REPORT

Strengthening Chemicals and Waste Management through Sectoral Approaches: Interlinkages between Stockholm Convention National Implementation Plans, other Relevant International Conventions and the Global Framework on Chemicals

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This report was authored by Dr. Roland Weber (POPs Environmental Consulting, Schwäbisch Gmünd, Germany), under the coordination of the Agrifood and Health Unit, Chemicals and Health Branch, Industry and Economy Division, UNEP. Technical review was provided by Dr. Lautaro Girones (Argentine Institute of Oceanography/Universidad Nacional del Sur), Mihaela Paun (Programme Management Officer, Agrifood and Health Unit, Chemicals and Health Branch, UNEP), Dr. Feng Wang (Programme Management Officer, Plastics Unit, Industry Innovation Branch, UNEP) and Marcos Ierides (Chemicals Specialist, Chemicals and Health Branch, UNEP). The Green Growth Knowledge Partnership (GGKP) facilitated the design, layout, and dissemination of this report, ensuring its accessibility and alignment with global knowledge-sharing objectives.

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Table of Contents

List of Tables

List of Figures

List of Boxes

Abbreviations and Acronyms

ABS	Acrylonitrile butadiene styrene
ABSy	Anti-lock braking systems
ASR	Automotive shredder residues
BAT/BEP	Best available techniques/best environmental practices
BBP	Benzyl butyl phthalate
BFR	Brominated flame retardant
BRS	Basel, Rotterdam and Stockholm Conventions
c-DecaBDE	Commercial Decabromodiphenyl ether
c-OctaBDE	Commercial Octabromodiphenyl ether
c-PentaBDE	Commercial Pentabromodiphenyl ether
CAS	Chemical Abstracts Service
CFCs	Chlorofluorocarbons
CMR	Carcinogenic, mutagenic, or reprotoxic
CoC	Chemicals of Concern
COP	Conference of the Parties
CPs	Chlorinated paraffins
CDW	Construction and demolition waste
DBP	Dibutyl phthalate
DDT	Dichlorodiphenyltrichloroethane
decaBDE	Decabromodiphenyl ether; BDE-209
DEHP	Bis(2-ethylhexyl) phthalate
DIBP	Diisobutyl phthalate
DP	Dechlorane Plus
ECHA	European Chemicals Agency
EDC	Endocrine-disrupting chemicals
EEE	Electrical and electronic equipment
ELV	End-of-life vehicles
EPI	Emerging policy issue
EPR	Extended producer responsibility
EPS	Expanded polystyrene
ESM	Environmentally sound management
F-gases	Fluorinated gases
FAO	Food and Agriculture Organization of the United Nations
FR	Flame retardant
GADSL	Global Automotive Declarable Substance List
GASG	Global Automotive Stakeholders Group
GEBs	Global Environmental Benefits
GEF	Global Environment Facility
GFC	Global Framework on Chemicals
GGKP	Green Growth Knowledge Platform
GHG	Greenhouse gas
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GMP	Global Monitoring Plan
GWP	Global warming potential
HBB	Hexabromobiphenyl
HBCD	Hexabromocyclododecane
HCFCs	Hydrochlorofluorocarbons
heptaBDE	Heptabromodiphenyl ether
hexaBDE	Hexabromodiphenyl ether
HFCs	Hydrofluorocarbons
HHPs	Highly hazardous pesticides
HIPS	High impact polystyrene
HSLEEP	Hazardous Substances in the Life Cycle of Electronics and Electrical Products
ICCM	International Conference on Chemicals Management

IoC	Issues of Concern
IOMC	Inter-Organization Programme for the Sound Management of Chemicals
IFCS	Inter-governmental Forum on Chemical Safety
LCA	Life cycle assessment
MCCPs	Medium-chain chlorinated paraffins
MEAs	Multilateral environmental agreements
MRSLs	Manufacturing Restricted Substances Lists
NAP	National Action Plan
NPCM	National Profile for Chemicals Management
NIAS	Non-intentionally added substances
NIP	National Implementation Plan
NSO	National statistical office
ODS	Ozone-depleting substances
OPFR	Organophosphorus flame retardant
PAHs	Polycyclic aromatic hydrocarbons
PBDDs	Polybrominated dibenzo-p-dioxins
PBDEs	Polybrominated diphenyl ethers
PBDFs	Polybrominated dibenzofurans
PBT	Persistent, Bioaccumulative and Toxic
PCBs	Polychlorinated biphenyls
PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans
PCNs	Polychlorinated naphthalenes
PCP	Pentachlorophenol and its salts and esters
PeCB	Pentachlorobenzene
PFASs	Per- and polyfluorinated alkylated substances
PFBS	Perfluorobutane sulfonate
PFHxS	Perfluorohexane sulfonic acid
PFOA	Perfluorooctanoic acid; Perfluorooctanoate
PFOS	Perfluorooctane sulfonic acid; Perfluorooctane sulfonate
PFOSF	Perfluorooctane sulfonyl fluoride
PIC	Prior Informed Consent
PIR	Polyisocyanurate
POPRC	Persistent Organic Pollutants Review Committee
POPs	Persistent organic pollutants
PUR	Polyurethane
PVC	Polyvinyl chloride
RoHS	Restriction of Hazardous Substances
SAICM	Strategic Approach to International Chemicals Management
SC	Stockholm Convention
SCCPs	Short-chain chlorinated paraffins
SLCPs	Short-lived climate pollutants
t	Tonnes; metric tons
tetraBDE	Tetrabromodiphenyl ether
UNEA	United Nations Environment Assembly
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNITAR	United Nations Institute for Training and Research
US EPA	United States Environmental Protection Agency
UV-328	2-(2H-Benzotriazol-2-yl)-4,6-di-tert-pentylphenol
WEEE	Waste electrical and electronic equipment
XPS	Extruded polystyrene

Executive Summary

This document presents a set of initial considerations on how the National Implementation Plans (NIPs) under the Stockholm Convention can guide the management of hazardous chemicals and wastes through a sectoral approach, fostering synergies with other multilateral environmental agreements (MEAs), including the Basel, Rotterdam and Minamata Conventions, the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), the Montreal Protocol, and the recently adopted Global Framework on Chemicals (GFC). It was developed as an initial technical contribution and is intended as a starting point for future actions and developments in this area.

The analysis is framed within a global context defined by the triple planetary crisis of pollution, biodiversity loss and climate change. It recognizes that NIPs should not be developed in isolation, but rather integrated with other environmental, health and production-related policies at both national and international levels. The document builds on a critical review of the current NIP guidance and its potential revision in light of new multilateral agreements. In this regard, it proposes aligning the goals and targets of the GFC with the structural components of NIPs, promoting a more coherent, efficient and cross-cutting system of chemicals governance. Considering the GFC's five strategic objectives – legal frameworks, knowledge and data, issues of concern, safer alternatives, and effective cooperation – into the NIPs would enhance their implementation and position them as strategic tools for multisectoral coordination with GFC.

From a sectoral perspective, the document explores how NIPs can support GFC action lines in priority sectors such as health, agriculture, construction, electronics, transport and textiles, where there is significant interaction between hazardous chemicals, human exposure and environmental risk. Sectoral implementation offers an opportunity to align NIPs with national strategies on sustainability and resource efficiency, thereby strengthening their relevance and impact. The potential of NIPs to support the identification and sound management of wastes containing persistent organic pollutants (POPs) is also highlighted, in line with obligations under the Stockholm and Basel Conventions. The alignment of POPs and plastics inventories would support traceability, foster a circular economy controlling POPs, and help reduce risks to health and the environment.

The report also identifies relevant synergies with the Rotterdam Convention, particularly through the strengthening of the prior informed consent (PIC) mechanism for the import of POPs and other hazardous chemicals. With respect to the Minamata Convention, it emphasizes the value of sharing experiences related to inventory development, emissions inventory, institutional frameworks and international governance processes. Both conventions offer lessons that can inform and improve NIP implementation.

The document further examines the interlinkages between chemical pollution, biodiversity loss and climate change, underscoring the contribution of POPs to these crises and the potential of NIPs to address them. It proposes that the impact on biodiversity be explicitly integrated into the NIP, including references in introductory sections, substance-specific analyses, and action plans for research, awareness-raising and priority-setting. It also acknowledges that unintentional POP and greenhouse gas emissions have many common sources, and that their control can contribute to the goals of the Paris Agreement, and, for synergies with F-gases, also to commitments under the Montreal Protocol.

Additionally, the report outlines how NIPs can contribute to the achievement of the Sustainable Development Goals (SDGs), particularly in areas such as health (SDG 3), clean water (SDG 6), decent work (SDG 8), sustainable cities (SDG 11), responsible consumption and production (SDG 12), climate action (SDG 13), life below water (SDG 14) and terrestrial biodiversity (SDG 15). NIPs are encouraged to serve as platforms for promoting the development and adoption of safer chemical alternatives through green chemistry, avoiding regrettable substitutions and supporting sustainable innovation. Specific examples and available technical tools to support implementation are also discussed, based on applications in different regional and institutional contexts.

Taken together, the report proposes that Stockholm Convention NIPs can play a key role in integrating the management of chemicals and wastes into broader frameworks for environmental sustainability and national development. Achieving this will require a technical and strategic review of NIP structure, strengthened institutional capacities, and a systems-based approach that enables alignment with the GFC and the goals of other international environmental frameworks.

1 Introduction and Objectives

The Stockholm Convention National Implementation Plan (NIP) guidance (UNEP 2017a) emphasizes that the development, review and updating of a NIP should be based on existing work and assessments where available, and should not “reinvent the wheel”. This may include, for example, national profiles, national Strategic Approach to International Chemicals Management (SAICM) implementation plans, National Action Plans (NAPs) for the implementation of the Rotterdam Convention, national Globally Harmonized System of Classification and Labelling of Chemicals (GHS) implementation strategies, waste management and other chemicals management implementation efforts (UNEP 2017a).

The guidance also stresses that NIPs should not be developed, reviewed, or updated in isolation, but should take into account the goals of sustainable development through socially, economically, and environmentally sound policies and actions, to maximize the overall benefits. For example, a NIP should be well integrated with national environmental action plans or environmental strategies. Where possible, they should be linked to related initiatives to ensure maximum efficiency and reduce duplication of effort (UNEP 2017a).

The NIP guidance was last updated in 2017, before the interconnections between chemical pollution, biodiversity loss and climate change were widely recognized – now collectively referred to as the triple planetary crisis. In addition, the Global Framework on Chemicals (GFC) was only recently established and therefore synergies were not elaborated, but the predecessor Strategic Approach to International Chemicals Management (SAICM) has been mentioned, and a range of NIPs have considered synergies with SAICM (Government of Suriname 2019; Government of Pakistan 2020; Republic of the Union of Myanmar 2020; Republic of Botswana 2025).

In recent years, a sectoral approach to the management of persistent organic pollutants (POPs) has been promoted (GGKP 2024a), yet this approach has not been systematically assessed in relation to its potential synergies with other multilateral environmental agreements (MEAs) within the NIP context. Furthermore, it was not included in the most recent NIP development guidance (UNEP 2017a).

This report compiles initial considerations on how Stockholm Convention NIPs could guide chemicals and waste management through a sectoral approach, contributing to synergies among chemicals and waste MEAs. These include the Basel Convention(Chapter 4), the Rotterdam Convention (Chapter 5) and the Minamata Convention (Chapter 6). The report also includes a detailed assessment of the synergy of Stockholm Convention NIPs and the Global Framework on Chemicals (see Chapter 2 for synergies with the GFC’s objectives and targets, and Chapter 3 for sector-specific synergies).

In the context of the triple planetary crisis, which encompasses climate change, pollution and biodiversity loss, this report also explores the potential for NIP support under the Stockholm Convention with the Biodiversity Convention (Chapter 7) and the United Nations Framework Convention on Climate Change (Chapter 8).

2 Synergy Options between the Stockholm Convention NIP and the Objectives and Targets of the Global Framework on Chemicals

2.1 Background

The Global Framework on Chemicals (GFC) was adopted on 30 September 2023. Its core elements include five strategic objectives and 28 targets to be achieved by 2030 or 2035, which guide stakeholders at all levels to take measurable actions towards the sound management of chemicals and waste. Other outcomes adopted by the Fifth International Conference on Chemicals Management (ICCM5) include the Bonn Declaration for a Planet Free of Harm from Chemicals and Waste and 12 accompanying resolutions. Through Resolution V/8 on “Implementation

Arrangements", the Conference urged "governments, intergovernmental organizations, and organizations and stakeholders representing civil society and the private sector to comprehensively implement the GFC as a framework for national and international action and cooperation on chemicals and waste".

The scope of the GFC is to promote initiatives that enhance the sound management of chemicals and waste, while taking due account of existing instruments such as the Stockholm Convention and other multilateral environmental agreements on chemicals (GFC 2024). Implementation of the GFC should be guided by the principles and approaches outlined in the Rio Declaration on Environment and Development – as is the case with the Stockholm Convention – and, where appropriate, by those included in Annex II of the GFC, which references the Stockholm Convention among others. Conversely, the Stockholm Convention's guidance emphasizes that, in line with decisions on enhancing synergies, countries are encouraged to consider the requirements of, and possible synergies with, the Rotterdam and Basel Conventions when developing, reviewing, or updating their NIP. In the future update of the Stockholm Convention NIP guidance, synergies with the GFC should also be included.[1]

2.2 Development and updating of National Profile on Chemicals Management within NIP updates as an opportunity for GFC implementation in individual countries

Since 1996, the United Nations Institute for Training and Research (UNITAR) has promoted the development of National Profiles for Chemicals Management (NPCM) with the involvement of a wide range of national stakeholders, in line with the recommendations issued by the Intergovernmental Forum on Chemical Safety (IFCS) and the Strategic Approach to International Chemicals Management (SAICM).

UNITAR and the Inter-Organization Programme for the Sound Management of Chemicals (IOMC) developed a National Profile Guidance Document, first published in 1996, with a second edition released in 2012 under the title "Preparing a National Profile to Assess Infrastructure and Capacity Needs for Chemicals Management" (UNITAR 2012). This updated version takes into account developments since the first edition, incorporates lessons learned from countries' experiences, expands coverage of the full life cycle of chemicals management and integrates key elements of the 2007 IOMC SAICM Capacity Assessment methodology (UNITAR 2025).

One opportunity to align NIP development with broader chemicals management efforts is through the development or updating of National Profiles for Chemicals Management within the NIP. Understanding the country's baseline situation regarding POPs, and chemicals in general – through the preparation of a national profile – can be seen as a fundamental component of an NIP (UNITAR 2003). In this context, UNITAR prepared a Guidance "Preparing/Updating a National Profile as Part of a Stockholm Convention National Implementation Plan" (UNITAR 2003). "*The elaboration and updating of supporting documents and efforts, such as the National Profile and necessary improvements to the current regulations to accord with the NIP*" is already recommended in the NIP development guidance (UNEP 2017a). This could be further elaborated in the future updates of the NIP guidance (UNEP 2017a), by including a stronger recommendation for countries to update their National Profiles as part of their NIP revisions, and to align them with the objectives and targets of the GFC.

This process is already underway in some countries. For example, in an ongoing NIP update activity of Malawi (part of a UNEP regional NIP update project), the country is updating its National Profile within the update of the NIP (See Box 1). This approach was presented at a side event during the 2025 joint meetings of the Conferences of the Parties to the Basel, Rotterdam and Stockholm Conventions (BRS COPs), titled "*Bridging commitment: Unlocking the power of Stockholm Convention Implementation Plans to achieve the objectives and targets of the Global Framework on*

[1] Please note that an update of the guidance on developing National Implementation Plans for the Stockholm Convention (UNEP 2017a) is planned and that the addition of GFC is proposed in a related update document (Weber 2025).

Chemicals" (UNEP 2025i). Similarly, The Gambia is also updating its National Profile as part of its current NIP update.

Notably, the UNITAR guidance documents "Preparing a National Profile to Assess Infrastructure and Capacity Needs for Chemicals Management" have not been updated since 2012 (UNITAR 2012), and the guidance linking them to NIP development and implementation dates back to 2003 (UNITAR 2003). Therefore, one possible option would be to update both documents (UNITAR 2003, UNITAR 2012) or consolidate them into a single, revised document. This updated guide should explicitly align with the GFC, be referenced in future revisions of the NIP development guidance, and encourage countries to incorporate the update of their National Chemicals Profiles as part of the NIP review process.

Box 1: Case study: Malawi updates its National Profile for Chemicals Management within the NIP update (Carol Theka, UNEP 2025i)

Malawi developed its first National Profile for Chemicals Management (NPCM) in 1997, in response to the activities of the Inter-governmental Forum on Chemical Safety (IFCS). The purpose of the NPCM was to establish and document all existing structures, shortfalls and capacities pertaining to management of chemicals (Malawi Environmental Affairs Department 2012). Malawi developed her first NIP in 2004, focused on the initial POPs, and published an updated NIP in 2019 that included new POPs listed up to COP6 amendments.

Currently, Malawi is undertaking a second update of its Stockholm Convention NIP under the UNEP NIP project. As part of this process, the country is also updating its NPCM. This NPCM builds on the work previously done under the previous NPCM and will enable Malawi to strengthen its regulatory framework, enhance public and environmental safety, and contribute to a more sustainable and responsible approach to chemical use. During its development, the updated NPCM has taken into consideration the Global Framework on Chemicals and its Objectives and Targets, and has begun to align with them. Specifically, Malawi has linked the NPCM to GFC strategic objective A: "*Legal frameworks, institutional mechanisms and capacities are in place to support and achieve the safe and sustainable management of chemicals throughout their life cycle*". In addition, the updated NPCM is linked to:

- GFC Target A1: *By 2030, governments have adopted and are implementing and enforcing legal frameworks, and have established appropriate institutional capacity to prevent or, where prevention is not feasible, minimize adverse effects from chemicals and waste as appropriate for their national circumstances*.
- GFC Target A4: *By 2030, stakeholders have effectively prevented all illegal trade and traffic of chemicals and waste*.

Carol Theka, Coordinator of Chemicals and Waste Management, Malawi Environmental Affairs Department, stressed that additional GFC objectives and targets have been identified as relevant, and that Malawi is already working to align the NPCM with them.

Theka highlighted that updating the NPCM within an NIP update is a good synergistic approach and can be used to consider and integrate objectives and targets of the GFC. This can be further elaborated at the national level (and, if possible, at the international level) to ensure that these processes are coordinated and not developed independently, but rather in an integrated manner to address POPs and, more broadly, the management of all hazardous chemicals in a synergistic way. Moreover, for a resource-constrained party (and region), this represents a prudent and efficient use of resources.

