BUSINESS COALITION

ECONOMIC RATIONALE – METHODOLOGY DOCUMENT

April 2025

BUSINESS COALITION FOR A GLOBAL PLASTICS TREATY

SYSTEMIQ

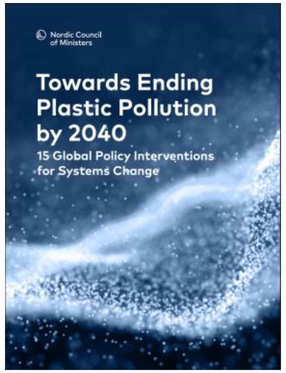
1. Quantitative analysis based on modelling

2. Macro-economic analysis

AN ESTABLISHED SYSTEMIQ MODEL WAS USED TO COMPARE TWO POLICY SCENARIOS: GLOBAL RULES VS. FRAGMENTED LANDSCAPE

1. Model from Towards Ending Plastic Pollution / Plastic Treaty Futures

Systemiq's established modelling framework, was used as the foundation—previously applied in the *Towards Ending Plastic Pollution*[1] *by 2040* and *Plastic Treaty Futures*[2] reports, that were validated by independent expert panels.



2. Customised scenarios

Two scenarios were designed and run based on policy levers that relate to Articles 3, 5, and 8:

- Global Rules
- Fragmented Policy Landscape

See pages 5-15 for the definition of scenarios as well as main assumptions

3. Analyses with raw data from customized scenarios

The raw data from the two customised scenarios was used to calculate analyses and compare the scenarios along the following dimensions:

- Volume flows (metric tons)
- Costs (USD)
- Jobs (# of jobs)

1: https://www.systemiq.earth/towards-ending-plastic-pollution-by-2040/
2. https://www.systemiq.earth/reports/plastictreatyfutures/

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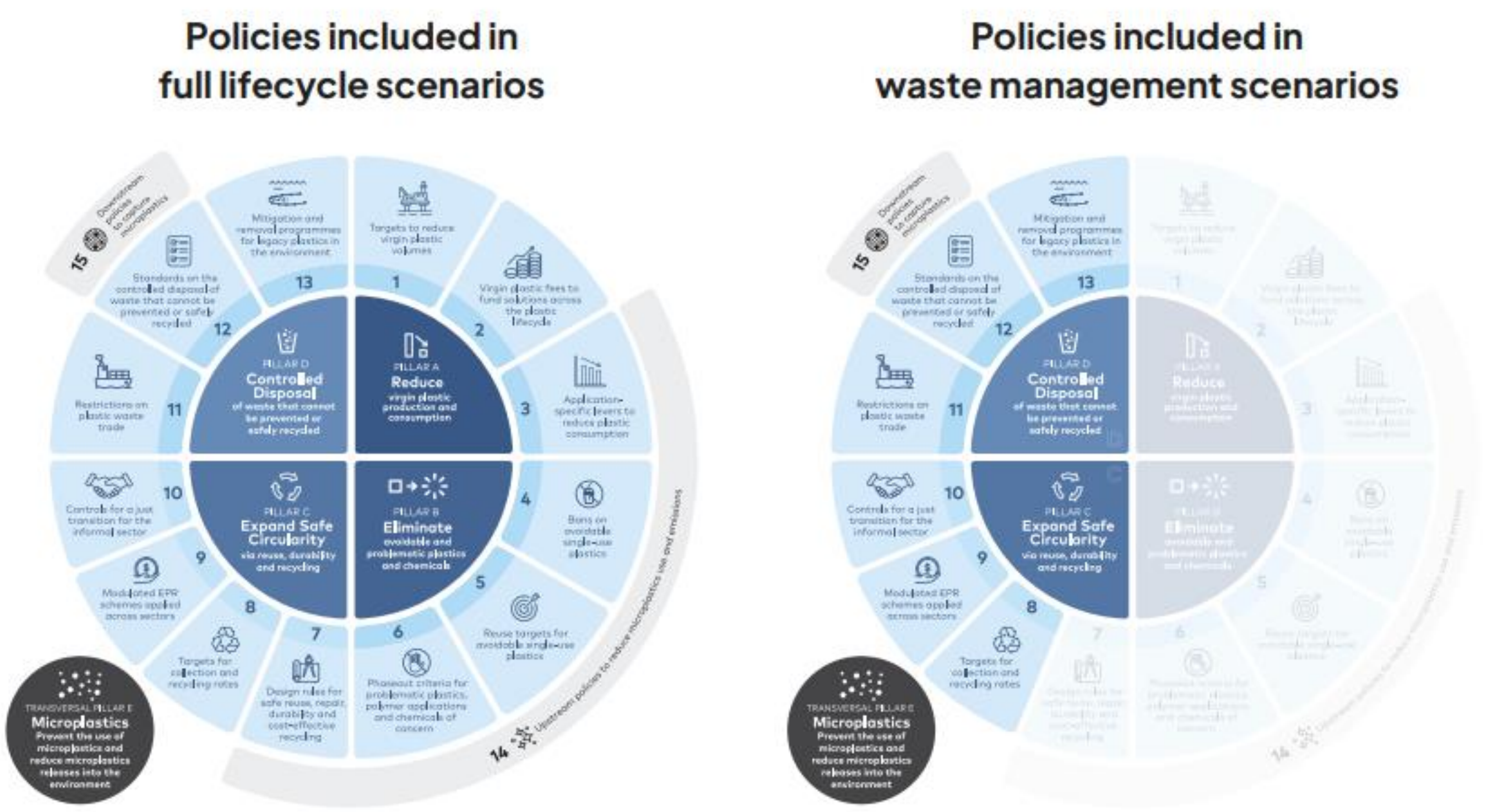
TEPP INCLUDED 15 POLICIES; PTF MODELLED THE FULL LIFECYCLE USING ALL POLICIES, AND WASTE MANAGEMENT BASED ON A SUBSET

