

IPCP Webinar Series: POPs in plastic and monitoring approaches

Part I: Understanding POPs in plastics; 24/25 April 2023

International Conventions to control plastic and related hazardous chemicals

Dr. Roland Weber

POPs Environmental Consulting,
73527 Schwäbisch Gmünd, Germany

<https://www.researchgate.net/profile/Roland-Weber-2>
<https://scholar.google.com/citations?user=-Cexto4AAAAJ&hl=en>



Content of Presentation

- Why chemical and waste conventions?
- Short overview on main chemical and waste conventions
- Basel Convention on transboundary waste
- Stockholm Convention eliminating POPs in plastic
- Development of a global Plastics Treaty
- Scientist supporting the global plastic treaty

The increasing production & consumption and the linear economy result in a waste/plastics nightmare crossing global boundaries

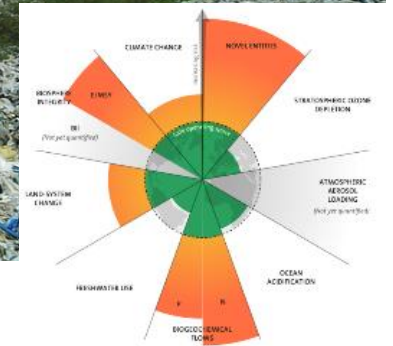
Marine Plastic Pollution



Plastic Waste Trade Crises in South East Asia

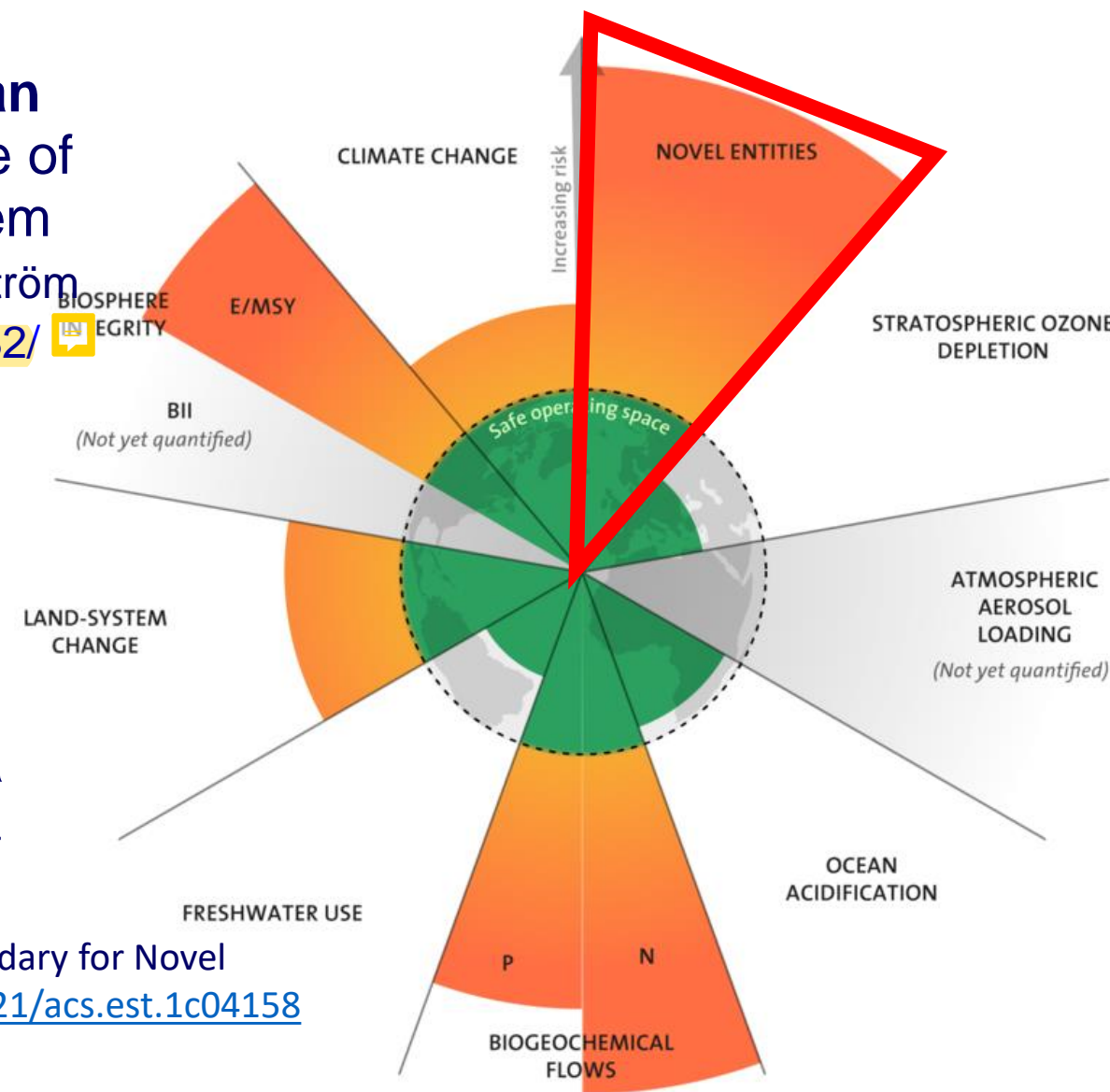


Persson et al. (2022) Outside the Safe Operating Space of the Planetary Boundary for Novel Entities. ES&T 2022, <https://doi.org/10.1021/acs.est.1c04158>



“New Entities” plastic & chemicals crossed Planetary Boundaries

- The planetary boundaries – **which define the environmental limits within which humanity can safely operate** – have been evaluated for a range of critical anthropogenic pressure on the Earth System (climate, phosphorus, nitrogen; biodiversity; Rockström et al. 2009). <http://www.ecologyandsociety.org/vol14/iss2/art32/>
- **Also “New entities” including chemical and plastic pollution have crossed planetary boundaries and is therefore a concern for humanity and several ecosystem services.**
- The irreversibility and global ubiquity of chemical and plastic pollution mean that the essential conditions for a planetary boundary threat are met. Increasing chemical & plastic production will further increase the pollution.