2.3 Experience with SAICM and related National Action Plans (NAPs) and opportunities provided by Stockholm Convention National Implementation Plans (NIPs)

The development of National Action Plans (NAPs) was encouraged by SAICM, but only a few NAPs have been developed due to limited project funding. In countries where SAICM NAPs were developed, most lacked dedicated financial support for their implementation, as SAICM had only a limited number of Quick Start Program projects. In contrast, the Stockholm Convention requires, under Article 7, the development and periodic update of National Implementation Plans (NIPs). This process is financed for developing countries by the Global Environment Facility (GEF) as an enabling activity and typically includes the following elements:

- Establishment of a coordination mechanism and institutional organization
- Inventory of POPs, review of the existing NIP and assessment of national capacity
- Evaluation and prioritization of actions for the management of legacy and newly listed POPs
- Formulation of the NIP and associated National Action Plans
- Endorsement and submission of the NIP

The NIP development and update process is relatively comprehensive and typically takes one to two years. It should be further explored how this process could contribute to the GFC objectives and targets, and help foster synergies between the SC and the GFC. This is particularly relevant in light of the recently established sectoral approach to assessing and managing POPs in major affected sectors (GGKP 2024a). The importance of working with sectors and related supply chains is also emphasized in the GFC (GFC 2024; see Section 3.1.2).

In sections 2.4 to 2.8, the objectives of the GFC and related targets are briefly described, along with how Stockholm Convention NIP development or implementation could contribute to achieving these targets, including through the use of sectoral approaches.

2.4 GFC Objective A: Legal frameworks, institutional mechanisms and capacities

Objective A of the GFC addresses the foundational conditions required for sound chemical management. It underpins the implementation of the other strategic objectives and targets, and is articulated as follows: *Legal frameworks, institutional mechanisms and capacities are in place to support and achieve the safe and sustainable management of chemicals throughout their life cycle*.

2.4.1 Stockholm Convention NIP: Update of legal framework and option of updating chemical profile

For the Stockholm Convention NIP update, Parties are assessing and updating their legal frameworks. With POPs listed with exemptions and some still in production, the entire life cycle of these POPs is being assessed, and relevant legislation is updated accordingly. As described above in Section 2.2, some countries are updating their chemical profiles within the framework of the NIP update. This approach could be encouraged in future NIP updates, and the potential synergies with the GFC should be emphasized.

By updating the guidance materials of the chemical profile (UNITAR 2012) and the document *Preparing/Updating a National Profile as Part of a Stockholm Convention National Implementation Plan* (UNITAR 2003), and by linking these activities to the GFC and its objectives and (selected) targets, a stronger synergy could be promoted between the NIP development process and the broader legal and institutional framework needed for the safe and sustainable management of chemicals throughout their life cycle.

2.4.2 Target A1

By 2030, Governments have adopted and are implementing and enforcing legal frameworks, and have established appropriate institutional capacity to prevent or, where prevention is not feasible, minimize adverse effects from chemicals and waste as appropriate for their national circumstances.

Synergy option with the Stockholm Convention NIP
Within the Stockholm Convention NIP, Parties adopt and implement legal frameworks for POPs, which can help to improve the broader legal frameworks on chemicals, in particular if a chemical profile is developed in the frame of the NIP development (See Section 2.2).
The development and implementation of the NIP, along with the management of POPs, require establishing institutional capacities to prevent and minimize the adverse effects of hazardous chemicals. The Stockholm Convention has supported extensive activities related to the management of POPs stockpiles – such as for PCBs and obsolete pesticides – in nearly all 186 Party countries. This has created a foundation of experience and capacity that can be leveraged to advance GFC activities.

Additionally, the NIP includes specific sections that detail the technical infrastructure for POPs management:

- Section 2.3.15: *Overview of technical infrastructure for POPs assessment, measurement, analysis, alternatives and prevention measures, research and development – linkage to international programmes and projects.*
- Section 2.3.16: *Overview of technical infrastructure for POPs management and destruction.*

These sections are equally relevant for the management of other hazardous chemicals and wastes, and could be expanded in future NIP updates to support broader assessments.

Furthermore, with the new industrial POPs mainly present in plastics in the transport, electronics, buildings/construction and textile sectors, the management of wastes in these sectors will become more relevant in the future, and can be extended to overall hazardous chemicals and waste management in these sectors, considering the synergies with the Basel Convention (see below sections 4.3 and 4.2). The Stockholm Convention sectoral guidance already considers other Chemicals of Concern (CoCs) under different MEAs (GGKP 2024a), and could be further updated to link to the GFC.

2.4.3 Target A2

By 2030, intergovernmental stakeholders develop guidelines to support the needs of interested Governments and relevant stakeholders to implement effective chemicals and waste management strategies, building on, among other things, updates of the Inter-Organization Programme for the Sound Management of Chemicals toolbox for decision-making in chemicals management.

Synergy with the Stockholm Convention
A range of guidance documents, including those on inventories, alternatives, contaminated sites and monitoring, have been developed in the framework of the Stockholm Convention to support the implementation of effective POPs and POP-containing waste management.
Furthermore, the United Nations Environment Programme (UNEP) has established a BAT/BEP group for developing or updating guidance documents on the best available techniques and best environmental practices for POPs management.

2.4.4 Target A3

By 2030, companies implement measures identified to prevent or, where prevention is not feasible, minimize adverse effects from chemicals throughout their life cycle.

Synergy with the Stockholm Convention NIP
Within the NIP update process, industrial sectors using POPs or producing POP-containing products are integrated and supported in their efforts to phase out POPs. These sectors – such as those producing EEE, cars/vehicles, buildings/construction materials, or textiles – are actively engaged through awareness-raising and capacity-building activities. These efforts could be expanded to cover other hazardous chemicals and to strengthen life cycle management approaches in these industries.

2.4.5 Target A4

By 2030, stakeholders have effectively prevented all illegal trade and traffic of chemicals and waste.

Synergy with Stockholm Convention NIP
During NIP implementation, the illegal trade of POPs – both as substances and in products – needs to be assessed for appropriate management. In many low- and middle-income countries, the export of POP-containing waste is often necessary due to the lack of domestic destruction facilities. To support this, a guidance document on the control of the import and export of POPs has been published (UNEP 2017c)

2.4.6 Target A5
By 2030, Governments work towards notifying, regulating, or prohibiting the export of chemicals they have prohibited nationally, in line with their international obligations.

Synergy with the Stockholm Convention NIP
The production, use and export of POPs are regulated by the Stockholm Convention. Certain POPs have exemptions for production and use if a Party has registered for such exemptions. Currently, it is theoretically allowed for a Party to produce and export a POP even if its use is not allowed domestically. Aligning the Stockholm Convention with Target A5 of the GFC would likely require an amendment to the convention, which would need to be proposed by a Party and decided by the COP.

2.4.7 Target A6
By 2030, all countries have access to poison centres equipped with essential capabilities to prevent and respond to poisonings, as well as access to training in chemical risk prevention and clinical toxicology.

Synergy with the Stockholm Convention NIP
POPs are toxic chemicals that pose a threat to human health. Some parties have included the establishment or improvement of poison centres in the action plan of their Stockholm Convention NIPs (e.g., Environmental Protection Agency of Ghana, 2019; Republic of the Union of Myanmar, 2020). While this is not currently a specific requirement in the NIP update guidance, it could be incorporated in a section dedicated to synergies with the GFC.

2.4.8 Target A7
By 2035, stakeholders have taken effective measures to phase out highly hazardous pesticides in agriculture where the risks have not been managed and where safer and affordable alternatives are available, and to promote transition to and make available those alternatives.

Synergy option with the Stockholm Convention NIP
As elaborated in Section 3.6 below, highly hazardous pesticides (HHPs) can be addressed within the Stockholm Convention NIP, and several countries have already integrated HHPs in their plans (Government of Suriname 2019; Government of Pakistan 2020; Republic of the Union of Myanmar 2020; Republic of Botswana 2025; Cooperative Republic of Guyana 2025). Therefore, the development of NIPs can serve as an effective entry point for creating synergies with GFC in the agricultural sector, particularly concerning the management and phase-out of HHPs.

2.5 Objective B: Knowledge, data and information
Sound chemicals and waste management rely heavily on the generation, accessibility and use of accurate data and information. Objective B of the GFC highlights the importance of improving knowledge systems, promoting data sharing, and enhancing information flows across sectors and stakeholders. The Stockholm Convention's NIP process already contains elements that support these goals and offers valuable synergies for strengthening the science-policy interface and decision-making frameworks under the GFC.

2.5.1 Target B1
By 2035, comprehensive data and information on the properties of chemicals are generated and made available and accessible.

Synergy option with the Stockholm Convention NIP
The recommended NIP structure includes sections 2.3.18, *Details of any relevant system for the assessment and listing of new chemicals* and 2.3.19, *Details of any relevant system for the assessment and regulation of chemicals already in the market*. These sections encourage Parties to evaluate whether their national chemical management system includes assessments of chemicals on the market in relation to POP properties. These sections could be further strengthened by encouraging the submission of generated chemical data to the BRS Secretariat's Clearing-House Mechanism, and/or to the GFC, if a system for assessment of chemicals and a related data-sharing mechanism is established under it.

Further relationships to the Stockholm Convention
Parties may nominate new chemicals for POP listing based on the pre-screening at the national level. These nominated substances are then evaluated by the POPs Review Committee (POPRC), during which data and information are gathered. In some cases, alternative substances to the nominated compounds are also assessed to determine whether they exhibit POP-like properties. Such information could be of relevance to the GFC process.

2.5.2 Target B2
By 2030, stakeholders make available, to the extent possible, reliable information on chemicals in materials and products throughout the value chain.

Synergy option with the Stockholm Convention NIP
During POP inventory development, countries gather information on POPs used in production processes and present in products. These assessments can support the evaluation of value chains, in particular, for POPs that are still in use. This includes substances such as decaBDE, UV-328, Dechlorane Plus and SCCPs/MCCPs in EEE, the transport sector and construction materials. These evaluations could inform the development of regulatory frameworks, requiring stakeholders along the value chain to disclose information on POPs used in products and production.

Further relationships to the Stockholm Convention
Following the listing of Dechlorane Plus and UV-328, discussions in the POPRC have addressed the presence of POPs in products and the proposal by African countries to require labelling. POPRC documents have been compiled on POPs information in products and articles in use and waste (UNEP 2023a), including related challenges (UNEP 2025k).
Additionally, the Stockholm Convention Guidance for strengthening regulatory framework and voluntary agreements includes annexes outlining: *Voluntary schemes for identification of chemicals in articles and their gaps to facilitate the control of import/export and monitoring of article possible containing new POPs*; and *Tools and regulatory frameworks for identification of chemical and their gaps to facilitate the control of import/export of new POPs or the monitoring of products and articles possibly containing new POPs* (UNEP 2021a).

These annexes reference several databases, such as the:
- Global Automotive Declarable Substance List (GADSL) for transport and vehicles, including POPs (GASG 2020)
- Manufacturing Restricted Substances Lists (MRSLs) for the electronics sector (Green Electronics Production Network 2025).

Recently, a review article compiled a list of 57 databases on chemicals in products (Olisah et al. 2025), which can support both the Stockholm Convention and GFC-related work.

2.5.3 Target B3
By 2035, stakeholders generate data on the production of chemicals, including the use of chemicals in materials and products, in addition to data on emissions and releases of chemicals and waste to the environment, making these data available and publicly accessible.

Synergy option with the Stockholm Convention NIP
The development of the Stockholm Convention NIP and related inventories has built capacities in countries to inventory chemicals and chemicals in products along their life cycle. The compilation of these inventory data on the production and use of POPs serves as a precedent for making chemical data available and publicly accessible.

POPs are among the best investigated chemicals in products and in recycling streams, as well as in terms of their release to the environment, presence in food, and general exposure pathways. A large share of POP-related data is publicly available, and the Convention is systematically generating POPs data through the Global Monitoring Program (GMP).[2] The experience with POPs data generation could serve as a model for developing data on other internationally relevant CoCs.

2.5.4 Target B4

By 2035, stakeholders apply appropriate guidelines, best available practices and standardized tools for hazard and risk assessment and chemical and waste management.

Synergy option with the Stockholm Convention NIP
For both the development and implementation of the NIP, Parties use BAT/BEP guidelines, guidance documents and other standardized tools for inventories and management of POPs and POP-containing chemicals and waste. The Stockholm Convention BAT/BEP guidelines refer, where appropriate, to the Basel Convention guidelines for POPs waste management. Therefore, the Basel Guidelines are also considered by Parties that adhere to both conventions. For hazard and risk assessment, the Stockholm Convention provides Parties with the framework established in Annex D for evaluating POP criteria, and Annexes E and F for risk evaluation and risk management of chemicals.

In addition, the NIP contains recommended sections where Parties are encouraged to assess their regulatory framework. It also includes dedicated sections for assessing new chemicals and chemicals already on the market for their POP properties (Section 2.3.18: *Details of any relevant system for the assessment and listing of new chemicals,* and Section 2.3.19: *Details of any relevant system for the assessment and regulation of chemicals already in the market*). This assessment could be extended to cover other criteria listed in the EU Classification, Labelling and Packaging (CLP) Regulation (e.g., chemicals that are carcinogenic, mutagenic, or toxic for reproduction (CMR)).

Further relationships to the Stockholm Convention
The Stockholm Convention has developed a methodology for the assessment of chemicals. This uses a standardized framework to: (i) evaluate POPs criteria as set out in Annex D; (ii) develop a Risk Profile according to the information requirements in Annex E; and (iii) conduct a Risk Management Evaluation based on the socio-economic considerations outlined in Annex F.

The Stockholm Convention has also developed BAT/BEP guidance for managing and recycling waste containing PBDEs and Dechlorane Plus, including the separation of POP-containing plastic fractions, specifically addressing plastics from WEEE and ELVs (UNEP 2025c). This guidance can also support Parties in the identification and segregation of POP-contaminated plastic fractions during mechanical recycling processes, thereby preventing the unintentional contamination of new products and ensuring the environmentally sound management of POP-containing materials.

2.5.5 Target B5

By 2030, educational, training and public awareness programmes on chemical safety, sustainability, safer alternatives and the benefits of reducing chemicals and waste risks have been developed and implemented, taking into consideration a gender-responsive approach.

Synergy option with the Stockholm Convention NIP
The Stockholm Convention includes a dedicated Article 10 on *public information, awareness and education*, which requires Parties to promote and facilitate awareness-raising among key

[2] https://www.pops.int/implementation/globalmonitoringplan/overview/tabid/83/default.aspx

stakeholders, within their capabilities. This obligation is reflected in the suggested NIP structure, which includes in the action plan the *Activity: Public and stakeholder awareness, information and education (Article 10)*. Countries frequently include in this activity broader education on hazardous chemicals and chemical safety (e.g., Government of Suriname 2019; Republic of the Union of Myanmar 2020; Cooperative Republic of Guyana 2025). Therefore, there is an opportunity to further expand awareness-raising activities within NIPs to include broader issues related to hazardous chemicals, considering synergies with NIP-related GFC Issues of Concern, and support alignment with the awareness-raising goals of the GFC.

2.5.6 Target B6

By 2030, all Governments have implemented the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) in all relevant sectors as appropriate for their national circumstances.

Synergy option with the Stockholm Convention NIP

The implementation of GHS has been included in the NIP action plans of several countries (e.g., Government of Suriname 2019; Cooperative Republic of Guyana 2025). This indicates that the NIP can serve as an appropriate platform to promote further implementation of GHS, particularly to help control hazardous chemicals such as POPs in mixtures and articles (IOMC 2022). This issue has been highlighted as a challenge for Stockholm Convention Parties, documented in a recent POPRC report (UNEP 2025k). It will likely receive increased emphasis in future NIP updates, thereby supporting synergies with GFC implementation.

Moreover, existing gaps in the GHS framework have been identified in the Stockholm Convention guidance on strengthening the regulatory framework and voluntary agreements (see Box 2), which also provides recommendations to address these gaps.

Box 2: Gaps for GHS classification and labelling and addressing gaps (UNEP 2021a)

While the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) is an internationally standardized system for communicating chemical hazards, it is not yet the single global information system for managing data about chemicals in products. Currently, around 83 countries are listed as implementing GHS (UNECE 2023), and other countries are preparing for implementation; many developing countries might need some time for preparation and implementation.

Concentration levels below 0.1% are normally not covered in GHS labelling. However, there are possibilities to lower this generic value. For POPs, specific concentration thresholds would need to be established.

As described in the guidance on labelling of products or articles that contain new POPs or use new POPs during manufacture, the Conference of the Parties (COP) of the Stockholm Convention could recommend that Parties implement the GHS and classify and label the newly listed POPs based on all known hazards.

A list for the GHS classification and labelling of all newly listed POPs, made available by the Stockholm Convention COP, would facilitate GHS implementation by Parties. This list could be prepared upon request by the COP through the POPRC, in cooperation with the Subcommittee of Experts of the United Nations Economic and Social Council (ECOSOC) on the GHS (SCEGHS). As a first step, the Secretariat of the Stockholm Convention could initiate the exchange of information on how Parties classify and label POPs when implementing the GHS.

Addressing the gaps

The COP of the Stockholm Convention could ask the POPRC, in cooperation with SCEGHS, to develop a science-based proposal for cut-off values for POPs based on the principles of the GHS. The cut-off values can be reduced if the classifier has information that the hazard of an ingredient will be evident below the generic cut-off values/concentration limits, the mixture containing that

ingredient should be classified accordingly. Adequate documentation supporting the use of any values other than the generic cut-off values/concentration limits should be retained and made available for review on request.

These values could be recommended by the COP to be used by Parties when implementing the GHS. The Secretariat of the Stockholm Convention could initiate an exchange of information about the cut-off levels for POPs used by Parties when implementing the GHS.

2.5.7 Target B7

By 2030, stakeholders generate, to the extent possible, and make available comprehensive and accessible monitoring and surveillance data and information on concentrations and potential exposure sources of chemicals in humans (disaggregated by sex, age, region, other demographic factors, and other relevant health determinants as feasible), other biota and environmental media. Sufficient knowledge, data and information are generated, available and accessible to all to enable informed decisions and actions.

Relationship to the Stockholm Convention NIP and opportunity

POPs are among the best monitored human pollutants globally. They are the only class of pollutants for which an international convention has established a dedicated mechanism – supported by GEF projects – to promote human biomonitoring (e.g., in human milk and blood), and, to some extent, monitoring in biota. POPs are a major group of pollutants monitored in biota. For some POPs, it has been shown that the current levels, in particular in top predators, result in risk of extinction (Paasivirta 1998, Desforges et al. 2018, Schaap et al. 2023).

Accordingly, Target B7 has already been partially achieved for POPs, including in low- and middle-income countries, through the Global Monitoring Plan (GMP) and global research efforts. Nonetheless, it is important to highlight that, for many low-income countries, achieving this target remains unrealistic, as even data on human exposure to POPs are still predominantly generated by industrialized countries. However, the GMP has shown that robust data can be generated for low- and middle-income countries through international cooperation and coordination.[3]

Since sampling represents a significant portion of the effort required to generate data, the GFC could explore synergies with the Stockholm Convention's GMP sampling activities. For instance, existing GMP samples could potentially be leveraged to monitor other CoCs, such as a wide range of PFAS in water samples or additional substances within the Convention's air monitoring programmes.