FIGURE 4 **Policies in scope for full lifecycle and waste management scenarios**



Source: Systemiq (2024) Plastic Treaty Futures

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WE INTERPRETED BOTH SCENARIOS ALONG THE THREE ARTICLES IN SCOPE: 3, 5 AND 8

	Scenario 1: Legally binding global rules	Scenario 2: Fragmented policy landscape
Article 3: Problematic Plastic Products	**Global bans and phase-outs** of problematic & avoidable plastics as well as chemicals of concerns	Unharmonized restrictions and phase-outs in **some regions**, varying based on national policy
Article 5: Plastic product design	**Standardized global design rules** and harmonised recycled content targets	**Varying standards** and recycled content targets across countries and regions
Article 8: Plastic Waste Management	**Global requirements** to handle waste responsibly (e.g. through **EPR** – though not necessarily identical)	No global requirements to handle waste responsibly (e.g. **no EPR** or “bad” EPR esp. in global south)

Source: Systemiq analysis (2025)

FOR THE MODELLING, WE SELECTED 3 MAIN LEVERS THAT RELATE TO ARTICLES 3,5 AND 8 TO REPRESENT OUR GLOBAL RULES SCENARIO

	Connected lever in model	Main assumptions	Sectors to which lever was applied and rationale
Article 3: Problematic Plastic Products	**Elimination mandates**	Assumes a series of bans on SUP applications (based on European SUP directive) increasing gradually, where plastic use in these applications would be avoided entirely by 2040.	**Only the Packaging & Household Goods sector**, as the bans on problematic plastic products only affect this sector.
Article 5: Plastic product design	**D4R target**	Design policies improve collection, recycling yields and shift formats from hard to recycle multi materials to mono materials and rigid formats.	**All sectors** (Packaging & Household Goods, Textiles, Electronics, Construction, Transportation, Agriculture, Fishing Gear & Aquaculture, Microplastics, Other), as the discussion on Design for Recycling is broader than only packaging.
Article 8: Plastic Waste Management	**EPR**	EPR vary by material and region. Revenues from EPR fees lead to increase in waste management capacity in the model.	**Only the Packaging & Household Goods sector**, as there will likely only be EPR fees for packaging.

Refer to slide 6 for details on the selection of levers

Refer to slides 10-15 for details on the modelling assumption

Source: Systemiq analysis (2025)

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THE LEVERS WERE SELECTED BY MAPPING ARTICLES 3,5,8 TO POLICIES IN TEPP/PTF AND RELATED MODELLING ASSUMPTION

	Related policies in TEPP/PTF	Main assumptions (from TEPP technical annex)	Connected lever in model
Article 3: Problematic Plastic Products	4: Bans on avoidable single-use plastics	Global Rules Scenario assumes a series of bans on SUP applications (based on European SUP directive) increasing gradually, where plastic use would be avoided entirely by 2040.	**Elimination mandates**
	6: Phase-out criteria for problematic plastics, polymer applications and chemicals of concern	Not quantified	*None*
Article 5: Plastic product design	7: Design rules for safe reuse, repair, durability and cost-effective recycling	Design policies improve collection, recycling yields and shift formats from hard to recycle multi materials to mono materials and rigid formats.	**D4R target**
Article 8: Plastic Waste Management	8: Targets for collection and recycling	Not an input but an output of the model	*None*
	9: Modulated EPR schemes across sectors	EPR vary by material and region. Revenues are collected and invested nationally (with 30% allocated to administration), primarily into expanding collection, sorting, and disposal infrastructure. Implementation levels vary by income group.	**EPR**
	10: Controls for a just transition for the informal sector	Not quantified	*None*
	11: Restrictions on plastic waste trade	Not quantified	*None*
	12: Standards on the controlled disposal of waste that cannot be prevented or safely reduced	In the Global Rules Scenario, residual plastic volumes that cannot be prevented or recycled are allocated to engineered landfills or incineration	*None*

TEPP = Towards Ending Plastic Pollution; PTF = Plastic Treaty Futures
Source: Systemiq Analysis (2025)

