have potential for LRET, such as DDT and other organochlorines
Bisphenols	While bisphenols are somewhat resistant to degradation, they do not demonstrate the extreme environmental persistence seen in POPs (Staples et al., 1998)	Bisphenols, particularly BPA, tend to bioaccumulate less than POPs (Staples et al., 1998)	Bisphenols are known to be endocrine disruptors, with significant adverse effects on human health and wildlife (Ma et al., 2019; Dalamaga et al., 2024)	Less volatile than many POPs, meaning they are less likely to be transported over long distances (Cousins et al., 2010), except when associated with plastic debris
Flame retardants	Many halogenated or brominated flame retardants are persistent	Many halogenated or brominated flame retardants bioaccumulate	Many halogenated or brominated flame retardants have adverse effects	Some halogenated or brominated flame retardants have potential for LRET
Metal and metalloids	Inorganic chemicals fall outside the primary scope of the convention	Inorganic chemicals fall outside the primary scope of the convention	Inorganic chemicals fall outside the primary scope of the convention	Inorganic chemicals fall outside the primary scope of the convention
Non-intentionally added substances (NIAS)	Some are persistent	Some bioaccumulate	Some have adverse effects	Some have potential for long-range
Per- and polyfluoroalkyl substances (PFASs)	PFASs are highly persistent in the environment, often referred to as "forever chemicals"	Long-chain PFASs (like PFOA and PFOS), have been shown to bioaccumulate in living organisms	PFASs have been linked to a range of adverse health effects	Some PFASs have potential for LRET
Phthalates	Less persistent than POPs (Andrade et al., 2021, Cousins et al., 2002)	Because of their chemical properties exposure to phthalates does not result in bioaccumulation (Heudorf et al., 2007)	Phthalates are known for their adverse health effects, particularly as endocrine disruptors. (Dalamaga et al., 2024)	Not subjected to significant long-range transport (Cousins et al, 2002), except when associated with plastic debris
Polycyclic aromatic hydrocarbons (PAHs)	PAHs are generally persistent in the environment (Choi et al., 2009)	Some PAHs, have a strong tendency to bioaccumulate in organisms (Choi et al., 2009)	PAHs have potential for long-range environmental transport via atmospheric currents (Choi et al., 2009)	Many PAHs are known to be toxic, with some (such as benzo[a] pyrene) classified as carcinogens. (Choi et al., 2009)
UV stabilizers	Some UV stabilizers are persistent in the environment	Certain UV stabilizers have been found to bioaccumulate in living organisms	Adverse effects from certain UV stabilizers can include endocrine disruption, reproductive toxicity, developmental toxicity, and potential carcinogenicity	Some UV stabilizers have the potential for LRET

4.2 Polymers of concern

Polymers are regulated to some degree, when they become waste, under the Basel Convention's Plastic Waste Amendments. Regulations apply only to transboundary movements of plastic waste and do not aim to specifically address polymers "of concern" in the manufacture or use of plastic products, including the generation of microplastics. The Convention lists polymers present in wastes that are presumed to not be hazardous unless they contain an Annex I material which causes them to exhibit an Annex III characteristic. The wastes considered non-hazardous are described as follows (Entry B3011):

- Almost exclusively consisting of one non-halogenated polymer,
- Almost exclusively consisting of one cured resin or condensation product,
- Almost exclusively consisting of one of the following fluorinated polymers (post-consumer wastes are excluded):
  - Perfluoroethylene/propylene (FEP)
  - Perfluoroalkoxy alkanes:
    - Tetrafluoroethylene/perfluoroalkyl vinyl ether (PFA)
    - Tetrafluoroethylene/perfluoromethyl vinyl ether (MFA)
    - Polyvinylfluoride (PVF)
    - Polyvinylidenefluoride (PVDF)
- Mixtures of plastic waste, consisting of polyethylene (PE), polypropylene (PP) and/or polyethylene terephthalate (PET), provided they are destined for separate recycling of each material and in an environmentally sound manner, and almost free from contamination and other types of wastes.

The entries do not imply the polymer itself is safe, but instead aims to strengthen the feasibility in the state of import of recycling processes for wastes that meet these characteristics.

At the global level, plastic polymers are not regulated upstream of the waste phase. In the waste phase, it is only the transboundary movement of plastic polymers that is regulated for specific purposes. However, the requirement to ensure that waste subject to transboundary movement is destined for facilities considered to provide environmentally sound management of these wastes could have the added benefit of stimulating greater availability of domestic facilities for environmentally sound management of wastes.

4.3 Micro- and nanoplastics

Plastics must be assessed for harmful ingredients or properties. The properties, and therefore the pathways and effects, of microplastics differ from macroplastics. This can be further exacerbated for nanoplastics. Effects on the human body can vary depending on the property of the polymer, including whether it is a chain or cyclical.

