



# Plastic Footprint Event

June 17, 2026

# WELCOME!

# Agenda

10:00 Opening

10:05 Health impact microplastics (dr. Heather Leslie)

10:35 Methodology plastic footprint (Earth Action & a.s.r.)

10:55 BREAK

11:10 Current regulatory developments (VBDO)

11:25 Innovators present solutions:

- Regeneration.VC (Narina Mnatsakanian)
- Princess Traveller (Tim Ouborg)
- Infinity Recycling (Nicky van 't Hof)

11:55 Closing

12:00 Lunch



Plastic Footprint Event 2026

# Keynote: health impact of microplastics

By ecotoxicologist dr. Heather Leslie





# Plastics, the environment and health

Dr. Heather A. Leslie

Plasticvervuiling terugdringen met  
beleggen | Plastic Footprint Event  
ASR Utrecht 17 June 2026

# What's in the air?

*ventilating 6 L of air/min...*

# What are we swallowing?

*87 tonnes of food and drinks during a lifetime...*

# What's our largest organ absorbing?

*synthetic textiles, cosmetics, devices...*

# What's in our stuff?

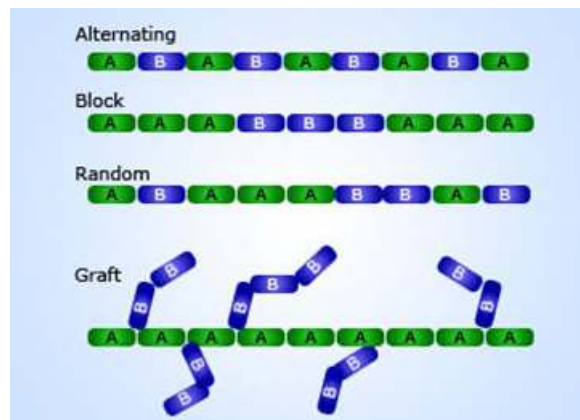
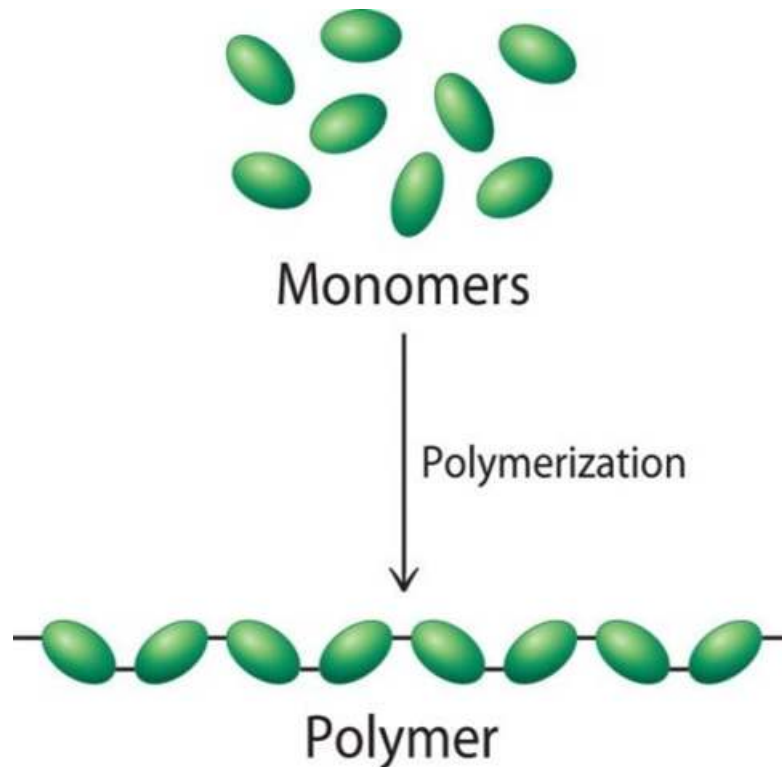
# ...and is it contaminating the environment?

*plastics leach chemicals and shed microplastics at home/office/school/outdoors/roads/nature*

What is plastic?



# polymers



# additives

*thousands of substances of concern...*

Seewoo et al.2023

- Monomers
- Accelerants
- Antifoams
- Antidegradants
- Antioxidants
- Biocides
- Blowing Agents
- Deuterated Phthalates
- Coupling Agents
- Cross Linking Agents
- Flame Retardants**
- Plasticizers**
- Bisphenols**
- PFAS**
- UV Stabilizers
- Antistatic agents
- Processing Aids
- Retarders
- Recyclate(re)stabilizers
- Fragrances
- Stearates
- Antiozonates
- Dyes & Breakdown Products
- NIAS, fillers
- Heavy metals

*'Microplastics are like a  
time release capsule!'*

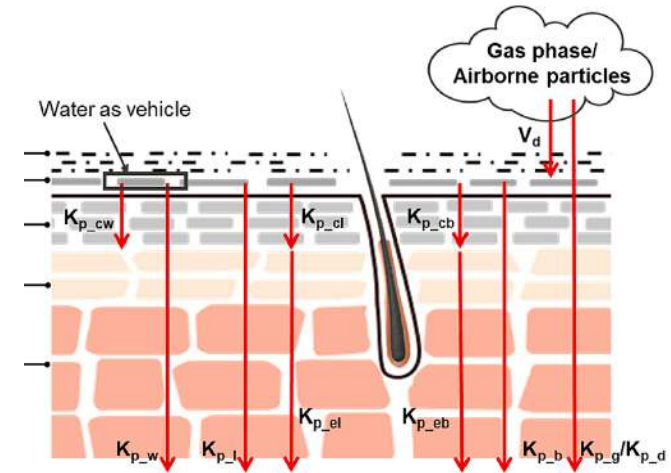
# How do plastics and associated chemicals get in?



breathe



swallow



skin

Wang et al. 2024

Once absorbed  
they gain access to biological systems

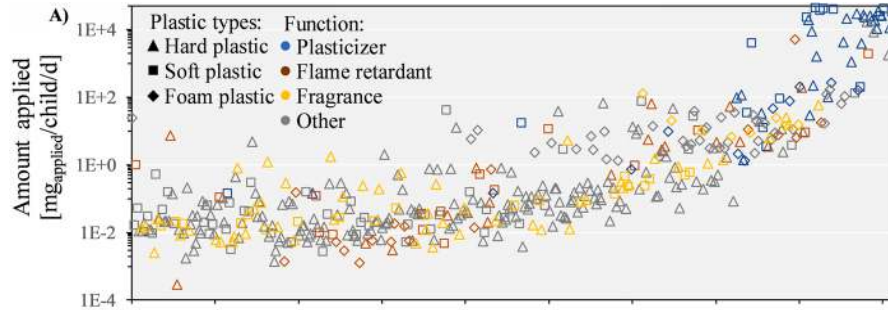
Plastic is an everyday thing

# plastic toys



>100 of Chemicals of Concern

6-800  $\mu\text{g}$   
PBDE/g



Aurisano et al. 2022  
Leslie et al. 2016

# mattresses

adults and baby's rooms

Polyurethane

Multiple unhealthy volatile compounds

Oz et al. 2019

# nylon textiles

microfibres  
bisphenols  
heavy metals (Cr, Al)  
PFAS  
flame retardants

Song et al. 2023

# antiwrinkle cream

Who is wearing  
polyethylene on  
their skin today?

10kV x1,000 10um 0015 09 25 SEI

0  $\mu\text{m}$  250

# flower fields

Microplastic delivery of pesticides: *controlled release formulations*

5 pesticides in urine of people living near Dutch fields

RIVM 2019

# GRP pollution and waste incineration

Emissions of dozens of chemicals to air:  
VOCs  
Semi-VOCs  
PAHs

IMO 2019

# tires and turf

Phthalates  
per- and polyfluoroalkyl substances  
PAHs  
Heavy metals  
*carcinogens, neurotoxicants, mutagens, and EDCs*

Murphy et al. 2022

# desktop 3D printers

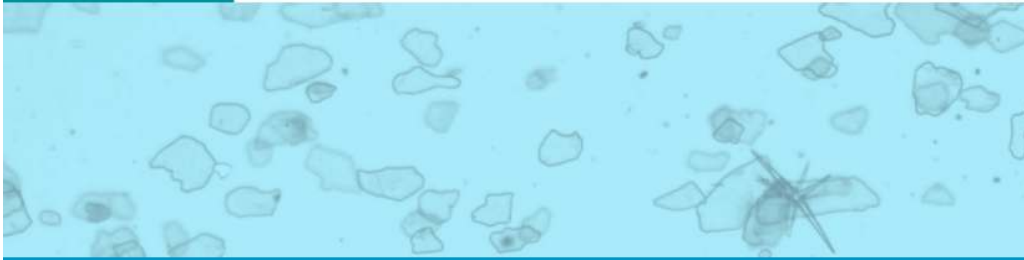
Thermoplastics releasing gases and particles

UFP (<100 nm) 1000s/cc air  
VOCs e.g. styrene up to 110 µg/min

Azimi, Stephens et al 2016

Photo: Creative-Tools.com

FULL REPORT



Heather A. Leslie, PhD

## Exploring Everyday Microplastic Exposures

Recent evidence of products  
delivering microplastic to humans

2026



Read about  
products you  
didn't expect  
were everyday  
microplastic  
shedders.

Available from [heather-leslie.com/news](https://heather-leslie.com/news)

# Real world exposure: nascent studies of plastic particles in humans

- placenta
- blood
- breastmilk
- urine
- feces
- testes, sperm
- thrombus/blood clot
- huidader, artery
- bronchoalveolar lavage
- meconium
- colon
- lung
- liver
- spleen
- olfactory bulb/brain

**Table 1** Recent reports on micro and nanoplastics concentration and numbers, size, polymer type, detection frequency, and applied detection methods in human matrices

Matrix	Concentration/number	Size (µm)	Polymer type	Detection frequency	Detection method	Ref
Blood	1.6 µg/mL	≥0.7	PET, PE, PS, PMMA	17/22	Py-GC-MS	[7]
	6 MPs (in 0.5 mL)	20-67	PA6, PE, PEAA, PSAN, PVAL	5/8	µRaman	[9]
	2-114 MPs/mL	20-184	PA, PET, PP, PUR, PS, PE, PVC, PC, PMMA	14/14	LDIR	[10]
	88-1460 events/µL	≥0.2	-	224/224	Flow cytometry	[17]
Thrombus	61.8-141.8 µg/g	20 - >100	PA6.6, PVC, PE	24/30	Py-GC-MS, LDIR, and SEM	[18]
				4/5	µFTIR	[19]
				17/17	Py-GC-MS	[20]
				30/44	µFTIR and SEM-EDS	[14]
				45/45	µFTIR and µRaman	[21]
				4/6	µRaman	[8]
				18/18	LDIR	[15]
				17/17	LDIR	[16]
				62/62	Py-GC-MS	[22]
				10/10	µFTIR	
				12/12	LDIR	[12]
				0/16	µFTIR	[23]
				11/11	µFTIR	[24]
				13/20	µRaman	[25]
				11/13	µFTIR	[26]
				11/12	LDIR and SEM	[27]
				26/34	µRaman	[11]
				7/7	LDIR	[12]
				5/11	µRaman	[28]
				3/5	µRaman	[28]
				11/25	LDIR	[13]
				6/10	µRaman	[29]
				4/6	LDIR	[13]
				4/6	µRaman	[30]

Are we all microdosing plastic?

