POLICY BRIEFING

Transposing the Basel Convention plastic waste amendments: challenges & recommendations

gaia

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Key recommendations

Ban plastic waste imports and exports; where not possible, faithfully transpose the Basel Convention plastic waste amendments with particular attention to the following points:

- Exports of wastes with a significant plastic fraction for co-incineration or co-processing:
  - Clearly communicate and apply waste trade controls applicable to RDF, SRF, PEF, AFR and other plastic waste-based fuels
- Contamination limits in B3011 plastic wastes:
  - Impose a 0.5% contamination limit for non-hazardous, non-target material in plastic waste exports and imports
  - No hazardous and toxic contaminants
  - Place burden on exporters to prove absence of hazardous and toxic contaminants
  - Industry specifications are not an appropriate substitute for contamination limits
- Thermosets ("cured resins") and fluorinated polymers:
  - Regulate transboundary movements of all thermosets and fluorinated polymers FEP, PFA, MFA, PVF and PVDF through prior informed consent, or where applicable, a trade ban between parties to the Ban amendment for hazardous plastic wastes.
- Measures further upstream:
  - Phase out unnecessary single-use plastics
  - Support systems for reusable products & packaging
  - Phase out plastics that are challenging to recycle
  - Require disclosure on additives in plastics to end toxic recycling
  - Establish separate collection of waste at source to reduce contamination
  - Recognize and integrate waste-pickers as municipal service providers
  - Ensure recycling industries serve domestic waste-management needs as a priority

Introduction

Before April 2019, most plastic waste flows between countries were uncontrolled under international law. Exporters only had to obtain prior informed consent from importing countries before shipping hazardous plastic waste, as is the case for all hazardous waste under the Basel Convention.

However, companies in high-income countries have been exporting mixed, heavily-contaminated and often unrecyclable plastic waste abroad in order to avoid paying to properly manage it locally. The waste management sector in many of the world's highest-income countries has become structurally dependent on large-scale plastic waste dumping abroad.[1] Often, all such plastic waste is counted as "recycled" in the exporting country, regardless of its ultimate fate.

The plastic dumping loophole has lessened the pressure for authorities and private actors in exporting countries to develop adequate eco-design guidelines, EPR legislation, and recycling infrastructure to ensure that plastic waste is adequately managed in the country where it is generated. This loophole has skewed incentives for companies designing and selling plastic products and packaging, as well as for companies managing and trading resulting waste. In other words, plastic waste dumping has stopped exporting countries from developing a genuine, local, toxic-free circular economy.

For many years, China was the main destination for the world's plastic waste exports. When in 2018 China finally took action to close its borders to foreign plastic waste and resulting pollution, the global plastic waste economy was thrown into chaos. Malaysia, Indonesia, Vietnam and Thailand became some of the new destinations for global plastic waste flows that they were unequipped to manage, and that was often unrecyclable. The environmental damage from these plastic waste imports became hard to deny, as activists raised the alarm and international media increased its scrutiny. Soon, new South-East Asia destination countries began announcing bans on plastic waste imports.

Photo during the press conference at Subic Bay in the Philippines where environment group bids goodbye to Canadian waste and calls on the government to ban all waste imports in the Philippines and ratify the Basel Ban Amendment. © Albertito Lozada

In April 2019, the Basel Convention agreed on new rules that require exporters to secure prior informed consent from importing countries for shipments of all but a narrow set of non-hazardous plastic wastes.[2] These plastic wastes exempted from controls must be sorted, mostly halogen-free, free from contamination, and destined for environmentally-sound recycling. Several questions remain:

- what is the practical meaning of "free from contamination"?
- what is the relevance of additives in plastics?
- what to do about thermoset and fluorinated plastic waste currently exempted from controls although they cannot be recycled in an environmentally-sound manner?
- how do these new rules relate to fuels derived from plastic waste?

When transposing the rules into national legislation, countries can either clarify these points, or stretch them into loopholes that undermine the spirit of the Basel Convention. Countries may also pass laws that place greater controls on plastic waste trade than the Basel Convention and therefore provide greater environmental protection, such as import or export bans. And some countries will take the opportunity provided by the transposition process to pass comprehensive legislation that prevents plastic waste at source and begins a shift towards a local, climate-protective and toxic-free circular economy.