Persson et al. (2022) Outside the Safe Operating Space of the Planetary Boundary for Novel Entities. Environ. Sci. Technol. 2022, 56, 3, 1510–1521. <https://doi.org/10.1021/acs.est.1c04158>

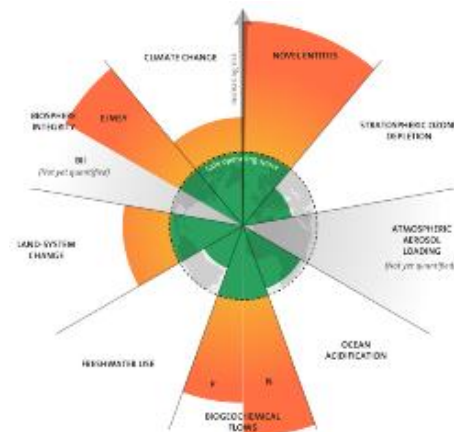
Rockström et al. (2009) Ecology & Society 14(2): 32

Update post 2015: http://www.post2015hlp.org/wp-content/uploads/2013/06/Rockstroem-Sachs-Oehman-Schmidt-Traub_Sustainable-Development-and-Planetary-Boundaries.pdf

Multilateral Environmental Agreements (MEA)

- The problem of exceeding global boundaries and the challenge of transboundary POPs pollution or the plastic release into oceans can only be solved by global approaches.
- Similarly the management and control of hazardous waste such as e-waste, POPs waste including POPs containing plastic waste needs an international frame that these expensive to manage and polluting wastes are not exported and dumped in developing countries as the cheapest „solution“.
- Therefore over the last three decades **Global and regional Multilateral Environmental Agreements (MEAs) were developed:**

„Agreements between countries to take global or regional actions when the world or the region has an environmental problem which can only be solved by collaboration of the countries“.



Scope of Global Multilateral Environmental Agreements (MEAs) on Chemical and Waste

Agreement	Scope	Enforced
Vienna Convention Montreal Protocol	Protection of ozone layer by phase out of ozone-depleting substances	1985 1987
Basel Convention	Control of transboundary movements of hazardous wastes & their disposal	1992
Rotterdam Convention	Prior Informed Consent (PIC) procedure for certain hazardous chemicals and pesticides in international trade	2004
Stockholm Convention	Elimination of POPs for the protection of human health and environment	2004
Minamata Convention	Elimination of mercury for protection of human health and environment	2013
SAICM	<i>Strategic Approach to Integrated Chemical Management</i>	2006
„Plastics Treaty“	International legally binding instrument on plastic pollution	Initiated 2022

Scope of some Regional Chemical MEAs

Agreement	Scope.	Year
Barcelona Convention	Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean. First regional regulatory framework for marine litter	1976
HELCOM Convention	Prevent and eliminate pollution to the Baltic Sea	1992
OSPAR & HELCOM	Reduce discharges, emissions and losses of hazardous substances to the North Sea to near-zero or background levels by 2020	1998
UNECE Convention on LRTAP;	Reduce air emissions on transboundary air pollutants	1983
EU water frame-work directive	An integrated approach to protecting water resources.	2000

Basel Convention - Parties

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Adopted 22.03.1989, effective 05.05.1992) (187 Parties; www.basel.int)




Just 8 UN countries are not Parties: East Timor, Grenada, Fiji, Haiti, San Marino, Solomon Islands, South Sudan, and the **USA**

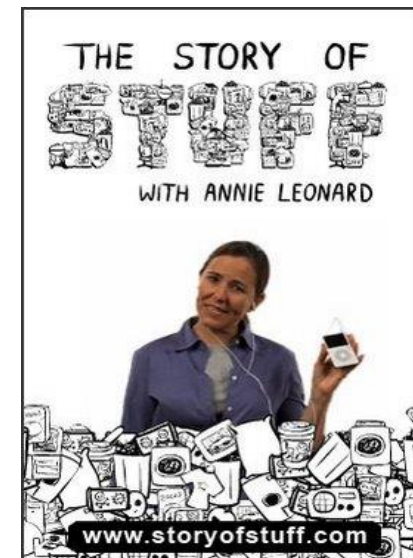
Basel Convention

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1992)

Reason:

- Concerns about dumping hazardous wastes in developing countries.
- The tighter environmental regulations in industrial countries since the 1970s/1980s and increase in waste fees resulted in increased exports of hazardous waste from industrial countries to developing countries. “Toxic traders” searching for cheaper solutions shipping hazardous wastes to e.g. Africa, Asia, Eastern Europe.

- High profile chemical accidents (mismanagement of Seveso wastes; also waste exports from US not ratified the Basel Convention until now)
- Public’s attention since the 1980s (Basel Action Network www.ban.org); Annie Leonard (book and film “The Story of Stuff” <https://www.storyofstuff.org/movies/story-of-stuff/>). 





Basel Convention

Key Objectives:

- The goal of the Convention is to protect human health and the environment from the adverse effects which result from inappropriate management of hazardous and other wastes.
- **Control of transboundary movements of hazardous wastes and their disposal.**
- This includes handling, transporting, storing, treating, processing and the disposal of these wastes (environmentally sound management of hazardous waste).

BASEL CONVENTION

ON THE CONTROL OF TRANSBOUNDARY MOVEMENTS
OF HAZARDOUS WASTES AND THEIR DISPOSAL

PROTOCOL ON LIABILITY AND COMPENSATION
FOR DAMAGE RESULTING FROM TRANSBOUNDARY
MOVEMENTS OF HAZARDOUS WASTES AND THEIR DISPOSAL

TEXTS AND ANNEXES

REVISED IN 2019

UN
environment
programme





Basel Convention

The Convention is based on two pillars/approaches:

- **A control regime for the transboundary movements of hazardous wastes,**
 - **applying the “Prior Informed Consent”** procedure (shipments made without consent are illegal; Article 6).
 - BAN amendment; Prohibits exports of hazardous wastes for final disposal from OECD countries to other parties (non-Annex VII countries/all other Parties); (unblocked in 2011)
 - Shipments to and from non-Parties are illegal unless there is a special agreement “Art. 11 Agreement”
 - **Each Party is required to introduce appropriate national or domestic legislation to prevent and punish illegal traffic in hazardous and other wastes.**

- **The promotion of the environmentally sound management (ESM) of hazardous wastes.** The principle of ESM addresses:
 - the treatment and disposal of hazardous wastes as close as possible to their source of generation,
 - the reduction of transboundary movements of hazardous wastes and other wastes to a minimum consistent with their environmentally sound management and
 - the minimization of the generation of hazardous wastes.

