Global NIP Update Round table
"Developing and updating National Implementation Plans. Challenges & good practices",
June 5, 2024, 14:00 -15:00 CEST, GMT 2

NIP Development and Implementation: An Opportunity to Promote an Integrated and Sectoral Approach on Chemicals, Plastics & Waste Management at National Level

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https://scholar.google.com/citations?user=-Cexto4AAAAJ&hl=en

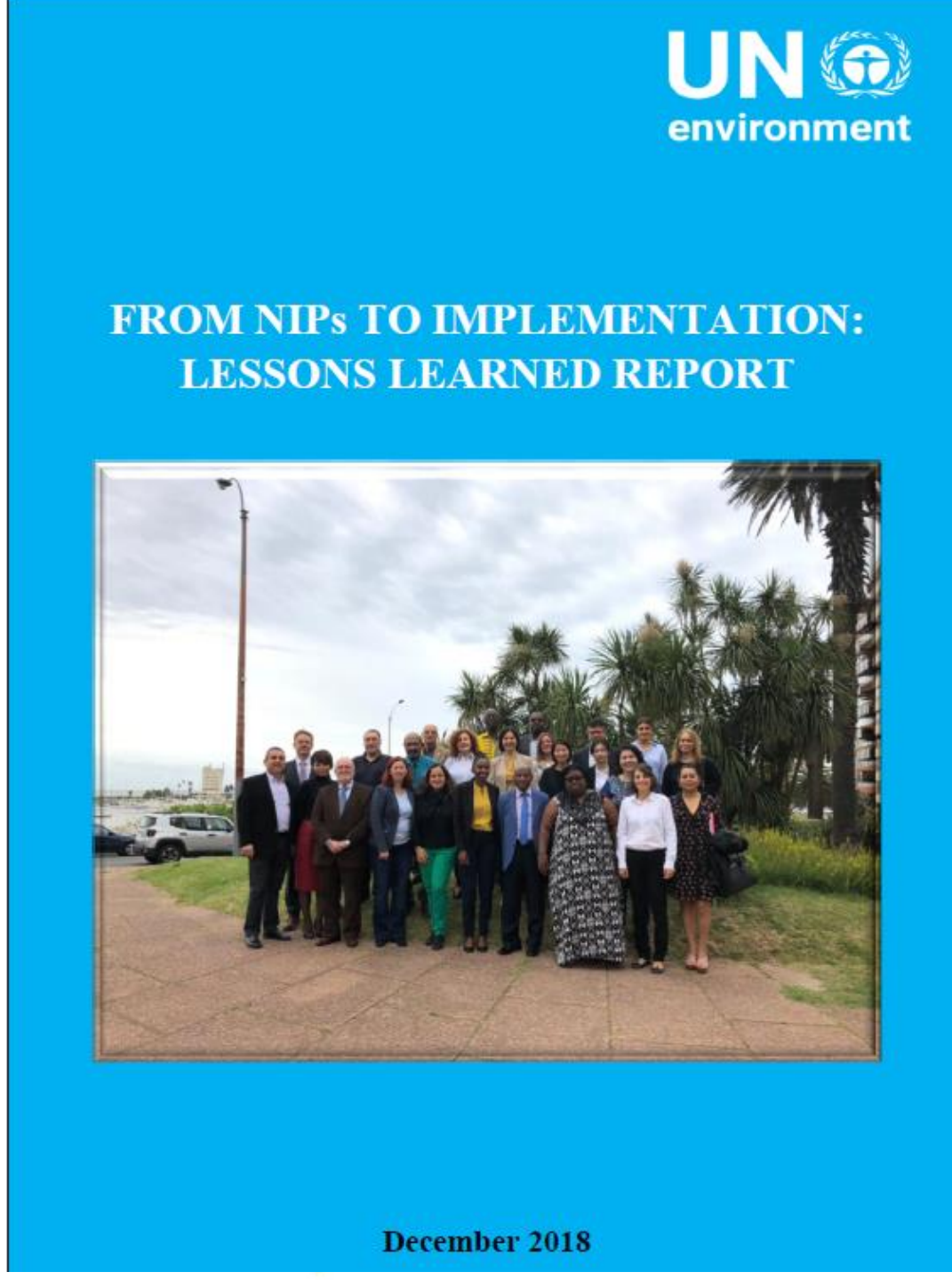
BASEL / ROTTERDAM / STOCKHOLM
CONVENTIONS

Lessons learned from NIP update we compiled in a UNEP report “From NIPs to Implementation”

- I recommend to consider this report and the findings compiled there.
- To best use the former national capacity built for NIP development in the next NIP update.
- To involve Universities and build capacity there including inventory development. Best in a research group working on waste/chemical and resource management.
- Professors often stay for decades at an university which might guarantee continuity.