Following the submission by Switzerland of a proposal for listing, the COP to the Stockholm Convention has agreed to for list UV-328 in Annex A to the Stockholm Convention. This was the first time the fulfilment of the criteria of long-range environmental transport included consideration on the movement of microplastics and macroplastics.[39] This may present options in the future for chemicals used in plastics to be regulated under the Stockholm Convention and warrants further discussion. It should be noted that this option would not address chemical exposure in a short range, e.g. through dermal contact.

4.4 Chemicals in plastic waste

The Basel Convention addresses the management of plastic wastes rather than requires consideration of chemicals of concern that may be present in plastic waste, such as some plastic additives, residual processing aides, monomers present as residuals or from degradation, and non-intentionally added substances. According to Article 1.1(a), hazardous wastes under the Convention are defined as those falling within the categories listed in Annex I, unless the characteristics outlined in Annex III demonstrate that the waste is not hazardous. Wastes listed in Annex VIII to the Basel Convention are also characterized as hazardous as per Article 1.1(a). These listed wastes may also be assessed against Annex III to demonstrate that the waste is not hazardous. Even if a waste does not demonstrate these characteristics or is not listed under Annex VIII, it may still be considered hazardous if considered or defined as such under the national legislation of the exporting, importing, or transit Party.

39 See the Draft risk profile Prepared by the intersessional working group of the Persistent Organic Pollutants Review Committee, May 2021, available at: https://chm.pops.int/Portals/0/download.aspx?d=UNEP-POPS-POPRC16CO-UV328-DRP-20210514.En.docx

The presence of POPs in wastes, including plastic waste and e-waste, is managed through the characteristics of Annex III and the development of numerous guidelines, such as the "General technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants[40]". As recognized in these guidelines, "even when POPs are adequately managed to "turn off the tap" at the beginning of POPs life cycles, waste management efforts are ongoing as POPs can last in products and waste streams for many decades." It serves as an "umbrella" document and lists specific technical guidelines that have been developed for use in conjunction with the general technical guidelines on POP wastes.

Article 6.2(c) of the Stockholm Convention requires the COP to the Stockholm Convention to cooperate with the appropriate bodies of the Basel Convention to "work to establish, as appropriate, the concentration levels of the chemicals listed in annexes A, B and C in order to define the low persistent organic pollutant content referred to in paragraph 1 (d) (ii)." See section 5.2 for further discussion. Cooperation in this regard is ongoing, with the draft technical guidelines for POP wastes mentioned above providing preliminary concentration levels to define low POP content. In addition, cooperation is required to determine what is considered the methods that constitute environmentally sound disposal of such wastes (Art. 6.2(b)).

The Basel Convention expert working group on the review of Annexes is currently reviewing whether any additional characteristic in relation to plastic wastes should be added to Annex III to the Convention. The most recent version of its draft recommendations[41] provide:

> "The following characteristics seem relevant [in relation to plastic wastes] [to classify plastic wastes as hazardous]:[42]
>
> a) From the current entries: [H 6.1 Poisonous (Acute), and H 6.2 Infectious substances], H11 (Toxic (Delayed or chronic)) - see the proposal to limit H11 to Carcinogenic -, H12 (Ecotoxic), and possibly H13 (Capable, by any means, after disposal, of yielding another material, e.g., leachate, which possesses any of the characteristics listed above);
>
> b) From the new proposed entries: 3(a) (Toxic for reproduction), 3(b) (Reproductive toxicity), 4(a) (Mutagenic for germ cells), 4(b) (Germ cell mutagenicity), 7 (POPs), 12 (Hazardous to the aquatic environment (acute or chronic toxicity) and 13 (Endocrine [disruptor] [disruption])".

40 UNEP/CHW.16/6/Add.1/Rev.1.
41 UNEP/CHW/RA_EWG.6/3/Rev.2, available at: https://www.basel.int/Implementation/LegalMatters/LegalClarity/Meetings/6thRAEWGmtg/tabid/9633/Default.aspx
42 Note that certain options under the current entries are wider than the current entries and may therefore also be relevant.

The Basel Convention expert working group on the review of Annexes is also currently reviewing whether any additional constituents in relation to plastic wastes should be added to Annex I to the Convention. The most recent version of its draft recommendations[43] provide:

> "The following constituents seem relevant in relation to plastic wastes:
>
> a) From the current constituents: [Y23], Y24, Y26, Y27, [Y29], Y31 and Y45;
>
> b) From the proposals for new constituents: C4, C7 (which covers Y39 and Y40, including e.g. phthalates and bisphenol A, except pentachlorophenol and decaBDE, tetraBDE, pentaBDE, hexaBDE, heptaBDE) and C10 (which includes Y43 and Y44 and part of Y39 (pentachlorophenol) and Y40 (decaBDE, tetraBDE, pentaBDE, hexaBDE, heptaBDE)). [C11, C12 and C13]."