Basel Convention – “Hard law”

Defines Certain Wastes to be subject to Control --
“hazardous waste” and “other wastes” (Article 1)

“Hazardous Waste”:

1. According to Annexes (I, III and VIII)
2. Also according to National Law of a Country involved in trade scenario

“Other Waste” (Annex II, wastes for special consideration)

1. Wastes collected from households
2. Incinerator ash from incinerating household waste,
3. **Certain plastic wastes (since 2019).**



Wastes regulated under the Basel Convention

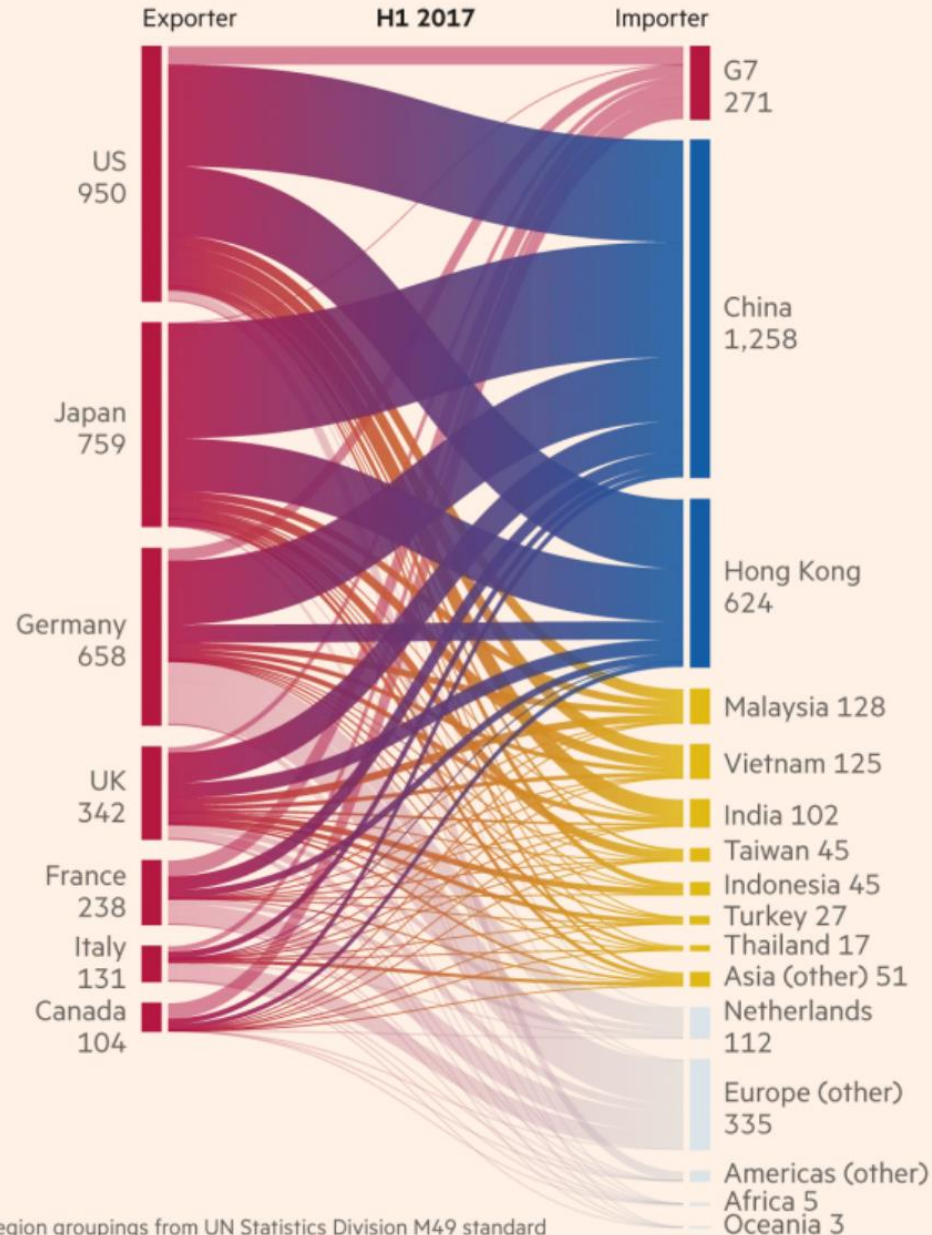


- Biomedical and healthcare wastes
- **Persistent Organic Pollutant wastes (POPs wastes),**
- Used oils
- Mining wastes
- Industrial wastes
- End-of-life equipment e.g.:
 - Used lead acid batteries
 - PCB equipment
 - E-wastes,
 - Ships destined for dismantling
 - Asbestos,
- **Mixed plastic wastes (since 2019)**

Not controlled under Basel: ODS (Montreal Protocol) and radioactive wastes (IAEA).

Driver for listing plastic in the Basel Convention

Exports of plastic waste, parings and scrap from G7 countries ('000 tonnes)



Before 2018:

- Major plastic waste export from G 7 and some other industrial countries to mainly China.
- Additionally some plastic export to some other Asian countries such as India, Malaysia, or Vietnam.
- Some of the imported plastic was recycled but a large share of the imported plastic was disposed, openly burned or littered into the environment

2017
China imports
60% of G7
plastic waste

Region groupings from UN Statistics Division M49 standard
Data accessed Sep 19-Oct 1, 2018
Sources: US Census Bureau; Japan e-Stat; Eurostat; Statistics Canada

Drivers for listing plastic in Basel Convention

China banned imports for plastic scrap in 2018 to protect environment (Operation *National Sword*) unless purity is 99.5%.