Comment on African Institute: “Non-priority in scientific issues like NIPs”.

STOCKHOLM CONVENTION



Integrated Approach for POPs Management: Linking NIP activities and national priority activities on chemicals and waste management and SDGs

NIP Update Guidance: “The development, review, and updating of a NIP should **build on existing work and assessments….**”.

Therefore:

- POPs **should not be addressed on their own** but **should be integrated within general chemicals and waste management.** This may include, National chemical and waste management plans, National Profiles, national GHS implementation plans/strategies,.”
- **Synergies** between **Basel, Rotterdam and Stockholm** Convention.
- **Synergies to the upcoming Plastic Treaty.**
- Synergies to Minamata Hg Convention and activities on heavy metals.
- **Linking to the broader issues of SAICM and Global Framework of Chemicals.**
- Synergies to the Convention on Climate Change and related GHG reduction.
- Linkage to Sustainable Production & Consumption and to the SDGs.

BASEL CONVENTION

STOCKHOLM CONVENTION

saicm

ICCM5 25–29 September 2023 Bonn, Germany

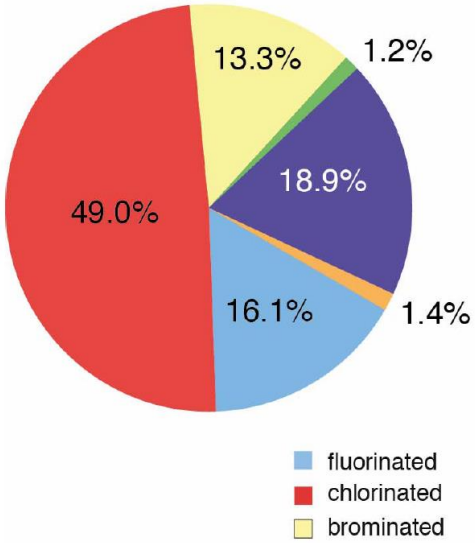
MINAMATA CONVENTION ON MERCURY

Integrated Approach of POPs Management – Synergies of Stockholm Convention and SAICM/Global Framework on Chemicals

There are close links between POPs and SAICM "emergency policy issues and issues of concern":

- Perfluorinated alkylated substances (and polyfluorinated as precursors) (PFAS) and the transition to safer alternatives.
- Highly Hazardous Pesticides
- Hazardous substances within the life cycle of electrical and electronic products.
- Chemicals in products

In the NIP development I recommended that the specific POPs issue can/should be linked in the action plans to SAICM emerging policy issues where appropriate and to address POPs and related wider group of POPs-like chemicals with a science-based approach.



Global Framework on Chemicals: Enhanced sectoral engagement

Global Framework on Chemicals (12/2023) developed within SAICM beyond 2020, **highlight the need of enhanced sectoral and stakeholder engagement:**

36. The involvement & 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. Extended producer responsibility is one guiding principle in the involvement.**

