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RETHINKING PLASTICS: INNOVATION, MARKETS AND NEW RULES OF THE GAME

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How many plastic items did you touch before you left the house this morning?

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The plastic wonder…

- It revolutionised medicine — sterile, lightweight, single-use devices transformed healthcare
- Cars are 50% plastic by volume and 10% by weight — enabling fuel efficiency and safety
- Plastics reduced food waste through packaging, lowered transport emissions, and enabled modern electronics



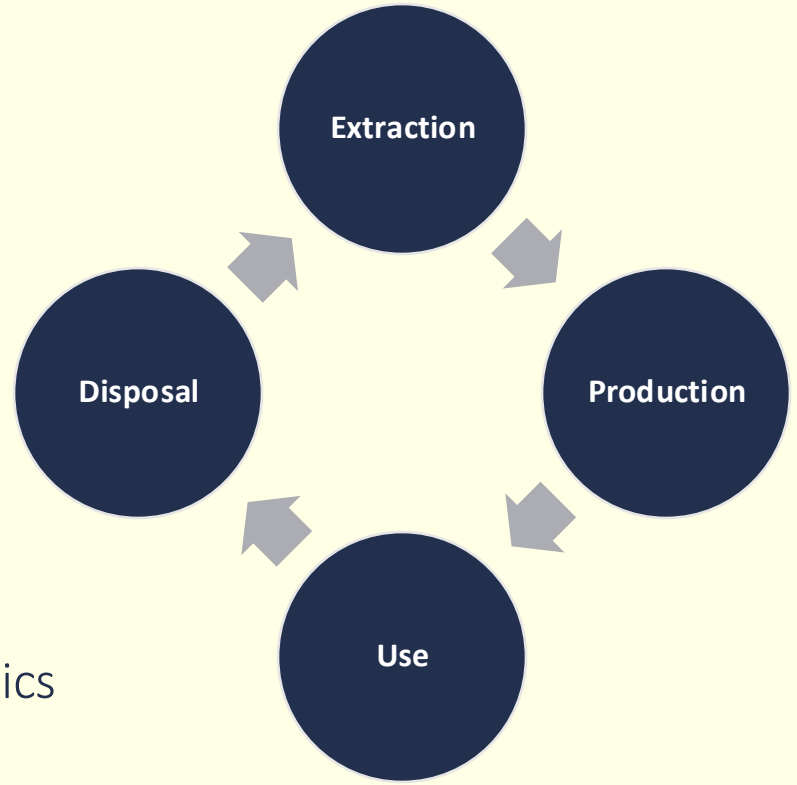
The main types of plastics

SOURCE: PLASTICS FOR CHANGE



But the big issue: It is not just the waste

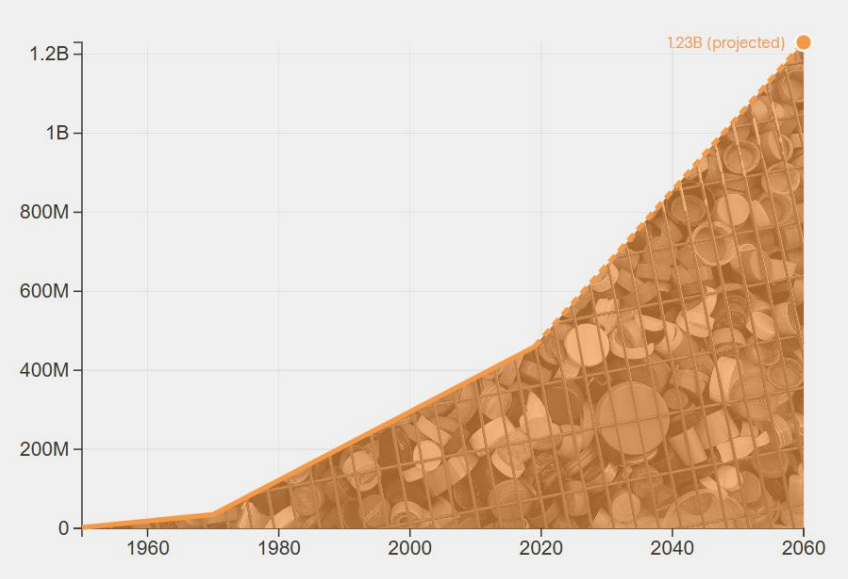
- Where it comes from – fossil fuel
- How it is produced – cracking and chemical additives
- What it does when used – chemical leaching, microplastics
- Where it ends up