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FOR THE FRAGMENTED POLICY SCENARIO, WE ASSUMED A 50% LOWER AMBITION THE 3 POLICY LEVERS AS IN THE GLOBAL RULES SCENARIO…

Rationale for why Global Rules will drive higher ambition from governments (not exhaustive)		Modelling hypothesis
Avoids displacement effect Minimizes the ability of companies to exploit regulatory loopholes and move operations to less restrictive countries	**Smaller lobbying power** Minimizes the ability of companies influence national legislation in their favour, lowering countries' ambitions	The ambition level of government policy is, on average, **50%** lower in a "fragmented rules" scenario compared to a "global rules" scenario
Avoids "race to the bottom" Avoids a situation where countries lower environmental standards to attract investment or maintain competitiveness	**Incentivizes higher ambitions** The requirement to meet minimal thresholds to participate in the global plastic system can encourage countries to agree to policy ambition levels that they would otherwise not implement on their own	

Source: Systemiq analysis (2025)

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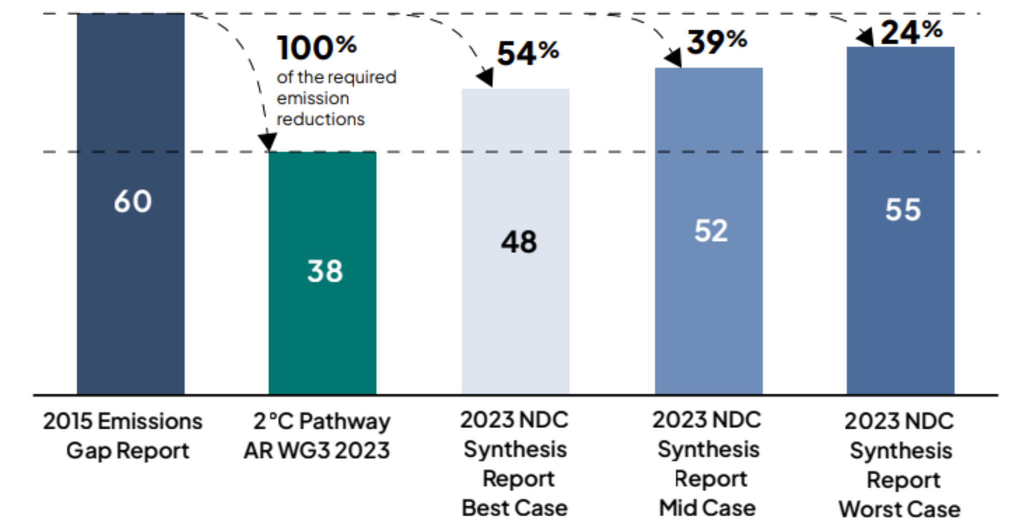
…THIS IS IN LINE WITH WHAT HAS BEEN ACHIEVED WITH NATIONAL ACTION IN OTHER ENVIRONMENTAL AGREEMENTS SUCH AS THE PARIS AGREEMENT

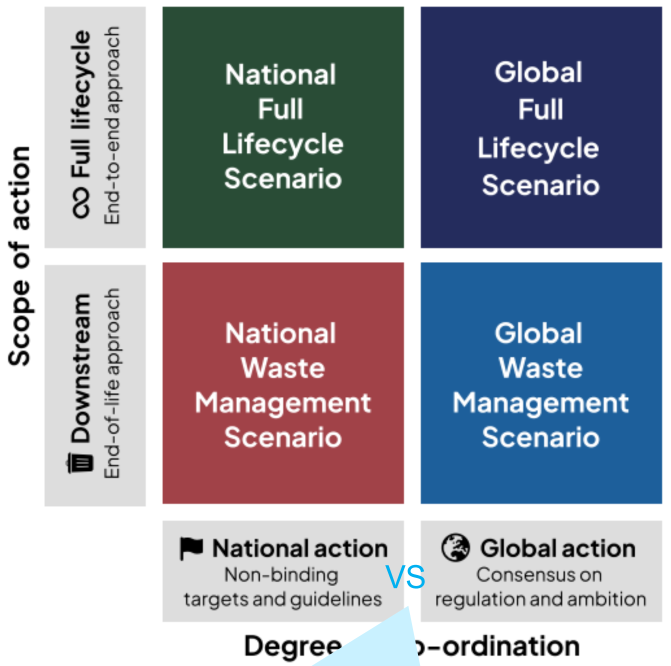
FIGURE 18 **Paris NDC process is expected to deliver between 24% and 54% of the required emission reductions to keep warming likely below 2°C[1] by 2030**

Estimates of 2030[2] emissions
$GtCO_2e$. All numbers are subject to rounding



With nationally determined action, the Paris Agreement NDC process is expected to achieve **24% to 54% of the required action**

FIGURE 2 **Framework for scenarios for the instrument**



In Plastic Treaty Futures, we assumed that national action achieves **at best 60% ambition** in comparison to the global action scenarios

Source: Systemiq (2024) Plastic Treaty Futures

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PLEASE REFER TO THE TECHNICAL ANNEX OF PLASTIC TREATY FUTURES FOR DETAILED INFORMATION ON THE MODEL AND BASELINE VALUES

8. The Business as Usual Scenario

The Business as Usual Scenario models the trajectory that plastic demand and waste will take if no further policies and interventions are put into place until 2040. The Business as Usual Scenario relies on forecast on the increase of plastic consumption by region and by application (see table 3) and in existing data for each step in the system maps presented above (for example, collection rates, recycling yields, etc.). The data points for the Business as Usual Scenario are presented below.