It could be foreseen that most plastic wastes be classified under entries A3210 (hazardous), Y48 (special consideration) or B3011 (presumed not hazardous). For those not determined as hazardous under A3210, Parties would need to make further determinations under entries B3011 and Y48 including whether plastic wastes are "almost free from contamination" and "almost exclusively containing" the polymers specified in the entries. Discussions are underway on how these terms should be interpreted.[44]

Entries A3210 (hazardous) and Y48 (special consideration) require PIC as per Art. 6.1. The information to be provided in the notification required under Art. 6.1 is specified in Annex V. The information to be provided on the designation and physical description of the waste, needs to include information on "the nature and the concentration of the most hazardous components, in terms of toxicity and other dangers presented by the waste both in handling and in relation to the proposed disposal method" and where necessary must "assess the hazard and determine the appropriateness of the proposed disposal operation." Parties must also take measures to require the importing State of a proposed transboundary movement of hazardous wastes and other wastes to be given clear information on the effects of the proposed movement on human health and the environment (Art. 4.2f).

43 UNEP/CHW/RA_EWG.6/3/Rev.2, available at: https://www.basel.int/Implementation/LegalMatters/LegalClarity/Meetings/6thRAEWGmtg/tabid/9633/Default.aspx

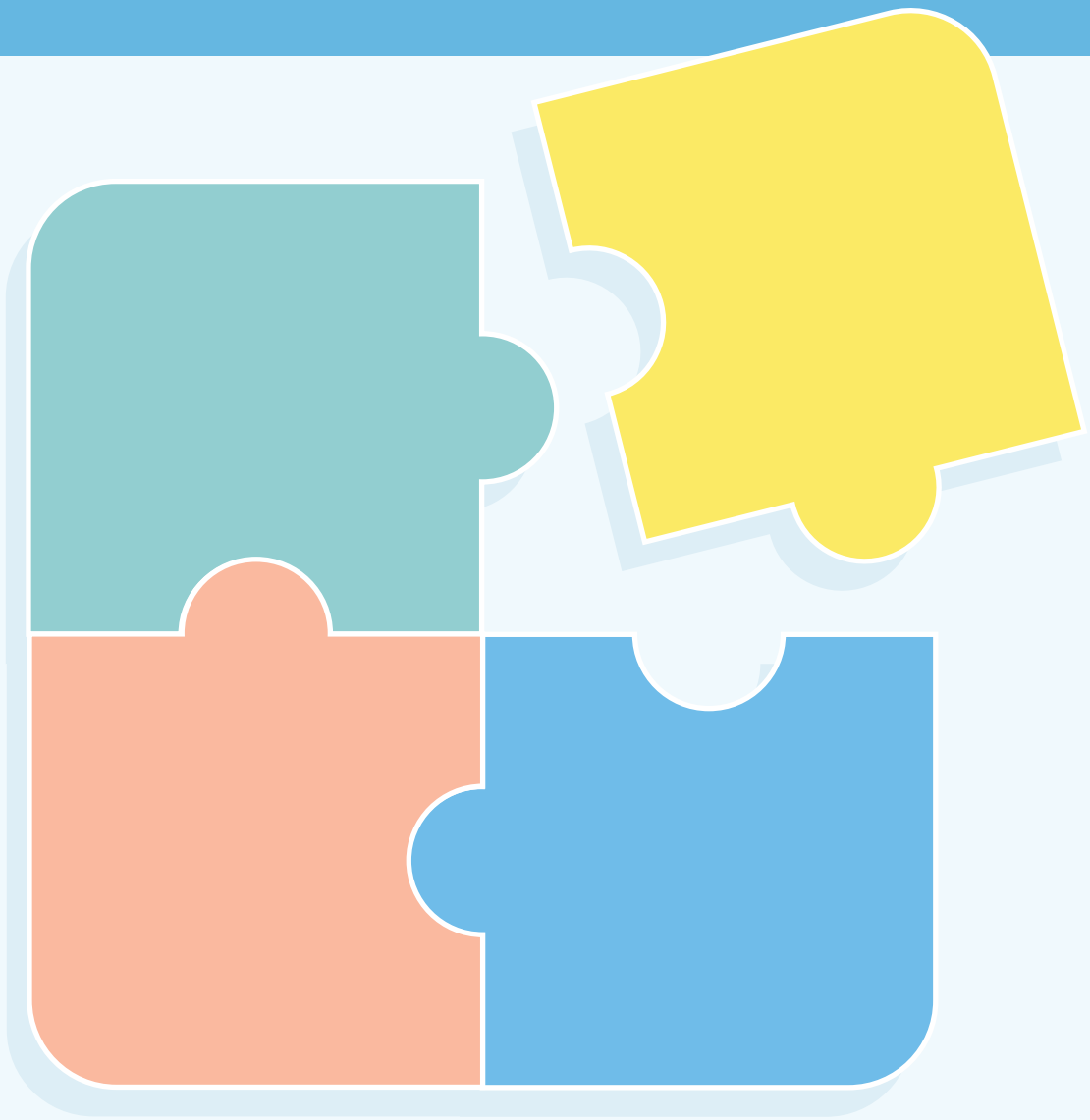
44 Compilation of national and international specifications related to "almost free from contamination and other types of wastes" and "almost exclusively" for shipments of plastic waste destined for recycling (UNEP/CHW.16/INF/56), March 2023.