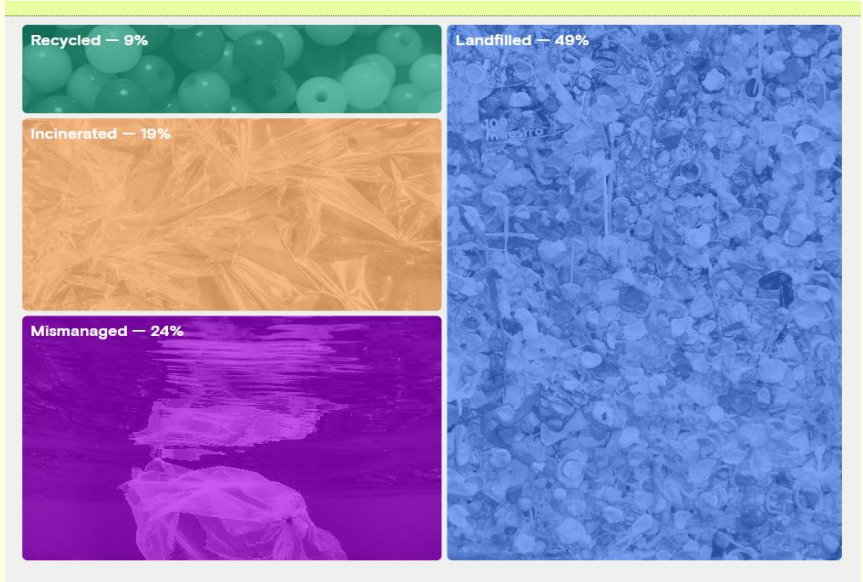
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How bad the problem is in charts

Plastic Production



End of life plastic



Source: World in numbers

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Can all plastics be recycled

Thermoplastics (75%)

- Soften when heated, can be melted and remoulded repeatedly

Thermosets (25%)