Packaging & Consumer goods Baseline values

Table 5: Datapoints in the system map: Packaging and consumer goods

Steps in system map (Model ID) Value for 2019	R1	R2	R3	R4	R5	R6	R7	R8	R9
Collection rates (Arrow A1)	98%	98%	98%	85% (U) 45% (R)	97% (U) 45% (R)	80% (U) 45% (R)	80% (U) 45% (R)	65% (U) 45% (R)	65% (U) 45% (R)
Formal collection (Arrow B1)	100%	100%	100%	See notes	See notes	See notes	See notes	See notes	See notes
Segregated collection - Bottles (Arrow C1)	65%	29%	44%	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)
Segregated collection – Rigid mono-materials (Arrow C1)	42%	22%	44%	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)
Segregated collection – Flexible mono-materials (Arrow C1)	38%	15%	16%	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)
Segregated collection – Multi-layer Multi-materials (Arrow C1)	0%	0%	0%	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)
Segregated collection - Consumer goods (Arrow C1)	3%	0%	0%	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)	0% (U) 0% (R)
Informal collection for recycling (Arrow D1)	n.a.	n.a.	n.a.	95% (U) 95% (R)	95% (U) 95% (R)	95% (U) 95% (R)	95% (U) 95% (R)	95% (U) 95% (R)	95% (U) 95% (R)
Collected and sorted waste sent to disposal (Arrow F2)	20%	20%	20%	20%	20%	20%	20%	20%	20%
Unsorted waste to post collection mismanaged (Arrow L2)	0%	0%	0%	45% (U) 70% (R)	0% (U) 50% (R)	45% (U) 70% (R)	45% (U) 70% (R)	95% (U) 95% (R)	95% (U) 95% (R)

Notes:
- In plastic packaging and for Regions R4-R9, the model differentiates between urban ("U") and rural ("R") to reflect the differences between those.
- There are varying levels of formal collection (Arrow B1) between different formats (see below), with the rest assumed to be collected by the informal sector.
  - **Urban R4**: bottles 55%, rigid mono-materials: 55%, flexible mono-materials 90%, multi-materials 100%, consumer goods 90%
  - **Urban + Rural R5**: bottles 55%, rigid mono-materials: 50%, flexible mono-materials 90%, multi-materials 100%, consumer goods 90%
  - **Urban R6**: bottles 50%, rigid mono-materials: 50%, flexible mono-materials 90%, multi-materials 100%, consumer goods 90%
  - **Urban+ Rural R7**: bottles: 20%, rigid mono-materials: 50%, flexible mono-materials 90%, multi-materials 100%, consumer goods 90%,
  - **Urban R8, R9:** bottles: 50%, rigid mono-materials: 50%, flexible mono-materials 90%, multi-materials 90%, consumer goods 50%
- In **R4, R6, R8, R9** no informal collection is considered in **rural** areas (B1 = 100%)
- In the Business as Usual Scenario, collection and recycling rates by 2040 are assumed to remain at the same levels as of 2019, with the following exceptions that are based on existing regulations and targets
  - Textiles R1: Separated formal collection 2019: 40% -> 2040 85%
  - Packaging R1: Segregated collection: Bottles 2019: 65% -> 2040: 90%; Rigid mono-materials: 2019: 42% -> 2040: 70%; Flexible mono-materials 2019: 38% -> 2040: 60%
  - Packaging R3: Segregated collection: Bottles 2019: 44% -> 2040: 50%; Rigid mono-materials: 2019: 44% -> 2040: 50%; Flexible mono-materials 2019: 16% -> 2040: 17%

Sources: Systemiq (2022). ReShaping Plastics: Pathways to a Circular, Climate Neutral Plastics System in Europe; THE Charitable Trusts, Systemiq (2020). "Breaking the Plastic Wave: A Comprehensive Assessment of Pathways Towards Stopping Ocean Plastic Pollution", EPA (2020) Advancing Sustainable Materials Management: 2018 Tables and Figures, NAPCOR (2021) PET Recycling Report, Plasteax (2023) Unpublished data, World Bank (2019) Urban and Rural Municipal Solid Waste in China and the Circular Economy, India Plastics pact (2022) Material Flow of PET Used in Packaging Applications in India for the year 2021-22.

