

Global NIP Update Webinar “Activity Options for Action Plans for Stockholm Convention NIPs: <sup>1</sup>  
Brominated, chlorinated, and other POPs plastic additives”, 22. January 2026, 14:00 -16:30 CET



# Action Plan Considerations for Management and Control of POPs Plastic Additives and related Plastics and Resources in Major Sectors

**Dr. Roland Weber**

POPs Environmental Consulting,  
73527 Schwäbisch Gmünd, Germany

roland.weber10@web.de

<https://www.researchgate.net/profile/Roland-Weber-2>



A wide range of POPs have been used in **the three sectors** (EEE, transport and construction) and for plastic additive POPs (POP-BFRs, DP and UV-328) they were the major use, for SCCP/MCCP a main use.

## Master format bearbeiten

| POP (main production & use period)*                              | Building & Construction Sector | Electronics          | Transport Sector |
|------------------------------------------------------------------|--------------------------------|----------------------|------------------|
| <b>c-PentaBDE (1970-2004)</b>                                    | Former use                     | Minor former use     | Major former use |
| <b>c-OctaBDE (1970-2004)</b>                                     | Minor former use               | <b>Major use</b>     | Minor former use |
| <b>decaBDE (since 1970s)</b>                                     | <b>Major use</b>               | <b>Major use</b>     | <b>Major use</b> |
| <b>HBCD (1980 to 2021)</b>                                       | <b>Major former use</b>        | Minor former use     | Minor former use |
| <b>HBB (1970 to 1976)</b>                                        | Not relevant                   | Minor former use     | Minor former use |
| <b>SCCP (Since 1930s)</b>                                        | <b>Major use</b>               | Minor use            | Minor use        |
| <b>MCCP (Since 1930s)</b>                                        | <b>Major use</b>               | 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)                                               | <b>Major former use</b>        | Former use           | Minor former use |
| PCN (1930 to 1970s)                                              | Minor former use               | Minor 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     |
| <b>Decabrom Plus (DBP)</b>                                       | Use                            | Use                  | Use              |

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



## Managing POPs in plastics can trigger better plastic management

- More than 50% of plastic stocks are in electronics, transport & buildings and a part contains POPs.
- Inventory and the right activities to managing POPs in major affected plastic use sectors can improve the management of plastics in these sectors and result in depollution of these plastics.
- Action plans on POPs and their implementation can become an excellent synergy with the upcoming Plastic Treaty! The POPs management in these sectors requires the overall management of these waste categories and the related plastics.
- And we do not have a plastic treaty yet and it is not clear if it will become a strong treaty including chemicals. So for the time being the Stockholm Convention and the Basel Convention can fill this gap with ambitious action plans.

Primary plastic production by industrial sector, 2015  
Primary global plastic production by industrial sector allocation, measured in tonnes per year.

Our World  
in Data

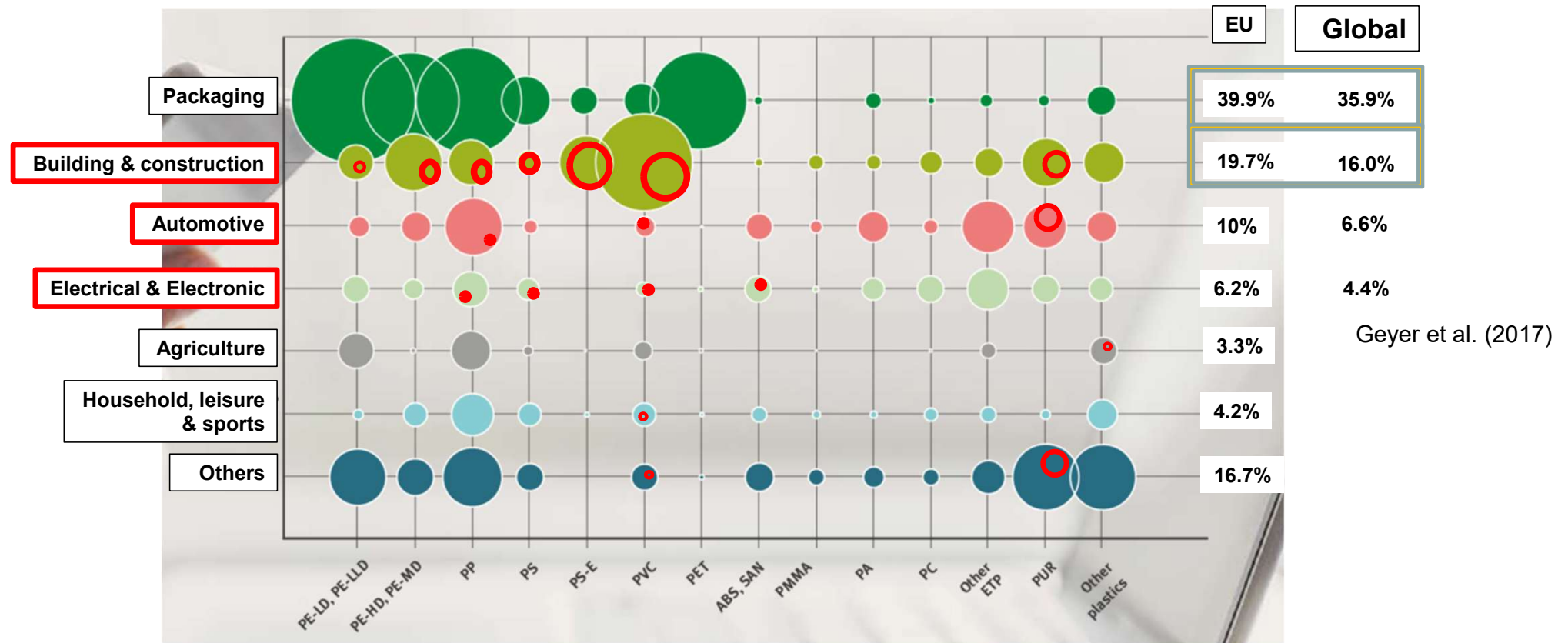


Geyer et al. (2017) 10.1126/sciadv.1700782

Reproduced by National Graphics (Issue June 2018)

# Major plastics and their applications and link to POP plastic additives <sup>4</sup>

- Only a share of plastics in major use sectors (EEE, transport, buildings) contains POPs additives.
- For recycling, the polymers in the major use sectors (here compiled for Europe) need to be separated.
- POP/CoC use-frequency often unknown – can be high as for EPS/XPS in buildings or low. Need analysis!



PlasticsEurope (2017) <https://plasticseurope.org/wp-content/uploads/2021/10/2017-Plastics-the-facts.pdf>

**Please note:** The red circles were added to the original figure and indicate that these polymers in these uses are known to partly contain POPs.



## Assessment and management of other chemicals of concern

- There are a **range of other chemicals of concern (CoC)** in e.g. **EEE/WEEE** related to other **MEAs** which can be addressed in a synergistic way in **integrated action plans and management**.
- This includes e.g., **F-gases** in **refrigerators/freezer and AirCon** which are **partly ODS and GHGs**.

| Chemical of Concern                            | MEA; SAICM/GFC                        | Short description                                                         | Use in EEE                                                           | Relevance   |
|------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------|-------------|
| <b>Heavy metals</b> (e.g., Hg, Pb, Cd, Hg, Sb) | GFC, Minamata Convention, <b>UNEA</b> | Toxic metals, neurodevelopmental disorder                                 | Used in a variety of EEE products                                    | <b>High</b> |
| <b>BFRs</b>                                    | GFC, ECHA                             | Many BFRs are PBTs                                                        | Flame retardants                                                     | <b>High</b> |
| <b>Polycyclic aromatic hydrocarbon (PAHs)</b>  | UNECE LRTAP Convention                | Many PAHs are carcinogenic, mutagenic, or toxic for reproduction          | Unintentional trace contaminants in black plastics and rubber parts; | Medium      |
| <b>All other PFASs (not POPs)</b>              | GFC Issue of concern                  | very persistent, very mobile (compounds or degradation product)           | FR(PFBS); NIAS in fluoropolymers (thermal degradation products)      | Medium      |
| <b>Phthalates</b>                              | GFC Issue of concern                  | Certain phthalates are EDCs and reprotoxic                                | Plasticiser in cables and other plastic parts (mainly PVC)           | Medium      |
| <b>Halogenated OPFR</b>                        | GFC Issue of concern                  | Certain halogenated OPFR are carcinogen or toxic for reproduction         | Major flame retardants in casings and other plastic parts            | Medium      |
| <b>Asbestos</b>                                | Rotterdam Conv. Annex III             | Classified as carcinogenic to humans                                      | Electrical panels, wire insulation, cable wrap and electrical paper  | Medium      |
| <b>CFCs, HCFCs, HFCs</b>                       | Montreal Protocol; UNFCCC             | Ozone depleting substances; GHG                                           | Refrigerants in air conditioner, cooling equipment; heat pumps       | <b>High</b> |
| <b>Plastics</b>                                | Plastics Treaty; Basel Convention     | Environmental/marine pollutant; haz. additives; source open waste burning | Casings, cables, printed circuit boards and others                   | <b>High</b> |



United Nations  
Framework Convention on  
Climate Change



MINAMATA  
CONVENTION  
ON MERCURY

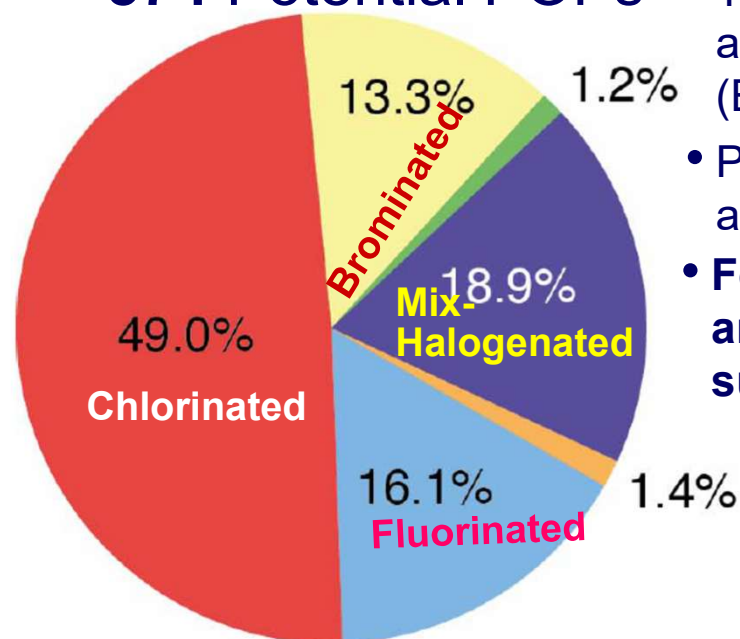
UNEP (2024) Sectoral guidance for  
inventory of POPs and other CoCs

# How many potential POPs are in use?

Approx. 100,000 chemicals in chemical databases have been scientifically evaluated according to the POP criteria in Annex D of the Stockholm Convention, with the following results:

## 574 Potential POPs

- Today many chemicals in use have POPs-like/PBT properties and many of them are used in consumer goods often in plastics (EEE, cars, buildings, furniture, textiles, synthetic carpets).
- PBTs in products pose a risk for human health, the environment and the recycling/recovery flows.
- **For an improvement of the situation, chlorinated, brominated and fluorinated PBTs need to be managed and systematically substituted with green & sustainable alternatives (Action Plan).**



|                  |             |
|------------------|-------------|
| iodinated        | fluorinated |
| several halogens | chlorinated |
| no halogens      | brominated  |



Global Framework  
on Chemicals



<https://wedocs.unep.org/items/7b58b5e6-25f9-4a5a-b512-37f7cfc2f6e6>

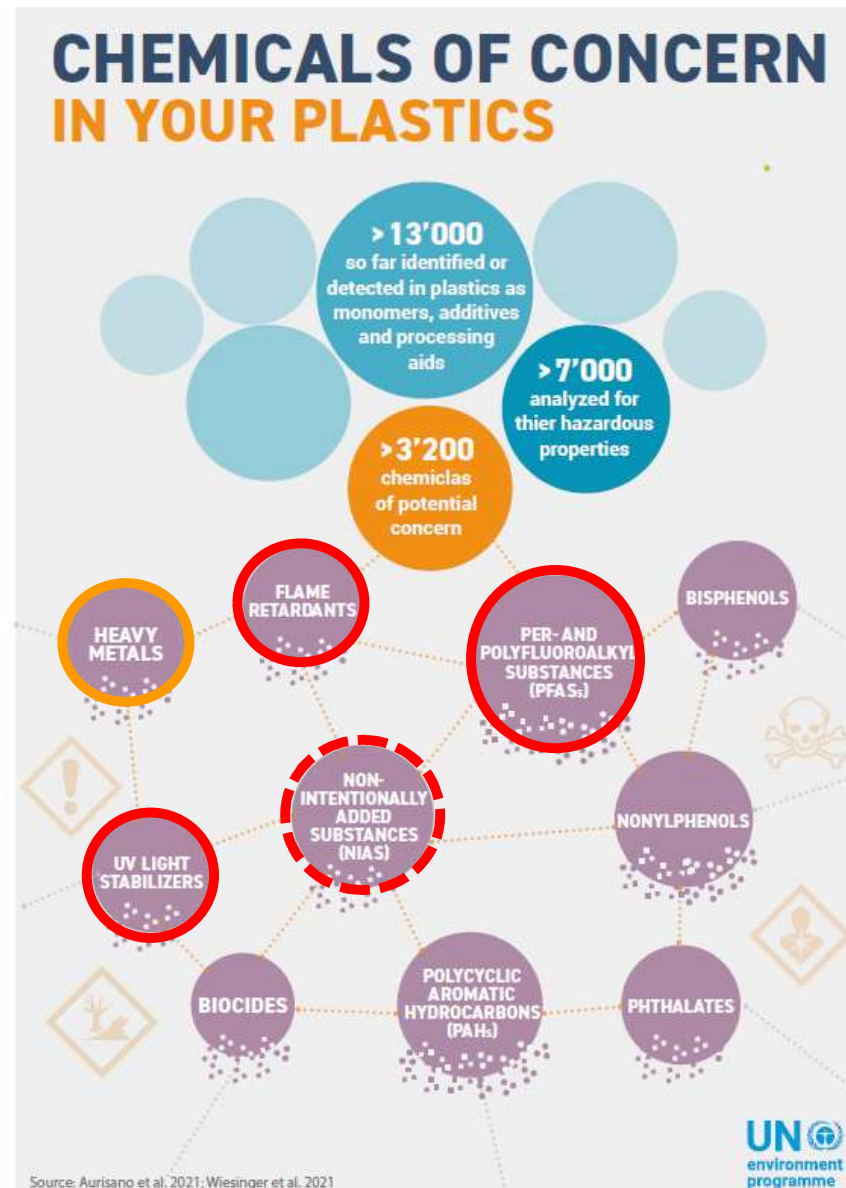


Scheringer et al. (2012) Atmos. Pollut. Res. 3, 383–391.

