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Circular Industry Solutions for a Global Plastics Treaty

INSIGHT REPORT
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Foreword



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The significant increase in plastic pollution is an environmental crisis of our time. The generation of plastic waste globally has more than doubled from 156 million tonnes per annum in 2000 to 353 million tonnes per annum in 2019, underscoring the need for urgent, collective action.

In March 2022, 175 countries adopted a historic resolution at the fifth session of the United Nations Environment Assembly (UNEA-5.2), to develop an international, legally binding instrument to end plastic pollution, including in the marine environment. Member states are now preparing for the fifth, and hopefully final, session of the Intergovernmental Negotiating Committee (INC-5), in November 2024, after which a final instrument will hopefully be adopted by all UN member states. The instrument is an important lever to help move towards a circular plastics economy. Its success will depend on collective action from public and private sectors, as well as civil society.

With this ambition, it is crucial to advance the agenda with open, multistakeholder dialogue. Plastic pollution has to be addressed through a systemic approach and collective action, across the full value chain, from sustainable design and production through to end-consumer behaviours and beyond.

It is encouraging to see that many innovative solutions exist that can contribute towards mitigating this crisis. However, these solutions will not be able to address the plastic waste crisis without enabling policy and regulatory frameworks and multilateral global cooperation.

The proposed international, legally binding instrument on plastic pollution thus provides an opportunity to drive systemic change and to address the plastic pollution crisis holistically.

The World Economic Forum and KPMG have collaborated to delve into already existing circular industry solutions across plastics value chains and geographies, which have been developed by organizations of various sizes, and positions within such value chains. Understanding how industry players have built these solutions, which enabling policy tools better support implementation, and what helps innovators and innovations scale, will hopefully be valuable to negotiating member states in their journey towards an impactful global agreement. By identifying and spotlighting the best-in-class practices, we hope to inspire an international, legally binding instrument on plastic pollution that can be the cornerstone in building a more circular, more resilient and more sustainable economy.

We would like to express our gratitude to all organizations across the world who have contributed to the report.

Introduction

To ensure an effective and impactful global plastics treaty, it is key to understand the industry solutions already out there.

Global plastic waste generation more than doubled from 156 million tonnes in 2000 to 353 million tonnes in 2019. Nearly two-thirds of plastic waste comes from plastics with useful life of under five years, with 40% coming from packaging, 12% from consumer goods and 11% from clothing and textiles.¹ The scale of the issue underscores the need for urgent action. This transformation is not just an environmental necessity; it is an economic opportunity. Transitioning to a carbon-neutral, circular economy could potentially create 100 million jobs by 2030.²

In March 2022, member countries adopted a historic resolution at the fifth session of the United Nations Environment Assembly (UNEA-5.2), to develop an international, legally binding agreement on plastic pollution, including in the marine environment.³

As member states are negotiating the ins and outs of the forthcoming instrument, key industry players across the plastics value chain are, to varying degrees, preparing themselves for its implications. This report shares key insights and learnings from industry players across the plastics value chain, who have started to develop and

implement solutions. It gathers case studies from across the globe, highlighting the key lessons learned by industry players while implementing solutions that address plastic pollution.

It seeks to explore questions such as: What factors contributed towards a successful launch of the solution? What were some of the barriers that industry actors faced in implementing the solutions, and how did they overcome them? What is needed to further scale and replicate these innovative solutions to mainstream them? How can a global plastics treaty support this?

From 59 case study submissions, 24 case studies are featured in this report. This selection aims to represent a well-balanced set of solutions across the plastics value chain, across geographies, and across various sizes of organizations. However, all case study submissions, whether featured in the report or not, have been carefully analysed and have made critical contributions to the analysis and key findings presented in this report.

By analysing existing solutions, this report aims to provide both confidence and relevant insights in the journey towards creating and adopting an effective and impactful global plastics treaty.



1

Key insights

A broad range of successful solutions are available, but mainstreaming them is a challenge.



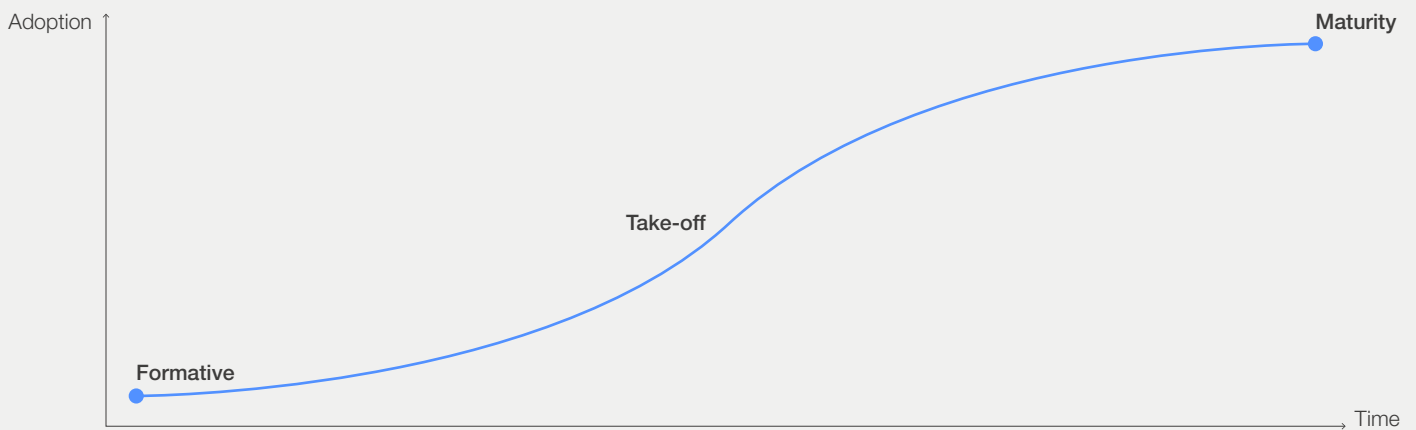
The authors of this report collected 59 case studies through two surveys and conducted 35 interviews.

The survey called for submissions on “Circular Industry Solutions for a Global Plastics Treaty”. Roughly 65% of the submitted case studies have a for-profit business model and roughly half of these solutions are currently profitable. As can be derived from the statistics in the case studies, even though some of the solutions originate inside multinational companies, only 25% of the solutions are considered “grown-up”, roughly 20% are in the start-up phase and over 55% are

in the scale-up phase. Almost all solution providers emphasize that the aim is to further scale the solution in the existing market and/or replicate it in other markets.

In almost all interviews, respondents addressed the challenges in reaching scale. Looking at the typical S-curve for innovation, this may not be surprising, as a solution reaches maturity after an acceleration in take-off, but this is preceded by a relatively long formative phase. This formative phase can be very challenging for solutions to pass through as costs can be high before widespread adoption.

FIGURE 1. S-curve for innovation



This report focuses on what elements in a global plastics treaty can bring forward the take-off so that solutions gain large-scale adoption in a shorter time frame.

The interviewees for this report emphasized two areas in which the treaty could speed up the scaling of solutions:

- Informing policies: Interviewees ask for bold and consistent policies that help scale demand and adoption of their solutions.

- Mobilizing financing mechanisms: Interviewees ask for regulations and mechanisms such as extended producer responsibility (EPR) that can help unlock investment in their solutions.

In addition, the interviewees also referred to other aspects that could shorten the time of the S-curve:

- Enhancing multistakeholder collaboration.
- Building trust with customers.
- Increasing awareness.