As we used the same model and baseline values and only changes the scenarios, please refer to the Technical Annex of Plastic Treaty Futures[1] for more information on:

- Model architecture
- Taxonomy (geographic and plastic categories
- Basline values for the Business as Usual Scenario

1. https://www.systemiq.earth/reports/downloads/Systemiq-Plastic_Treaty_Futures-Technical_Annex_EN.pdf

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FOR ARTICLE 3, WE ASSUMED A SERIES OF BANS ON SUP APPLICATIONS INCREASING GRADUALLY, UNTIL 2040

Bans on avoidable or unnecessary single-use plastic packaging

Avoidable or unnecessary plastic can refer to "products that can currently be reduced or substituted with non-plastic fit-for-purpose alternatives and/or can be eliminated entirely without compromising the consumer's access to the product, inability to meet health or safety regulations, or causing undesirable environmental outcomes" (Raubenheimer, K., Urho, N.2020).
The Global Rules Scenario assumes a series of bans on single use plastic applications, increasing gradually, where plastic use would be avoided entirely by 2040. This would translate to those plastic volumes being eliminated, shifted to multi-serve, reuse, or refill alternatives, or replaced by other materials that exhibit better environmental performance. These measures can also trigger changes in product design and the exploration of new product concepts that offer the same functionality with better impacts. Bans on intentionally added microplastics are also in the scenario, covered in the microplastics chapter (see Policy Intervention #14 and #15). **The Global Rules Scenario does not consider** substitution of current plastics with bio-based plastics, biodegradable plastics, oxo-degradable plastics, or compostable plastics (except for some specific applications in agriculture). Uncertainty remains regarding the role of these solutions in the future, and caution is necessary based on available evidence (EIA, 2018).
For the Global Rules Scenario, a specific list of plastic applications was assumed to be in scope for these bans. As a starting point, the analysis includes bans on single-use plastic applications from European Union's Single Use Plastic Directive (EU Commission, 2023), both enacted and under discussion. This includes plastic applications such as bags, straws, cutlery, takeaway containers, and microbeads. The scenario also includes additional bans on applications not presently covered by the European Union's regulations, where alternatives could be developed by 2040. To select appropriate applications beyond European Union's regulations, the Global Rules Scenario builds on past analysis on technological, financial, performance, and behavioural constraints (The Pew Charitable Trusts and Systemiq, 2020). For instance, in this scenario there is a gradual banning of flexible multi-layer sachets, when assuming alternatives can be developed (e.g., reuse, mono material films, other materials) to provide equivalent barrier properties if these demonstrate better environmental impact.

The **single use plastic applications considered in the Global Rules Scenario sets bans by 2040 on:**
- Food service disposables and take away food and beverage single use plastic applications (straws, stirrers; on-premises food service disposables; off-premises plastic cups, lids, containers, clamshells, and cutlery)
- Plastic pots, tubs and trays for vegetables and fruits (not applied for dairy, meat, ready meals)
- Single use plastic bags.
- Plastics in logistics and business-to-business for single use applications such as films to wrap pallets, e-commerce, or single-use crates for beverages.
- Multi-material / multi-layer sachets only if better choices are available (e.g., mono materials, other materials)

To estimate the potential reduction of plastic consumption from these bans, the analysis assumes global implementation by 2040 and compares the relative volume impacted versus the total consumption of plastic in a household, differentiating by regions. The impact of these bans is estimated together with the reuse targets as they may impact the same products
For those volumes impacted, the analysis assumes the most likely outcome of the ban: elimination (consumption ceases to exist), shift to reuse models, or replacement with other materials, based on past analysis on technological, financial, performance, and behavioural constraints (The Pew Charitable Trusts and Systemiq, 2020)

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FOR ARTICLE 5, WE ASSUMED DESIGN TARGETS WILL IMPROVE…

Design rules for safe reuse, repair, durability and cost-effective recycling in local contexts

In the model, design policies improve collection, recycling yields and shift formats from hard to recycle multi materials to mono materials and rigids formats. These policies are applied equally to all sectors or plastic categories.

Effects of design for recycling policies in packaging sector and resulting changes of arrows

Sector	Variable / System ID	Format	2019	2040	Comments and Sources
Packaging And Consumer Goods	Sorted collection sent to disposal (not recycling) Arrow F2	Bottles	20 %	10%	Antonopoulos, Ioannis & Faraca, Giorgia & Tonini, Davide. (2021). Recycling of post-consumer plastic packaging waste in the EU: Recovery rates, material flows, and barriers. The Pew Charitable Trusts and Systemiq (2020). "Breaking the Plastic Wave: A Comprehensive Assessment of Pathways Towards Stopping Ocean Plastic Pollution"
		Rigids	20 %	10%	
		Flexibles	20 %	10%	
	Mechanical Recycling process losses Arrows I2 / J2	Bottles	27 %	7 %	
		Rigids	27 %	7 %	
		Flexibles	27 %	7%	
		Multi material or multi-layer formats	27 %	7 %	Assumption: no recycling of multi material or multi-layer formats
	D4R: Shift from flexible-mono-material to mono-material rigids	Multi material shifts to rigid formats	0 %	45 %	Assumption: Design for recycling over time will shift 45 % of multi-materials to flexible-mono-materials, and 45% of flexibles to rigids. It is assumed that in some cases multi-material packaging is still needed because of e.g., better barrier towards oxygen and other performance criteria.
	D4R: Shift from multi-material to mono-material flexible packaging	Multi material shifts to mono material flexible formats	0 %	45 %	