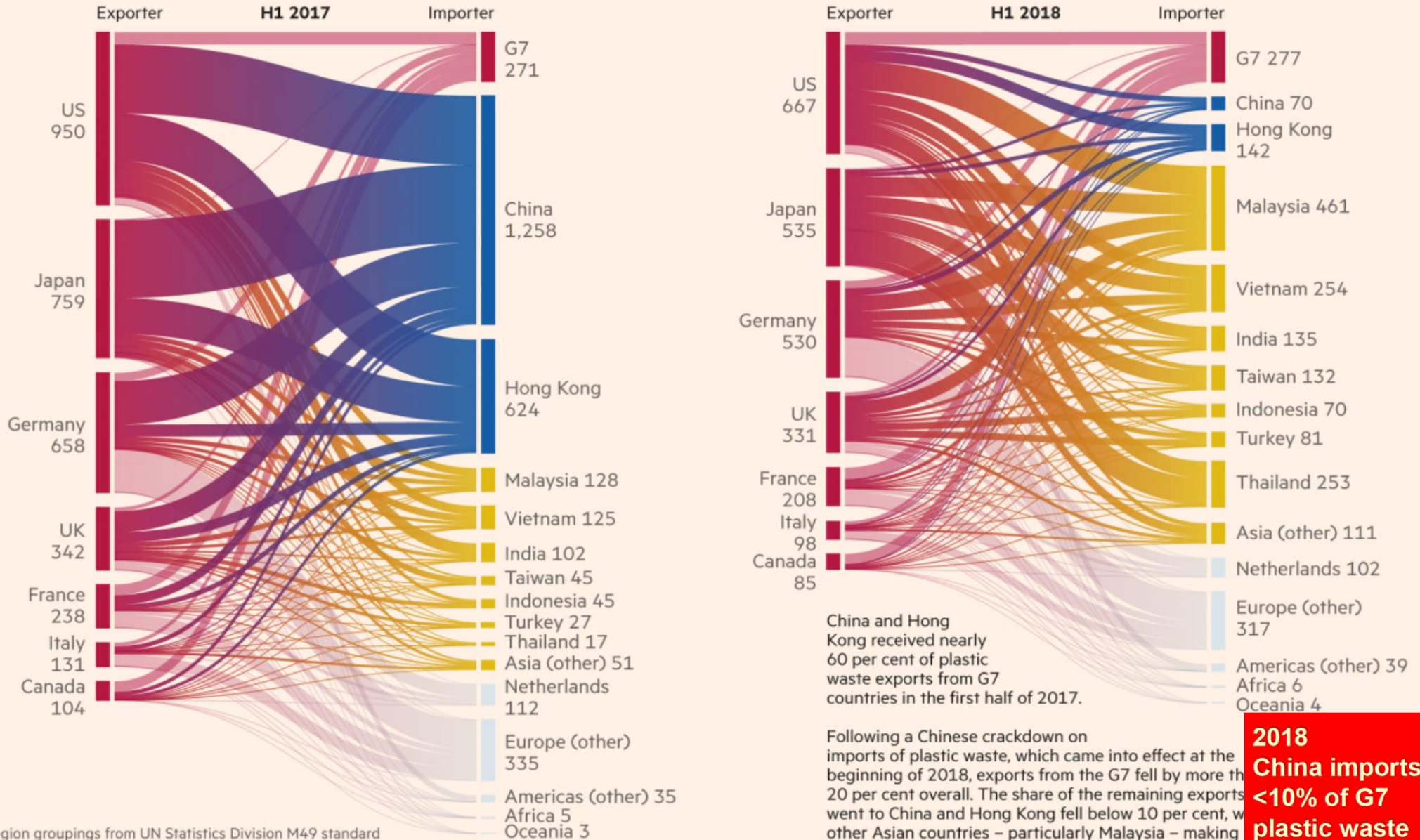
From the film “Plastic China”

Drivers for listing plastic waste in the Basel Convention

How the global river of plastic waste changed course in just 12 months

Exports of plastic waste, parings and scrap from G7 countries ('000 tonnes)

The move created global plastic waste trade chaos.



China and Hong Kong received nearly 60 per cent of plastic waste exports from G7 countries in the first half of 2017.

Following a Chinese crackdown on imports of plastic waste, which came into effect at the beginning of 2018, exports from the G7 fell by more than 20 per cent overall. The share of the remaining exports went to China and Hong Kong fell below 10 per cent, with other Asian countries – particularly Malaysia – making up much of the shortfall.

2018
China imports <10% of G7 plastic waste

Region groupings from UN Statistics Division M49 standard
Data accessed Sep 19-Oct 1, 2018
Sources: US Census Bureau; Japan e-Stat; Eurostat; Statistics Canada

After China Ban → Waste Moves to Southeast Asia

NGO watchdogs document the plastic crises in SE-Asia



Contamination in Asia from plastic exports & “recycling”



Contamination in Asia from plastic imports & recycling



Logo for **basel action network** (yellow and blue vertical bars).

Logo for **#break free from plastic** (text).

Logo for **CIEL** (Center for International Environmental Law) (globe icon).

Logo for **ecology center** (sun and house icon).

Logo for **SAHABAT ALAM MALAYSIA** (circular emblem with a map of Malaysia).

Logo for **gaia** (hands holding a globe icon).

Logo for **IPEN** (a toxics-free future) (blue and white text).

Logo for **NEXUS3** (circular icon with three figures).

Logo for **Friends of the Earth International** (green circle icon).

Logo for **eia** (Environmental Investigation Agency) (blue circle icon).

Logo for **ecoton** (Ecological Observation and Wetlands Conservation) (globe icon).



Basel Convention – listing of plastic

- In May 2019, the 14th Conference of the Parties (COP) to the Basel Convention adopted decision BC-14/12 on plastic waste and decision BC-14/13 on further actions to address plastic waste under the Basel Convention.
- COP-14 also adopted amendments to Annexes to the Convention with the objectives of enhancing the control of transboundary movements of plastic waste and clarifying the scope of the Convention as it applies to such waste.
- This makes the Basel Convention the only global legally binding instrument that currently and specifically addresses plastic waste. From 2021 on, 186 States and one regional economic integration organization around the world are bound by the amendments.



Basel Convention – listing of plastic

Four Plastic Waste Types exempt from controls (Annex IX) so long as they are destined to recycling:

- Plastic waste almost exclusively consisting of one non-halogenated polymer (i.e. no PVC) examples: PE, PP, PET, PS, ABS etc.
- Plastic waste almost exclusively consisting of one cured resin or condensation product. examples: epoxy resins; urea-formaldehyde (UF)
- Plastic waste almost exclusively consisting of one of a short list of fluorinated polymer wastes. examples: perfluorovinyl ether (PFA)
- Mixtures of polyethylene (PE), polypropylene (PP) and polyethylene terephthalate (PET) provided they are destined for separate recycling and are free from contamination and other types of waste.