Policy: The most important factor to scale and replicate

Interviewees mentioned policy twice as often as any other key enabler to scale their solutions. Generally speaking, most of the solution providers are able to scale their solutions up to a certain level but see new policies as pivotal to making these solutions mainstream. A circular plastics economy needs a viable market for circular solutions, and policy interventions can serve as a direct stimulus. The

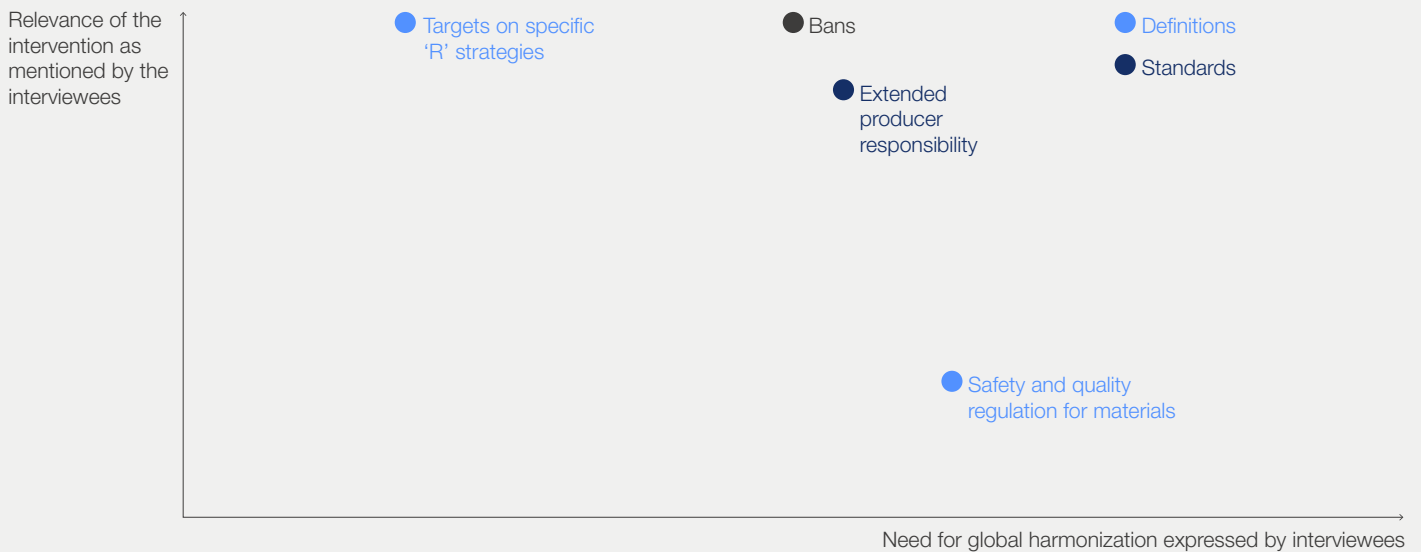
interviewees asked for bold and consistent policies to create the necessary conditions to move from pilot to scale. Policy that is only implemented once scale has been reached would neither be sufficient nor effective to de-risk the necessary investments. Interviewees said sufficient resources for consistent implementation and enforcement are crucial for the policy interventions to achieve the anticipated effect.

The interviewees mentioned a broad range of relevant policies that they believe could provide an enabling environment to accelerate the adoption of solutions. Tackling plastic pollution requires not one single solution but a combination of many, and each of these solutions can be driven forward by specific policy interventions. As there is no single solution, the policies required for accelerating innovation are not straightforward.

Of the policy interventions that the interviewees mentioned, some relate to establishing global

rules, while others require local rules to flexibly accommodate local circumstances. Based on the interview insights, the following matrix has been drawn. The further on the x-axis, the more the interviewees expressed a need for global harmonization of the intervention rather than local contextualization and therefore high relevance for the uptake of global measures. The higher on the y-axis, the greater the interviewees rated the relevance of an intervention for quick and meaningful impact.

FIGURE 2. Overview of policy interventions



The following section provides a deep dive into the policy interventions mentioned in Figure 2.

Definitions

The interviewees emphasized the need for clear and consistent definitions when developing policies. As can be seen from Figure 2, interviewees rated definitions and standards as requiring the highest need for global harmonization. The global plastics treaty can be key in harmonizing definitions on a global level. In particular, the interviewees highlighted some key concepts that need definition, such as “plastics”, “alternative plastics” and “substitutes of plastics”.

The revised draft, published after the third session of the Intergovernmental Negotiating Committee (INC-3) that lays the foundation for the forthcoming global plastics treaty,⁴ proposes a provision on “alternative plastics and plastic products”. The provision includes the terms “biobased”, “biodegradable” and “compostable” as well as “plastics from non-fossil feedstock”. In addition, there is a possible provision on “non-plastic substitutes”.

From among the case study sample, some solutions could either be categorized as “alternative plastic” or “non-plastic substitutes”. During the interviews, it became apparent that a key challenge is defining “plastics” in the first place, and with that, the difference between “alternative plastics” versus “non-plastic substitutes”.

Stephen Taylor, Product Circularity Engineer at NFW, described it as follows: “Sometimes, a plastic is referred to as something that is mouldable under heating pressure, whereas in other cases it is referred to as fossil-feedstock derived polymers. If we take both definitions, is a non-fossil feedstock derived polymer an alternative plastic or a non-plastic substitute?”

NFW and Notpla are solution providers that produce non-fossil feedstock-based polymers. In theory, non-fossil feedstock-based polymers could fall under the revised draft text’s category of “alternative plastics”. However, Notpla has passed the Dutch government’s assessment of “not plastic” – based on the definition used in the European Union (EU) Single-Use Plastic Directive – which means it could also fall under the revised draft text’s category of “non-plastic substitute”.

While this may seem insignificant, it could have big implications for the scope and applicability of other policies and regulations. For example, for policies on single-use plastics or recycled content for plastics, it is key to understand what is within the scope of “plastics” and therefore to which materials, products and applications the policies and regulations apply.

Another example of definitions is related to extended producer responsibility (EPR). Emmanuelle Bautista and Baptiste Roubaud, who both work on EU and international affairs at Citeo, a producer responsibility organization (PRO) in France, said: “We noticed that many people are speaking about EPR without really understanding what it exactly entails. Many stakeholders think it is limited to recycling only, to which it should not be restricted. We need to have a clear definition of the concept.”

A case in point: if the global plastics treaty adopts requirements for EPR, it will become critical to define whether this responsibility only includes financing for collection and recycling infrastructure, or whether it also covers reuse models, reduction and consumer education.

Standards

Like definitions, solution providers assert that standards are important to understand the scope and application of these policies, as well as for agreeing on methods and interpretation of testing and results. Examples mentioned by interviewees include standards for testing biodegradability, recyclability, hygiene and (food contact) safety for both alternative and conventional materials.

Givaudan is one of the solution providers that observed a challenge in finding a clear standard. Ian Harrison, Innovation Director, Fragrance and Beauty, explained: “When we developed our biodegradable alternative to nano-plastic fragrance capsules, we did a lot of testing on the biodegradability of our solution as well as testing other solutions that claimed to be “biodegradable”. On testing some of these alternatives, we did not find these to be biodegradable. They either did not degrade at all or they did not degrade sufficiently in the required timelines of the tests. There is no particular prescribed test methodology for preparing capsules for biodegradability testing, and there is a difference between testing the biodegradability of the separate ingredients versus the entire product.”

Without a “golden standard” for the method of preparation and testing for biodegradability, claims and solutions cannot be compared. This could also have implications for the applicability of policies and regulations in case there are specific policies or exemptions making a distinction between “biodegradable” and “non-biodegradable”. It is also important to draw the distinction between

testing the sum of the ingredients versus the entire product, as the form in which products enter the biosphere can impact the result.

Interviewees made a similar suggestion regarding “recyclability”. For example, Paul Bodager, Senior Global Sustainability Manager at Avery Dennison Materials Group, said: “We see great potential for the entire product to become recyclable. So, the entire bottle with its cap, labels and adhesives would be recyclable, not just the bottle’s plastic material.” These biodegradability and recyclability discussions demonstrate a difference between purely assessing a material versus scoping and assessing a product. Standards can help clarify what needs to be assessed according to which methodologies.