See assumptions for Fisheries and Aquaculture on next page

In the other sectors, Design for recycling targets are assumed to maximise recycling rates through simplicity of polymer, fewer fillers and additives and fewer polymer types. In these sectors, the rate for sorted waste losses is halved as new designs enter the in-use stock (in system map terms, the Arrow F2 is reduced gradually, until reaching a 50% reduction by 2040). The analysis uses estimates from Phasing Out Plastics report (ODI, 2020) to calibrate towards the maximum recycling rates achievable in each sector (e.g., 40% in transportation plastics).

For durables, changes in design also include the reduction of plastic demand through different interventions, which are based on the Phasing Out Plastics report (ODI, 2020). For **electronics**, a 50% reduction of plastic use in in Europe, the US and Canada, Japan, Republic of Korea, Australia, New Zealand, China, as well as Central, South America and the Caribbean by 2040 compared to the Business as Usual is modelled. This is achieved by first changing the design of electronics by 2050 through modular design for disassembly to facilitate reuse and extend product life; and second, the substitution of plastics with other materials: metals, wood, and ceramics could replace the use of PP and PE for structural uses and casings and the use of PUR and PS for insulation (ODI, 2020). For **agriculture,** the Global Rules Scenario assumes design rules to extend the lifespan for plastic applications in agriculture with the purpose of reducing demand. This is achieved through re-design of e.g., mulching films that enable reuse or a substitution of non-degradable plastics with biodegradable plastic for applications that necessarily end up in the soil such as coatings for seeds, fertilisers, or pesticides.

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… COLLECTION, RECYCLING YIELDS AND SHIFT FORMATS FROM HARD-TO-RECYCLE MULTI-MATERIALS TO MONO-MATERIALS AND RIGID FORMATS

Design for recycling and design for durability policies in Fisheries and Aquaculture

Sector	Variable/ System ID	Sub-sector	2019	2040	Comments and Sources
Fisheries – Design for Durability	Box 0.1	Fisheries	R1–R9: 0%	R1–R3: 50% R4–R9: 75%	Increased durability of gear from fisheries will reduce the demand for gear. Assumption: The average durability of gear can reach the level of Norway: 4years This would lead to increasing the lifespan for fisheries gear from 2 to 4 years for R1–R3 and from 1 to 4 years for R4–R9 (Systemiq, Handelens Miljøfond, and Mepex 2023)
Aquaculture – Design for Durability	Box 0.1	Aqua-culture	R1–R9: 0%	R1–R3: 33% R4–R9: 66%	Increased durability of gear from aquaculture will reduce the demand for gear. Assumption: The average durability of gear can reach the level of Norway: 15years This would lead to increasing the lifespan for aquaculture gear from 10 to 15 years for R1–R3 and from 5 to 15 years for R4–R9 This is based on an average of upper level range of lifespan for various gear: floating collar expected to have a lifespan of 20 years, 4 years for feeding pipes, 9 years for mooring systems (Systemiq, Handelens Miljøfond, and Mepex 2023)
Fisheries & Aquaculture – Design for Recycling	Arrow B1	Fisheries and Aqua-culture	R1–R3: 95% R4–R5: 50% R6–R9: 15%	R1–R3: 95% R4–R9: 85%	Increased collection resulting from the implementation of EPR scheme, mandatory port collection, and gear marking and the reduction of problematic polymers
Impact of Design for Recycling	Arrow F1	Fisheries	R1–R3: 4% R4–R9: 1%	R1–R3: 75% R4–R9: 65%	Assumption: The share of sorted collection going towards recycling would increase through better designs to reach the level of Norway for R1–R3. It has been adjusted to 65% for R4–R9 to account for the feasibility and ramp up of infrastructure (Systemiq, Handelens Miljøfond, and Mepex 2023)
Impact of Design for Recycling on recycling type	Arrow X1	Aqua-culture	0%	30%	Out of the 80% HDPE used in aquaculture, we expect 30% to go towards closed loop recycling

Notes:

- Fishing nets cannot be recycled closed-loop. Fishing nets will be either recycled through open-loop recycling or chemical recycling. The large share of HDPE in aquaculture will make it possible to shift a share of the recycling volumes towards closed-loop recycling.
- **Sources:**
- Systemiq, Handelens Miljøfond, and Mepex “Achieving circularity, A low-emissions circular plastic economy in Norway”, 2023

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FOR ARTICLE 8, WE ASSUME SPECIFIC EPR FEES DIFFERENTIATED BY REGION AND FORMAT…

Extended Producer Responsibility (EPR) refers to schemes where industry players, who place products containing plastics on the market, pay a fee that is used to fund the collection, sorting, recycling, or disposal of the waste materials from its use. Fees are assumed to likely be passed to consumers (although this is not part of the model). EPRs are considered effective policies for achieving circularity targets and to raise significant funds that can be deployed towards solutions. EPR is perceived as one of the top policy instruments and there is high level of consensus that it should be scaled.
This model does not consider any EPR impact on overall plastic demand and considers the plastic demand as inelastic (i.e., major shocks in oil prices did not translate to significant fluctuations of demand for plastic products). This section explains how EPRs were conceptualised and the methodology to estimated impact in the system map.