https://www.chemicalsframework.org/

ICCM5
25–29 September 2023
Bonn, Germany

saicm
STRATEGIC APPROACH TO INTERNATIONAL CHEMICALS MANAGEMENT
GOOD CHEMISTRY, TOGETHER

TOWARDS SAICM BEYOND 2020

34 POPs listed in the Stockholm Convention (2024)

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Chemical	Pesticides	Industrial chemicals	Unintentional production	Annex
DDT	+			B
Aldrin, Dieldrin, Endrin, Chlordane, Chlordecone, Toxaphene	+			A
Alpha-, Beta-, Gamma-HCH	+		By-product of lindane	A
Endosulfan, Heptachlor, Mirex	+			A
PCP, Dicofol, Methoxychlor	+	+		A
Commercial PentaBDE		+		A
Commercial OctaBDE (Hexa/HeptaBDE)		+		A
Commercial DecaBDE		+		A
Hexabromobiphenyl (HBB)		+		A
Hexabromocyclododecane (HBCD)		+		A
PFOS, its salts and PFOSF	**+**	+		B
PFOA and related compounds				
PFHxS and related compounds		+		A
SCCPs, Dechlorane Plus		+		A
UV-328		+		A
PCB, PeCBz, HCB, PCN, *HCBD*	**+**	**+**	+	A/C
PCDD, PCDF			+	C

Many of the new listed POPs are plastic additives or were used otherwise in polymers.

5 are brominated flame retardants.

2 chlorinated FRs (DP & SCCPs)

SCCPs plasticizer in PVC/rubber.

PFAS were/are used in side-chain fluoropolymers.

One **non-halogenated** plastic UV stabilizer (**UV-328**) was listed as POP in 2023.

POPs RC (10/23) recommended **MCCP & LC-PFAA** for listing 2025

POP-Plastic additives are contained in large product and waste sectors – **Chance** for environmentally sound sectoral resource & plastic management

- Electronics plastic (computer, TV, cables, etc.) ending up in E-waste,
  Recycling/treatment of WEEE plastic
- Transport sector (plastic, textile and upholstery in cars, trains, air plane)
  Recycling/treatment of polymers/SR
- Textiles, curtains, carpets, mattresses. US: Baby/kids sleep wear.
  Recycling/treatment of PUR; textiles
- Insulation in construction materials (increasing with increasing GHG incentives for insulation of houses)
  Recycling/treatment of insulation

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POP-Plastic additives are contained in large product and waste sectors – **Chance** for environmental sound plastic waste management: **EEE/WEEE**

E-waste/WEEE (53 Mt/year) and related resource including plastic management

- Plastic is in average 20% of total WEEE. **Globally 10 million t/year.**
- Heterogeneous plastic fraction with recycling challenges (down-cycle).
- High halogen content with associated challenges in thermal treatment The bromine content of WEEE plastic shredder fractions were 1.7 - 5.2% and the chlorine content 0.1 to 4.4% (Schlummer et al. 2007).
- EU WEEE directive require separation of WEEE plastic BFR fraction.
- Appropriate treatment needed. **SC BAT/BEP guidance for PBDEs compiled techniques for separation and recycling**.

Several Stockholm Convention GEF projects on WEEE management including WEEE plastics which should be assessed for best practice and lessons learned.

Best practice facility for WEEE plastic management in the EU

Procurement	Processing	Selling
		
• Growing supply • Land-filled/Incinerated • Self-replenishing • Sustainable and growing supply	• Mechanical 'mining' process • < 10% of energy • <10% of water consumption • Save about 1-3 tons CO2/ton	• "Green" products • Virgin-like quality possible • More sustainable business • PCR plastics

Back to plastic for EEE !

MBA Polymers
THE PLASTICS RECYCLING PROFESSIONALS

Chris Slijkhuis (2018) Presentation, Dioxin 2018; 26-31 August, Krakow, Poland

POP-Plastic additives are contained in large product and waste sectors – **Chance** for ESM of POPs and plastic waste: **End of life vehicles**

Auto shredder residues (End-of Life Vehicle)

- Plastic/foam/rubber fraction (ca. 15%; 200 kg) with challenge to recycle.
- **Approx. ~200 kg plastics per car** as pollutants! **2017 ca. 1.4 Billion vehicles** containing ~**280,000,000 t** of **plastics (incl. foam & rubber)**. Considering a service life of 20 years, **14 million t plastic waste/year**.
- High halogen content with associated challenges in thermal treatment.
- The EU ELV **Directive 2000/53/EC** stipulates targets for reuse, recycling and recovery of ELVs **(Circular Economy!)**. **The set high reuse and recovery rate require recovery & recycling of a part of the polymer fraction.**

EU ELV Directive	As of 01.01.2006	As of 01.01.2015
Reuse & Recycling	80%	85%
Reuse & Recovery	85%	95%

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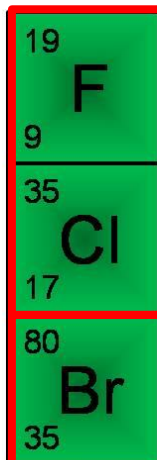
Stockholm Convention UNIDO GEF project in Ivory Coast on recycling of WEEE and ELVs **as best practice idea for NIP implementation**. However technical challenges in the project which should result in further lessons learned.



