PLASTIC

DESCRIPTION: Material derived from petroleum products through the industrial process of polymerization, commonly grouped into three broad categories: thermosets (hard and durable plastics), thermoplastics (easily moulded into packaging and thin films) and elastomers (soft plastics with rubber-like properties)[1].

GLOBAL PRODUCTION/DISPOSAL: A 2017 study[2] found that 9 billion tonnes of plastic has been produced since 1950, of which 30% is in use today. Of the rest, just 9% has been recycled, 12% incinerated and the remainder persists in our landfills, soils and oceans.

COMMON SOURCES: Bottles, containers, packaging, bags, disposable tableware, stationary, plastic foams, plastic films, fabrics, construction and agricultural materials, furniture, automotive parts and casings for electronic equipment.

IMPACTS IF NOT MANAGED CORRECTLY: Plastic is made from fossil fuels and consumes energy and water in its production. Plastic takes up to 500 years to break down on land[3] and accounts for more than 80% of marine litter: more than 100,000 tonnes, mostly so-called micro-plastics, is floating in the world's oceans[4]. The European Commission says plastic is a serious threat to marine biodiversity and a vehicle for endocrine disruptors to enter the food chain, potentially endangering human health[5].

OPTIONS FOR REDUCING: Avoid the use of disposable plastics, including food containers, shopping bags and bottles in favour of containers made from more durable and reusable material, or bio-plastics that are compostable. Drink tap water where safe to do so and install water treatment plants to produce drinkable water. Choose furniture/toys/fabrics made from natural renewable fibres rather than plastic, where suitable. Look for products with less packaging and where possible buy in bulk to reduce packaging. Some countries have banned certain types of plastic bags outright (notably Rwanda and Kenya) while many others in Europe (such as Italy) require plastic bags to be degradable or charge a levy for plastic bags, providing a financial incentive to avoid disposable plastic.

OPTIONS FOR REUSING: Maximise the life of reusable plastic items and components: choose reusable bottles and containers. Bring your own mug and refillable bottle. Bring your shopping bag when buying groceries and household items. Check, clean, refurbish, repair and maintain whole items or spare parts to avoid replacing them frequently.

OPTIONS FOR RECYCLING: The majority of plastics (by volume) can be recycled, although globally just 9% of plastics have ever been recovered (30% in Europe[6]). Once collected, plastic waste is processed and turned into flakes and pellets used to make new plastic items. Unlike glass, plastic cannot unfortunately be recycled infinitely.

Plastic for recycling should be rinsed and separated from other materials. Check with local authorities or private recycling companies for guidance on what plastics are accepted in your area as this can vary widely. Some countries have introduced deposit schemes for plastic bottles/packaging providing a financial incentive to recycle.

The Plastics Industry Association (SPI) identifies six plastic types that are readily recyclable (see table below), assigning each a number from 1 to 6 as a uniform, US and international voluntary labelling system. SPI also includes a seventh code, identified as "7-OTHER," to be used when the product in question is made with a plastic other than the common six, or is made of more than one plastic used in combination.

SYMBOL	POLYMER NAME	EXAMPLES
	Polyethylene Terephthalate	Soft drink and water bottles
	High Density Polyethylene	Shampoo bottles and rigid containers
	Polyvinyl Chloride	Pipes, fittings, window and door frames (rigid PVC). Thermal insulation (PVC foam) and automotive parts.
	Low Density Polyethylene	Bags, bin liners and packaging films.
	Polypropylene	Margarine tubs, microwaveable meal trays, also produced as fibres and filaments for carpets, wall coverings and vehicle upholstery.
	Polystyrene	Yoghurt pots, foam hamburger boxes and egg cartons, plastic cutlery, protective packaging for electronic goods and toys. Insulating material in the building and construction industry.
	Other plastics, including acrylic, acrylonitrile butadiene styrene, fiberglass, nylon, polycarbonate, and polylactic acid	Any other plastics that do not fall into any of the above categories

Source (SPI) Plastics Industry Association: http://www.minigrip.com/resin-identification-codes.html, and WRAP UK http://www.wrap.org.uk/content/types-plastic

OTHER OPTIONS (LAST RESORT): Some plastics cannot be recycled and for these waste streams the most sustainable solution is combustion with energy recovery. Most waste plastics have a high calorific value of about 40 MJ/kg. In Europe 39% of plastic waste is used for energy recovery. Plastic combustion is preferable to landfilling but must use appropriate pollution control equipment. At all costs avoid open burning of plastics as this creates dioxins and other chemicals that can be ingested by humans and animals and deposited in soil and surface water and on plants. These chemicals can cause immune and reproductive disorders, respiratory illness and even cancer.

OTHER COMMENTS: This fact sheet does not address the use of bio-plastics that are vegetable based, made from starches such as corn, potatoes, rice, tapioca, palm fibre, wood cellulose, wheat fibre and bagasse (sugar cane waste). Bio-plastics are biodegradable, to varying degrees, and some can therefore be composted. Bio-plastics must not be recycled with fossil-fuel-based plastic wastes.

DID YOU KNOW?
Transporting water bottles to remote locations where the UN operates may use a quantity of fuel comparable to the amount of water.

ENDNOTES

1European Parliament, 2015, website: http://www.europarl.europa.eu/EPRS/EPRS-Briefing-564398-Understanding-waste-streams-FINAL.pdf.

2 Geyer, Rambek & Law, 2017, 'Production, use, and fate of all plastics ever made' published in Science Advances journal 19 July 2017, website: http://advances.sciencemag.org/content/3/7/e1700782.

3 European Commission, Plastic Pollution Factsheet, website: http://ec.europa.eu/environment/waste/pdf/plastic_waste_factsheet.pdf.

4 European Commission 2015, ibid.

5 European Commission; Strategy to reduce plastic waste, website: https://ec.europa.eu/environment/efe/themes/waste/strategy-reduce-plastic-waste_en.

6 Plastics Europe, Plastics Waste: recycling and recovery in Europe.

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