Asmaa Reznara, senior consultant at ThirdWay Partners and working with United Nations Industrial Development Organization (UNIDO) and Equatorial Coca-Cola Bottling Company, on managing a bottle-to-bottle recycling pilot in Morocco, emphasized the need for standards: “We need standards for the use of recycled content in food-grade applications. On the one hand, the key is clarity of the regulation, as these can sometimes be very vague. On the other hand, the key is harmonization, as products can be exported to other countries. Hence, alignment on how much recycled content use is permissible and what food-grade quality should apply is key.”

The global plastics treaty can play a critical role in achieving this alignment by establishing the relevant quality standards for food-grade recycled content.

The interviewees also mentioned quality and food safety (testing) standards in relation to reuse systems and returnable products.

Extended producer responsibility

The revised draft text contains a provision on extended producer responsibility (EPR), which is linked to fiscal and/or non-fiscal schemes/systems. EPR was frequently mentioned by solution providers, both in relation to desired policy measures and in connection with financing mechanisms. Solution providers that produce and bring products to market in more than one jurisdiction spoke of the need to harmonize the EPR schemes and regulations, as many of these products are produced for large geographies. Harmonizing EPR systems, while still allowing for tailoring to local contexts and needs, can create economies of scale for circular solutions.

The global plastics treaty could help with harmonization, for example through a dedicated annex outlining the key principles and design of an effective EPR system. Some of the interviewees shared their views on what those key principles should be. Baptiste Roubaud from Citeo said: “We

believe that an EPR system should encompass a full range of solutions, including reuse, alternatives and awareness campaigns. Finally, EPR is a complex mechanism and a good understanding by governments and the participation of all stakeholders are key for it to be properly implemented.”

It is noteworthy that the interviewees did not only mention EPR as an important instrument to further scale their solutions, but a fifth of the solution providers also mentioned the presence of an existing EPR scheme as an important success factor to have driven the uptake of their solution in the first place.

Bans

The interviewees routinely named bans as an important intervention in terms of effectiveness and speed of creating change, specifically when it comes to problematic types of plastics, packaging, materials, chemicals and applications.

For example, Bintang Ekananda, co-founder and CEO at Alner, who provides a reusable alternative to single-use sachets and plastics, said: “Banning certain types of packaging can really force the brands to look for alternatives, thereby creating rapid change.”

Another organization that experiences the impact of bans on the uptake of their solution is Boomerang Water. “In general, we see an increased uptake for our solution, and we are convinced that we will further scale at a steady pace,” said Jerrod Freund, Co-Founder of Boomerang Water. “In a city like Los Angeles, where they put a ban on single-use plastics, we are seeing greater interest in the Boomerang solution, which will really help accelerate the proliferation of the technology.”

Although some noted that the harmonization of bans between countries is important to avoid the flooding of non-banning markets with undesired items, others highlighted the need for bans in specific contexts. For example, some plastic items might be more problematic in countries where specific infrastructure is lacking, and some substances might be more problematic in food-grade applications compared to some durable applications.

The global plastics treaty can provide guidance on criteria to support an evidence-based approach to help determine in what context, under what circumstances, for what applications, which plastics, materials and substances could be banned.

Targets on specific “R” strategies

Most of the interviewees mentioned the need for specific targets for each of the “R” strategies, which include reduce, reuse and recycle. The interviewees expressed concern that without specific targets for each, too much focus on one strategy could undermine the potential of other strategies.

The global plastics treaty could address this by outlining a clear value proposition for each of the “R” strategies and identifying its role in different contexts. Most interviewees tend to agree that reduce, reuse or recycle cannot do the job in isolation and that a combination of solutions and strategies is needed. “There is not one solution sufficient to be the silver bullet. It is counterproductive that sometimes each “R” in the value chain lobbies for its benefit while implying that the others are greenwashing. The reality is that the efficacy and economic viability of each solution is heavily influenced by each context’s geographical



and logistical complexity, weather, buying power and cultural habits, etc.,” said Tommy Tjiptadaja, co-founder and CEO at Greenhope, a material innovation technology company. “I come from Indonesia where even within the country different archetypes exist requiring different solutions. Reuse systems might be suitable in dense and high-income sections of Jakarta and other big cities but prove very difficult for our sparse secondary and tertiary cities and the 12,000 islands, where alternatives like biodegradables will work better. We need to have an honest, open-minded and practical discussion about the trade-offs of each solution in order to deploy the most suitable one for the right plastic applications and geography.”

Interviewees highlighted that the success of the targets also depends on the capacity of regulators to enforce the achievement of targets as well as by their ability to create the right incentives (e.g. through taxation or fiscal measures) and conditions (e.g. infrastructure) for achieving the targets.

Safety and quality regulation for materials

Many of the solution providers that produce alternative materials instead of conventional ones emphasize the crucial need to obtain trust from the client, end-consumer and general public on performance, quality and safety. Regulation and

standards that regulate quality and safety can increase trust. In this regard, Hoa Doan, Head of Impact and Sustainability at Notpla, said: “We utilize unmodified natural polymers, which occur naturally in the environment. This differentiates Notpla from solutions that employ synthetic substances and harmful forever chemicals, such as PFAS [per- and polyfluoroalkyl substances, also called “forever chemicals”]. We believe that regulations need to include a framework to evaluate the long-term environmental and health impacts of all materials, both existing and new.”

Health concerns are not only mentioned in relation to alternative materials, but also conventional materials – especially when it comes to reusing and recycling conventional plastics. As Jason Dibble, Co-Founder of Boomerang Water, said: “There should be a greater focus on alternative materials that are also more broadly recyclable with higher and more valuable recycling content than plastics. A life cycle analysis of all material/substrates covering economic, environmental, climate and health issues is needed to identify the most suitable solutions and alternatives.”

The global plastics treaty could provide harmonization and guidance on what alternative and conventional materials and additives are considered suitable and safe for what type of applications. Knowing that this is regulated will increase trust in the materials and applications on the market.

Access to finance: The second most important factor to scale

Many sources of capital already exist to implement and scale solutions – it is often a matter of unlocking these sources and ensuring they flow in the right direction. The plastic pollution financing landscape proves to be complex and, as such, it is key to clearly map the current landscape, including its actors, activities, flows and instruments, to understand the gaps and opportunities. Hence, the global plastics treaty has a critical role in channelling financial flows in the right direction, thereby also supporting a just transition.

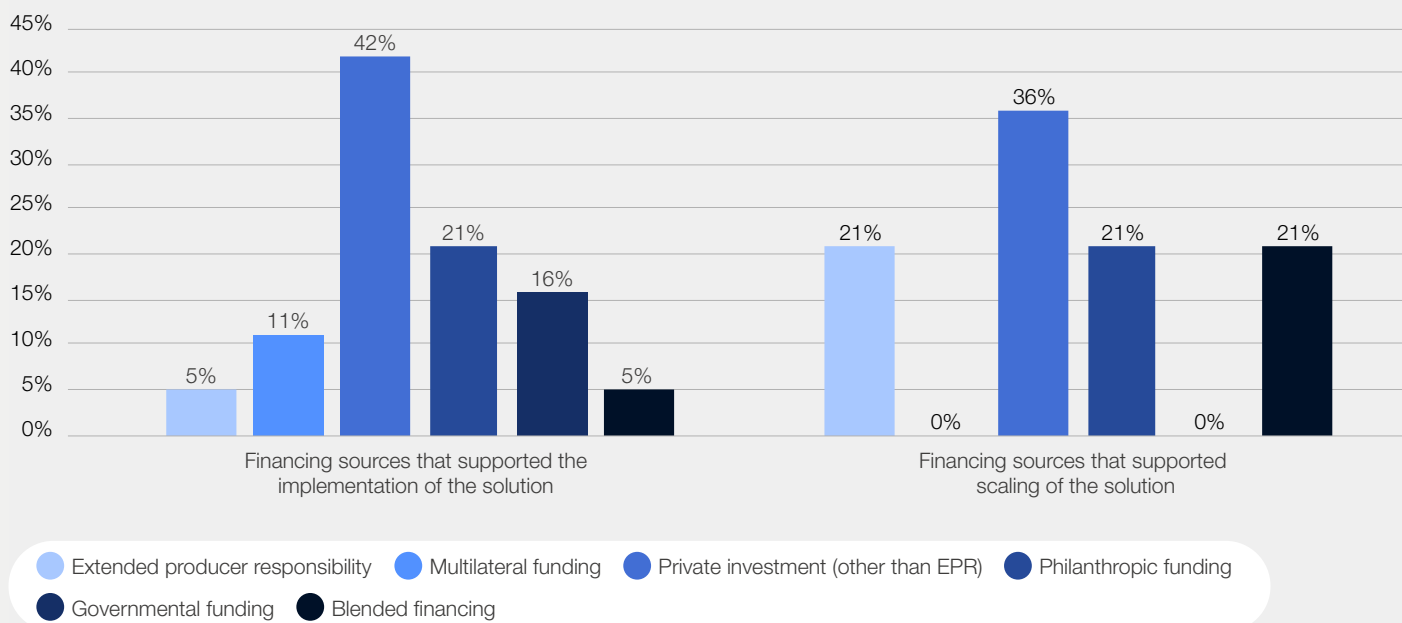
It also becomes clear that there is not one single source, but rather a combination of financing sources required, including private, public, philanthropic and blended sources. Looking at the ratio of this combination of sources, an insight that emerges is that most of the solution providers have their eyes on private investments rather than being dependent on public or philanthropic funding. The main reason is that the solution providers aim to have a sustainable business model, which is self-sustaining and not dependent on public or philanthropic funding.

