ELLEN MACARTHUR FOUNDATION

This is an Ellen MacArthur Foundation publication, laying out our perspective on the *'Breaking the Plastic Wave'* study released in July 2020 by The Pew Charitable Trusts and SYSTEMIQ

Perspective on *'Breaking the Plastic Wave'* study

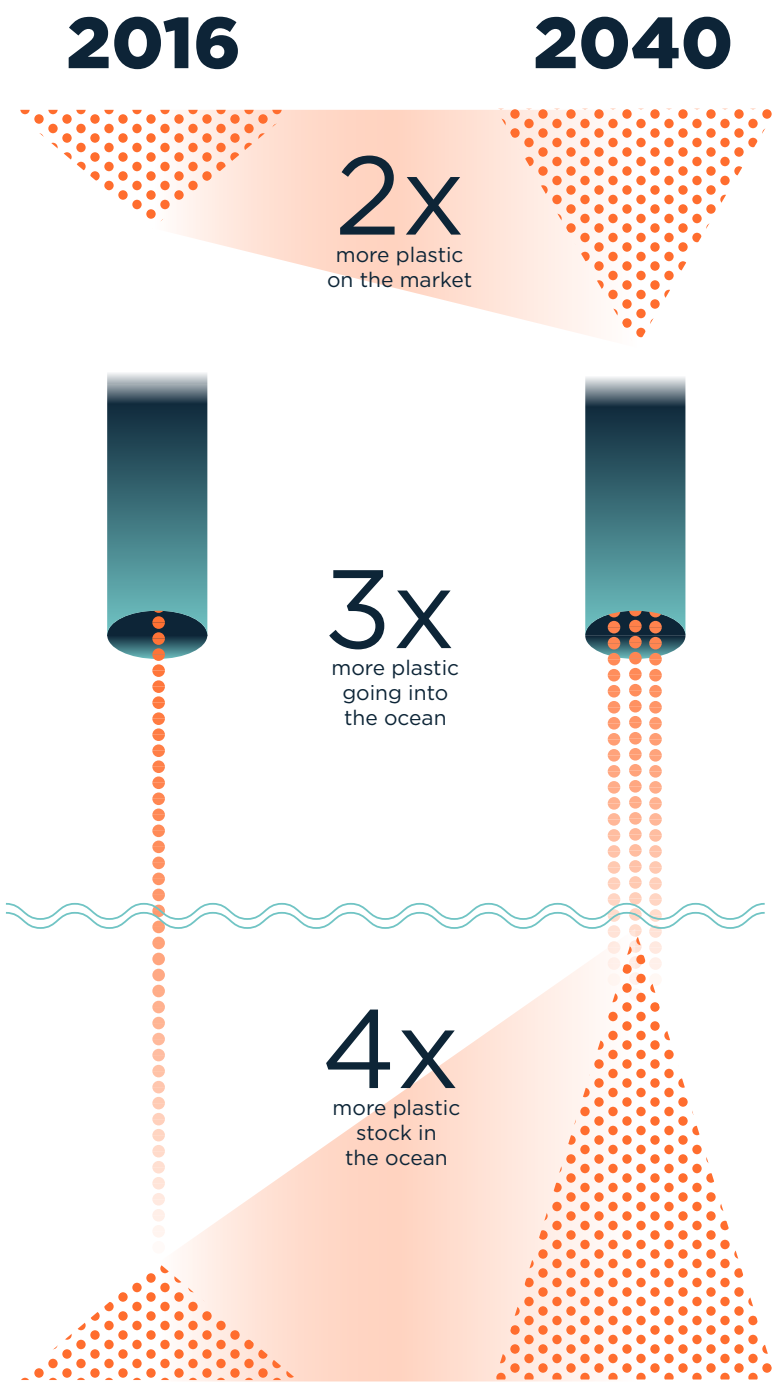
THE CIRCULAR ECONOMY SOLUTION TO PLASTIC POLLUTION

"We need to raise our level of ambition and match it with bold and urgent action."

Dame Ellen MacArthur

On the 23 July 2020, The Pew Charitable Trusts and SYSTEMIQ released *Breaking the Plastic Wave: A Comprehensive Assessment of Pathways Towards Stopping Ocean Plastic Pollution* - one of the most analytically robust studies ever produced on ocean plastics. Thought partners were the University of Oxford, University of Leeds, Common Seas, and the Ellen MacArthur Foundation.

This is the Ellen MacArthur Foundation's perspective on the study's findings and what businesses and governments must do **now** to address them.