- Permanently hardened during manufacture and cannot be re-melted

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The plastic lifecycle



Extraction

99% of plastic begins as crude oil

Gas law no plastic law



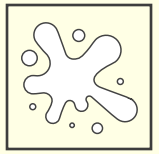
Production

Fossil fuel are refined and sent to ‘cracker’ plants

Creation of plastic polymer pellets

Cracker plant releases toxic air pollutants

Chemical additives are incorporated



USE

Chemical leaching – additives migrate out of plastic

Microplastic shedding

40% of plastics are single use



DISPOSAL

Mechanical recycling

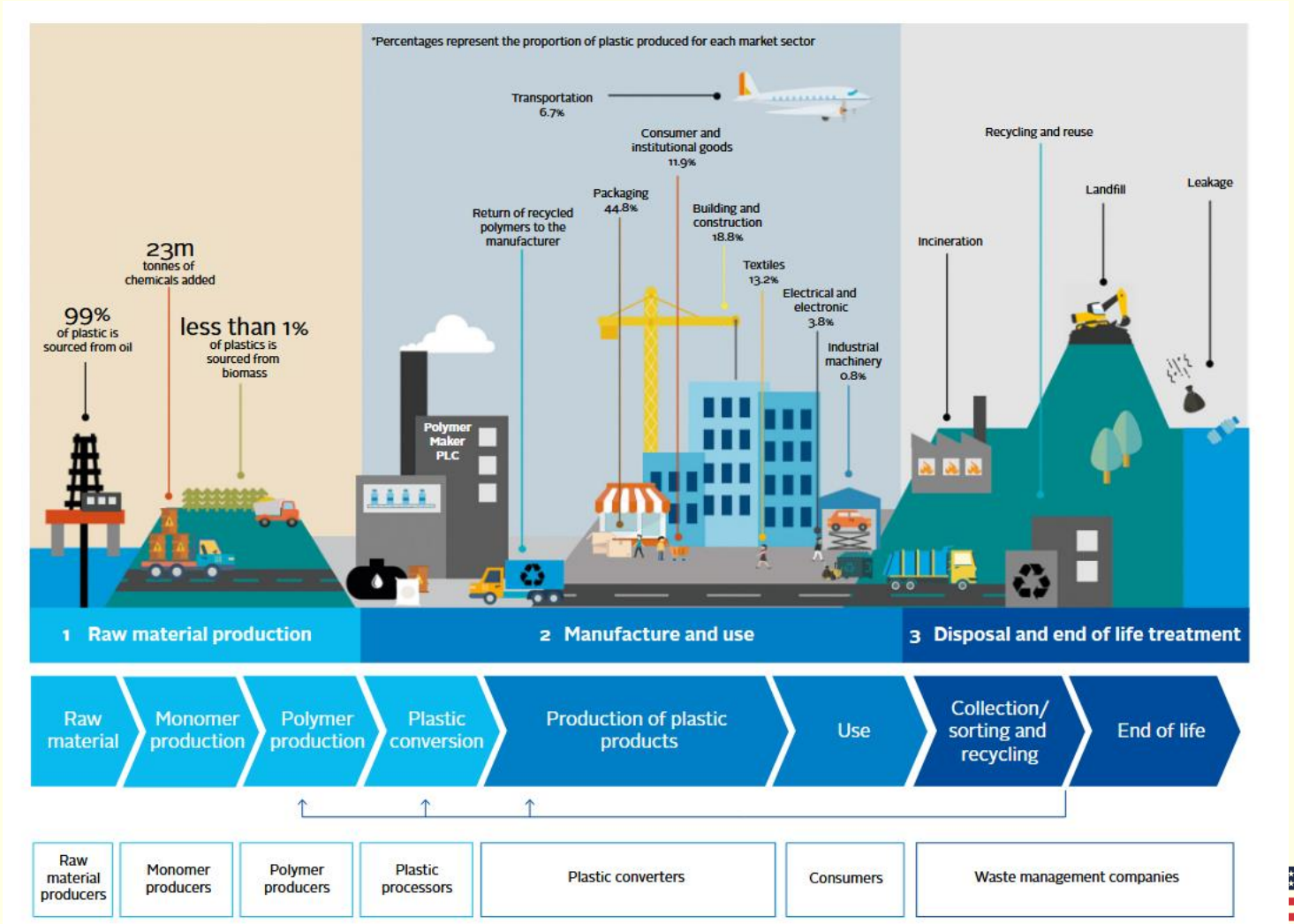
Incineration

Landfill

Ocean leakage

8% of CO_2 emissions > aviation + shipping

Plastics - a value chain approach



Source: https://www.unpri.org/

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Some plastic jargon

- Macro-plastic (pieces over 5mm) – Blocks digestive systems of wildlife, entangles marine animals, smother seafloor habitats
- Microplastics (pieces under 5mm) – Food chain at the base
- Nanoplastics (invisible in the naked eye) – Crosses biological barriers

We talk about plastic waste as if disposal solves the problem. What would it mean for our entire regulatory approach if we accepted that there is no 'away' to throw plastic to?