Figure 3 illustrates the various funding sources that interviewees highlighted as having supported the implementation of their solution (i.e. backward-looking), as well as those that can support to further scale their solution (i.e. forward-looking). For the latter category, more than half of all solution providers mentioned access to financing as a key requirement.

The reliance on private investment even increases when moving from financing sources that have supported implementation (backward-looking) towards those that can support further scaling (forward-looking). The private financing sources mentioned in interviews include venture capital, impact investments, plastic credits, corporate partnerships and industry commitments.

Looking at differences across the regions where the solutions are implemented, an interesting trend emerges: solutions providers in Asia, Africa and Latin America have received relatively more support for implementation through public finance and grants rather than private investment compared

FIGURE 3. | Financing sources for circular solutions



to those in North America and Europe. However, solutions in Asia, Africa and Latin America indicate a need for private investments and EPR schemes more frequently, to be able to effectively scale their solutions, compared to solutions in North America and Europe.

With these high-level insights of the landscape and investment needs in mind, the global plastics treaty should play a key role in unlocking and facilitating access to financing and helping the solution providers scale their solutions, keeping in mind the local contexts and needs across regions. The interviewees highlighted the following mechanisms to unlock financing: 1) setting up the right regulation and ensuring enforcement; 2) ensuring well-designed governance and financial structure of EPR; and 3) providing a disclosure framework to enhance transparency for tracking and tracing.

All in all, whereas solution providers do not expect the global plastics treaty to provide a huge fund to help them scale their circular solutions, the treaty would play a critical role by providing the right definitions, frameworks, guidance and policies to incentivize investors and unlock financing.

Regulations and enforcements

As stated above, various solution providers state that clear regulations, to be provided by the global plastics treaty, can serve as key enablers to unlock access to private financing. “As much as we would like businesses to do the right thing, there always remains a financial disincentive to deviate from business-as-usual, as any alteration to that requires

massive capex [capital expenditure] and opex [operational expenditure], which in turn requires resource prioritization,” said Gill German, Global Senior Director Brand Partnerships at Loop, a global platform for reuse. “That is why the industry will not go big in this space unless they *have to*.”

Many interviewees emphasized that the success of unlocking investments through upcoming regulations comes with anticipated enforcement and compliance. It is therefore important to consider enforcement when designing an instrument, as well as the need for member states to set up well-designed compliance and enforcement systems.

Besides specific regulations, the interviewees highlighted the need for harmonization and long-term consistency of regulations to de-risk investment in new solutions. For example, interviewees highlighted the long-term investments that are needed to build and fine-tune packaging manufacturing lines and recycling facilities. These investments in high-capital equipment can be for decades. Legislation can impact the demand for certain material and packaging types as well as the composition of waste entering recycling facilities. Therefore, interviewees highlight the need for clarity on the direction of regulation to optimize the manufacturing and recycling plants for the anticipated material, packaging and waste composition.

Many solution providers emphasize that most of these investments in infrastructure and high-capital equipment are meant to last for at least 30 years. As important as creating the necessary investment in high-level equipment, infrastructure and capacity (for recycling, reuse and change of

manufacturing lines) is certainty of future demand. Regulation that drives demand is therefore seen as a de-risking mechanism and can unlock further investment from the private sector. In this regard, the interviewees particularly highlighted regulation that drives the inclusion of externalities. Most of the solutions have lower externalities (pollution, emissions, etc.) than the conventional alternative, so including these in the price could create a level-playing field that makes the more sustainable solutions more competitive.

Extended producer responsibility

Many solution providers referred to EPR schemes as key financial incentive to scale their solutions. “EPR programmes that include eco-modulation incentives may provide a financial incentive for producers to seek more sustainable packaging options,” said Marcia Popa, Advanced Application Engineering Specialist at 3M, which offers a 100% recycled-paper alternative to plastic cushion.

An important condition for implementing EPR schemes is a clear understanding of the scope of EPR, which must not be limited to recycling. “Producers must be incentivized by making reusable options free in an EPR scheme,” said Lauren Sweeney, co-founder and CEO at DeliverZero, a network for returnable, reusable food containers. “In addition, funds collected by the EPR should be used for reuse infrastructure as well, instead of only waste management infrastructure.”

This underscores the need for the global plastics treaty to provide a clear scope of EPR that covers

the full plastics value chain. Thereby, it can serve as a strong financial incentive in support of solutions across the full plastics value chain, and it can incentivize consumer behaviour towards reducing pollution.

Tracking and tracing

The global plastics treaty can also support a disclosure framework to enhance transparency for tracking and tracing, which can serve as a way of measuring impact, thereby incentivizing private investors. Such a framework will improve the availability of and access to evidence-based data on supply chains and their environmental impact, which provides key information for private and institutional investors and is also a key enabler to accelerate the emergence of green financing instruments that aim to address plastic pollution.

“By being able to trace every reusable item, we can report clearly on the values, return on investment and results,” said Tim Breker, founder of Vytal, a reusable packaging system, “Thereby, our venture capitalists can see the value creation across the lifetime of our reusable containers.” Vytal says that by being able to track its reusable containers, investors have more trust in the company, and the ability to make evidence-based investment decisions serves as a financial incentive. Upcoming technologies such as artificial intelligence and blockchain can support efficient and credible data collection to generate the relevant insights. The evolution of such technologies should also be considered when building a framework to unlock private finance.



The need for multistakeholder collaboration, building trust for customer adoption and raising awareness

Besides what the global plastics treaty could do from a policy point of view, the case studies also provided important insights on non-policy interventions to support current uptake and future scaling of these solutions. These interventions, which are of broader societal and cultural nature, are not completely separate from the global plastics treaty. The process for developing this instrument is already an opportunity to drive multistakeholder collaboration, build trust in innovative solutions and raise awareness on the issue among the wider public.

In addition, specific attention to driving these cultural changes throughout the negotiation process as well as during the implementation process can further support the aims of the treaty through an inclusive multistakeholder agenda, education and knowledge exchange.

This section explores the three non-policy interventions most commonly cited by the interviewees.

Multistakeholder collaboration

This is the most frequently mentioned non-policy related success factor. On the contrary, lack of trust, resistance to change and unwillingness to share information are some of the most frequently mentioned barriers. This lack of trust sometimes also plays a role in multistakeholder collaboration. As one of the interviewees put it: “There is a need for a collective collaboration mindset, but these are overused words with underused action. Everyone talks about it, but little is happening. So, it is about the action to really tie in everything from upstream to downstream.”