Based on data from Breaking the Plastic Wave study by The Pew Charitable Trusts and SYSTEMIQ (2020)

Plastic pollution is rapidly outpacing efforts to stop it.

Breaking the Plastic Wave shows that, if we fail to act, by 2040:

- the volume of plastic on the market will have doubled
- the annual volume of plastic entering the ocean will have almost tripled, from 11m tonnes in 2016 to 29m tonnes in 2040
- ocean plastic stocks will have quadrupled, reaching over 600m tonnes.

This is in line with our 2016 analysis, which showed there could be more plastic than fish in the ocean by 2050.

This is driven by a perfect storm consisting of four compounding trends: rapid population growth; rising per capita plastic use; shifts to low-value/hard-to-recycle materials; and disproportionate growth in markets with low collection rates.

The scope of the study is all plastics disposed of as municipal solid waste (packaging, toys, diapers, day-to-day objects like toothbrushes, etc.). It excludes other plastics, such as those used in construction, automotive, electronics, and textiles. The scope covers around two thirds of total plastics production, and the vast majority of total ocean leakage.

The problem starts long before plastic reaches our oceans, rivers and beaches, and so must the solutions.

Many efforts to tackle plastic pollution to date have focused narrowly on improving waste management or clean-ups. Others have focused only on bans and plastic reduction.

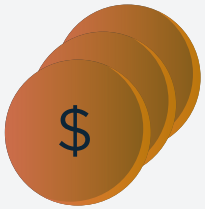
Breaking the Plastic Wave provides the clearest evidence to date that none of these solutions will work in isolation: we cannot recycle our way out of plastic pollution, and neither can we simply reduce our way out of it.

We won't recycle our way out of plastic pollution

Scenarios focused on only recycling and disposal fall short

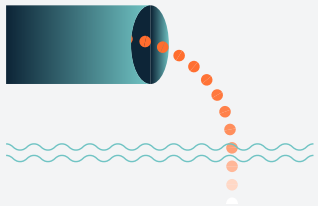
Limited by speed of infrastructure development

Scaling collection, recycling and disposal is limited by the realistic speed of infrastructure development, especially in the Global South. Connecting everyone to formal collection systems would require **connecting over 500,000 people every single day** between today and 2040.



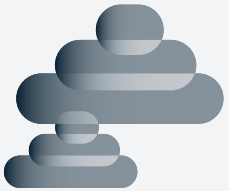
Costly for governments

By 2040 these scenarios will be USD 80-180 billion per annum more expensive compared to a comprehensive circular economy approach, while resulting in worse environmental and social outcomes.