The new Basel Convention plastic waste trade rules will become effective on 1 January 2021. The new rules apply to all Basel Convention parties as importers or exporters of plastic waste, except those who have formally notified that they are not accepting the amendments. China, Canada and Turkey have signaled that they do not accept the amendments for the time being for purposes of national implementation and will not transpose them into national law for the moment, but still support them in principle.[3]

Core features of the Basel Convention plastic waste amendments

Plastic waste exempted from controls are defined in new Annex IX entry B3011 and include:

- mixes of polypropylene (PP), polyethylene (PE) and polyethylene terephthalate (PET) destined for recycling, almost free from contamination;
- shipments of a single type of non-halogenated plastic wastes destined for recycling, almost free from contamination;

Two sets of plastic wastes that were already exempted from trade controls under the Basel Convention are included in entry B3011 on an interim basis until their reconsideration at the 15th Conference of Parties to the Basel Convention in 2021 (COP15). These are:

- all thermoset plastics ("cured resins and condensation products")
- five fluorinated polymers: perfluoroethylene/propylene (FEP), tetrafluoroethylene-perfluoroalkyl vinyl ether (PFA), tetrafluoroethylene-perfluoromethyl vinyl ether (MFA), polyvinyl fluoride (PVF) and polyvinylidene fluoride (PVDF).

All other plastic wastes are either subject to prior informed consent under new Annex II entry Y48, or, if they are hazardous (new Annex VIII entry A3210), subject to a trade ban for parties to the Basel Ban amendment, and to prior informed consent otherwise.

The waste-burning loophole

The new Basel Convention plastic rules clearly require trade controls for all mixed plastic wastes not destined for environmentally-sound recycling. However, a dangerous loophole threatens to weaken these new regulations when plastic waste is pre-processed and exported as "alternative fuel" for burning.

This pre-processed waste, which usually includes a significant plastic fraction, comes under several labels and acronyms: "refuse-derived fuel" (RDF), "solid recovered fuel" (SRF), "process-engineered fuel" (PEF) and "alternative fuel and raw materials" (AFR). These labels have one feature in common: they hide the fact that these materials are wastes. However, these waste-based fuels are still wastes that clearly fall within the scope of the Basel Convention, and trade controls apply.

These waste-based fuels are typically made from mixed waste, often municipal or household waste with significant amounts of plastic. Waste is screened, dried, shredded, and can be subjected to additional mechanically separation to remove glass and metals. It can then be compressed into pellets or briquettes for subsequent incineration. This pre-processing fails to effectively and fully extract PVC and other halogenated plastics which generate toxic emissions during incineration. An organic fraction can also be extracted from these wastes but is highly contaminated with heavy metals and other toxic elements compared to compost obtained from separate organics collection.[4]

Waste-based fuels are by definition never destined for recycling; rather, they are destined for co-incineration (sometimes referred to as "co-processing"), usually in cement kilns or other industrial furnaces. Waste-based fuels partially substitute the use of conventional fuels such as petroleum coke. Their co-incineration in cement or other industrial kilns harms the environment and human health. Concerns include emissions of heavy metals (mercury, lead and cadmium), dioxins and furans, and particulate matter (including nanoparticles).[5] Emissions monitoring in cement kilns is often lacking entirely,[6] and even agencies promoting burning waste-based fuels have acknowledged this issue.[7] The gravity of resulting impacts on human health and livelihoods has triggered significant community resistance to waste-burning in cement kilns.[8]

Photo taken in Puerto Rico, in the Arecibo area in which community organizers fought against an incinerator proposal.
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Basel Convention listings clearly cover these waste-based fuels in Annex II to the Convention, under Y46 "Wastes collected from households" when the primary component is municipal waste, or the new plastic waste listing Y48, when the primary component is plastic waste from other sources. Prior informed consent is therefore required for all shipments of waste-based fuels. **Governments must clearly identify RDF, SRF, PEF, AFR and other waste-based fuels as wastes, and apply relevant Basel Convention trade controls.** Exporters must also ensure to use the correct World Customs Organization's Harmonized System codes, namely 382510 for municipal waste or 3915 for plastic wastes (there are no specific codes for waste-based or "alternative" fuels).