Within private-sector collaborations, cross-value chain collaboration is cited as critical to better understand challenges and solutions along the value chain, as well as for setting up return logistics. Yuri Tomina, head of Cazoolo, the circular packaging design lab at Braskem, cited the following example: “We need cross-value chain collaboration and transparent knowledge exchange along the value chain. For example, we need the expertise of the brands because they know their consumers, the expertise of ESG teams because they know how to measure impact, the expertise of waste-pickers and -handlers because they know what can be recycled, and the expertise of designers and engineers with a systematic challenge-solving mindset. All this knowledge and expertise needs

to come together to innovate on packaging design, to make it work in the broader system.”

Collaboration is necessary not only across the value chain but also between the private sector, public sector and civil society (e.g. non-governmental organizations and the informal waste sector), the interviewees said, on both global and local levels.

Building trust

Most of the solutions providers have innovative new products. They need to convince their (potential) customers to change their habits and move to these new products instead of the conventional alternatives. Most interviewees highlighted the need for building trust in this regard, especially with their customers who do not want to have a compromise in performance, convenience and price. Interviewees said that most of their customers and end-consumers want to see proof that the product is the same or of better quality and safety, readily available in the right quantities and outperforming on sustainability criteria.

Some solution providers mentioned the role of particular “champions”, who are individuals with power or influence and are personally engaged in driving trust in the solution. For example, city mayors who make it their personal mission can drive up the speed of processes and lift the administrative burden for solution providers. Another example is C-level commitment in the corporate sector, where ambitious targets create incentives for investment and innovation within the business and along the value chain.

While these champions have proven very important in launching and demonstrating the effectiveness of the solutions, most of them also call for policies that will provide tailwinds to further scale these solutions and replicate them in the environments where the champions are not (yet) present.

Increasing awareness

The interviewees cited increased awareness and societal pressure as other success factors to create a business case for new solutions, as they increase customer demand and shift consumer expectations. Simultaneously, the lack of awareness is mentioned almost twice as often as any other barrier that solution providers

have to overcome in solution development. Not surprisingly, interviewees frequently cited a further increase in awareness as well as campaigns for behavioural change as factors to further scale the solutions.

Most of the interviewees said they have seen an increase in awareness over the last five years and are quite positive that the negotiations for the global plastics treaty will spur this further. At the same time, the interviewees showed different levels of awareness of the global plastics treaty, the status of the negotiations and the contents of the revised draft text. This could be explained by the capacity of the organization to carefully follow the negotiations versus mainly focusing on driving the solution.

Interviewees also emphasized that awareness alone is not enough, and that the consumer needs to be enabled to make choices and have convenient, affordable and accessible alternatives. Many of the interviewees said they see a role for both the public and private sectors to educate consumers, and that they have their well-established marketing machines lined up to make the more sustainable choices more appealing. One interviewee made a reference to the marketing departments of large companies that have been able to convince consumers to buy new and innovative products that they did not know they needed before. They highlighted the need to have the marketeers' expertise and insights involved to change consumer behaviour towards adopting new and innovative solutions that reduce plastic pollution.

Conclusion

As the report indicates, scaling circular industry solutions is mentioned as the most common challenge for solution providers. To overcome this challenge and accelerate the journey on the innovation S-curve from being a niche alternative to becoming mainstream, the global plastics treaty has a crucial role to play.

As such, the most frequently mentioned driver are policy interventions, followed by financing mechanisms. Interviewees see the global plastics treaty as an instrument that can drive the relevant policies and unlock financing by decreasing the risk for private capital. When it comes to policies, the interviewees highlight the need for having clear and uniform definitions and standards, harmonized

extended producer responsibility schemes, bans where appropriate for problematic plastics, targets to drive all "R" strategies optimally in a specific context, and clarity and enforcement of material quality and safety standards.

In addition to these clear asks from the instrument itself, the interviewees also highlight less tangible, but equally important factors: building trust, creating awareness, and enhancing multi-stakeholder collaboration. Although the Global Plastics Treaty cannot mandate these factors top-down, the current negotiations as well as the subsequent adoption and implementation phase provide a clear opportunity to educate, collaborate and build trust, in which all stakeholders should contribute and play their part.

② Case studies from across the plastics value chain

Overview of the solutions



This chapter highlights a selection of the solutions submitted for this report. Stakeholders from across the value chain responded to online questionnaires that included questions on the background of the solution, its success factors and barriers, and what is needed to scale and replicate it. In all, case studies representing 59 unique solutions were received.

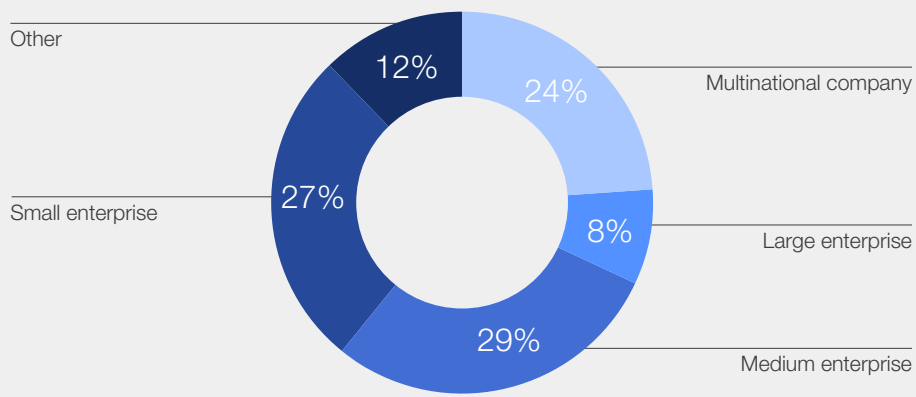
The previous chapter discusses the overarching key findings of the questionnaire, and this chapter presents some background information about the 59 submitted solutions together with an overview of the 24 solutions featured in this report.

Background of the organizations owning the solutions

The solutions are owned by organizations of all sizes. As can be seen from Figure 4, almost a quarter of the solutions submitted are owned by multinational companies, and roughly a quarter

by small enterprises. In the category “other” are other types of organizations, for example, NGOs, public organizations or those with combined ownership structures.

FIGURE 4. Solutions by organization size



Reach of the solutions

The solution providers were asked about the number of countries (Figure 5) as well as the regions (Figure 6) in which their solution is implemented. Roughly half of the solutions are implemented in one country, while almost a quarter are implemented in more than

10 countries. Many of the solutions are implemented in more than one region. Figure 6 demonstrates what percentage of the solutions are implemented in each of the regions.