# How many chemicals of concern are used/present in plastics?

IPCP prepared for UNEP in 2023 the report “*Chemicals in plastics – A Technical Report*” with following key findings:

- >13,000 (update 16325) chemicals are present in plastics (5,776 additives, 3,498 processing aids, 1,975 starting substances & 1,788 non-intentionally added substances).
- >3,200 (update 4200) are chemicals of potential concern (with certain hazard properties considering GHS/CLP).
- Need of sustainable alternatives for clean material cycles.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

Current Opinion in  
Green and Sustainable Chemistry

<https://doi.org/10.1016/j.cogsc.2021.100513>

**Enabling a circular economy for chemicals in plastics**

Nicolò Aurisano<sup>1</sup>, Roland Weber<sup>2</sup> and Peter Fantke<sup>1</sup>

## Deep Dive into Plastic Monomers, Additives, and Processing Aids

Helene Wiesinger,<sup>\*</sup> Zhanyun Wang,<sup>\*</sup> and Stefanie Hellweg

<https://doi.org/10.1021/acs.est.1c00976>

**ENVIRONMENTAL**  
Science & Technology

**Analysis** <https://doi.org/10.1038/s41586-025-09184-8>

## Mapping the chemical complexity of plastics

L. Monclús<sup>1,2</sup>, H. P. H. Arp<sup>1,2</sup>, K. J. Groh<sup>3</sup>, A. Faltynkova<sup>1</sup>, M. E. Løseth<sup>2</sup>, J. Muncke<sup>4</sup>, Z. Wang<sup>5</sup>,  
R. Wolf<sup>2</sup>, L. Zimmermann<sup>4</sup> & M. Wagner<sup>1</sup>

## Action Plan consideration: Waste management and resource management

- The direct exposure risk from POPs in stored or transported plastic waste is relatively small (<<PCB s or pesticides). Therefore the waste plastics containing POPs need not necessarily be categorized as hazardous waste (e.g. HBCD in EPS in Germany).
- An aim of the SC BAT/BEP guidance is to separate POPs-containing plastic fraction for ESM and to facilitate the recycling of non-impacted plastic materials (please see BAT/BEP).

### An action plan for POPs plastic additives should be a basis for:

- An environmentally sound management of POPs impacted plastics in the major affected sectors.
- **The recycling and recovery of non-impacted plastics** and polymer fractions in these sectors and that the recycled materials do not lead to exposure of recyclers and consumers (**no recycling into sensitive uses since the separation is never perfect**; see SC PBDE BAT/BEP guidance).
- **Support the overall waste management and recycling** of these major waste categories (WEEE, ELVs, CDW), to prevent contaminated sites and remediate contaminated sites already present.

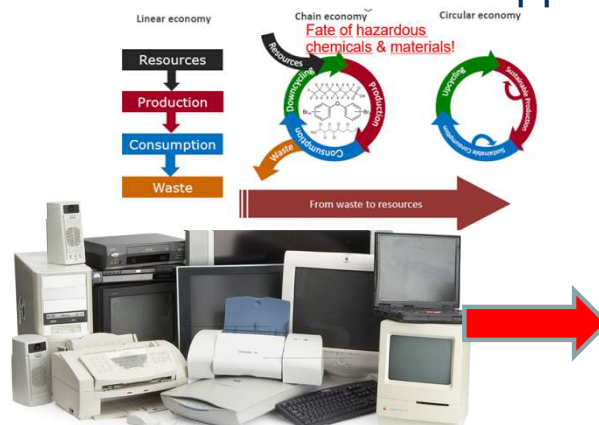


# 1. Regulatory framework for POP-BFRs and other POPs plastic additives and impacted product/waste categories

**Objective:** Established regulatory frame for management of POP-BFRs, UV-328, Dechlorane Plus, and related articles and waste categories including robust financing.

## Recommended activity options:

- Inclusion of PBDEs, PBB, HBCD, UV-328, and Dechlorane Plus in the list of banned or restricted substances. Consider needed exemptions when restricting these POPs.
- Assessment of regulatory framework for these substances and the products and waste sectors containing these substances (WEEE, ELV and CDW) and need of improvement.
- Set low POP content limits and unintentional trace contaminant limits for POP-plastic additives.
- **Assessment of the flame retardant strategy** of the EU/ECHA to regulate certain chemicals as a group and assess the possible usefulness of the approach for the country.



# 1. Regulatory framework for POP-BFRs and other POPs plastic additives and impacted product/waste categories

**Some background information on the recommended activity options:**

- **Assessment of the flame retardant strategy of the EU/ECHA to regulate certain chemicals as a group and assess the possible usefulness of the approach for the country.**

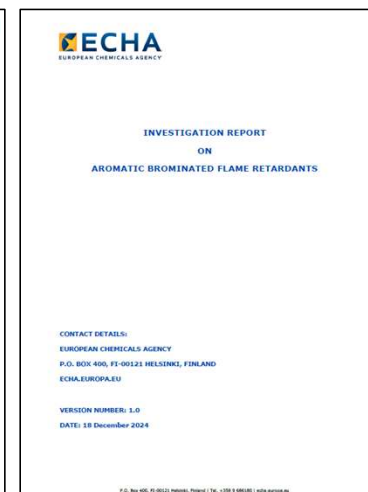
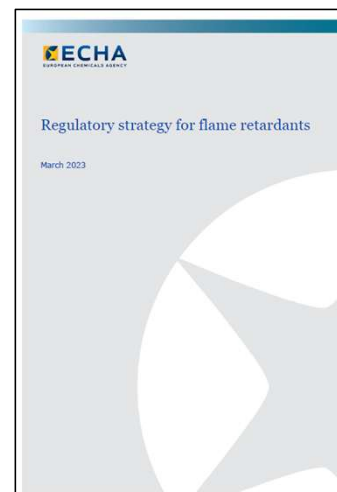
**Background: 03/2023 ECHA published regulatory strategy for flame retardants.**

12/2024, ECHA published a **report on aromatic brominated flame retardants (ABFR)**, highlighting that the use in articles poses significant environmental risks, as ABFRs exhibit PBT properties or are vPvB. The report also noted that some alternatives to ABFR, including organophosphorus flame retardants (OPFR), may present hazardous characteristics for human health and the environment.

- The EU Commission has now given ECHA a dual mandate:
  - **Preparation of a restriction dossier on all non-polymeric additive aromatic BFR.**
  - Preparation of an investigation report on organophosphorus flame retardants (OPFR) and other flame retardants. Report expected (12/2026).

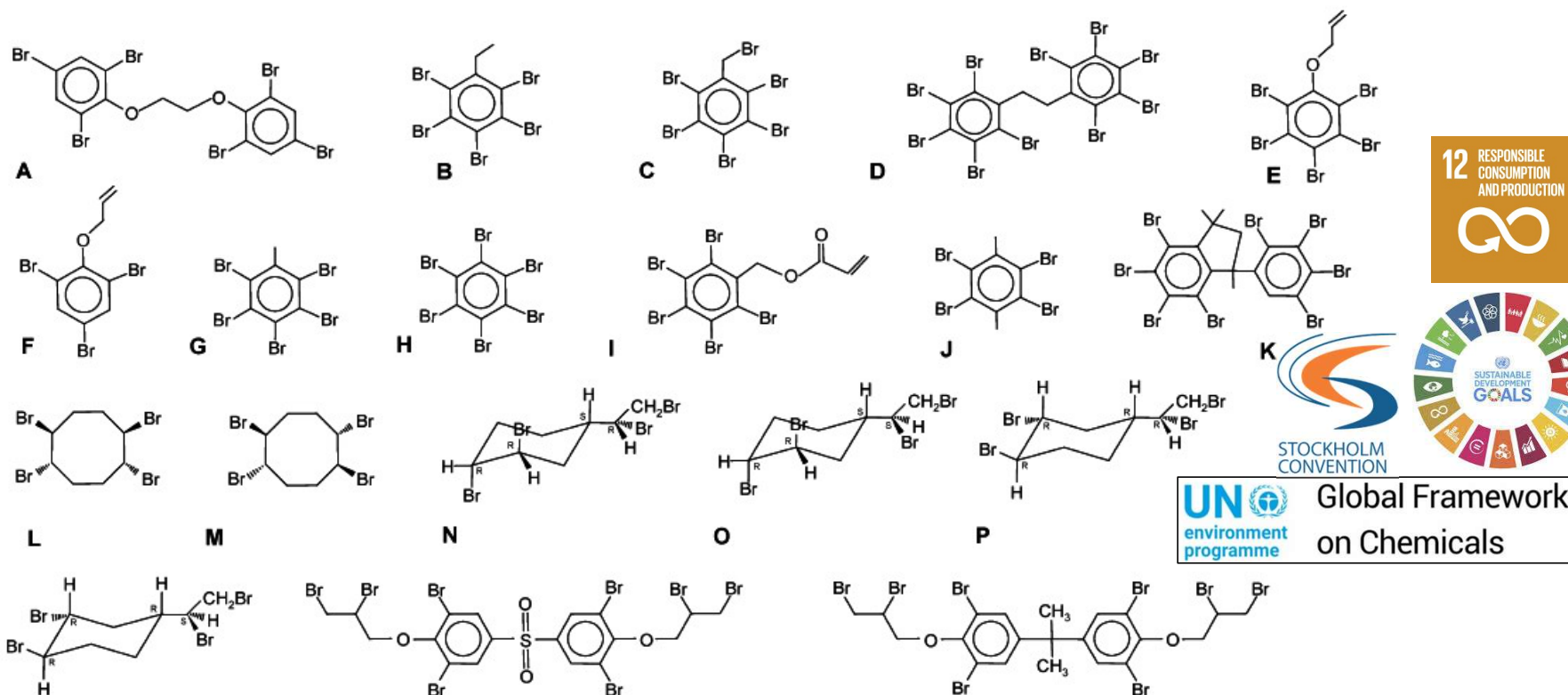
<https://echa.europa.eu/de/-/echa-identifies-certain-brominated-flame-retardants-as-candidates-for-restriction>

[https://echa.europa.eu/documents/10162/17233/rest\\_aromatic\\_brominated\\_flame\\_retardants\\_investig](https://echa.europa.eu/documents/10162/17233/rest_aromatic_brominated_flame_retardants_investig)



## Other Brominated Flame Retardants (BFRs)

- Approx. 75 BFR on the market as alternatives (Fisk et al 2003).
- Many of them are persistent polybrominated aromatic chemicals
- The European Chemical Agency: “Regulatory Strategy for Flame Retardants” aim to restrict all aromatic BFR additives <https://echa.europa.eu/de/-/echa-identifies-certain-brominated-flame-retardants-as-candidates-for-restriction>



Structures of BFRs addressed by Gauthier (Gauthier, Potter *et al.* ES&T 2009)



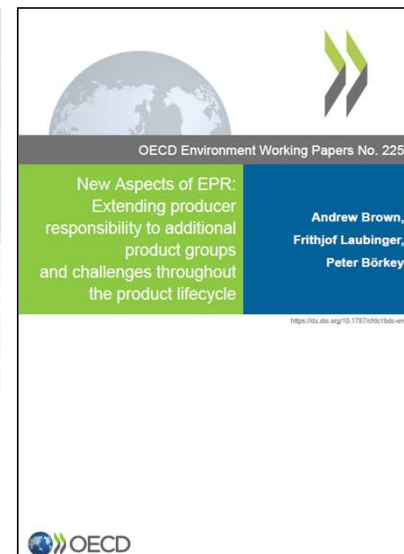
# 1. Regulatory framework for POP-BFRs and other POPs plastic additives and impacted product/waste categories 13

**Objective:** Established regulatory frame for management of POP-BFRs, UV-328, Dechlorane Plus, and related articles and waste categories **including robust financing.**

**Background:** Sustainable financing is essential for environmentally sound management of waste. One of the main instruments is extended producer responsibility (EPR).

## **Recommended activity options:**

- **Development of regulatory frames of POPs-containing products and wastes considering EPR.**
  - Development of regulatory frame for EEE/WEEE considering EPR (see e.g. EU WEEE Directive; Regulations in Ghana).
  - Development of a regulatory frame for vehicles considering EPR (importation, ELV management; e.g. EU ELV Directive).
  - Development of regulatory frame for the construction sector considering including EPR (see OECD document; EU docs).
- We invited today Mr. Alexander Batteiger the Head of Global Action Partnership for EPR @OECD, who will give some insights on international EPR activities and support options.



## 2. Refining of the inventory for POPs plastic additives, other CoCs, and resources of related major products and wastes

**Objective:** Robust inventory of the use of POPs plastic additives (PBDEs, HBCD, Dechlorane Plus, UV-328) and the stock and wastes of related products with appropriate databases for information management and for waste management planning.