Overall pollutants and recyclables from End-of-Life Vehicles (ELVs) – From managing POPs in plastic towards pollutants in vehicles

The PBDEs and HBCD are just a part **of pollutants** in end of life vehicles. Other pollutants to consider for management:

- Other POPs: PCB (in older vehicles); SCCP/MCCPs in leather/PVC, UV-328, DP.
- PFRs, phthalates, styrene, BTEX
- Chlorinated fluorinated carbons **(CFC) and HFCs/FCs** in air conditioning systems of vehicles as **ODS and strong GHG.**
- **Lead** batteries, **Hg and Cadmium**
- Lithium batteries from E-vehicles (upcoming challenge!!)

Other pollutants/hazardous materials

- Petroleum; Oils; Detonation of airbags.

But also recyclables: Iron, aluminum, copper, Pd/Pt; 250 to 400$/car

Strategy: Valuables from vehicles need to be recovered & recycled and used for financing the ESM of ELVs including hazardous substances!

The updated unintentional POPs BAT/BEP Guidance stresses the overall depollution of ELVs.

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BASEL CONVENTION

United Nations Framework Convention on Climate Change

MONTREAL PROTOCOL
caring for all life under the sun

Overall POPs & pollutant management from construction and demolition waste

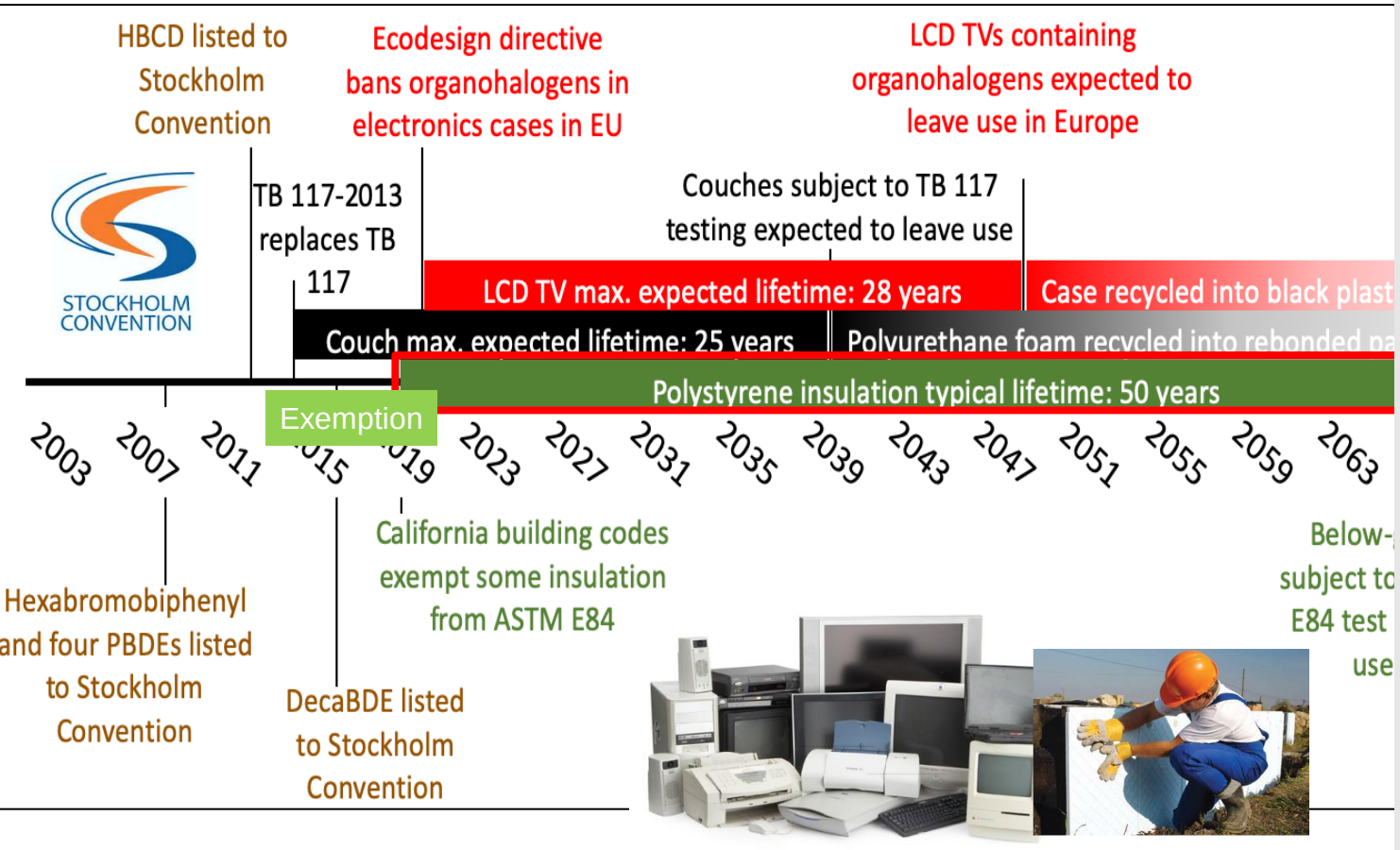
HBCD and PBDEs are just a part **of POPs in construction**:

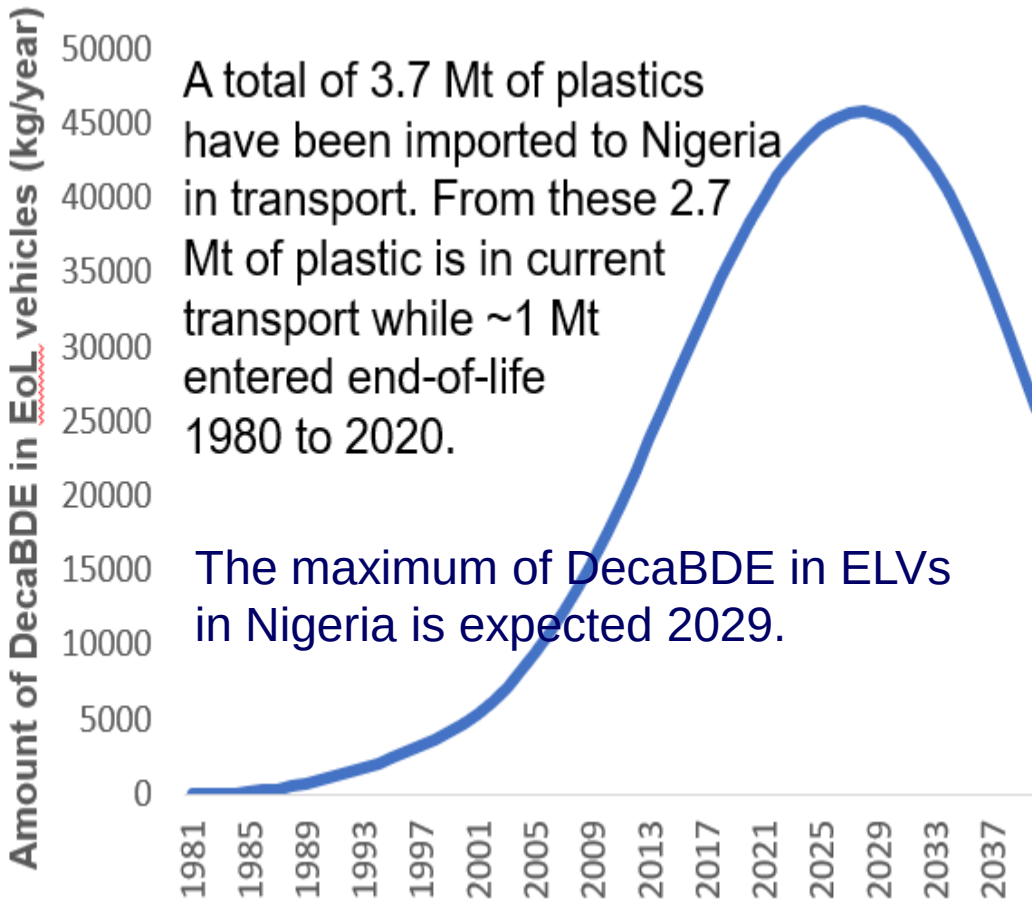
- PCBs in sealants, adhesives and paints;
- SCCPs in PVC floors and tiles, adhesives, sealants and pain
- PCP, DDT, Lindane/HCHs, Endosulfan in construction wood
- Lead in paints; cadmium and lead in PVC;
- Chlorinated fluorinated carbons **(CFC) and HFCs/FCs** in insulation foam and air conditioning systems as **ODS and strong GHG.**
- Asbestos as a major pollutant!