FIGURE 5. Solutions by application in number of countries

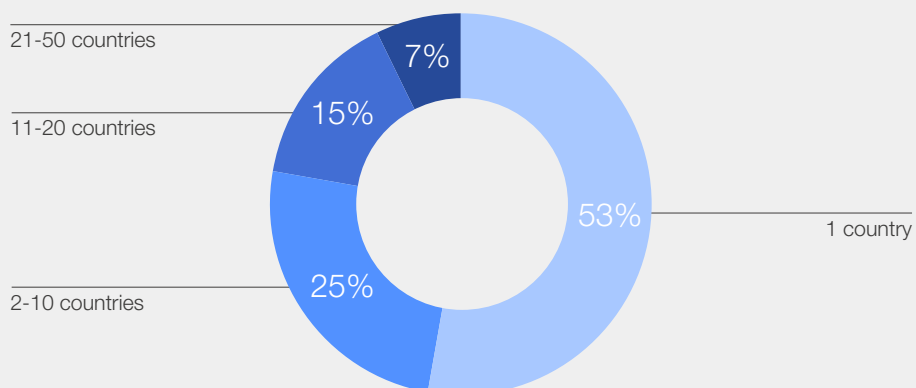
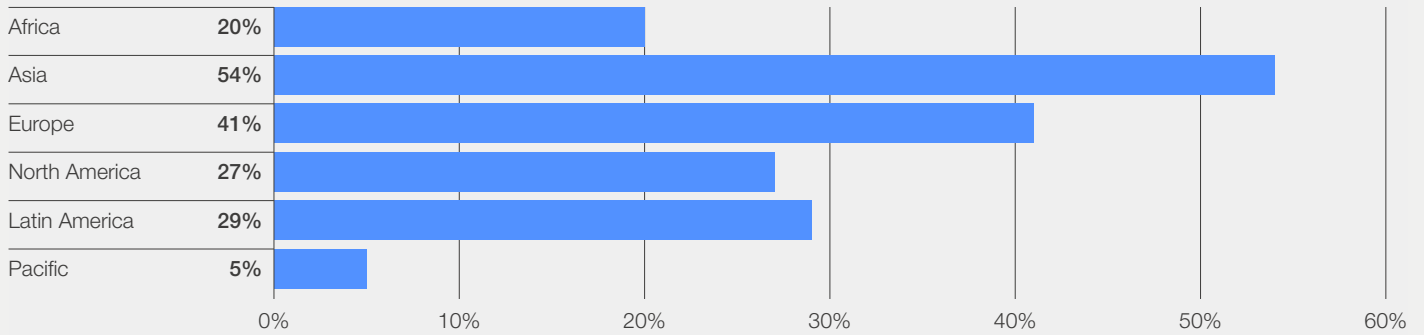


FIGURE 6. Solutions by region



Revenue model and maturity

Figure 7 demonstrates that 63% of the solutions submitted have a for-profit revenue model. Within this group, roughly half of the solution providers said that their business is not profitable yet. This

strongly relates to the maturity of the solutions as demonstrated in Figure 8, which shows that the majority of the solutions have been in place for a maximum of four years.

FIGURE 7. Revenue model of solution

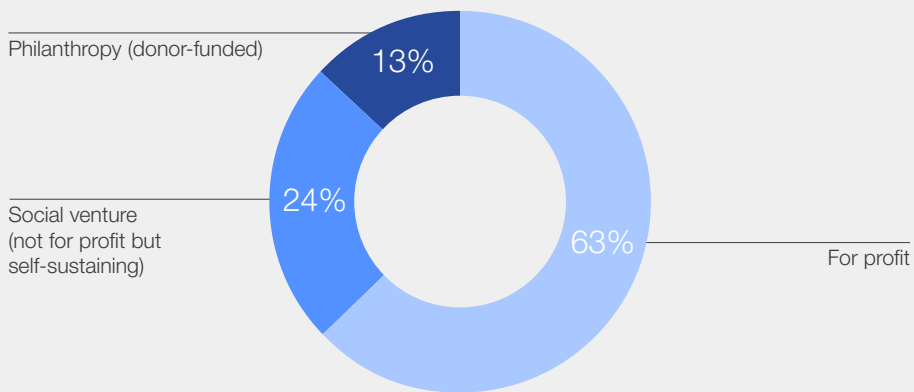
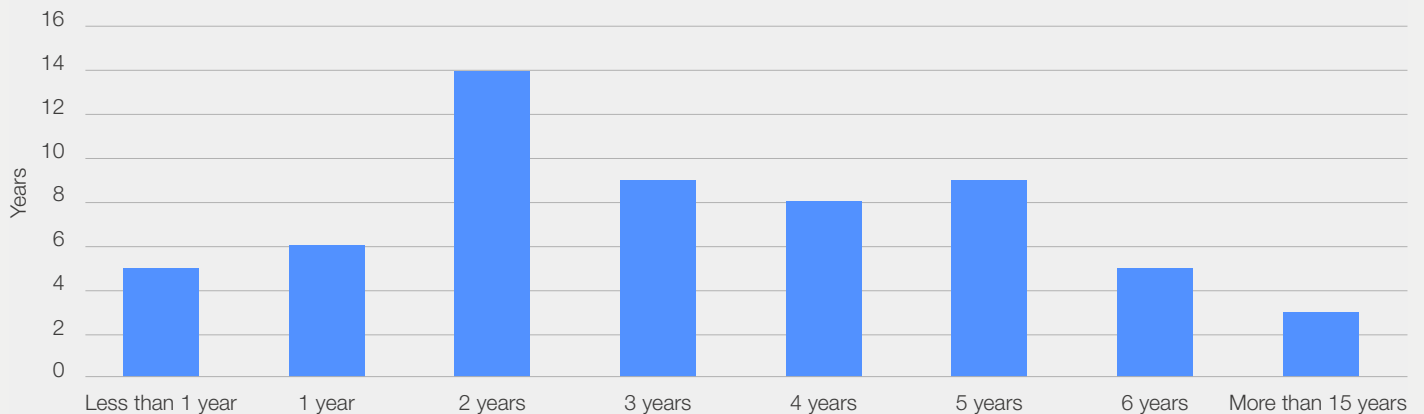


FIGURE 8. Maturity of solution

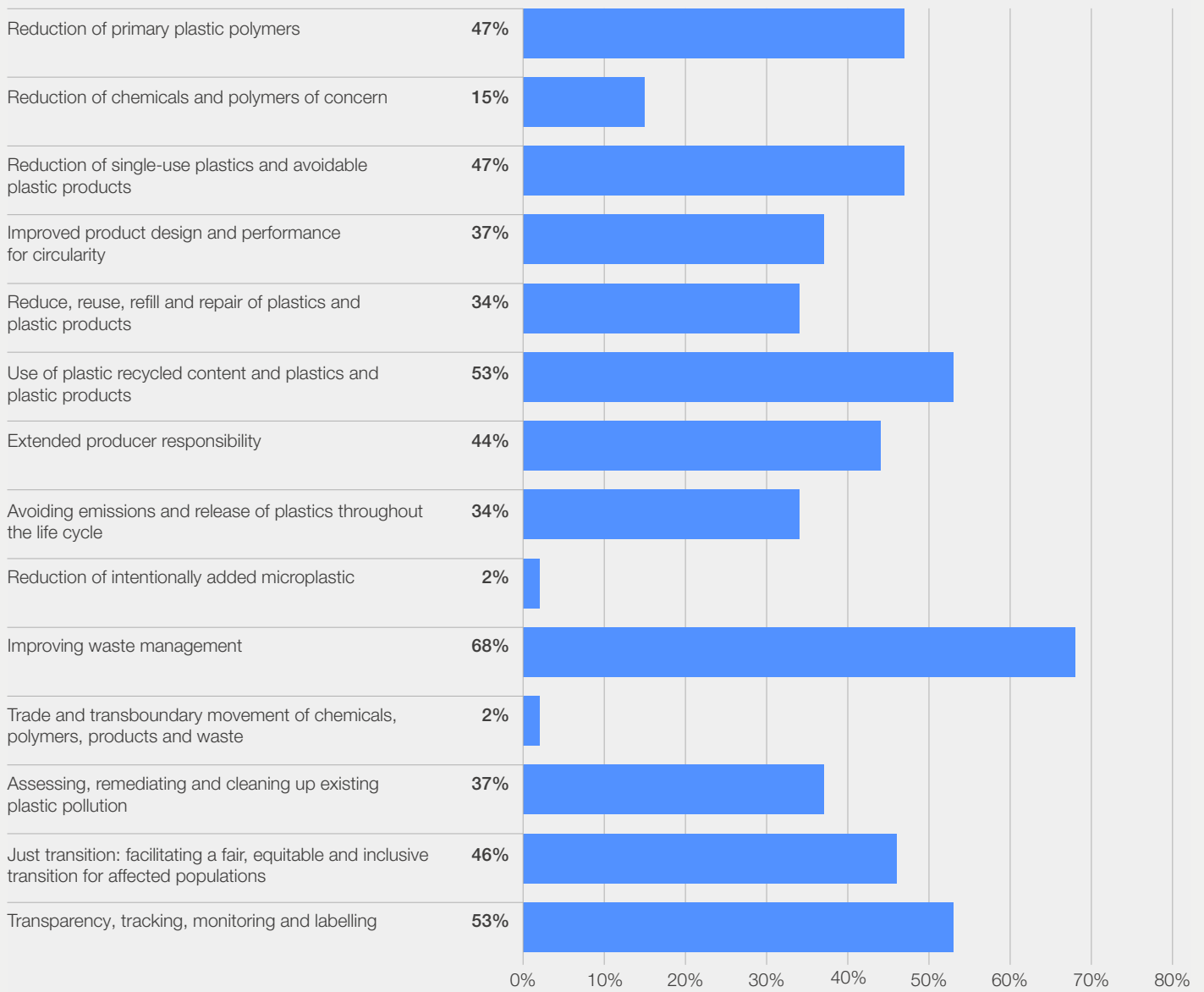


Relation to the revised draft text

Solutions providers were asked which of the elements in the revised draft text their solution contributes to. (Please note that since this is self-reporting, some of these claims might be arbitrary. Nevertheless, it is worth mentioning that within the case study sample, there is a good balance