### Recommended activity options:

**Develop or refine sectoral inventories considering all relevant POPs, other chemicals of concern and major resources for circular economy:**

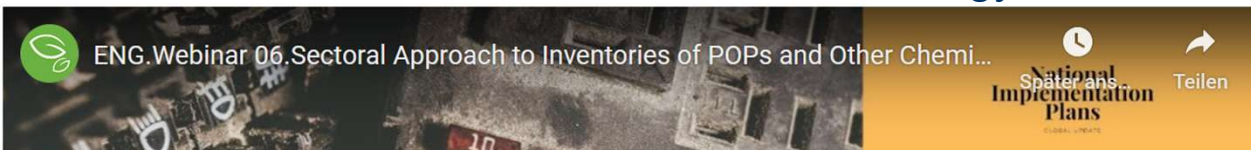
- Inventory of the current production & use of POPs plastic additives (UV-328, DP, DecaBDE, ABFRs)
- Refine inventory for POPs, other CoCs and resources in EEE/WEEE (dynamic MFA/SFA).
- Refine inventory for POPs, other CoCs and resources in vehicles (dynamic MFA/SFA).
- Develop inventory for POPs in buildings & construction (POP plastic additive and POP in wood) as well as other CoCs and resources (dynamic MFA/SFA).
- Assess the need of POPs inventory in other (minor) uses (e.g. textiles, furniture) depending on flammability standards.
- Data management for stocks and waste containing POPs, plastics and resources.



## 2. Refining of the inventory for POPs plastic additives, other CoCs, and resources of related major products and wastes

**Objective:** Robust inventory of the use of POPs plastic additives (PBDEs, HBCD, Dechlorane Plus, UV-328) and the stocks and wastes of related products and resources with appropriate databases for information management and for waste management planning.

- **Recorded GGKP webinar on Sectoral Approach to inventories of POPs and CoCs.**
- **Recorded GGKP webinar on the methodology to address gaps in POP data and statistical offices.**



<https://www.greenpolicyplatform.org/webinar/sectoral-approach-inventories-pops-and-other-chemicals-concern-construction-electronics-and-vehicles>

<https://www.youtube.com/watch?v=UjQvLt-x1ms>

A YouTube video player thumbnail. The title is 'Global NIP Update - "Sectoral approach to inventories of POPs and other chemicals of concern in construction, electronics, and vehicles"'. The date and time are 'Thursday, 01 August 2024, Online (Zoom) 14:00-16:00 Geneva (CEST) (GMT +2)'. It is hosted by 'Green Growth Knowledge Partnership (GGKP)'. At the bottom, it says 'Ansehen auf YouTube' with a play button icon.

### Speakers:

Mr. Roland Weber, Int  
Environmental Consult

### Modertor:

Ms. Anastasiya Buch  
Project Assistant, GGKP

ENG. Strengthening the Collaboration with National Statistical Office

<https://www.greenpolicyplatform.org/webinar/strengthening-collaboration-national-statistical-offices-address-gaps-pops-data-and-related>

**Global NIP Update - "Strengthening the Collaboration with National Statistical Offices to Address Gaps in POPs Data and Related Information"**

Tuesday, 19 November 2024, Online (Zoom)

14:00-16:00 Geneva (CET) (GMT +1)

Hosted by: Green Growth Knowledge Partnership (GGKP)

Ansehen auf YouTube

### GUIDANCE

Guiding Methodology for  
Strengthening Collaboration with  
National Statistical Offices to  
Address Gaps in POPs Data and  
Related Information

GGKP, 2024

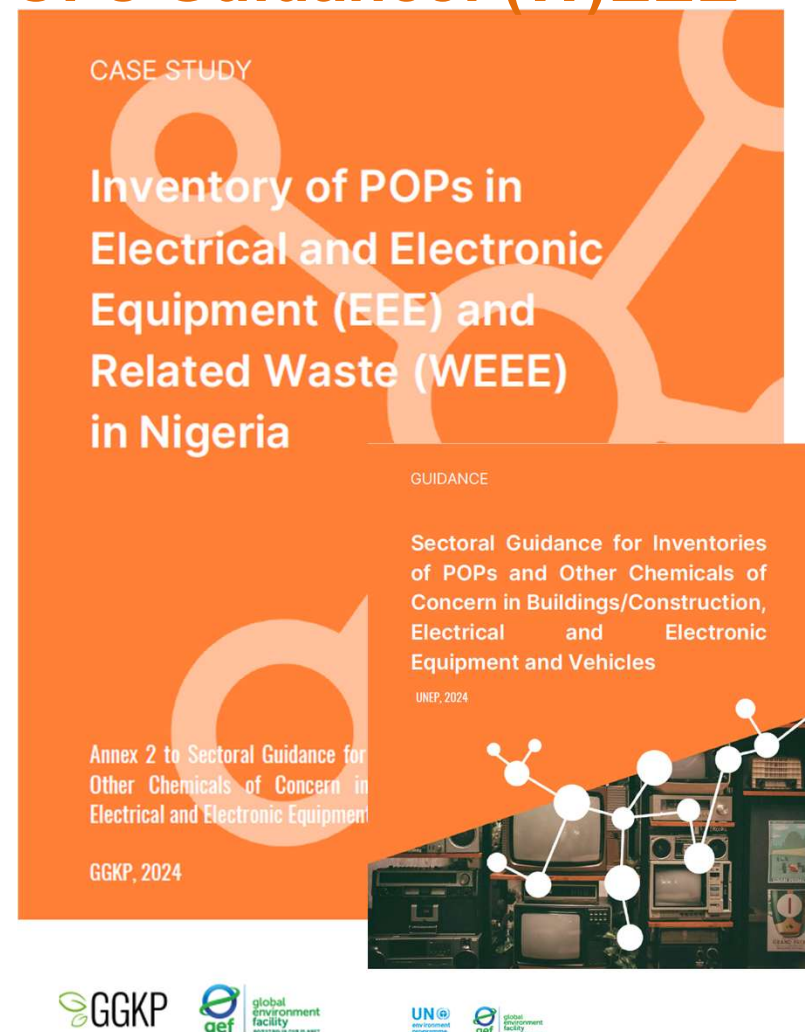
# Inventory Case Study Annexes Sectoral POPs Guidance: (W)EEE 16

## Annex 2: Inventory of POPs in Electrical and Electronic Equipment (EEE) and Related Wastes (WEEE) in Nigeria<sup>1</sup>

Tables 1

Figures 2

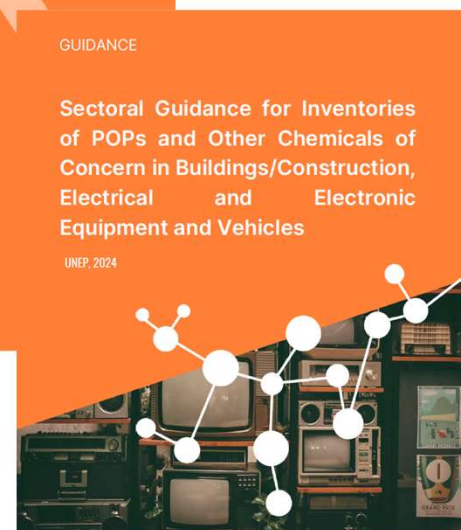
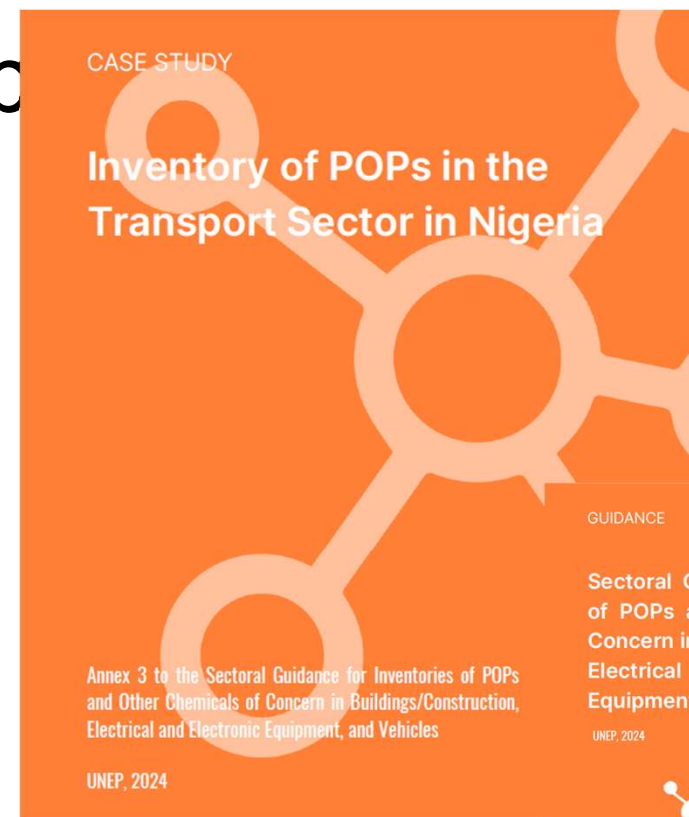
|       |                                                                             |    |
|-------|-----------------------------------------------------------------------------|----|
| 1     | Introduction                                                                | 3  |
| 2     | Step 1: Planning of the inventory and identification of stakeholders        | 3  |
| 3     | Step 2: Choosing inventory methodology                                      | 4  |
| 4     | Step 3: Collecting and compiling the data                                   | 5  |
| 4.1   | Tier 2 inventory approach: Inventory based on Nigerian EEE/WEEE inventory   | 5  |
| 4.1.1 | EEE/WEEE inventory data Nigeria                                             | 5  |
| 4.1.2 | PBDEs in import of EEE/WEEE and time trends                                 | 6  |
| 4.1.3 | Other POPs in EEE/WEEE plastic (HBCD, SCCPs, MCCPs, and Dechlorane Plus)    | 8  |
| 4.1.4 | Other chemicals of concern in EEE/WEEE                                      | 9  |
| 4.2   | Tier 3 inventory approach: Measurement of PBDEs in CRT polymers             | 10 |
| 4.2.1 | Calculation of impact factors of CRTs (TVs and PCs)                         | 10 |
| 4.3   | Tier 3 Material/substance flow analysis of PBDE containing EEE/WEEE plastic | 11 |
| 4.3.1 | Introduction to the material and substance flow analysis                    | 11 |
| 5     | Step 4: Managing and evaluating data                                        | 15 |
| 5.1   | Evaluation of data and further improvement of the data                      | 15 |
| 5.2   | Gaps and uncertainties and further improvement                              | 15 |
| 6     | Step 5: Inventory report and managing of the data                           | 16 |



<https://www.greenpolicyplatform.org/case-studies/inventory-pops-electrical-and-electronic-equipment-eee-and-related-waste->

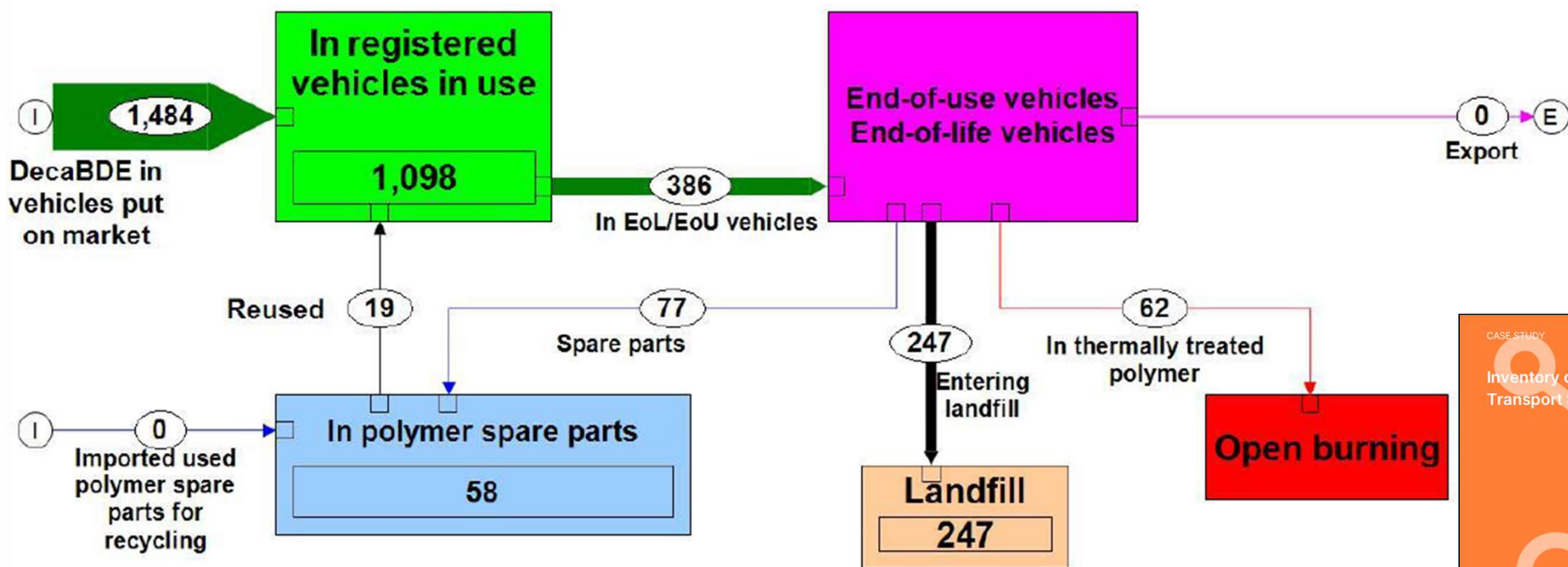
## Annex 3<sup>1</sup>: INVENTORY OF POPs IN THE TRANSPORT SECTOR IN NIGERIA

|                                                                                                                     |           |
|---------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Acknowledgement:</b>                                                                                             | <b>1</b>  |
| <b>1 Introduction</b>                                                                                               | <b>2</b>  |
| <b>2 STEP 1: Planning of the inventory and identification of stakeholders</b>                                       | <b>2</b>  |
| <b>3 STEP 2: Choosing the inventory methodology</b>                                                                 | <b>3</b>  |
| <b>4 STEP 3: collecting and compiling the data</b>                                                                  | <b>4</b>  |
| 4.1 Tier 1 preliminary assessment .....                                                                             | 4         |
| 4.2 Tier 2 inventory – inventory based on available and estimated data .....                                        | 4         |
| 4.2.1 Methodology for Data Collection .....                                                                         | 4         |
| 4.2.2 Inventory of PBDEs listed 2009 and decaBDE in vehicles in Nigeria .....                                       | 7         |
| 4.2.3 Estimate of HBCD in vehicles in Nigeria .....                                                                 | 11        |
| 4.2.4 Estimate of SCCPs and MCCP in vehicles in Nigeria .....                                                       | 11        |
| 4.2.5 PFOS, PFOA and PFHxS in vehicles in Nigeria .....                                                             | 12        |
| 4.2.6 Halogenated organophosphorus flame retardants .....                                                           | 13        |
| 4.2.7 Inventory summary of POPs amount in the transport sector .....                                                | 14        |
| 4.2.8 Total polymer in the transport sector .....                                                                   | 14        |
| 4.2.9 Other chemicals of concern in the transport sector .....                                                      | 15        |
| 4.2.10 Assessment of POPs in other transport sectors in Nigeria (planes and trains) .....                           | 15        |
| 4.3 Tier III: Material and substance flow analysis of POPs and POP-containing materials from transport sector ..... | 16        |
| 4.3.1 Material and substance flow analysis .....                                                                    | 16        |
| 4.3.2 Overview of flows and stocks of POPs in the transport sector Nigeria .....                                    | 16        |
| <b>5 STEP 4: Managing and evaluating data</b>                                                                       | <b>21</b> |
| 5.1 Evaluation of data and further improvement of the data .....                                                    | 21        |
| 5.2 Uncertainties and improvements for developing a more robust inventory .....                                     | 21        |
| 5.3 Managing the data .....                                                                                         | 21        |
| 5.4 Data gaps and need for improvements (preliminary action plan consideration) .....                               | 22        |
| <b>6 STEP 5: Inventory report</b>                                                                                   | <b>22</b> |