Plastics and sustainability



Links with SDG 12 – Responsible production and consumption



Paris Climate Agreement



Circular economy

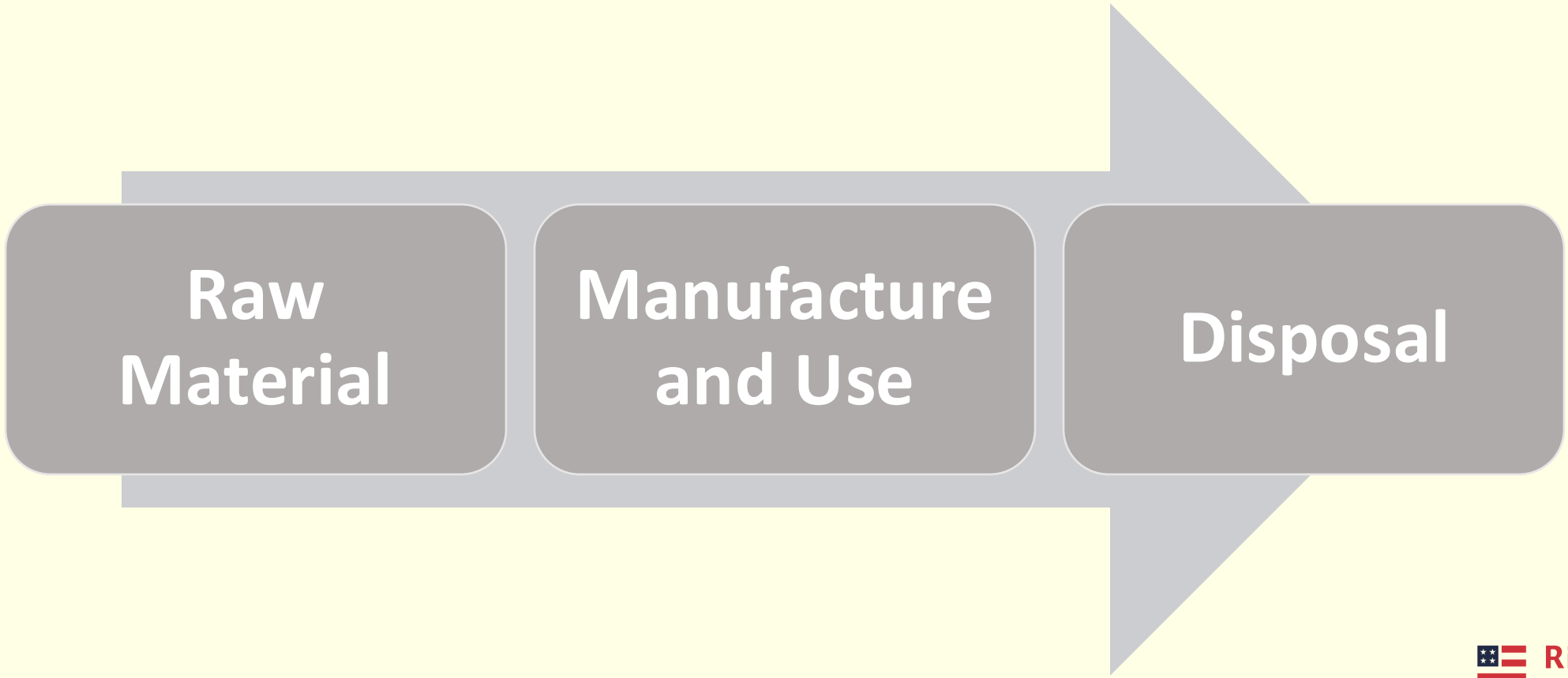


Global initiatives - Basel Convention

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Plastics regulation – Value chain approach





Raw Material

No current regulations BUT

Indirect impact due to

- Increase the amount of recycled plastics
- Decreased dependency on fossil fuels
- Reduction of GHG from extraction and production

Potential impact on demand for plastics

Production caps – contested issue

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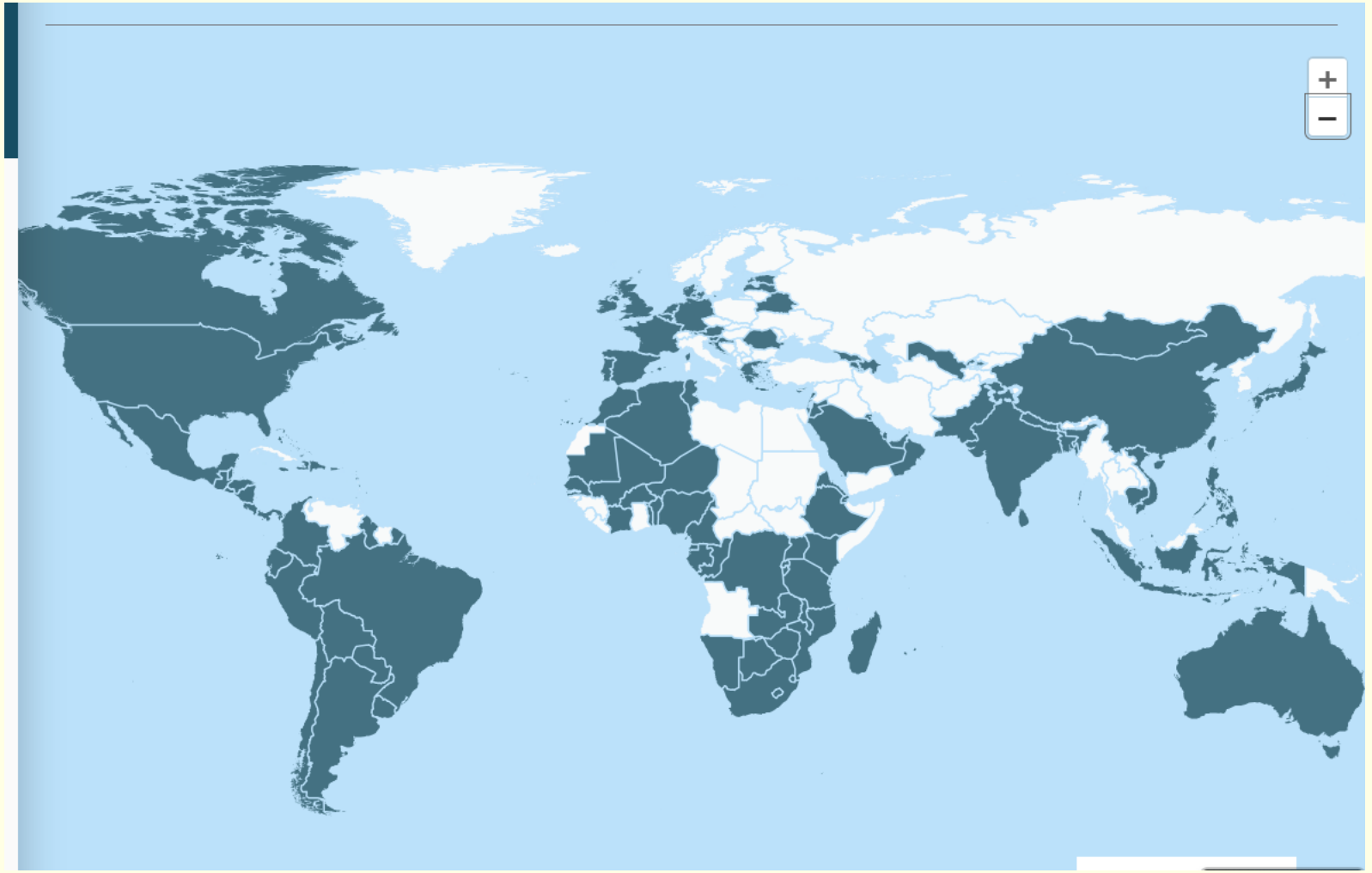
Manufacture and use

