BROCHURE

Managing POPs:
Stakeholders in the Construction Sector

Subject to Output 4.1 of the GEF ID 10785 project titled: "Global Development, Review and Update of National Implementation Plans (NIPs) under the Stockholm Convention (SC) on Persistent Organic Pollutants (POPs)"

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The GGKP is a global community of organizations and experts committed to collaboratively generating, managing and sharing green growth knowledge. Led by the Global Green Growth Institute (GGGI), Organisation for Economic Co-operation and Development (OECD), United Nations Environment Programme (UNEP), United Nations Industrial Development Organization (UNIDO) and World Bank Group, the GGKP draws together over 90 partner organizations. For more information, visit www.greengrowthknowledge.org.

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This brochure was developed by Anastasiya Buchok (Senior Project Associate, GGKP, GGGI), summarizing guidance authored by Dr. Roland Weber: "Sectoral guidance for inventories of POPs and other chemicals of concern in buildings/construction, electrical and electronic equipment, and vehicles". Technical review was provided by Dr. Roland Weber, an international consultant specializing in Persistent Organic Pollutants (POPs) and National Implementation Plans for POPs reduction and control.

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Introduction

This brochure highlights stakeholders involved in the management of Persistent Organic Pollutants (POPs) and other Chemicals of Concern (CoC) present in the construction sector. It is part of a series, with additional brochures exploring the electronics and transport sectors (GGKP 2024a; GGKP 2024b).

POPs pose significant environmental and health risks, making their management a global priority. Stakeholders in the construction sector play a key role in addressing this challenge, as POPs can be found in raw materials, buildings and waste, impacting both people and the environment. By identifying key stakeholders at each stage of a building's lifecycle, this brochure aims to help:

- Identify potential groups of stakeholders for effective POPs management and awareness raising
- Identify potential sources of POPs and period of their use in buildings and construction
- Identify other CoC in buildings and construction
- Implement preventive measures and sustainable practices

This material is designed to be a valuable resource for a diverse audience, including:

- National focal points of the Stockholm Convention
- Policymakers and government officials involved in the NIP review and update process
- The general public
- Stakeholders in the construction and demolition industry

Join us in this journey towards a cleaner, safer construction, renovation and demolition industry. Together, we can build a future where progress harmonises with environmental stewardship, and where every stakeholder plays a vital role in achieving this vision.

POPs in the Construction Sector: Overview

The construction and building sector is among the most chemically intensive industries, closely following the chemical sector. This heightened chemical usage is driven by the rapid urbanisation, resulting in an expected annual growth rate of 3.5% in the global construction industry. Simultaneously, the chemicals market within this sector was projected to grow by 6.2% annually from 2018 to 2023 (UNEP 2019).

Plastic and other materials commonly used in construction contain specific chemicals, such as POPs like HBCD, PBDEs, SCCPs, PCBs and PFOAs.

POPs have the potential to contaminate indoor environments, posing threats to both human health and the environment. To address these concerns, it is essential to identify the specific areas and construction practices where POPs and other CoC are used within this sector. This knowledge extends beyond individual building components and encompasses a broader context involving multiple stakeholder groups that may be exposed to POPs and manage materials containing POPs and other CoC. Engagement with stakeholders in this sector is crucial for NIP development, review and update.

While most POPs literature often focuses on stakeholder engagement for inventory development, this brochure goes beyond the data collection exercise. It examines every stage of a building's lifecycle, involving both direct and indirect stakeholders for comprehensive POPs management and awareness raising.

The subsequent sections offer an overview of the areas of application, products, materials and substances in the construction industry that utilize or contain POPs *(Table 1);* the periods of use of POPs in the sector (*Table 2);* relevant groups of stakeholders throughout the lifecycle of buildings (*Table 3); and o*ther CoC present in buildings (*Table 4*).

POPs in the Construction Sector: Areas of Application

Table 1: Overview of the areas of application, products, materials and substances in the construction industry that utilise or contain POPs