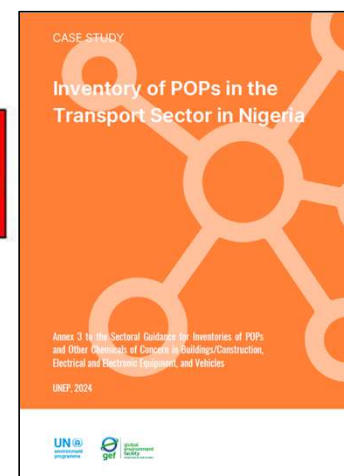


# Inventory Case Study Annexes Sectoral POPs Guidance: Transport

- The dynamic Substance Flow Analysis showed that the largest share of decaBDE in Nigeria's transport sector was still in registered vehicles (1098 t; 74%) in use in the inventory year 2020.
- In the waste stream it is estimated that most of ELV plastics/textiles containing decaBDE entered landfills (64%) followed by the reuse in spare parts (20%) and open burning (16%).

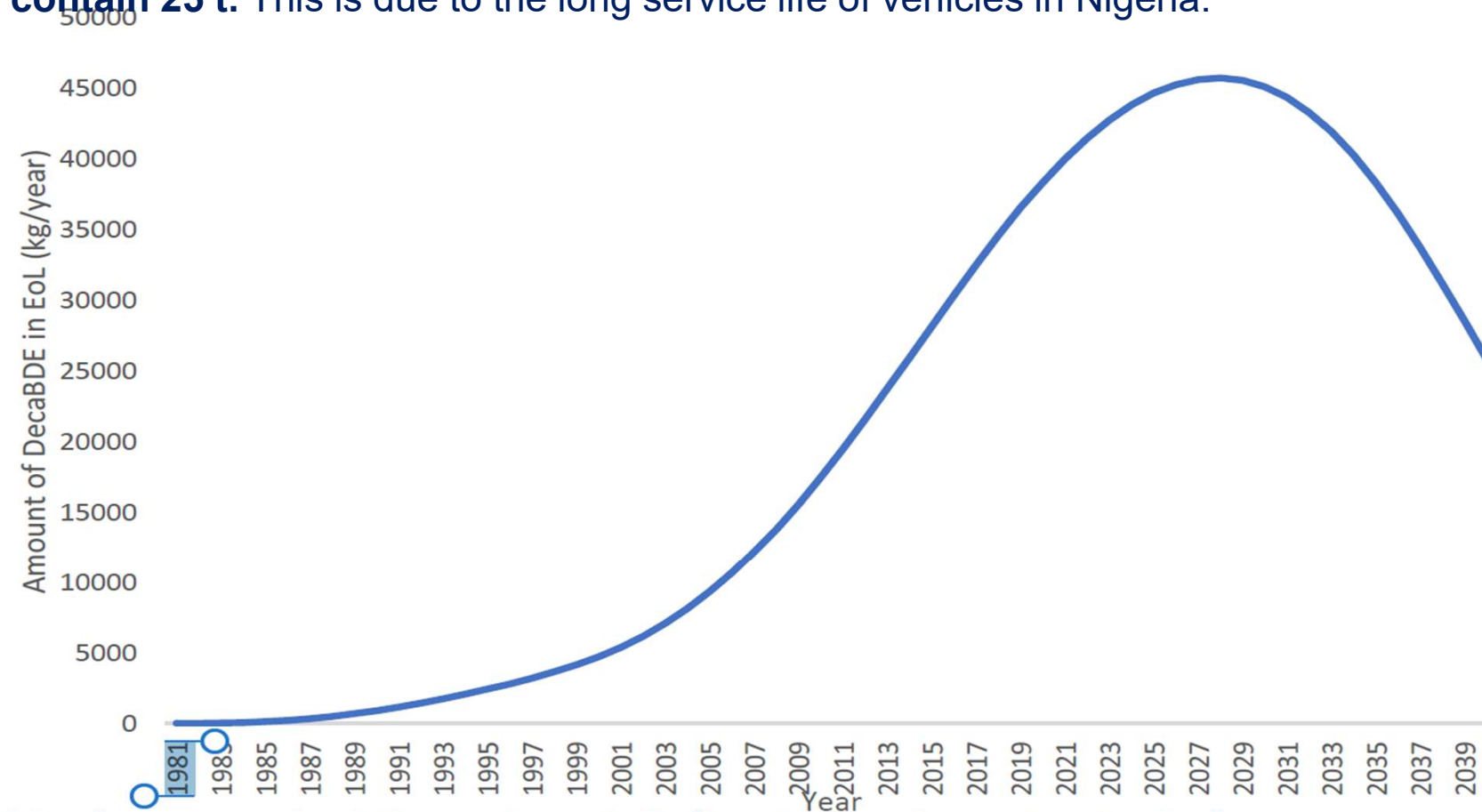


**LEGEND**  
Stocks [t]

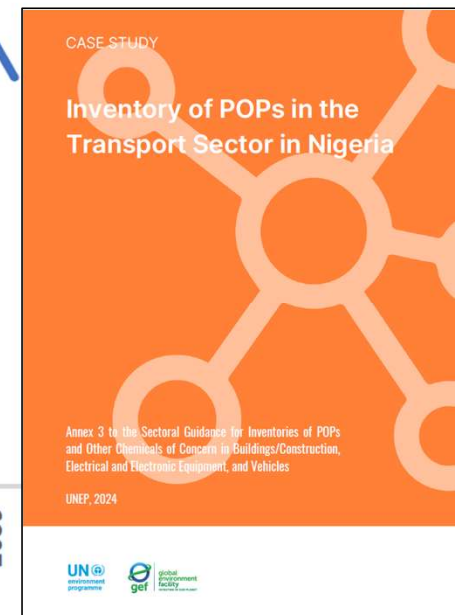


# Inventory Case Study Annexes Sectoral POPs Guidance: Transport<sup>19</sup>

The **dynamic SFA** also revealed that the peak decaBDE in Nigeria's vehicles that reach their end of life is **in 2028 with approximately 46 tonnes**. The amount of **decaBDE in ELVs in 2040 is estimated to still contain 25 t**. This is due to the long service life of vehicles in Nigeria.

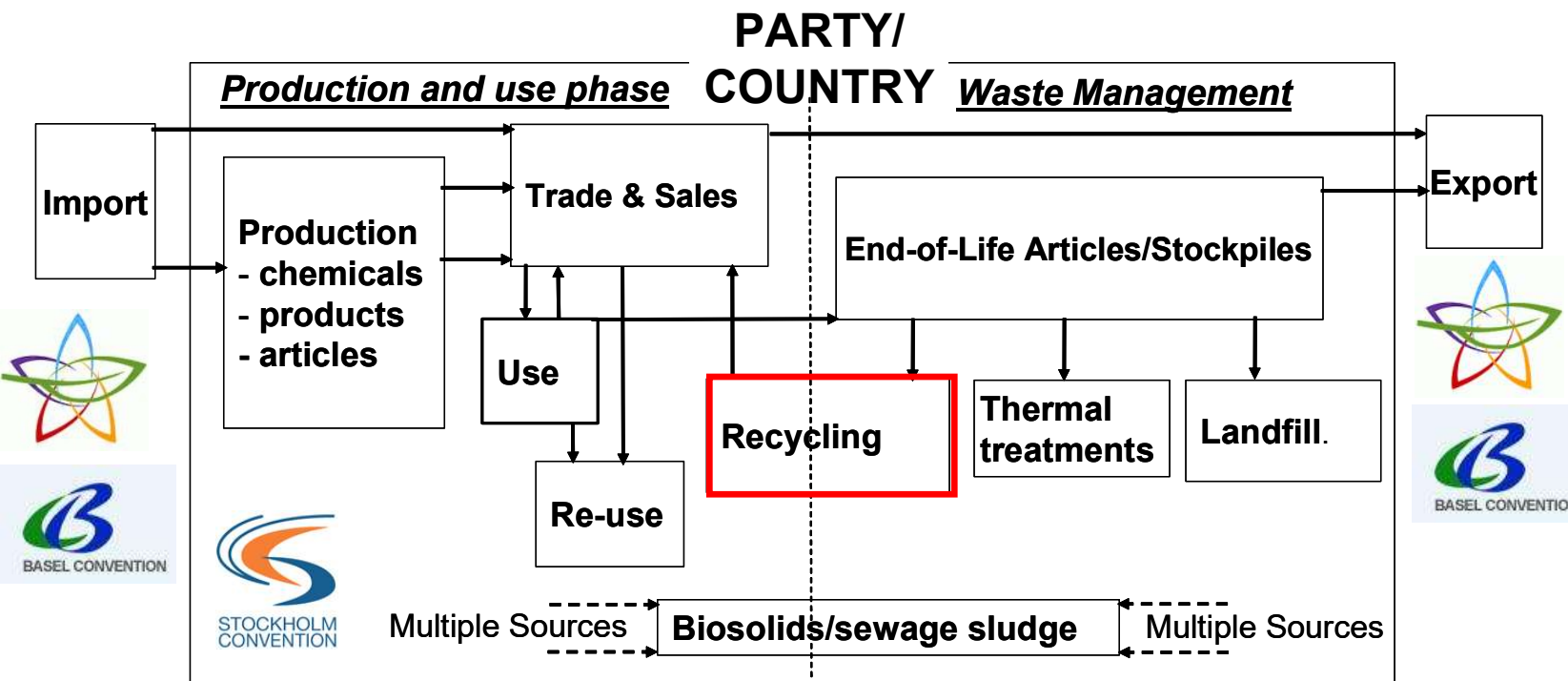


<https://www.greenpolicyplatform.org/case-studies/inventory-pops-transport-sector-nigeria>



# Master title format bearbeiten

- Action plans should address POPs, plastic additives and other CoC in products along the entire life cycle.
- Control should start with import (synergy Rotterdam; **but challenges to control POPs in products**) and production and end with waste management and recycling.



EU research project RiskCycle

The Handbook of Environmental Chemistry 23  
Series Editors: Damià Barceló · Andrey G. Kostianoy

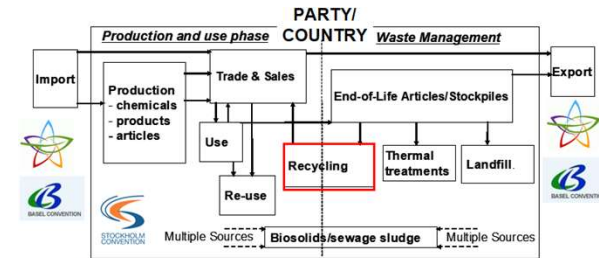
Bernd Bilitewski  
Rosa Mari Darbra  
Damià Barceló Editors

## Global Risk-Based Management of Chemical Additives II

Risk-Based Assessment and  
Management Strategies

Springer

### 3. Life cycle management of stocks and waste in major sectors that contain POPs-plastic additives (1)



**Objective:** Sound Life Cycle Management of product and waste categories that contain POPs plastic additives (EEE/WEEE, ELVs, CDW, and possibly textiles, furniture et al.) established.

#### Recommended activity options:

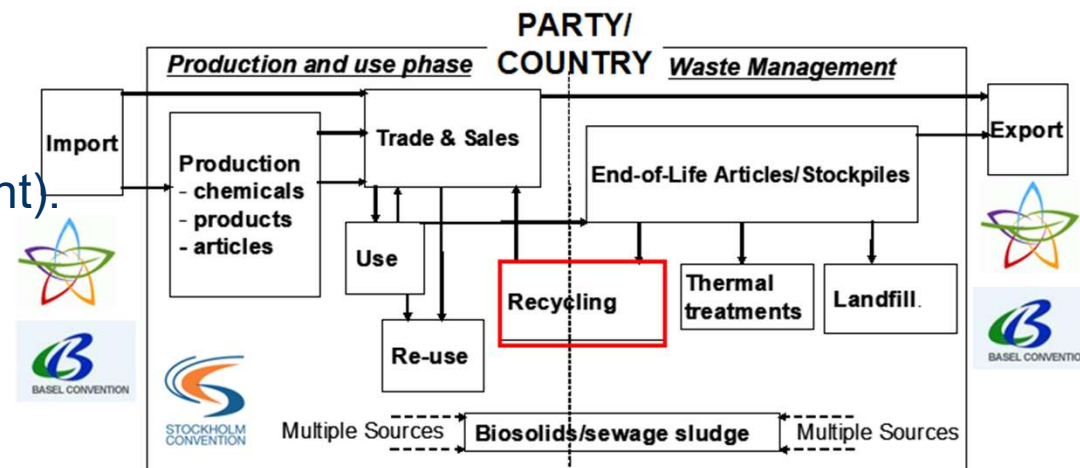
- Compilation of information on the management of products and waste containing POPs in major sectors, and the fate of these POPs and other pollutants.
- **Assessment of recycling and separation options for POP impacted plastic products** and waste categories and possible integration in a general plastic management/recycling strategy.
- **Assessment of the management and destruction options** for waste plastics of major waste categories that contain POPs (WEEE, ELV, and CDW) in the county and the region.
- **Environmentally sound management** of POP/CoC containing **plastics & other polymer in WEEE including financing**, collection, treatment according to waste hierarchy, within the frame of **hazardous substance and resource management** throughout the life cycle of EEE.
- **Environmentally sound management** of POPs/CoC containing **plastics & other polymers in ELVs**, including financing, collection and treatment according to the waste hierarchy, within the frame of **hazardous substance and resource** management of vehicles.