- Outright bans
- Design standards and product requirements
- Mandatory recycled content
- Economic instruments – taxes, levies and fees
- Extended Producer Responsibility (EPR)
- Transparency, labelling and disclosure requirements
- Consumption reduction measures and Reuse/refill incentives

Disposal

Collection systems – separation of items
Deposit Return Schemes (DRS)
EPR (Extended Producer Liability) – different from the manufacturing stage
Recycling targets and standards
Waste trade controls
Landfill restrictions and bans
Incineration and energy recovery – regulation and debate
Microplastic and chemical release controls

Diverse regulatory framework



Source: https://www.globalplasticlaws.org/

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In Summary

Manufacture/Use

- Design/use (55)
- Microplastic (18)
- Production/manufacture (17)
- Reduction (1246)
- Transparency/Traceability (29)

Disposal

- Extended Product Responsibility (EPR) (99)
- Waste Management (123)
- Waste Trade (13)

A diverse global regulatory framework

Over 60 countries have introduced some form of plastic legislation, but coverage, ambition and enforcement vary enormously

European Union

Most comprehensive — PPWR, SUP Directive, EPR, recycled content targets, microplastic restrictions

United Kingdom

PPT, pEPR, DRS, SUP bans — broadly aligned with EU trajectory despite Brexit

United States

No federal framework — patchwork of state laws (California, Oregon, Maine leading). No national EPR

China

National ban on single-use plastics (2021). China's 14th Five Year Plan includes plastic reduction targets

Africa

Rwanda and Kenya among strictest globally on plastic bag bans. Implementation and enforcement vary widely

Latin America

Chile, Brazil and Colombia have introduced EPR laws; several countries have SUP bans



Examples – the EU

- Single-Use Plastics Directive: Ban on some plastics, collection targets and EPR schemes for certain plastics.
- Labelling requirements for plastics
- Plastic carrier bags – consumption per person should not exceed 40 bags per person or bags cannot be free
- Recycling targets – 55% of plastic packaging must be recycled by 2030
- Levy on non-recycled plastic packaging waste – Eur0.80 per kg (paid by Member States) – driver to plastic tax on businesses.
- Microplastics – Ban on intentional addition (phased in until 2035), unintentional release (eg fashion, tyres) voluntary
- Plastic in food contact packaging – heavier compliance once recycled
- Ban in plastic waste exports to non-OECD countries

Examples - UK

What is avoidable plastic waste?

