earth action

Costs and timelines for global plastic product bans and phaseouts

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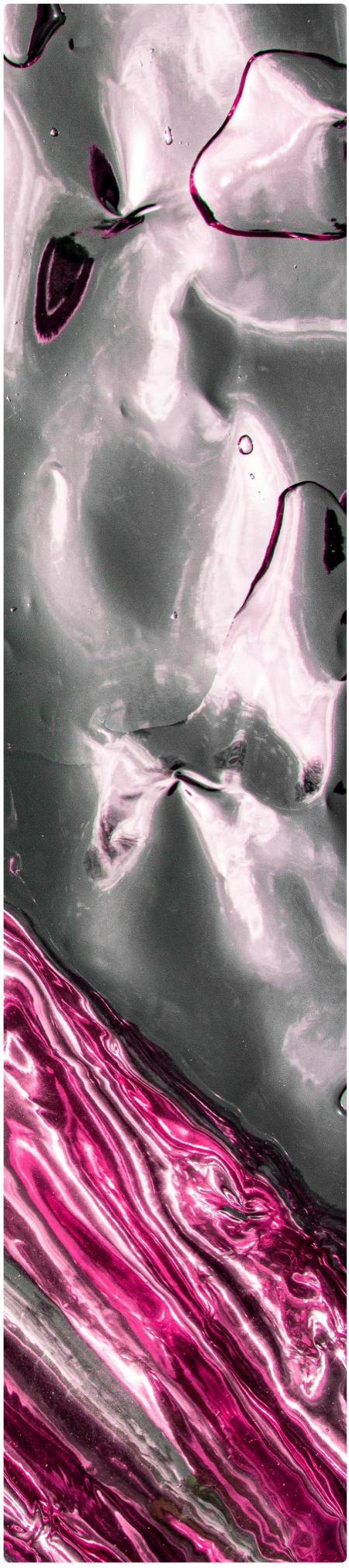

Disclaimer:
This document summarizes the technical report prepared by Earth Action (EA) for World Wildlife Fund (WWF) for the assignment 'Costs and timelines for global plastic product bans and phaseouts ' and its findings. The cost-benefit analysis model was prepared on a global level using a select group of costs and benefits, coefficients sourced from literature and data aggregated from Plasteax. The policy scenarios were based on assumptions derived from literature and should not be used to predict actual impacts, but to demonstrate hypothesized outcomes from policy implementation. The values can be used to show the direction of assumed impacts, the order of magnitude and identify priorities for policy.

Introduction

The World Wide Fund for Nature (WWF) commissioned Earth Action (EA) to assess the estimated global costs and benefits of banning and phasing out problematic plastic products. WWF classifies problematic plastics as those with high likelihood of ending up in the environment and potentially harmful impacts on the environment and human health. This study looked in particular at problematic plastics that are already known to have a high elimination feasibility.

The analysis focused on the cost implications of different policy scenarios and timelines, looking at private, public and social costs and benefits. The values in this report are presented in **net present value (NPV)** for the years 2025-2040. Net present value is the difference between the present value of cash inflows and the present value of cash outflows over a specific time period.

Methodology

Earth Action conducted a social cost-benefit analysis of potential policies, and included the following costs and benefits;

- Private: value of the plastic market, value of the alternatives market, transition costs to shift from plastic market to alternatives;
- Public: waste management costs, administrative costs;
- Social: greenhouse gas emission costs, mismanaged waste costs.

Three categories of plastics products were chosen for analysis due to their proposed coverage by the United Nations treaty to end plastic pollution:

- food packaging of EPS;
- packaging made of PS, PVC or EPS;
- single-use plastics: cotton buds, cutlery, straws and stirrers.

Six scenarios are covered in the analysis including the business-as-usual (BAU), where plastic consumption continues to grow . The details for each scenario are given in Table 1.

