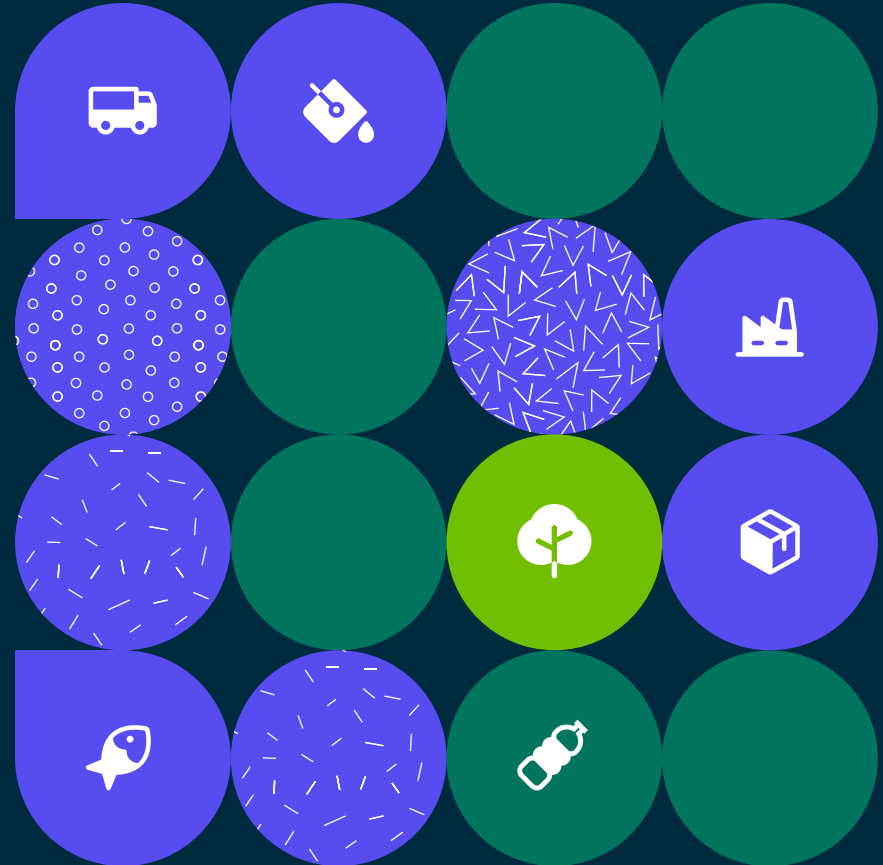


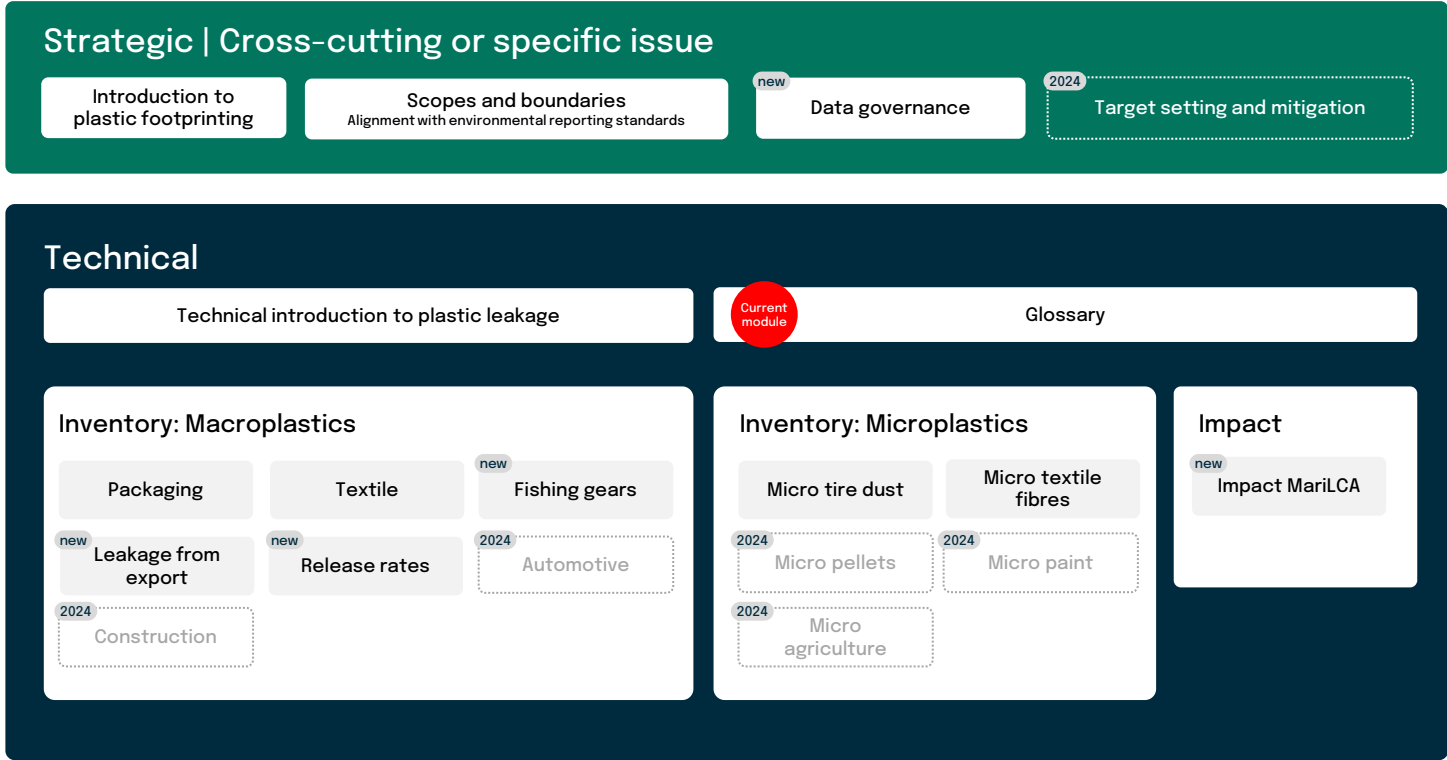
Glossary

Version 1. November 2023



Where does this module fit in the PFN landscape?

Guidance



Glossary: Plastic – The basics

Polymer:

Polymers are a group of organic, semi-organic, or inorganic chemical substances made out of large molecules. These molecules are formed by linking together small molecules, called monomers, by polymerizations processes (in Greek: polys = many, meros = part). According to the International Union of Pure and Applied Chemistry (IUPAC) polymer and macromolecular substance are synonyms. Polymers can be both natural (e.g cellulose) or synthetic (e.g polypropylene, nyol, polyester, etc.)

Plastic:

Plastics are commercially-used materials made from monomers and other raw materials chemically reacted to a macromolecular structure, the polymer, which forms the main structural component of the plastic.

The name plastic refers to their easy processability and shaping (in Greek: plas-tein = to form, to shape). Plastics are usually divided into two groups according to their physical or chemical hardening processes: thermoplastic and thermosetting resins (polymers). Plastics contain additives to achieve defined properties.

Elastomer/Rubber:

Rubber is an elastic substance which is mainly constituted by elastomers, or “elastic polymers,” large chainlike molecules that can be stretched to great lengths and yet recover their original shape. Rubbers can be natural, such as latex (aqueous suspension of cis-polyisoprene), or synthetic like neoprene, styrene-butadiene rubber and many others.

Biopolymer:

Biopolymers are polymers that are produced by or derived from living organisms, such as plants and microbes, rather than from petroleum, the traditional source of polymers. The primary sources of biopolymers are renewable. Many, but not all, biopolymers are biodegradable, which means they are capable of decomposing into carbon dioxide, methane, water, inorganic compounds or biomass by the enzymatic action of microorganisms'. Polylactic Acid (PLA) and Polyhydroxyalkoanate (PHA) are commonly used biopolymers.