POPs	Application
C-decaBDE	Polyurethane (PUR) and extruded polystyrene (XPS) insulation, cladding panels, polyethylene (PE) and polypropylene (PP) films, cables and electrical ducts and fittings or piping insulation
C-pentaBDE (tetraBDE and pentaBDE)	Expanded polystyrene (EPS), PUR, XPS foam in insulation, PUR foam fillers, PE insulating foam, PE and PP plastic sheeting, roller blinds and curtains, adhesive layer of reflective tapes, intumescent paint, polyvinyl chloride (PVC) plastic sheeting, PVC hosepipes for plumbing, PVC flooring, roofing, wall papers, cables
HBCD	Flame-retarded EPS insulation, flat roof insulation, pitched roof insulation, floor insulation, slab on ground insulation, insulated concrete floor systems, interior war insulation with gypsum board, exterior wall insulation or external insulated composite systems, cavity wall insulation boards and loose fill, insulated concrete forms (ICF), foundation systems, void forming systems, load bearing foundation applications, core material for EPS in sandwich and stressed skin panels, floor heating systems, sound insulation in floating floors, EPS drainage boards, EPS concrete bricks, EPS concrete, soil stability foam, seismic insulation, EPS containing ornaments, decorations, logos etc. XPS insulation boards, cold bridge insulation floors, basement walls and foundations, inverted roofs, ceilings, cavity insulation composite panels and laminates
SCCPs and MCCPs	PVC, PUR spray foams, rubbers, paints, sealants
PCBs and PCNs	Sealants, coatings, paints (including underwater paints), adhesives, cables
PFOA, PFOS, PFHxS	Paints, lacquers, interior architectural paints, sealants, adhesive products, carpets and floor covering, foam, plastic, textile insulation, drywall, plaster, polishing agents, damp proofing, impregnation products, plastic facades materials
PCPs	Wooden buildings, wooden housing, half-timbered houses (windows, doors, roof trusses, staircases, stair railings, wooden paneling of walls or ceilings, in stables, on fences and other constructions
POP Pesticide	Insecticide or fungicide in wood in construction. Used in wood treatment. (DDT, aldrin, chlordane, dieldrin, endosulfan, lindane, mirex)
Dechlorane Plus	Flame retardant in many polymers, thermoplastic, PP, polyester, acrylonitrile butadiene styrene (ABD), natural rubber, polybutylene terephthalate (PBT), nylon, styrene butadiene rubber (SBR) block copolymer and thermosets (epoxy, polyester resins, PUR foam, PUR rubber, silicon rubber, ethylene propylene diene monomer rubber and neoprene)
UV-328	UV absorber in polymers (polyolefins, PUR, PVC, polyacrylate, unsaturated polyester, polycarbonate and elastomers), paints, lacquers, varnishes, wood coatings

POPs in the Construction Sector: Period of Use

The construction industry has been using POPs since the 1940s. While the use of most POPs has since been restricted, addressing their presence in existing buildings and their entry into the waste stream remains a key focus on the public policy agenda.

When engaging with stakeholders in the context of POPs application in the construction sector, it is vital to consider the historical periods when these chemicals were utilized in construction practices. Understanding the specific timeframes of POPs use not only helps identify relevant stakeholders, but also aids in data collection and inventory efforts. For POPs no longer in use, the focus should be on assessing their current in-use stock and managing waste and recycling effectively. For POPs still in use, a comprehensive lifecycle assessment is necessary.

This assessment encompasses the design, production, ongoing use and demolition of buildings where POPs can be present. Understanding the period of use is essential to ensure that buildings constructed during these periods are taken into consideration when identifying the stakeholders. *Table 2* provides an overview of periods of POPs use in construction.

Table 2 : Overview of the periods of use of POPs in the construction sector

Chemical	Current use	Former use	Period of use
C-decaBDE	■	■	1970s to present
C-pentaBDE (tetraBDE and pentaBDE)		■	1970s - 2000s
HBCD		■	1970s - 2020s
SCCPs (and MCCPs)	■	■	1970s to present
PCBs		■	1950s - 1970s
PCNs		■	1940s - 1980s
PFOA and PFOA-related compounds	■	■	1970s to present
PFOS and PFOS-related compounds	■	■	until 2000s*
PFHxS and PFHxS-related compounds		■	until 2020s
PCP		■	1940s - 2010s
POP Pesticides	■	■	1950s - 1990s**
Dechlorane Plus		■	1960s - 2020s
UV-328	■	■	1970s to present

Source: GGKP (2024c)

* Still in use in firefighting foam in fixed installations and fire extinguishers
** Still in use in some countries for indoor residual spraying

■ Use of chemical

POPs in the Construction Sector: Why Stakeholders?

POPs still used in the construction sector include SCCPs and MCCPs, c-decaBDE, Dechlorane Plus, UV328 and PFOA. To effectively manage these chemicals and those remaining inside the buildings and construction waste, it is crucial to consider the entire supply chain and all stages of the lifecycle, encompassing planning and design, procurement and production, distribution and storage, construction and commissioning, operation and use, and end-of-life stages. This approach ensures comprehensive identification of all stakeholders involved in the construction facility lifecycle. Understanding the stakeholders involved in each stage of this cycle is not merely a bureaucratic exercise; it is an essential step in ensuring the safety and sustainability of endeavours and managing demolition waste.

Here is why it matters:

Mitigating health and environmental risks
Identifying stakeholders – from buildings designers, regulatory bodies, importers and retailers to contractors to those unaware of POPs in construction – allows for a comprehensive assessment of the potential risks associated with POPs and other CoC and extended coverage for outreach. This knowledge supports tailored preventive measures to reduce health hazards and environmental contamination effectively.