In the Global Rules Scenario EPR fees will be applied to the packaging and household goods sector and eco-modulated (i.e., higher fees for materials harder to recycle). They will grow over time and differ based on each region, as shown in the exhibit. The fees are assumed to be collected and invested at national level, also paying for the administration of the EPR scheme itself. The share of investment that each part of the value chain receives in the model is in direct proportion to their cost. Investments in recycling infrastructure and reuse models are assumed to mainly be taken by the private sector as these sectors would generate profits from these investments. The scenario assumes regions with Deposit Return Schemes (DRS), particularly in bottles, would apply both the EPR fee and the deposit, with the deposit being returned to the consumer after depositing the used item in the correct channel.

1. Revenue per policy:
- A certain fee per tonne of plastic is applied, differentiated by region and format.
- These fees are multiplied by the volumes of plastic waste to estimate a total revenue raised.
- EPR fees will start taking effect 2 years after the Treaty's completion, in 2026.

2. Administrative costs:
- 30% of the revenue is deducted as assumed to be expended in administration costs, 70% will be invested into waste management.

3. Allocation of revenues:
- **EPR fees will be collected and invested at national level**; implementation levels will be 100% in high-income countries; 85% in upper-middle income countries (e.g., China and Brazil); and 70% in lower-middle income and lower income countries (e.g., India and Indonesia)
- **Allocating revenue to downstream solutions:** The remaining revenue is allocated to building out collection, sorting and disposal infrastructure by the public sector. For collection, EPR fees will be used to collect all waste, not just plastic (as plastic is not generally collected in isolation). For collection, sorting, and controlled disposal, revenue is allocated as follows:

1. In R1, R2, R3 (advanced collection and disposal infrastructure), revenue allocated to sorted collection schemes
2. In R4 to R9, revenue is allocated to expand collection, sorting, and disposal. The share that each part of the value chain receives is in direct proportion to their costs, such that the capacity for each will increase by the same tonnage amount (assumption that the value chain scales simultaneously).

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… WHICH LEAD TO INCREASE IN WASTE MANAGEMENT CAPACITY IN THE MODEL AS A RESULT OF EPR

4. Estimating the impact in capacity of investing this revenue: This allocated revenue to expand capacity in each step is compared to the OPEX and CAPEX cost in that step for one ton of plastic waste (see table 24 and 27). This comparison follows this process:

1. For each step (collection, sorting, disposal), the "dollar cost per tonne of plastic waste" is scaled by a factor. This is to account for the fact that plastic is generally not collected, sorted or disposed of in isolation, and in many waste streams will be managed with other waste materials (paper, metals, mixed waste).
2. For example, a factor of 4 is applied to collection cost per ton of plastic waste from packaging and consumer goods. This factor is estimated comparing to data of collecting all waste, not just plastics.
3. Then the allocated dollar revenue to that step (e.g., collection) is divided by that scaled cost factor, to result in an incremental capacity (in tons) from that investment
4. The capacity addition is calibrated with region-specific levels of implementation, to acknowledge different levels of difficulty to expand systems in each region: 100% in R1–3, 85% in R4–5; and 70% R6–8

5. Increasing capacity in the system map:

- The capacity addition of each value chain step is then added to the baseline tonnage value to calculate the new levels of collection, sorting, or disposal. Revenue invested will materialise capacity addition 1 year later to account for time required for establishing the added capacity. Hence, with financial policies kicking in in 2025, the first addition in capacity would materialise in 2026. Capacity is added until either 2040 is reached, or a maximum constraint (e.g., 98% collection rate) is reached. Note: because costs are annualised both for OPEX and CAPEX, each ton of capacity added will need to be paid for again in all other years that follow.