Annex IX provides a listing of wastes that are not considered hazardous if they do not contain materials listed in Annex I to an extent which causes them to exhibit one of the characteristics listed in Annex III. The entries in Annex IX listed below are known to commonly contain plastic fractions and associated chemicals, many of which are not listed in Annex I but which, in some cases, may result in delayed toxicity, including carcinogenicity (H11, Annex III), and other harms to human health not covered by Annex III, such as endocrine disruption:

- B1115 - Waste metal cables coated or insulated with plastics if they are not included in Annex I, List A, entry A1190, excluding:
  - those destined for operations listed in Annex IVA, or
  - any other disposal operations involving, at any stage, uncontrolled thermal processes, such as open-burning.
- B3020 - Paper, paperboard and paper product wastes, including.
  - Paper or paperboard made mainly of mechanical pulp (for example, newspapers, journals and similar printed matter), and
  - Other, including but not limited to 1) laminated paperboard 2) unsorted scrap.
- B3026 – Waste from the pre-treatment of composite packaging for liquids, including:
  - Non-separable plastic fraction, and
  - Non-separable plastic-aluminium fraction.
- B3030 – Textiles, including:
  - Waste of man-made fibres of synthetic fibres or of artificial fibres, and
  - Worn clothing and other worn textile articles.
- B3035 – Waste textile floor coverings, carpets.
- B3040 – Rubber wastes, if not mixed with other wastes.
- B3080 - Waste parings and scrap of rubber.
- B3140 - Waste pneumatic tyres, excluding those destined for Annex IVA operations.
- B4030 – Used single-use cameras (if they do not contain the types of batteries listed in Annex VIII, List A.

Plastic waste falling under these entries of Annex IX may not be considered, or may not qualify, under Y48 (special consideration) or A3210 (hazardous).

5 POSSIBLE LINKAGES BETWEEN EXISTING MEAs AND THE PLASTICS INSTRUMENT



5. Possible linkages between existing MEAs and the plastics instrument

Section 2 and Section 3 have outlined mechanisms and processes under existing MEAs that may be considered for application in the plastics instrument for regulation of chemicals used in plastics. Section 2 also highlights areas where the mandates of these MEAs have direct application to plastics.

This section explores further linkages of a more technical nature that could be developed in the future between existing MEAs and the plastics instrument on specific themes, particularly coordination between technical bodies of existing MEAs and those that may be established under the plastics instrument. Emphasis is given to the Basel Convention to minimize possible overlap in mandates, ensuring complementary of actions with regards to plastic waste management.

5.1 Definitions

The Minamata Convention applies the relevant definitions of the Basel Convention to wastes covered under the Minamata Convention for those Parties that are also Party to the Basel Convention. For those that are not Party to the Basel Convention, the same definitions should be used as a guidance and applied to the wastes covered by the Minamata Convention (Art. 11.1). Other definitions for the purposes of the Minamata Convention are included in Article 2. The thresholds for content of mercury and mercury compounds that define wastes for the purposes of the Minamata Convention have been finalized in collaboration with the relevant bodies of the Basel Convention in a harmonized manner (Art. 11.2). Thresholds were established by the COP in its decisions MC-3/5 and 5/10. Parties to the Minamata Convention must take appropriate measures for the environmentally sound management of mercury waste, taking into account the guidelines developed under the Basel Convention. For Parties to the Basel Convention, mercury wastes must not be transported across international boundaries except where such movement complies with the Minamata Convention and the Basel Convention (Art. 11.3). The COP is to cooperate closely with the relevant bodies of the Basel Convention in the review and update of such guidelines (Art. 11.4).