Scenario	Name	Description
1	Business as usual (BAU)	Plastic production continues to follow current trends.
2a	Complete ban of assessed products	Production drops to zero in year of ban implementation (2028).
2b		Production drops to zero in 2028 for high-income countries and in 2033 for mid- and low-income countries.
3a	Phase-out of assessed products	Production linearly drops to zero 5 years after policy is implemented (2028).
3b		Production linearly drops to zero 5 years after policy is implemented (2028 for high-income countries and 2033 for mid- and low-income countries).
4	Phase-out with technology transfer	Scenario 3b where mid- and low-income countries have no transition costs.
5	Phase-out with multilateral fund	Scenario 3b where high-income countries subsidize administrative costs mid- and low-income countries.
6	Phase-out with technology transfer and multilateral fund	Scenarios 3b, 4 and 5 combined.

Table 1: Modelled scenarios, including in some cases a differentiation in the implementation of the policies between high-income and mid- and low-income countries.

Key findings

1. Bans and phase-outs significantly reduce mismanaged waste

Bans and phase-outs of assessed plastics would significantly reduce consumption and mismanaged waste, with earlier bans providing greater environmental benefits. The assessment has shown that implementing bans and phaseouts on the assessed plastics could **reduce plastic consumption by around 173-224 million tons and decrease mismanaged waste by around 51-74 million tons from 2025 until 2040**. While all scenarios analysed, other than the BAU scenario, would significantly reduce the burden of plastic pollution on global economies, the quicker timelines for bans and phase-outs would lead to larger reductions in consumption and waste generation.

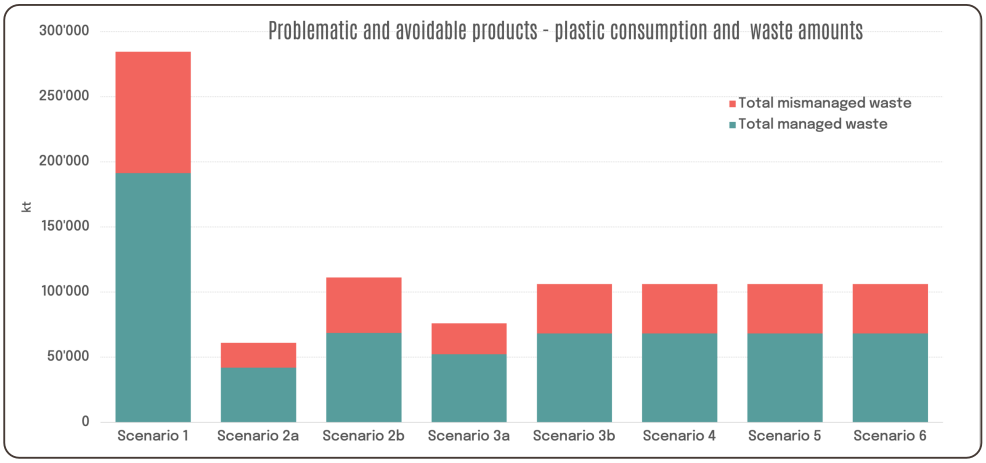

Figure 1: Total plastic consumption of products included in the assessment under the modelled scenarios. The bars represent total plastic consumption and the proportion of managed and mismanaged waste.

Key findings

2. The benefits of plastic product bans and phase outs outweigh costs

Overall results show that the BAU scenario, taking into account the public, private and social costs and benefits, would result in a cost of over **10 trillion USD for the period of 2025-2040**, which is the largest total cost out of all the scenarios.