2.6 Objective C: Issues of Concern are identified, prioritized and addressed

The SAICM Emerging Policy Issues and Issues of Concern[4] constitute the first set of GFC Issues of Concern (IoCs). Under Resolution V/5 on Emerging Policy Issues and Issues of Concern, the International Conference on Chemicals Management (ICCM) decided that all issues recognized prior to its fifth session, held in Bonn, Germany, in September 2023, would transition on an interim basis to "Issues of Concern" under the Framework, and strongly encouraged all relevant stakeholders to continue their work on such issues.

IoCs have a dedicated section in the GFC text,[5] and at its first session, the International Conference of the Global Framework on Chemicals will determine their path under the Framework. Further IoC can be nominated by stakeholders,[6] which should submit the information specified in Part 1 of Annex I to the Framework.[7] These nominations will be reviewed by the Secretariat in accordance with Part II of Annex I of the GFC[7] and circulated to all stakeholders. Nominations will then be considered by the ICCM at its regular meetings.

[3] For the next GMP phase, a higher emphasis on monitoring capacity development in the global South is planned.
[4] https://www.saicm.org/implementation/emergingpolicyissues
[5] https://www.unep.org/global-framework-chemicals/framework/text-global-framework-chemicals - Issues of concern
[6] https://www.unep.org/global-framework-chemicals/implementation/issues-concern
[7] https://www.unep.org/global-framework-chemicals/framework/text-global-framework-chemicals#Annex%20I%20-%20Issues%20of%20concern

At the first Meeting of the Open-Ended Working Group (OEWG) for the GFC (06/2025), the IOMC proposed the following regarding IoCs:

- Dropping nanotechnology/nanomaterials.
- Expanding lead in paint to all lead exposures.
- Keeping HHPs as an IoC until the new global alliance "gains momentum".
- Integrating the IoCs of "chemicals in products", "hazardous substances within the life cycle of electrical and electronic products", and "environmentally persistent pharmaceutical pollutants" into sectoral implementation programmes.
- Continuing to address perfluorinated chemicals and endocrine-disrupting chemicals as was done under SAICM.

Switzerland and Brazil and several civil society organizations opposed dropping nanomaterials as an IoC. Most delegates welcomed the idea of expanding the focus on lead exposure and supported the IOMC's proposal to integrate the three IoCs into sectoral implementation programmes (IISD 2025a).

Synergy option with the Stockholm Convention NIP

The current Issues of Concern (from SAICM) offer multiple synergies and opportunities for integration into Stockholm Convention NIP implementation. Several countries have already elaborated on these synergies and incorporated IoCs into their NIPs (e.g., Government of Suriname 2019; Government of Pakistan 2020; Republic of the Union of Myanmar 2020; Republic of Botswana 2025; Cooperative Republic of Guyana 2025).

IoCs and their potential synergies with the Stockholm Convention on POPs are compiled in Table 1. This compilation shows that the Stockholm Convention has close links to most IoCs.

Table 1: SAICM/GFC Issue of Concern and synergy with the Stockholm Convention NIP

Issue of Concern of SAICM/GFC	Synergy with the Stockholm Convention NIP
All per- and polyfluoroalkyl substances (PFAS)	Listed POP-PFAS and assessment of alternatives
Highly hazardous pesticides (HHPs)	POPs pesticides are also HHPs
Hazardous chemicals in electronics	Multiple POP plastic additives are present in electronic equipment, including in products still in use or currently manufactured
Chemicals in products	Numerous newly listed POPs (e.g., SCCPs, MCCPs, PBDEs, PFOS, PFOA) are found in everyday products such as EEE, vehicles, building materials, textiles, paper and toys – especially those made from recycled materials
Endocrine-disrupting chemicals (EDCs)	Most POPs are recognized as EDCs
Lead in paints	Presence of POPs in paints and coatings (e.g., SCCPs, MCCPs, PFAS, HBCD, PCBs) and unintentional POPs in certain pigments and dyes (PCBs, HCB, PCDD/PCDFs)
Environmentally persistent pharmaceutical pollutants	With the exception of lindane – formerly used as a pharmaceutical for treating lice and scabies – no persistent pharmaceuticals have been proposed for listing under the Convention

2.6.1 Target C1

Processes and programmes of work, including timelines, are established, adopted and implemented for identified issues of concern.

Synergy option with the Stockholm Convention NIP

A range of issues of concern have synergies with the management of POPs and related NIP implementation (Table 1) and POP management can be extended in the NIP action plan to address

broader related issues of concern, where appropriate, and where the authorities (and respective stakeholders) are interested in addressing them. After further IoCs have been established, their synergy with the Stockholm Convention NIP can be evaluated – similar to the assessment of current IoCs (Table 1) – and considered in the action plan where appropriate.

2.7 Objective D: Safer alternatives and innovative and sustainable solutions

Safer alternatives and innovative and sustainable solutions in product value chains are in place so that benefits to human health and the environment are maximized, and risks are prevented or, where prevention is not feasible, minimized.

2.7.1 Target D1

By 2030, companies consistently invest in and achieve innovations towards advancing sustainable chemistry and resource efficiency throughout the life cycle of chemicals.

Synergy option with the Stockholm Convention NIP

For major sectors impacted by POPs with exemptions and still in use (e.g., construction, electronics, textiles, transport), the NIP normally already considers relevant stakeholders during the inventory phase, including industrial sectors and their related supply chains. The Stockholm Convention addresses the entire life cycle of chemicals, including their environmentally sound management, and – together with the Basel Convention[8] – can promote Extended Producer Responsibility (EPR). EPR ensures that companies take into account the entire life cycle of products, including end-of-life considerations.

2.7.2 Target D2

By 2035, Governments implement policies that encourage production using safer alternatives and sustainable approaches throughout the life cycle, including best available techniques, green procurement and circular economy approaches.

Synergy option with the Stockholm Convention NIP

Several POPs are currently used in production under various exemptions (e.g., Chlorpyrifos, Dechlorane Plus, DecaBDE, MCCPs, PFOS, PFOA, UV-328) and need to be substituted. One of the major tasks for Parties to the Stockholm Convention is to substitute these POPs with safer alternatives. The assessment of alternatives should follow a life cycle approach, taking into account externalities in the production, use, and disposal stages. This forms part of the NIP action plan and its implementation, and may be supported through capacity-building activities specifically focused on alternative assessment.

2.7.3 Target D3

By 2030, the private sector, including the finance sector, incorporates strategies and policies to implement the sound management of chemicals and waste in its finance approaches and business models and applies internationally recognized or equivalent reporting standards.

Synergy option with the Stockholm Convention NIP

The Stockholm Convention addresses the entire life cycle of chemicals, including the environmentally sound management of waste, and can promote, in cooperation with the Basel Convention,[8] the EPR, which ensures that companies take into account the entire life cycle, including end-of-life and related costs.

2.7.4 Target D4

By 2030, relevant stakeholders give priority to sustainable solutions and safer alternatives to harmful substances in products and mixtures, including in consumer products, in their research and innovation programmes.

Synergy option with the Stockholm Convention NIP

[8] https://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/EPRForum/tabid/9658/Default.aspx

Over the past 16 years, numerous POPs have been listed under the Stockholm Convention, often with specific exemptions. This has necessitated the identification and evaluation of viable alternatives, leading to the development of guidance documents for selected POPs, including SCCPs (UNEP 2021e), DecaBDE (UNEP 2021f) and PFOA (UNEP 2022a). In addition, the *POPs in Articles and Phasing-Out Opportunities* document,[9] compiles all POPs with exemptions as of 2014, presenting information on available alternatives, tools for assessing alternatives and a dedicated chapter on green and sustainable chemistry (UNEP 2014).

In the NIP, a range of countries included the assessment of alternatives and substitution of POPs, incorporating considerations on green and sustainable chemistry. Therefore, synergies can be explored for this target and promoted through the NIP.

2.7.5 Target D5

By 2030, governments implement policies and programmes to increase support for safer and more sustainable agricultural practices, including agroecology, integrated pest management and the use of non-chemical alternatives, as appropriate.

Synergy option with the Stockholm Convention NIP

Under the Stockholm Convention, POP pesticides are subject to substitution with alternatives. The recently listed POP pesticide chlorpyrifos was granted a wide range of exemptions, similar to the listing of endosulfan in 2011. Accordingly, NIPs include actions to promote alternatives to POP pesticides, with several NIPs explicitly incorporating integrated pest management, agroecology, organic farming and non-chemical alternatives in their action plans (e.g., Government of Suriname 2019; Government of Pakistan 2020; Republic of the Union of Myanmar 2020; Republic of Botswana 2025; Cooperative Republic of Guyana 2025).

2.7.6 Target D6

By 2030, sustainable chemical and waste management strategies have been developed and implemented for major economic and industry sectors that identify priority Chemicals of Concern and standards and measures, such as the chemical footprint approach, to reduce their impact and, where feasible, their input along the value chain.

Synergy option with the Stockholm Convention NIP

POPs are one class of priority CoCs for a range of sectors, including EEE, transport, construction and textiles. A range of POPs in these sectors has been substituted in the past 15 years. The Stockholm Convention document on *POPs in Articles and Phasing-Out Opportunities*[9] includes a compilation of information on alternatives to POPs, tools for alternative assessment and a section on the footprint approach (UNEP 2014). POPs substitution in the NIP across different sectors can also introduce the footprint concept in the assessment of alternatives.

2.7.7 Target D7

By 2030, stakeholders implement measures and strive to ensure effective occupational health and safety practices as well as environmental protection measures in all relevant sectors and throughout the supply chain.

Synergy option with the Stockholm Convention NIP

NIPs also address occupational health and safety, particularly because POPs are toxic and related exposure needs to be minimized. In addition to human health, environmental protection is a core objective, as reflected in Article 1 of the Stockholm Convention (UNEP 2004). In sectors involving POPs (e.g., agriculture, EEE, transport, buildings/construction, textiles/leather, paints, lubricants), exposure to POPs can be emphasized in the NIP and highlighted in the action plans. This can be extended to other CoCs in these sectors, referencing the synergies to GFC.

[9] https://chm.pops.int/Portals/0/Repository/Publication_Stockholm Convention POPs phase-out and alternatives.pdf

2.8 Objective E: Enhanced implementation occurs through increased and effective resource mobilization, partnerships, cooperation

Enhanced implementation occurs through increased and effective resource mobilization, partnerships, cooperation, capacity-building and integration into all relevant decision-making processes.

2.8.1 Target E1

By 2035, Governments have mainstreamed the sound management of chemicals and waste through implementation in all relevant sectoral plans, budgets and development plans and development assistance policies and programmes.

Synergy option with the Stockholm Convention NIP

With emphasis on a sectoral approach to managing POPs in major affected sectors, the Stockholm Convention NIP and its implementation can support the mainstreaming of the sound management of chemicals and waste into those sectors.

Most Parties from low- and middle-income countries face persistent challenges in financing POPs management and implementation of the Convention (UNEP 2018), challenges that similarly affect broader hazardous chemicals and waste management efforts. In response, many countries have identified ways to finance or co-finance activities related to POPs management. Key lessons on securing finance for POPs management are summarized in Box 3.

Box 3: Key factors enabling countries to secure funding for the implementation of the Stockholm Convention (UNEP 2018)

- Recognizing the binding nature of the Stockholm Convention, as an obligation that Parties have signed and ratified, which UNIDO identifies as a major driver for support.
- Defining the budget within national plans, such as the national plan for remediation of sites contaminated by pesticides or other pollutants, including dioxins.
- Linking actions needed to be implemented under the Stockholm Convention with other related actions already budgeted for.
- Strengthening the legal framework.
- Linking Convention implementation activities to a project or activity triggered by national or county regulation (not necessarily linked to Stockholm requirements).
- Creating a specific institution dedicated to chemicals management (Chemicals Office), which will also serve as a unit for Stockholm Convention implementation. For this purpose and to implement the measures indicated in the NIP, the ministry is in continuous contact and negotiation with the ministry responsible for finance.
- Aligning NIP activities with government objectives, for example, actions for raising awareness regarding the pesticides used and alternatives.
- Involving the private sector, industry and companies for co-financing. For example, in a PCB elimination project, the government could convince companies in the energy sector and industry to cover part of the project cost within their budgeted activities.
- Ensuring the availability of GEF-approved project funds, which could attract other funding for addressing common aims with the co-funding institution.
- Developing national strategic and regulatory documents that set the actions to be addressed under the Stockholm Convention.
- Engaging in effective lobbying of financial decision-makers.
- Sensitizing high-profile personnel of government and national stakeholder institutions to Convention implementation.
- Mainstreaming the sound management of chemicals and waste into the activities of relevant stakeholder institutions. Institutions are encouraged to budget for chemicals and waste activities.
- Strengthening laboratory capacities and research, and providing data in support of action.

- Strengthening collaboration between the environmental ministry and other ministries around shared objectives, for example, where agriculture ministries and related institutions co-finance POPs pesticide management projects after clearly recognizing the benefits of the activities.

2.8.2 Target E2

By 2030, partnerships and networks among sectors and stakeholders are strengthened to achieve the sound management of chemicals and waste.

Synergy option with the Stockholm Convention NIP

The Stockholm Convention includes activities within the NIP development that bring stakeholders together for inventory development, action plan preparation and NIP validation. For major sectors that include POPs – such as EEE, transport and buildings/construction – the Green Growth Knowledge Partnership (GGKP) has developed brochures on stakeholder mapping and engagement (GGKP 2024d, 2024e, 2024f).

If EPR is supported within the legal frameworks of these sectors, including the establishment of Producer Responsibility Organizations (PROs) to manage sector-specific waste, then dedicated stakeholder networks can, and in many cases must, be established. For the management of POP-containing waste, in addition to EEE, transport and construction sectors, other sectors such as plastics/polymers, textiles, pulp and paper and agriculture (POP pesticides; food safety and control of POPs in food) can also be addressed. Strengthening coordination among stakeholders in these areas contributes to achieving sound management of POPs and can be extended to other CoCs by emphasizing the synergy between the Stockholm Convention and the GFC.

In addition to waste management, the substitution of POPs (especially those with exemptions) can also serve as an opportunity to engage stakeholders across sectors and supply chains, and to build their capacity in alternative assessment and implementing safer alternatives.

2.8.3 Target E3

Adequate, predictable and sustainable financial resources from all sources needed to support achieving the sound management of chemicals and waste are identified and mobilized in alignment with the vision, strategic objectives and targets of the Framework in all sectors by and for all stakeholders, including by leveraging private finance and promoting innovative and blended-finance schemes.

Synergy option with the Stockholm Convention NIP

As mentioned above, in sectors where POPs are present – such as EEE, transport, construction, plastics/polymers, textiles, pulp and paper and agriculture – financial frameworks, particularly EPR schemes, can be developed, possibly in synergy with the Basel Convention activities.[10]

2.8.4 Target E4

Funding gaps for the implementation of sound management of chemicals and waste are identified and considered for capacity-building, including through the Global Framework on Chemicals Fund.

Synergy option with the Stockholm Convention NIP

The recommended NIP structure (UNEP 2017a) includes two sections where funding and funding gaps can be addressed:

- Section 3.3 in the individual action plans
- Section 3.6 Resource Requirement

The currently formulated target indicates that chemical and waste management could be financed "through the Global Framework on Chemicals Fund". However, the GFC is a voluntary agreement and currently has limited funding. Based on the SAICM experience, it is important to ensure that GFC is capable of financing capacity-building efforts across the 125 developing economies. In this

[10] https://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/EPRForum/tabid/9658/Default.aspx

regard, synergies with the Stockholm Convention NIP can be explored, especially in relation to the development and updating of NIPs. Opportunities may exist for co-financing the elaboration of NIPs and related outputs – such as national chemical profiles – thereby addressing broader chemical management in line with the objectives and targets of the GFC.

2.8.5 Target E5

By 2030, Governments have taken measures to put in place policies to internalize the costs of the sound management of chemicals and waste through different approaches.

Synergy option with the Stockholm Convention NIP

Similar to other chemicals, the sound management of POPs requires sustainable financing. As mentioned above, the suggested NIP structure (UNEP 2017a) includes a section on financing. During the development of the NIP – especially when emphasizing synergies with the GFC – these financing sections could be expanded to include broader considerations for chemicals management, including EPR schemes and other measures, such as those described in the LIRA Guidance (Legal and Institutional Infrastructures for the Sound Management of Chemicals and Measures for Recovering Costs of National Administrations) (UNEP 2015).

2.8.6 Target E6

By 2030, stakeholders identify and strengthen, as appropriate, synergies and linkages between chemicals and waste management and other key environmental, health and labour policies, such as those related to climate change solutions, biodiversity conservation, human rights protection, universal health coverage, or primary health care.

Synergy option with the Stockholm Convention NIP

Considering the intersecting challenge of the triple planetary crisis – climate change, biodiversity loss and pollution – which collectively pose significant threats to the Earth's environment, ecosystems and human well-being, UNEP has emphasized that these issues should be addressed in an integrated manner where appropriate. These interrelated events (or crises) often occur simultaneously and produce compounding impacts that are greater than the sum of each individually. This convergence of crises is now considered a defining feature of our time. Therefore, they need to be understood and addressed as a whole (UNEP 2024a).

Within NIP development, linkages between POPs (and possibly the wider chemical pollution), climate change and biodiversity loss can be elaborated. This can help to prepare integrated GEF projects where, in addition to generating Global Environmental Benefits (GEBs) for POPs management, further benefits related to CO_2 and other greenhouse gas (GHG) reductions can also be integrated. For example, in sectors such as EEE, transport, or buildings, waste management strategies that apply circular economy principles – such as separating and removing POP-containing plastics and recycling of the separated clean plastic fraction – can result in quantifiable CO_2 savings, which can be calculated as GEBs, in addition to those derived from POPs management.

At the same time, such efforts can also address other hazardous chemicals in recycling cycles and promote their elimination at the design and production stages, especially where such substances hinder recyclability (UNEP 2023c, Almroth et al. 2025). In the following chapter, the sectoral approach of NIPs is elaborated further, including its synergy options for GFC implementation.

3 Sectoral Approach of the Stockholm Convention NIP and Synergy with the GFC Sectoral Approach

3.1 Background

3.1.1 Sectoral approach of the Stockholm Convention and GEF considerations

In recent years, the Stockholm Convention has begun assessing POPs through a sectoral approach and has developed related guidance documents (GGKP 2024a, GGKP 2024c). Newly listed

industrial POPs are particularly present in the electronics, transport, buildings/construction and textiles sectors, along with other CoCs that can negatively affect human health (Imm et al. 2003, Takahashi et al. 2017, Lucattini et al. 2018; GGKP 2024a). These sectors represent large material stocks and generate diverse types of waste streams that are relevant to the circular economy. They consume more than 40% of all plastics produced and contain well over 50% of global plastic stocks, due to their long service life, particularly when compared to packaging.

The sectoral guidance also emphasizes that POPs represent only one category of CoCs present in these sectors. It highlights that other relevant CoCs are addressed under international instruments such as the Basel and Rotterdam Conventions, the Minamata Convention on Mercury, and through "Issues of Concern" under SAICM/GFC (GGKP 2024a). The guidance encourages a synergistic approach, whereby assessment of individual sectors also includes CoCs relevant to other international agreements (GGKP 2024a).