The significance of contamination

Many countries are dumping waste that is not safely or economically recyclable in other countries, under the pretext of "recycling". This happens in several ways:

- By shipping recyclable plastic waste mixed with unrecyclable plastic waste;
- By shipping recyclable plastic waste significantly contaminated with other wastes;
- By shipping plastic waste that contains toxic additives that make safe recycling impossible.[9]

These concerns triggered the April 2019 amendments to the Basel Convention. The amendments recognized the importance of contamination in particular, by restricting unregulated plastic waste shipments to those that are "almost free from contamination" and "almost exclusively consisting of" waste of one type of plastic polymer. These crucial terms remain undefined in the Convention. The amendments merely contain footnotes 6 and 7 that state, respectively, that in relation to "almost free from contamination and other types of wastes" and to "almost exclusively", "*international and national specifications may offer a point of reference*".

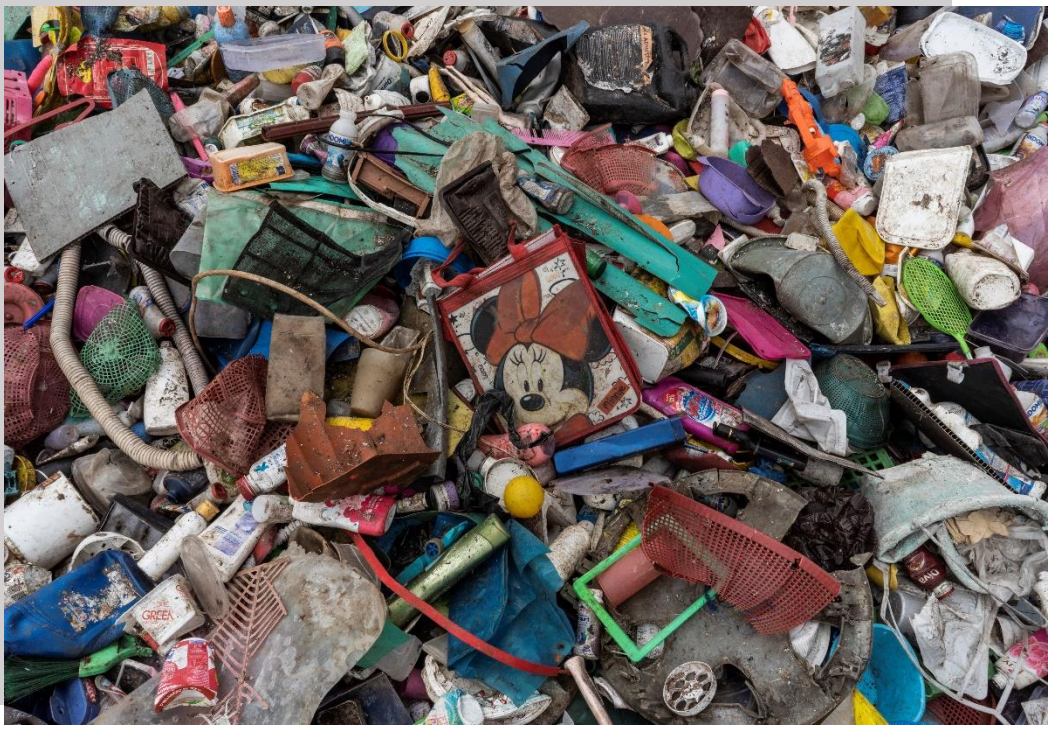
Since the Convention does not define these terms, it is up to national governments to set contamination limits for imported and exported plastic waste in a way that respects the spirit of the Basel Convention, and does not undermine it with vague language or lax standards. Contamination can be measured by mass or by volume. Every national transposition of the Basel Convention plastic amendments carries a risk of undermining the Convention if contamination limits are not clearly defined or are too lax. A binding international standard for contamination limits in global plastic waste flows would resolve this problem.