EPR fees across regions

EPR fees US$ per plastic ton	Europe, USA and Canada, Japan, Republic of Korea, Oceania		China, Central/South America, and the Caribbean		India, Eurasia, South and South-East Asia, Africa, and the Middle East	
	2030	2040	2030	2040	2030	2040
Bottles	100	400	50	350	50	300
Other packaging rigids	100	600	100	525	100	450
Mono-flexibles packaging	150	800	150	700	100	600
Multi-materials packaging	200	1,000	200	875	150	750
Household goods	200	1,000	200	875	150	750

Source: Systemiq (2024) Plastic Treaty Futures – Technical Annex

SYSTEMIQ

1. Quantitative analysis based on modelling

2. Macro-economic analysis

MACRO-ECONOMIC INSIGHTS WERE BASED ON LITERATURE REVIEW, MODEL RESULTS TO BUILD PROJECTIONS AND EXPERTS INTERVIEWS

1. Literature review

Literature review to assess previous studies that contained useful numbers on the argumentation towards global regulations. This was based both on internal and external studies

2. Projections building

Whenever possible, estimations or methodologies from previous studies were joined with PTF model's results and used to make projections and comparisons between scenarios

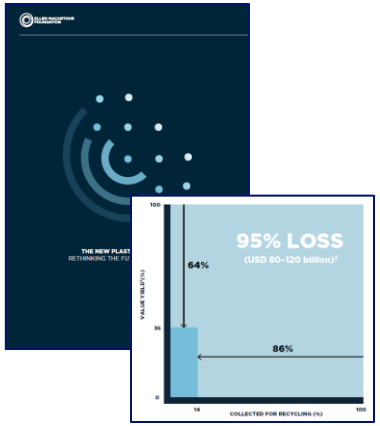
3. Experts interviews

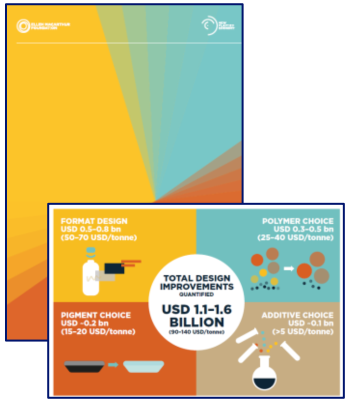
Internal and external expert interviews were conducted to gather information on why Global Rules could be more beneficial than Fragmented Rules, especially for the waste pickers and cost of capital topics

Systemiq studies

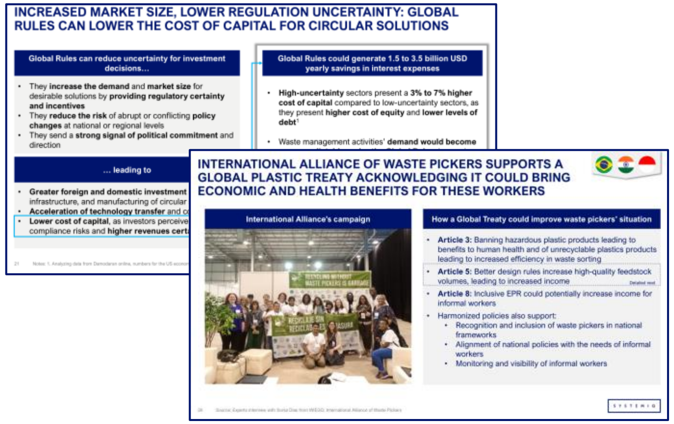
External studies

Former estimations contributing to projections





Insights from experts interviews



Source: Systemiq analysis (2025)

SYSTEMIQ

SPECIFIC METHODOLOGIES FOR CALCULATING COST OF CAPITAL, VALUE LOSS TO THE ECONOMY AND DESIGN FOR RECYCLING IMPACTS

Cost of Capital

- The idea of this analysis was to measure the "cost of uncertainty" generated by fragmented rules. After interviews with finance experts, this cost of uncertainty was translated into a higher cost of capital for waste management projects
- Following analysis from Damodaran's database, we identified that high uncertainty sectors (e.g., retail, software) have a cost of capital that is 3 to 7% higher than low uncertainty sectors (e.g., utilities and water treatment)
- PTF's model estimates the annual CAPEX that is needed for sorting, recycling, incineration and landfilling until 2040, in each scenario. We took the yearly average CAPEX for each scenario and multiplied by 3% and 7% to calculate the amount saved annually by Global Rules

Value loss to the economy

- In EMF (2016) The New Plastics Economy – Rethinking the future of plastics, a methodology for estimating the value loss to the economy was developed:
  - 10% of all packaging put on the market (78M tons) was recycled in 2013
  - The original value of virgin packaging was 1,100 to 1,600 USD/ton
  - The value of the recycled products was 550 to 800 USD/ton
  - The value loss to the economy is:
    78 Mt*(1,600 USD/t) - 7,8 Mt*(800 USD/t) = ~120 billion USD[1]
- Using that same methodology, we took PTF's model outputs (total packaging volume put on the market) and estimated the value lost to the economy in the BAU, Global Rules and Fragmented Rules scenarios

D4R economic impact

- In EMF (2017) The New Plastics Economy – Catalyzing Action, it was estimated that good D4R rules could improve the recycling process economics by 90 to 140 USD/ton of plastic packaging collected
- Using outputs from PTF's model (estimated volume of plastic packaging collected in each country and globally by 2040) and multiplying these volumes by 140 USD/ton, we calculated the estimated maximum economic impact on recycling

Note: 1. This calculation is done for both price ranges: 1,100 and 1,600 USD/ton
Source: Systemiq analysis (2025)