- Germany & Switzerland developed guidance documents for overall pollutant assessment and management in buildings.

Lesson learned: POP-BFR in products and related waste & recycling is a long-term challenge and that we need to avoid regrettable substitutes

- Several products containing legacy POP-BFRs have long service life and can reach recycling cycles for decades or even longer.
- If these POPs in polymers are substituted by regrettable alternatives the problem continue…..





Charbonnet, Weber, Blum (2020) Emerg. Contam. https://doi.org/10.1016/j.emcon.2020.05.002

Bad lesson learned: POP-BFR were substituted by other POP-BFRs

When looking to substitution history of PBDEs we find that partly chemical alternatives were chosen which are now also listed as POPs. Examples of regrettable substitution where alternative assessment failed!

Polymer	Content [%]	POP-BFRs 2009	Alternative introduced
High impact polystyrene	11–15	OctaBDE	DecaBDE, Br-polystyrene Ethane 1,2 bis(pentabromophenyl)
Epoxy resin	0-10	PentaBDE	TBBPA
Polyamides	13–16	OctaBDE	DecaBDE, Br-polystyrene
Polyolefins	5–8	OctaBDE	DecaBDE, propylene dibromo styrene
Polyurethanes	10-18	PentaBDE	Brominated polyols
Polyesters	8–11	OctaBDE	Brominated polystyrene
Unsaturated polyesters	13–28	PentaBDE	TBBPA
Textiles	12–15	PentaBDE	DecaBDE, HBCD

- HBCD & DecaBDE were then listed in the Stockholm Convention with **exemptions.**

UNEP study on chemicals in plastics – opportunity to avoid regrettable substitutes

UNEP "Technical Report - Chemicals in Plastics" found that:

- More than 13,000 chemicals are present in plastics.
- More than 2400 are chemicals with certain hazard properties
- Risk of human exposure from hazardous additives.
- **Need of informed substitution of plastic additives (Chapter 6 of the UNEP report & SC guidance Document).**
- **Opportunity for future synergy of SC and Plastic Treaty!**