A trash picker collects plastic to recycle from a domestic waste dump in Jakarta, Indonesia on January 23, 2019. © Adam Dean

It is worth considering China's plastic waste import regulations because it imported plastic wastes to a larger extent than any other country, suffered the consequences, and adapted its regulations as a result. On 1 March 2008, China banned the import of waste plastic bags, film, and nets. In 2018, it banned post-consumer plastic scrap,[10] and tightened contamination limits to 0.5% for post-industrial plastic scrap, down from a previous limit of 1.5%.[11] In late 2018, China also banned post-industrial plastic scrap.[12] In 2020, Hong Kong, a major transshipment port and port of entry for China, also adopted a 0.5% contamination limit for plastic waste imports and exports.[13]

While caps, labels, glues, dirt and food residues are common contaminants in plastic waste, additives intentionally added to polymers during the production process, as well as unintentional additives, are also significant contaminants. When the presence of toxic additives makes plastic waste hazardous, or exceeds limit values for persistent organic pollutants in wastes, controls such as prior informed consent, or a prohibition on trade apply for countries that have ratified the Basel Ban Amendment.[14]

On this basis, **we recommend that countries impose a 0.5% contamination limit for non-hazardous non-target material in plastic waste exports and imports**, in order transpose the Basel Convention amendments faithfully. **No contamination with hazardous materials, substances or wastes, including pesticides, solvents, or medical waste, can be tolerated**. Countries may wish to adopt a gradual approach with contamination limits over a 1 or 2-year period if they are not able to enforce a 0.5% contamination limit by 1 January 2021.



Waste dump in Bantar Gabang, Indonesia
© Adam Dean

The relevance of toxic additives

"Additives" are substances added to plastic intentionally or unintentionally, mainly during the production process. Toxic additives are a risk in all plastic wastes, and shipments of plastic waste containing toxic additives endanger the environment and human health in importing countries. They may leach from plastic wastes, be circulated through recycling, and trigger additional hazards when plastic wastes are open-burned or thermally processed. Additives are relevant contaminants under the Basel Convention. The presence of toxic and hazardous additives even very low concentrations can trigger the classification of plastic waste as POPs or hazardous waste, and implies corresponding international trade controls.

Non-intentional additive substances (NIAS) include, for example:

- residual monomers and parent compounds;
- oligomers (partially polymerized substances)
- solvent residues from production process
- catalysts (such as antimony), initiators and other polymerisation aids
- chemicals that leach into plastics from plastic injection-molding machinery.

Intentional additives include, for example:

- pigments (cadmium is often used for bright red, orange or yellow)
- stabilizers (often lead or cadmium);
- surfactants, such as PFOA in PFTE;
- antioxidants, UV stabilizers;
- plasticizers (including phthalates and bisphenols);
- flame retardants (including brominated flame-retardants such as brominated diphenyl ethers, and chlorinated flame-retardants such as dechlorane, and organophosphorus compounds such as triphenylphosphine oxide).

Villagers process imported plastic in Bangun Village, near Gresik, Surabaya, Indonesia onbFebruary 22, 2019.
© Adam Dean

A recent investigation has shown the contribution of plastic additives to toxic pollution from imported plastic wastes in Malaysia. Toxic additives including lead, cadmium, molybdenum, phthalates, brominated and chlorinated flame-retardants, and polycyclic aromatic hydrocarbons were found in soil, sediment and water samples from areas of Malaysia where there is frequent foreign plastic waste dumping, recycling and open-burning.[15]

Plastic manufacturers and companies marketing plastic products have shown no transparency regarding the presence and concentration of different additives. This is a serious challenge for governments attempting to prevent imports of plastic waste containing toxic additives.

Given the risks involved, the precautionary principle applies: **shipments should not be allowed to move without prior informed consent unless exporters can establish the absence of toxic additives.** Toxic additives in plastic wastes may trigger a hazardousness classification for the wastes and the prohibition under the Basel Ban amendment would apply for all signatories.

Villagers pick through and burn discarded imported plastic in Sumengko Village, near Gresik, Surabaya, Indonesia on February 21, 2019. © Adam Dean

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The limits of industry specifications

Footnotes 6 and 7 to the Basel Convention plastic waste amendments state that in relation to "almost free from contamination and other types of wastes" and to "almost exclusively", *"international and national specifications may offer a point of reference*". Can references to industry specifications avoid the need for clear contamination limits in national legislation transposing the Basel Convention plastic waste amendments?