- **Clearly avoidable** – already banned
- **Contested middle ground** – eg small toiletries in hotel
- **Genuinely unavoidable**

- Plastic Packaging Tax (PPT) £228.82/tonne from April 2026 – manufacturers and importers of plastic packaging with less than 30% of recycled content
- Extended Producer Responsibility for Packaging (PEPR) – Fees payable from October 2025
- Banning of single-use plastic products (from October 2023)
- Deposit Return Scheme (DRS) from October 2027
- Businesses/households separate collections (food waste, dry recyclables, garden waste)
- By 2029, 90% collection target for plastic drinks bottles
- By 2042 eliminate all avoidable plastic waste

Sector case studies — plastics in practice

How regulation and innovation play out across four sectors

Food & Beverage

REGULATION

- EU PPWR: all packaging recyclable by 2030
- Mandatory recycled content in PET
- PFAS & BPA bans in food cont act

INNOVATION

- Mono-material packaging
- Compostable bags (PepsiCo)
- In-store refill stations

Fashion

REGULATION

- France: microfibre filters in washing machines (2025)
- EU Digital Product Passport (July 2026)
- PFAS bans in textiles (US, 2025)

INNOVATION

- CiCLO biodegradable polyester
- Guppy bags / laundry filters
- Bio-based fibres (hemp, mycelium)

Automotive

REGULATION

- EU ELV Regulation (Dec 2025):
- 15% recycled plastic in 6 yrs
- 25% in 10 yrs — 20% from scrapped cars

INNOVATION

- AI polymer sorting
- Chemical recycling
- Bio-composite interiors

Hospitality

REGULATION

- Mini bottle bans (California, NY, IL, WA)
- EU condiment sachet ban by 2030
- UK EPR fees from April 2025

INNOVATION

- Accor: 58 SUP types eliminated
- Bulk dispensers replacing miniatures
- Premium refill water systems

Food & Beverage

Packaging = ~45% of all plastic produced globally. Plastic leaches directly into food — unique safety dimension absent from other sectors.

REGULATION

- EU PPWR (Feb 2025): all food packaging recyclable by 2030
- 30% recycled content mandatory in PET food packaging by 2030
- PFAS banned in food contact packaging from August 2026
- EPR + Deposit Return Schemes: 90% bottle collection target by 2029
- Digital labelling (QR codes) on all packaging from 2027

INNOVATION

- Mono-material packaging replacing unrecyclable plastic/foil laminates (e.g. Mondi recyclable ham pack)
- PepsiCo: 100% compostable chip bag from plant-based materials, industrially certified
- In-store refill stations eliminating primary packaging entirely

Fashion & Textiles

Synthetic fibres = 69%+ of global textile production. Every wash releases microplastics — the 'no away to throw to' problem made invisible in our wardrobes.

REGULATION

- France (2025): first country to mandate microfibre filters in all new washing machines
- EU REACH: bans intentionally added microplastics; unintentional shedding from textiles remains largely voluntary
- EU Digital Product Passport for garments: live July 2026
- PFAS banned in new textiles in California (2025), several US states following
- EU Ecodesign Regulation: durability and recyclability requirements for synthetics

INNOVATION

- CiCLO biodegradable polyester: fibres break down when shed — 100M+ lbs produced by mid-2024, used by 50+ brands
- Guppy bags & XFilter systems: laundry filters capturing >99% of microplastics at point of wash
- Bio-based fibres: hemp, flax, mycelium leather reducing fossil-fuel dependency
- Reformation: one of only 2/50 major brands rated 'leading the shift' — phasing out virgin synthetics by 2030

Automotive

Cars are 50% plastic by volume — but only 3% of that plastic is recycled content today. 800,000+ tonnes of end-of-life vehicle plastic goes to landfill or incineration in Europe every year.

REGULATION

- EU End-of-Life Vehicles Regulation (agreed Dec 2025): binding recycled plastic targets
- 15% recycled plastic in all new vehicles within 6 years of entry into force
- 25% within 10 years — 20% of both targets must come from scrapped vehicles (closed loop)
- Design-for-disassembly: new vehicles must allow easy removal of parts for recycling
- Reinforced EPR: manufacturers liable for collection and treatment of end-of-life vehicles

INNOVATION

- AI-powered polymer sorting: identifies and separates types from shredded vehicles — enabling closed-loop recycling
- Chemical recycling: breaks degraded automotive plastics to molecular building blocks, restoring virgin-quality material
- Bio-based composites: hemp and flax fibre-reinforced thermoplastics for interiors — some carbon-negative

Hospitality

A single 200-room hotel generates 300,000 plastic items every month. The sector sits at the 'contested middle ground' of avoidable plastic — and is now being hit from multiple regulatory directions.