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

Available online at www.sciencedirect.com

ScienceDirect

Current Opinion in Green and Sustainable Chemistry

ELSEVIER

Enabling a circular economy for chemicals in plastics

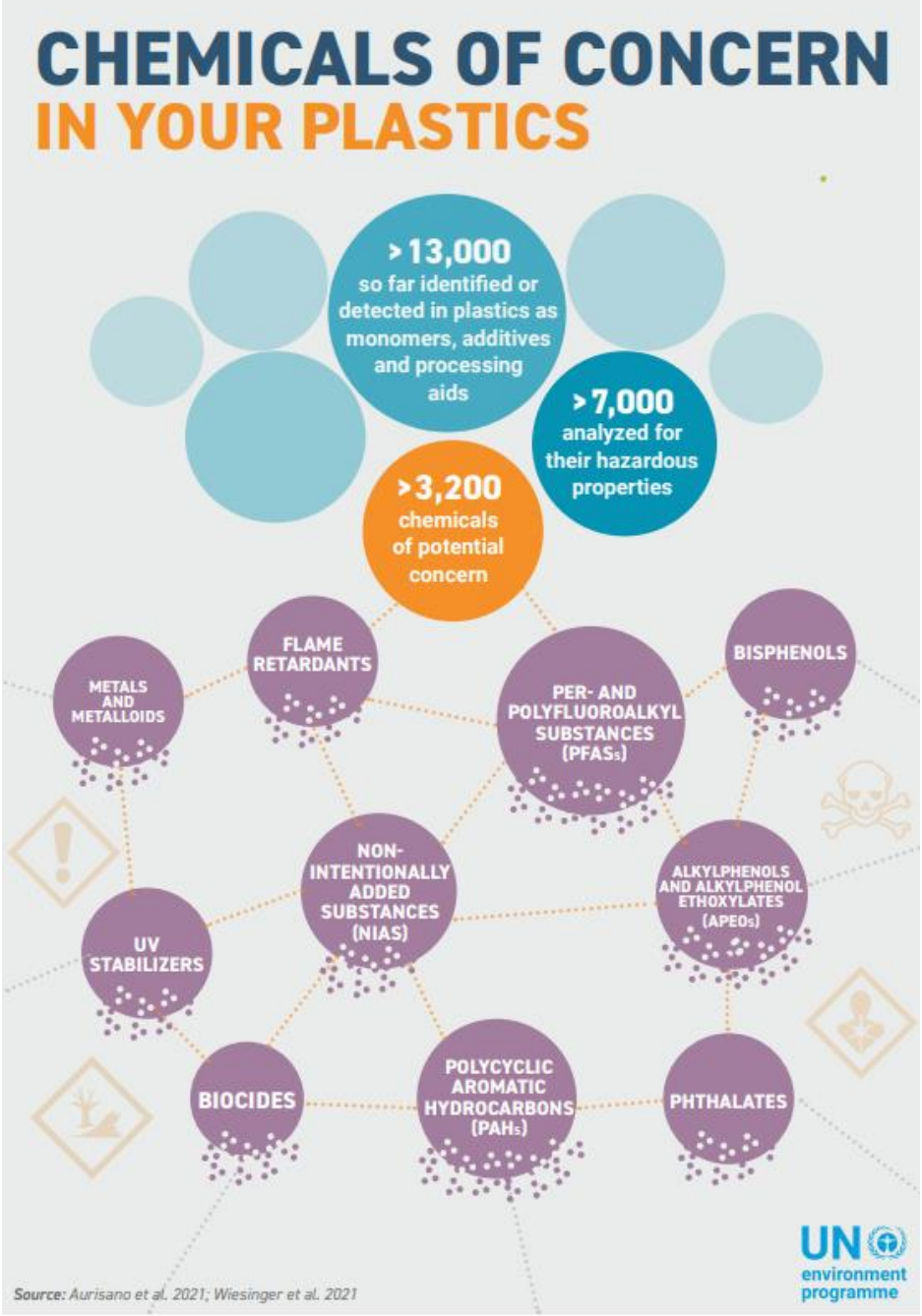
Nicolò Aurisano[1], Roland Weber[2] and Peter Fantke[1]

Deep Dive into Plastic Monomers, Additives, and Processing Aids

Helene Wiesinger,* Zhanyun Wang,* and Stefanie Hellweg

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

Environmental Science & Technology



UNEP "Chemicals in Plastics" short film: https://www.youtube.com/watch?time_continue=1&v=nFknRzTJwC8&feature=emb_logo