Legend: CPE: Chlorinated Polyethylene; µFTIR: micro Fourier Transform Infrared Spectrometry; PA: Polyamide; PA6: Polyamide 6; PA6.6: Polyamide 6.6; PE: Polyethylene; PEAA: Ethene-Ethyl Acrylate Copolymer; PEMA: Poly(methyl methacrylate); PHT: Phthalate; PEVA: Ethylene-Vinyl Acetate Copolymer; PLA: Polylactide; PSU: Polysulfone; PTFE: Poly(Tetrafluoroethylene); ALK: Alkyd Resin, Resin2: Alkyd/Epoxy/Hydrocarbon; PSAN: Polystyrene; Py-GC-MS: Pyrolysis Gas Chromatography-Mass Spectrometry; SEM: Scanning Electron Microscopy; TPE: Thermoplastic Elastomer

Brits et al. 2024

Leslie et al. 2022

# Measured effects of exposure to plastic particles

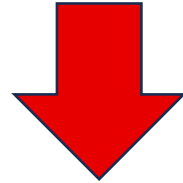
*in vitro* cell lines and animal models

- ↑ ROS
- ↑ oxidative stress
- ↑ inflammation
- ↑ cardiotoxicity
- ↓ lipid digestion
- ↓ cell viability
- ↓ cell contractility
- ↓ energy metabolism
- ↓ liver weight
- ↓ metabolism
- abnormal gut flora

Table 1 (continued)

Polymer	Particle Size	Shape	Cell Model	Biological effects	Significance	Ref
Virgin PS	0.5 µm	Spherical	A general-purpose rat model (Wistar)	* Cardiovascular toxicity observed.	* PS exposure significantly increased the levels of CK-MB and Troponin-I in 50 mg/L PS-treated rat hearts.	[64]
Virgin PS	5 µm	Spherical	Immortalized epithelial colon cells (Caco-2 cells)	* Decreased cell viability *Inflammation)	* No significant decrease in cell viability of PS-treated groups observed. * TRPV1, NOS2, IL-1β, and IL-8 genes were significantly upregulated in 12.5 mg/L, 25 mg/L, and 50 mg/L concentrations of PS.	[65]
1 µm Virgin and Fluorescent PS 10 µm Virgin PS	1 µm and 10 µm	Spherical	Malignant human lung epithelial (A549) cells	* Reduced cell proliferation observed. *Morphological changes in cells.	* 24, 48, and 72 h PS treated cells gave significantly fewer absorbance readings than unexposed cells. *No analytical significance given for morphological changes.	[66]
Weathered PP	Smaller than 20–25 µm	Irregular	Model cells for macrophages (PBMCs Raw 264.7 cells)	* Increased ROS observed.	* IL-6 expression changed significantly with PP concentrations of >100 µg/mL at the smaller sizes. *Small PP particles caused a significant increase in ROS levels. * Larger PP particles did not cause any change at 1000 µg/mL concentration.	[58]
Virgin PE	10–150 µm	Spherical	Common inbred strain (C57BL/6) of laboratory mice	* Change in bacterial diversity in the gut and induced dysbiosis. * Induction of intestinal inflammation. * Reduced lipid digestion	* PE particles showed a significant increase in the number of gut microbes, floral diversity, and abundance of bacteria. * Compared to the control group 600 µg PE treated mice showed inflammation. * All the MPs significantly reduced lipid digestion over time.	[22]
Virgin PE, PVC, PET and PS MNPs	50 nm-10 µm	Spherical	In vitro triculture small intestinal epithelial model (Caco-2, HT29-MTX, and Raji B cells)			[67]
Weathered PE	200–800 µm	Fibers	Xenopus laevis	*Physical gastrointestinal tract occlusion, gut epithelium piercing.	*No mortality observed by significant reduction in mobility detected.	[68]
Virgin PMMA	40 nm	Spherical	Xenopus laevis	*Impaired survival, growth rate and severe deformations.	*No significant effects on mortality. Three concentrations tested 1, 100 and 1000 µg/L. Negative effects only observed at 1000 µg/L.	[69]
Virgin PS	100 nm	Spherical	Caenorhabditis elegans	*Increased oxidative stress, fatty acid oxidation, glycolysis and oxidative phosphorylation. *Neurotoxicity observed from levels as low as 1 µg/L.	*Redox homeostasis, ATP level, lifespan, and fecundity of C. elegans was affected at all concentrations (0.1, 1, or 10 mg/L PS) tested.	[70]
Virgin PS and Carboxyl modified PS	1 µm	Spherical	Caenorhabditis elegans		*Carboxyl modified PS (mimicking surface oxidised PS particles in soils) effects neurotransmission of dopamine, glutamate, serotonin, and GABA and caused significantly more neurotoxicity as unmodified PS.	[71]
Carboxyl modified PS	2 µm	Spherical	Drosophila melanogaster	*Concentration-dependent necrosis and apoptosis in midgut cells. *Sex-specific changes in survival post-treatment.	*Male flies showed higher mortality rates post treatment as female flies. Effects observed at 500 µg/L.	[72]
Weathered PET	40 nm	Irregular shapes	Drosophila melanogaster	Oxidative stress and DNA damage induction were markedly increased	*Intestinal barrier was crossed and particle internalisation into cells was observed. This caused significant changes in the expression of genes involved in stress and oxidative damage regulation. *Physic damage in the intestinal barrier was observed.	[73]

Toxicity and disease burden:  
4200 toxic plastic-associated chemicals



Endocrine disruption  
Neurotoxicity  
Carcinogenicity  
Chronic inflammation  
Infertility  
Mixture toxicity  
and others

Wagner et al. 2024  
Seewoo et al.2023  
Trasande et al. 2024  
Landrigan et al. 2025  
Rocklov et al. 2026

# Plastic pollution changes the whole world

Health damage costs est. **\$249 billion/y** in USA

(from phthalates, PFAS and flame retardants, Trasande et al. 2024)

**nearly universal exposure** - humans and environment

80% of chemical production (excl. fuel) are **polymers**

**2.3 billion tonnes** chemical production capacity, US \$5 trillion

(Second UN Global Chemicals Outlook)

**emissions** during feedstock extraction to product end-of-life

**no testing for safety** >50% of HPV

**limited pre-market evaluation** of new chemicals

mandatory in only past decade / only a few high-income countries

A clear plastic bag is shown floating in the ocean. The water is a deep blue-green color, and the bag is partially submerged, with its top edge above the surface. The bag is crumpled and appears to be drifting. The background shows the surface of the water with some ripples and a bright light source, possibly the sun, creating a shimmering effect. The overall scene is a visual representation of plastic pollution in the marine environment.

What does it take to mitigate plastic pollution and its effects?

Synthetic bioplastic drop-ins?

Recycling?

Biodegradable polymers?

Material substitutions?

Functional substitutions?

Sustainable investments?

Regulations?

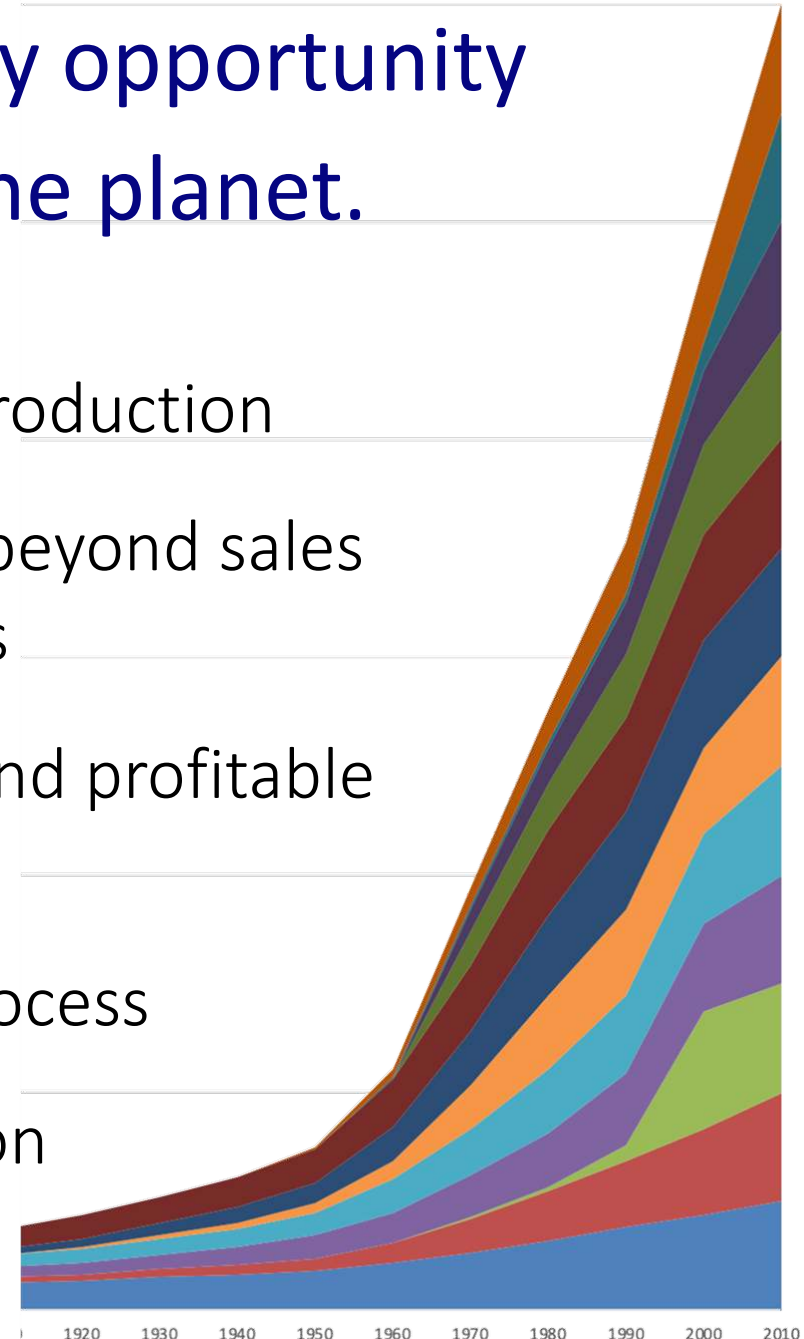
Awareness?

Political will?

?

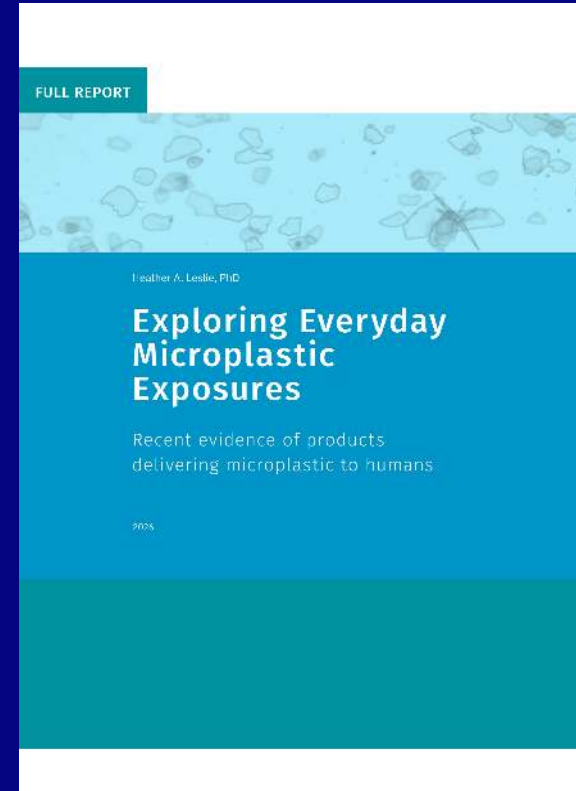
# We have an extraordinary opportunity to improve the health of the planet.

1. Building the case for cleaner production
2. Quality information that goes beyond sales pitches, into the nuts and bolts
3. Probing options, finding true and profitable solutions
4. Informing the due diligence process
5. Connecting knowledge to action



*Let's connect!*

heather-leslie.com



heather  
leslie  
projects

Amsterdam-based consultancy and independent research organisation for environment and health solutions.

Plastic Footprint Event 2026

# Methodology for calculating the financed plastic footprint

By Riccardo de Gennaro, Earth Action & Emilia Leijnse, a.s.r.





# Why focus on plastic pollution?

a.s.r.'s responsible investment strategy focusses on 4 themes:

- ✓ **Health & wellbeing**
- ✓ Human rights
- ✓ **Biodiversity & natural resources**
- ✓ Climate change & the energy transition

Plastic pollution causes biodiversity loss and health issues.