between upstream and downstream solutions, but an under-representation of solutions related to 1) intentionally added microplastics, 2) chemicals and polymers of concern, and 3) trade in listed chemicals, polymers and products, and in plastic waste.)

FIGURE 9. Reference by solution providers to revised draft text options



Overview of case studies

The selected case studies are categorized as:

- 1. Alternative materials and substitutes:** 3M, FortunaCools, Boomerang Water, Givaudan, Greenhope, NFW, Notpla
- 2. Design:** Avery Dennison, Braskem Cazoolo,
- 3. Reuse:** Alner, DeliverZero, Loop, Closed Loop Partners, Vytal
- 4. Recycling:** ECOCE, Equatorial Coca-Cola Bottling Company, Veolia
- 5. Collection, cleaning and sorting:** Citeo, Pinovo, SweepSmart, The Circulate Initiative, The Ocean Cleanup
- 6. Tracking and tracing:** BanQu, SAP

1. Alternative materials and substitutes

CASE STUDY 1.1

3M – Scotch™ Cushion Lock™ Protective Wrap

What is your solution?

“Scotch™ Cushion Lock™ Protective Wrap is a 100% recycled paper alternative to plastic bubble.”

What is your long-term vision for this solution?

“In an ideal world, we would replace 100% of plastic bubble used to protect products during shipping. Today, Scotch™ Cushion Lock™ Protective Wrap can effectively protect fragile items that weigh up to ~10 pounds. As a paper-based product, this material is not ideal for protecting wet or frozen/refrigerated items that produce condensation.”

What is needed to get there?

“Consumer awareness and demand. We already see an increase in consumer demand for more sustainable packaging, but more awareness is needed of solutions and alternatives like Scotch™ Cushion Lock™. In the end, it also comes down to behaviour change, to convince people to try an alternative to what they are used to.”

How can a global plastics treaty help?

“The demand for the product is already growing, which is not necessarily due to regulations. Still, any push to reduce virgin plastics as well as EPR programmes can further incentivize these alternative packaging options.”

CASE STUDY 1.2

Fortuna Cools – Insulated packaging made from coconut husk fibres

What is your solution?

“Fortuna’s bio-based insulation reduces waste and emissions in perishable supply chains by swapping plastic foam packaging with upcycled coconut fibre.”

What is your long-term vision for this solution?

“We designed our materials to match the staggering demand for plastic foam packaging: we aim to replicate and license our organic waste-

to-packaging model across Southeast Asia and the Americas – where farmers have mountains of leftover coconut husks and businesses are shipping perishable products.”

What is needed to get there?

“We need partners for speed and capital for scale. We work with agri-businesses on supply, plugging our machinery into their mills to get up and running. We need long-term commitments from agri-businesses and trailblazing food and

delivery customers to de-risk each new market. Investment goes much further by leveraging existing local capacity, but we still need enlightened lenders and investors to spark the expansion.”

How can a global plastics treaty help?

“It turns a nice-to-have sustainability story into a mainstream business imperative around the world, as the true cost of plastic packaging is internalized and particularly harmful materials like polystyrene are called out and phased out. It ensures that the status quo will not drag on forever and gives solutions like ours even more momentum.”

CASE STUDY 1.3

Boomerang Water

What is your solution?

“Boomerang Water provides organizations and businesses of all kinds, from hotels to convention centres, cruise lines, and beyond, with a bottling system that rinses, sanitizes, refills, caps and seals aluminum bottles and glass bottles with locally-sourced water from the tap, that is ultra-filtered through a state-of-the-art, small-footprint, reverse osmosis water treatment system, then fed into our machines.”

What is your long-term vision for this solution?

“Boomerang Water has identified nearly 200,000 opportunities in the US alone to deploy our equipment. While Boomerang Water already has a high growth rate, we can definitely grow further and help businesses and organizations to reduce the use of single-use plastic bottles, litter and pollution in their communities.”

What is needed to get there?

“We need to raise awareness about the Boomerang Water solution as an economical, sustainable and circular option. In fact, many are already looking for alternatives and there is incipient legislation and consumer pressure to reduce waste single-use plastics, which has helped with the early adoption of our solution by hotels and resorts and some municipalities.”

How can a global plastics treaty help?

“The global plastics treaty has the potential to become the fundamental global policy signal and instrument to tackle both the plastic and climate crises, and to encourage and support the development and uptake of circular solutions based on alternative sustainable materials.”

CASE STUDY 1.4

Givaudan – PlanetCaps™

What is your solution?

“Givaudan has developed PlanetCaps™, a fragrance encapsulation innovation to enable long-lasting fragrance in a biodegradable and bio-sourced delivery system for fabric softeners. This can support brands to avoid the use of microplastics in their formulas.”

What is your long-term vision for this solution?

“We aim to grow our solution as a cost-effective bio-sourced and biodegradable alternative to current fragrance encapsulation technologies. Today, being bio-sourced means that our solution

contains more than 60% of renewable carbon, and our longer-term vision is to continuously evolve PlanetCaps™. Moving from oil-based raw materials to this type of solution comes with an impact on cost and we need access to cheaper sustainable options.”

What is needed to get there?

“We need further global adoption of the solution to drive volumes and drive down the cost of sustainable options.”

How can a global plastics treaty help?

“We need standards and clarity on how we test the level of biodegradability of encapsulation systems on a global basis. Givaudan’s biodegradable PlanetCaps™ solution has undergone stringent testing, using conditions developed by our scientists together with our

in-house, fully-certified testing facilities and OECD [Organisation for Economic Co-operation and Development] standards. We have evaluated other solutions that claim to be biodegradable but fail under our test conditions. Therefore, having globally standardized testing methodology would provide clarity.”

CASE STUDY 1.5

Greenhope – Biodegradable packaging solutions

What is your solution?

“We are a material innovation company with a portfolio of proprietary technologies: Ecoplas and Naturloop (cassava-based biodegradable and compostable bioplastic) as well as Oxium (biodegradable additive) that bring positive environmental and social impacts.”

What is your long-term vision for this solution?

“We help fight plastic waste pollution and the climate crisis by replacing many kinds of conventional plastic packaging that is too small, contaminated and mixed, and hence uneconomical or impossible to recycle, with biodegradable materials from renewable feedstock that has lower carbon footprint and positive impact for farmers.”

What is needed to get there?

“We need to have an honest, open-minded discussion. There will not be a single R that can be the silver bullet as each has its own

strengths and limitations depending on the applications and local context. A form of recycling that works in a developed country with great technology, mature collection infrastructure and proper waste-water processing, may not work in developing countries, while some other solutions such as biodegradable materials can work better in line with the local weather (sun, heat, etc.), limited infrastructure and end-of-life design (e.g. a landfill that can be mined).”

How can a global plastics treaty help?