Managing POPs in plastics can trigger better plastic management in sectors

- Inventory and managing POPs in major affected plastic use sectors can improve the management of these large plastic-use sectors and result in depollution of these sectors. Good experience with global phase-out of HBCD and nearly stop of all DecaBDE production (only India is producing some).
- Stockholm Convention countries started to inventories and manage these plastics
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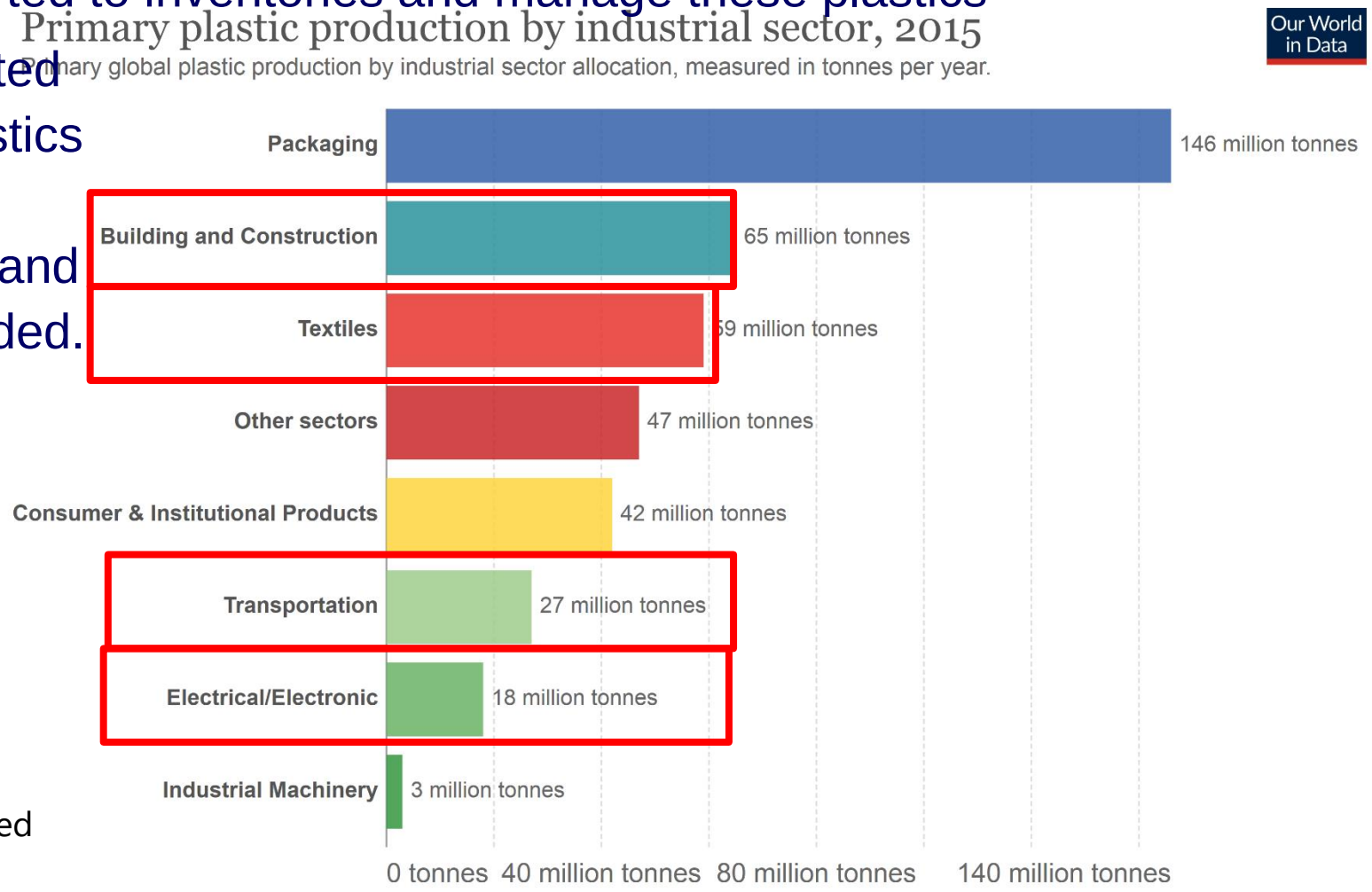
- With the addition of plastic additives SCCP, Dechlorane Plus and UV-328 and 2025 MCCP this will be further extended.
- Can become a nice synergy with the upcoming Plastic Treaty!



Geyer et al. (2017) 10.1126/sciadv.1700782 Reproduced by National Graphics (Issue June 2018)

Thank you for your attention ! Questions?

More Information

Basel Convention: www.basel.int

Rotterdam Convention: www.pic.int

Stockholm Convention: http://chm.pops.int/

Montreal Protocol/Vienna Convention: http://ozone.unep.org

SAICM: http://www.saicm.org/

OECD: http://www.oecd.org/chemicalsafety/

POPs phase out & alternatives http://poppub.bcrc.cn/

Science: www.ipcp.ch; http://greensciencepolicy.org/

NGO: www.ipen.org; www.chemsec.org; www.ihpa.info; www.ban.org

Better-world-links: http://www.betterworldlinks.org/