Glossary: Plastic – Sources

Bio-based plastics:

Bio-based plastics are made wholly or partially from renewable biological resources. Bio-based plastics are a wide range of plastics (bio-PE, bio-PET, PLA, PHA, TPS, etc.) today produced mainly from resources such as sugar cane, sugar beets, wheat and corn. Properties, potential recycling and end-of-life options of bio-based plastics vary considerably from material to material. It is important to note that not all bio-based plastics are biodegradable or compostable.

Biodegradable plastic:

Biodegradable plastics are a family of plastics that can biodegrade (be decomposed by microorganisms into water, carbon dioxide and biomass) in a specific environmental compartment (such as soil, marine, freshwater) or a man-made environment (industrial or home composting).

Compostable plastic:

Composting is enhanced biodegradation under managed conditions, predominantly characterized by forced aeration and natural heat production resulting from the biological activity taking place inside the material. The resulting material, compost, contains valuable nutrients and may improve soils.

Industrial composting requires elevated temperatures (55-60°C) combined with high relative humidity and the presence of oxygen, and it is optimal compared to other everyday biodegradation conditions, i.e., in soil, surface water and marine water.

According to the EN 13432 standard, plastic can be called compostable if:

- the material and its relevant organic components (>1 wt.%) are naturally biodegradable (under certain conditions)
- disintegration of the material takes place in a composting process for organic waste within a certain time
- the material has no negative effect on the composting process, and
- the quality of the compost is not negatively influenced by the material



All types of plastics need to be considered when performing a plastic footprint assessment.

Glossary: Plastic – Sources

Virgin plastic:

A virgin plastic is a plastic made from virgin raw material, i.e., the extraction of crude oil. It is also called fossil-based plastic. The term “primary” is often used interchangeably with “virgin”.

Recycled plastic:

Recycled plastic is a plastic made from recovered and recycled material. The term “secondary” is often used interchangeably with “recycled”.



All types of plastics need to be considered when performing a plastic footprint assessment.

Glossary: Plastic – Additives

Additives:

Additives are chemical compounds added (e.g., during shaping of the polymer, through injection molding, extrusion, blow molding, vacuum molding) to improve the performance, functionality, and ageing properties of the polymer. These chemicals present various kind of classifications, depending on their chemical structure and/or their function. The most commonly used additives in polymeric packaging materials are plasticizers, flame retardants, antioxidants, acid scavengers, light and heat stabilizers, lubricants, pigments, antistatic agents, slip compounds and thermal stabilizers. Each additive plays a distinct role in delivering/enhancing the functional properties of a plastic product.

Glossary: Plastic – Macro and Micro

Macroplastics:

Macroplastics are large plastic waste readily visible and with dimensions larger than 5 mm, typically plastic packaging, synthetic textile or fishing nets.

Microplastics:

Microplastics are small plastic particulates below 5 mm in size and above 1 mm. Two types of microplastics are contaminating the world's oceans: primary and secondary microplastics.

Primary microplastics:

Primary microplastics are plastics directly released into the environment in the form of small particulates. They may be intentionally added to products such as scrubbing agents in toiletries and cosmetics (e.g., shower gels) or they may originate from the abrasion of large plastic objects during manufacturing, use or maintenance such as the erosion of tires when driving or of the abrasion of synthetic textiles during washing.

Secondary microplastics:

Secondary microplastics originate from the fragmentation of larger plastic items into smaller plastic fragments once exposed to the environment. This happens through photodegradation and other weathering processes of mismanaged waste such as discarded plastic bags, or from unintentional losses such as fishing nets.

Glossary: Plastic waste management

Collection rate:

Ratio between the plastic waste collected and generated. Possible fates for collected waste include: export, proper disposal (recycling, sanitary landfill or incineration) and improper disposal (unsanitary landfills, dumpsites or open burning).

Uncollected:

Waste fraction that is not collected, either by the formal or the informal sector. It excludes littering.

Littering:

Littering is the incorrect disposal of small, one-off items, such as: throwing a cigarette, dropping a crisp packet, or a drink cup. Most of the time these items end-up on the road or side-ways. They may or may not be collected by municipal street cleaning.