### 3. Life cycle management of stocks and waste in major sectors that contain POPs-plastic additives (2)

**Objective:** Sound Life Cycle Management of product and waste categories that contain POPs plastic additives (EEE/WEEE, ELVs, CDW, possibly textiles, furniture et al.) established.

**Recommended activity options:**

- ESM of **POP-containing plastic and other polymer in construction and demolition waste (CDW)** within the larger frame of hazardous substance & resource management in **CDW**.
- ESM of **POP-containing plastic/polymer in other uses found relevant in the country** (e.g. textiles, leather, furniture, mattresses).
- **Environmentally sound disposal of POP-containing plastic waste** (best linked to a larger national strategy of plastic management).



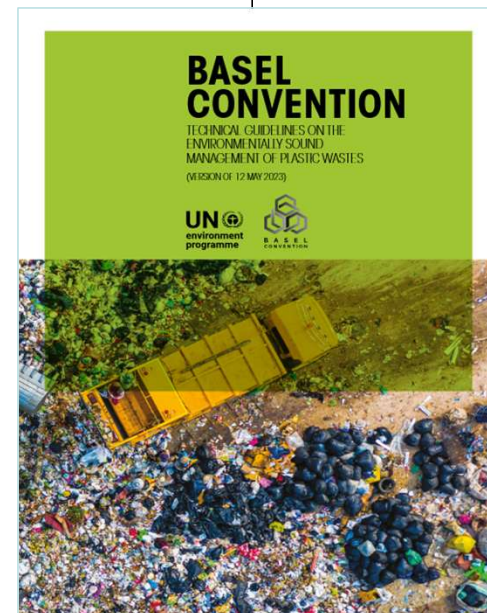
### 3. Life cycle management of stocks and waste in major sectors that contain POPs-plastic additives (2)

**Objective:** Sound Life Cycle Management of product and waste categories that contain POPs plastic additives (EEE/WEEE, ELVs, CDW, possibly textiles, furniture et al.) established.

#### Guidance documents for managing POPs-containing plastics

- Within the Basel Convention a Technical Guidance on the environmentally sound management of plastic wastes have been published. <https://www.basel.int/Portals/4/download.aspx?d=UNEP-CHW-WAST-GUID-ESM-PlasticWastes-20230512.English.pdf>
- Within the Stockholm Convention a BAT/BEP guidance relevant to PBDEs and DP has been developed in which separation of POP-BFR and POP-CFR plastic additives is described [https://www.pops.int/Implementation/BATandBEP\(new\)/IntentionalPOPs/releases/BATandBEPGuidance/tabid/9644/Default.aspx](https://www.pops.int/Implementation/BATandBEP(new)/IntentionalPOPs/releases/BATandBEPGuidance/tabid/9644/Default.aspx)

Guidance on best available techniques and best environmental practices relevant to polybrominated diphenyl ethers and Dechlorane Plus listed under the Stockholm Convention on Persistent Organic Pollutants



ber 2024

## Full scale WEEE plastic recycling plants with POP separation

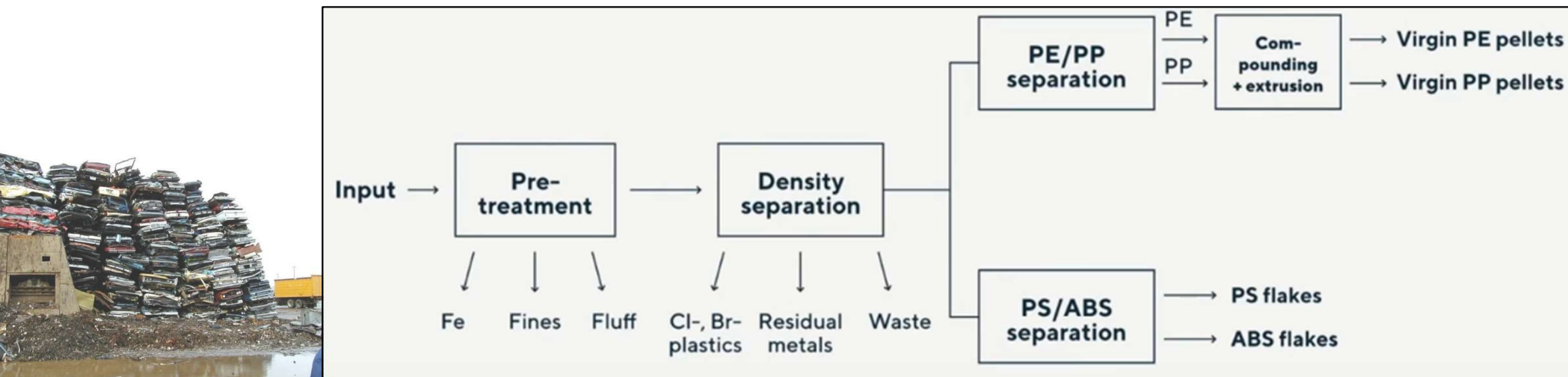
A range of recycling plants for WEEE plastic are operating full scale since several years, They can separate POPs/BFRs/CFR containing plastic and separate polymers to produce recyclates.

| WEEE (country)              | input        | Separation techniques                     | Polymers Separated                | Quality of sep. polymers  | PBDE/BFR/DP/CFR Elimination*  | Reference                                      |
|-----------------------------|--------------|-------------------------------------------|-----------------------------------|---------------------------|-------------------------------|------------------------------------------------|
| Mixed from (Austria, China) | plastic WEEE | Not disclosed                             | Low-BFR types of ABS, HIPS and PP | Good (Customer specified) | Yes; BFR fraction incinerated | MBA Polymers (2012) & MGG Polymers (2018)      |
| Small White (Switzerland)   | EEE, goods   | Includes XRT                              | BFR and PVC free polymers         | Good                      | Yes                           | RUAG Technology (2012)                         |
| WEEE (UK)                   | plastics     | Undisclosed                               | Low-BFR types of ABS and HIPS     | Good                      | Yes                           | Morton (2007)                                  |
| WEEE (Austria, Germany)     | plastics     | Undisclosed (incl. S/F and Electrostatic) | Low-BFR types of PP, ABS, HIPS    | Good                      | Yes                           | Bage Plastics GmbH (2012, 2020)                |
| WEEE (The Netherlands)      | plastics     | Undisclosed (incl. S/F & Electrostatic)   | Low-BFR types of PP, ABS, HIPS    | Good                      | Yes                           | CloseWEEE (2017) Coolrec                       |
| WEEE (Sweden)               | plastics     | Undisclosed (incl. S/F & Electrostatic)   | Low-BFR types of PP, ABS, HIPS    | Good                      | Yes                           | NONTOX (2020)                                  |
| WEEE plastics               |              | Undisclosed (incl. S/F & Electrostatic)   | Low-BFR types of PP, ABS, HIPS    | Good                      | Yes                           | UNEP (2024) PBDE/DP/BFR guidance NONTOX (2020) |

# Full scale recycling plants for separating POPs containing plastics<sup>25</sup>

- In Europe some full- scale facilities have been developed which can separate different types of plastic from ELVs. The major company is Galloo (BE) or WIPAG/MOCOM (DE).
- The company Ad Rem which provided the technology for the Galloo plant, is exporting their treatment system for end-of-life vehicles and separation of shredded waste (e.g. Japan).
- In these plants, sink & float technology is used to separate the brominated, chlorinated and fluorinated plastic fraction which are disposed (e.g. incinerated). Non/low-impacted plastics which are separated by sink float to a PE, PP fraction and a HIPS/ABS fraction which are further separated by other technologies.

Simplified recycling scheme for separation of plastics from ELV and WEEE engineered by Ad Rem <https://www.youtube.com/watch?v=NfGHfeh3Piw>



## 4. Assessment and selection of alternatives to POP plastic additives (1)

**Objective:** Alternatives for POP plastic additives in exempted uses are assessed by a science-based approach and are substituted by the most sustainable chemical & non-chemical solution.

### Recommended activity options:

- Compilation of information on more sustainable chemical alternatives to POPs plastic additives (considering BRS guidance documents, activities of POPRC; UNEP BAT/BEP guidance).
- Compilation of information on non-chemical alternatives (e.g. alternatives to EPS insulation; SC BAT/BEP guidance; POPRC docs).
- Education and capacity building on alternatives assessment.
- Selection of the most sustainable/green alternative chemicals and non-chemical solutions in the different uses.
- Phase in of sustainable chemicals and non-chemical alternatives.



# Education and capacity building on alternatives assessment

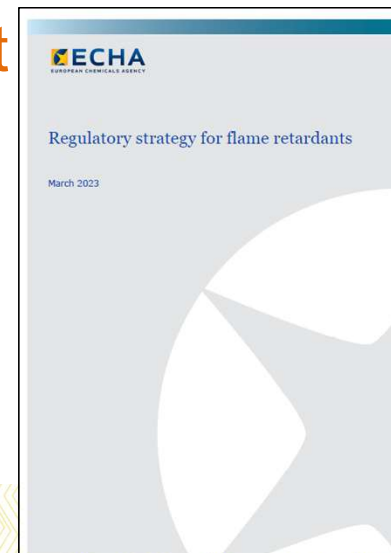
## Substitution of DecaBDE in Plastics of Electronics

### Substitution can take place at three levels:

**A. Flame Retardant Substitution:** This approach involves identifying a drop-in chemical substitute for the DecaBDE (e.g. DBDPE but it is vPvB & SVHC).

**B. Resin/Material Substitution:** This approach involves changing the resin and changing the chemical used as the flame retardant.

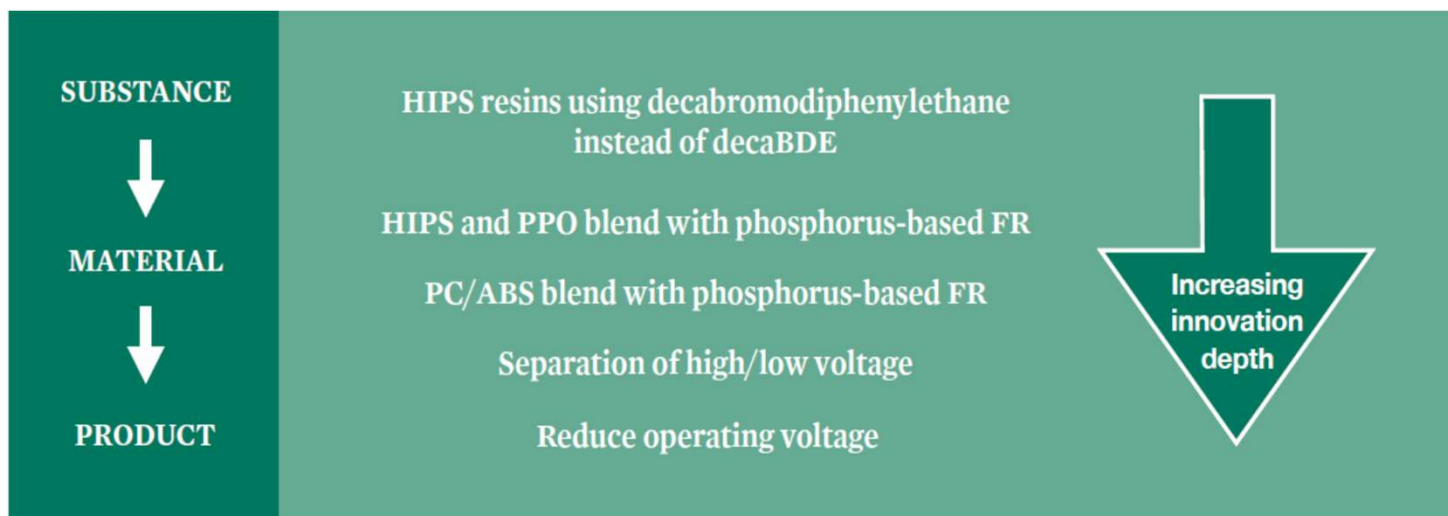
**C. Product Redesign:** This approach involves changes to the actual product design to minimize or eliminate the need for flame retardant chemicals (e.g. barrier material; heat source reduction like reduced operation voltage).