As mentioned previously, the pollution triggered by contaminants in plastic waste exports is one of the key problems that the Basel Convention plastic waste amendments sought to address. Existing industry specifications – which are voluntary, focused on facilitating trade, and inconsistent at the global level - have been ineffective at preventing significant contamination of plastic waste shipments, and resulting pollution. References to industry specifications instead of contamination limits will likely confuse businesses and enforcements officials alike, and increase the risk of violations of Basel Convention obligations.

Voluntary commercial guidelines, not binding environmental protection

Industry specifications are voluntary commercial guidelines developed to facilitate trade. They provide an optional framework to help plastic waste buyers and sellers negotiate their transactions and agree on prices.

For instance, the plastic waste specifications developed by US industry body the Industry for Scrap and Recycling Industries (ISRI) attribute different "grades" to bales of recyclable plastic shipments depending on levels of certain contaminants. For instance, a bale of PET bottle waste gets a "Grade A" label if it has less than 6% contamination, "Grade B" with 7-17% contamination, "Grade C" with 18-28% contamination and "Grade F" with over 28% contamination.[16]

Shipments that meet higher grades have a higher monetary value than those that meet lower grades. This means this grading system may have the opposite effect than binding contamination limits for environmental safety: shipments that do not meet high grades are sold at a lower price which may make it easier, not more difficult, for them to be traded internationally.

Industry specifications are voluntary commercial guidelines designed to facilitate trade. While they have a role to play in commercial transactions, they cannot stop contaminated shipments or shipments tainted with hazardous substances from being traded. Industry specifications should not be used as a substitute for binding environmental regulations including contamination limits in plastic wastes destined for environmentally-sound recycling.

Hard to enforce or unenforceable contamination limits

Customs officials need clear and measurable contamination limits to verify compliance with the Basel Convention. However, industry specifications for plastic waste can be too complex for customs officials to enforce, sometimes include unenforceable vague and ambiguous language on contamination, and sometimes include no contamination limits at all.

For example, ISRI specifications include limits that vary between 0 and 50% depending on the type of contaminant and the type of plastic waste. In some instances, ISRI specifications use ambiguous and unenforceable language such as "small percentages" instead of clear contamination limits.

Meanwhile, ISO plastic waste standard EN 15347 does not specify contamination levels at all - it only offers a framework for how plastic waste should be characterized, leaving it up to buyers and sellers to agree on quality requirements for each transaction. These specifications are a far cry from the "almost free from contamination" language of the Basel Convention amendments.

Imported plastic cases from electronic products mostly originating in USA, Canada and China are seen at an illegal recycling factory near Klang, Malaysia on January 21, 2019. © Adam Dean

No consistency in industry specifications at the international level

There also are no truly international specifications for plastic waste. ISRI specifications commonly used in the US are rarely used within the EU or for trade between EU and Asian countries. A significant barrier to the more generalized use of the ISO EN 15347 standard is its fee-based model, which is unlikely to change in the foreseeable future. The widespread inconsistency in industry specifications make them impossible for customs officers to enforce. Meanwhile, national-level contamination standards vary widely from country to country, which makes it difficult for industry actors to adapt their practices for compliance with the Basel Convention to facilitate safe, environmentally-sound recycling.

The European Commission's own Joint Research Centre has recognized this lack of consistency in international plastic waste contamination standards and other specifications as a key driver for the dumping of plastic waste from the UK with contamination rates as high as 20-30% in Asian countries.[17] The inconsistencies and lack of clarity in contamination standards contained in current industry specifications is a key cause in the global plastic waste crisis, and points to the need for a binding international contamination standard for global plastic waste flows. Therefore**, industry specifications are not an appropriate substitute for clear contamination limits for international trade without prior informed consent.**

Table: Differences between binding contamination limits and voluntary industry specifications

Regulatory element	Binding contamination limits	Voluntary industry specifications
Primary intent	To minimize harm to human health & the environment	To facilitate trade
Limit for non-hazardous contaminants	0.5% for all non-hazardous contaminants and all plastic wastes (previous regulation in China, and current regulation in Hong Kong)	0-50% or "low percentages" depending on type of contaminant and type of plastic waste (ISRI). Unspecified (ISO EN 15347).
International consistency	Nearly universal: all Basel Convention Parties (188 countries)	Low: ISRI specifications mostly used in the US, Canada. Businesses can set their own specifications.