Higher annual leakage of plastics in the ocean

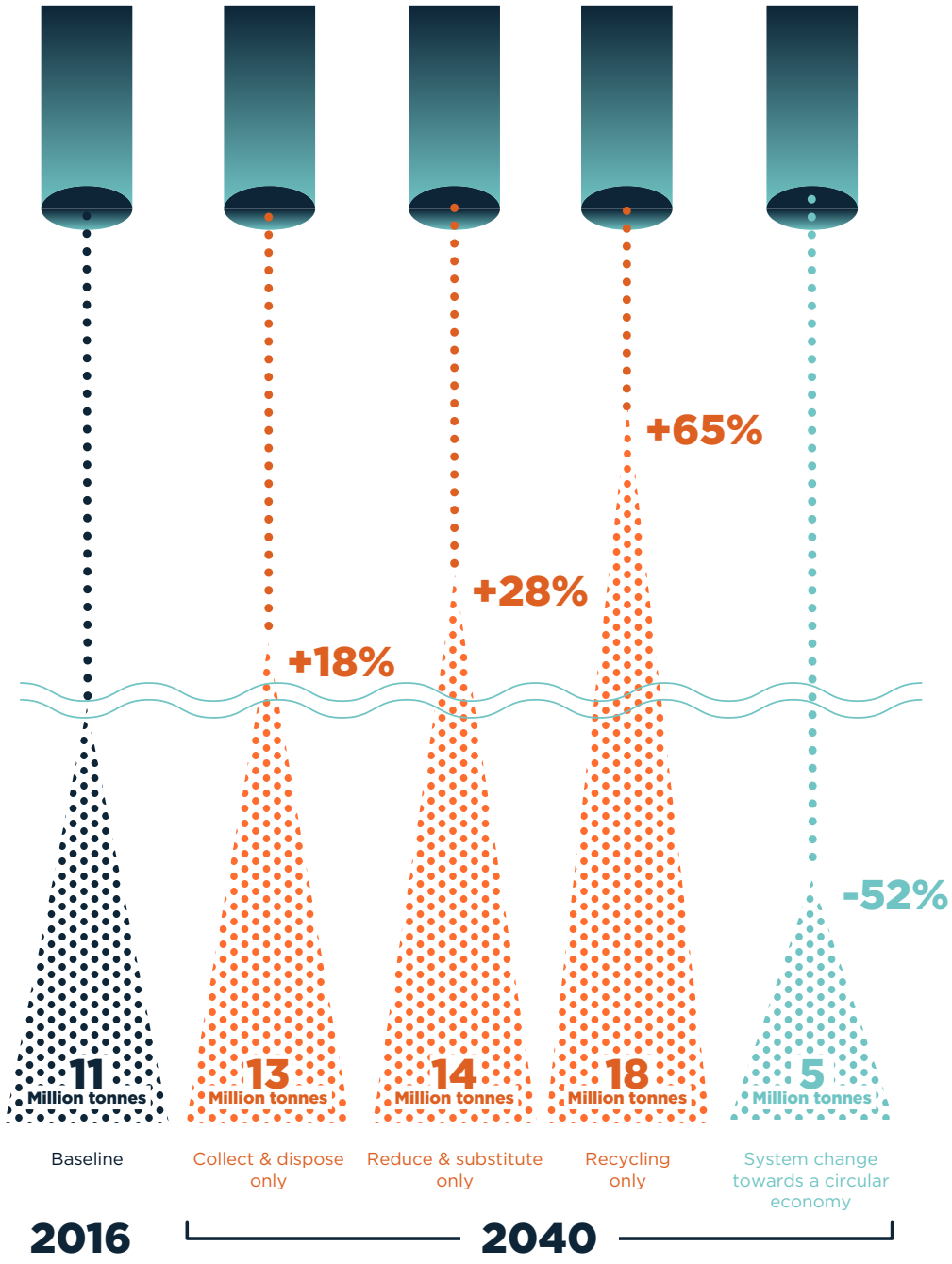
These scenarios **fail to reduce the annual amount of plastics entering our oceans** in 2040 to below 2016 levels, even with the most aggressive but realistic pace of infrastructure development.



Higher greenhouse gas emissions

These scenarios lead to **almost 15% higher GHG emissions** compared to a comprehensive circular economy approach and lock us in into a system relying on finite fossil resources.

ANNUAL LEAKAGE OF PLASTICS INTO THE OCEAN BY 2040 FOR DIFFERENT SCENARIOS



Based on data from Breaking the Plastic Wave study by The Pew Charitable Trusts and SYSTEMIQ (2020)

No single solution will suffice in isolation, we need a comprehensive circular economy approach

Breaking the Plastic Wave report shows that we must take a comprehensive circular economy approach. A systems change towards a circular economy, where we prioritise rethinking what is put on the market, whilst also rapidly increasing our ability to keep it in the loop after it has been used.

In addition to presenting the most effective answer to plastic pollution, the circular economy offers the strongest economic, social, and climate benefits.

Compared with business-as-usual, a comprehensive circular economy approach has the potential to reduce the annual volume of plastics entering our oceans by over 80%, generate savings of USD 200 billion per year, reduce greenhouse gas emissions by 25%, and create 700,000 net additional jobs by 2040.

2040 outcomes by scenario

SCENARIO	NET COST[1] (USD billion per year)	OCEAN LEAKAGE[2] (Million tonnes per year)	VIRGIN PLASTIC USAGE[3] (%)	GREENHOUSE GAS EMMISIONS[4] (%)
BUSINESS AS USUAL (BAU) No systems interventions or change in culture/consumer behavior	940	29	100	100
COLLECT AND DISPOSE Maximise increase of collection and safe disposal facilities	920	13	94	85
RECYCLING Maximise increase of collection and recycling capacity	820	18	84	85
REDUCE & SUBSTITUTE Maximise reduction in consumption and substitute for alternatives where possible	780	14	52	80
SYSTEM CHANGE (CIRCULAR ECONOMY APPROACH) Maximise reduction, substitute where possible, and maximise collection and recycling	740	5	45	75

Based on data from Breaking the Plastic Wave study by The Pew Charitable Trusts and SYSTEMIQ (2020)

[1] Total net cost for the entire system (from raw material to production to after-use management) in the year 2040 to deliver the same total 'utility' in all scenarios
[2] Tonnage of plastics entering the ocean per year in 2040
[3] Tonnage of virgin plastics per year in 2040 relative to BAU
[4] Tonnage of CO_2e per year in 2040 relative to BAU