Definitions used for the purposes of the Kyiv Protocol, such as “pollutant”, “release”, “diffuse sources”, “waste” “hazardous waste” or “wastewater” (Art. 2), could be applied also in a plastic pollution context. In addition, under the Protocol, the term “waste” includes substances or objects that are subject to regulation by national law (Art. 2.11-14). This is particularly relevant to the development of national PRTRs, where regulation by national law related to waste, hazardous waste or wastewater may increasingly cover substances, materials or objects associated with plastic and plastic waste.

Potential actions:

- In the event the new plastics instrument addresses issues covered by the Basel Convention, it could consider adopting existing definitions from that MEA, such as the definitions of "wastes", "environmentally sound management", and "transboundary movement". A reference could also be made to the Technical Guidelines on the Environmentally Sound Management of Plastic Waste.
- Any technical bodies of the plastics instrument could collaborate with the relevant technical bodies of the Basel Convention, the World Health Organization (WHO) and the International Labour Organization (ILO) regarding possible thresholds for chemicals in plastic wastes, in relation to chemicals that do not qualify for regulation under the Stockholm Convention, as well as micro- and nanoplastics.
- Relevant definitions agreed under the Kyiv Protocol could be considered for use in the plastics instrument to help find common ground.

5.2 Determining thresholds of concern

The Stockholm Convention recognizes overlap with the scope of the Basel Convention in relation to waste issues and requires the COP to cooperate closely with the appropriate bodies of the Basel Convention to, amongst others (Art. 6.2):

1. Establish levels of destruction and irreversible transformation necessary to ensure that the characteristics of POPs as specified in paragraph 1 of Annex D are not exhibited,
2. Determine what they consider to be the methods that constitute environmentally sound disposal referred to above, and
3. Work to establish, as appropriate, the concentration levels of the chemicals listed in Annexes A, B and C in order to define the low POP content threshold that allows for environmentally sound disposal in place of destruction or irreversible transformation.

Potential actions:

- In the event the plastics instrument addresses chemicals of concern in plastics, a similar collaborative approach may be considered for the plastics instrument for chemicals in plastics that do not qualify for regulation under the Stockholm Convention. Chemicals of concern listed in the plastics instrument may require collaboration with the relevant technical bodies of the Basel Convention, the WHO and the ILO to determine appropriate thresholds.

- The determination of thresholds of concern developed under the plastics instrument for listed chemicals in plastics and in collaboration with relevant technical bodies could inform a common understanding of "almost free from contamination and other types of wastes" used in the Basel Convention in relation to entries Y48 and entry B3011.

5.3 Human Health

The Minamata Convention encourages the consultation and collaboration of the COP with the WHO and the ILO when considering health-related issues and promotes the exchange of information with these and other relevant intergovernmental Organizations (Art 16.2).

Potential actions:

- The plastics instrument should strongly encourage consultation by the COP with the WHO and the ILO on the health impacts of plastics and associated chemicals, particularly endocrine disruptors, heavy metals, microplastics and nanoplastics.

5.4 Inventories

The technical guidelines on the environmentally sound management of plastic wastes developed under the Basel Convention regard inventories as an important tool for identifying, quantifying and characterizing wastes and provides some guidance on their development. Similarly, the UNECE Kyiv Protocol on Pollutant Release and Transfer Registers (PRTRs) mandates the establishment of PRTRs, which track releases from production of plastic and several associated chemicals, and recovery or final disposal operations (UNECE, 2022).

Potential actions:

- To improve monitoring, reporting, and accessibility of data on plastic releases, the plastics instrument could mandate the development by Parties of "plastic pollution release and transfer registers" that present data in a more detailed and easily accessible manner, building on existing structures. Alternately, the COP to the plastics instrument could work closely with the governing body of the PRTR Protocol to specifically include chemicals used in plastics under national registers developed as per the PRTR Protocol. This approach would, however, exempt non-Parties to the PRTR Protocol from establishing registers that include all chemicals used in plastics.

- The relevant technical bodies of the plastics instrument could collaborate with the relevant technical bodies of the Basel Convention to elaborate on the current guidance and include plastic material flows across the full life cycle of plastics.

5.5 Transparency and information sharing

Transparency and information sharing about chemicals of concern used in plastics is limited throughout the full life cycle. Increasing transparency and sharing of information regarding chemicals of concern used in plastics, such as the identities, occurrence and hazard traits of chemicals of concern is critical to ensuring proper risk management and regulation.

Potential actions:

- In the event the plastics instrument addressed chemicals of concern in plastics, collaboration between the scientific and technical bodies of the Stockholm Convention and any such bodies under the plastics instrument could work towards establishing a global, unified database. This platform would compile data on the identity, occurrence, and toxicity of chemicals in plastics, facilitating the identification, categorization, and regulation of chemicals of concern on a global scale.