Furthermore, the GEF promotes GEF-8 Integrated Programming, which aims to mobilize diverse coalitions of stakeholders across relevant sectors for systemic transformation, including greater private sector engagement (GEF 2021). This includes integrated programming for "Circular Solutions to Plastic Pollution" and "Elimination of Harmful Chemicals from Supply Chains" (GEF 2022), for which the aforementioned sectors are also of key relevance.

3.1.2 GFC and sectoral approach

The Global Framework on Chemicals (12/2023) highlights the need for enhanced sectoral and stakeholder engagement (GFC 202):

- *36. The involvement and commitment of all relevant sectors and stakeholders at the local, national, regional and international levels is important for sound management of chemicals throughout their life cycle.*
- *40. The enhanced efforts of all relevant sectors and stakeholders should include increased or improved (a) actions by members of individual sectors and stakeholders, (b) collaboration between and among key sectoral and stakeholder groups, (c) multi-stakeholder and multisectoral dialogue throughout the implementation of the Framework, and (d) contributions, as appropriate, to achieve the shared vision as well as the objective and targets of the Framework.*
- *42. The involvement of industry and the private sector throughout the value chain needs to be significantly enhanced under the Framework at all levels. The roles and responsibilities of industry and the private sector throughout the value chain in implementing the sound management of chemicals and waste offer a strong basis for enhanced involvement and action and should be clearly identified and developed.*

3.1.3 Issues of Concern in the GFC and related sectors

Several issues of concern identified in the GFC/SAICM are sector-specific – for example, HHPs in the agricultural sector, or hazardous chemicals in the electronics sector, and environmentally persistent pharmaceutical pollutants. In both the agriculture and electronics sectors, several POPs have been listed under the Stockholm Convention; therefore, synergies can be explored (see below Section 3.2 and Section 3.6).

Other important chemical-use sectors – such as construction and transport – are also impacted by various POPs, but have not yet been specifically addressed as sectors under the GFC. Since the GFC aims to strengthen work through sectoral engagement, future opportunities for synergy may arise in these two sectors (see Section 3.3 and 3.4), as well as in other sectors where POPs are relevant (see Section 3.5).

3.2 POPs and other Chemicals of Concern in the electronics sector and possible synergies of GFC with NIP implementation

3.2.1 Background

The electronics market continues to grow rapidly. It has been estimated that the global market for electronic chemicals and materials will increase from $22 billion in 2014 to $30.5 billion by 2020

(UNEP 2019d). Hazardous chemicals in the life cycle of electrical and electronic equipment (EEE) are an issue of concern under the GFC, previously recognized as an Emerging Policy Issue under SAICM (UNEP 2020a). A share of these hazardous chemicals are POPs, primarily used as plastic additives in EEE. An overview of POPs found in EEE is provided in Table 2 below, based on the Stockholm Convention's sectoral inventory guidance (GGKP 2024a).

Table 2: Listed POPs use and relevance in the three sectors – electronics, transport and buildings/construction (POPs highlighted in yellow indicate predominant use in these sectors)

POP (main production & use period)*	Building & Construction Sector	Electrical & electronic equipment	Transport Sector
c-PentaBDE (1970-2004)	Former use	Minor former use	Major former use
c-OctaBDE (1970-2004)	Minor former use	**Major use**	Minor former use
decaBDE (since 1970s)	**Major use**	**Major use**	**Major use**
HBCD (1980 to 2021)	**Major former use**	Minor former use	Minor former use
HBB (1970 to 1976)	Not relevant	Minor former use	Minor former use
SCCP (Since 1930s)	**Major use**	Minor use	Minor use
MCCP (Since 1930s)	**Major use**	Use	Use
PFOS (1960 to 2012)**	Former use	Former use	Former use
PFOA (since 1960s)	Former use	Minor use in product	Use
PFHxS (1960 to 2021)	Former use	Former use	Former use
PCB (1940 to 1980)	**Major former use**	Former use	Minor former use
PCN (1930 to 1970s)	Minor former use	Minor former use	Minor former use
PCP (1930 to 2015)	Major former use	Not relevant	Minor former use
DDT, aldrin, dieldrin, lindane, endosulfan, Mirex (1940 to 2000)	Former use	Not relevant	Not relevant
Dechlorane Plus (DP)	Use	Use	Use
UV-328	Major use	Major use	Major use

**Main period for production and use in these sectors*
***Major production/use stopped 2002 by 3M*

3.2.2 Synergies and opportunities to substitute POPs and other CoCs in EEE

POPs used or present in plastics within the EEE sector are listed in Annex A of the Stockholm Convention and are subject to elimination, meaning they need to be substituted (e.g., SCCPs/MCCPs, PBDEs, HBCD, Dechlorane Plus, UV-328). To support this, the Stockholm Convention has developed guidance documents that compile potential alternatives to these substances (e.g., UNEP 2021e, UNEP 2021f, UNEP 2022a). These compilations do not include a formal assessment of the alternatives, but rather list all available options, intentionally avoiding prescriptive recommendations.

However, avoiding the selection of regrettable substitutes is essential to prevent future challenges, including those related to recycling (Fantke et al. 2015). The UNEP Assessment Report on Issues of Concern emphasizes that acting earlier in the life cycle of EEE – particularly during design stages – would be significantly more effective (UNEP 2020a). Preventive actions such as redesigning products to avoid hazardous chemicals, including POP-like substances and other CoCs, would not only minimize upstream environmental impacts and risks to workers' health, but also contribute to the environmentally sound management of e-waste, including its recycling. This life cycle approach to hazardous substances in EEE was recognized by the international community when HSLEEP (Hazardous Substances in EEE Products) was adopted as an issue of concern under SAICM in 2009.

Since the Stockholm Convention has a focus on PBT properties outlined in Annex D of the convention (UNEP 2004), there is a certain risk when selecting alternatives that other regrettable substitutes might be selected, having negative effects other than PBT (Fantke et al. 2015). Therefore, assessments of alternatives should ideally be conducted in synergy with initiatives with a broader view on hazardous chemicals, such as the GFC and UNEP's Sustainable Chemistry Initiative (UNEP 2020b). Moreover, many flame retardants used as alternatives have been identified by the European Chemicals Agency (ECHA) as potential PBTs (Hennebert 2021). In response,

ECHA has proposed a Flame Retardant Strategy, which includes restricting brominated aromatic flame retardants due to their similar hazardous properties (ECHA 2023).

A broader assessment of alternatives could be carried out through cooperation between the Stockholm Convention, the GFC, and possibly USEtox,[11] to evaluate alternatives to POPs and other CoCs in EEE. This would support the NIP implementation of Parties and contribute to achieving objectives of the GFC.

3.3 POPs and other Chemicals of Concern in the construction sector and possible synergies with GFC in NIP implementation

3.3.1 Background

The building and construction sector is one of the most chemical-intensive sectors downstream of the chemical industry. Driven by rapidly accelerating urbanization, the global construction sector is expected to grow by 3.5% annually, with its chemicals market estimated to grow by 6.2% annually between 2018 and 2023 (UNEP 2019d). Similar to the electronic sector, a wide range of POPs have also been used in the construction sector, and some are still present in plastics and other materials used in buildings and construction (e.g., HBCD, PBDEs, SCCPs, PCBs, PFOA) (Table 2). Furthermore, a wide range of other CoCs are present in buildings (UNEP 2021c, Huang et al. 2022). These substances pollute the indoor environment and pose risks to human health and the environment (Lucattini et al. 2018, Blumenthal et al. 2022). While hazardous chemicals in construction were not classified as an issue of concern under SAICM (and therefore are currently not under the GFC either), a specific report on CoCs in the building and construction sector has been developed under SAICM (UNEP 2021c).

Construction and demolition waste (CDW) is the largest waste stream globally, accounting for more than 30% of total waste, and it continues to increase. Most of this waste is disposed of in landfills (Wu et al. 2019, Purchase et al. 2021, Al-Otaibi et al. 2022). Given the large volumes of waste that will need to be managed in the future, industrialized countries are transitioning towards a more circular economy for CDW (European Commission 2024a) – a further reason to eliminate CoCs from materials used in construction.

3.3.2 Synergies and opportunities to substitute POPs and other hazardous chemicals in buildings and construction

POPs that were and are still used or present in plastics in buildings and constructions are listed in Annex A of the Convention and need to be substituted (e.g., SCCPs/MCCPs, PBDEs, HBCD, Dechlorane Plus, UV-328). To support this, the Stockholm Convention has developed guidance documents compiling potential alternatives to these POPs (e.g., UNEP 2021e, UNEP 2021f, UNEP 2022a). In developing these lists of alternatives, all available options were compiled in a non-prescriptive manner, with no prioritization or exclusion, to provide a broad and inclusive resource. However, the selection of regrettable substitutes needs to be avoided to reduce exposure to hazardous chemicals and prevent future challenges, including those related to the recycling of CDW.

The Stockholm Convention uses PBT properties – outlined in Annex D of the Convention (UNEP 2004) – as key criteria for identifying POPs. While this approach is essential, it also entails the risk of selecting alternative substances that may exhibit other hazardous properties, leading to regrettable substitution (Fantke et al. 2015). To address this, assessments of alternatives in the building and construction sector could be most effective if conducted in synergy with initiatives such as the GFC and UNEP's Sustainable Chemistry Initiative (UNEP 2020b). Moreover, broader evaluations could be carried out through cooperation among the Stockholm Convention, the GFC, and tools like USEtox[11], to support countries' NIP implementation and contribute to the objectives of the GFC.

[11] The USEtox model has been developed by the USEtox Team, a team of international researchers from the Task Force on Toxic Impacts under the auspices of UNEP/SETAC Life Cycle Initiative.

3.4 POPs and other Chemicals of Concern in the transport sector and possible synergies of GFC with NIP implementation

3.4.1 Background

The transport sector is also a large consumer of chemicals, accounting for approximately 8% of global plastic consumption (Geyer et al. 2017), and a wide range of POPs have been used in this sector, some of which are still used or present in plastics and textiles (e.g., HBCD, PBDEs, SCCPs, PCBs, PFOA) (see Table 2) (GGKP 2024a). Furthermore, numerous other CoCs are present in vehicles (Zulauf et al. 2019; GGKP 2024a).

Considering the need to move to a more circular economy and a better recovery of resources, plastics and other polymers from vehicles need to be better reused, recycled, and recovered, as required, for example, by the EU Directive on end-of-life vehicles (European Union 2023). Recently, the European Commission (2023) proposed a regulation on circularity requirements for vehicle design and the management of end-of-life vehicles, including a minimum recycled plastic content of 25%, of which 6.25% must come from closed-loop recycling.

3.4.2 Synergies and opportunities to substitute POPs and other hazardous chemicals in the transport sector

POPs, which were and are still used or present largely in plastics and textiles in the transport sector, are listed in Annex A of the convention and need to be substituted (e.g., SCCPs/MCCPs, PBDEs, HBCD, Dechlorane Plus, UV-328). For this, the Stockholm Convention developed guidance documents compiling alternatives to these POPs (e.g., UNEP 2021e, UNEP 2021f, UNEP 2022a). In developing these lists of alternatives, all available options were compiled in a non-prescriptive manner, without prioritization or exclusion, to provide a broad and inclusive resource. However, the selection of regrettable substitutes needs to be avoided to reduce exposure to hazardous chemicals and to prevent future challenges, including those related to the recycling of plastics and textiles from ELVs.

The Stockholm Convention uses PBT properties – outlined in Annex D of the Convention (UNEP 2004) – as key criteria for identifying POPs. While this approach is essential, it also entails the risk of selecting alternative substances that may exhibit similar hazardous properties, leading to regrettable substitution (Fantke et al. 2015). To address this, assessments of alternatives in the transport sector and supply chains should consider broader sustainable chemistry criteria and could be most effective if conducted in synergy with initiatives such as the GFC and UNEP's Sustainable Chemistry Initiative (UNEP 2020b). Moreover, broader evaluations could be conducted through cooperation among the Stockholm Convention, the GFC and possibly USEtox[11], to assess alternatives to POPs and other CoCs in the transport sector and supply chains supporting NIP development and implementation of countries and contributing to objectives of the GFC.

3.5 Other sectors that can be approached and addressed within the NIP development and implementation

There are a range of further industries that need to be assessed for the production of POPs, the use of POPs in production, and the generation and release of unintentional POPs. When approaching these industries for the inventory or management of POPs, other CoCs could also be assessed during the inventory development. In this activity, the survey on chemicals used or the management of chemicals and waste should be assessed for these industrial sectors. Two sectors are the textile/leather industry and the pulp and paper industry.

3.5.1 Textile and leather industry

The textile industry is highly chemical-intensive, using more than 15,000 chemicals including over 10,000 dyes and pigments and over 5,000 auxiliary chemicals (Roos et al. 2019). The UNEP Textile Initiative provides strategic leadership and encourages sector-wide collaboration to accelerate a just transition towards a sustainable and circular textile value chain. UNEP's work includes supporting and informing governments, such as through its Global Textile Policy Dialogue, and assisting industry – particularly small and medium-sized enterprises (SMEs) in developing countries – in

shifting towards circular business models, eliminating hazardous chemicals, and scaling the use of industry standards for circularity while adopting a life cycle approach (UNEP 2025l).

A range of POPs have been used and, in some cases, are still used in the textile industry (e.g., SCCPs/MCCPs, PBDEs, HBCD, Dechlorane Plus, UV-328, and PFOA) and need to be substituted and managed in the recycling of textiles. Similarly, some POPs were or are used in leather treatment (e.g., PCP, PFOA, and SCCP/MCCPs) and need to be substituted and managed in recycling. For the substitution, the Stockholm Convention has developed guidance documents compiling alternatives to these POPs (e.g., UNEP 2021e, UNEP 2021f, UNEP 2022a). In developing these lists of alternatives, no particular assessment of these alternatives was conducted; rather, all available alternatives were compiled in a non-prescriptive manner. However, the selection of regrettable substitutes needs to be avoided (Fantke et al. 2015) to reduce exposure to hazardous chemicals and to avoid future challenges, including issues related to recycling textiles for a more circular economy.

Since the Stockholm Convention focuses on PBT properties as outlined in Annex D of the Convention (UNEP 2004), there is a certain risk that, when selecting alternatives based solely on Annex D criteria, other regrettable substitutes might be selected with other hazardous properties (Fantke et al. 2015). Therefore, such assessments of alternatives need to consider broader sustainable chemistry criteria and could be best conducted in synergy with, for example, GFC and UNEP Sustainable Chemistry Initiative activities (UNEP 2020b). A broader assessment of alternatives could be conducted through cooperation between the Stockholm Convention and GFC, and possibly USEtox[11], to assess alternatives to POPs and other CoCs in the textile sector and its supply chains, supporting NIP development and implementation of countries, and contributing to the objectives of the GFC.

3.5.2 Pulp and paper industry

Certain POPs are used in specific types of impregnated paper.[12] This includes PFOA-related substances in food contact paper, which are still in use (Jiang et al. 2016, Bugsel et al. 2022). Also, SCCPs and, more recently, MCCPs are used as solvents in carbonless copy paper (Vantage 2022), which substituted the use of PCBs in such paper products (Trout 1972, Pivnenko et al. 2014). Flame retardants, including brominated POPs, have also been used in paper (Fernandes et al. 2023). Furthermore, a wide range of pigments used for printing paper contain unintentional POPs such as PCBs and HCB (UNEP 2025m, Box 4).

For substitution, the Stockholm Convention has developed guidance documents compiling alternatives to these POPs (e.g., UNEP 2021e, UNEP 2021f, UNEP 2022a). In developing these lists, no particular assessment of the alternatives was conducted; instead, all available alternatives were compiled in a non-prescriptive manner. However, the selection of regrettable substitutes should be avoided (Fantke et al. 2015) to reduce exposure to hazardous chemicals and to prevent future challenges, including those related to the recycling of textiles for a more circular economy. Additionally, for pigments containing unintentional PCBs, alternatives have been compiled and published (Nestler et al. 2019, Box 4), and relevant information has been included in the BAT/BEP guidance on unintentional POPs (UNEP 2025m).

As with the textile sector, since the Stockholm Convention focuses on PBT properties compiled in Annex D of the Convention (UNEP 2004), there is a risk of selecting regrettable substitutes if relying solely on these criteria (Fantke et al. 2015). Therefore, assessments of alternatives should include broader sustainable chemistry criteria and could best be conducted in synergy with, for example, the GFC and UNEP Sustainable Chemistry Initiative (UNEP 2020b). A broader assessment of alternatives could be carried out in cooperation between the Stockholm Convention, GFC and

[12] There is still use of elementary chlorine in the pulp and paper industry in low-income countries, with formation and release of PCDD/PCDF. Elemental chlorine is, however, on the way to being substituted and therefore not considered a synergy of the Stockholm Convention and GFC.

possibly USEtox[13] to evaluate alternatives to POPs and other CoCs in the pulp and paper industry and its supply chains, thereby supporting countries' NIP development and implementation and contributing to GFC objectives.

Box 4: Systematic approach to substitute pigments containing PCBs in products (UNEP 2025m)

A systematic approach to substituting pigments containing unintentional PCBs has been developed and published by ChemFORWARD (Nestler et al. 2019). ChemFORWARD also developed the iPCB Pigments Resource, a free, searchable database of nearly 400 pigments, organized by chemical name, CAS number, colour and presence of chlorine. The tool can be used to find alternatives by avoiding pigments that contain or are manufactured with chlorine, thereby reducing the likelihood of containing unintentional PCBs[14] (ChemFORWARD 2024).

3.6 POPs pesticides and highly hazardous pesticides (HHPs) (agricultural sector)

3.6.1 Background

Pesticides are a major group of POPs listed in the Stockholm Convention. They are at the same time highly hazardous pesticides (HHPs), which are an issue of concern in the GFC (before SAICM), and the phase out of HHPs is highlighted in Target A7 of the GFC: *By 2035, stakeholders have taken effective measures to phase out highly hazardous pesticides in agriculture where the risks have not been managed and where safer and affordable alternatives are available, and to promote transition to and make available those alternatives*."

Furthermore, the United Nations Environment Assembly (UNEA) supported this engagement in 2024 by agreeing on a resolution that calls for action to phase out HHPs globally by 2035 (Resolution 6/11; UNEA 2024).

The agricultural sector is highly relevant for human exposure to chemicals, with the highest risk from HHPs. Pesticides are also a major driver of biodiversity loss (Geiger et al. 2010, Tang et al. 2021). Therefore, pesticides are an important link between chemical pollution and biodiversity loss. The HHP list of the Pesticide Action Network (PAN) considers not only the WHO Ia (extremely hazardous) and WHO Ib (highly hazardous) classifications as criteria for HHPs, but also includes other criteria such as toxicity to pollinators and fish (Pesticide Action Network 2024).