Dumping:

Dumping is the deliberate disposal of larger quantities of litter in an unauthorized area. Dumping can be the result of the formal or informal collection sector. Discarded items could range from a single bag of rubbish to a large sofa or broken refrigerator.

Properly disposed:

We say that plastic waste is properly disposed when it is disposed in a waste management system where no leakage is expected to occur. This includes recycling, sanitary landfills and incineration under controlled conditions.

Improperly disposed:

We say that plastic waste is improperly disposed when it is disposed in a waste management system where leakage is expected to occur. This includes unsanitary landfills and dumpsites, and open burning.

Glossary: Plastic waste management

Mismanaged waste:

The quantity of waste that does not enter a suitable waste management system. It comprises uncollected waste, littered waste, and waste that is collected but improperly disposed of.

Mismanaged waste index (MWI):

The ratio (%) between the mismanaged waste and the overall waste produced. It can be country-specific and also specific to the type of waste, as for example for textile.

Mismanaged textile waste index (MTWI):

The ratio (%) between the mismanaged textile waste and the overall textile waste produced.

Incineration:

« Proper » incineration: technology that destroys waste by burning it while respecting technical requirements and operating conditions to avoid environmental pollution. It can be with or without energy recovery.

Open burning:

Waste that is combusted without emissions cleaning.

Sanitary landfill:

Particular area where large quantities of waste are deliberately disposed in a controlled manner.

Unsanitary landfill:

Particular area where large quantities of waste are deliberately disposed in an uncontrolled manner.

Glossary: Plastic waste management - Recycling

Recycling:

Recycling is when waste materials are converted into new materials for the production of new products.

Mechanical recycling:

Mechanical recycling is the process of recovering plastic waste by mechanical processes such as sorting, washing, drying, grinding, re-granulating and compounding.

Chemical recycling:

Chemical recycling aims at converting plastic waste into chemicals. It is a process where the chemical structure of the polymer is changed and converted into chemical building blocks including monomers that are then used again as a raw material in chemical processes. There are different types of chemical recycling: from plastic to polymer (purification or dissolution), from plastic to monomer (depolymerisation, chemical solvolysis or bio-chemical through enzymes), from plastic to hydrocarbons (thermal cracking, pyrolysis, gasification).

Downcycling:

Downcycling is a recycling process where the value of the recycled material decreases over time, being used in less valued processes, with lesser quality material and with changes in inherent properties, when compared to its original use.

Upcycling:

Upcycling is when materials are recycled to produce a higher value or quality product than the original.

Domestic recycling:

Recycling of waste collected in the country. It does not include recycling of imported waste nor waste collected for recycling in the country that is exported abroad.

Glossary: Plastic Leakage

Leakage:

Plastic leakage is defined as the plastic leaving the technosphere (human environment) and accumulating in the natural environment.

Loss:

The loss is the quantity of plastics that leaves a properly managed product or waste management system.

This could be the quantity of materials that is detached from the plastic product during manufacturing, use or transport for microplastics or the mismanaged waste for macroplastics. These quantities don't necessarily end up in the natural environment, for example, part of the microfiber losses through apparel washing are recaptured in wastewater treatment plants or parts of the mismanaged plastic waste is recollected by wastepickers.

Release:

The quantity of plastics that ultimately leaves the human environment for the natural environment is said to be released. The natural environment is made out of different compartments: waterways and oceans, soil and terrestrial compartments and air.

The sum of the plastic released into different environmental compartments corresponds to the total leakage.

Glossary: Loss rates

Loss:

The loss is the quantity of plastics that leaves a properly managed product or waste management system.

Loss rate:

The ratio (%) between the lost amount and the total amount of plastic involved. It is specific to the source or activity.