5.6 Complementary of listings

A unified database could also enhance the complementarity across different MEAs by sharing information to inform, avoid duplication of efforts and ensure consistency between the different processes for amendments to list additional chemicals and wastes within each Convention.

Potential actions:

- In the event the plastics instrument addressed chemicals of concern in plastics, collaboration between the scientific and technical bodies of the MEAs, in particular those of the Basel and Stockholm Conventions, and any such bodies under the plastics instrument will be critical to prevent duplication of efforts, ensure coherence across conventions, and maintain a harmonized approach to the regulation of chemicals in plastics.

5.7 Product design and environmentally sound management of plastic waste

The Conference of the Parties to the Basel Convention have adopted updated "Technical guidelines on the environmentally sound management of plastic wastes" (UNEP/CHW.16/6/Add.3), which promotes design as a component of effective EPR programs for plastic products, highlighting that actors furthest up the chain have the greatest influence on design change (para. 77.c) Design is also highlighted as a key component of effective waste prevention, including through limiting the use of plastics in new products (paras 104, 105). Recycling options are also influenced by the design of a product (para. 107). Importantly, the guidelines suggest product design could ensure hazardous substances are avoided in plastics (para. 110).

Other guidelines of relevance are:

- General technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants (UNEP/CHW.16/6/Add.1/Rev.1), as well as technical guidelines on specific persistent organic pollutants relevant to plastics[45]
- Technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP/CHW.15/6/Add.4/Rev.1) [46]
- Technical guidelines: Technical guidelines on the environmentally sound disposal of hazardous wastes and other wastes in specially engineered landfill (D5) (UNEP/CHW.15/6/Add.5/Rev.1)
- Guidance to assist Parties in developing efficient strategies for achieving the prevention and minimization of the generation of hazardous and other wastes and their disposal, which includes examples of good practice for packaging waste, e-waste and plastic waste (UNEP/CHW.13/INF/11/Rev.1). [47]

45 http://www.basel.int/tabid/5052.
46 http://www.basel.int/tabid/8392.
47 http://www.basel.int/tabid/5310.

Potential actions:

- In the event the plastics instrument addressed plastic wastes, it could promote the use by Parties of the guidelines developed under the Basel Convention for the management of plastic waste to assist in promoting design, waste prevention and environmentally sound management of plastic waste. Parties that have adopted practices involving incineration on land (D10) and/or incineration as covered by the operation "use as a fuel (other than in direct incineration) or other means to generate energy" (R1) can be encouraged to consider the technical guidelines on these operations developed under the Basel Convention. The examples of good practice for waste streams that contain plastic could be promoted as a starting point for Parties to the plastics instrument.
- Any relevant technical bodies of the plastics instrument could collaborate with the relevant technical bodies of the Basel Convention for the review and updating of guidelines developed under the Basel Convention that have relevance to the plastic life cycle.
- Institutional cooperation in developing technical guidelines under the plastics instrument would be beneficial to ensure complementarity with the Basel Convention's work, possibly through joint technical committees of working groups.

5.8 Financial support to address plastic pollution

The Global Environment Facility (GEF) is a designated financial mechanism that supports MEAs relevant to plastics, including the Stockholm Convention, the Montreal Protocol (when it comes to countries with economies in transition), the Minamata Convention (as one of the two components of the financial mechanism). Moreover, the Stockholm Convention is supported by 17 regional and subregional centers.

The Basel Convention does not establish a financial mechanism for the implementation of the Convention. Instead, financial support can be provided in the context of the technical assistance activities of the Secretariat, the support provided by the 14 regional centers, the projects under the Partnerships, and the support of the Implementation and Compliance Committee to individual Parties. Such support can promote implementation of the control regime for transboundary movements of hazardous and other wastes, their minimization, and their environmentally sound management, including through the implementation of guidance developed under the Convention. However, Parties to the Convention have developed and adopted an ESM toolkit, which includes guidance on addressing ESM in the informal sector, self-assessing national capacity for ESM of waste, and options for extended producer responsibility (EPR) and financing, as well as other private sector incentives, amongst other options.[48]

48 http://www.basel.int/tabid/5839.

The technical guidelines on the environmentally sound management of plastic wastes (UNEP/CHW.16/6/Add.3/Rev.1) also provide guidance on EPR and other market-based instruments. Guidance under the Basel Convention also addresses the minimization of waste generation as well as the control of transboundary movements.

Potential actions:

- In the event that the GEF is established as the financial mechanism for the plastics instrument, strong linkages could be established with the Stockholm Convention, Minamata Convention and Montreal Protocol, to ensure coordinated and coherent support for sound management of chemicals of concern in plastics.
- In the event the plastics instrument addressed plastic waste and established a financial mechanism to support implementation of its provisions, the provisions of the Basel Convention pertaining to plastics wastes, as further elaborated upon in guidance documents, could be promoted through the use of such guidance.