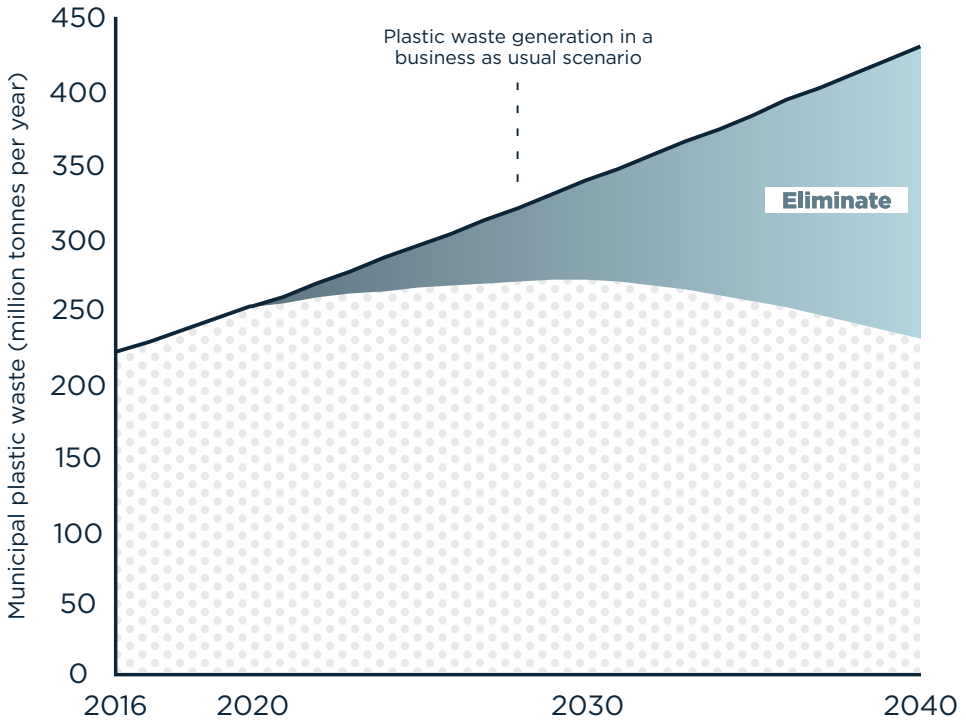
First and foremost we must ELIMINATE the plastic we don't need

The volume of plastic on the market – and resulting plastic waste generation – is predicted to double by 2040 in a business-as-usual scenario, driven by population growth and economic development, mainly in the Global South. This would lead the annual volume of plastic entering the ocean to almost triple and ocean plastic stocks to quadruple.

To prevent this, first and foremost we need to rethink what is put on the market. We must **ELIMINATE** the plastics we don't need, going beyond removing just the straws and carrier bags, and rapidly scaling innovative new delivery models that provide products to customers without packaging or using reusable packaging. Material substitution can also be considered, where relevant and considering unintended consequences.

Plastic use should be reduced by nearly 50% by 2040 compared to business-as-usual. This is the equivalent of net-zero growth in plastic use versus today.

Any scenario aiming to achieve the same reduction in ocean plastic leakage by 2040 with less reduction in plastic use is significantly more expensive, increases GHG emissions and requires collection rates in (rural areas of) the Global South that are unrealistic with known solutions.



Based on data from Breaking the Plastic Wave study by The Pew Charitable Trusts and SYSTEMIQ (2020)