For example:

- For microfibres, it is the quantity of fibres that gets lost during the washing process, it is measured in mg/kg (mg of lost fibres out of kg washed)
- For microplastic from tires, it is the quantity that is lost during the driving. It is measured in mg/km and it depends on the type of vehicle, type of road, etc.
- For packaging, it is the quantity that is mismanaged, that is to say, the whole amount of packaging waste times the MWI
- For textile, it is the quantity that is mismanaged, that is to say, the whole amount of textile waste times the MTWI

Glossary: Release rates

Release:

The quantity of plastics that ultimately leaves the human environment for the natural environment is said to be released.

Release rate:

The release is the fraction of the mismanaged plastic that is ultimately released into a specific environmental compartments : waterways and ocean, soils, other terrestrial environment, air.

Release rates are influenced by different factors, such as the size of the item, as well as the geography of the country, the distance to water and the amount of precipitations. Release rates are specific to environmental compartments, so there is a RR for Oceans and water ways and another RR for terrestrial compartments.

Releases to waterways and oceans:

Represent the plastics released to rivers, lakes or directly to oceans.

Releases to soils:

Represent the plastics released to either the soil surface or to deep soil, such as plastics leaching from waste dumps to shallow or deep soils.

Releases to terrestrial environment:

Represent the plastics released to terrestrial environment other than soils, such as plastics deposited and stored in dumpsites, plastics deposited on buildings or trees, or littered plastic packaging.

Releases to air:

Represent the plastic released to air, such as plastic micro-fibres emitted when synthetic textiles are worn.

Glossary: Types of data

Specific data:

Specific data in plastic footprinting is detailed and focused on a particular location, product, or material. It includes precise end-of-life data, such as PET polymer usage in bottles within a specific country.

Generic data:

Generic data in plastic footprinting is broader and covers a wider scope. It encompasses general information related to waste management, plastic waste, or municipal solid waste and is often applied to larger regions rather than specific situations.

Primary data:

Primary data is information obtained directly from the source, often through methods like weighing quantities conducted by the company itself. It is highly precise and specific but requires significant effort to collect.

Secondary data:

Conversely, secondary data is derived from external sources, such as literature and external data repositories, to include various factors in calculations. While it is easier to produce, it tends to be less precise compared to top-down data.

Directly weighed data:

It refers to quantitative information obtained through direct measurement. This often occurs when a company can measure the weight of its products and the volume of products sold.

Extrapolated data:

Extrapolated data is derived from estimates based on average values or literature when direct measurement is unfeasible. For instance, it is used to estimate the number of microfibers lost during production without conducting specific tests.

Glossary: Types of data

Economic data:

Economic data is presented in the form of sales revenue or monetary figures. This type of data is typically expressed in terms of financial transactions, such as the revenue generated from the sale of products.

Quantity data:

Quantity data is the specific weight or amount of a product typically needed for plastic footprinting. When this weight data is not readily available, it can be derived from sales data and the average weight of the plastic products sold, thus converting economic data into the weight-based data.

Our commitment to continuous improvement

The Plastic Footprint Network's successful collaboration is built on pillars of:

- Open
- Non-competitive and productive dialog
- Leveraging science and supporting ongoing research
- Broadly empowering global stakeholders (product manufacturers, brand owners, treaty negotiators, regulators, consultants, NGOs, etc) to effectively do their part to address the plastic pollution crisis.

Given corresponding commitments to transparency and continuous improvement, we welcome and encourage your feedback and input on this document so that the methodology can continue to be enhanced and refined.

Thank you for supporting the work of the Plastic Footprint Network.

Contact us at: contact@plasticfootprint.earth

Our mission is to continuously advance Plastic Footprint Methodology, ensuring it remains at the forefront of sustainable practices and promoting its widespread adoption. By empowering companies to rigorously assess, enhance, and transparently report their plastic footprints, we aim to make significant strides in mitigating the plastic pollution crisis.

Plastic Footprint Network

The Plastic Footprint Network is convened by EA – Earth Action



This working group was led by:



PFN secretariat is led by



Scientific Committee



2023 members





Illustrations by German Kopytkov



Plastic Footprint Network

www.plasticfootprint.earth

contact@plasticfootprint.earth

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