Assessing financed plastic pollution reveals where portfolios drive negative impact, enabling targeted engagement.



**Reduce harm**



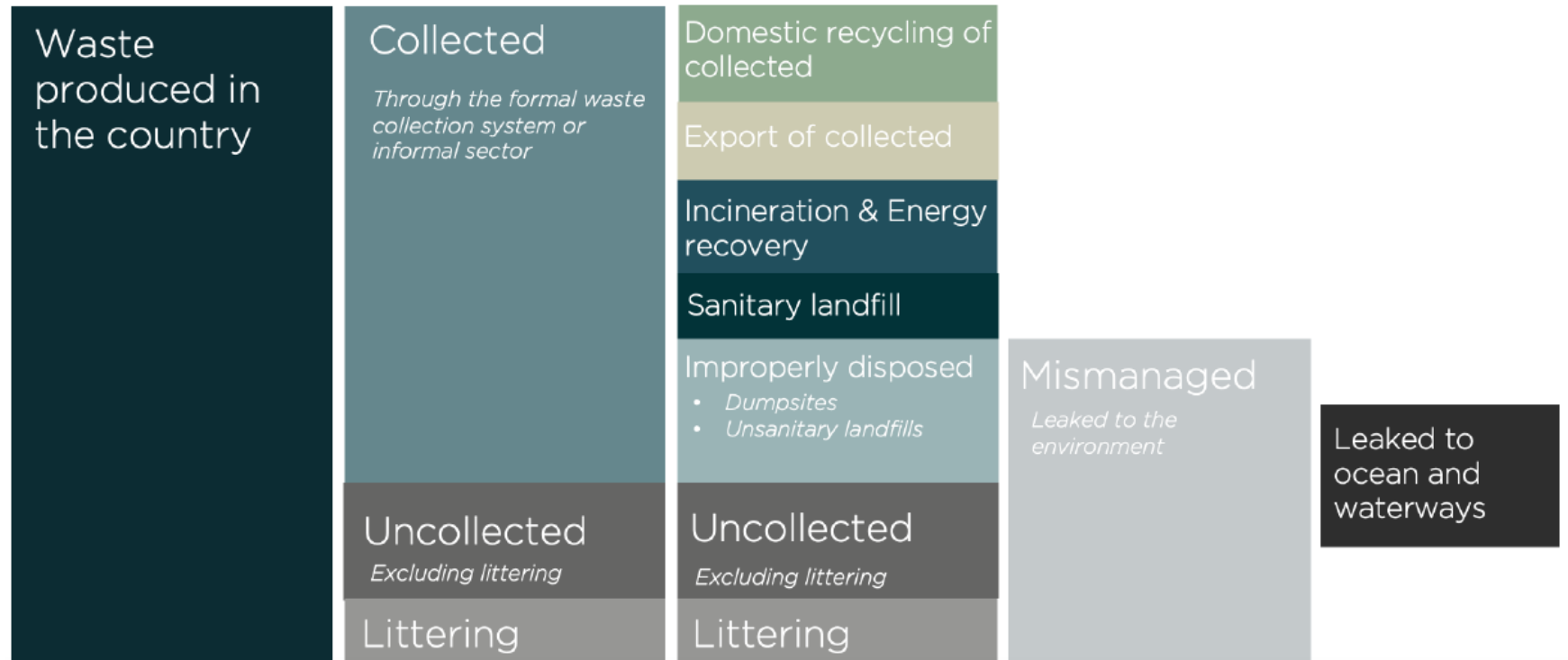
**Drive change**



**Create impact**

# What is plastic pollution?

Any given country will produce a total volume of plastic waste. Of that plastic waste, a portion will be treated by existing waste management systems. Another portion will remain unmanaged, hence leaking to terrestrial and aquatic ecosystems. It is this portion of mismanaged plastic waste that is the cause of plastic pollution i.e., plastic waste found in natural environments.



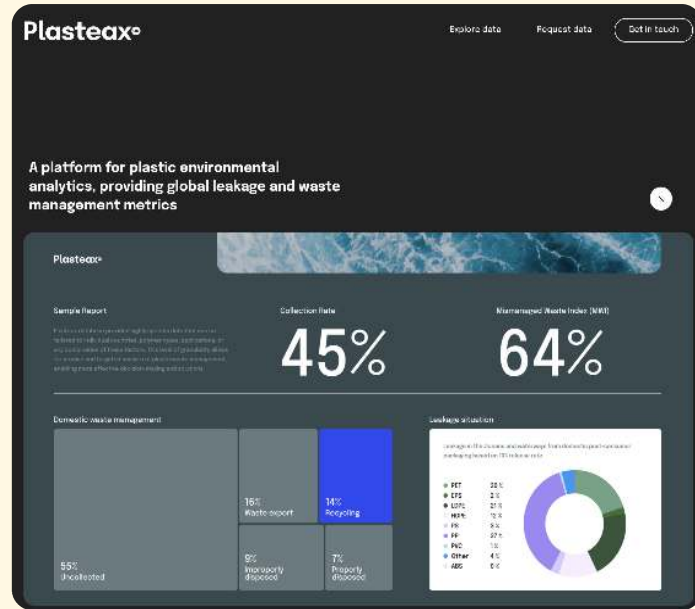
# What is plastic footprinting?

*Measuring plastic pollution at company or portfolio level*

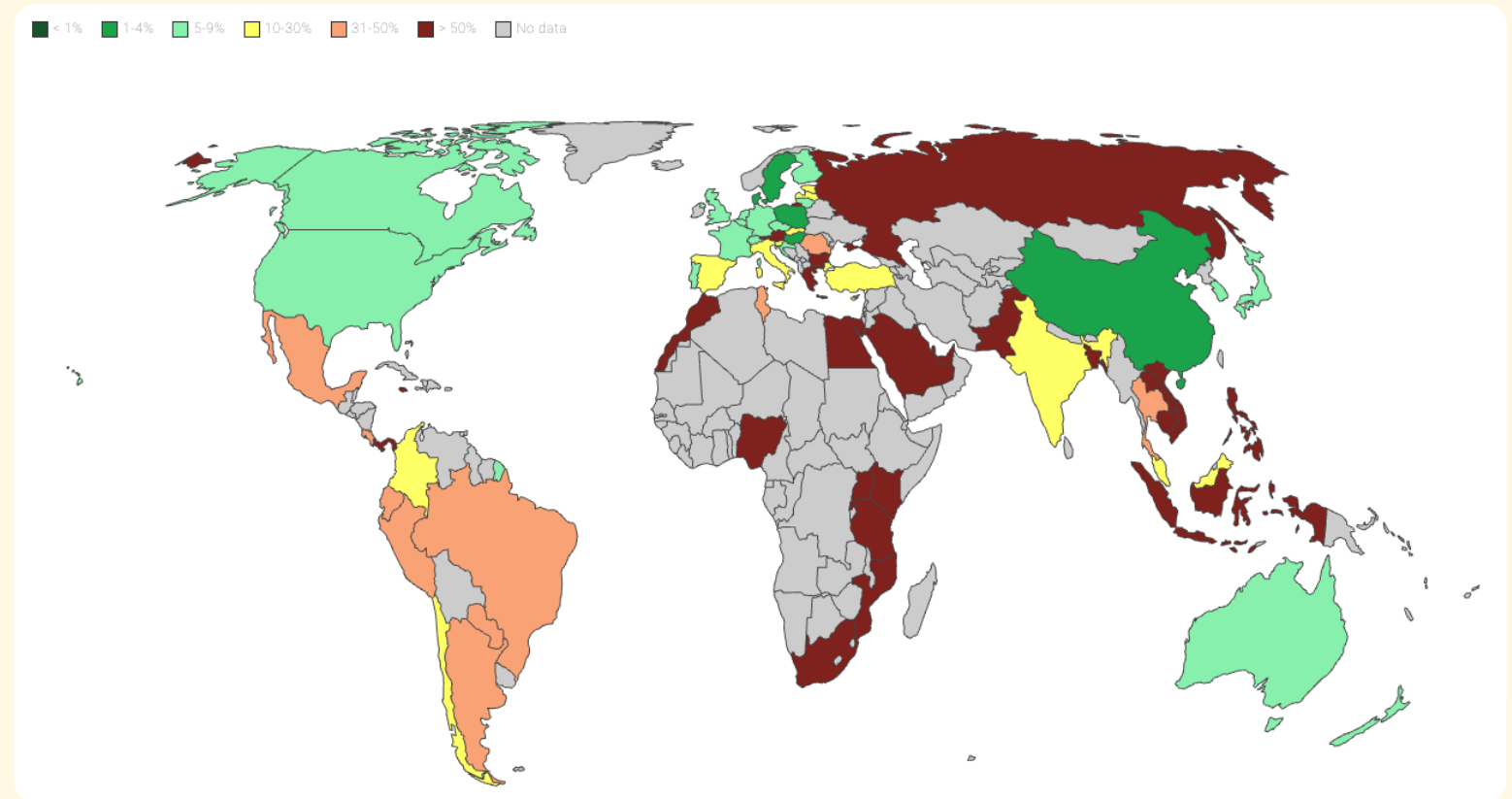
- To understand how much plastic pollution a company is responsible for, a company needs to take inventory of its total plastic use per country and calculate how much plastic is mismanaged in that country. That allows to calculate the plastic footprint of a company. In turn, the plastic footprint can inform the human health & ecosystem impacts.
- Company data and reporting is limited which makes it difficult to assess specific impacts.
- The methodology integrates a component that takes into account how much effort a company makes in reporting and setting targets on plastic.
- Companies can improve their score by reporting and setting targets, can be used in engagement with portfolio companies.



# Plasteax – geographic resolution of plastic mismanagement



Plasteax provides country-specific **MWI (Mismanaged Waste Index)**, namely the probability for plastic waste to be mismanaged in a country.



 **Packaging DataHub** Powering smarter packaging decisions.  
by  & 

<https://www.packagingdata.earth>

# CDP plastic questionnaire and the PPS

The PPS (Plastic Performance Score) allows to introduce a bonus score for companies that:

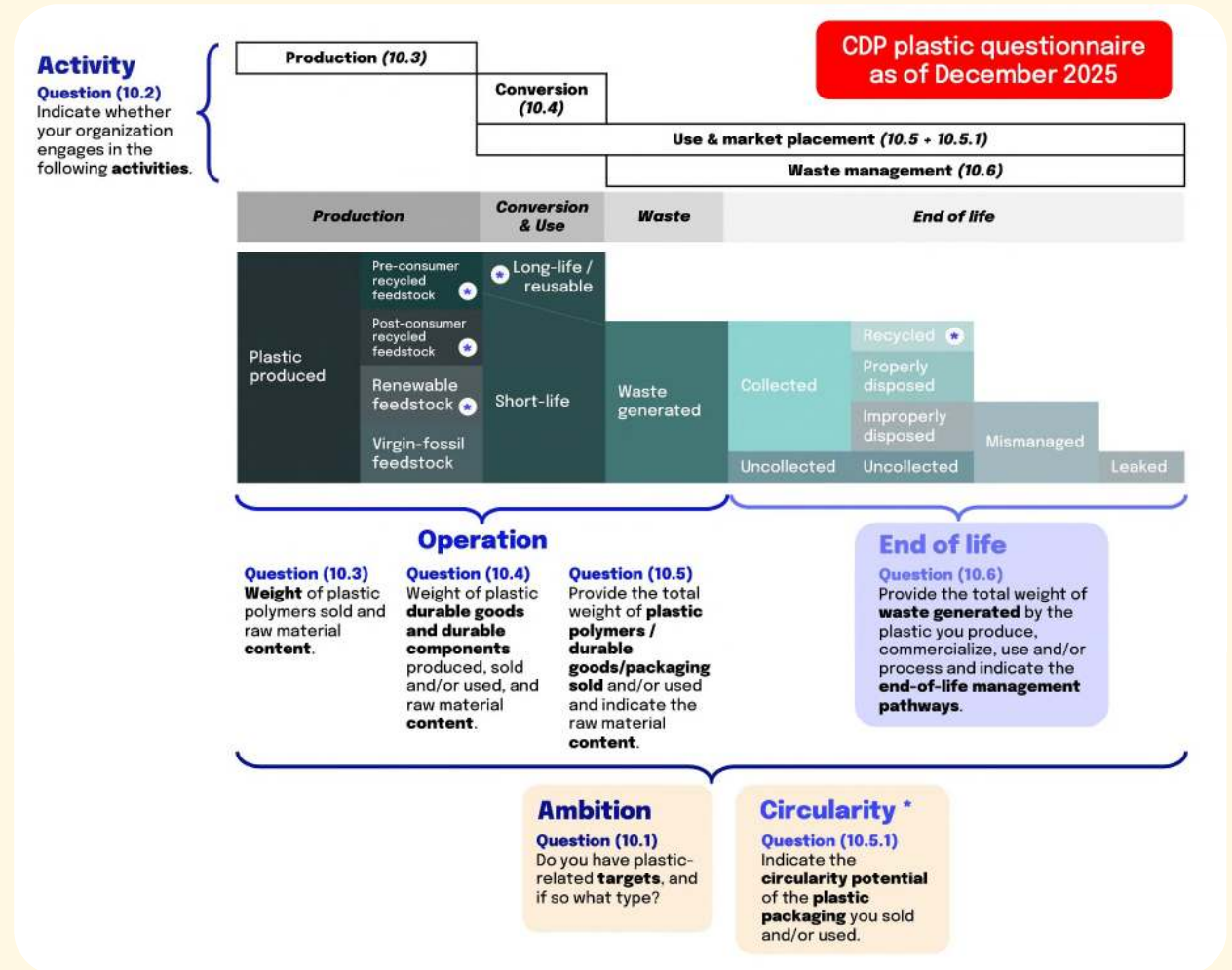
- Report on their plastic metrics
- Act against plastic pollution