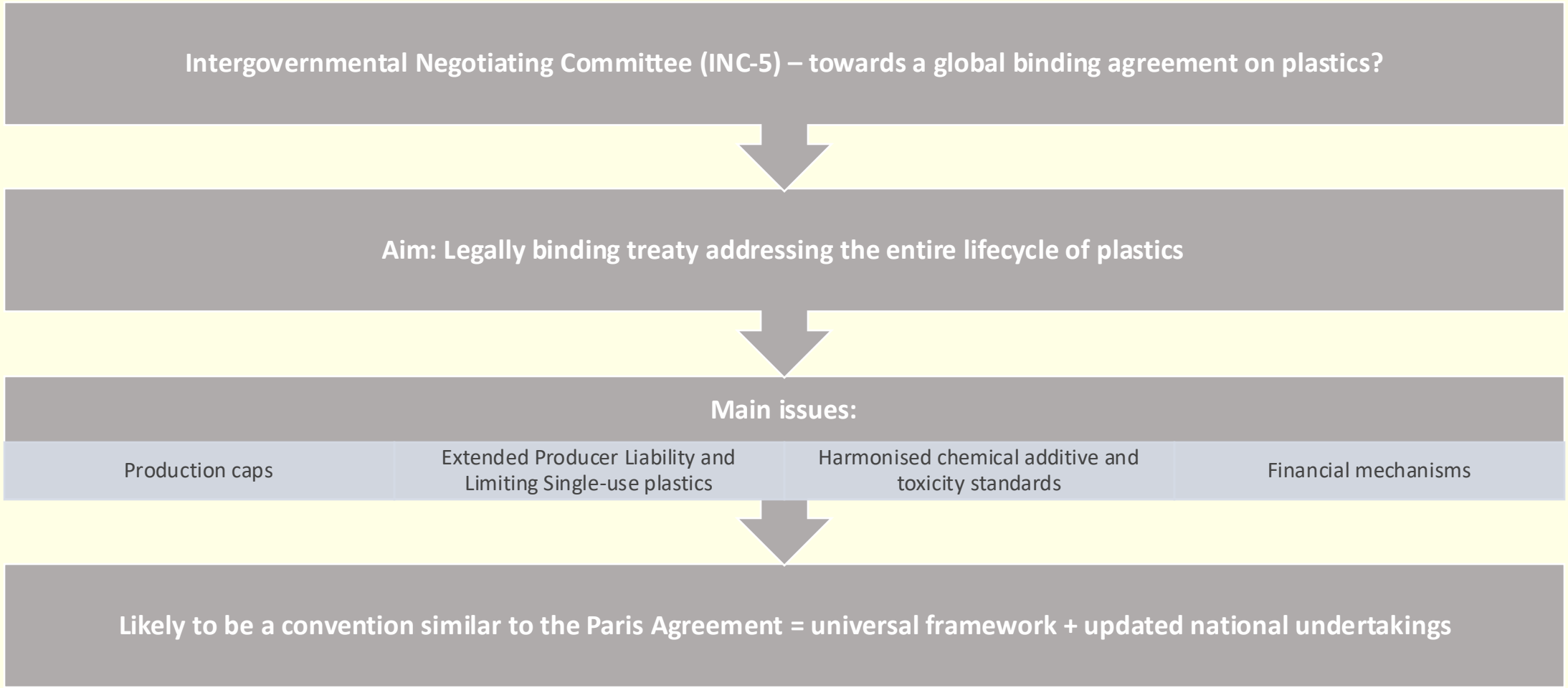
REGULATION

- Mini bottle bans: California, New York, Illinois and Washington banned small plastic toiletry bottles in hotels (2025 onwards)
- EU PPWR (2030): single-use condiment sachets banned in all hotels, restaurants and cafés
- UK pEPR from April 2025: hospitality liable for EPR fees on 100% of on-trade packaging
- UK Deposit Return Scheme from October 2027: affects venue waste reporting