### 20 Case Studies on HOW TO PREVENT THE USE OF TOXIC CHEMICALS frequently found in the Mediterranean Region



[https://backend.orbit.dtu.dk/ws/files/163013878/Weber\\_2018.pdf](https://backend.orbit.dtu.dk/ws/files/163013878/Weber_2018.pdf)

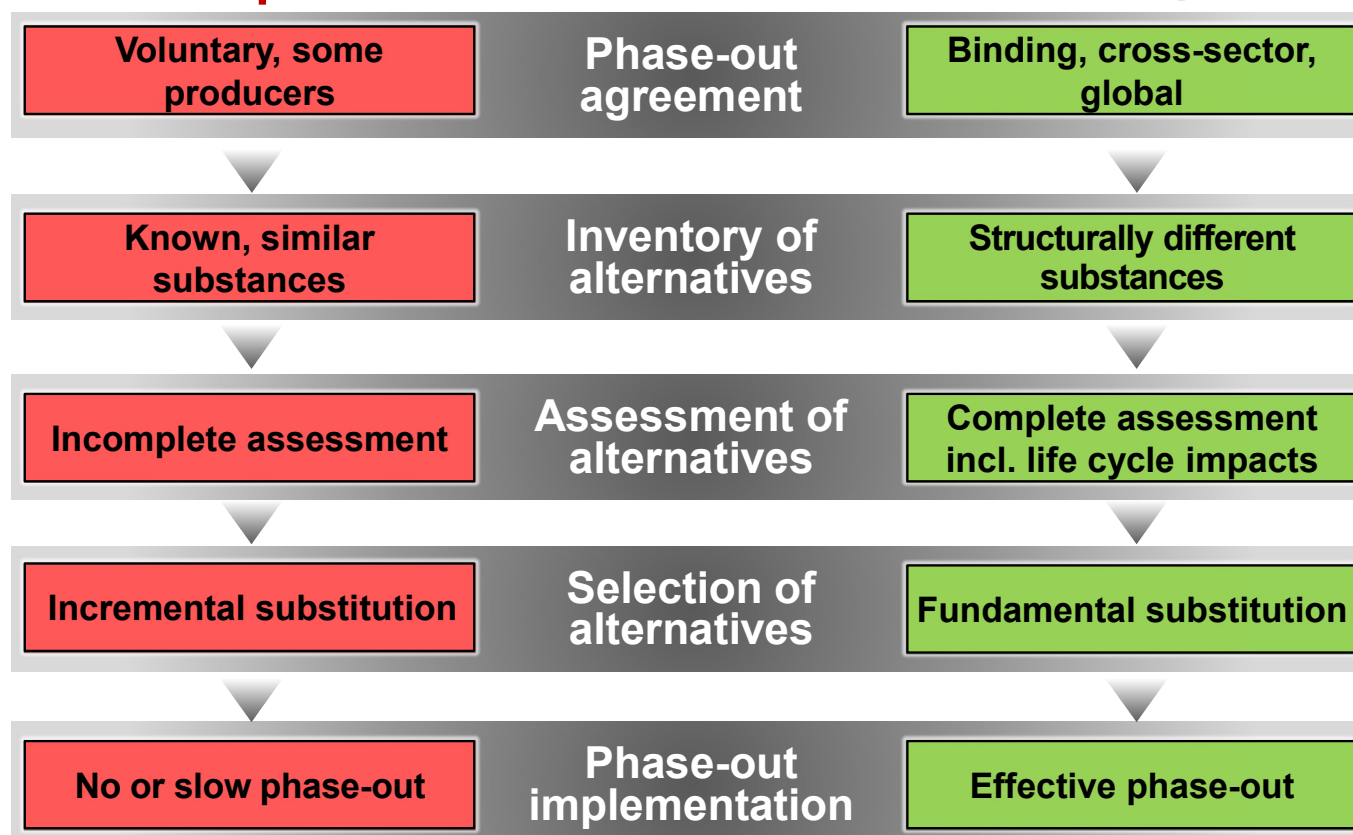


# Education and capacity building on alternatives assessment

Current and recommended substitution practice to avoid regrettable substitutes

## Current practice

## Recommended practice



**subsportplus**  
Substitution Support Portal

REGULATIONS SUBSTANCES

[https://www.subsportplus.eu/EN/Home/Home\\_node](https://www.subsportplus.eu/EN/Home/Home_node)

Welcome to  
**SUBSPORTplus!**

The Portal offers you information supporting your efforts in substituting hazardous substances and assisting you to find your way to safer alternatives. Enjoy exploring the portal and please do not hesitate to contact the project team for any comments or questions.

OECD

OECD > Data > Dashboards & tools > Substitution and Alternatives Assessment Toolbox (SAAToolbox)

**Substitution and Alternatives Assessment Toolbox (SAAToolbox) for chemicals and nanomaterials**

<https://www.oecd.org/en/data/tools/substitution-and-alternatives-assessment-toolbox-for-chemicals-and->

From incremental to fundamental substitution in chemical alternatives assessment  
<http://dx.doi.org/10.1016/j.scp.2015.08.001>

Peter Fantke<sup>a</sup>, Roland Weber<sup>b</sup>, Martin Scheringer<sup>c,d,\*</sup>



Contents lists available at ScienceDirect  
Sustainable Chemistry and Pharmacy  
journal homepage: [www.elsevier.com/locate/scp](http://www.elsevier.com/locate/scp)



## 4. Assessment and selection of alternatives to POP plastic additives (2)

**Objective:** Alternatives for POP plastic additives in exempted uses are assessed by a science-based approach and are substituted by the most sustainable chemical & non-chemical solution.

**Recommended activity option:**

- **Science based assessment** if any **exemption for the use of POP plastic additives is needed**.
- **Notification of the BRS Secretariat /COP** on the **needed of exemption** with the **appropriate information** (What exemption(s), estimated quantity of production/use, Purpose of production / use, reason for exemption).
- **Periodic review to assess the need for continued exemptions and assess alternatives. Stop exemption and use by more sustainable alternatives as soon as feasible.**

BRS CONVENTIONS

BASEL CONVENTION

ROTTERDAM CONVENTION

STOCKHOLM CONVENTION

Home The Convention Procedures Implementation Countries Partners

Search

Overview

Decisions

### Registers of Specific Exemptions for chemicals listed in Annex A

<https://chm.pops.int/Implementation/Exemptions/SpecificExemptions/DecabromodiphenyletherRoSE/tabid/7593/Default.aspx>  
<https://chm.pops.int/Implementation/Exemptions/SpecificExemptions/DechloranePlus/tabid/10238/Default.aspx>  
<https://chm.pops.int/Implementation/Exemptions/SpecificExemptions/UV328/tabid/10277/Default.aspx>

## 5. Application of BAT/BEP in exempted uses of POPs plastic additives

Objective: BAT/BEP is applied if exempted POPs are used (possibly e.g. DecaBDE, UV-328, MCCP, UV-328, DP) and release and exposure is minimized.

### Recommended activity options:

- Define and implement BAT/BEP for production of POP plastic additives including release limits and develop related control of production, releases and waste.
- Apply BAT/BEP for exempted uses of POPs plastic additives in production:
  - For DecaBDE in plastic in vehicle spare parts (and others)
  - Dechlorane Plus in exempted use
  - UV-328 in exempted uses
- **Possibly labelling** of new products containing exempted POPs.

Please note: Alternatives for almost all uses are available for POPs plastic additives DecaBDE, DP and UV-328. (For exempted uses of MCCP see action plan for SCCP/MCCP)

Guidance on best available techniques and best environmental practices relevant to polybrominated diphenyl ethers and Dechlorane Plus listed under the Stockholm Convention on Persistent Organic Pollutants

December 2024

BAT/BEP guidance for UV-328 and for MCCPs is under development.



Global Framework  
on Chemicals

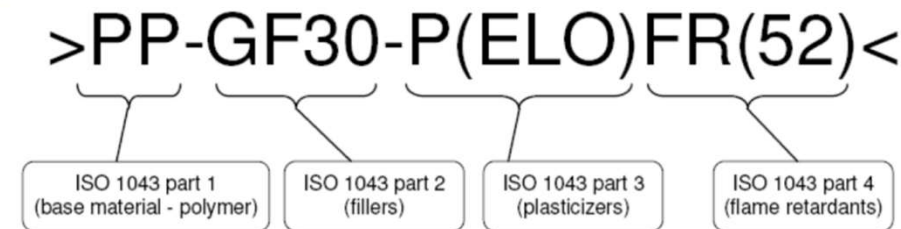


## 5. Application of BAT/BEP in exempted uses of POPs plastic additives

### ISO standard for labelling of plastic – option to label POPs in plastic

- **ISO standards have been developed for labelling of plastics (ISO 11469)** based on definitions in the ISO 1043 series (see Table).
- The ISO 1043 series consists of 4 standards (see Table):
  - **Part 1 on polymers** (ISO 1043-1, 2011),
  - **Part 2 on fillers and reinforcing** (ISO 1043-2, 2011),
  - **Part 3 on plasticizers** (ISO 1043-3, 2016) and
  - **Part 4 on flame retardants** (ISO 1043-4, 2021)

Example of a plastic marking according to ISO11469 (Tecchio et al. 2018)



Tecchio et al. (2018) Procedia CIRP, 69, 716-721.

| ISO Standard    | Title/content                                                                           |
|-----------------|-----------------------------------------------------------------------------------------|
| ISO 11469:2016  | Plastics — Generic identification and marking of plastics products                      |
| ISO 1043-1:2011 | Plastics – Symbols & abbrev. terms – Part1:Basic polymers their special characteristics |
| ISO 1043-2:2011 | Plastics – Symbols and abbreviated terms – Part 2: Fillers and reinforcing materials    |
| ISO 1043-3:2016 | Plastics – Symbols and abbreviated terms – Part 3: Plasticizers                         |
| ISO 1043-4:2021 | Plastics – Symbols and abbreviated terms – Part 4: Flame retardants                     |
| ISO 1629:2013   | Rubber and latices – Nomenclature                                                       |
| ISO 18064:2022  | Thermoplastic elastomers – Nomenclature and abbreviated terms                           |

## 6. Education/awareness raising on POPs plastic additives in the major use sectors within general awareness on CoCs in products (1)

**Objective:** Education/Awareness of major stakeholders on POPs-containing products and waste created (integrated in the frame on awareness of chemicals in products (GFC/SAICM synergy).

### Recommended activity options:

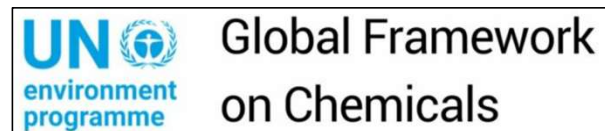
- **Develop a strategy to raise awareness** on the impact of POP and other CoCs on health, the environment, and recycling in the life cycle of EEE, vehicles, buildings, textiles and other product categories considering gender mainstreaming and vulnerable populations.
- **Developing awareness raising and education materials** on POPs & other CoCs in EEE, ELVs, buildings, textiles and possibly others for different stakeholders (considering available materials).
- Awareness raising and education for stakeholders (policy makers, industry, recyclers, research and public) on POPs in these products **within a larger education activity on chemicals in products and chemicals in LC of electronics (GFC synergy; synergy to SDG 12).**
- Awareness raising of the public on POPs impacted plastic **within a general awareness on plastic risk, pollution and sustainable consumption.**



## 6. Education/awareness raising on POPs plastic additives in the major use sectors within general awareness on CoCs in products (2)

**Objective:** Built knowledge and capacity for the management of POPs-impacted products and waste within life cycle management (LCM) of hazardous substances in EEE, vehicles, buildings, textiles and possibly others.

- **Capacity building of authorities and institutions** for developing the regulatory frame for lifecycle management of EEE, ELVs, construction sector and other sectors.
- **Develop training materials** and programs for the **enforcement of the policy and regulatory frame** for WEEE, ELV, CDW & other impacted waste and related POPs management.
- **Capacity building for implementation of the regulatory frames for managing WEEE, ELVs, CDW and other impacted wastes and implementation in the individual sectors.**
- **Training/education for customs** authorities on the control of imports of (W)EEE, cars, and possibly other relevant POPs containing products and waste.



## 6. Education and training for relevant stakeholder groups on life cycle management of POPs containing products (3)

**Objective:** Built knowledge and capacity for handling of POPs in production and POP-impacted materials and wastes within the life cycle management of hazardous substances in EEE, vehicles, buildings, furniture, and textiles.

- **Development of education and training materials** for the management and handling of POPs/CoCs (EEE, vehicles, buildings, textiles, furniture) (considering available materials).
- **Capacity building of the handling and management for POPs and training of workers in production, in recycling and waste management** for relevant sectors within the life cycle management of CoCs in EEE, vehicles, buildings, furniture, textiles.



## 6. Education and training for relevant stakeholder groups on life cycle management of POPs-containing products – E-waste

**Objective:** Built knowledge and capacity for management of POPs impacted products and waste within the life cycle management (LCM) of hazardous substances in EEE, vehicles, buildings, textiles and possibly others.

- **Education and training materials on E-waste** has been compiled in “The E-waste Challenge Massive Open Online Course (MOOC)”

### The E-waste Challenge Massive Open Online Course (MOOC)

<https://www.basel.int/Implementation/Ewaste/MOOC/tabid/4966/Default.aspx>



## 6. Education and training for relevant stakeholder groups on life cycle management of POPs-containing products – E-waste

**Objective:** Built knowledge and capacity for management of POPs impacted products and waste within the life cycle management (LCM) of hazardous substances in EEE, vehicles, buildings, textiles and possibly others.