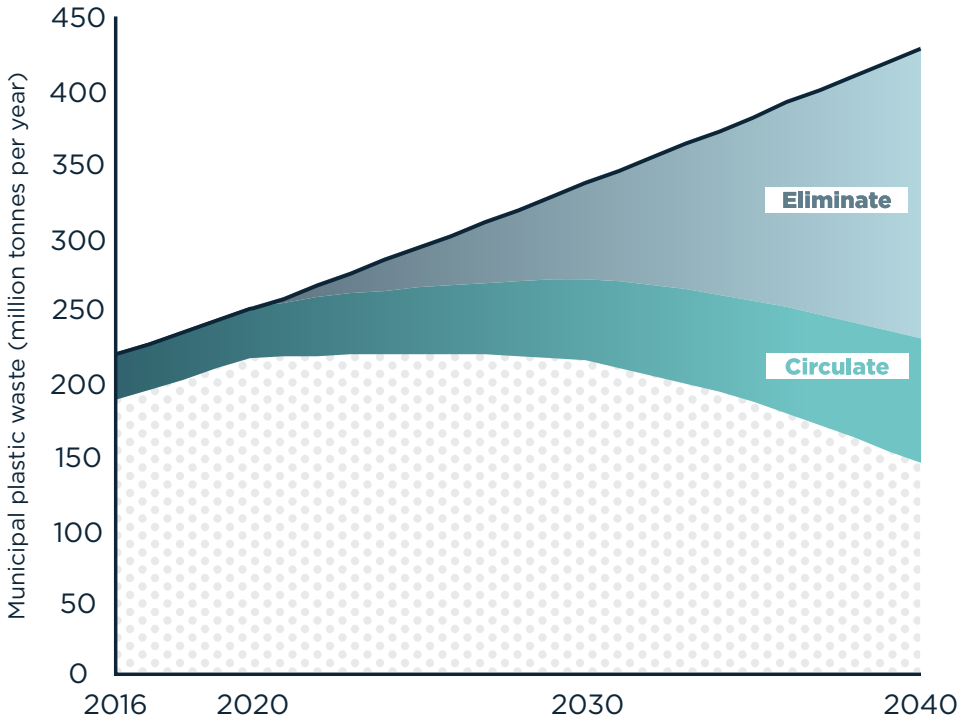
The scope of the study is all plastics disposed of as municipal solid waste (packaging, toys, diapers, day-to-day objects like toothbrushes, etc.). It excludes other plastics, such as those used in construction, automotive, electronics, and textiles. The scope covers around two thirds of total plastics production, and the vast majority of total ocean leakage. As the vast majority of objects in scope have short use-phases, halving plastic waste by 2040 roughly equals halving plastic use by 2040.

Invest at least USD 150 billion in collection and reprocessing over the next five years alone to ensure we CIRCULATE the plastics we do need

Businesses must move rapidly to design all plastic items to be reusable, recyclable or compostable. It is also crucial to fund the necessary infrastructure, rapidly increasing our ability to collect and **CIRCULATE** these items.

This will require around USD 30 billion of on-going annual funding in a best case scenario. Without significant action on elimination and redesign these costs would be significantly higher.

It is highly unlikely this funding will come from government budgets alone, especially in the Global South where the biggest infrastructure gaps exist. Therefore, mechanisms that improve the economics of recycling and provide stable recurring funding streams with fair industry contributions, such as Extended Producer Responsibility (EPR) or equivalent industry-led initiatives, must urgently be put in place globally.



Based on data from Breaking the Plastic Wave study by The Pew Charitable Trusts and SYSTEMIQ (2020)

The USD 150 bln over the next five years is based on a USD 30 bln annual net cost (capex plus opex minus revenues) in the 'System change scenario'.

Note: Given the realistic speed of infrastructure development by 2040, even in this scenario still close to 20% of remaining plastic waste generated in 2040 is not (yet) collected, and thus mismanaged.

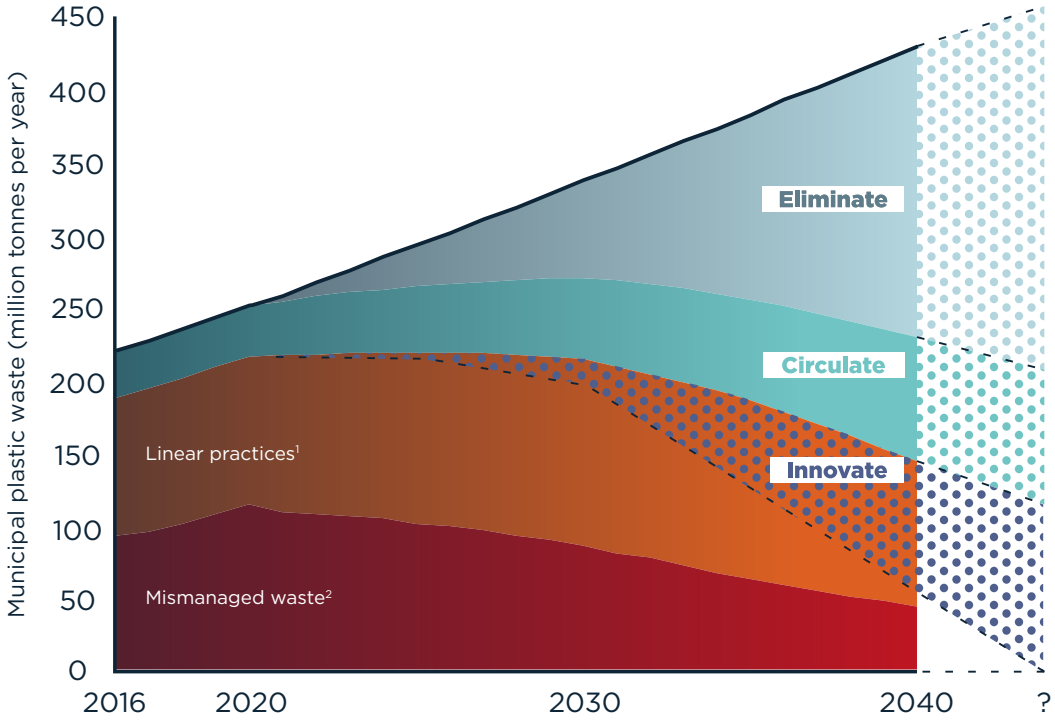
Note: It only includes the part of the collection costs that are allocated to plastics. The full cost of setting up collection systems is much higher, as municipal collection systems typically also collect other municipal waste (paper, glass, organics, etc.).