3.6.2 Integration of HHPs into SC NIPs as an option/recommendation

The integration of HHPs into the Stockholm Convention NIP is already being considered by a number of countries. For example, HHPs are included in the NIPs of Botswana, Guyana, Myanmar, Pakistan and Suriname (Government of Suriname 2019; Government of Pakistan 2020; Republic of the Union of Myanmar 2020; Republic of Botswana 2025; Cooperative Republic of Guyana 2025). HHPs have been included in the action plan together with POP pesticides, and some countries have included HHPs in the inventory/assessment of POP pesticides. This shows that for HHPs, integration into the common approach of the NIP is a straightforward synergy for low- and middle-income countries when updating the NIP.

The inclusion of HHPs into the NIP could involve their assessment during the POP pesticide inventory phase. Currently, the NIP update guidance (UNEP 2017a) does not mention HHPs. An update of the guidance is needed in any case, given that ten new POPs were listed between 2017 and 2025. In this update, Annex 2 on POP pesticides could be revised to include a recommendation

[13] The USEtox model has been developed by the USEtox Team, a team of international researchers from the Task Force on Toxic Impacts under the auspices of UNEP/SETAC Life Cycle Initiative.

[14] The use or presence of chlorine in a pigment or in the pigment manufacturing process does not definitively determine that inadvertent PCBs are present in a pigment. Manufacturing process changes regularly occur, and current information can be obtained by contacting the pigment manufacturer directly. While it is known that some pigments can contain inadvertent PCBs, such as diarylide yellow, it may not be true for all suppliers of it or other pigments that contain chlorine or could be made with chlorinated solvents (CHEMFORWARD 2024).

to also address HHPs, taking into account the synergies with the GFC and its Target A7 (see also Section 2.4.8).

3.6.3 Listing of Chlorpyrifos as an opportunity to phase out an HHP with guided substitution

Chlorpyrifos has been listed in the Stockholm Convention at COP12 in May 2025 under Annex A. According to the GHS, it can also be considered an HHP due to its reproductive toxicity (Repr. 1A and 1B, indicating proven or presumed human reproductive hazards) and high toxicity to bees (Pesticide Action Network 2024). Chlorpyrifos has been listed with a wide range of exemptions (IISD 2025b, UNEP 2025j). Therefore, in the coming years, many Stockholm Convention Parties will look for and assess alternatives to chlorpyrifos.

This assessment could be used for a science-based substitution of chlorpyrifos in low- and middle-income countries, including an assessment of alternative pesticides and non-chemical alternatives, such as agroecology (Fibl and IFOAM 2025) and organic farming (Pesticide Action Network 2015), while avoiding regrettable substitution (Fantke et al. 2015).
This substitution of chlorpyrifos can be linked to the GFC principle of a preventive approach to the substitution of hazardous chemicals and the use of safe and sustainable chemicals.

The use of such chemicals is a priority for the sound management of chemicals and waste (GFC 2024). Since many low- and middle-income countries are still using chlorpyrifos and have asked for a wide range of exemptions (IISD 2025b, UNEP 2025j), this substitution could be supported by UNEP activities on Sustainable Chemistry, considering Objectives and Guiding Considerations 2 of the Green and Sustainable Chemistry Framework Manual “Avoiding regrettable substitutions and alternatives” (Fantke et al. 2015, UNEP 2020b).

Furthermore, such a science-policy task could be supported by the newly established Science-Policy Panel, which includes capacity building as one of its objectives[15] (UNEP 2025h). Through such an international capacity-building activity, interested Parties to the Stockholm Convention and members of the GFC could explore options for cooperation with the Science-Policy Panel (UNEP 2025h) and related UNEP activities on sustainable chemistry (UNEP 2020b).

UNEP is hosting USEtox®,[16] which can be applied for chemical substitution, including footprinting, risk screening and life cycle assessment (LCA) of chemicals, to inform public and private stakeholders, and could potentially support such an activity.

3.6.4 Action plan on POPs pesticides considers all HHPs

The Stockholm NIP has in Chapter 3 the action plan for controlling POPs, including an action plan specifically on pesticides in Section *3.3.3 Activity: Production, import and export, use, stockpiles, and wastes of Annex A POPs pesticide (Annex A, Part I chemicals)*. A range of countries already have included HPPs in their NIP action plans (see above). Also, in this section, the inclusion of HHPs could be mentioned and encouraged in an update of the NIP development guidance (UNEP 2017a) as an option for synergy with GFC, which would facilitate the addressing and substitution of HHPs in the implementation of the NIP.

4 Synergies between the Basel Convention and the Stockholm Convention NIP

[15] Integrate capacity-building into all functions and the work of the panel to strengthen the science-policy interface. Such capacity-building activities should enhance individual capacities of scientists, policymakers and other relevant stakeholders and thereby institutional capacities, particularly in developing countries, guided by the capacity-building priorities, identified by governments and other stakeholders, related to the Panel’s functions and work, by encouraging access to different forms of knowledge, data and best practices, and enabling the dissemination and encouraging the utilization of the deliverables of the Panel at international, (sub)regional and national levels (UNEP 2025h).
[16] USEtox is a scientific consensus model endorsed by UNEP's Life Cycle Initiative for characterizing human and ecotoxicological impacts of chemicals. The main output is a database of characterization factors, including fate, exposure, and effect parameters (https://usetox.org).

4.1 Background

The Stockholm Convention addresses the entire life cycle of POPs and POP-containing products, including end-of-life and recycling. All GEF projects on POPs waste management and destruction are implemented within the framework of the Stockholm Convention. According to Article 6.2, the Stockholm COP shall cooperate closely with the appropriate bodies of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal to, inter alia, establish levels of destruction and irreversible transformation, determine what constitutes environmentally sound disposal, and define the low POP content limit.

Many of the newly listed industrial POPs are plastic additives (Table 2). They were, or are, mainly used in electronics, transport, and building and construction sectors, and partly in textiles.

4.1.1 Plastic in the Basel Convention

In 2019, the Conference of the Parties (COP) to the Basel Convention adopted two decisions to address plastic waste.

In May 2019, the COP adopted decision BC-14/12 (UNEP 2019a), which amended Annexes II, VIII, and IX to the Convention in relation to plastic waste. In addition, the COP adopted decision BC-14/13 (UNEP 2019b) on further actions to address plastic waste under the Basel Convention. This decision includes in its sections I, II, III and VII a set of actions aimed at preventing and minimizing the generation of plastic waste, improving its environmentally sound management and controlling its transboundary movement; reducing the risks from hazardous constituents in plastic waste; and enhancing public awareness, education, and information exchange (UNEP 2019b).

In section V of the decision (Technical guidelines), the COP decided to update the 2002 “Technical Guidelines for the Identification and Environmentally Sound Management of Plastic Wastes and for their Disposal.”

In section VI of the decision (Basel Convention Partnership on Plastic Waste), the COP welcomed the proposal to establish a Partnership and decided to establish a working group. The goal of the Partnership is to improve and promote the environmentally sound management of plastic wastes at the global, regional and national levels, and prevent and minimize their generation to – among other things – significantly reduce and, in the long-term, eliminate the discharge of plastic waste and microplastics into the environment, in particular the marine environment.

In section VIII of the decision (Further Consideration), the COP decided to include in the 2020-2021 work programme of the Open-ended Working Group the consideration of whether, how and when the COP should assess the effectiveness of the measures taken under the Convention to address plastic waste contributing to marine litter and microplastics, and which further activities could be undertaken in response to developments in scientific knowledge and environmental information. The COP also invited Parties and other stakeholders to submit information on plastic waste consisting almost exclusively of a single cured resin or condensation product, as well as plastic waste consisting almost exclusively of one of the listed fluorinated polymers, for consideration at its fifteenth meeting. In addition, the COP adopted other decisions specifically addressing plastic waste:

- BC-14/9 on cooperation with the World Customs Organization on the Harmonized Commodity Description and Coding System
- BC-14/10 on national reporting
- BC-14/18 on technical assistance
- BC-14/19 on the Basel Convention Partnership Programme
- BC-14/21 on international cooperation and coordination
- BC-14/23 on the clearing-house mechanism for information exchange

These steps have strengthened the Basel Convention as the only global legally binding instrument specifically addressing plastic waste. Some technical assistance is provided to support Parties in fulfilling their obligations, including those related to plastic waste. In parallel, a plastic pollution treaty is currently under negotiation (as of March 2026). This treaty, if adopted, may be expected further

complement and strengthen international efforts to manage plastic waste and its associated risks, and synergies with the Stockholm Convention may be explored where appropriate.

4.2 Synergy of inventory of plastics present in the major sectors of the sectoral approach

4.2.1 Background and synergy

The management of POPs requires information on their presence and quantity. Within the POP inventories, plastic inventories for EEE/WEEE, vehicles/ELVs and selected plastics in buildings need to be carried out (GGKP 2024a). For the POPs inventories in these major use sectors, an inventory of the products both in use and at end-of-life is needed. These larger overall inventories of these sectors are also the basis for planning waste management and establishing the respective facilities needed for their treatment.

The inventory of major plastic stocks and wastes in these sectors is a cross-cutting task for the Stockholm Convention NIP implementation and Basel Convention considerations on plastic waste management. Due to the long service life of plastics in these three sectors, they account for more than 75% of all plastics stocks in use (Houssini et al 2025). The move towards a more circular economy and the risk of contamination of new products further highlight the relevance of developing robust inventories of POPs and other CoCs in plastics in these sectors. Due to this relevance, entire books have been written on RiskCycle (Bilitewski et al. 2012, Bilitewski et al. 2013), with chemicals in electronics and related plastics as a major example.

Within the Basel Convention, inventory guidance for plastic has been developed and revised (Box 5; UNEP 2025e). However, this guidance does not mention or address POPs or other hazardous chemicals in plastic, and therefore does not specifically support Parties in the inventorization of POPs and the management of POPs or CoCs in plastics. Therefore, the inventory of POP-containing plastics under the Stockholm Convention implementation can complement and help refine plastic inventories developed solely on the basis of the Basel Convention inventory guidance.

Box 5: Basel Convention guidance on the development of inventories of plastic waste (UNEP 2025e)

The *Practical guidance on the development of inventories of plastic waste* of the Basel Convention (UNEP 2025e) aims to provide practical instructions to assist in developing inventories of plastic waste. It is meant to be used in conjunction with the *Methodological guide for the development of inventories of hazardous wastes under the Basel Convention* (UNEP 2016).

A robust inventory of plastic and related hazardous additives is a basis for environmentally sound management and respective planning. Such inventories can be used to develop appropriate strategies and policies, including those for collecting, separating, recycling and disposing of plastic waste. Moreover, they are an important input for the planning of facilities dedicated to recovery and final disposal, which require substantial financial investment and regular throughputs of wastes.

The main objective of developing a plastic waste inventory is to obtain information on the amount of plastic waste generated at a country level, as well as its disposal and transboundary movement (UNEP 2025e).

4.2.2 Inventory of POPs and plastics in the EEE sector

Electrical and electronic equipment (EEE) and related waste (WEEE or e-waste) are major stocks of POPs used as plastic additives. EEE contains on average approximately 25% plastics, with some EEE categories containing a higher share (e.g., CRTs or LCD-TVs) and some others a lower share (UNEP 2021b). For PBDEs, different impact factors are suggested for major EEE categories in the

PBDE inventory guidance (UNEP 2021b), with further average impact factors for POPs in EEE – including SCCPs/MCCPs, HBCD and Dechlorane Plus – suggested in the Sectoral Inventory guidance (GGKP 2024a).

The Global E-waste Statistical Partnership (GESP) aims to collect and improve worldwide e-waste statistics and improve the quality of e-waste statistics by guiding countries and building national capacity through e-waste statistics trainings.[17] GESP estimates for each country the amount of e-waste generated for individual years and new EEE put on the market since 2018. The POPs inventory in electronics and related plastics could be linked and harmonized with the GESP inventory approach. An initial link has been established in the case study on POPs and EEE/WEEE and related plastic inventory for Zimbabwe (Mwanza et al. 2025). This can be further extended best with a common harmonized approach for EEE/WEEE inventories and related plastic and POP inventories. Also, the Basel Convention developed a practical guidance for the development of inventories of waste electrical and electronic equipment, with a recent update (UNEP 2025f). **Thus, the inventory of POPs in the NIP update can consider the synergy with the Basel Convention inventory activities and the work of GESP.**

4.2.3 Inventory of POPs and plastics in the transport sector

Transport is a major use of plastics and other polymers (Geyer et al. 2017). While approximately 7% of all plastic is used in the transport sector, the long service life results in the share of transport in the total plastic stock increasing to approximately 15% (Wang et al. 2021). A rough inventory of the total plastics for cars is relatively simple, with approximately 200 kg of plastics per average car (UNEP 2021b). A refined plastic inventory could be developed in synergy with the Basel Convention plastic inventory and activities with the UNITAR plastic toolkit and possibly included in the NIP update inventory activities.

4.2.4 Inventory of POPs and plastics in the building and construction sector

Construction and demolition waste (CDW) is the largest waste stream, accounting for more than 30% of all wastes with a total amount of 10 billion tonnes/year, and is increasing worldwide, with the largest share of waste disposed to landfills (Wu et al. 2019, Purchase et al. 2021, Al-Otaibi et al. 2022). The sector is the second largest consumer of plastics (~20%) (Geyer et al. 2017). Some of the chemicals present in plastic and other materials in building and construction are POPs (e.g., HBCD, PBDEs, SCCPs/MCCPs, PCBs, Dechlorane Plus, and UV-328) or other CoCs (UNEP 2021c, GGKP 2024a). The service lives of buildings and construction materials are several decades, up to a century and possibly longer (Li et al. 2016, UNEP 2021c). Therefore, a large share of the plastic materials and foams containing POPs additives and other CoCs used over the last 70 years is still in use in buildings and construction (Li et al. 2016, GGKP 2024c).

The inventory of POPs within the development of the NIP can be a good synergy for the development of an overall plastic inventory in buildings. This can contribute to an overall plastic inventory as promoted by the Basel Convention (UNEP 2021d, UNEP 2025e). Also, for this, a synergy with the UNITAR toolkit can be established, and the update of the NIP used to develop a broader plastic inventory in the building sector.

4.2.5 Inventory of POPs and plastics in textiles and leather

POPs are present in certain textiles like uniforms, tents, tarps, carpets, curtains, furniture, and other flame-retardant or stain-repellent textiles. Due to the lack of POP data in textiles, there are currently no systematic inventory activities on treated textiles. Two GEF projects on POPs in textiles have been initiated in selected African (GEF Project ID 10543) and Asian countries (GEF Project ID 10523). These projects are expected to generate new insights into POPs in textiles, which can eventually be used in the NIP update.

Recently, textile waste has become an emerging issue under the Basel Convention, and the COP adopted the work programme of the Open-ended Working Group for 2026-2027, which includes textile waste (UNEP 2025d). The COP also invited Parties and observers to submit, by 15 November

[17] https://globalewaste.org/about-us

2025, comments – including data, where applicable – regarding experiences, challenges, and costs related to the trade in used textiles and textile waste, as well as views on how transboundary movements and management of textile waste could be addressed under the Basel Convention (UNEP 2025d).[18] Since textiles represent the third largest sector in terms of plastic use, the plastic inventory efforts of the Basel Convention and the upcoming UNITAR plastic toolkit could be linked with the NIP update and inventory activities related to POP-containing textiles. Currently, there is a lack of data on the POPs content of textile fractions, and only one impact factor for POP-PFASs have been proposed for transport largely from textiles[19] (GGKP 2024a). Monitoring data on PFASs in waste fractions indicate that certain textile and leather waste streams exceed the POP-PFAS unintentional trace contaminant (UTC) limits established by the European Union for recycling (Pivato et al. 2024), underscoring the need for inventories and further monitoring to support a safe circular economy.

4.2.6 Overall inventory of plastics and management and release from open burning

Plastic is a major fuel source and driver of open burning of waste (Pathak et al. 2024), which is a primary source of unintentional POPs releases (UNEP 2017d, Petrlik et al. 2022). The waste management group at Vienna University developed a calculation tool for UNIDO that incorporates waste collection rates and material flow analysis (MFA) to estimate open burning rates and associated PCDD/PCDF emissions. Through this methodology, waste collection rates and collection targets, including for plastics, are directly linked to UPOPs and greenhouse gas (GHG) releases.

4.3 Management and recycling of plastics in sectors within controlling POPs (and other CoCs)

4.3.1 Background

Considering the increasing importance of recycling of plastics, CoCs, including POPs, need to be controlled (Bilitewski et al. 2012, 2013) in order not to contaminate sensitive plastic uses, such as toys, food contact materials, or skin contact materials (Kuang et al. 2018, Kajiwara et al. 2022, Behnisch et al. 2023). POPs and other CoCs can hamper, or even restrict, the recycling of plastics if plastic wastes exceed the Low POP Content Limits (LPCL) of the Basel Convention (UNEP 2025b), or the European Union (European Commission 2024b; Table 3). Furthermore, recyclates and products need to meet Unintentional Trace Contaminant (UTC) limits, established in some countries, like the European Union (European Commission 2024b; Table 3).

This requires a synergistic approach to the implementation of the Stockholm Convention on managing POP-containing plastics in EEE, the transport sector, and the buildings and construction sector, within the broader framework of the Basel Convention on the overall waste management of e-waste, ELVs and CDW, particularly the related plastics in these sectors. Since these three sectors contain approximately one-third of plastics in new products and, due to their long service life, more than 50% of global plastic stocks, they are key to overall plastic management. Therefore, in this section, the synergies of Stockholm Convention NIPs and the Basel Convention are explored and described.

While some detailed materials on e-waste have been developed under the Basel Convention, and a synergistic implementation for e-waste is straightforward, and occurring in different GEF projects (see Section 4.3.2), the management of ELVs and CDW is still at an initial stage within the Basel Convention. ELVs are only addressed in the “Factsheet on Specific Waste Streams” (UNEP 2017b), and CDW in the guidance on household waste (UNEP 2025g), without a specific guidance for ESM of these waste categories. Therefore, the promotion of managing these POP-containing waste

[18] https://www.basel.int/TheConvention/ConferenceoftheParties/Callforinformation/FollowuptoCOP17/tabid/10259/Default.aspx

[19] Currently, the only impact factor that stems from textiles is the preliminary impact factor of PFOS, PFOA and PFHxS in vehicles present primarily in textile fabrics of seats derived from a Norwegian study. But also for this, further analysis is needed, including analysis of car textiles, which degrade side-chain fluorinated polymers to cover these major PFOS/PFOA-related compounds (GGKP 2024a).

streams in the NIP can support and promote initial activities under the Basel Convention on ELVs (see Section 4.3.4) and CDW (see Section 4.3.5).

"*Technical guidelines on the environmentally sound management of plastic wastes*" has been developed under the Basel Convention (UNEP 2023b). These guidelines serve as overarching guidance under the Basel Convention for managing plastics at end-of-life and they include references to POPs.

In addition, the Basel Convention Plastic Waste Partnership organizes the Forum on Extended Producer Responsibility for Plastic Wastes,[20] to promote action and dialogue among all stakeholders involved. This includes considerations of some POP-related waste streams, such as e-waste, ELVs and textiles,[20] and could be linked to the legal and policy action plans of the Stockholm NIP.