In all scenarios of bans and phase-outs of the assessed plastics, the waste management savings in the long term would far outweigh the initial short-term costs. Immediate bans would cost more in the short term, but resulting in much higher long-term savings, than gradual phase-outs:

- Bans on assessed products would incur a total cost of 2 trillion USD, resulting in almost **8 trillion USD of cost savings** between 2025 and 2040, when compared to the cost of 10 trillion USD of BAU scenario. These cost savings would be approximately twice as much as Germany's annual GDP (in 2023).
- Global phase outs of the assessed products would lead to **savings of over 7 trillion USD**, when compared to the BAU cost.
- Bans of assessed products, with differentiated timelines for high-income and low- and middle-income countries, will lead to the lowest cost saving, of around **4.7 trillion USD**, when compared to BAU.
- Bans and phaseouts that give more time for low- and middle-income countries to implement the obligations would see global cost savings between 4.7 – 5.4 trillion USD, showing that **even if longer time horizons are granted for some countries**, elimination of these plastic products **still leads to significant cost savings** when compared to BAU.

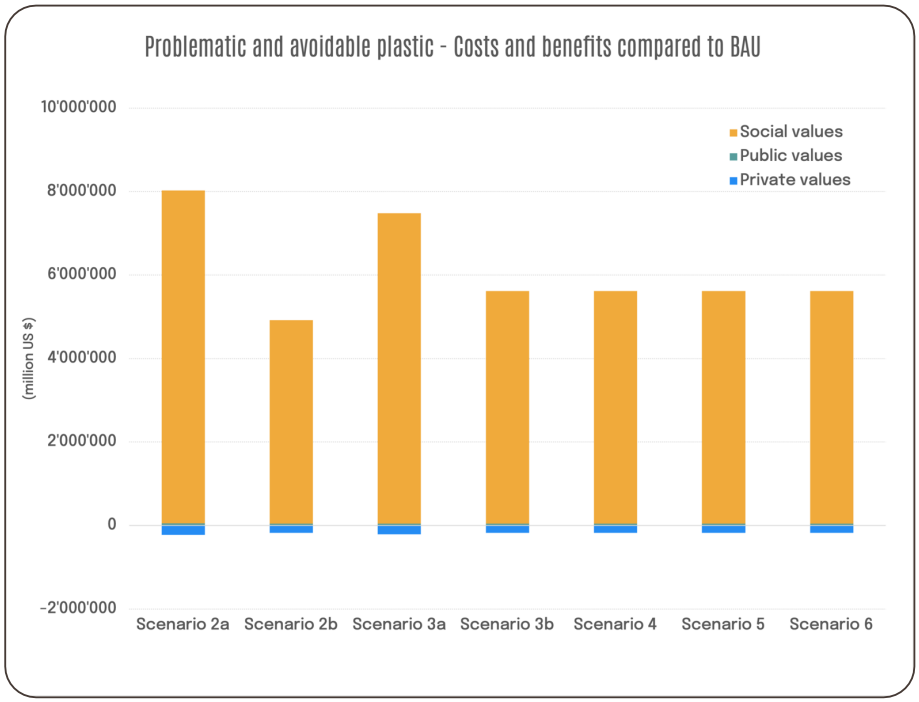

Figure 2: Net present values of the modelled scenarios for the products included in the assessment compared to the business-as-usual.

Key findings

3. Savings in waste management outweigh administrative costs of policies

Costs for governments: governments can benefit from implementing policies to ban and phase out assessed plastic products despite potential increases in administrative costs. These policies generally lead to significant reductions in waste management expenses, offsetting the administrative costs to implement and enforce policies.

An immediate ban in 2028 across all signatory states would lead to the highest administrative costs, amongst all scenarios, costing governments **323 million USD globally**. However, an immediate ban starting in 2028 would reduce waste management costs **by 50 billion USD**, far outweighing the administrative costs.

The lowest administrative costs, **around 313 million USD**, occur in the phaseout scenarios where low- and middle- income countries receive support from high- income countries. This support includes technology transfer between high-income and low- and middle-income countries, a multilateral fund that covers administrative costs, or both technology transfer and a multilateral fund in combination.