- **Education and training materials on E-waste** has also been developed & published in the frame of the **GIZ lighthouse project on e-waste management in Ghana** (2017 to 2026) including **12 guidance documents of different aspects of e-waste recycling in a low income country**.

|                                                                                                                                                                             |                                                                                                                                                                         |                                                                                                       |                                                                                                      |                                                                                                                                                                             |                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Handbook on the Re-use of End-of-Life Lithium-Ion Batteries from E-Waste (WEEE) within the Ghanaian Context                                                                 |       |  pdf<br>2.43 MB     | Strategies for the Formalization of Scrap Business on the Old Fadama Scrap Yard                      |       |  pdf<br>560.04 KB |
| Technical principles and framework conditions for the recycling of e-waste thermoplastics                                                                                   |       |  pdf<br>5.61 MB     | Business Cases for Selected Recycling Technologies in Support of an Optimal Recycling Chain in Ghana |       |  pdf<br>1.06 MB   |
| Baseline Study – Assessing the baseline of the e-waste sector in Ghana                                                                                                      |     |  pdf<br>895 KB     | Downstream Technology Option for E-waste Recycling                                                   |     |  pdf<br>5.71 MB  |
| Alternative Business Models – Towards creating safe and viable income opportunities for scrap workers (and their wider service support system) at Old Fadama (Agbogbloshie) |   |  pdf<br>3.18 MB   | Operationalization Model for an Optimal Recycling System in Ghana                                    |   |  pdf<br>1.04 MB |
| Political and Ethnic Conflicts in Agbogbloshie/Old Fadama- Executive Summary                                                                                                |   |  pdf<br>709.77 KB | Incentive Based Collection of E-Waste in Ghana (GIZ 2020)                                            |   |  pdf<br>2.62 MB |
| Manual Dismantling of Cars on the Old Fadama Scrapyard – A process analysis and recommendations for improvement                                                             |   |  pdf<br>4.1 MB    | E-Waste Training Manual (GIZ 2019)                                                                   |   |  pdf<br>4.1 MB  |

<https://www.giz.de/en/projects/recycling-and-disposal-waste-electrical-equipment-environmentally->

## 6. Education and training for relevant stakeholder groups on life cycle management of POPs-containing products - ELVs <sup>37</sup>

- Some guidance documents for end-of-life vehicle management have been published in recent years including for low- and middle income countries. A practitioner's guideline from the ISLANDS project.
- A first project on recovery of plastics from ELVs in Ghana is currently established and GIZ published a first report on manual dismantling of cars/ELVs in Ghana.
- **Within improved recycling activities, plastics can be separated and recovered and POPs and other pollutants can be managed.**

Section VI

Guidance/guidelines by source category:  
Source categories in Part III of Annex C

Part III Source category (k):  
Shredder plants for the treatment of end-of-life  
vehicles<sup>1</sup>

February 2023

### Manual Dismantling of Cars on the Old Fadama Scrapyard

*A process analysis and recommendations for improvement*

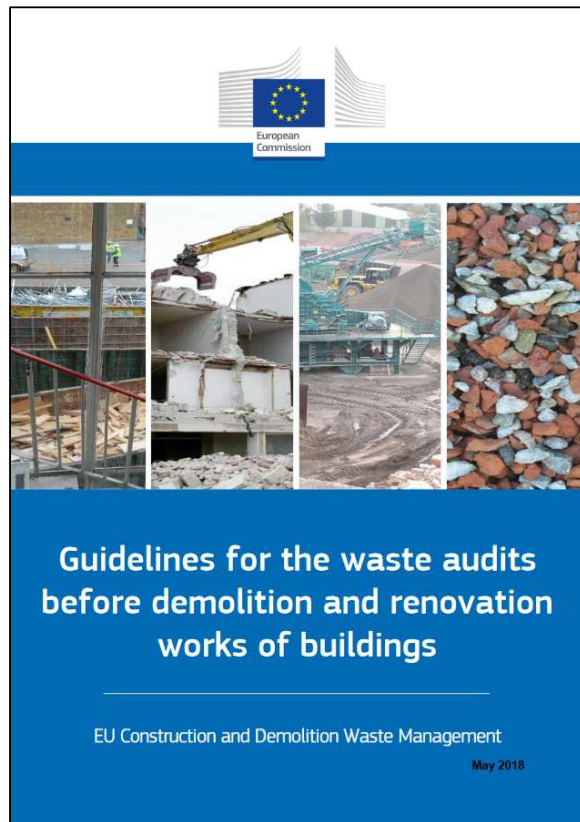


GIZ (2022) <https://www.giz.de/de/downloads/giz2022-en-manual-dismantling-of-cars-ghana.pdf>

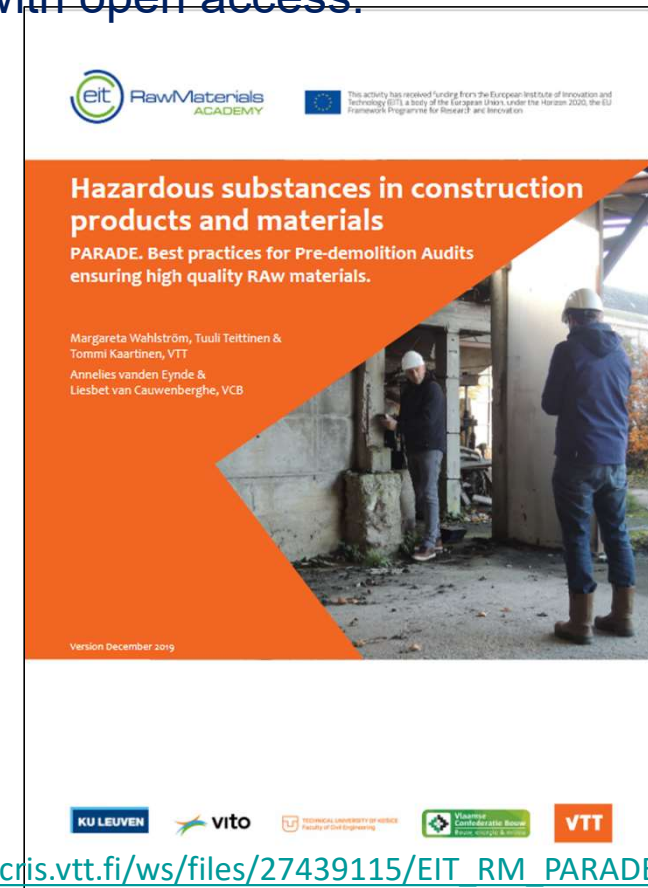
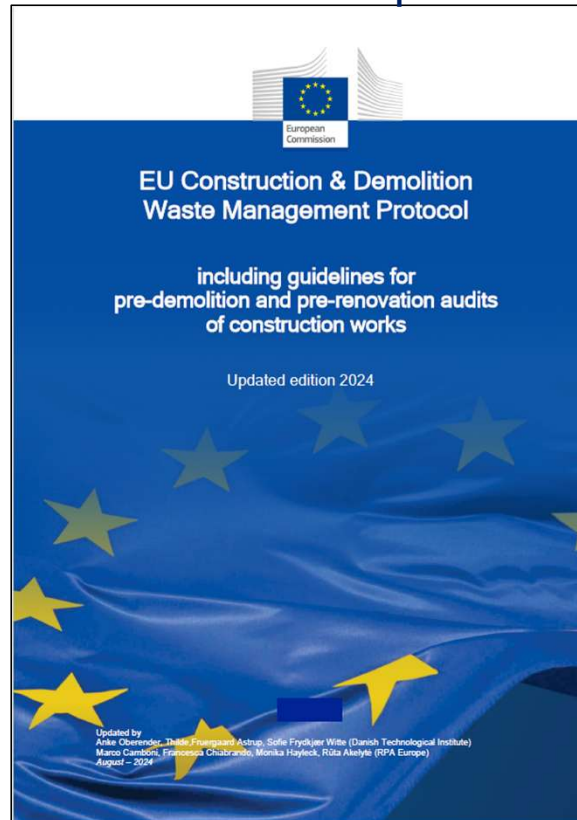


## 6. Education and training for relevant stakeholder groups on life cycle management of POPs-containing products - **CDW**

- Robust guidance documents on the assessment, **deconstruction of buildings containing pollutants**, were developed/published in the European Union with open access.



<https://build-up.ec.europa.eu/en/resources-and-tools/publications/eu-construction-demolition-waste-management-protocol-2024-updated>



[https://cris.vtt.fi/ws/files/27439115/EIT\\_RM\\_PARADE\\_Hazardous\\_substances\\_in\\_construction\\_Final\\_2019.pdf](https://cris.vtt.fi/ws/files/27439115/EIT_RM_PARADE_Hazardous_substances_in_construction_Final_2019.pdf)

## 6. Education & awareness raising on POPs plastic additives within general awareness on CoCs in products <sup>39</sup>

### Chemicals which cause a decrease in sperm quality

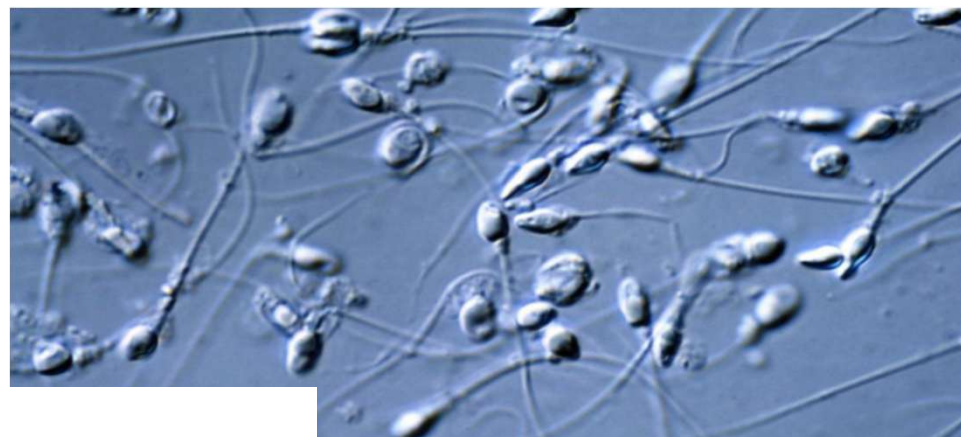
Men's sperm quality in Europe has decreased by ~50% in the past 60 years!

There are 29 chemicals or chemical groups relevant to male reproductive health with a focus on deterioration of sperm quality and **many are POPs or plastic additives**:

- Androgen receptor antagonists: Bisphenols A, F, S; n-butyl paraben; PBDE 99, 100, 183, 209; PCB 118, 126; chlorpyrifos, vinclozolin, procymidone, fenitrothione
- Suppression of testosterone synthesis: Phthalates DEHP, DnBP, BBzP, DiNP; acrylamide
- AhR activation: **Dioxins (PCDD/Fs)**, Polychlorinated biphenyls: PCB 118, 126, 169.
- Disruption of prostaglandin signaling: Paracetamol
- Inhibition of steroidogenic enzymes: linuron
- Further chemicals with effects on the sperm quality related to materials in buildings with unknown mode of action: PFOS/PFOA, organophosphate esters

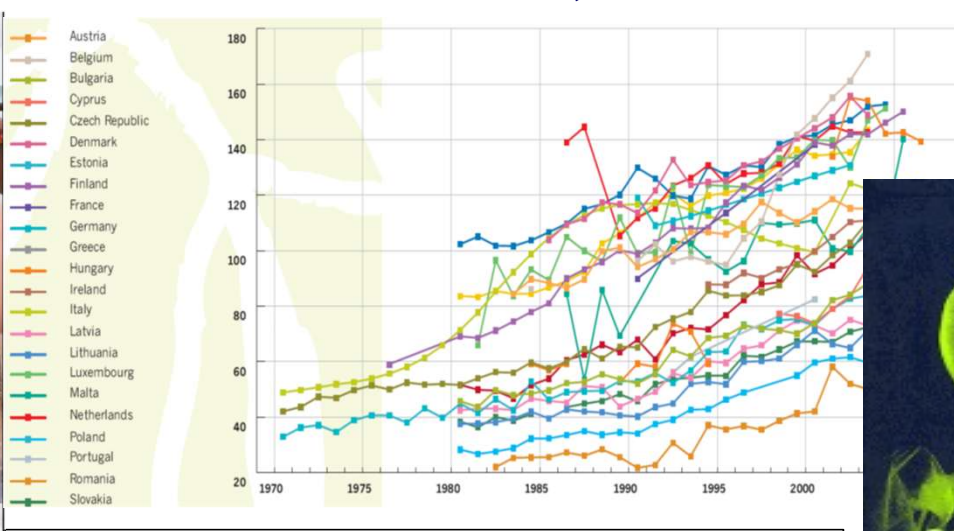
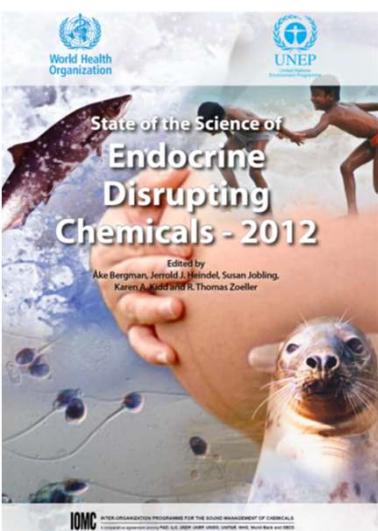
The study has open access:

Kortenkamp et al. (2022) Environ. Int. 165, 107322.



## 6. Education & awareness raising on POPs plastic additives within general awareness on CoCs in products 40

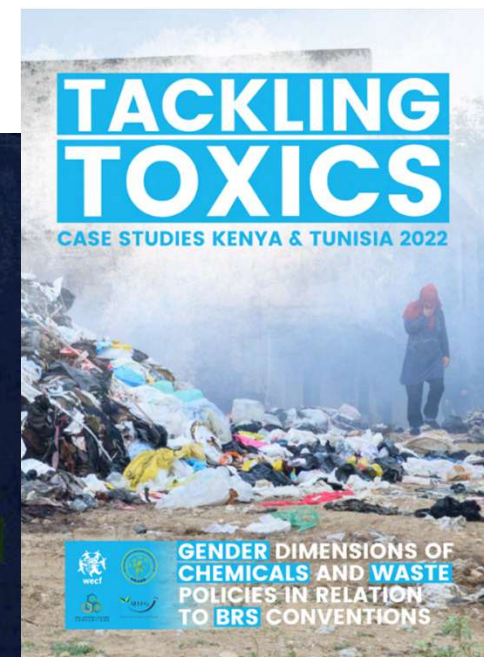
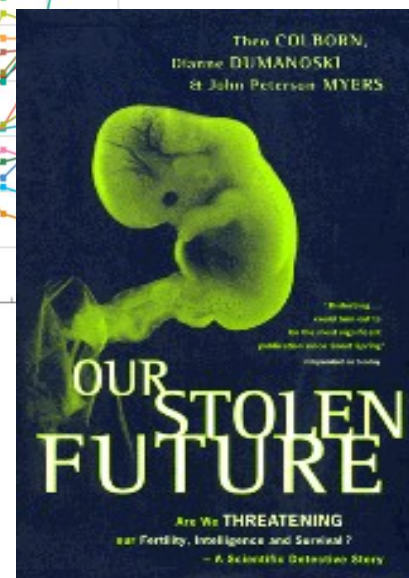
- Certain plastic additives including POPs plastic additives **impact on women's health** such as breast cancer (e. g. PBDEs).
- They can also **impact on the next generation** including decreased IQ (Herbstman et al. 2010).
- Good awareness materials from the UN, science community, Woman NGOs (WECF).