It is a weight factor between 0 and 1, applied to a company's plastic emissions. Companies that report and perform well against plastic pollution receive a lower PPS, resulting in less financed plastic pollution.

**This factor enables financial institutions to engage with portfolio companies.**

## CDP plastic questionnaire

- Q10.6 – End of life: volume of plastic waste generated
- Q10.1 – Ambition: plastic targets
- Q10.5.1 – Circularity: circularity potential of plastic packaging



# Health Risk Impact Score

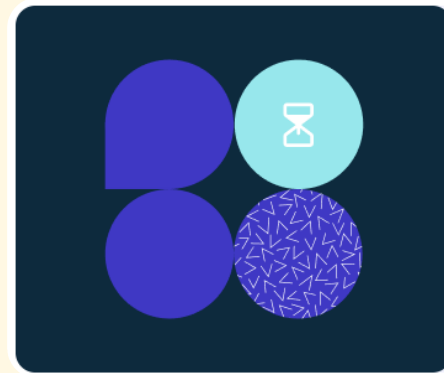
The score is built by combining multiple risks that are potentially dangerous for human health:

- Microplastics generation in use phase of product (high/medium/low)
- Inhalation in use phase of product (Y/N)
- Direct food contact in use phase of product (Y/N)
- Direct skin contact in use phase of product (Y/N)
- Presence of problematic polymers and additives in product (Y/N)

The final score ranges from 0 (low risk) to 6 (high risk).



# Coming soon ...



Coming soon

## Financed Plastic Pollution

This module provides a methodology to translate a company-level plastic footprint into a portfolio-level metric for financial institutions.

What is the PFN?

The Plastic Footprint Network (PFN) was established to unify methodologies for conducting plastic footprint assessments and to create and advocate for a single framework for assessing and mitigating organizational plastic use.

### Mission

Driving global adoption of plastic footprinting for target setting & mitigation.

- Founded to align practitioners on plastic footprint methodologies.
- Provides an up-to-date, science-based approach for corporate plastic footprint measurement.
- Developing the standard for plastic pollution footprinting, mitigation accounting, and mitigation disclosure.

The module will be published soon on PFN website



<https://www.plasticfootprint.earth/assessment-methodology/#financed>

# Plastic Footprint Network

[www.plasticfootprint.earth](http://www.plasticfootprint.earth)

The Plastic Footprint Network is convened by EA for Impact, the non-profit arm of Earth Action



## Advisory Committee



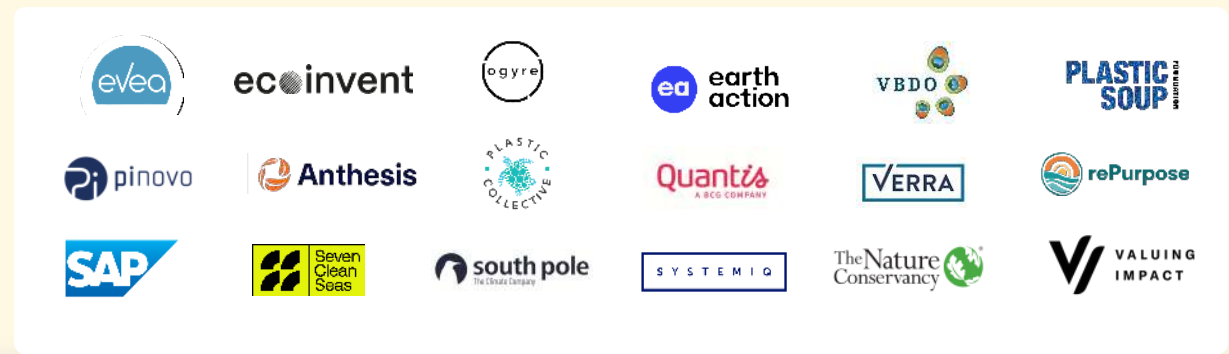
## Scientific Committee



## Technical Committee



## Members and Collaborators



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# Current regulatory developments

By Freek van Til, VBDO



# Plastic Regulatory Landscape

## a.s.r. Plastic Footprint Event

**Freek van Til**

Senior Projectmanager Sustainability &

Responsible Investment

VBDO



# Content

- ❖ Introduction
- ❖ Overview of regulations and mechanisms
  - ❖ *Global Plastics Treaty*
  - ❖ *EU Packaging and Packaging Waste Regulation (PPWR)*
  - ❖ *EU Single Use Plastics (SUP)*
  - ❖ *Deposit Return Schemes (DRS)*
  - ❖ *Extended Producer Responsibility (EPR)*
- ❖ Timeline of regulations
- ❖ Key takeaways from each regulation
- ❖ Taking action
- ❖ Q&A

# VBDO & Plastic



# It all starts with a full plastic footprint

Grocery retailers**	Ahold Delhaize	Carrefour	Colruyt Group	Dino Polska	Groupe Casino	Jeronimo Martins	Marks and Spencer Group	Metro AG	Sainsbury's Plc	Tesco
Global Commitment Signatory of the Ellen MacArthur Foundation***	Yes	Yes	No	No	No	Yes	No	Yes	No	No
Plastic footprint data – own brand products	Green	Green	Brown	Brown	Brown	Green	Brown	Brown	Green	Green
Plastic footprint data – branded products	Brown	Brown	Brown	Brown	Brown	Green	Brown	Brown	Brown	Green

FMCGs	Coca-Cola EP	Danone	Henkel	L'Oreal	Nestle	Unilever	AB InBev	Heineken
Global Commitment Signatory of the Ellen MacArthur Foundation***	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Plastic footprint data – branded products	Green	Green	Green	Green	Green	Green	Brown	Brown

# Case exploration of engaging FMCGs and grocery retailers

## Phase I: Research on topic, scope and expectations

- ❑ Plastic crisis, lack of transparency, coherent reporting, adverse target setting
- ❑ Plastic lobbying activities hampering ambitious EU and UN regulations (PPWR & GPT)

## Phase II: Exploring collective engagement with investors

- ❑ Round table presenting research and expectations to discuss next steps
- ❑ Form core group to co-create investor statement

## Phase III: Public engagement

- ❑ Seek further support (185+ investors)
- ❑ Publication of statement and further steps

## Phase IV: Engagement

- ❑ Engagement letters and calls to companies
- ❑ Investor letters to EU MEPs and ministers
- ❑ Webinars to continue knowledge sharing and adequately responding to ongoing developments of GPT, EU, and companies



## Plastic Perspectives

An overview of the plastic footprints, ambitions and plastic lobbying activities of listed European and UK grocery retailers and FMCGs



[Investors call for urgent action to reduce plastics from intensive users of plastic packaging](#)

3 May 2023

The whole plastics lifecycle poses a serious and growing threat to the environment, climate, biodiversity, human rights and public health. Accumulating research continues to emphasise the gravity of these impacts but the picture is already clear: intensive production and use of plastics is causing untold damage to the health of people and planet, with scientists affirming that “clean-up is futile” if production continues at current rates.<sup>1</sup>

We, investors and their representatives, believe that companies must set their sights higher and act more swiftly to address the plastics crisis through reducing their dependence on single-use plastic packaging, working to bring production and consumption of plastics within the limits of the planetary boundaries and alignment with the Paris Agreement and the Kunming-Montreal Global Biodiversity Framework. This statement is directed at companies in the fast-moving consumer goods and grocery retail sectors, including (non-exhaustively) those listed in the Appendix to this statement.

[Financial risks to companies and investors](#)

Plastics imposes an estimated externality cost on society of \$US 350 billion per year arising from greenhouse gas emissions, ocean pollution and collection costs - at least US\$ 1000 per tonne of plastic produced.<sup>2</sup> As action from policymakers steps up to address the plastics crisis and society demands accountability from corporate actors perpetuating the problem, companies on the value chain are exposed to significant and mounting plastic-related risks.

These risks include regulatory risks arising from bans, taxation and extended producer responsibility costs, reputational risks, increased momentum in plastic-related litigation<sup>3</sup> and increased raw material costs<sup>4</sup>. As responsible investors, we are concerned that companies that do not proactively address these risks with actions aimed at reducing their dependence on single-use plastics may face higher costs or lose business opportunity, therefore putting long-term value creation and investment returns at risk.

## FINANCIAL TIMES

Big investors call on companies to slash use of plastics

Coalition overseeing \$10tn in assets warns on financial risks of inaction



The Dutch Association of Investors for Sustainable Development estimates that plastic pollution costs society more than \$100bn a year. © Milosz/Dreamstime

Attracta Mooney and Chris Flood in London MAY 4, 2023

26

## ESGCLARITY

Investors urge EU lawmakers to stay strong on plastics as companies lobby for watered down legislation