INNOVATION

- Accor: eliminated 58 single-use plastic product types, replaced by wall-mounted refillable dispensers
- Clean the World: diverted 680,000 kg of plastic amenity waste from landfill in 2024 across 1.4 million hotel rooms
- Iberostar: AI waste management + full procurement redesign as part of net-zero-by-2030 goal
- Premium water: hotels replacing single-use bottles with on-site filtration and branded glass , sustainability repositioned as luxury

The future – INC-5



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Business compliance: Act now

Map your plastic footprint

Register for EPR

Redesign for recyclability

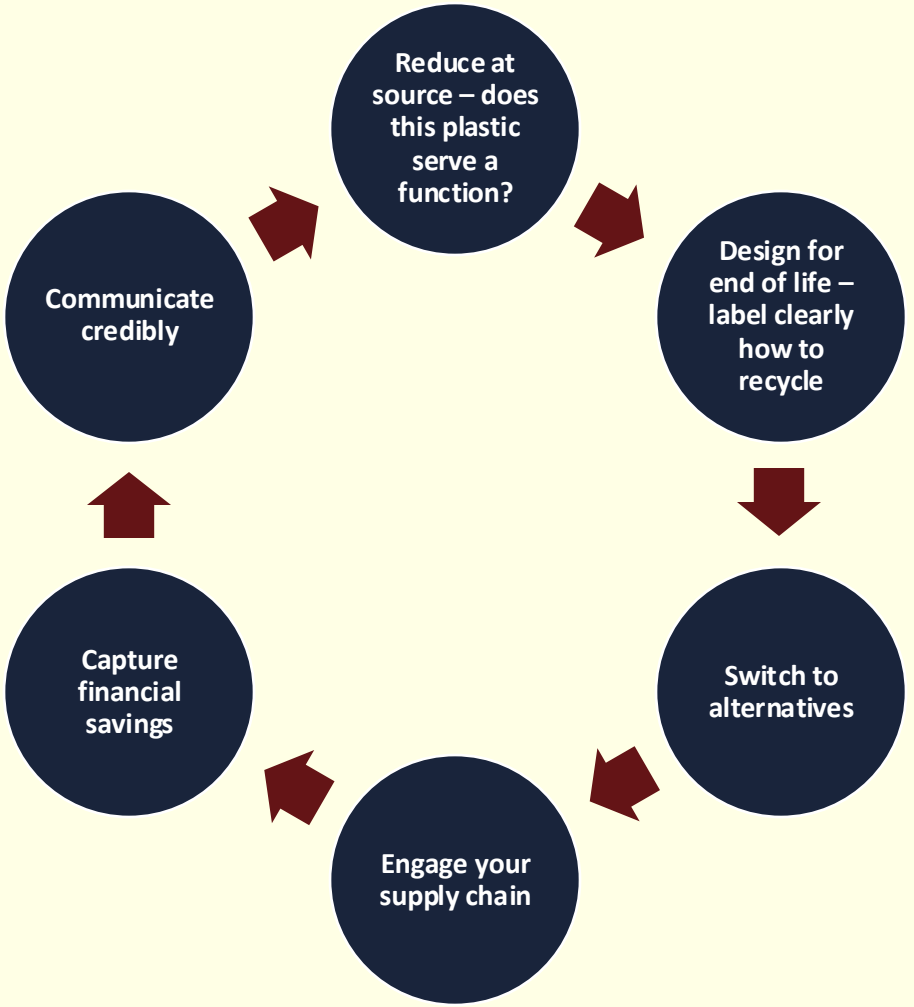
Increase recycled content

Prepare your Digital Product Passport (live in the EU from July 2026)

Set targets and disclose



The business case for deplastification





Practical tips for individuals

Kitchen and food

- Reusable water bottle/coffee cup/shopping bags
- Buy loose produce
- Bar soap and shampoo
- Glass, stainless steel food storage, beeswax wraps or silicone lids

Bathroom and personal care

- Minimal cardboard packaging
- Refills
- No microplastics in cosmetics (‘polythelene’ or ‘polypropylene’)
- Bamboo toothbrush, compostable dental floos, solid deodorant

- Work
  - Audit single-use plastic in the office
  - Switch to reusable crockery and cutlery
  - Plastic reduction requirements in suppliers
- Clothing and shopping
  - Avoid synthetic fibres if you can
  - Washing bags that capture microfibres (guppybags)
  - Buy secondhand

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