Basel Convention

Approach of the Basel Convention


- **Development of Technical Guidelines (since 1992). E.g.:**
 - Environmentally sound management POPs/PCB waste
 - **Technical guidelines on the environmentally sound management of plastic wastes (version of 03/2023)**
 - Transboundary movement E-waste (distinction non-e-waste)
 - Environmentally sound management mercury waste
- Environmentally sound management (ESM) toolkit.
- **Partnership program/projects e.g., plastics, computers (PACE), mobile phone.**
- Establishment of Regional Centers for Training and Technology Transfer (Article 14(1))

<http://www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/ESMToolkit/Overview/tabid/5839/Default.aspx>

UNITED NATIONS   **BC**

UNEP/CHW/16/INF/11/Rev.1

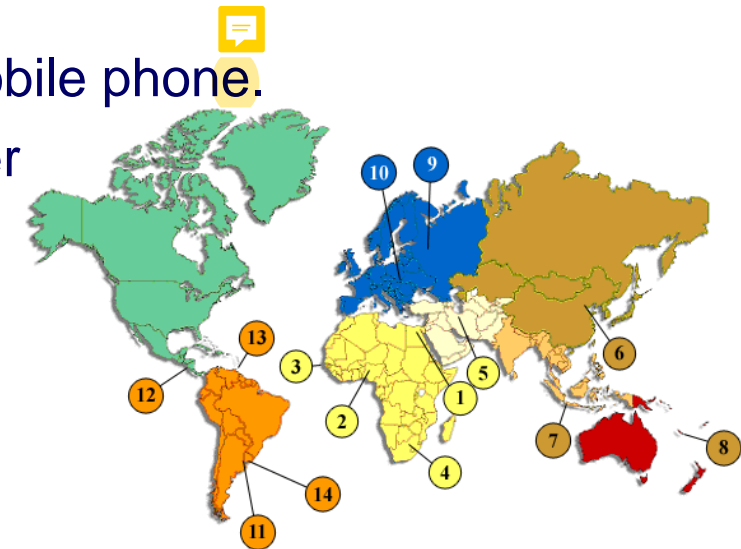
Distr.: General
6 April 2023
English only


BASEL CONVENTION

Conference of the Parties to the Basel Convention
on the Control of Transboundary Movements
of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Item 4 (b) (i) of the provisional agenda*
Matters related to the implementation of the
Convention: scientific and technical matters:
technical guidelines

**Technical guidelines on the environmentally sound management of
plastic wastes**

Note by the Secretariat



Basel Convention – Plastic Waste Partnership & Pilot Projects to improve global plastic management

- A **Plastic Waste Partnership (PWP)** has been established under the Basel Convention to mobilise business, government, academic and civil society resources, interests and expertise to improve and promote the environmentally sound management (ESM) of plastic waste at the global, regional and national levels and to prevent and minimize its generation.
- Following a call for project proposals, the steering group for pilot projects of the PWP selected **23 pilot projects to be implemented by Governments, the private sector, civil society and the Basel and Stockholm Convention Regional Centres**. The pilot projects will be implemented in 2021-2023.