Regulatory compliance
Various regulations, including multilateral environmental agreements (MEAs), govern the use of POPs and other CoC in construction and other sectors. Defining stakeholders helps ensure compliance with these regulations reducing legal liabilities.

Transparency and accountability
Clearly defining stakeholders fosters transparency in the construction process. It ensures that everyone involved is aware of the presence and consequences of POPs and other CoC, promoting collective accountability for their safe handling, and protection of the environment and human health.

Effective communication
Effective stakeholder management facilitates communication between different stakeholder groups. This open dialogue enables the sharing of knowledge, best practices and safety protocols related to POPs and other CoC, ultimately enhancing efficiency of Stockholm Convention on POPs and other MEAs.

Sustainability and reputation:
In today's environmentally conscious world, sustainable construction practices are highly valued. Engaging stakeholders in the management of POPs and other CoC aligns with sustainability goals, enhancing the industry's reputation and attracting environmentally responsible partners and clients.

POPs in the Construction Sector: Who Are the Stakeholders?

Table 3 below provides an overview of potential stakeholders directly and indirectly involved in the use and management of POPs and other CoC throughout a building's lifecycle.

Table 3: Relevant groups of stakeholders throughout the lifecycle of buildings

Throughout the Lifecycle	• Ministry of Construction, Ministry of Health, Ministry of Environment and Climate Change, Ministry of Gender, Children and Social Protection • Environmental agencies, Disaster management agency • Academic and research institutions • Community and neighborhood groups • Indigenous people • Youth, women and other gender groups • Civil society organizations

Planning and Design	**Procurement and Production**	**Distribution and Storage**

• Regulatory Bodies and Authorities
  ◦ Regulatory bodies and local government agencies that provide permits and ensure compliance with building codes
  ◦ Regulatory bodies and local government agencies that ensure development of the bidding/procurement requirements
• Project Management and Oversight
  ◦ Project owners and managers
  ◦ Procurement teams of project owners
  ◦ Government planning and development departments
• Industry and Technical Service Providers
  ◦ Construction companies
  ◦ Architects and designers
  ◦ Civil engineers
• Financial institutions
• End users or tenants
	• Regulatory Bodies and Authorities
	  ◦ Construction products regulation authority
	  ◦ National regulator for construction products
	  ◦ Ministry of Industry, Ministry of Forestry and Agriculture
	• Material Suppliers
	  ◦ Raw materials suppliers
	  ◦ Producers of raw materials and construction materials
	• Quality and Compliance Bodies
	  ◦ Quality control and testing laboratories
	  ◦ Certification bodies
	• Trade associations, Plastic associations, Construction products association
	• Companies deploying firefighting systems
	• Workers of the factories, production facilities
	• Corporate consumers (hotels, firefighting stations etc.)
	• Project owners and end users
		• Regulatory Bodies and Authorities
		  ◦ Departments in regulatory bodies responsible for safety and environmental standards related to the transportation and storage of construction materials
		  ◦ Ministry/Department of Trade
		• Material Suppliers and Distributors
		  ◦ Importers, retailers, distributors of raw materials and construction materials
		  ◦ Operators of warehouses and storage facilities of construction materials
		• Logistics and Transportation
		  ◦ Logistic companies
		  ◦ Workers in logistic companies
		  ◦ Custodians, warehouse managers, freight movers
		• Trade associations, Plastic associations
		• Construction companies

Construction and Commissioning	**Operation and Use**	**End of Life**

• Regulatory Bodies and Authorities
  ◦ Regulatory bodies and local government agencies that provide permits and ensure compliance with building codes and involved in commissioning processes
  ◦ Department supervising compliance with construction code
  ◦ Health and safety inspectors
• Industry and Technical Service Providers
  ◦ Construction companies
  ◦ Companies deploying firefighting systems
  ◦ Architects and designers
  ◦ Civil engineers
• Waste Management and Recycling
  ◦ Waste collection and recycling companies
  ◦ Construction waste pickers
• Project Management and Procurement
  ◦ Project owners and managers
  ◦ Procurement teams of project owners
• Construction site workers and builders
• End users or tenants
	• Regulatory Bodies and Authorities
	  ◦ Local government and regulatory authorities
	  ◦ Health and safety inspectors
	• Industry and Technical Service Providers
	  ◦ Construction companies (for maintenance and renovation)
	  ◦ Companies deploying firefighting systems
	  ◦ Utilities and service providers
	  ◦ Waste management companies
	  ◦ Emergency services
	  ◦ Environmental consultants
	• Facility and Property Management
	  ◦ Facility management
	  ◦ Property management companies
	  ◦ Maintenance contractors
	  ◦ Security personnel
	  ◦ Cleaning and maintenance crew
	• Building owners
	• Tenants or occupants
	• Building users
	• Community and neighborhood associations
		• Regulatory Bodies and Authorities
		  ◦ Waste management agency
		  ◦ Historical and cultural preservation authorities
		• Industry and Technical Service Providers
		  ◦ Contractors and deconstruction experts
		  ◦ Transportation services for removal of construction waste
		  ◦ Utility providers
		  ◦ Surveyors
		  ◦ Environment remediation specialists
		  ◦ Environmental consultants
		• Waste Management and Recycling
		  ◦ Waste management companies
		  ◦ Construction waste pickers
		  ◦ Recycling organizations
		• Project Managers overseeing deconstruction and demolition activities
		• Facility managers assisting in the deconstruction and demolition processes
		• Building owners
		• Community engagement specialists