Cured resins and fluorinated plastics

Two sets of plastic wastes were included in Annex IX to the Basel Convention when it was first adopted at COP4 in 1998 in Malaysia. They remain in the annex on an interim basis until their reconsideration at COP15 in 2021. These are:

- all thermoset plastics ("cured resins and condensation products")
- five fluorinated polymers: perfluoroethylene/propylene (FEP), tetrafluoroethylene-perfluoroalkyl vinyl ether (PFA), tetrafluoroethylene-perfluoromethyl vinyl ether (MFA), polyvinyl fluoride (PVF) and polyvinylidene fluoride (PVDF).

For these plastics to comply with the new Annex IX requirements for plastic wastes, they must satisfy two conditions: they must not be hazardous wastes, and they must be recyclable in an environmentally-sound manner.

An assessment of thermosets and all five fluorinated polymers reveals that they are generally unrecyclable and trigger significant hazards when thermally degraded, which is a characteristic of hazardous wastes (see sections below). Therefore, it is very likely that these plastics will be excluded from Annex IX at COP15 – and **we therefore recommend that Parties to the Basel Convention do not allow their unregulated trade.** Allowing the trade of these types of plastic waste without prior consent might trigger a need to amend national law once more after COP 15.

Many of these plastic wastes are in fact hazardous wastes under the Basel Convention, because they have hazardous constituents to the extent that they exhibit hazardous characteristics:

- All five fluorinated polymers are organohalogens (hazardous constituent Y45), and have several hazardous characteristics including carcinogenicity and acute mammalian toxicity (hazardous characteristic H11), ecotoxicity (H12) and flammability (H4.1)
- All thermosets are wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives (hazardous constituent Y13), and thermosets can display hazardous characteristics including toxicity (H11) and ecotoxicity (H12).[18]

Furthermore, there is a structural concern with the current listing of thermoset plastics on Annex IX: it is an open-ended listing. Thermoset plastics are an extremely large, diverse and growing family of plastics, and can be used with a wide and growing set of additives. An open-ended listing prevents any thorough assessment of harm to health and the environment in importing countries. This goes directly against the spirit and mission of the Basel Convention to end the transboundary toxic dumping of waste, particularly at the expense of developing countries.

In sum, these wastes trigger significant hazardousness and recyclability concerns, while there is a danger of an open-ended loophole for thermosets. For these reasons, governments who are not ready to adopt a plastic waste import or export ban **should at least regulate transboundary movements of thermosets as well as the five fluorinated polymers FEP, PFA, MFA, PVF and PVDF through prior informed consent, or where applicable, a trade ban on hazardous plastic wastes between parties to the Ban amendment.**

Obstacles to recycling

The very chemistry of fluorinated polymers and thermosets creates obstacles to environmentally-sound recycling. The chemical changes that occur during the curing of thermosets means they cannot be melted into new shapes (thermoformed), so they are not currently recycled. Most thermoset and fluoropolymer wastes are landfilled or incinerated.[19]

The second set of obstacles to environmentally-sound recycling comes from product design: fluorinated polymers and cured resins are often used in composite materials as laminates, coatings, adhesives and fillers, and composite materials are generally very challenging to recycle if recyclable at all.

Chemical depolymerisation of thermosets (solvent-based or using supercritical water) has been explored in laboratory contexts but has failed to deliver solutions at scale to date. These specialized processes also generate their own hazardous wastes for which there are no known decontamination technologies.[20]

Hazards during thermal degradation

The harder it is to recycle plastic wastes, the more likely it is that they will be open-burnt or otherwise thermally degraded. When thermosets and fluorinated polymers are thermally degraded, they emit toxic gases with hazardous characteristics. Therefore, these wastes fit hazardousness characteristic H13: "Capable, by any means, after disposal, of yielding another material, e.g., leachate, which possesses any of the characteristics listed above [other Annex III hazardous characteristics]").