Table 3: POPs listed in the EU POPs regulation and UTC limits (Annex I) and low POP content limits (Annex IV) in the European Union (European Commission 2024b)

POP	Specific exemption on intermediate use or other specification (Annex I) and related unintentional trace contaminant (UTC) limit for POPs	POP limit (mg/kg) in Annex IV (LPCL)
Aldrin		50 mg/kg
Alpha-HCH, beta-HCH and lindane		50 mg/kg
Chlordane		50 mg/kg
Chlordecone		50 mg/kg
DDT		50 mg/kg
Dechlorane Plus	not yet listed in Annex I	not yet determined
Dicofol		50 mg/kg
Dieldrin		50 mg/kg
Endrin		50 mg/kg
HBB		50 mg/kg
HBCD	For the purposes of this entry, Article 4(1), point (b), shall apply to concentrations of hexabromocyclododecane equal to or below 75 mg/kg where it is present in substances, mixtures, articles, or as constituents of the flame-retarded articles. For the use of recycled polystyrene in the production of EPS and XPS insulation material for use in buildings or civil engineering works, point (b) shall apply to concentrations of hexabromocyclododecane equal to or below 100 mg/kg.	500 mg/kg
HCB	For the purposes of this entry, Article 4(1), point (b), shall apply to concentrations of hexachlorobenzene equal to or below 10 mg/kg where it is present in substances, mixtures, or articles.	50 mg/kg
HCBD		100 mg/kg *
Heptachlor		50 mg/kg
Polybrominated diphenyl ethers (PBDEs) (TetraBDE, PentaBDE, HexaBDE, HeptaBDE and decaBDE)	For the purposes of this entry, point (b) of Article 4(1) shall apply to concentrations of heptabromodiphenyl ether equal to or below 10 mg/kg (0.001 % by weight) where it is present in substances. For the purposes of the entries on tetra-, penta-, hexa-, hepta- and decaBDE, point (b) of Article 4(1) shall apply to the sum of the concentration of those substances up to 500 mg/kg where they are present in mixtures or articles, subject to review and assessment by the Commission by 16 July 2021.	500 mg/kg as a sum and from 30 December 2025 until 28 December 2027 then 350 mg/kg; from 30 December 2027 then 200 mg/kg
Methoxychlor	For the purposes of this entry, Article 4(1), point (b), shall apply to concentrations of methoxychlor equal to or below 0.01 mg/kg where they are present in substances, mixtures or articles.	not yet determined
Mirex		50 mg/kg

[20] https://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/EPRForum/tabid/9658/Default.aspx

POP	Specific exemption on intermediate use or other specification (Annex I) and related unintentional trace contaminant (UTC) limit for POPs	POP limit (mg/kg) in Annex IV (LPCL)
PCBs	Member States shall identify and remove from use equipment (e.g., transformers, capacitors or other receptacles containing liquid stocks) containing more than 0.005 % PCBs and volumes greater than 0,05 dm^3, as soon as possible but no later than 31.12.2025. Furthermore, a UTC for PCB in substances, mixtures and articles is currently developed.	50 mg/kg
PCDDs and PCDFs		5 µg/kg TEQ**
PCNs		10 mg/kg
PCP and its salts and esters	For the purposes of this entry, point (b) of Article 4(1) shall apply to concentrations of pentachlorophenol and its salts and esters equal to or below 5 mg/kg (0.0005 % by weight) where they are present in substances, mixtures or articles.	100 mg/kg
PeCB		50 mg/kg
PFOA, its salts and PFOA-related compounds	For the purposes of this entry, point (b) of Article 4(1) shall apply to concentrations of PFOA or any of its salts equal to or below 0.025 mg/kg (0.0000025 % by weight) where they are present in substances, mixtures, or articles. For the purposes of this entry, point (b) of Article 4(1) shall apply to conc. of any individual PFOA-related compound or a combination of PFOA-related compounds equal to or below 1 mg/kg (0.0001 % by weight) where they are present in substances, mixtures or articles. For the purposes of this entry, point (b) of Article 4(1) shall apply to concentrations of PFOA-related compounds equal to or below 20 mg/kg (0.002 % by weight) where they are present in a substance to be used as a transported isolated intermediate within the meaning of Article 3 point 15(c) of Regulation (EC) No 1907/2006 and fulfilling the strictly controlled conditions set out in Article 18(4)(a) to (f) of that Regulation for the production of fluorochemicals with a perfluoro carbon chain equal to or shorter than 6 atoms. For the purposes of this entry, Article 4(1), point (b), shall apply to concentrations of PFOA and its salts equal to or below 1 mg/kg (0.0001 % by weight) where they are present in polytetrafluoroethylene (PTFE) micropowders produced by ionising irradiation or by thermal degradation as well as in mixtures and articles for industrial and professional uses containing PTFE micropowders until 18 August 2023. All emissions of PFOA during the manufacture and use of PTFE micropowders shall be avoided and, if not possible, reduced as far as possible. The limit of 1 mg/kg (0.0001 % by weight) shall apply only to the manufacture, placing on the market and use of PFOA and its salts where they are present in PTFE micropowders that are transported or treated for the purpose of reducing the concentration of PFOA and its salts below the limit of 0.025 mg/kg.	1 mg/kg (PFOA and its salts) 40 mg/kg (sum of PFOA-related compounds) **
Perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds	For the purposes of this entry, Article 4(1), point (b), shall apply to concentrations of PFHxS or any of its salts equal to or below 0,025 mg/kg where they are present in substances, mixtures or articles. For the purposes of this entry, Article 4(1), point (b), shall apply to the sum of concentrations of all PFHxS-related compounds equal to or below 1 mg/kg where they are present in substances, mixtures or articles. For the purposes of this entry, Article 4(1), point (b), shall apply to concentrations of PFHxS, its salts and PFHxS-related compounds equal to or below 0.1 mg/kg (0,00001 % by weight) where it is present in concentrated firefighting foam mixtures that are to be used or are used in the production of other firefighting foam mixtures.	1 mg/kg (PFHxS and its salts), 40 mg/kg (sum of PFHxS-related compounds) **

POP	Specific exemption on intermediate use or other specification (Annex I) and related unintentional trace contaminant (UTC) limit for POPs	POP limit (mg/kg) in Annex IV (LPCL)
PFOS, its salts and PFOSF	For the purposes of this entry, point (b) of Article 4(1) shall apply to concentrations of PFOS equal to or below 10 mg/kg (0,001 % by weight) where it is present in substances or in mixtures. For the purposes of this entry, point (b) of Article 4(1) shall apply to concentrations of PFOS in semi-finished products or articles, or parts thereof, if the concentration of PFOS is lower than 0,1 % by weight calculated with reference to the mass of structurally or micro-structurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is lower than 1 µg/m 2 of the coated material.	50 mg/kg (sum of PFOS and salts)
Short-chain chlorinated paraffins (SCCPs)	By way of derogation, the manufacturing, placing on the market and use of substances or mixtures containing SCCPs in concentrations lower than 1 % by weight or articles containing SCCPs in concentrations lower than 0.15 % by weight shall be allowed.	1,500 mg/kg **
Tech endosulfan		50 mg/kg
Toxaphene		50 mg/kg
UV-328	Not yet listed in Annex I	not yet determined

** The Commission shall review that concentration limit and shall, where appropriate, adopt a legislative proposal to lower that value to not higher than 200 mg/kg no later than 30 December 2027.*
*** The Commission shall review that concentration limit and shall, where appropriate, adopt a legislative proposal to lower that value, where such lowering is feasible in accordance with scientific and technical progress, no later than 30 December 2027.*

4.3.2 Development of a regulatory framework for managing POP-containing waste in the sectors

An appropriate regulatory framework is a prerequisite for managing POPs and waste in general. Without established low POP content limits (LPCLs) and unintentional trace contaminant (UTC) limits, it is very difficult to define what constitutes POPs waste and to manage it properly. Therefore, the EU has developed dedicated LPCL and UTC thresholds (see Table 3). Furthermore, a major bottleneck of global waste management is financing, which is particularly challenging in developing countries (Ezeudu and Bristow 2025, ISWA 2025, Lerpiniere et al. 2025). For the major waste categories containing plastic POPs additives – e-waste, ELVs, CDW and textiles – extended producer responsibility (EPR) is a major financing mechanism (UNEP 2019c, OECD 2023).

To establish regulatory limits and a financing framework for waste management, including POPs waste, appropriate national legislation needs to be developed. The NIP includes a dedicated section for compiling information on relevant regulatory frameworks (proposed section 2.2 in NIP guidance, Annex 10), as well as a separate section addressing financial aspects of NIP implementation (proposed section 3.3.17, *Activity: Technical and financial assistance*) (UNEP 2017a). Furthermore, the NIP contains a specific section in the action plan on regulatory measures (proposed Section 3.3.1, *Activity: Institutional and regulatory strengthening measures*) (UNEP 2017a).

4.3.3 Management of POPs and plastics in EEE and related e-waste

Among the three sectors, the recycling of plastics in EEE is the most advanced, and large recycling plants have been established in Europe and in China, including facilities for separating POP-containing plastics (UNEP 2025c).

The Basel Convention started to address e-waste in 2002, when the Mobile Phone Partnership Initiative (MPPI) was adopted by the sixth meeting of the COP to the Basel Convention. The Nairobi Declaration on the Environmentally Sound Management (ESM) of Electrical and Electronic Waste was adopted at the eighth meeting of the COP in 2006, whereby Parties agreed to cooperate to develop policies and strategies, enhance the environmentally sound collection, separation from household waste, repair, recycling and final disposal of e-waste, and to prevent illegal traffic. Since

then, activities on e-waste have expanded, and in 2022 at COP15, the mandate of the Follow-up Partnership to PACE was extended to include, in addition to mobile phones and computing equipment, television screens, video and audio equipment, refrigerators, cooling and heating equipment (PACE II).[21]

After certain PBDEs were listed in 2009 (tetraBDE to heptaBDE), NIPs included e-waste plastics in the inventories and action plans. Since then, a range of GEF projects have been developed addressing the management of e-waste plastics (e.g., GEF Project IDs 9263, 9078, and 11049). With the further listing of decaBDE, Dechlorane Plus, SCCPs/MCCPs and UV-328, the relevance of e-waste plastic for POPs management has further increased (GGKP 2024a).

Therefore, the Stockholm Convention NIPs and related action plans can place stronger emphasis on the management of e-waste plastics, the separation of POP-containing plastic, and the recycling of non-impacted materials. These activities can explore synergies with PACE II under the Basel Convention and elaborate further alignment.

4.3.4 Management of POPs and plastics in the transport sector

The management of POPs in the transport sector is mainly related to plastics and textiles, like upholstery fabrics. The overall amount of plastics in the transport sector is higher than in the EEE sector.[22] The separation and recycling of these plastics, including the elimination of POPs, is, however, less developed compared to EEE/WEEE. The Basel Convention has not developed dedicated activities for end-of-life vehicles[23] (ELVs), but addresses them in the revised draft factsheet on specific waste streams, which is Tool IX of the Environmentally Sound Management (ESM) Toolkit[24] (UNEP 2017a).

One of the main reasons why plastics from ELVs have not been adequately addressed to date is the widespread application of shredding technology for ELV processing. This method produces mixed shredder residue fractions, in which metals are efficiently recovered; however, the remaining light fractions – composed of plastics, textiles, rubber and residual metal components – are technically challenging to recycle and have predominantly been landfilled or incinerated, often resulting in additional environmental concerns (UNEP 2025c).

However, this situation is beginning to change in Europe with the strategy for plastics in a circular economy (European Commission 2018). The European Commission has published a draft update of the End-of-Life Vehicle Directive, requiring that 25% of the plastics in new vehicles be sourced from recycled plastics – of which 25% must come from ELVs, meaning 6.25% of new vehicle plastics must be derived from end-of-life vehicles (European Commission 2023). This creates a need to recover plastic recyclates from ELVs and to separate POP-containing plastics to ensure compliance with unintentional trace contaminant limits. While no GEF projects have specifically targeted ELVs to date, a broader GEF-funded initiative in Africa (Project ID 9263) supports pilot efforts in plastic recycling and chemical safety that may generate relevant insights. In addition, the GEF project Circular and POPs-free Plastics in Africa (Project ID 11049) includes plastic management from ELVs, WEEE and construction waste. In parallel, the European Automobile Manufacturers' Association (ACEA) is planning plastic recovery efforts from ELVs in Africa and presented a pilot project in Ghana during a side event at COP12.

Therefore, the NIPs under the Stockholm Convention and related action plans can address the management of plastics from ELVs, the separation of POP-containing plastics and the recycling of non-impacted plastics. These efforts have synergies with the Basel Convention.

[21] The partnership name was changed to reflect the enlarged scope and became "Partnership for Action on Challenges relating to E-waste", abbreviated PACE II.
[22] Due to the longer service life of vehicles compared to EEE, currently the total amount of plastics from ELVs are similar to WEEE. However since larger amount of plastics is going into transport, this will finally also have a higher volume.
[23] With the exemption of waste management of lead acid batteries, tires and waste oil.
[24] https://www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/ESMToolkit/Overview/tabid/5839/Default.aspx

4.3.5 Management of POPs and plastics in the construction sector

CDW is the largest waste stream globally (Purchase et al. 2021), and plastic in buildings and construction is the second largest plastic use sector (Geyer et al. 2017). Some of the chemicals present in plastic and other materials in building and construction are POPs (e.g., HBCD, PBDEs, SCCPs, PCBs, PFOA) or other CoCs (UNEP 2021f, GGKP 2024a). Furthermore, POPs have been used in treated timber (PCP, lindane, DDT, endosulfan, and some other POP pesticides) (GGKP 2024a), which has a long service life. PCPs still have an exemption for use in utility poles and cross arms.

The Basel Convention has included CDW in its guidance document on the ESM of household waste, but without specific information on CDW management (UNEP 2025g). EPR for CDW has not been considered in the first set of webinars of the Basel Convention Forum on Extended Producer Responsibility for Plastic Wastes.[25] However, EPR for the construction sector has been elaborated in a recent publication by the OECD with practical examples (OECD 2023) and could be considered in the regulatory framework of the NIP.

Therefore, the NIPs under the Stockholm Convention and related action plans can address the management of plastics (and wood) from CDW, the separation of POP-containing plastics from CDW and the recycling of non-impacted plastics (and wood). These activities can explore and strengthen synergies with the Basel Convention.

4.3.6 Management of POPs in the textile sector

Currently, the first GEF projects on POPs in textiles are ongoing (GEF ID 10543 for African countries[26] and GEF Project ID 10523 for Asian countries[27]), which could lay the foundation for improved textile management under the Stockholm Convention. Since textiles consist of more than 60% plastics (mainly polyester) and other combustible materials, they contribute to the open burning of waste, which is the major source of unintentional POPs releases in developing countries (UNEP 2013). Furthermore, the textile sector is the third largest consumer of plastics, with a reuse and recycling rate of 25%, and only around 1% of textile fibres are recycled in closed loop systems (Recovery 2019, Juanga-Labayen et al. 2022).

Therefore, action plans in the NIP could highlight textiles as one of the fuels in open burning, requiring improved management strategies, including recycling. Textiles are also highlighted in the Basel Convention technical guidelines on the ESM of plastic wastes as one of the five major plastic categories to be separated at source (UNEP 2023b). In the future, NIP updates could address the textile sector in better alignment with the increasing Basel Convention activities on textile waste, as emphasized in the technical guidelines on plastics (UNEP 2023b) and discussed at the recent BRS COP (UNEP 2025d), including a side event hosted by the EU on the possible role of the Basel Convention in addressing textile waste and used textiles.[28]

Therefore, the NIPs under the Stockholm Convention and related action plans can address the management of textiles, the separation of POP-containing textiles and the recycling of non-impacted plastics. These activities can explore and strengthen synergies with the Basel Convention.

4.3.7 Management of POPs in pulp and paper

Pulp and paper is another sector where POPs have been, and in some cases still are, used. This includes PFOA-related substances in food contact paper, which are still in use (Jiang et al. 2016,

[25] https://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/EPRForum/tabid/9658/Default.aspx
[26] GEF (2022) Promotion of circular economy in the textile and garment sector through the sustainable management of chemicals and waste in Lesotho, Madagascar and South Africa. https://publicpartnershipdata.azureedge.net/gef/GEFProjectVersions/a90d86e4-115d-e911-a835-000d3a37557b_CEOEndorsement.pdf
[27] GEF (2021) Reducing uses and releases of chemicals of concern, including POPs, in the textiles sector https://publicpartnershipdata.azureedge.net/gef/GEFProjectVersions/111eefa4-dae8-e911-a845-000d3a375321_CEOEndorsement.pdf
[28] https://webcast.ec.europa.eu/2025-brs-cops-side-event-2025-04-30

Bugsel et al. 2022). Monitoring data of PFASs in waste fractions show that some paper and cardboard waste fractions exceed the POP-PFAS UTC limits of the European Union for recycling (Pivato et al. 2024). SCCPs and, more recently, MCCPs have also been used as solvent in carbonless copy paper (Vantage 2022), replacing PCBs previously used for that purpose (Trout 1972, Pivnenko et al. 2014).

Flame retardants, including brominated POPs, have also been used in some paper products. These brominated POPs can end up in recycled paper and contaminate the food chain (Fernandes et al. 2023, Pivato et al. 2024). For example, in an assessment of commercial bedding materials in the UK made from recycled materials, recycled cardboard contained 223 ng/g Σ17 PBDEs, and recycled paper sludge contained 420 ng/g Σ17 PBDEs. The use of these bedding materials resulted in elevated PBDEs levels in chicken eggs: 11 ng/g fat and 16 ng/g fat, respectively, compared to 0.43 ng/g fat when using clean wood shavings as bedding (Fernandes et al. 2023). Similarly, HBCD was detected in these recycled materials at concentrations of 43 and 55 ng/g, respectively, and its use as bedding resulted in slightly elevated levels of HBCD in chicken eggs (0.4 ng/g fat) (Fernandes et al. 2023).

Paper has recently been included as a major component in the Basel Convention's revised draft overall guidance document on the ESM of household waste (UNEP 2025g).

Therefore, the NIPs under the Stockholm Convention and related action plans can address the management of POP-containing paper, the separation of such materials and the recycling of non-impacted paper. These activities can explore and strengthen synergies with the Basel Convention.

5 Synergies between the Rotterdam Convention and the Stockholm Convention NIP

5.1 Introduction

Authorizations for the import and export of hazardous chemicals in international trade are regulated by the Rotterdam Convention. The Convention establishes rules for the exchange of information and prior authorizations for trade (import and export) of hazardous chemicals listed in Annex III. If a hazardous substance listed in Annex III of the Rotterdam Convention is to be exported to another Party to the Rotterdam Convention, the exporting country must notify the competent authority of the importing country as well as the Convention Secretariat. The importing country must either provide explicit consent for the import of the substance into its territory, or submit a preliminary response followed by clarification regarding the intended use or verification of the companies involved.