By Natacha Turner  
18 Jul 2023

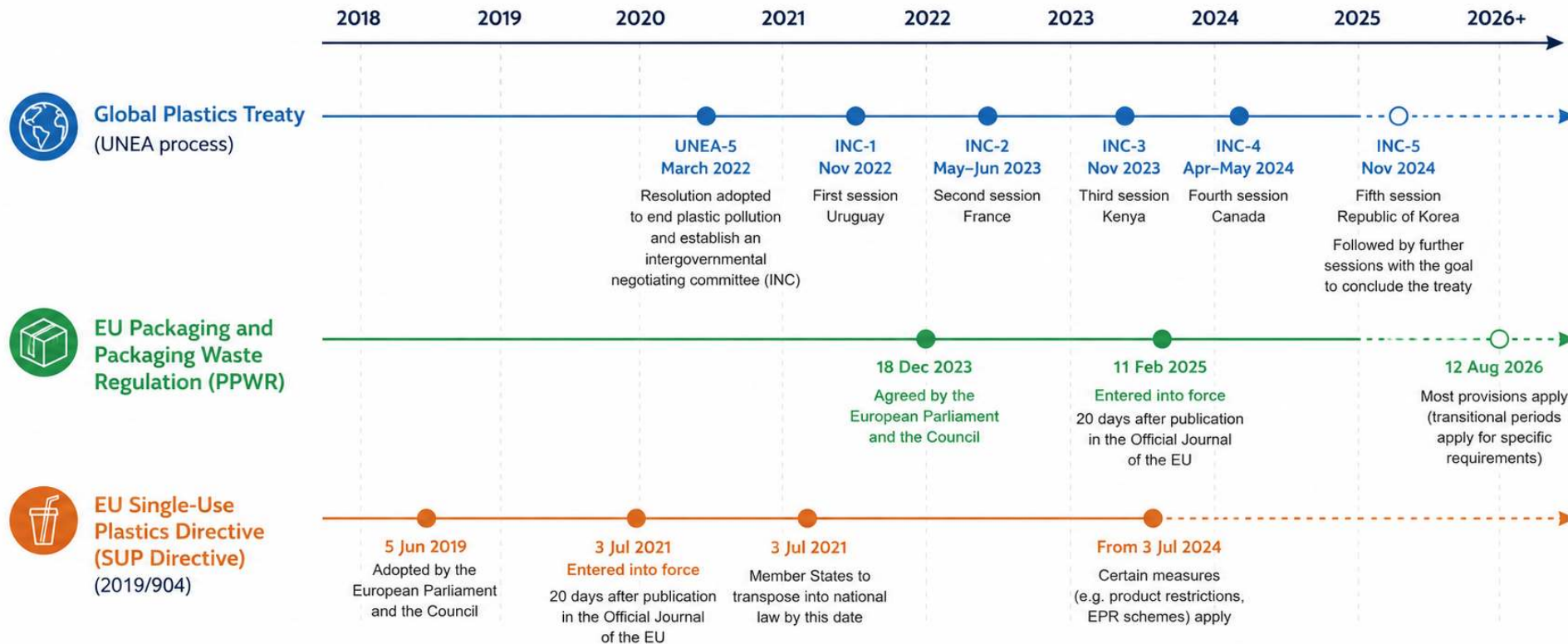


# The Plastic Regulatory Landscape – June 2026



# The Plastic Regulatory Landscape - Overview

## Key Regulations & Policy Frameworks on Plastics: Timeline



Note: Dates for the Global Plastics Treaty INC-5 and beyond are subject to change.  
Sources: UNEA, European Commission, Official Journal of the EU.

# The Global Plastics Treaty - Overview

*Status: negotiations delayed until 2027*

## Scope of UNEA 5/14

Convenes an INC to develop an international legally binding instrument:

- plastic pollution in all environments (including marine environment), including microplastics
- comprehensive approach addressing the full lifecycle of plastics, including provisions on:
  - sustainable production and consumption
  - product design
  - environmentally sound waste management
  - national action plans
  - reporting
  - technical and financial assistance
- ‘...any other aspects the INC considers relevant’
- Aspirational target of concluding by end of 2024



# The Global Plastics Treaty

## Why it is not progressing

- Divide between the "high ambition coalition" and the "like minded group" (i.e., oil-producing countries)
  - High Ambition Coalition: 100+ countries (including NL, EU)
  - Like Minded Group: Saudi Arabia, US, Russia
  - HAC wants full lifecycle (i.e. reduction narrative), LMC wants waste management and recycling
- Corporate lobbying and narrative fragmentation driven by the oil industry
  - Yet, the Business Coalition for a Global Plastics Treaty takes a positive stance with companies like Unilever, Danone, and Nestle
- The UN system: no consensus = no progress

Article by Cambridge University Press: Deadlock at INC-5.2: Understanding the blocker progress of the Global Plastics Treaty negotiations



***InfluenceMap Corporate Advocacy on the UN  
Global Plastics Treaty – Briefing 2025***

# EU PPWR- Overview

*Status: In-force since 2025, official starting date: 12 August 2026*

## Core aim

The PPWR is the EU's flagship **regulation** on packaging and packaging waste, replacing the previous **directive** with a harmonised framework across all Member States.

It aims to:

- **Prevent** packaging waste
  - per capita packaging waste: -5% in 2030, -10% in 2035, -15% in 2040 (against 2018 levels)
- Increase **reuse** and **refill** systems
  - 10% target 2030, 40% target 2040, Member States can introduce higher targets
- Improve **recyclability** and circular design
- Increase **recycled** content in plastic packaging
- **Reduce** unnecessary and single-use packaging

The PPWR applies to all economic operators placing packaging or packaged products on the EU market, including:

- Manufacturers and brand owners
- Importers and distributors
- Retailers and e-commerce companies
- Food and beverage companies
- Packaging producers and converters

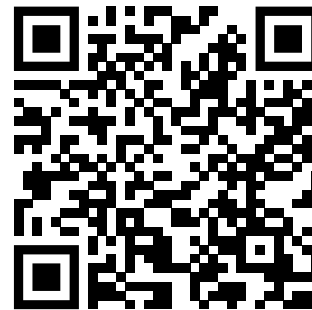
# EU PPWR- Why does it matter?

- The regulation covers **all packaging materials**, including plastic, glass, metal, paper, and composite packaging.
- The PPWR represents a major shift from a focus on **recycling alone** towards **waste prevention, reuse, and circular design**.
- For companies, it creates new compliance obligations and investment needs.
- For investors, it introduces both risks and opportunities as packaging-intensive business models face increasing regulatory, operational, and reputational pressures.

*HOWEVER!!*



*CEOs petition EU Commission to postpone enforcement of PPWR*



*Civil Society response by large coalition – Break Free From Plastic*

# EU SUP- Overview

*Status: In-force since 2019, official starting date: 3 July 2021 (transposed by Member States)*

## **Core aim**

The Single-Use Plastics (SUP) Directive is one of the EU's key measures to address marine litter and plastic pollution.

## **It aims to:**

- Reduce the use of the most littered single-use plastic products
- Promote reusable alternatives
- Improve collection and recycling of plastic products
- Increase producer responsibility for waste management and clean-up
- Reduce plastic leakage into the environment and oceans

Overall, the directive looks to prevent plastic pollution at source and accelerate the transition towards a more circular economy.

## **Who does it apply to?**

- Food and beverage companies
- Retailers and hospitality providers
- Packaging producers and converters
- Manufacturers and importers of covered products

## **The directive covers products such as:**

- Beverage bottles and caps, food containers and cups, cutlery, plates, and straws, wet wipes and tobacco filters, fishing gear containing plastic

# EU SUP- Why does it matter?

The SUP Directive marks a shift from waste management towards pollution **prevention**.

Key measures include:

- Bans on selected single-use plastic products
  - Since **July 2021**, selected single-use plastic products are banned from the EU market, including cutlery, plates, straws, stirrers, and expanded polystyrene food containers.
- Design requirements (e.g., tethered caps)
  - Since **July 2024**, beverage containers up to 3 litres must have **tethered caps** (caps remain attached to the bottle).
- Separate collection targets for beverage bottles
  - Member States must collect **77% of plastic beverage bottles by 2025** and **90% by 2029**.
- Recycled content requirements for PET and plastic bottles
  - PET beverage bottles: **25% recycled plastic by 2025**
  - All plastic beverage bottles: **30% recycled plastic by 2030**
- Extended Producer Responsibility (EPR) schemes
  - Producers are required to cover the costs of waste collection, clean-up, awareness raising, and data reporting for products such as tobacco filters, fishing gear, food containers, and wet wipes.

# DRS & EPR - Overview

## Deposit Return Schemes

- 57+ systems globally
- Covering 357+ million people
- 10 new systems since 2020

## Extended Producer Responsibility

- 400+ EPR schemes worldwide
- 63 countries with packaging EPR

## Waste management

infrastructure is rapidly expanding.

Regulation, however, is signaling a shift from waste management to **waste prevention**

## Circular economy hierarchy

Prevention	Circularity	Waste management
SUP bans	PPWR reuse targets	DRS
Packaging minimisation	Refill systems	EPR
Global Plastics Treaty	Circular business models	Recycling infrastructure

## Be wary of false solutions

- Waste management  $\neq$  waste prevention
- Recycling alone cannot solve plastic pollution
- Some solutions may prolong dependence on virgin plastics:
  - Chemical recycling
  - Poorly designed plastic credits
  - Overreliance on recycling targets

# Impact for investment sector & how to take action

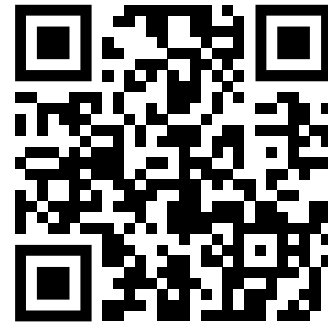


# Impact for investment sector

- ❖ **Regulatory pressure** - The SUP, PPWR, and GPT signal increasing regulatory pressure on plastic-intensive business models and highlights the growing importance of circular economy and pollution-related risks
- ❖ **Transition and stranded asset risks** – Companies that do not adapt may face stranded assets, higher capital expenditures, and declining long-term value, while investment in circular solutions can mitigate these risks.
- ❖ **Litigation and liability risks** – Growing concerns around plastic pollution and human health may increase legal and financial exposure, underscoring the need for prevention and safer materials.
- ❖ **Reputational risks** – Companies associated with plastic pollution may face declining consumer trust and social licence to operate, making transparent targets and action on plastics increasingly important.
- ❖ **Investment opportunities** – The transition creates opportunities in reuse systems, packaging innovation, and circular infrastructure, potentially generating new sources of growth. **But remain limited due to regulatory uncertainty.**
- ❖ **Stewardship expectations** – Investors are increasingly expected to engage companies on plastics and circularity to safeguard long-term value creation. (e.g., engage companies to reduce their plastic footprint)

# Take action

- ❖ Join sessions of VBDO's Plastic Insight Programme in September and November
  - ❖ September: Plastic Credits
  - ❖ November: Reuse/Refill systems
- ❖ Join collaborative engagement with Coca Cola Europacific Partners to encourage reuse/refill strategy to minimise plastic pollution



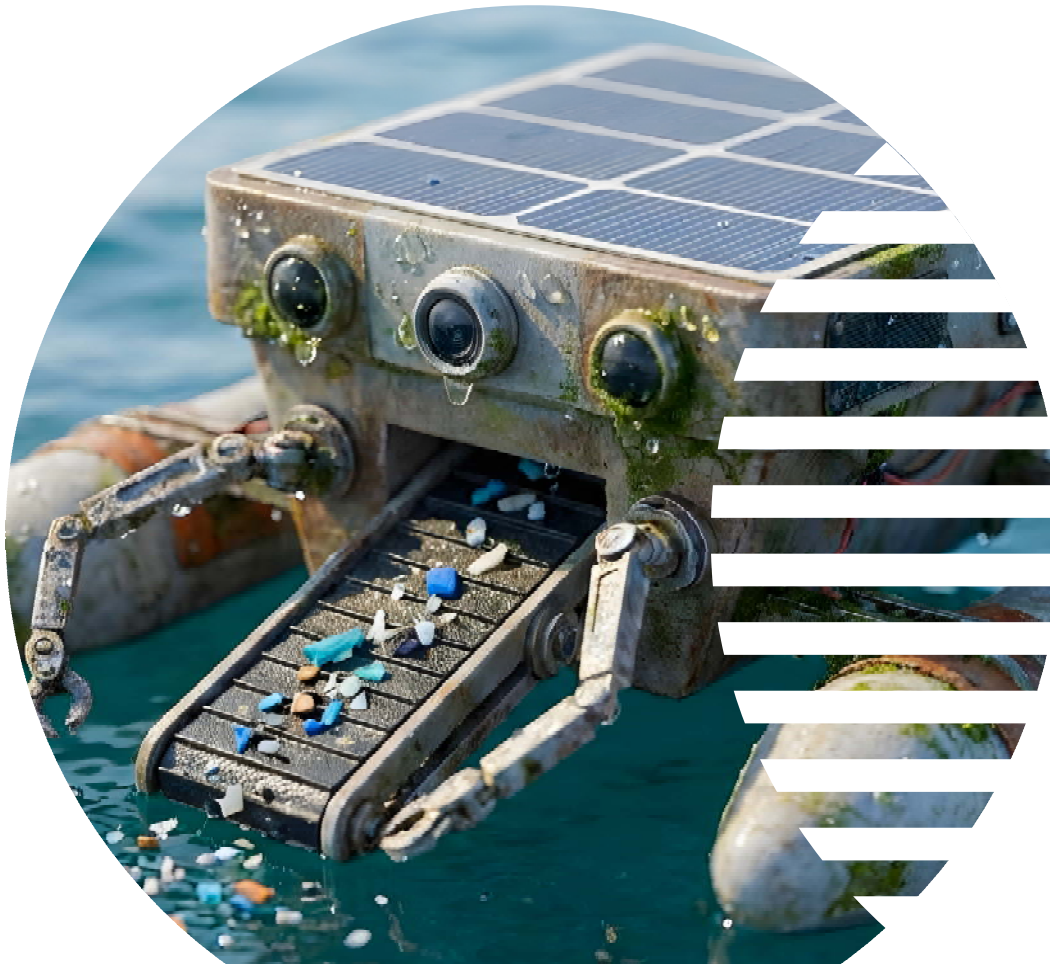


Thank you for your time!  
Any questions?