Other Chemicals of Concern: Construction and Building Sector

POPs are just one group of pollutants in buildings and construction. *Table 4* highlights other key CoC relevant to other MEAs, outlining their primary uses in buildings and construction to support a synergistic approach to MEA implementation and integrated management of POPs and other CoC. For details, refer to the sectoral guidance (GGKP 2024c), the SAICM document "Chemicals of Concern in the Building and Construction Sector" (UNEP 2021) and in Huang et al. (2022).

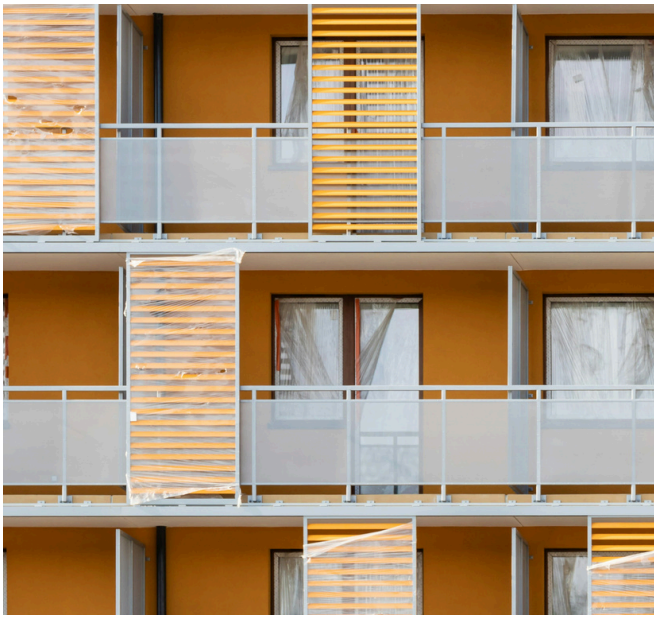

Table 4: Selected other CoC in buildings and construction related to MEAs or SAICM

CoC	MEA or SAICM	Short description	Use in buildings and construction	Relevance
Asbestos	Rotterdam Convention	Classified as carcinogenic	Used in a variety of building insulation materials	High
Polycyclic aromatic hydrocarbons (PAHs)	UNECE LRTAP Convention	Many PAHs are carcinogenic, mutagenic, or reprotoxic (CMR)	Treated wood (creosote); corrosion protection coating and paint; tar roofing; asphalt; tar-based adhesives	Medium
Phthalates	SAICM EPI (EDCs)	EDC (DEHP, DBP, BBP, DIBP)	Plasticizer in soft PVC flooring, wallpaper and cables	Medium
Halogenated organo-phosphorous flame retardants (OPFRs)	SAICM	Certain halogenated OPFR are carcinogen or reprotoxic	Major flame retardants in PUR and polyisocyanurate (PIR) foams; other plastics	Medium
CFCs, HCFCs, HFCs	Montreal Protocol	Ozone depleting substances; GHGs	Blowing agent present in insulation foams and air conditioners	High
Lead	Lead in paints is an EPI under SAICM	Adverse effects in all age groups particularly on the developing nervous system of children	Pigments in paints: stabilizers in PVC (window profiles, pipes, fittings, flooring, and roofing); lead sheeting for wall cladding, noise attenuation and damp proofing, lead pipes	High
Mercury compounds	Minamata Convention	Harms the nervous system, brain, heart, kidneys; impacts neuro development	Used in lamps and as catalyst in PU elastomers; contained in ash fillers	Medium
Tributyltin compounds	Rotterdam Convention Annex III	Neurotoxic and immunotoxic	Biocides in anti-fouling paints, preservatives for wood and others. Organotin stabilizers impurity (PVC)	Medium
Manufactured nano-materials	EPI under SAICM	The combination of particle size with certain hazards may affect impacts	Various uses	Unknown

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