The Convention also requires Parties to inform each other of national bans or restrictions on chemicals and to communicate whether there are any environmental or health concerns associated with a specific substance. Parties must use up-to-date safety data sheets and appropriate labelling, and they must inform importing Parties whenever an export of a chemical listed in Annex III is planned. The 52 chemicals currently listed in Annex III include 35 pesticides, 16 industrial chemicals and one chemical listed under both categories (tributyltin compounds). These chemicals may not be exported to another Party without that country's clear prior authorisation. This procedure is known as the Prior Informed Consent (PIC). For this reason, the Rotterdam Convention is also referred to as the PIC Convention. Exports that go against the importing country's decision are not permitted. However, the PIC procedure is not intended to serve as a barrier to trade.

The Convention contains 30 articles describing the PIC procedure and five annexes listing the chemicals (industrial chemicals and pesticides) to which the PIC procedure applies. Chemicals listed in Annex III of the Convention are banned or severely restricted by two or more Parties for health or environmental reasons. In principle, trade of chemicals listed in Annex III is still permitted. However, certain information must be exchanged between the exporting and importing countries.

Under the PIC procedure, once a substance is included in Annex III, a "decision guidance document" containing information on the hazardous properties of the substance is prepared and sent to the Parties (Article 7(3)). Furthermore, the Secretariat must inform the Parties when a chemical has been included in the PIC procedure. Article 10 of the Convention sets out the obligations of the Parties with regard to the import of chemicals listed in Annex III and accordingly subject to the PIC procedure. Within nine months, the respective Parties must notify the Secretariat of their position on the future import of the chemical. In addition to a final decision, a provisional response can also be submitted. If a Party amends this response, it shall submit the revised response as soon as possible. An overview of the new import responses submitted by the Contracting Parties is published every six months, in June and December, in the PIC Circular. The following three responses regarding future import may be submitted (Article 10(4a)):

- No consent to import
- Consent to import
- Consent to import only subject to certain conditions

5.2 Synergies between the Rotterdam and Stockholm Convention NIP

While there are differences between the Rotterdam and Stockholm Conventions, there are also close complementarities between them (UNEP 2017a). In national actions to implement the two Conventions, it is important to consider these closely related sets of obligations and procedures in an integrated manner to ensure complementarity and avoid duplication and overlap. The NIP development guidance mentions that countries are therefore encouraged to consider their obligations under the Rotterdam Convention when developing their NIPs for the Stockholm Convention (UNEP 2017a).

The substances in Annex III of the Rotterdam Convention also include several POPs regulated under the Stockholm Convention. Among the initial 12 POPs, all nine pesticides and PCBs are included in Annex III of the Rotterdam Convention, while only PCDDs and PCDFs are not. Of the 25 newly listed POPs under the Stockholm Convention, 12 POPs are also listed in Annex III of the Rotterdam Convention (see Table 4). Chlorpyrifos was suggested to be listed in Annex III of the Rotterdam Convention at the COP held in May 2025, but the listing was not agreed (IISD 2025b).

Several major industrial chemicals that are listed with specific exemptions under the Stockholm Convention are also included in Annex III of the Rotterdam Convention. These include HBCD, PCP, PBDEs listed in 2009, decaBDE, PFOS, PFOA and SCCPs.[29] The recently listed industrial POPs – PFHxS, Dechlorane Plus and UV-328 – have also been proposed by the Chemical Review Committee of the Rotterdam Convention for possible inclusion in Annex III. As a result, all relevant industrial POPs under the Stockholm Convention would then also be listed in the Rotterdam Convention. Their export and import could thus be controlled through the PIC procedure.

Table 4: POPs newly listed under the Stockholm Convention and their status under Annex III of the Rotterdam Convention

Newly listed POPs in the Stockholm Convention	Stockholm Convention		Rotterdam Convention Annex III (CAS)
	Annex	Year listed	
Alpha-hexachlorocyclohexane	A	2009	HCH mixed isomers (608-73-1)
Beta-hexachlorocyclohexane	A	2009	HCH mixed isomers (608-73-1)
Lindane	A	2009	Lindane (58-89-9)
Chlordecone	A	2009	No
Hexabromobiphenyl (HBB)	A	2009	All PBBs (13654-09-6, 27858-07-7, 36355-01-8)

[29] https://www.pic.int/Implementation/IndustrialChemicals/Decisions/tabid/4693/language/en-US/Default.aspx

Newly listed POPs in the Stockholm Convention	Stockholm Convention		Rotterdam Convention Annex III (CAS)
	Annex	Year listed	
PFOS, its salts and PFOSF	B	2009	Perfluorooctane sulfonic acid, perfluorooctane sulfonates, perfluorooctane sulfonamides and perfluorooctane sulfonyls (1691-99-2, 1763-23-1, 24448-09-7, 251099-16-8, 2795-39-3, 29081-56-9, 29457-72-5, 307-35-7, 31506-32-8, 4151-50-2, 56773-42-3, 70225-14-8)
PFOA, its salts and PFOA-related compounds	A	2019	PFOA and related compounds (335-67-1)
PFHxS, its salts and PFHxS-related compounds	A	2022	No
Hexa-/heptaBDE	A	2009	Commercial octabromodiphenyl ether (36483-60-0, 68928-80-3)
Tetra-/pentaBDE	A	2009	Commercial pentabromodiphenyl ether (32534-81-9, 40088-47-9)
Pentachlorobenzene (PeCB)	A & C	2009	No
Technical endosulfan	A	2011	Endosulfan (115-29-7)
Hexabromocyclododecane (HBCD)	A	2013	HBCD (134237-50-6, 134237-51-7, 134237-52-8, 25637-99-4, 3194-55-6)
Hexachlorobutadiene (HCBD)	A & C	2015	No
Polychlorinated naphthalene (PCN)	A & C	2015	No
Pentachlorophenol (PCP), salts and esters	A	2015	Pentachlorophenol (87-86-5)
Short-chain chlorinated paraffins (SCCPs)	A	2017	SCCPs (85535-84-8)
DecaBDE	A	2017	DecaBDE (1163-19-5)
Dicofol	A	2019	No
Methoxychlor	A	2023	No
Dechlorane Plus	A	2019	No
UV-328	A	2023	No

Box 6: Rotterdam and Stockholm Convention import/exemption harmonization – A real case study (2024, identified through a BRS Secretariat project)

Country A had the Rotterdam Convention focal point located at the Ministry of Agriculture and the Stockholm Convention Focal Point in the Ministry of Environment. The country had submitted import responses for the listed POP pesticides (chlordane, DDT, dieldrin, endosulfan, HCH) and for other pesticides listed in the Rotterdam Convention. This import response was in agreement with the Stockholm Convention listing of exemptions. For example, the country had not registered an exemption for DDT or lindane under the Stockholm Convention and has notified the Rotterdam Convention of "No consent to import".

However, for all industrial POPs listed in Annex III of the Rotterdam Convention, the country had not submitted any notification to the Rotterdam Convention regarding import consent. On the other hand, the country had registered a range of exemptions under the Stockholm Convention and had even reported high-volume imports of certain POPs listed under the Stockholm and Rotterdam Conventions. There was a clear mismatch between the Stockholm Convention exemptions and

the Rotterdam Convention import consents for industrial POPs, as the Rotterdam focal point at the Ministry of Agriculture focused solely on the pesticides listed under the Rotterdam Convention overlooked the industrial POPs included in Annex III.

This also showed the lack of communication between the two focal points. After the discrepancy was discovered by the Stockholm Convention focal point, he contacted the Rotterdam focal point to discuss the inconsistency and the necessary updates so that the Stockholm Convention exemptions and the Rotterdam Convention import consents would be in agreement with each other.

5.3 Gaps in the Rotterdam Convention PIC procedure and opportunities for improvement in NIP development and implementation

Most countries do not produce POPs, but rather import them as chemicals, mixtures, or additives in products. Controlling POP imports, therefore, is crucial for ensuring sound POPs management and minimizing impacts on human health and the environment.

However, there are practical challenges that still hinder this control process. In particular, there are no specific Harmonized System (HS) codes for several newly listed POPs, making them difficult to identify at customs (GGKP 2024b). Moreover, POPs contained as additives in products – such as SCCPs in PVC, rubber, toys, cables, or yoga mats – are often not labelled, and thus cannot be easily recognized upon import (Babayemi et al. 2022). In addition, the registration of exemptions under the Stockholm Convention and the notifications under the Rotterdam Convention regarding import consent should be consistent, but this is not always the case (see Case Study in Box 6).

A recent review article compiled information on the trade of hazardous chemicals listed under the Rotterdam Convention based on UN Comtrade data. For the 46 chemicals listed under the Rotterdam Convention as of 2019, at least 64.5 megatonnes were traded between 2004 and 2019. It also revealed widespread illegal trade, with 25,324 trade records covering 25.7 megatonnes – mostly involving pesticides – highlighting major regulatory gaps (Zou et al. 2023).
Considering these gaps in the control of POPs imports and the lack of coordination between the Stockholm and Rotterdam Conventions (see Box 6), there is considerable room for improvement. The existing synergies with the Rotterdam Convention could therefore be leveraged within the Stockholm Convention implementation process by identifying challenges during the NIP update and suggesting improvements in the action plan.

6 Synergies between the Minamata Convention and the Stockholm Convention NIP

6.1 Introduction

There is a wide range of synergies between the Minamata Convention and the Stockholm Convention, as well as with the Basel and Rotterdam Conventions. A dedicated document titled *Joint report on cooperation and coordination between the secretariats of the Basel, Rotterdam and Stockholm conventions and of the Minamata Convention* (UNEP 2025n) addresses these linkages. Cooperation between the secretariats has been strengthened, providing a solid basis for exploring synergies in inventory development and implementation work, where appropriate.

Mercury and POPs are present together in several sectors, including electronics, transport and buildings. Therefore, sectoral inventory guidance for POPs has also included mercury as a CoC in these sectors (GGKP 2024a), and synergistic inventory options can be evaluated for the individual sectors (see below). Furthermore, mercury and dioxins/UPOPs are released from many of the same industrial sources and can often be reduced simultaneously (see Section 6.2).

6.2 Inventory and reduction of unintentional POPs and mercury from major emission sources

A range of sources listed in Stockholm Convention Annex C, Part II and III – such as waste incinerators, metal industries, chlor-alkali plants, cement production and the power sector – emit both PCDD/PCDF and other unintentional POPs, as well as mercury (UNEP 2013, UNEP 2023d). These shared sources allow inventories under both conventions to be developed and assessed synergistically during Stockholm NIP or Minamata NAP development. At a minimum, the exchange of information on the activity rates of these industries should be ensured as a basic form of synergy. Additionally, the assessment of the technological level of individual facilities (e.g., incinerators or power plants) for determining emission factors could also be conducted in a coordinated and synergistic manner.

Industries included in the detailed Minamata report include:

- Chlor-alkali plants
- Coal-fired power plants
- Smelting and roasting processes used in the production of non-ferrous metals
- Waste incinerators
- Cement clinker production

In the Minamata national reporting format, there is an option to tick "multi-pollutant control strategy that would deliver co-benefits for control of mercury emissions" (see Box 7).

Box 7: Question to tick in the national reporting for the Minamata Convention for waste incineration facilities

☐ A quantified goal for controlling and, where feasible, reducing emissions from relevant sources

☐ Emission limit values for controlling and, where feasible, reducing emissions from relevant sources

☐ Use of BAT/BEP to control emissions from relevant sources

☐ Multi-pollutant control strategy that would deliver co-benefits for control of mercury emissions

☐ Alternative measures to reduce emissions from relevant sources

Several BAT/BEP measures for the reduction of UPOPs and mercury releases are the same – particularly the use of activated carbon spray or carbon beds in incinerators or metal plants, which can remove dioxins/UPOPs and mercury from air release. Therefore, in addition to inventory and assessment synergies during NIP/NAP development, joint projects on reducing dioxins/UPOPs and mercury emissions can also be explored.

Depending on the technologies used, chlor-alkali production sites may also be relevant sources of mercury and PCDD/PCDF (and other UPOPs; Takasuga et al. 2020). As a result, several large, contaminated sites with both mercury and dioxin/UPOPs have been identified and documented (Biester et al. 2002, Chang et al. 2009, Takasuga et al. 2020). A special session on assessing and managing mercury and dioxin/UPOPs pollution at chlor-alkali sites was organized during the 14th IHPA Forum in 2023 and was recorded.[30]

6.3 Electronics sector

Mercury and mercury compounds have been used in various electronic products, particularly in batteries, switches, thermostats, and fluorescent lamps (GGKP 2024a). The development of a mercury inventory for EEE/WEEE under the Minamata Convention could consider synergies with Stockholm Convention inventory activities and vice versa. Furthermore, projects on POPs management in e-waste under the implementation of the Stockholm Convention NIPs could be

[30] https://www.youtube.com/watch?v=ai1olQPYT98&list=PL67C3BLFwRkqL_emv9FVTW7KEr3lj6t4T&index=6

integrated or coordinated with mercury management actions as part of the implementation of the Minamata Convention.

6.4 Transport sector

Mercury has historically been used in vehicles[31] in four-wheel drive anti-lock braking systems (ABSy), high-intensity discharge (HID) lamps, active ride control systems, headlamps, taillights, and underhood or truck lighting (UNEP 2019e, New Jersey Department of Environmental Protection 2022, GGKP 2024a). Older vehicles (pre-1994) can contain mercury switches in the crash sensor module of airbags. Many vehicles manufactured prior to 2004 contain mercury switches in the ABSy (GGKP 2024a).

The development of a mercury inventory for the transport sector under the Minamata Convention could also benefit from synergies with Stockholm Convention inventory activities within NIP update and vice versa. Similarly, projects on management of POPs in vehicles within the framework of implementing Stockholm Convention NIPs could integrate or coordinate mercury management as a synergy with the implementation of the Minamata Convention.

6.5 Building and construction sector

Mercury and mercury compounds have been used in products relevant to the building and construction sector. Common uses include fluorescent lamps (tubes and compact fluorescent lamps, CFLs), high-intensity discharge (HID) lamps (such as mercury vapor, metal halide, most high-pressure sodium, and low-pressure mercury discharge lamps) and cold cathode light sources (ultraviolet and some “neon” types). These energy-efficient mercury-containing lamps are currently being phased out under the Minamata Convention, which mandated a ban on their import, export, and manufacture by 2020.

Other documented mercury applications in the building and construction sector include the use of mercury compounds as catalysts in PUR elastomers (UNEP 2019e), which were used in products like hardeners and resins for plastic materials, plastic flooring materials and jointing compounds, as well as the use of mercury compounds as biocides in paints. Reported mercury levels in polyurethane floors (e.g., Tartan surfaces) ranged from 1000 to 2000 mg/kg (ATSDR 2006). Some PUR materials can also contain POPs used as flame retardants (GGKP 2024a).

A few fixed installations in buildings constructed between 1930 and the 1960s contained mercury-containing equipment, such as mercury-containing gas pressure regulators and boiler heating systems (USEPA 2011). Additionally, some thermostats include mercury switches, where the mercury is enclosed in one or more glass bulbs inside the thermostat (USEPA 2011). For the inventory in buildings, both past and current uses of mercury in buildings could be assessed within the framework of the Minamata Convention, considering the Mercury Inventory Toolkit (UNEP 2019e).

The development of a POPs inventory in buildings, as part of the Stockholm Convention’s NIP update, could consider synergies with inventory activities under the Minamata Convention and vice versa. Furthermore, projects addressing the management of POPs in buildings in the frame of implementing Stockholm Convention NIPs could integrate or coordinate mercury management in buildings as a synergy with the implementation of the Minamata Convention.

7 Synergies between the Biodiversity Convention and the Stockholm Convention NIP

7.1 Background

Biodiversity is declining at an alarming rate, faster than ever in human history: approximately 25 percent of species in assessed animal and plant groups are threatened, suggesting that around 1

[31] The Directive on end-of-life vehicles (ELV Directive) prohibits the use of hazardous substances when manufacturing new vehicles (especially lead, mercury, cadmium and hexavalent chromium) except in defined exemptions when there are no adequate alternatives.

million species already face extinction unless decisive action is taken to reduce the intensity of drivers of biodiversity loss (IPBES 2019, UNEP 2025a). This ongoing crisis has catalysed the development of the Kunming-Montreal Global Biodiversity Framework (GBF) and its targets, designed to address the multifaceted challenges of biodiversity loss (UNEP 2022b).

Chemical pollutants have been identified as one of the main drivers of global biodiversity loss (Mueller et al. 2023) and UNEP has increased activities in this respect (UNEP 2023e). Target 7 of the Kunming-Montreal Global Biodiversity Framework includes *reducing the overall risk from pesticides and highly hazardous chemicals by at least half.* Additionally, the International Union for Conservation of Nature's Red List of Threatened Species places pollution among the major threats to species health, including different classes of pollution and an indication of their severity (IUCN 2024, European Commission JRC 2025).

Concentrations of many manufactured chemicals bioaccumulate in wildlife and increase as they move up food chains, resulting in high concentrations in animals at the top of the food web (Muir et al., 1988, UNEP 2019d). Exposure to chemical contamination reduces the long-term viability of biological populations by changing the DNA sequence (mutation process) that is passed on to offspring (Bhat 2013). Chemical contamination can cause population reduction through both heritable and non-genetic modes of toxicity, and although the original damage is at the molecular level, there are emergent effects at the level of populations – such as the loss of genetic diversity – that are not predictable based solely on the knowledge of a chemical's toxicity mechanism (UNEP 2021g). Although several factors are involved in the loss of biodiversity, chemical contamination has been implicated in the decline or disappearance of many populations (e.g., bald eagle, peregrine falcon, orca) (Bickham 2000, Jepson et al. 2016).

When toxicological effects of chemicals on biota or wildlife are assessed, the focus usually is restricted to directly observable endpoints of acute toxicity: survival, growth and reproduction (UNEP 2023e). However, subtle non-lethal effects – such as developmental malformations, physiological alterations, or behavioural changes – may also have significant impacts on the fitness of an individual or an entire population in the natural environment. A decline in populations or extinction of particularly sensitive species may lead to a change in communities and entire ecosystems (UNEP 2023e).

Given the significant role that chemical pollution plays in biodiversity loss, chemicals proposed for listing under the Stockholm Convention are assessed not only for their persistence, bioaccumulation and long-range environmental transport, but also for their potential impacts on biodiversity.

7.2 Common approach of the BRS Conventions and GFC on Biodiversity

In line with paragraph 8 of resolution V/6, the secretariat of the Global Framework on Chemicals, in collaboration with the secretariats of the Basel, Rotterdam and Stockholm Conventions, prepared a report on the contributions of the international frameworks and agreements on chemicals and waste to the Kunming-Montreal Global Biodiversity Framework (UNEP 2025a). The report highlights those contributions and includes a series of guiding questions for national target-setting under the Global Biodiversity Framework, serving as a starting point for Parties seeking to update their national biodiversity strategies with a view to better integrating considerations related to chemicals and waste.