Costs for the private sector: in all scenarios, the private sector would see a reduction of their benefits linked to the reduction of the plastics market and the investments needed for the transition. These costs would be partially offset by the benefits from expanded markets for direct alternatives to single-use plastic, which is accounted for in this assessment. However, this assessment does not account for all possible new economic opportunities, particularly the growth in a burgeoning market of reusable products, systems, and circular business models. Thus, expected benefits for the private sector will likely exceed those identified in this assessment.

The scenario of a phaseout with different timelines for high-income, and low- and middle-income countries, and with technology transfer, would lead to the lowest overall **transition costs of 143 million USD** for the private sector. When accounting for all costs, including the loss value of the plastic market, and benefits linked to the market for alternatives, this scenario would in total cost the private sector around **180 billion USD**, while the scenario of an immediate and global ban starting in 2028, would lead to the highest total costs for the private sector, of around **228 billion USD**. For comparison, the value of the plastics market of the assessed products was estimated to be 362 billion USD in the BAU scenario.

The combined private sector transition costs and governmental administrative costs to ban the assessed products worldwide by 2028 would amount to **632 million USD**. Putting this number into perspective, the direct costs would amount to less than 1% of the GDP of Costa Rica and less than 0.01% of the total costs of the BAU scenario. In other words, it would be significantly cheaper to pay for the transition to banning these plastic products rather than continuing with BAU.

Key findings

4. Granting longer time frames for low- and middle-income countries increase costs

Differentiated timelines for low- and middle-income countries would increase costs globally:

- An immediate ban of the assessed plastic products for all parties would reduce costs by 65% and lower the amount of mismanaged waste by 23 million tons and the costs by 3.1 trillion USD, compared to a ban with differentiated timelines for high-income countries and low- and middle-income countries.
- Phasing out said plastic products for all parties with the same timeline reduce costs by 34% and lower the amount of mismanaged waste by 14 million tons and the costs by approximately 1.8 trillion USD, in comparison to a phaseout with differentiated timelines for high- and low- and mid-income countries.
- Phasing out assessed plastic products with differentiated timelines for high- and low- and mid-income countries would lead to 15% cost savings, compared to banning these products with differentiated timelines for high-income countries and low- and middle-income countries. This is the case as consumption volumes gradually sink towards the phase-out date, whereas in ban scenarios, consumption remains stable until entry into force.

Assumptions and limitations

The assessments were conducted for these scenarios based on the following assumptions:

- Negotiating states begin signing the treaty in 2025 and the treaty enters into force in 2026. For this analysis, only 72 countries, representing 92% of the global plastic consumption, are included.
- After the entry into force, signatory states will start implementing the treaty through national legislation for phasing out of products and for complete bans by 2028.
- For some ban and phase-out scenarios the treaty allows low- and middle-income countries a longer time horizon to implement certain provisions of the treaty.
- Legislative processes take an equal amount of time in high income and low- and middle-income countries.

The following limitations of the study applies

- Plastic data is sourced from the Plasteax database, a database that includes 73 countries representing 92% of the global plastic consumption in 2021 (the latest year with accurate data).
- The 6 main scenarios are based on the following assumptions:
    - bans occur within a calendar year,
    - phase-outs occur linearly over 5 years,
    - national legislative timelines are the same for high-, middle- and low-income countries,
    - the alternatives market can absorb 17% of the existing plastic market
    - administrative costs are proportionate to the amount of plastic being managed,
    - transition costs are based on a single study in Canada and extrapolated to a global context.
- Due to limited scope and data available from literature, the cost benefit analysis does not include:
    - Feedback loops that would occur in an industrial transition, such as achieving economies of scale, material innovation or production efficiency gains. Including these could lead to increased share of alternatives market , reduced transition and material costs.
    - Other costs of plastic production and management, such as health costs arising from toxic chemicals from plastic use, collection or disposal.
    - Additional supporting markets, such as the reuse market, which is expected to increase to fill in gaps left by single use plastics and packaging.

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