INNOVATE at unprecedented speed and scale

Deploying all known solutions to plastic waste at maximum realistic speed and scale would still result in more than 150 million tonnes being landfilled, incinerated or mismanaged every year by 2040. This would include 5 million tonnes entering the ocean. This is an 80% improvement compared to business-as-usual, but is still unacceptably high.

In addition to the radical and immediate scaling of known solutions, we must **INNOVATE** at unprecedented speed and scale towards new business models, product design, materials, technologies, and collection systems to accelerate the transition to a circular economy.

If the plastics and the waste management industries increased their R&D intensity to the same level as, for example, the machinery industry, it would create a USD 100 billion per annum R&D agenda by 2040 – a quadrupling of R&D investment versus today's levels.



Based on data from Breaking the Plastic Wave study by The Pew Charitable Trusts and SYSTEMIQ (2020)

[1] Including landfilling, incineration, and conversion of plastic to fuel or energy

[2] Including open burning, leakage into the environment and into the ocean

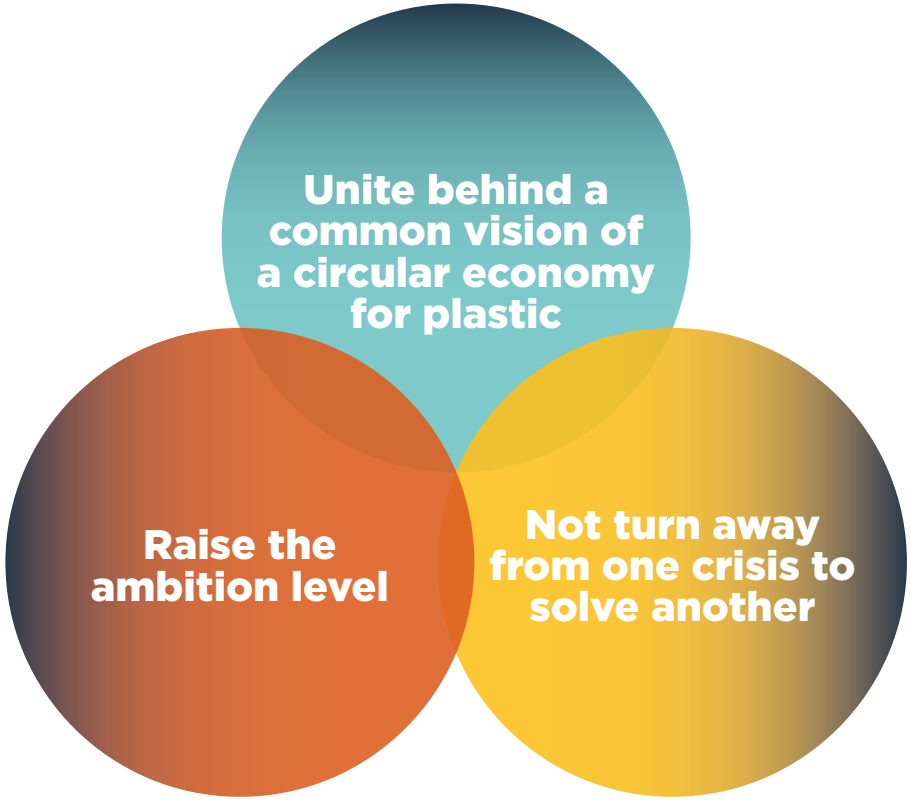
[3] Solid lines represent the outcomes of the analytical modeling of the Breaking the Plastics Wave study. Dashed lines and dotted shading are illustrative, representing the impact of innovation and the impact of continued eliminate and circulate efforts beyond 2040

Call to action

Many were shocked by our analysis in 2016 that there could be more plastic than fish in the ocean by 2050.

