Plastics and Chemicals of Concern In Consumer Products

Policy Brief, July 2020

The Strategic Approach to International Chemicals Management (SAICM) is a voluntary multi-stakeholder multi-sectoral global policy framework. Since its inception in 2006, SAICM has aimed to achieve the sound management of chemicals throughout their life cycle so that by the year 2020, chemicals are produced and used in ways that minimize significant adverse impacts on the environment and human health. This policy brief provides some key lessons learned since 2006 that SAICM's stakeholders may consider in moving forward beyond 2020.

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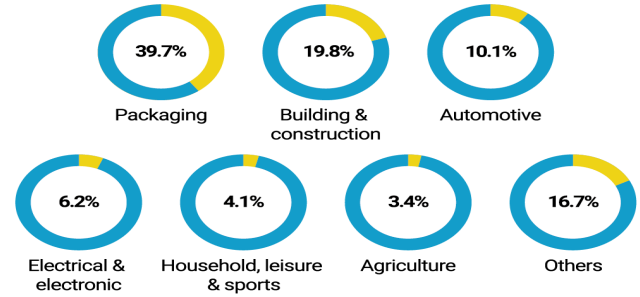
Background

Plastic production is growing exponentially

Plastics are used across the economy and in diverse downstream sectors such as packaging, construction, transportation, healthcare, textiles, and electronics.[1] Durable products, ranging from construction materials to medical devices make up nearly half of the global plastics market, while packaging products are the largest uses of single-use plastics. Some plastics contain chemicals that are considered to be harmful for health and the environment. Phthalates, poly-fluorinated chemicals, bisphenol A (BPA), brominated flame retardants and antimony trioxide are considered most harmful for health and the environment. The production of plastics increased from 1,5 million tonnes in 1950 to 350 million tonnes in 2017 and is expected to double by 2035, and almost quadruple by 2050.[2] Plastic pollution poses a serious global environmental problem. This includes among other factors, the rapidly increasing levels of plastic waste. For example, it is estimated that in 2016, the world generated 242 million tonnes of plastic waste – 12% of all municipal waste.[3] Less than 20% of plastic waste is recycled annually.[4]

Uses of Plastic: Main downstream sectors (adapted from Plastics Europe 2018, p.24)



Others refer to medical equipment, plastic furniture and furniture equipment, technical parts used for mechanical engineering or machine-building, etc.

When looking at chemicals across the value chain, chemicals of concern- meaning chemicals that may pose a threat to human health and the environment- need to be excluded in the production and recycling of plastics to ensure there is no damage to humans and ecosystems, and to enable higher degree of recyclability. It would ultimately ensure a toxic-free circular economy of plastics.[5]

Chemicals in Products have been a longstanding Emerging Policy Issue (EPI) under the SAICM framework. To further advance this issue, the GEF-funded project, "Global best practices on emerging chemical policy issues of concern under SAICM" addresses the use of chemicals of concern in three priority sectors: toys, building products and electronics, and aims to develop new tools and guidance to reduce the use of chemicals of concern in these sectors.

[1] UNEP, 2018. *"Addressing Marine Plastics: A Systemic Approach – Recommendations for Actions"*
[2] UNEP, 2019. *"Global Chemicals Outlook II"*
[3] World Bank, 2018. *"What a Waste 2.0 : A Global Snapshot of Solid Waste Management to 2050"*
[4] Basel Convention, 2020. *UNEP/CHW/PWPWG.1/INF/4 "Basel Report on Plastic Waste"*
[5] UNEP,2019. *"Addressing Marine Plastics: A Roadmap to a Circular Economy"*

The Issue

Plastics and chemical additives in products

Plastics are made up of chemicals, including polymers derived from fossil material (coal, natural gas, crude oil) and/or organic resources (cellulose, salt) and renewable compounds (grains, corn, potatoes, palm, sugar beet). During the manufacture and compounding of plastics other chemicals are often used, including initiators, catalysts, solvents and a wide range of additives in plastic products for enhancing polymer properties and prolonging their life.[6] These chemical additives can potentially migrate and eventually lead to human exposure via e.g. food contact materials. They can also be released from plastics during the various recycling and recovery processes.

Plastic waste containing hazardous chemical additives and the global trade in plastic waste is also of great concern. Actions to address plastic waste and the control of transboundary movements of hazardous wastes and their disposal is now considered under the Basel Convention. In 2019, the Plastic Waste Amendments were adopted to better control plastic waste under the Basel Convention binding framework making global trade in plastic waste more transparent and tightly regulated.

Some of the additives in plastics have potential impacts on biodiversity including in -soil, air and water. These additives include persistent organic pollutants (POPs) and endocrine disrupting chemicals, which have been linked to health issues such as cancer, as well as reproductive,and developmental diseases.[7] Some of these substances are POPs regulated by the Stockholm Convention, and used as additives, flame retardants and/or plasticizers in plastics. Other substances such as BPAs and certain phthalates have also raised concerns about the risk of adverse effects on human health and the environment in the plastics lifecycle.