**A breast cancer case-control study of polybrominated diphenyl ether (PBDE) serum levels among California women**

<https://doi.org/10.1016/j.envint.2019.03.043>

Susan Hurley<sup>1,2</sup>, Debbie Goldberg<sup>1,3</sup>, June-Soo Park<sup>3</sup>, Myrto Petreas<sup>3</sup>, Leslie Bernstein<sup>4</sup>, Hoda Anton-Culver<sup>5</sup>, Susan L. Neuhausen<sup>4</sup>, David O. Nelson<sup>2</sup>, and Peggy Reynolds<sup>1,2,6</sup>



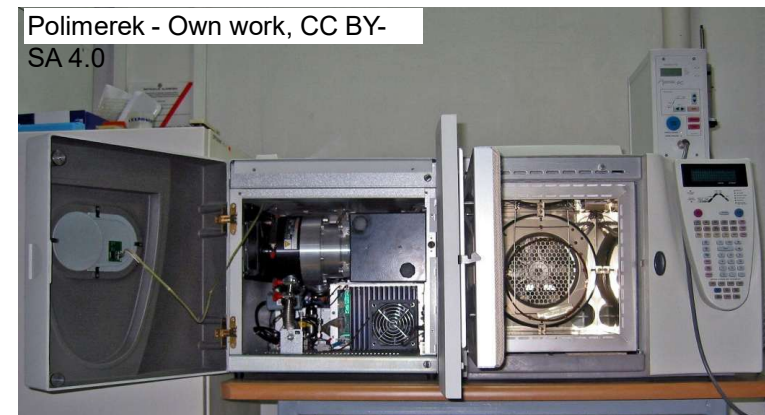
<https://www.wecf.org/resources>

## 7. Analysis and monitoring of POP-BFR and other POPs/CoCs in the technosphere and other priority areas

**Objective:** Established monitoring of POP-BFRs and other POPs and CoCs in plastics and other priority areas in the major sectors and in recycling.

### **Recommended activity options:**

- **Assessment of options for monitoring of POPs plastic additives** (BFRs, CFRs, UV-328) in the country or region (international collaboration or development of own capacity).
- Establishment of a monitoring approach for POPs plastic additives and other CoCs in plastics.
- Monitoring of POPs and CoCs in major product categories, related wastes and recycling.
- Improvement of inventory by monitoring where relevant gaps have been identified (Tier III).
- Possibly monitoring of humans, biota and environment for POPs plastic additives for effectiveness evaluation and in priority areas (e.g. contaminated sites) (participate GMP).



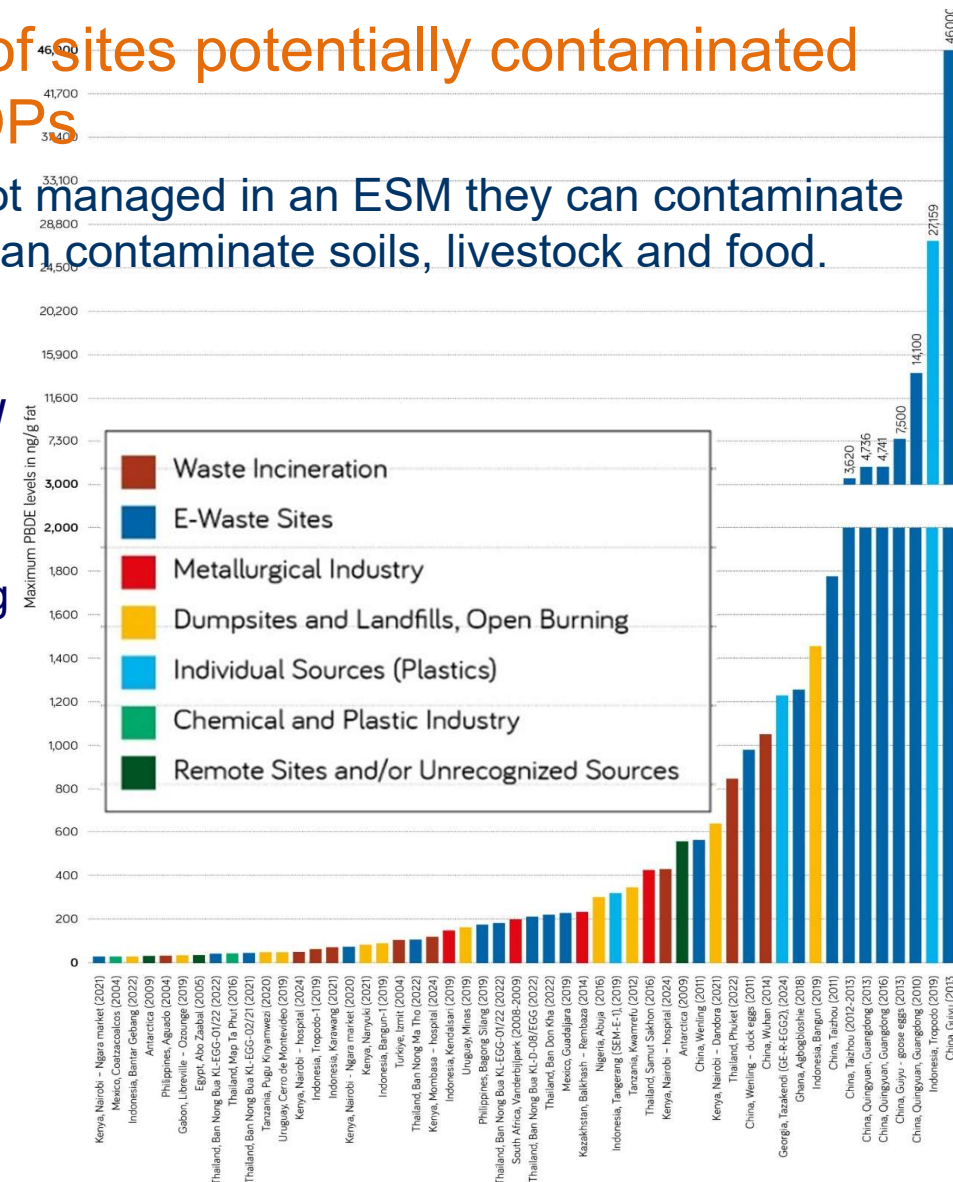
## 8. Assessment, management, database of sites potentially contaminated with POPs plastic additives and other POPs

**Background:** If e-waste, ELVs or waste plastics are not managed in an ESM they can contaminate the environment by releasing POP and metals, which can contaminate soils, livestock and food.

### PBDE in global egg monitoring: E-waste sites

- PBDE levels in eggs were highest in flocks living on/ near e-waste recycling areas (up to ppm/fat content).
- The highest PBDE-contaminated chicken egg was sampled 2013 in Guiyu (China) and contained 46,000 ng PBDE/g fat and a duck egg also from Guiyu with 7500 ng/g fat (Zeng et al. 2016). Another study at three WEEE recycling sites in China also reported high levels of PBDEs of 3220 to 14,100 ng/g fat (Zheng et al. 2012).
- Eggs were also sampled in Agbogbloshie/Accra, Ghana, which is one of the largest e-waste recycling sites in Africa. Eggs from a household on the scrap yard contained 1258 ng PBDE/g fat.

Petrlik et al. (2025) Emerging Contaminants 11, 100567  
<https://doi.org/10.1016/j.emcon.2025.100567>



## 8. Assessment, management, database of sites potentially contaminated with POPs plastic additives and other POPs

**Background:** If e-waste, ELVs or waste plastics are not managed in an ESM they can contaminate the environment by releasing POP and metals, which can contaminate soils, livestock and food.

- Also the **highest PBDD/F-contamination (PBDD/F in POPRC)** of pooled eggs was **503 pg TEQ/g fat** detected in the **chicken flock at an e-waste and ELV dismantling site in Ghana (Agbogbloshie)**. These eggs also had the highest PCDD/F-TEQ ever measured (856 pg PCDD/F-TEQ/g fat).
- The second- and third-highest levels of PBDD/F-TEQ in eggs were found in egg samples from an e-waste dismantling site in Thailand (81.3 and 30.4 pg TEQ/g fat).



Petrlik et al. (2022) Emerging Contaminants <https://doi.org/10.1016/j.emcon.2022.05.001>

## 8. Assessment, management, database of sites potentially contaminated with POPs plastic additives and other POPs

**Background:** If e-waste and ELVs are not managed in an environmentally sound manner it can heavily contaminate the environment and result in POP and metal contaminated sites and food.

- The PCDD/F-PCB-TEQs were between 20.4 to 856 pg TEQ/g and therefore **all eggs exceeded the EU regulatory limit**. The **mean TEQ was 308.4 pg TEQ/kg fat** were by far the highest mean/median of all source categories.
- Three of the eggs from African sites had TEQ levels above 500 pg TEQ/g fat (**>100 times above regulatory limits**). For the **highest contaminated eggs** from Agbogbloshie (Ghana) containing a total of 1156 pg TEQ/g fat, **a child (15 kg) eating one egg (7 g fat) is exposed to more dioxins than the FAO/WHO consider tolerable: intake for 230 days** and the **EU consider a tolerable intake for 5 years**.



## 8. Assessment, management, database of sites potentially contaminated with POPs plastic additives and other POPs

**Objective:** Sites potentially contaminated with POP-BFRs and other POPs (incl. PBDD/Fs) are identified, assessed and contaminated sites secured and possibly remediated.

### **Recommended activity options:**

- Train and upgrade skills of personnel in identification, assessment, securing and remediation of contaminated sites.
- Analytical confirmation of POP plastic additives, PBDD/F, and other POP contamination, for the identified locations (priority list)
- Develop strategies for the environmentally sound management of POPs contaminated sites.
- Take measures to secure the contaminated sites to stop human exposure and environmental releases.
- Identification of clean-up measures and possibly initiate the clean-up, starting with high priority sites.

**Guidance on best available techniques and best environmental practices for the management of sites contaminated with persistent organic pollutants**

February 2025



<https://www.pops.int/Implementation/BATandBEP/POPscontaminatedsites/Guidance/tabid/9649/Default.aspx>

## POP contaminated site BAT/BEP guidance (2025)

The guidance consists of nine modules, an executive summary and a first case study.

**Guidance on best available techniques and best environmental practices for the management of sites contaminated with persistent organic pollutants**

February 2025



| Module | Title                                                                                             | English                                                                                                                                                                     |
|--------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | Executive Summary and Introduction                                                                |       |
| 1      | Background on POPs Contaminated Sites                                                             |       |
| 2      | Principles and Approaches for POPs Contaminated Sites Management and Remediation                  |       |
| 3      | Site Investigation, Assessment and Conceptual Site Model                                          |       |
| 4      | Environmental Risk Assessment                                                                     |       |
| 5      | Remediation Technologies and Techniques                                                           |       |
| 6      | Technology Selection Tool for remedial options to be used in Phase 3 - the Remediation Assessment |       |
| 7      | Stakeholder Engagement, Public and Worker Safety and Health                                       |   |
| 8      | Contaminated Sites Remediation and Monitoring and Aftercare                                       |   |
| 9      | Getting Started: Legislation, Policy, Inventory Development and Financing Remediation             |   |
| 10     | Case study - Environmental Management Plan Lâm Hoá site, Viet Nam                                 |                                                                                        |

<https://www.pops.int/Implementation/BATandBEP/POPscontaminatedsites/Guidance/tabid/9649/Default.aspx>

# Thank you for your attention ! Questions?

**More Information** <https://www.thegef.org/>; [https://en.wikipedia.org/wiki/Triple\\_planetary\\_crisis](https://en.wikipedia.org/wiki/Triple_planetary_crisis)

**Basel Convention:** [www.basel.int](http://www.basel.int)

**Rotterdam Convention:** [www.pic.int](http://www.pic.int)

**Stockholm Convention:** <http://chm.pops.int/>;

**Montreal Protocol/Vienna Convention:** <http://ozone.unep.org>

**GFC:** <https://www.chemicalsframework.org/> **FAO:** [www.fao.org](http://www.fao.org) **WHO** [www.who.int/](http://www.who.int/)

**Climate Convention** <https://unfccc.int/> **Biodiversity Convention:** <https://www.cbd.int/>

**OECD/IOMC:** <http://www.oecd.org/chemicalsafety/>

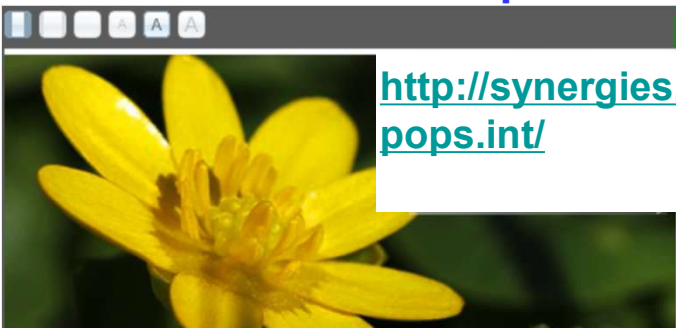
**Science:** <https://www.ipcc.ch/>; <https://www.ipbes.net/>; <https://www.unep.org/isp-cwp>; <https://www.ipcp.ch/>

**Industry:** <http://www.suschem.org/>; <https://icca-chem.org/>; <https://cefic.org/>

**NGO:** [www.ipcp.ch](http://www.ipcp.ch); [www.ipen.org](http://www.ipen.org); [www.ciel.org/](http://www.ciel.org/); [www.ban.org](http://www.ban.org); [www.chemsec.org](http://www.chemsec.org); [www.wecf.org](http://www.wecf.org)

**Better-world-links:** <http://www.betterworldlinks.org/>





<http://synergies.pops.int/>

**SYNERGIES**  
among the Basel, Rotterdam  
and Stockholm conventions

**UN**  
environment  
programme

Global Framework  
on Chemicals

**United Nations**  
Framework Convention on  
Climate Change

**GREEN GROWTH**  
Knowledge Partnership

**Convention on  
Biological Diversity**