Breaking The Plastic Wave is a clear signal that if we are to avoid that scenario, the solution lies in taking urgent, ambitious, and coordinated action across the entire plastic system with a clear emphasis on stemming the flow at its source.

We call on businesses and governments to:



We call on businesses and governments to:

Unite behind a common vision of a circular economy for plastic

Breaking the Plastic Wave recognises the need to build on current work and highlights the New Plastics Economy and other ambitious initiatives as a significant step. The New Plastics Economy Global Commitment and the Plastics Pact network already unite 850+ organisations behind a common vision and clear actionable targets for a circular economy for plastic, setting a clear direction and minimum ambition level for 2025 to build on. We urge those outside this growing community to join this international effort.

A binding global agreement that builds on the vision of a circular economy for plastic could also ensure a unified international response to plastic pollution that matches the scale of the problem.

NEW PLASTICS ECONOMY Global Commitment

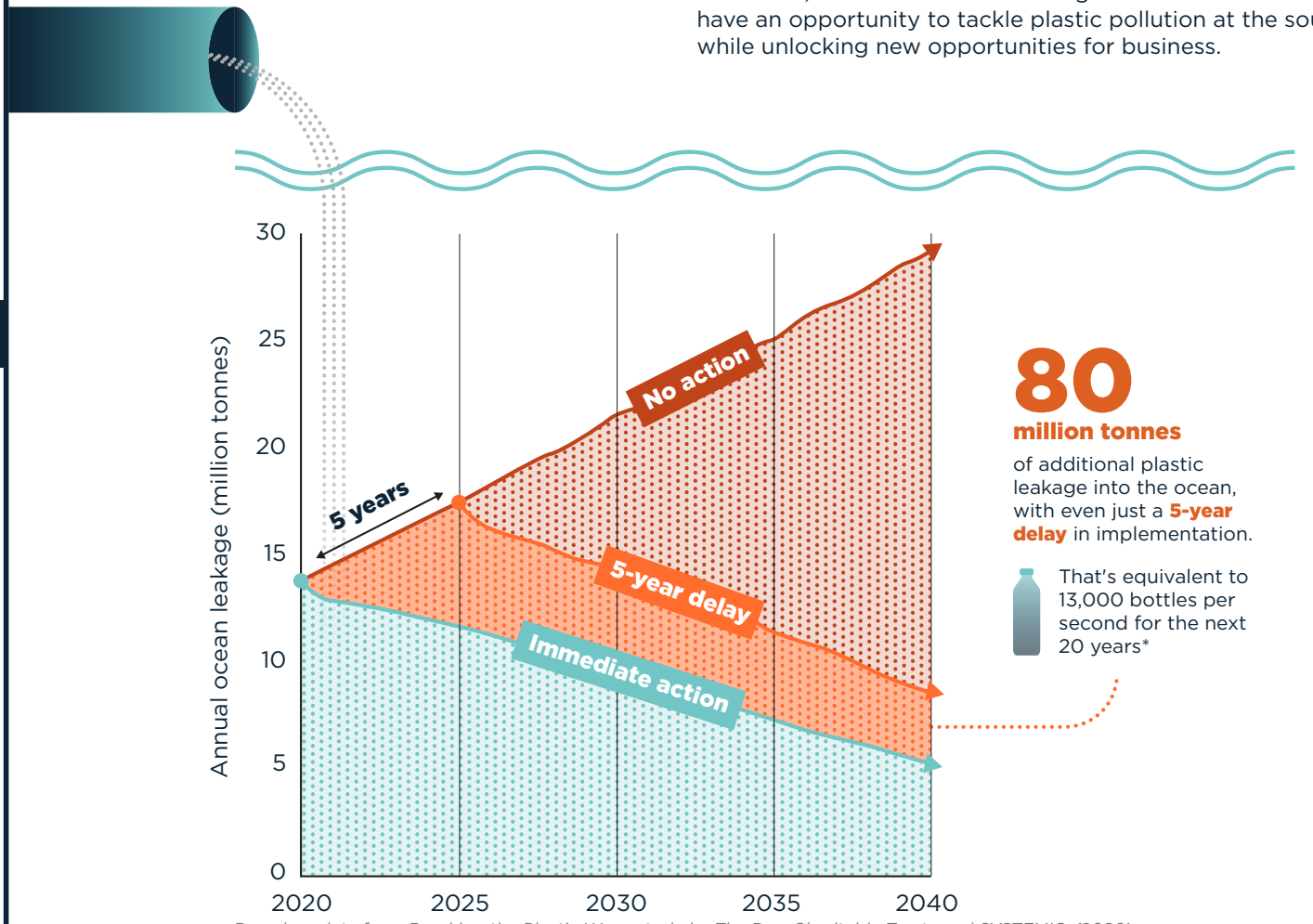
PLASTICS PACT

We call on businesses and governments to:

Not turn away from one crisis to solve another

To respond to the devastating impacts of the Covid-19 pandemic, without turning our attention away from other global challenges such as plastic pollution and climate change, we must accelerate the transition to a circular economy. *Breaking the Plastic Wave* shows an implementation delay of five years would result in an additional 80 million tonnes of plastic entering our oceans between now and 2040.

While this report shows delay today could lead to disaster tomorrow, it also shows that through the circular economy we have an opportunity to tackle plastic pollution at the source, while unlocking new opportunities for business.



80
million tonnes
of additional plastic leakage into the ocean, with even just a **5-year delay** in implementation.

That's equivalent to 13,000 bottles per second for the next 20 years*

Based on data from Breaking the Plastic Wave study by The Pew Charitable Trusts and SYSTEMIQ (2020)

*assuming bottles of 500ml and 9.9g average weight

We call on businesses and governments to:

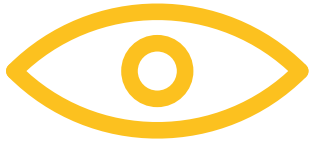
Raise the ambition level

The Global Commitment and Plastics Pact network set a clear direction.

However, we recognise we need to raise the ambition level further, for 2025 and beyond.

ELIMINATE

Set absolute (virgin) plastic reduction targets, underpinned by increased efforts on elimination and reuse



INNOVATE

Embark on a well-funded R&D agenda, focused on solutions such as new delivery models and new materials, in particular for flexible plastic and multi-materials (representing 80% of remaining macroplastics leakage into the ocean in 2040)

CIRCULATE

Set up mechanisms to provide stable, recurring funding of collection and recycling where industry pays its fair share, for example through Extended Producer Responsibility (EPR) schemes or equivalent voluntary initiatives

A pathway to build back better

As we look for ways to recover from the economic shock of the Covid-19 pandemic, the circular economy presents opportunities to build a more resilient and regenerative economy that is better than the one we had; addressing global challenges, such as plastic pollution and climate change, while helping us restore the environment, create jobs, and benefit society.

The comprehensive circular economy approach set out here, which considers every stage of a product's journey – before and after it reaches the customer – is not only vital to stopping plastic pollution but, as the study shows, it offers the strongest economic, social, and climate benefits. Compared with business-as-usual, the circular economy has the potential to generate savings of USD 200 billion per year, reduce greenhouse gases by 25%, and create 700,000 net additional jobs by 2040, making it a clear opportunity to build back better.

Governments and businesses have shown sustained commitment to building a circular economy for plastic in recent years. This momentum can now be harnessed to transform the plastic system.

By 2040, the circular economy has the potential to:

Generate savings of

USD 200 billion

per year

Reduce greenhouse gases by

25%

Create

700,000

additonal jobs

Explore more

Full Report

Breaking the Plastic Wave by The Pew Charitable Trusts and SYSTEMIQ

Summary Report

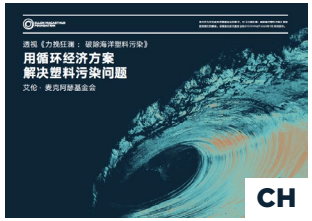
Breaking the Plastic Wave by The Pew Charitable Trusts and SYSTEMIQ

***Science* Journal article**

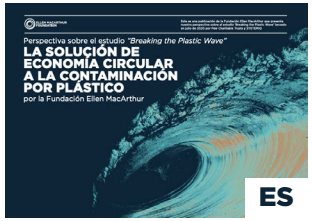
on the technical underpinnings *of Breaking the Plastic Wave* study

Webpage

The Circular Economy Solution by the Ellen MacArthur Foundation



The circular economy solution - Chinese version



La solución de economía circular a la contaminación por plástico por la Fundación Ellen MacArthur

A solução da economia Circular para a poluição por plásticos por Fundação Ellen MacArthur

For more information on the circular economy for plastic, head to our New Plastics Economy website.