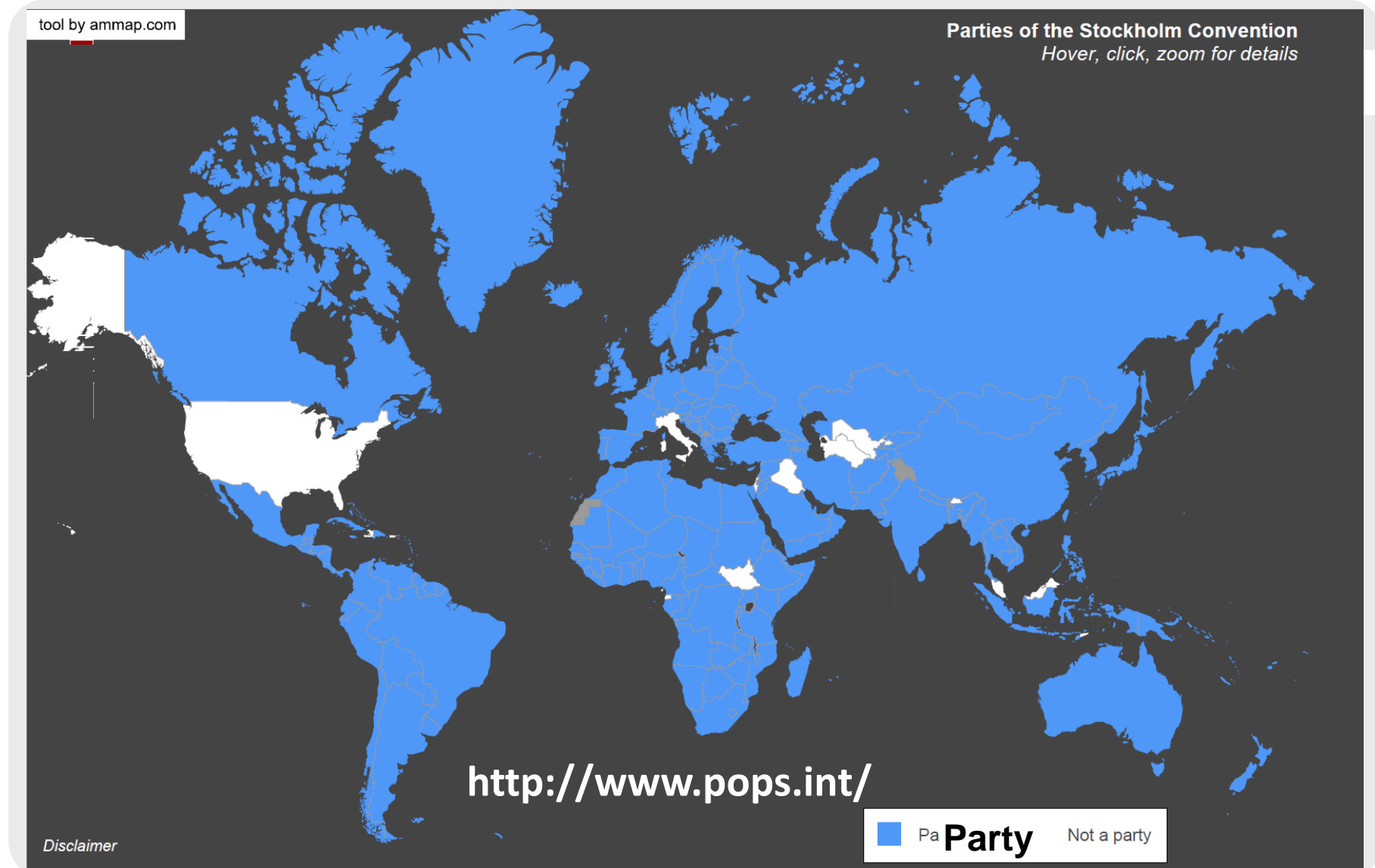
Stockholm Convention - Parties

(opened 2001; adopted 2004; www.pops.int: 186 Parties)


Reason: Global transboundary contamination of humans & environment with persistent organic pollutants.



STOCKHOLM
CONVENTION



Plastic additives as new POPs in the Stockholm Convention

 STOCKHOLM CONVENTION Chemical	Pesticides	Industrial chemicals	Unintentional production	Annex
Chlordecone α- and β- hexachlorocyclohexane Lindane (gamma HCH) Endosulfan, Dicofol Pentachlorophenol (PCP)	+ + + + +	+	By-product of lindane	A A A A A
Commercial PentaBDE Commercial OctaBDE (hexa/hepta) DecaBDE Hexabromobiphenyl (HBB) Hexabromocyclododecane (HBCD) Perfluorooctane sulfonic acid (PFOS), its salts and PFOSF PFOA and related compounds PFHxS and related compounds Short Chain Chlorinated Paraffins	+	+ + + + + + + +		A A A A A B A A A
Hexachlorobutadiene (HCBD) Pentachlorobenzene (PeCB) Polychlorinated Naphtalene (PCN)		+ +	+ +	A/C A/C

Many of the new listed POPs are additives in plastic.

Some of these have or had high production volumes.

DecaBDE, HBCD, PFOA and SCCP received exemption for continued production.

Three of POPs candidates are also plastic additives.

Therefore the control and management plastic becomes a major task in implementing Stockholm Convention.

POPRC: Chlorpyrifos, MCCP, LC-PFAA, **COP:** Methoxychlor, UV328, Dechlorane Plus



Stockholm Convention: Global Action Towards Risk Reduction of POPs

Approaches/activities for the control of POPs (with relevance for plastic additives)

- **Eliminate or restrict the production, use, import & export of POPs**
- Reduce releases from unintentional POP production
- **Promote BAT/BEP to reduce POP emissions**
- **Eliminate POPs stockpiles and wastes**
- **Procedure for adding new POPs for action (three POP candidates are plastic additives)**
- **Mechanism for financial and technical assistance (GEF projects!)**
- Information exchange by a Clearing House Mechanism

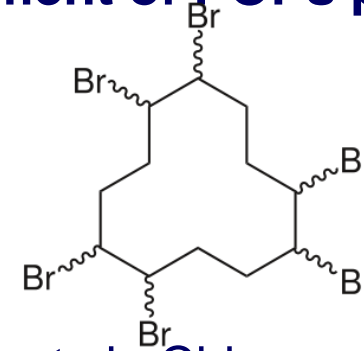


Stockholm Convention: Projects on POPs plastic additives – phase out & management

Stockholm Convention projects on global phase out and management of POPs plastic additives financed by the Global Environment Facility (GEF)

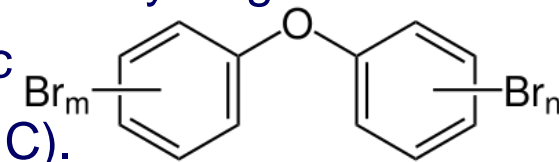
HBCD phase out project China and Turkey

- Stop of the last 8 HBCD production plants in China (stopped 11/2021)
- Assessment and substitution with better alternative flame retardants
- Elimination of HBCD stockpiles and wastes (destruction project components in China and Turkey)
- Global knowledge platform



Management of PBDE containing waste plastic fractions (Indonesia, Ivory Coast, Nigeria)

- Monitoring and separation of PBDE containing plastic fraction from e-waste to support recycling
- Management of PBDE containing plastic and destruction of PBDE containing plastic
- Monitoring & separation of PBDE containing plastic fraction of end of live vehicles (IC).

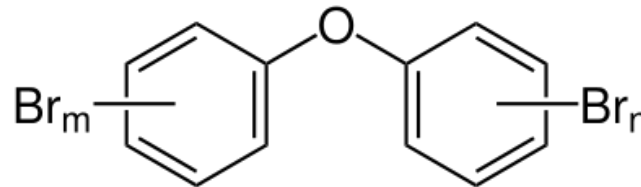
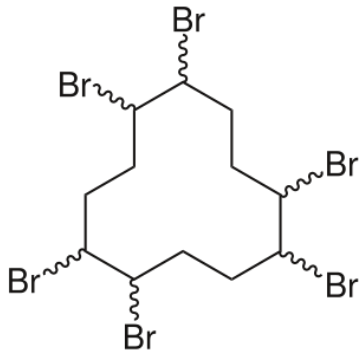


These projects can be seen as pilot projects which might be replicated in other countries and can be replicated for other POP plastic additives and possibly other additives of concern (in other frame).