	Plastic use per sector	Types of chemical additives found in plastics in sector products
Toys	90% of toys in the market are made of plastics.[8] Chemicals of concern often enter the lifecycle of toys during the production phase or through recycling materials.	Plastics used in toys contain additives, and sometimes are found to contain hazardous ones, such as phthalates, BPA or POPs. POPs and brominated flame retardants, originally used in plastics for the electronics sector, can be found in toys made of recycled plastics. Heavy metals have been found to be used as additives, pigments or in PVC parts of toys.[9]
Electronics	Plastics in electrical and electronic products account for about 20% of material used in plastics.[10] Waste in electrical and electronic equipment (WEEE) are considered to be one of the fastest-growing waste streams globally. The annual value of global e-waste as over $62.5 billion, more than the GDP of most countries. More than 44 million tonnes of electronic and electrical waste was produced globally in 2017 – over six kilograms for every person on the planet.[11]	Some POPs performing as flame retardant (especially PBDEs) hamper recycling rates in the sector. Additionally, these restricted substances may be reintroduced through recycling processes, possibly in sensitive categories such as toys or food contact materials. Heavy metals can be found in recycled plastics from electronics.
Buildings and construction products	The global buildings and construction plastic market was valued at $57.9 million in 2017 and is expected to reach $104.5 million by 2025.[12] Plastic is widely used as construction material: about 21% of the 47 million tonnes of plastic used in Europe goes into the construction sector.[13]	Polymer foams such as polystyrene are used for insulation. Phthalates can be found in flooring made of PVCs. PCBs can still be found in coating and in sealants. Flame retardants are added to foam in order to meet flammability requirements. Some flame retardants used are brominated flame retardants (HBCDD and DecaBDE) have an exemption under the Stockholm Convention to be used in construction insulation materials. If not soundly managed, these chemicals may pose a risk to the environment at end-of-life.

[6] United Nation Environment Programme, 2019. *"Global Chemicals Outlook II "*
[7] GEF STAP, 2018. *"Plastics and the circular economy "*
[8] Plastics –themag, 2011. *"Plastics shape the toy industry"*
[9] IPEN, GRID-Arendal, 2013. *"Toxic metals in children's products: an insight into the market in Eastern Europe, the Caucasus and Central Asia"*
[10] Nordic Council of Ministers, 2019. "Designing plastics circulation – electrical and electronic products"
[11] The Platform for Accelerating the Circular Economy (PACE), The E-waste coalition, , 2019. *"A New Circular Vision for Electronics"*
[12] Preeti, K., 2018. *"Building and Construction Plastic Market by Type (Thermoplastic and Thermosetting Plastic) and Application (Flooring, Window & Door Panel, Siding, Piping, Roofing, Insulation, and Others): Global Opportunity Analysis and Industry Forecast, 2018 - 2025"*
[13] Plastics Europe, 2012. *"Plastics in construction and building products"*

Exploring the Issue Further

Microplastics

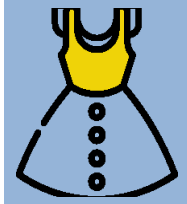
Microplastics are solid particles made of synthetic polymers, typically defined as smaller than 5 mm.[14] They can be classified in three main categories: micro-sized plastic resin pellets, secondary microplastics originating from degradation of larger plastics, and intentionally added microplastics.

While some uncertainty remains, assessments[15] highlight that the high persistence, and the continuous amounts of microplastics being released, will result in environmental accumulation and may result in certain adverse effects on the environment and/or human health in the long term.

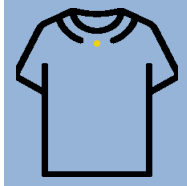
In addition, plastic such as polyethylene or polypropylene and related microplastics, are lightweight and may be transported and spread in the environment beyond the point of emission. Due to their size, it is difficult and costly to remove them from the environment, in particular from marine environments.

Initiatives focusing on reducing microplastics losses from use of consumer-related applications should not be limited to the use stage. Measures for reducing potential plastic losses in the use stage should also be implemented along the entire plastics value chain.

Microplastics and textiles microfibers



Approximately 60% of all materials used by the fashion industry are made from plastic.[16] These include synthetic textile materials, dominated by petroleum based organic polymers such as polyester, polyamide and acrylics. Textiles release fibres to the environment during production, use, and at end-of-life disposal. Microplastic pollution caused by washing processes of synthetic textiles is considered to be one of the main sources of primary microplastics.[17] Recent estimations[18] have assessed that synthetic clothes contribute around 35% to the global release of primary microplastics to the world oceans.



In moving forward, further research to gain a clear understanding of where the majority of microplastic releases from textiles occur along the value chain may help to identify corresponding interventions. Other activities may include the development of standard tests to determine releases from different textile products and alternatives and the promotion of the design of sustainable fabrics and clothing.