Plastic Footprint Event 2026

Innovators present solutions

By Narina Mnatsakanian , Regeneration VC



Plastic Footprint Event 2026

# Innovators present solutions

## By Tim Ouborg, Princess Traveller





17 June 2026

ASR Plastic Footprint Event

Narina Mnatsakanian, Partner, Chief Impact Officer



A global early-stage venture capital firm finding, funding and scaling circular and regenerative technology companies.

FAST FACTS

# 'Breaking the Plastic Wave' in numbers

Scale of the problem

**11 million** metric tons of plastic leaked into the ocean in 2016

**29 million** metric tons of plastic leakage into the ocean in 2040

**40%** of today's global waste ends up in the environment

**7%** reduction of leakage if all current government and industry commitments were implemented by 2040

**500,000** people need to be connected every day until 2040 to close the collection gap

**11%** of leakage is microplastic in 2016

**2x** plastic generation

By 2040:  
**3x** plastic leakage into the ocean

**4x** plastic stock in the ocean

**US\$100B** financial risk to industry under BAU in 2040

**45%** of today's leakage is from rural areas, where collection economics don't work

**21%** of plastics are economically recyclable (but only 15% are actually recycled) in 2016

**19%** share of carbon budget used by plastic industry by 2040 under BAU to stay under 1.5°C

**80%** share of leakage from flexible and multilayer plastics in 2016

## The System Change Scenario reduces 80% of plastic pollution by 2040

through the immediate implementation of eight complementary system interventions across the plastics value chain



Integrated system change achieves social, environmental, and economic benefits

**80%** reduction in plastic leakage into the ocean by 2040 relative to BAU

**US\$70B** saving for governments over 20 years relative to BAU

**700,000** jobs created by 2040 relative to BAU

**25%** reduction in annual GHG emissions by 2040 relative to BAU

**55%** reduction in virgin plastic demand by 2040 relative to BAU

**195 million** metric tons reduction in other environmental leakage (land and atmosphere)

# Our portfolio focuses on solutions. Future materials, ag tech, ingredients, packaging and recycling

- Our impact approach prioritizes reducing ecological footprints, optimizing resource flows, lowering emissions, and enhancing human well-being.
- We back founders who rethink production and consumption, we enable consumer corporates, retailers, and top-tier suppliers to adopt scalable, regenerative solutions and integrate them into their global supply chains.
- **We are committed to building a future where consumption restores ecosystems instead of depleting them.**



# Notpla

CIRCULAR DESIGN

## Problem

Single-use plastic packaging remains pervasive, polluting ecosystems, and does not biodegrade easily, burdening waste systems. Packaging alone accounts for 40% of the world's plastic waste.<sup>1</sup>

## Solution

Seaweed-based food containers,<sup>5,6</sup> liquid pods (like Ooho), coatings, films, and rigid cutlery are fully home- and industrially compostable, often even edible. Notpla is aiming to displace 1 billion units of single-use plastic by 2030.<sup>2</sup>

## Contribution

Notpla pioneers seaweed-based “disappearing packaging” that performs like plastic but degrades naturally. It leverages rapidly renewable seaweed—requiring no freshwater, land, or fertiliser—and turns it into scalable, compostable alternatives.

LAND-SYSTEM CHANGE

CLIMATE CHANGE

NOVEL ENTITIES

BIOSPHERE INTEGRITY

## 2025 Results

Notpla is scaling seaweed-based packaging to replace single-use plastics while advancing circular design with renewable, compostable materials.

**307 tons**

Linear Resource Use avoided<sup>3</sup>

**460 tons**

GHG emissions avoided<sup>4</sup>

**75 tons**

Macro plastics diverted from nature or landfill<sup>5</sup>

Notpla is redefining packaging by replacing single-use plastics with seaweed-based, plastic-free alternatives, at scale.



Sources United Nations Environment Program 2. Notpla.3. I.B.U.A. - Regeneration.VC and Circle Economy calculations based on company provided information. 4. GHG Notpla - Regeneration.VC.5. Notpla provided information

# Xampla - Eliminating the world's most polluting plastics

More materials are made from plants with no chemical modification and are fully biodegradable in all environments, home compostable, and fully compatible with recycling processes.



# Cruz Foam

CIRCULAR DESIGN

## Problem

Single-use plastics dominate packaging, generating vast amounts of waste each year, much of it polluting oceans and ecosystems.

## Solution

Cruz Foam makes a bio-based, compostable foam made from food waste & starch, offering a scalable alternative to EPS.

## Contribution

Materials run on existing equipment, enabling rapid brand adoption and cutting emissions, plastic leakage, and toxic waste. The company leverages natural, abundant waste streams (e.g., agricultural industry waste) to generate circular feedstock that closes material loops.

BIOSPHERE INTEGRITY

LAND SYSTEM CHANGE

NOVEL ENTITIES

## Results 2025

By expanding production and embedding its materials into existing supply chains, the company is reducing emissions, curbing plastic leakage, and cutting reliance on virgin resources.

**50 tons**

Linear Resource Use avoided<sup>5</sup>

**62 tons**

Micro plastics diverted from nature or landfill<sup>6</sup>

**63 tons**

Macro plastics diverted from nature or landfill<sup>7</sup>



Cruz Foam is a circular materials company offering certified compostable, protective packaging foam sustainable packaging solutions

Sources: 1. Precedence Research, 2. Precedence Research, 3. United States Environmental Protection Agency, 4. MDPI, 5. LRUA - Regeneration.VC and Circle Economy calculations based on company provided information, 6. Cruz FOAM provided information, 7. Cruz FOAM provided information

# Sulapac

CIRCULAR DESIGN

## Problem

Conventional plastics can linger in the environment for hundreds of years.<sup>1</sup> Every year, the world disposes of 268 million tons of plastic, but only about 9% of it ever gets recycled.<sup>2</sup>

## Solution

Sulapac develops sustainable and functional alternatives to conventional plastics. Its materials are biodegradable without leaving permanent microplastics behind\* and are compatible with existing plastic manufacturing equipment, enabling a smooth transition for industries.

## Contribution

Sulapac's innovation helps companies reduce their CO<sub>2</sub> emissions and eliminate permanent microplastic pollution\* while maintaining the highest standards for usability and aesthetics.

OCEAN ACIDIFICATION

CLIMATE CHANGE

NOVEL ENTITIES

BIOSPHERE INTEGRITY

## 2025 Results

Sulapac is advancing the sustainable bioeconomy by replacing conventional plastics with biobased and industrially compostable\*\* materials made with recycled feedstocks and side streams.

**750 tons**

Linear Resource Use Avoided<sup>3</sup>

**20x**

Lower cradle-to-gate carbon footprint compared to conventional plastic<sup>4</sup>

**~65%**

Recycled content and side-stream raw materials make up Sulapac materials<sup>5</sup>



Sulapac is redefining plastics by replacing them with biobased and biodegradable materials that reduce CO<sub>2</sub> emissions.

Sources: <sup>1</sup> United Nations; <sup>2</sup> European Climate Infrastructure and Environment Executive Agency; <sup>3</sup> LRIA - Regeneration VC and Circle Economy calculations based on company provided information; <sup>4</sup> Sulapac; <sup>5</sup> Sulapac

\* Depending on the material grade, Sulapac materials show 50-100% relative biodegradation into CO<sub>2</sub> in 420 days or less in simulated marine environment (86°F)(ASTM D6691). Sulapac Universal also tested according to ASTM 5511 (accelerated biodegradation in the landfill, 99°F): reached 68% relative biodegradation in 160 days. Please note, that in California this is not an adequate proof of biodegradability.

\*\*All materials have either BPI, Seedling or OK Compost certificate up to a certain thickness. Please note that the compostability of an end product depends both on the thickness and design of the item.

# Questions?



60

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The Fund will be a product classified as [6 out of 7 on the risk indicator scale, which is the second-highest risk class. The risk indicator scale is a guide to the level of risk of this product compared to other products. This rates the potential losses from future performance at a high level, and poor market conditions are very likely to impact the capacity of the Fund to pay the investors.

The investments of the Fund will be extremely illiquid and the repayment of capital and realization of a profitable investment in the Fund will be dependent on a full or partial sale of these investments. The product will not include any protection from future market performance, so the investors can lose some or all of their investments.

**A potential investor is about to purchase a product that is not simple and may be difficult to understand.**

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**SUSTAINABLE  
PRODUCTION**



# BRAND STORY

*why we do what we do*

At Princess Traveller, we don't just make travel products. **We create travel companions that bring people together**, carry stories, collect memories, and make you feel a little bit at home anywhere in the world.

For your first trip or your hundredth, stylish or practical: our range grows with you, for every family member and every journey.

We take our responsibility for the future of travel seriously. That is why **we are working step by step towards more sustainable materials and better choices**, so that you and future generations can continue to enjoy the world around us.

**Travel for Generations**



# BRAND STORY

*why we do what we do*



# SUSTAINABILITY

*our long-term responsibility*

2021

Shell of the suitcases from recycled PET bottles. And start **project Sungai Watch**.

2022

Components made from Ocean Bound plastic; such as old fishnets, ropes and other waste.

2023

GRS/RCS certified as a company

2024

Looking for opportunities to bring our production to Europe, drastically decreasing our carbon footprint.

2025

First production in Europe (Belgium).

2026

Today, a third of all the suitcases we produce contains recycled materials.

2030

by 2030 we want to produce 100% of our suitcase from recycled or sustainable materials!