5.9 Exemptions

The Montreal Protocol excludes the amount of controlled substances produced, exported or imported and used entirely as feedstocks or as process agents, including for fluoropolymer production, from the calculation of production and consumption. Emissions may result from residuals in products and fugitive leaks during production, storage, or transport (UNEP, 2021). Scholars recommend narrowing these exemptions, particularly for vinyl chloride and its feedstock, ethylene dichloride, to reduce PVC production (Andersen et al., 2021).

Additionally, under the Stockholm Convention, specific exemptions apply to some controlled industrial chemicals used in plastics. Although these exemptions are time-bound, they can still cause many challenges, such as contaminating plastic recycling streams.

Potential actions:

- Collaboration between the Montreal Protocol and the plastics instrument is essential to ensure that any exemptions under the Montreal Protocol do not undermine efforts to control harmful emissions or weaken regulations on substances used in plastics production.
- Collaboration between the Stockholm Convention and the plastics instrument is necessary to ensure that necessary safeguards are in place to support the objectives of the plastics instrument, which may include achieving safe circularity.

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APPENDICES

Appendix 1: Basel Convention Plastic Waste Amendments[49]

- **Annex II (Wastes requiring special consideration and subject to the PIC procedure)**
  - **Entry Y48**:[50] All plastic waste, including mixtures of such waste, except for the following:

    1. Hazardous plastic waste covered by Annex VIII, entry A3210

    2. Following plastic waste that is destined for recycling[51] in an environmentally sound manner and almost free from contamination and other types of wastes:[52]
       - Plastic waste almost exclusively[53] consisting of one non-halogenated polymer;
       - Plastic waste almost exclusively consisting of one cured resin or condensation product of certain resins;
       - Plastic waste almost exclusively consisting of one of the fluorinated polymers listed therein.

    3. Mixture of plastic waste, consisting of polyethylene (PE), polypropylene (PP) and/or polyethylene terephthalate (PET), provided they are destined for separate recycling of each material and in an environmentally sound manner and almost free from contamination and other types of wastes.

- **Annex VIII (Waste considered hazardous and is subject to the PIC procedure)**
  - **Entry A3210**: Plastic waste, including mixtures of such waste, containing or contaminated with Annex I constituents, to an extent that it exhibits hazardous characteristics listed in Annex III.

49 As adopted by decision BC-14/12
50 Parties can impose stricter requirements in relation to this entry.
51
52 In relation to "almost free from contamination and other types of wastes", international and national specifications may offer a point of reference.
53 In relation to "almost exclusively", international and national specifications may offer a point of reference.

- **Annex IX (Waste presumed not to be hazardous and is not subject to the PIC procedure)**

  - **Entry B3011**: Plastic waste listed below, provided it is destined for recycling[54] in an environmentally sound manner and almost free from contamination and other types of wastes:[55]

    1. Plastic waste almost exclusively[56] consisting of one non-halogenated polymer, including but not limited to the following polymers:
       - Polyethylene (PE)
       - Polypropylene (PP)
       - Polystyrene (PS)
       - Acrylonitrile butadiene styrene (ABS)
       - Polyethylene terephthalate (PET)
       - Polycarbonates (PC)
       - Polyethers

    2. Plastic waste almost exclusively consisting of one cured resin or condensation product, including but not limited to the following resins:
       - Urea formaldehyde resins
       - Phenol formaldehyde resins
       - Melamine formaldehyde resins
       - Epoxy resins
       - Alkyd resins

    3. Plastic waste almost exclusively consisting of one of the following fluorinated polymers:[57]
       - Perfluoroethylene/propylene (FEP)
       - Perfluoroalkoxy alkanes, including
       - Tetrafluoroethylene/perfluoroalkyl vinyl ether (PFA)
       - Tetrafluoroethylene/perfluoromethyl vinyl ether (MFA)
       - Polyvinylfluoride (PVF)
       - Polyvinylidenefluoride (PVDF)

54 Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B) or, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.
55 In relation to "almost free from contamination and other types of wastes", international and national specifications may offer a point of reference.
56 In relation to "almost exclusively", international and national specifications may offer a point of reference.
57 Post-consumer wastes are excluded.

4. Mixtures of plastic waste, consisting of PE, PP and/or PET, provided they are destined for separate recycling[58] of each material and in an environmentally sound manner, and almost free from contamination and other types of wastes.[59]

Appendix 2: The example of criteria under the EU REACH Regulation

EU REACH[60] Regulation (Annex XIV)

The following outlines hazard criteria specified in Article 57 of EU's REACH legislation for the identification of substances of very high concern (SVHC) for listing in the REACH Candidate List (List of substances subject to authorization).