Intentionally added microplastics in products

Under some circumstances, microplastics are intentionally added to some products to perform a specific function. Intentionally added microplastics may be found in some detergents and maintenance products, agriculture and horticulture products, medical products, food supplements, paints, oil and gas, adhesives, 3D printing materials and printing inks.[19] Some of these particles get washed away during use and may end up in waterways and aquatic organisms. International actions and voluntary phase-out intentionally added microplastics could be scaled up to cover other products.

Intentionally added microplastics in products can be managed as early as in the design phase of a product. For example, we have seen a ban of intentionally added microplastics in cosmetic products, in many countries such as France, Italy, Canada, the US, Republic of Korea, New Zealand and others currently reviewing in countries such as Mexico, Costa Rica, Argentina and Brazil.

[14, 15] GESAMP, 2016. *"Sources, fate and effects of microplastics in the marine environment: part two of a global assessment "*
[15] WHO, 2019. *"Microplastics in Drinking Water"*
[15, 19] European Chemical Agency, 2019. *"Annex XV Restrictions Report"*
[16] UNEP 2019. *"Fashions tiny hidden secret"*
[17] Boucher, J. & Friot, D, 2017. *"Primary Microplastics in the Oceans: a Global Evaluation of Sources"*
[18] De Falco, F., Di Pace, E., Cocca, M. et al, 2019. *"The contribution of washing processes of synthetic clothes to microplastic pollution"*

Considerations to address plastics and chemical additives in products

Plastic pollution is a growing issue of concern. Further voluntary and regulatory action, as well as accelerated research and development of more sustainable alternatives, are needed in order to enable a circular economy.[20] Further development of policies and incentives encouraging design for recycling, and policies and legislation requiring plastics to be free of chemicals of concern will increase the potential for plastic products to become high-grade secondary material at end-of-life.[21]

In the three priority sectors covered under the scope of the SAICM Chemicals in Products EPI: toys, building products and electronics, the following venues to remove substances of concern from products and support a circular economy can include: innovative design of products, enhancing regulations and their enforcement, and transparent and reliable information regarding the presence of some additives that pose concerns.

Policy considerations

Strengthen scientific and technological knowledge with regards to chemical additives in plastics.

There is an opportunity to scale-up efforts at the international level as well as in the scientific community to undertake joint research on the potential risks from chemical additives in plastics as well as chemicals that are adsorbed by plastics. This could cover design considerations to avoid use of chemical additives in the first place as well as end-of-life considerations, such as the presence of hazardous chemical additives from plastics that appear in recycled products.

Increase traceability and reliability of information sharing along value chains and strengthen commitments and standards to phase-out chemical additives in plastics.

Further traceability and information along value chains as well as strengthened commitments and standards to phase-out chemical additives in plastics will support efforts to soundly recycle plastics and avoid impacts upon human health and the environment. It is key to highlighting the importance of regulations and voluntary standards and commitments, to enable a circular economy that is safely reusing and recycling materials and avoids exposure of vulnerable populations.

Coordinate actions across the value-chains of plastic products.

There is an opportunity to further develop increased global policy coordination, including coordination with chemicals and waste regulations and chemical frameworks. The discussions on the new SAICM framework for chemicals and waste beyond 2020 provides an opportunity to set a focused target to reduce chemicals of concern in consumer products. This allows for a continued space for dialogue and action for multiple stakeholders to define coordinated approaches and actions to implement solutions, promote innovation, and improve information transparency and awareness-raising on plastic pollution and chemical additives.

[20] UNEP, 2019." *Global Chemicals Outlook II"*
[21] UNEP, 2018. *"Addressing Marine Plastics: A Systemic Approach – Recommendations for Actions"*

Further Readings

Information on the Basel Convention Plastic Waste Amendements
http://www.basel.int/Implementation/Plasticwaste/PlasticWasteAmendments/Overview/tabid/8426/Default.aspx

UNEP, 2018. *"Addressing marine plastics: A systemic approach - Stocktaking report"*
https://wedocs.unep.org/bitstream/handle/20.500.11822/26746/marine_plastics.pdf?sequence=1&isAllowed=y

UNEP, 2019. *"Addressing Marine Plastics: A Systemic Approach – Recommendations for Actions"*
https://www.unenvironment.org/resources/report/addressing-marine-plastics-systemic-approach-recommendations-actions

UNEP, 2020. *"National guidance for plastic pollution hotspotting and shaping action - Introduction report"*
http://wedocs.unep.org/bitstreamhandle/20.500.11822/33166/NGP.pdf?sequence=1&isAllowed=y

Wang, F., L. Talaue McManus, R. Xie (eds.), 2019. *"Addressing Marine Plastics: A Roadmap to a Circular Economy"*
https://gefmarineplastics.org/publications/addressing-marine-plastics-a-roadmap-to-a-circular-economy

World Health Organization, 2019. *"Microplastics in drinking water"*
https://apps.who.int/iris/bitstream/handle/10665/326499/9789241516198-eng.pdf?ua=1

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