The report was submitted as an information document to the Conferences of the Parties to the Basel, Rotterdam and Stockholm Conventions in 2025 and presented at a high-level side event entitled "From invisible threats to visible solutions: integrating chemicals and waste management into biodiversity conservation – the power of synergies" (UNEP 2025a).

The report stresses: *Moreover, recognizing the importance of the intersection of the BRS Conventions in achieving global biodiversity goals, the COPs to the BRS conventions, through their decisions BC-16/22, RC-11/9, and SC-11/21 on international cooperation and coordination with other organizations, welcomed the adoption of the GBF. They also requested the Secretariat, subject to the availability of resources, to prepare a report, including possible recommendations, on how the*

BRS conventions could contribute to the implementation of the 2030 Targets and 2050 Goals of the GBF.

Furthermore: *Relevant steps have already been taken towards fostering collaboration in the implementation of biodiversity and chemicals and waste agreements and frameworks. Notably, there has already been significant progress in identifying interlinkages between the GBF targets and the objectives of the MEAs and GFC and opportunities for enhancing coordination and cooperation among the clusters. Contributions were identified through several studies and reports including the study developed jointly with the Secretariat of the Minamata Convention on Mercury, titled 'Interlinkages between the chemicals and waste multilateral environmental agreements and biodiversity: key insights,' (UNEP 2021g) and the report of the Bern III Conference on Cooperation among the biodiversity-related conventions for the implementation of the Kunming-Montreal Global Biodiversity Framework Bern (UNEP 2024b).*

Countries have started to explore synergies, and Bangladesh has emphasized the importance of Target 7 of the Kunming-Montreal Global Biodiversity Framework, which calls for “reducing the overall risk from pesticides and highly hazardous chemicals by at least half” by 2030. They urged the GEF to increase grants for the BRS Conventions and other agreements with pesticide-related objectives.

7.3 Integration of biodiversity impact of POPs in the NIP development

7.3.1 Integrating a section on biodiversity in Chapter 1 of the NIPs

In Chapter 1, the NIP guidance recommends including: *A summary of the POPs issue would provide context and background outlining the chemicals, their uses, and the problems they cause*. Here, the loss of biodiversity can – and should – be described as one of the problems POPs causes.

7.3.2 Introduction of selected POPs in Chapter 2

In Chapter 2, which addresses the assessment of individual POPs, their impact on biodiversity could be mentioned in the introductory section for selected POPs, in particular PCBs (Jepson et al. 2016) and pesticides, especially when extending to HHPs (Geiger et al. 2010, IPBES 2016, Sánchez-Bayo and Wyckhuys 2019).

7.3.3 Integration of biodiversity in the action plan on awareness

In the action plan on awareness raising, individual major topics can be included. One activity could include the awareness of POPs and other CoCs (GFC synergy) and their effect on biodiversity.

7.3.4 Integration of biodiversity and POPs/CoCs in the action plan on research

One reason for gaps in the link between chemical pollution and biodiversity is focused research on this interlink (Sigmund et al. 2023). Such research on the impact of POPs/CoC on biodiversity can be encouraged in the action plan for research.

7.3.5 Integration of impact of POPs on biodiversity in priority assessment

The impact of POPs on biodiversity can be one indicator for the priority assessment of POPs. In the priority setting document for developing NIPs in the Caribbean, impact on biodiversity is considered for each POP group (Weber 2024).

The priority setting document also stresses that certain BAT/BEP measures also reduce other co-pollutants like heavy metals and particulate matter (Weber 2024) in particular when applying an integrated pollution prevention and control as recommended in the BAT/BEP guidance. This also need to be considered in an overall assessment on biodiversity and human health.

8 Synergies between the UN Framework Convention on Climate Change, the Montreal Protocol with the Stockholm Convention NIP

8.1 Background

The ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC) is to stabilize greenhouse gas (GHGs) concentrations *at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system.* It states that *such a level should be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner*.[32]

The Stockholm Convention shares strong synergies with climate and ozone-related agreements. Several POPs, especially those released unintentionally (UPOPs), are generated through combustion processes such as open burning, waste incineration and industrial fuel use – sources that also emit GHGs (UNEP 2013, UNEP 2025m). Integrated mitigation strategies can therefore deliver co-benefits for air quality, climate, and chemical pollution control.

Beyond emissions, materials relevant to climate mitigation – such as insulation foams, electronic equipment and vehicle components – frequently contain legacy or newly listed POPs, including flame retardants and plasticizers. For instance, PUR foams may contain both high-global warming potential (GWP) substances regulated under the Montreal Protocol and flame retardants like HBCD or SCCPs (UNEP 2021c, GGKP 2024a, 2024b). Likewise, electronics and vehicles targeted by energy-efficiency policies often contain plastic components with POP additives, complicating circular economy efforts (GGKP 2024d, 2024e, 2024f).
These overlaps highlight the relevance of cross-sectoral inventories and policy alignment. The GGKP's 2024 sectoral guidance, developed in close cooperation with the BRS Secretariat, supports countries in identifying and managing POPs and other CoCs across key climate-relevant sectors such as buildings and construction, EEE, and transport (GGKP 2024a).

As countries update their NIPs under the Stockholm Convention and their Nationally Determined Contributions (NDCs) under the UNFCCC, the opportunities for policy coherence and integrated solutions are strong.

8.2 Synergy of POPs and GHG management in the electronics sector

8.2.1 Inventory and management of POPs and CFCs, HCFCs, HFCs in EEE

The inventory in the NIP development and, in particular, the management of POPs in EEE/WEEE in NIP implementation require the establishment of an overall management of EEE/WEEE. CFCs, HCFCs and HFCs with partly high GWP are still used and present in several types of EEE/WEEE, such as refrigerators/freezers and air conditioners or heat pump equipment. Inventory activities of POPs and GHGs and ozone-depleting substances (ODS) could be coordinated, and the establishment of a robust WEEE management system can manage and destroy POP-containing plastics and F-gases as synergy in NIP implementation would be coordinated with UNFCCC and Montreal Protocol implementation activities (GGKP 2024a).

8.2.2 Management of POP-containing plastic fraction and recycling of polymers

The management of WEEE plastics, including the separation and management of POP-containing plastics, is an important NIP implementation task considering the large numbers of POP plastic additives and the large stocks of EEE in use. This management and separation is also a prerequisite for the recycling of WEEE plastics not impacted by POPs or other restricted CoCs. Recycling WEEE plastics can reduce GHG emissions by at least 1 tonne of CO_2 per tonne of recycled plastic, thereby contributing to climate mitigation.

[32] https://unfccc.int/process-and-meetings/what-is-the-united-nations-framework-convention-on-climate-change

Furthermore, life cycle assessment (LCA) of management options for POP-containing plastics indicates that dissolution of the plastic with separation of polymers and additives for recycling of the polymer would be favourable compared to incineration or pyrolysis of these plastics (Klotz et al. 2024).

8.3 Synergy of POPs and GHG management in the construction sector

8.3.1 Inventory and management of POPs and CFCs, HCFCs, HFCs in insulation foams

POPs and GHGs like chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), which have high GWP, are included as flame retardants and blowing agents in insulation foams. CFCs and HCFCs are also listed under the Montreal Protocol on Substances that Deplete the Ozone Layer, mandating a global phase-out of ODS.[33] Fluorinated gases (F-gases), such as HFCs, are also potent GHGs, but do not contribute to ozone depletion. They are addressed by the Kigali Amendment to the Montreal Protocol, which mandates a global reduction in HFC use. CFCs, HCFCs and HFCs have been widely used as blowing agents for foam products, particularly in the building and construction sector, including insulation materials such as PUR, EPS/XPS, phenolic and PIR.

ODS contained in building insulation (so-called “ODS banks”) and F-gases in insulation foam can be assessed and inventoried together with POPs such as HBCD, PBDEs and SCCPs/MCCPs (GGKP 2024a). Therefore, inventory and management activities would be coordinated with Montreal Protocol and GHG assessments under the UNFCCC.

Furthermore, the Montreal Protocol does not provide for environmentally sound management of existing stocks of ozone-depleting substances in building materials, which represents a blind spot for the Protocol (Blumenthal et al. 2022). Therefore, in addition to cooperation in inventory activities in the NIP development, the future activities on POPs management and destruction of insulation foams within the Stockholm Convention NIP implementation could support the destruction of these large GHGs and ODS stock (CFCs, HCFCs, and HFCs) in these uses.

Additionally, refurbishment of old insulation foams with a thicker state-of-the-art insulation can improve energy saving (Bojić et al. 2014). During such upgrades, POP-containing foams used since the 1960s (for HBCD) and 1970s (for PBDEs) can be properly managed and destroyed, while also reducing energy consumption in buildings and saving CO_2.

8.3.2 Management of POP-containing plastic fraction and recycling of polymers

As described above, recycling of the plastic fraction not impacted by POPs and other CoCs after separation can also contribute to GHG emission reduction (see Section 8.2.2). A study by the German Environment Agency (2021) did an initial evaluation of the plastic recycling potential from construction and demolition wastes in Germany. As mentioned, LCA results indicate that dissolution-based recycling of POP-containing plastics, with separation of polymers and additives, may offer environmental advantages over incineration or pyrolysis (Klotz et al. 2024). A first industrial-scale plant was built in the Netherlands to separate and recycle polystyrene containing HBCD (PS Loop)[34] including recovering the bromine. However, the current situation of the plant operation is unclear.[35]

8.4 Synergy of POPs and GHG management in the transport sector

8.4.1 Inventory and management of POPs and CFCs, HCFCs, HFCs in the transport sector

Since the 1990s, the globally prevailing refrigerant for mobile air conditioning in cars, buses and trains has been 1,1,1,2-tetrafluoroethane (HFC-134a), a greenhouse gas with a GWP of 1,430. Before 1994, the CFC dichlorodifluoromethane (R-12), with a GWP of 10,900, was widely used in most vehicle air conditioning applications (GGKP 2024a). While some regions (e.g., the EU) have

[33] https://ozone.unep.org/treaties/montreal-protocol#
[34] https://www.psloop.eu
[35] https://www.psloop.eu/news/project_completion/ ; https://www.psloop.eu/news/psloop-finds-new-shareholder/

banned HFC-134a in new vehicles since 2017, it remains prevalent in vehicles produced before that year.
Inventory activities for the transport sector could combine POPs assessments with F-gas-related GHG inventories for the UNFCCC and the Montreal Protocol as a synergy. Additionally, management of F-gases could be included in the NIP action plan alongside measures targeting POPs in end-of-life vehicles (ELVs).

8.4.2 Management of POPs containing plastic fraction and recycling of polymers

As described above for plastics from WEEE, the recycling of the plastic fraction from ELVs, which are not impacted by POPs and other CoCs after separation, additionally has a GHG reduction potential compared to virgin plastics (see Section 8.2.2).

LCA of end-of-life management options of POPs containing plastic indicates that dissolution of POPs containing plastics with separation of polymers and POPs/additives for recycling of the polymers would be favourable compared to incineration or pyrolysis of these POP-containing plastics (Klotz et al. 2024).

8.5 Reduction of unintentional POPs and GHG emissions

8.5.1 Reduction of open burning by improvement of the waste sector and recycling

The main source of unintentional POPs releases in developing countries is open burning of waste, with biomass burning as a secondary contributor (UNEP 2017d). Open burning also releases CO_2 and black carbon, a short-lived climate pollutant (SLCP). Therefore, NIP action plans to reduce open burning of waste also contribute to GHG and SLCP emission reductions.

8.5.2 Implementation of BAT/BEP

The implementation of best available techniques and best environmental practices (BAT/BEP) in sectors such as secondary metal production, cement manufacturing and waste incineration is crucial to reduce releases of PCDD/PCDFs and other unintentional POPs. Depending on the technological upgrade, BAT/BEP implementation can be combined with energy-efficient practices, further reducing CO_2 emissions. The European BAT reference documents covering all industrial Annex C Part II and III sources consider energy aspects and a cross-cutting document on BAT for Energy Efficiency has been published (European Commission 2009).

9 Synergies between the Sustainable Development and Related Goals (SDGs) and the Stockholm Convention NIPs

9.1 Background

The NIP development guidance stresses that: *NIPs should not be developed, reviewed, or updated in isolation but should take due account of the aims of sustainable development in the sense of socially, economically, and environmentally appropriate policies and actions to maximize the overall benefits they produce*. In addition: *The Parties shall endeavour to utilize and, where necessary, establish the means to integrate national implementation plans for persistent organic pollutants in their sustainable development strategies where appropriate* (UNEP 2017a).

One of the objectives of the NIP is *to draw up an initial or updated draft NIP suitable for the country to meet the needs of the Stockholm Convention and its country-specific objectives and priorities, coordinated with national activities on sustainable development and related goals, where appropriate*" (UNEP 2017b).

In this section, synergies between NIPs and national implementation of the Sustainable Development Goals (SDGs) are briefly outlined.

9.2 Relevance of the Sustainable Development Goal (SDGs) to POPs and chemicals management

Chemicals, wastes and their management are important to multiple SDGs of the 2030 Agenda, particularly SDG12 on sustainable production and consumption. POPs are among the most unsustainable groups of chemicals, and their management contributes to achieving several SDGs. The WHO Chemical Road Map identifies chemical-specific targets under three SDGs (WHO 2020; see Figure 1). Further SDGs where hazardous chemicals such as POPs play a critical role include:

- **SDG2**: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

  Stockholm Convention synergy and NIPs: Food is a major exposure pathway for most POPs. POPs and, in particular, POP-contaminated sites are a high risk for food and feed production and food security (Weber et al. 2018a, 2018b, Weber et al. 2019, Petrlik et al. 2022).

- **SDG3**: Ensure healthy lives and promote well-being for all at all ages (specifically Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination)

  Stockholm Convention synergy and NIPs: POPs are among the most problematic chemical groups due to their persistence and toxicity, with substances such as PBDEs and DDT associated with substantial external costs relative to GDP (Attina et al. 2016). Managing and reducing POPs through the implementation of NIPs makes an important contribution to Target 3.9. Leveraging synergies between NIPs and the GFC, including reductions in HHPs (see Section 3.6), could further amplify this contribution.

- **SDG6**: Ensure availability and sustainable management of water and sanitation for all (specifically Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally)

  Stockholm Convention synergy and NIPs: Fluorinated POPs pose a significant threat to water safety and security, with a substantial share of the population exposed to drinking water exceeding regulatory limits (Andrews et al. 2020, Liu et al. 2021). POP PFASs are considered to have exceeded global boundaries (Cousins et al. 2022). Their control under NIPs is essential to achieving SDG6.

- **SDG8**: Promote sustainable economic growth, full and productive employment, and decent work for all (specifically Target 8.8: Protect labour rights and promote safe and secure working environments for all workers)

  Stockholm Convention synergy and NIPs: POPs are a key chemical group relevant to worker exposure (Stapleton et al. 2008, Lucas et al. 2023, Mazumder et al. 2023) and their control through NIP implementation contributes to SDG8.

- **SDG11**: Make cities and human settlements safe, resilient and sustainable by ensuring access to housing, transport, green spaces and basic services, while managing urbanization, pollution and waste.

  Stockholm Convention synergy and NIPs: Urban areas have been impacted over the past century by the release and accumulation of industrial POPs in soils and wider environment, as documented for PCBs (Weber et al. 2018b) and PFAS (RIVM 2025). Unintentionally POPs, including PCDD/PCDF, have also accumulated in urban and industrial regions near major emission sources, such as metal industries, incinerators and historical open waste burning sites,

with contamination levels in food products such as chicken and eggs exceeding regulatory limits (Petrlik et al. 2022). Similarly, PCB contamination is observed in soils across the PCB life cycle, posing particular risks in urban environments (Weber et al. 2018). Also brominated dioxins and furans (PBDD/PBDF) currently evaluated in the POPs Review Committee are contaminating food at sites where e-waste is thermally treated or ashes from incinerator are not managed in an environmentally sound manner (Petrlik et al. 2025).

In the Netherlands, recent findings show that most eggs from small-scale poultry holdings exceed safe contamination levels for PFAS, leading the Dutch National Institute for Public Health and the Environment (RIVM) to advise against consuming home-produced eggs nationwide (RIVM 2025). Similarly, authorities in the Paris region and other parts of Europe have recommended avoiding or limiting consumption of home-produced eggs (Bergoend 2025).

The Stockholm Convention NIP guidance includes a dedicated section (2.3.17) on the "identification of impacted populations or environments, estimated scale and magnitude of threats to public health and environmental quality, and social implications for workers and local communities", as well as an action plan on POP-contaminated sites (Section 3.3.11: Identification of contaminated sites of Annex A, B, and C chemicals). Together, these assessments and actions can contribute to making cities and human settlements safe, more resilient and more sustainable.

- **SDG12**: Ensure sustainable consumption and production patterns (specifically Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil to minimize their adverse impacts on human health and the environment)

  Stockholm Convention synergy and NIPs: POPs are a major class of hazardous chemicals, and the Stockholm Convention is a key international framework for life-cycle chemicals and waste management under Target 12.4.

- **SDG14**: Conserve and sustainably use the oceans, seas and marine resources, contributing to the reduction of marine litter and related POPs contamination in the marine environment.

  Stockholm Convention synergy and NIPs: Several POPs have been used as high-volume additives in plastics, contributing to marine plastic pollution and associated POPs exposure (Gallo et al. 2018). Phasing out POPs through NIP implementation is therefore a key driver in reducing their presence in marine plastics. However, legacy stocks of POP-containing plastics will persist in the environment for decades, requiring both environmental degradation over time (Chamas et al. 2020) and targeted management of materials in the technosphere, particularly in long-lived sectors such as transport and buildings (Li et al. 2016, Charbonnet et al. 2020, GGKP 2024c, GGKP 2024g).

- **SDG15**: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss (specifically Target 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements; and Target 15.3: By 2030, combat desertification, restore degraded land and soil)

  Stockholm Convention synergy and NIPs: As elaborated in Section 7, POPs have significant impacts on biodiversity, particularly on top predators (Jepson et al. 2016). In addition, PFAS affect inland freshwater systems, undermining ecosystem services such as drinking water supply (Andrews et al. 2020, Liu et al. 2021) and irrigation (Brown et al. 2020, Zhang et al. 2021).

Figure 1: SDG goals and chemical-specific targets under the WHO Chemicals Road Map

9.3 Promotion of green and sustainable chemistry

POPs are among the most unsustainable classes of chemicals, and where listed POPs remain in use under exemptions, safer alternatives need to be phased in. Substitution should prioritize green and sustainable chemicals, as past phase-outs have often led to regrettable alternatives (Fantke et al. 2015). Green and sustainable chemistry – an important pillar of sound chemicals management – can therefore be highlighted and promoted through NIP action plans, as demonstrated by several countries in their NIPs (e.g., Government of Suriname 2019; Government of Pakistan 2020; Republic of the Union of Myanmar 2020; Republic of Botswana 2025). Assessments of alternatives would benefit from being conducted in synergy with the UNEP Sustainable Chemistry Initiative activities (UNEP 2020b) and, where relevant, the GFC (See Chapter 3).

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