Stockholm Convention: Global Action Towards Risk Reduction of POPs

BAT/BEP guidance for PBDE/HBCD and related plastics

- Within the Stockholm Convention a BAT/BEP guidance documents for the management of PBDE and HBCD and related plastics were developed.
- Compilation of separation technologies for PBDE containing plastics
- Compilation of destruction technologies for POPs containing brominated plastic waste (link to Basel Convention technical guidelines)
- BAT/BEP for the production of plastic additives



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

March 2021

UN Process for a global Plastic Treaty

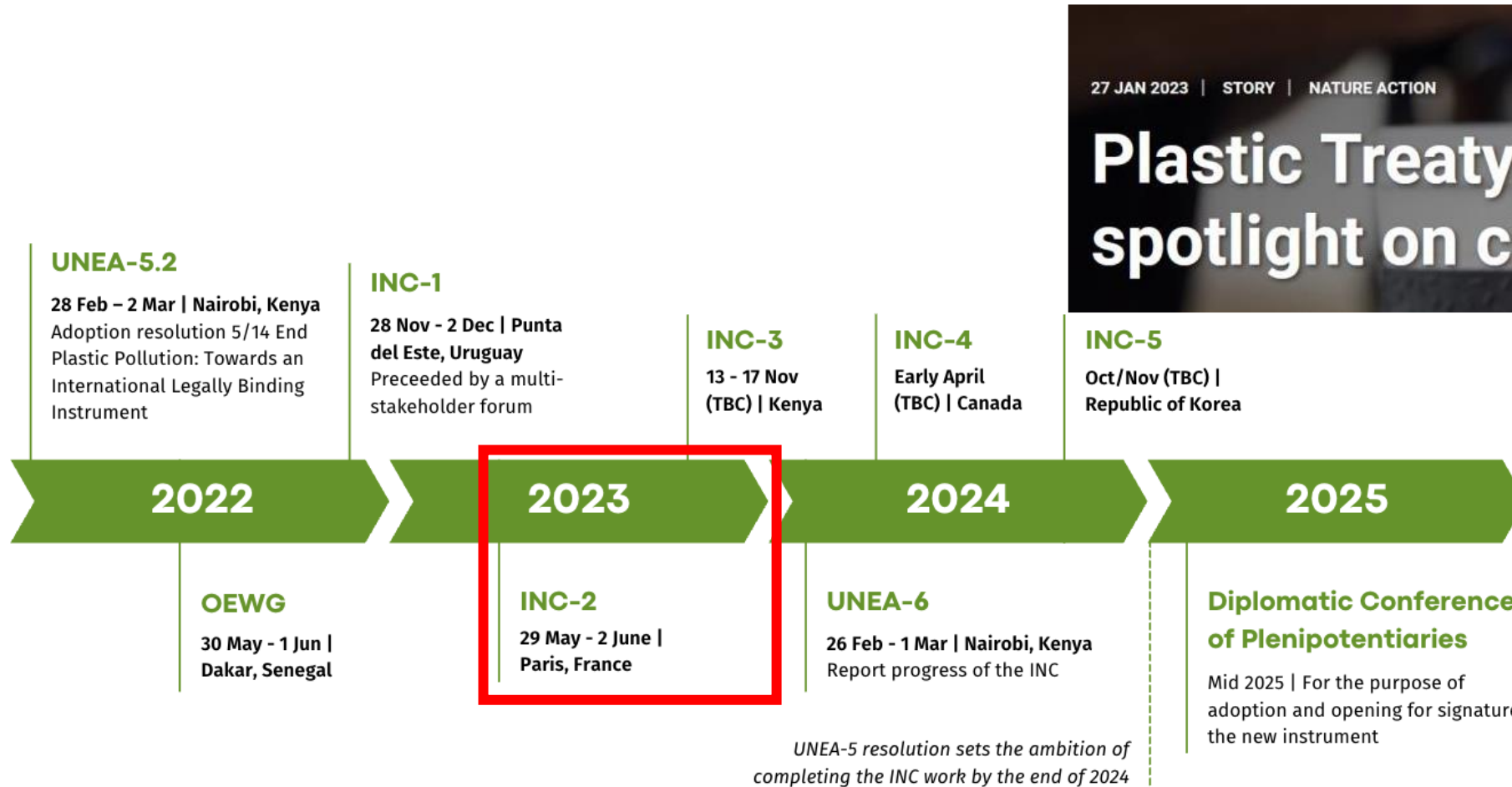
The United Nations Environment Assembly 5 (2022) adopted a resolution “**End plastic pollution: Towards an international legally binding instrument***” (UNEP/EA.5/L.23/Rev.1)

- Underlining that further international action is needed by developing an **international legally binding instrument on plastic pollution**, including in the marine environment,
- 1. Requests the Executive Director to convene an **intergovernmental negotiating committee**, commencing its work during the second half of 2022, **with the ambition of completing its work by the end of 2024**;
- 2. Acknowledges that some legal obligations arising out of a new international legally binding instrument will **require capacity building and technical and financial assistance** in order to be effectively implemented by developing countries and countries with economies in transition;
- 3. Decides that the **intergovernmental negotiating committee** is to develop an **international legally binding instrument** on plastic pollution,, which could include both binding and voluntary approaches, based on a **comprehensive approach that addresses the full lifecycle of plastic**....



UN Process for a global Plastic Treaty

- The second session of the Intergovernmental Negotiating Committee (INC) to develop an international legally binding instrument on plastic pollution, including in the marine environment (INC-2) will take place from 29 May to 2 June 2023 at the United Nations Educational, Scientific and Cultural Organization (UNESCO) Headquarters in Paris, France.



Global Plastic Treaty – Potential options for elements

- Working document INC-2 (06/2023) on “Potential options for elements towards an international legally binding instrument, based on a comprehensive approach that addresses the full life cycle of plastics...”.
- Other interesting document: “A Survey of State submissions on substantive elements (objectives, core obligations, control measures and voluntary approaches) and Implementation elements (Guarini Center 2023) ahead of INC-2. Include a section on measures and actions on “Chemicals & Additives”.



UNITED
NATIONS

UNEP/PP/INC.2/4



United Nations
Environment
Programme

Distr.: General
13 April 2023

Original: English

Intergovernmental negotiating committee to develop
an international legally binding instrument on plastic
pollution, including in the marine environment

Second session

Paris, 29 May–2 June 2023

Item 4 of the provisional agenda*

Preparation of an international legally binding instrument on
plastic pollution, including in the marine environment

**Potential options for elements towards an international legally
binding instrument, based on a comprehensive approach that
addresses the full life cycle of plastics as called for by
United Nations Environment Assembly resolution 5/14**

Note by the secretariat

Toward a Global Plastics Treaty

A Survey of State Submissions ahead of the Second
Meeting of the Intergovernmental Negotiating
Committee to End Plastic Pollution (INC-2)



Guarini Center
on Environmental, Energy
& Land Use Law
NEW YORK UNIVERSITY SCHOOL OF LAW



Origins

- «**The Scientists' Coalition for an Effective Plastic Treaty**» springs out of the Scientists' Declaration prepared for UNEA 5.2 in February 2022.
- More than 500 signatories
- Evidence of desire of scientists to meaningfully engage with the negotiation process

The Scientists' Declaration is available at www.plasticstreaty.org

Contact: Scientists.Coalition@ikhapp.org
<https://ikhapp.org/scientistscoalition/>

Scientists' Declaration on the Need for Governance of Plastics Throughout their Lifecycles

In response to the most recent United Nations Environment Programme (UNEP) global assessment on plastic pollution, we, the undersigned scientific experts, underscore that current practices of production, design, use and disposal of plastics have severe negative consequences for ecosystem health, biodiversity, human health including fertility and cancers, climate, sustainable livelihoods, cultural diversity and therefore human rights worldwide.