Thermal degradation of fluorinated polymers harms human health, the ozone layer, the climate and the environment. FEP, MFA, and other fluorinated polymers used for cable insulation are particularly likely to be open-burned to access metal in the cables if kept on Annex IX and traded globally without regulation. Cured resins and condensation products also emit toxic volatile organic compounds (VOCs) at room temperature such as formaldehyde, phenol, styrene, chlorofluorocarbons and chlorocarbons. These emissions also occur when thermosets are heated including during controlled incineration and open burn. In addition, brominated and chlorinated thermosets have a specific risk of brominated and chlorinated dioxins and furans emissions (unintentional persistent organic pollutants) during thermal degradation.

Toxic gases emitted during thermal degradation are harmful on their own but can also multiply each other's harms. Such is the case for carbon monoxide and hydrogen cyanide, which when emitted together from polyurethane insulation form (a thermoset) significantly increase the risk of cardiac arrest and cancer, hazards well-known to firefighters.[21]

Fluorinated polymers and thermosets emit the following toxic products during thermal degradation with the following Basel Convention hazardous characteristics (non-exhaustive list):

- Perfluoroethylene/propylene (FEP): carbonyl difluoride (acutely poisonous H6.1, corrosive H8 and ecotoxic H12[22]), trifluoroacetyl fluoride and hydrogen fluoride[23] (acutely poisonous H6.1, corrosive H8 and ecotoxic H12)[24]

- Tetrafluoroethylene-perfluoroalkyl vinyl ether (PFA): fluorinated hydrocarbons, carbonyl difluoride (acutely poisonous H 6.1, corrosive H8 and ecotoxic H12), hydrogen fluoride (acutely poisonous H 6.1, corrosive H8 and ecotoxic H12), and perfluoroisobutylene (also known as PFIB, a chemical weapon, and acutely poisonous H6.1)[25]
- Tetrafluoroethylene-perfluoromethyl vinyl ether (MFA): hydrogen fluoride (acutely poisonous H 6.1, corrosive H8 and ecotoxic H12) and carbonyl difluoride (acutely poisonous H 6.1, corrosive H8 and ecotoxic H12)

- Polyvinyl fluoride (PVF): hydrogen fluoride (acutely poisonous H 6.1, corrosive H8 and ecotoxic H12)

- Polyvinylidene fluoride (PVDF): hydrogen fluoride[26] (acutely poisonous H 6.1, corrosive H8 and ecotoxic H12)
- Urea formaldehyde resins release hydrogen cyanide (reproductive toxicant H11, acutely toxic H11, ecotoxic H12 and flammable gas H4.2),[27] carbon monoxide, and ammonia[28] (acutely toxic H6.1, corrosive H8, ecotoxic H12 and flammable H8).[29]

- Phenol formaldehyde resins release carbon monoxide and formaldehyde[30] (carcinogenic and mutagenic H11, acutely toxic H6.1 and corrosive H8)[31] as well as phenol VOCs[32]

- Melamine formaldehyde resins release carbon monoxide, ammonia (acutely toxic H6.1, corrosive H8, ecotoxic H12 and flammable H8) and hydrogen cyanide[33] (reproductive toxicant H11, acutely toxic H11, ecotoxic H12 and flammable gas H4.2)

- Epoxy resins release carbon monoxide, carbon dioxide, nitrous gases and hydrogen cyanide (reproductive toxicant H11, acutely toxic H11, ecotoxic H12 and flammable gas H4.2) as well as VOCs benzene and phenol.[34]

- Polyurethanes emit toxic gas hydrogen cyanide[35] (reproductive toxicant H11, acutely toxic H11, ecotoxic H12 and flammable gas H4.2), isocyanates, and also may emit trichlorofluoromethane (also known as R11, an ozone-depleting gas regulated under the Montreal Protocol).[36]

- Brominated epoxy resins emit acutely toxic hydrogen bromide gas, which causes severe skin burns and eye damage (H6.1),[37] as well as brominated dioxins and furans.[38]

Looking upstream: building a toxic-free, climate-protective & local circular economy

As Parties to the Basel Convention transpose these new rules into their national legislation and begin to enforce them, former destination countries will enjoy some respite from the relentless dumping they have experienced, particularly since 2018 when China closed its doors to plastic waste dumping. However, the root cause of the problem remains unaddressed: the production of technically or economically unrecyclable plastics continues to increase at an alarming rate, placing an ever-growing strain on even the most sophisticated waste-management systems.