# OUR PARTNERS

*two heads are better than one*



In samenwerking  
met onze duurzaamheidspartner



# OUR GOALS

*2026 and the near future*

## Local Production



- Postcode Lottery suitcase

## Repairability



- Standardized spareparts
- Service portal

## Transparency



- Certifications (GRS)
- Product passport

## Circularity



- ANWB – Collecting and reusing suitcases

# THE SUITCASE 2030

*Designed for the future*



**Up to 50% lower CO2 footprint per suitcase**

**More than 60% CO2 reduction over the entire product lifecycle**

- Easy-to-assemble and disassemble wheels without screws
- Only 6 screws in the entire suitcase
- Flexible interior layout with customizable lining and compartments
- Wide handle for improved stability
- Front panel customizable for your own design
- Strong and modern design
- Lower CO2 emissions
- PPWR and Right to Repair ready
- Locally manufactured – shorter lead times
- Lower transportation costs – no import duties
- Smaller outer carton – more efficient storage

**Mission: AFFORDABLE SUSTAINABILITY!**

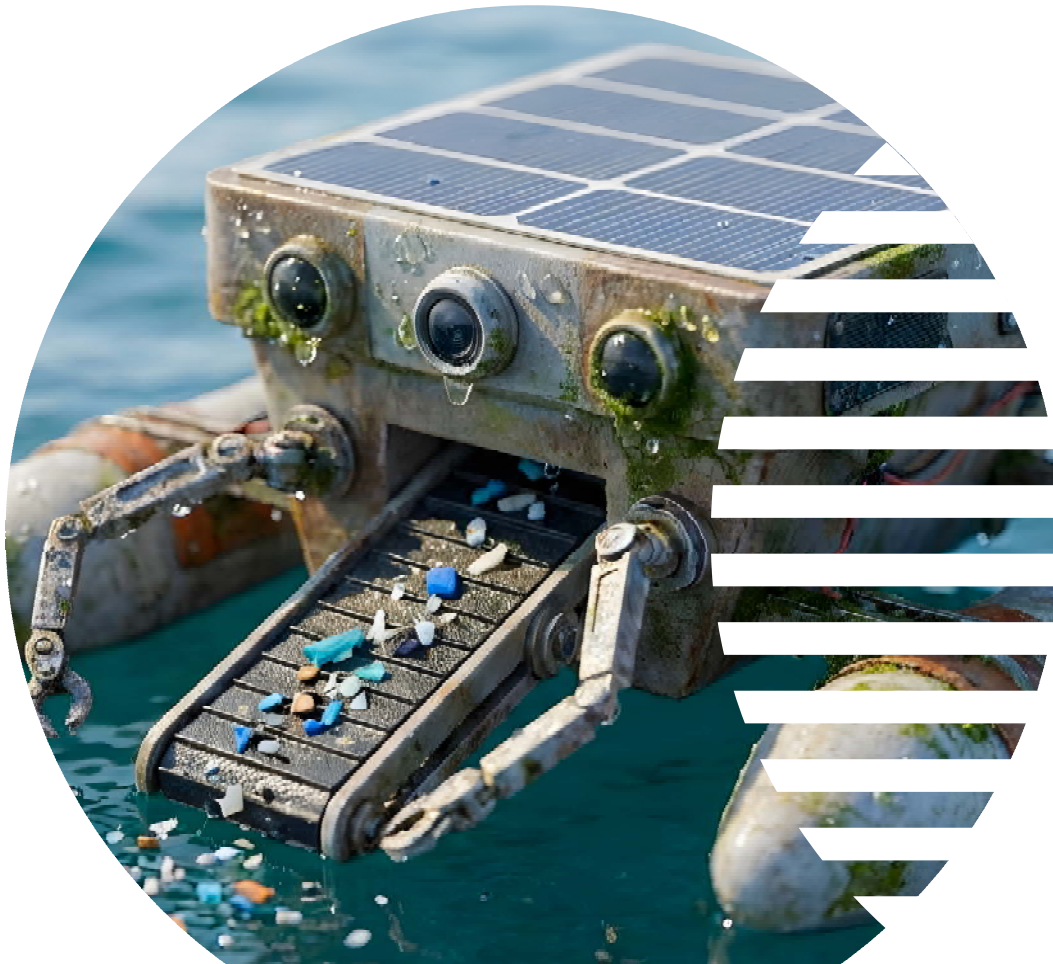


Travel for Generations

Plastic Footprint Event 2026

# Innovators present solutions

By Nicky van 't Hof, Infinity Recycling



# Infinity

*EUR 175m growth specialist investment fund focused on circularity*

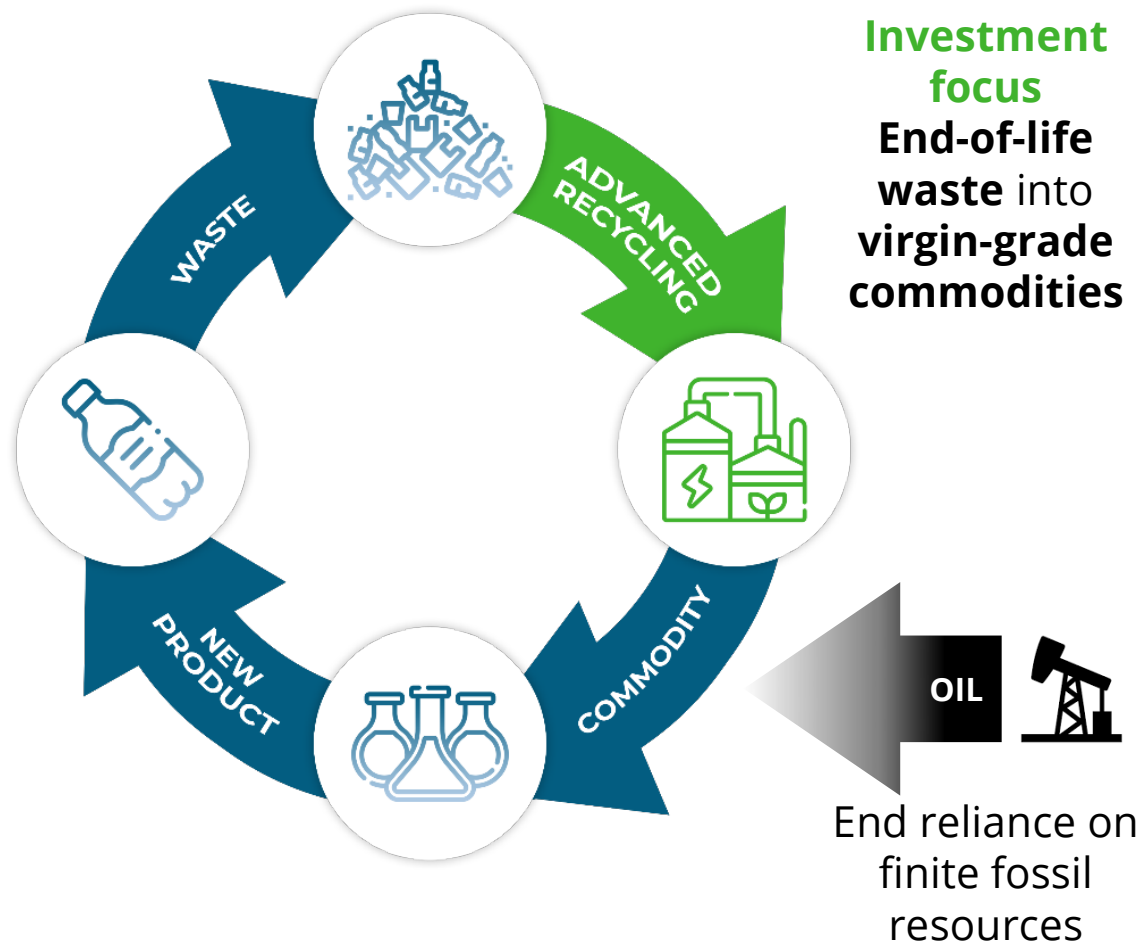
***Nicky van 't Hof***

17 June 2026

## MISSION

# Our mission is to accelerate circularity

**Investment focus**  
**End-of-life waste into virgin-grade commodities**



## INFINITY

- Growth capital firm based in the Netherlands founded in 2019
- Invests in growing businesses that accelerate circularity in large, established markets
- Utilizes a commodity-first strategy to fully accelerate circularity

# Circular Plastics Fund I in a nutshell

**EUR 175m**

Final Close in April 2024

**EUR 100m**

Current Asset under Management

**11 portfolio companies**

In which Infinity has invested since the launch of the Fund

**Strong advisory board**

Including senior executives from the plastics value chain, including Chevron Philips, LEGO Group and Blue-Sky Group



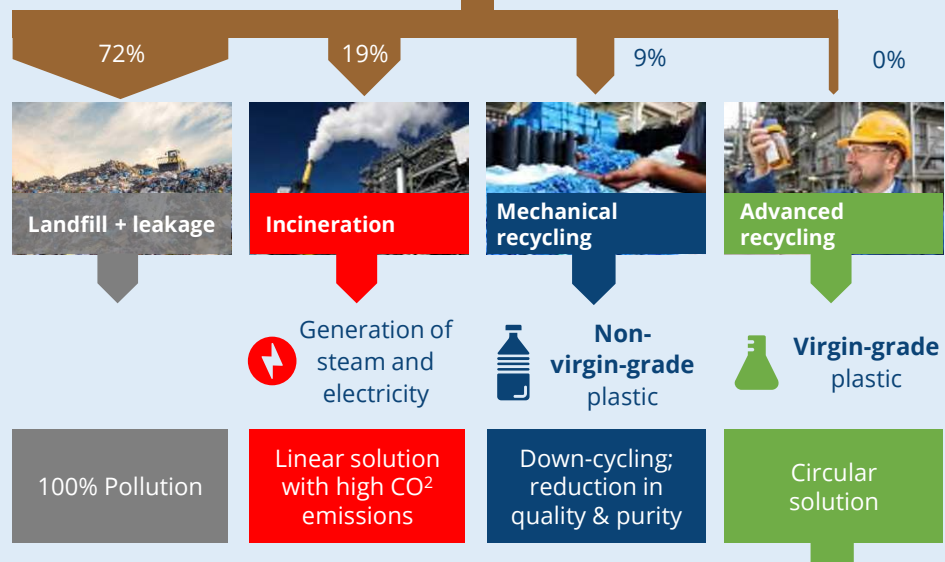
# Problem and Solution: more and more waste and only 9% being recycled today

## OUR PLASTIC WASTE CRISIS

36kg of polymer waste per person on the planet created annually<sup>1</sup>



Equal to 75% of the annual virgin plastics production



**McKinsey projects that by 2050 over 35% of plastics (350 Mmt) will be produced from advanced recycled plastic waste, compared to only a fraction today<sup>2</sup>**

## LARGE AND GROWING PLASTIC INDUSTRY

- USD 435 billion in 2020 expected to reach USD 617 billion by 2028
- 1.7Mil tons in 1950 to 367Mil tons 2020
- Over 55% of the total volume ever produced was made since 2000

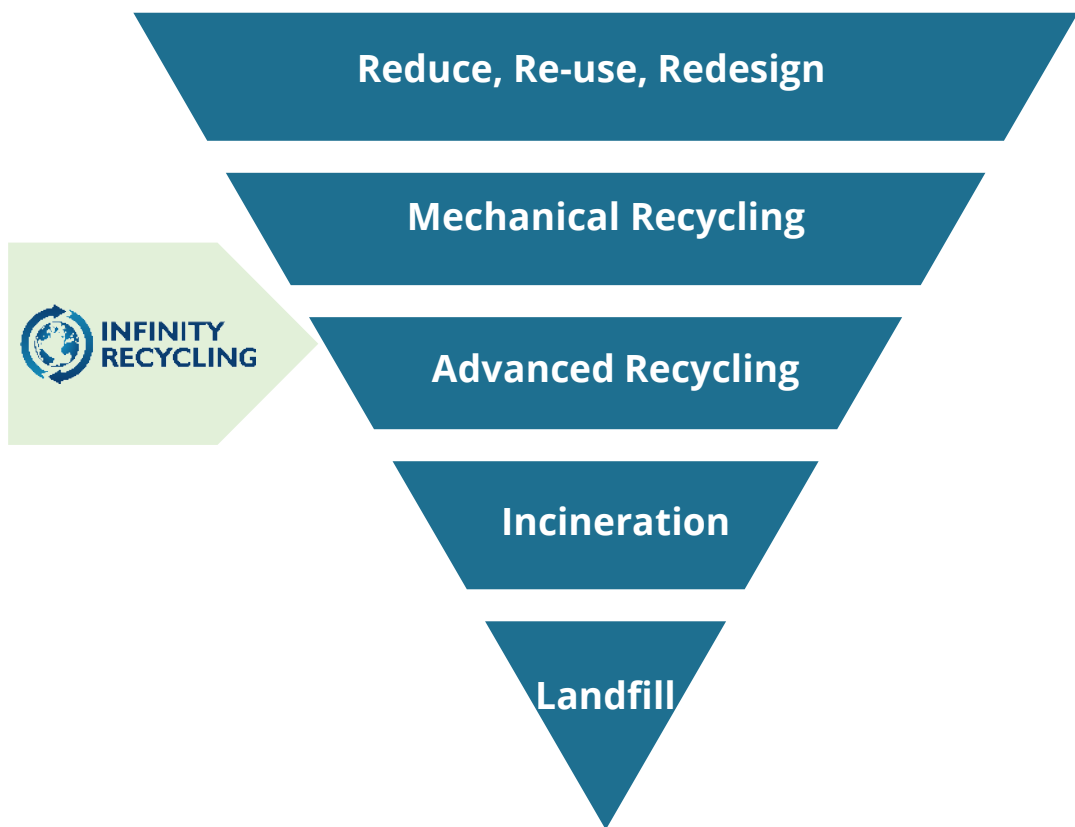
## CREATING A GROWING PLASTIC WASTE LEGACY