Approaches currently proposed for addressing plastics challenges which focus primarily on waste management and actions lower down the zero-waste hierarchy and are limited to pollution by marine litter do not adequately reflect the findings of UNEP's Scientific Advisory Committee for Marine Litter and Microplastics, which concluded that a full life cycle approach is needed which principally focuses on prevention, reduction and redesigning problematic plastics out of the global economy.

UNEP study on chemicals in plastics contributing to Plastic Treaty Process

IPCP members have prepared for UNEP a report on chemicals in plastics with following key findings:

- More than 13,000 chemicals are present in plastics.
- More than 3,200 are chemicals of potential concern (with certain hazard properties considering GHS/CLP).
- Need of a better life cycle management and control.
- Need of non-toxic alternatives for clean material cycles.



Available online at 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 Aurisano¹, Roland Weber² and Peter Fantke¹

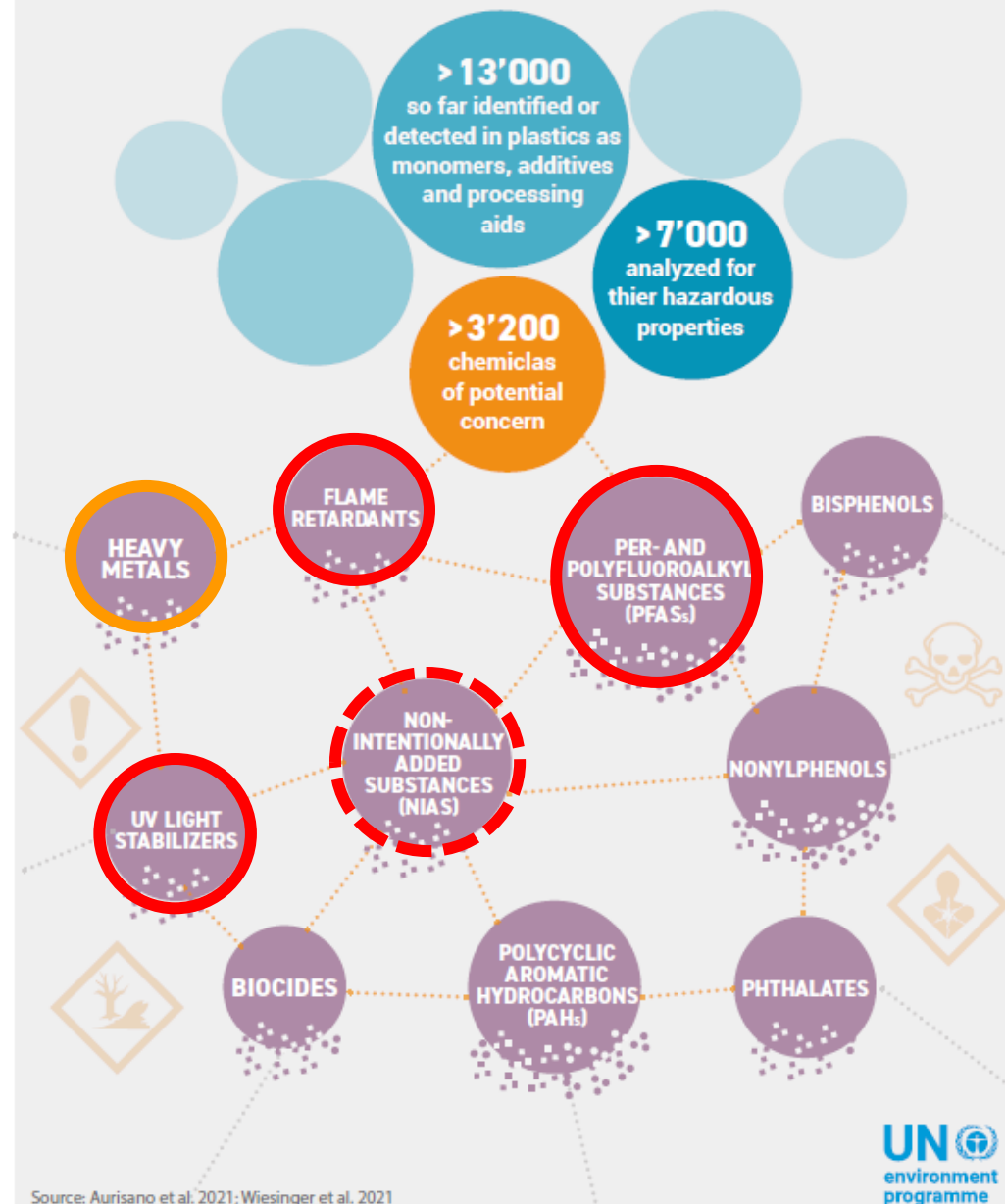
Deep Dive into Plastic Monomers, Additives, and Processing Aids

Helene Wiesinger,* Zhanyun Wang,* and Stefanie Hellweg

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



CHEMICALS OF CONCERN IN YOUR PLASTICS



Thank you for your attention !



More Information

UNEP Plastics Treaty: <https://www.unep.org/about-un-environment/inc-plastic-pollution>

Basel Convention: www.basel.int

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

Rotterdam Convention: www.pic.int

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

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

Industry: <https://endplasticwaste.org/>; <http://www.suschem.org/>

Science: <https://www.plasticstreaty.org/scientists-declaration/>; www.ipcp.ch;

NGO: www.ban.org; www.ipen.org; <https://www.ciel.org/>; www.chemsec.org

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