The following substances may be included in Annex XIV in accordance with the procedure laid down in Article 58:

1. Substances meeting the criteria for classification in the hazard class **carcinogenicity** category 1A or 1B in accordance with section 3.6 of Annex I to Regulation (EC) No 1272/2008;

2. Substances meeting the criteria for classification in the hazard class **germ cell mutagenicity** category 1A or 1B in accordance with section 3.5 of Annex I to Regulation (EC) No 1272/2008;

3. Substances meeting the criteria for classification in the hazard class **reproductive toxicity** category 1A or 1B, adverse effects on sexual function and fertility or on development in accordance with section 3.7 of Annex I to Regulation (EC) No 1272/2008;

4. Substances which are **persistent, bioaccumulative and toxic** in accordance with the criteria set out in Annex XIII of this Regulation;

5. Substances which are **very persistent and very bioaccumulative** in accordance with the criteria set out in Annex XIII of this Regulation;

58 Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B), with prior sorting and, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.
59 In relation to "almost free from contamination and other types of wastes", international and national specifications may offer a point of reference.
60 Registration, Evaluation, Authorisation and Restriction of Chemicals.

Substances — such as those having endocrine disrupting properties or those having persistent, bioaccumulative and toxic properties or very persistent and very bioaccumulative properties, which do not fulfil the criteria of points (d) or (e) — for which there is scientific evidence of probable serious effects to human health or the environment which give rise to an equivalent level of concern to those of other substances listed in points (a) to (e) and which are identified on a case-by-case basis in accordance with the procedure set out in Article 59.

Annex XIII: Criteria for the Identification of Persistent, Bioaccumulative and Toxic Substances, and Very Persistent and Very Bioaccumulative Substances

Hazard criteria used for listing substances under Annex XIV of EU's REACH legislation.
Annex XIII – PBT & VPVB 1.1.1.: Persistence (P) A substance fulfils the persistence criterion (P) in any of the following situations: (a) the degradation half-life in marine water is higher than 60 days; (b) the degradation half-life in fresh or estuarine water is higher than 40 days; (c) the degradation half-life in marine sediment is higher than 180 days; (d) the degradation half-life in fresh or estuarine water sediment is higher than 120 days; (e) the degradation half-life in soil is higher than 120 days. 1.2.1.: Persistence (vP) A substance fulfils the 'very persistent' criterion (vP) in any of the following situations: (a) the degradation half-life in marine, fresh or estuarine water is higher than 60 days; (b) the degradation half-life in marine, fresh or estuarine water sediment is higher than 180 days; (c) the degradation half-life in soil is higher than 180 days.
Substances which are persistent, bioaccumulative and toxic in accordance with the criteria set out in Annex XIII of this Regulation **Annex XIII – PBT & VPVB** 1.1.2.: Bioaccumulation A substance fulfils the bioaccumulation criterion (B) when the bioconcentration factor in aquatic species is higher than 2 000 . 1.2.2.: Bioaccumulation A substance fulfils the 'very bioaccumulative' criterion (vB) when the bioconcentration factor in aquatic species is higher than 5 000.

Annex XIII

1.1.3.: Toxicity

A substance fulfils the toxicity criterion (T) in any of the following situations:

(a) the long-term no-observed effect concentration (NOEC) or EC10 for marine or freshwater organisms is less than 0,01 mg/l;

(b) the substance meets the criteria for classification as carcinogenic (category 1A or 1B), germ cell mutagenic (category 1A or 1B), or toxic for reproduction (category 1A, 1B, or 2) according to Regulation EC No 1272/2008;

(c) there is other evidence of chronic toxicity, as identified by the substance meeting the criteria for classification: specific target organ toxicity after repeated exposure (STOT RE category 1 or 2) according to Regulation EC No 1272/2008.

Substances meeting the criteria for classification in the hazard class germ cell mutagenicity category 1A or 1B in accordance with section 3.5 of Annex I to Regulation (EC) No 1272/2008.

Substances meeting the criteria for classification in the hazard class reproductive toxicity category 1A or 1B, adverse effects on sexual function and fertility or on development in accordance with section 3.7 of Annex I to Regulation (EC) No 1272/2008.

Substances — such as those having endocrine disrupting properties or those having persistent, bioaccumulative and toxic properties or very persistent and very bioaccumulative properties, which do not fulfil the criteria of points (d) or (e) — for which there is scientific evidence of probable serious effects to human health or the environment which give rise to an equivalent level of concern to those of other substances listed in points (a) to (e) and which are identified on a case-by-case basis in accordance with the procedure set out in Article 59.

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