While the Basel Convention requires that Parties align with the new plastic waste amendments, it also allows them to take more ambitious measures to protect human health and the environment. Countries therefore have a golden opportunity to take a holistic approach and **address plastics at source by not only banning or regulating waste trade, but also adopting measures further upstream that regulate plastic production and use, to foster a toxic-free, climate-protective and local circular economy.** The waste hierarchy itself contains many of the answers: a responsible and circular materials economy involves reducing production and consumption where not essential, including by promoting systems that support reuse, repair and refurbishment. A growing number of countries are putting the waste hierarchy into practice by **banning non-essential single-use plastics.**[39] These efforts will be even more effective if governments also **support the introduction of reusable products and packaging and associated logistical and sanitization systems.**[40]

When a product is beyond repair, its design must ensure that it is safely recyclable without circulating toxics in the economy. Countries are supporting recycling by **restricting plastics that are unrecyclable or challenging recycle** such as expanded polystyrene (EPS) and polyvinyl chloride (PVC), and simplifying additives in order to increase recycling. For instance, Korea has ended the use of pigment additives in PET bottles and the use of most PVC food and beverage packaging.[41] **Full transparency for additives in plastics** would further support recycling and address concerns regarding the safety and range of applications of recyclate.

A more sustainable recycling economy can be supported by policies that rectify the artificially cheap price of virgin plastic. Minimum recycled content policies are also useful where plastics are needed. Meanwhile, plastic wastes that are costly to manage safely as wastes and that harm the environment and public health must be designed out of our economies.

Meanwhile, municipalities are leading the way in setting up systems to collect plastic wastes with high efficiency and low contamination, **through separate waste collection at source and deposit return systems.** Indeed, unsegregated ("single-stream") collection systems yield the highest levels of

contamination, followed by multi-stream curbside collection systems.[42] Manual sorting yields the purest plastic waste streams, but the workforce that provides it - largely informal waste workers - is under-valued and under-recognized. **Recognizing and integrating waste-pickers as municipal service-providers** is a key strategy to ensure effective separate collection of plastic recyclables and other waste streams in developing countries, while providing employment stability and benefits to waste-pickers who often come from marginalized and vulnerable communities.

The principle of proximity in the Basel Convention's preamble states that *"hazardous wastes and other wastes should, as far as is compatible with environmentally sound and efficient management, be disposed of in the State where they were generated".* This disregarded principle is the other critical key to resolving waste-management challenges, particularly in top plastic waste importing countries whose recycling industries have become dependent on foreign plastic waste while disregarding domestic recycling needs.

If many countries imported plastic waste, despite its challenges, remains of higher quality than domestically-available plastic waste, it is because lack of regulation allows low-quality, unrecyclable plastics to be placed on the domestic market. However, some countries are beginning to address the principle of proximity. For example, China has banned waste imports and increased quality requirement for plastic flake and pellet imports in an effort to **encourage its domestic recycling industry to serve domestic waste management needs as a priority.**

There is now near-universal recognition of the need to address chemicals and wastes throughout their lifecycle, and not to focus only on downstream aspects such as end-of-life trade, recycling and disposal. While it may appear more challenging at first, a lifecycle approach to reduce harm from plastics has multiple co-benefits given the significant climate and toxic pollution associated with fossil fuel extraction and petrochemical production.[43] Conversely, if we fail to tackle exponential plastic production, there is a risk that all our efforts to date, including through the Basel Convention, will be drowned under a new tsunami of plastic waste.

Endnotes

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GAIA is a global network of more than 800 grassroots groups, NGOs, and individuals. We envision a just, zero waste world built on respect for ecological limits and community rights, where people are free from the burden of toxic pollution, and resources are sustainably conserved, not burned or dumped. We work to catalyze a global shift towards environmental justice by strengthening grassroots social movements that advance solutions to waste and pollution.

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