- c.75% of global plastics production is mismanaged as waste
- Plastic waste is recycled mainly through mechanical processing
- Mechanical processing recycles only c. 9% of global plastic waste
- Europe is at the forefront of recycling with c.13% recycled in 2020

## FROM A LINEAR ECONOMY TO A CIRCULAR ECONOMY

- Minimize the deployment of virgin materials (becoming scarcer over time)
- Minimize the dependency on fossil fuel sources
- Reduce the emission of Green House Gases ("GHG")
- Prevent the harmful impact to biodiversity

# Infinity focused on advanced recycling



## Mechanical Recycling

- Circulating plastic waste has traditionally been limited to mechanically grinding and melting via an extruder
- Mechanical recycling is an effective process, but unfortunately **only applicable to a limited set of plastics**
- The process also leads to a reduction in quality

## Advanced Recycling

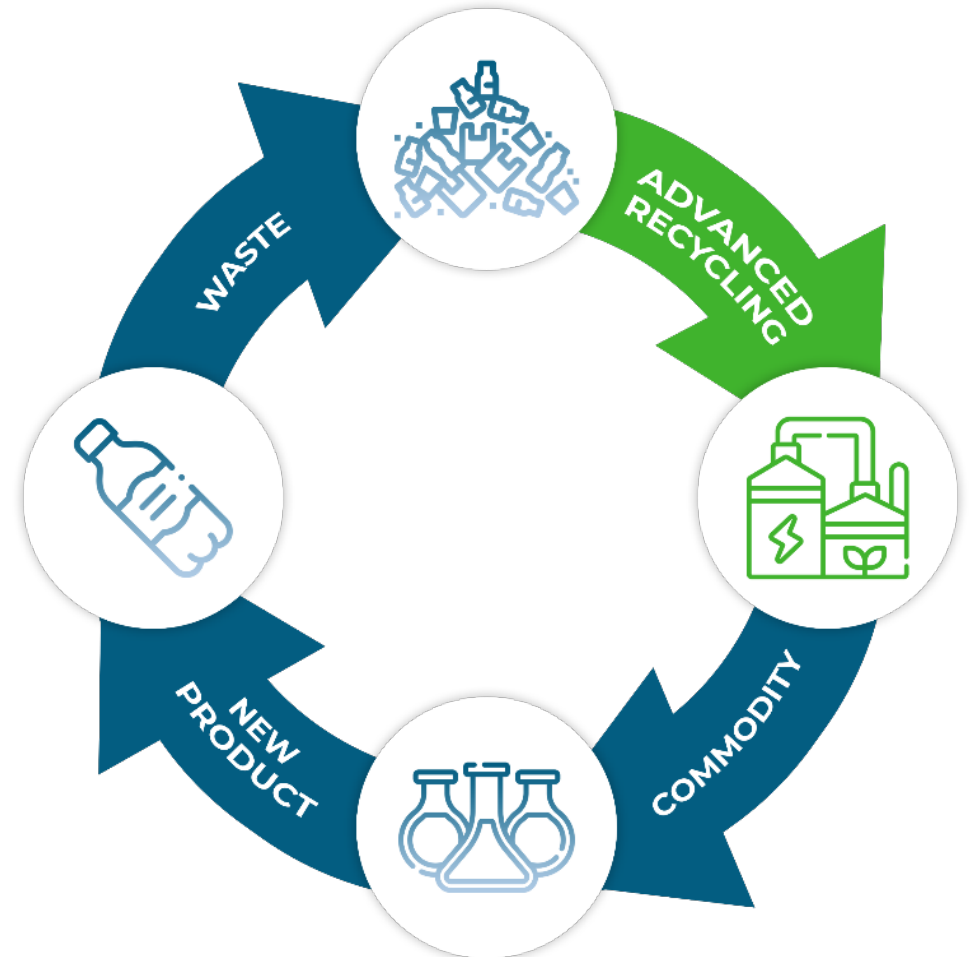
- Recycles the un-recyclable, including plastic waste which cannot be recycled mechanically. Uses existing processes (chemical, thermal) to **turn waste plastics back into their basic chemical ingredients**
- Generates a chemical product **identical to a virgin material** that can be integrated into the petrochemical infrastructure as a tradable commodity
- Can process over 200 million tons of plastic waste per annum which is currently incinerated or disposed in landfill/leakage<sup>1</sup>
- Manufacturing of products with chemically recycled feedstock **emits significantly less CO2 (-70%)** than virgin fossil products that are incinerated<sup>2</sup>

# Changing from a linear to a circular economy

## CURRENT PLASTICS VALUE-CHAIN



## A CIRCULAR VALUE CHAIN



# The S-curve

## Example:

### ICE HARVESTERS...



### ...WERE REPLACED BY ICE FACTORIES...

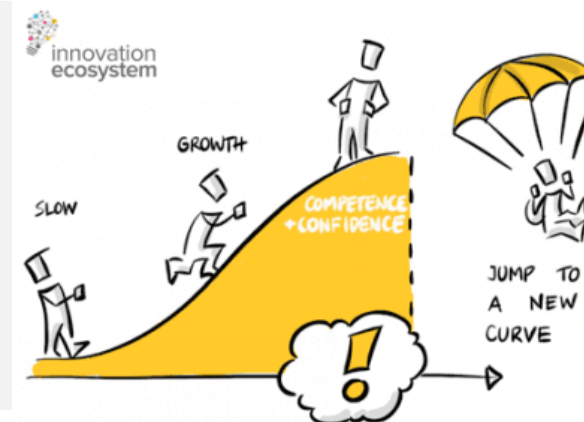


### ...THAT WERE REPLACED BY REFRIGERATORS

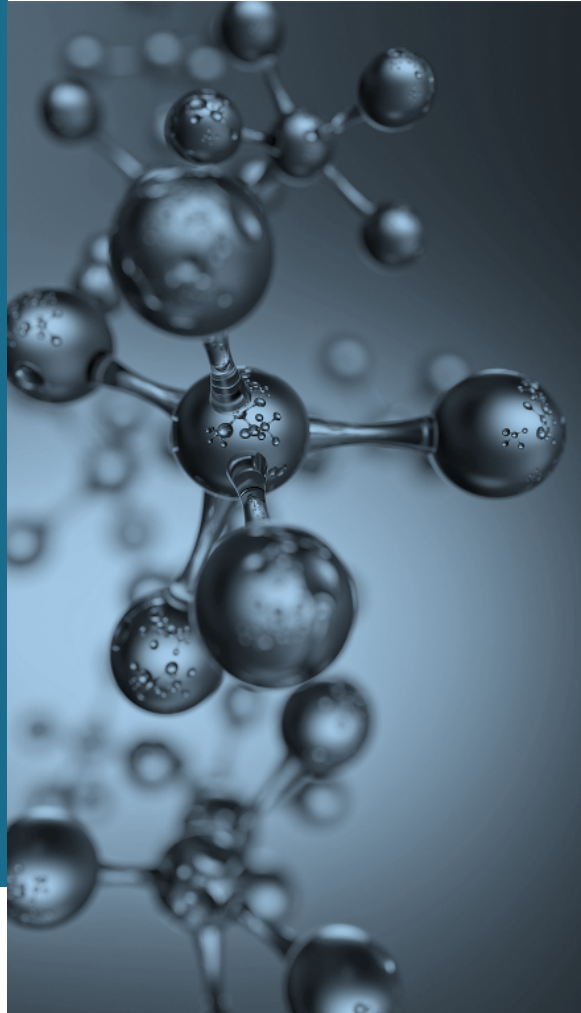


None of the organizations that were ice harvesters became ice factories and ice factories did not become refrigerator companies

Most companies define themselves in terms of what they do, not the benefits they provide.



# Solutions that work: portfolio in action



# Alterra Energy

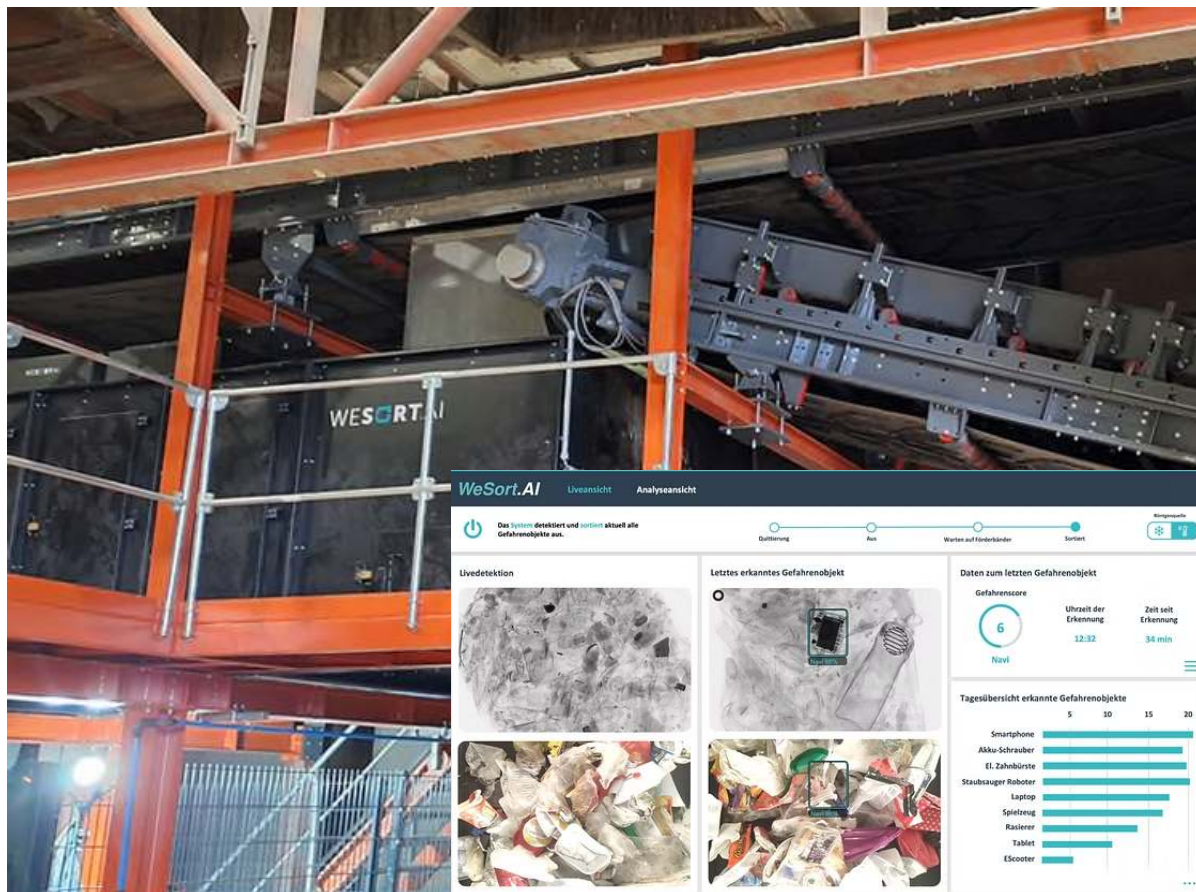


- Advanced pyrolysis converting hard-to-recycle plastic into oil
- Operational in Akron, US and proven at commercial scale
- Displaces virgin fossil feedstock with waste derived equivalent



**Recycling plastics to the original building block: oil**

# WeSort.AI



- AI + X-ray technology improving separation of materials at sorting facilities
- Revenue positive company with sorting units being operational at large sorting plants like PreZero
- Technology can sort out batteries, solving a major operational issue for the industry since batteries are causing fires
- Better sorting results in better feedstock quality for recycling processes

## Improving the sorting system and avoiding fires

## CONTACT

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# Plastic footprint event

June 17, 2026

# THANK YOU!