“While focusing on downstream R interventions, changing consumer behaviours, etc. is important, the treaty should also focus on pushing for upstream interventions such as incentivizing material innovations that reduce environmental footprint and the needs for high-cost waste management. This can help speed up progress as upstream interventions are often easier, faster and more economically viable. The treaty should also recognize the importance of combining local wisdom, approaches and solutions with global expertise and science.”

CASE STUDY 1.6

NFW – Naturally circular material innovation

What is your solution?

“NFW innovates and manufactures naturally circular materials from plants and minerals. Our bio-based textiles (CLARUS®), leatherlike (MIRUM®), foams (TUNERA™), and moulded composites (PLIANT™) help displace fossil fuel-derived synthetics in the global material economy. The NFW platform is built on sequestered biogenic carbon. For production, we use ingredients that have been abundant on earth for millions of years. We add no synthetic toxins or plastic at any stage of manufacturing, and we ensure materials can return safely to earth at the end of life.”

What is your long-term vision for this solution?

“Our hope is that in 10-15 years we are the best one-stop-shop for petrochemical-free materials for large brands, with current clients already including Ralph Lauren and BMW i Ventures. NFW has created a material platform using multiple technologies to meet those needs. We want to become the biomaterial hub for large brands.”

What is needed to get there?

“Money, time and people. We have a capex-light model; we work with existing supply chains and transform them from the inside out. We work with brands directly to reverse-engineer their supply chains.”

How can a global plastics treaty help?

“By helping establish thoughtful definitions. We not only need to look at what comes from nature, but also what can safely go back to nature, which can be two different things. The definitions of an “alternative to plastic” versus an “alternative plastic” need to be clear. Determining whether plastics are chemically defined (petrochemical polymers) or defined by processibility (mouldable under heat and pressure) is critical. If we get the definitions right, then new materials will be easily differentiated from toxic, extractive plastic materials. This is how you influence the market and research.”

CASE STUDY 1.7

Notpla

What is your solution?

“We are a sustainable packaging start-up that creates seaweed-based substitutes to single-use plastics packaging with partners like Just Eat Takeaway and Decathlon. Each product responds to a specific plastic problem identified across multiple industries, from electronics, fashion and cosmetics to food.”

What is your long-term vision for this solution?

“Our mission is for plastic packaging to disappear. For those applications where single-use packaging is still needed, it should not be plastic.”

What is needed to get there?

“For any new material, the challenge is price and awareness. We need a strong ban on avoidable plastics so that people search for substitutes. This

will help us scale, and by reaching scale, our price can decrease.”

How can a global plastics treaty help?

“We believe that the treaty should acknowledge and support innovative solutions like ours, which involve the use of seaweed in packaging applications. It is important to establish clear and strong definitions and standards for what constitutes plastic and non-plastic substitutes. The EU Single-use Plastics Directive has been a valuable tool in aligning member states on the definition of plastic. In addition, we need a new assessment framework that considers the long-term environmental impacts of materials.”

2. Design

CASE STUDY 2.1

Avery Dennison – CleanFlake™ adhesive technology

What is your solution?

“The AD CleanFlake™ adhesive technology enables PET [polyethylene terephthalate] and HDPE [high-density polyethylene] packaging recyclability. During PET recycling, the adhesive deactivates to allow both label and adhesive to cleanly separate. Avery Dennison also offers label solutions that enable HDPE packaging recycling where the label cleanly releases by mechanical stress or friction.

What is your long-term vision for this solution?

“We are always looking for solutions in other streams and plastic formats like polypropylene or polystyrene where we can be compatible and enable the recycling process.”

What is needed to get there?

“We have designed our products to be compatible with existing recycling processes and to require no equipment changes. We would like brand owners, package designers and packaging engineers to know that AD CleanFlake™ adhesive technology can make their packaging recyclable.”

How can a global plastics treaty help?

“By harmonizing design for recycling standards and recyclability testing methods. The industry can then focus its efforts on recycling the entire product versus only component materials.”

CASE STUDY 2.2

Braskem – Cazoolo

What is your solution?

“Braskem set up Cazoolo, a circular packaging design lab in São Paulo, Brazil, with the purpose of bringing collective intelligence to the sustainable development of packaging. Customers, brand owners, designers, start-ups and universities are able to create and co-create projects aiming for complete circularity and the lowest environmental impact of their products.”

What is your long-term vision for this solution?

“We aim to reach systemic change by starting with innovation in the design phase. This is a new mindset, we need to think well ahead what happens with packaging after the consumer, as with design we can influence consumer behaviour.”

What is needed to get there?

“Cross-value chain collaboration and transparent knowledge exchange along the value chain. For

example, we need the expertise of the brands because they know their consumers, the expertise of ESG teams because they know how to measure impact, the expertise of waste-pickers and waste-handlers because they know what can be recycled, and the expertise of scientists, for example on biomimicry. All this knowledge and expertise needs to come together to innovate on packaging design, to make it work in the broader system.”

How can a global plastics treaty help?

“The treaty can play a role in scale. In the early stages, better packaging tends to cost more – this could put us out of the market. If there is a global treaty that brings the same requirements to everyone, it creates a fair competitive landscape. There could still be a combination of different solutions and technologies, but it will set the direction and incentives for those innovative solutions to become mainstream.”

3. Reuse

CASE STUDY 3.1

Aler

What is your solution?

“In Indonesia, we provide a reusable alternative to single-use sachets and plastics. We collaborate with brands like Unilever to enable refillable versions of their conventional single-use products to activate a circular reuse ecosystem offering hundreds of products.”

What is your long-term vision for this solution?

“We aim to move from serving early adopters to going mainstream by working with more brands and retailers to provide the relevant convenience that would convince a broader range of consumers to adopt.”

What is needed to get there?

“Single-use plastic is too cheap because it does not include the negative externalities. Policies that ban certain types of packaging or drive the inclusion of costs for externalities will force producers to look for alternatives. Also, there is a need for legally-binding EPR.”

How can a global plastics treaty help?

“There needs to be more focus on upstream solutions rather than only downstream. We recommend incorporating concrete models. For example, the Ellen MacArthur Foundation has specified four models of reuse: return on-the-go, return from home, refill on-the-go and refill from home.”

CASE STUDY 3.2

DeliverZero – Food to-go in reusable containers

What is your solution?

“DeliverZero is a network of returnable, reusable food packaging. We make it simple for delivery platforms, point-of-sale systems, and restaurants to offer their customers an easy way to order in reusable packaging that is easy to return.”

What is your long-term vision for this solution?

“In addition to making our packaging a ubiquitous feature on delivery apps in major cities around the world, especially in emerging markets where conveniences like takeout are becoming more prevalent, our hope is that businesses across other sectors, such as e-commerce, will use our tech to track their packaging.”

What is needed to get there?

“Reuse needs to move from being a pilot that supports positive PR [public relations], to becoming an integrated part of the long-term overall packaging strategy. Policy can enable this by getting C-suite commitment.”

How can a global plastics treaty help?

“Regulation should incentivize producers by making reusables free in EPR schemes. Funds collected by the EPR process should then also be used for reuse infrastructure instead of only waste-management infrastructure. Also, minimum reuse targets or mandates will help. Binding reduction targets would create the most impact.”

CASE STUDY 3.3

TerraCycle – Loop

What is your solution?

“Loop is a global platform for prefill reuse where any manufacturer can create products in reusable, returnable packaging, which any retailer can sell to their consumers. We currently operate in France with Carrefour and Monoprix (130+ stores and counting), and in Japan with Aeon (110+ stores and counting).”

What is your long-term vision for this solution?

“Our vision is to make reuse easy, convenient and affordable, allowing consumers to buy anywhere and return anywhere. We strive to make reuse available in more stores and for a wider range of products, to create more convenience for consumers to embed reuse in their daily lives.”

What is needed to get there?

“Investment in terms of money, time and commercial prioritization. For reuse, a six-month

pilot project will not move the needle. We need major retailers and brands to weave reuse throughout their long-term business planning and integrate it in their commercial and packaging strategies. They also need to make an honest comparison to the costs of alternatives, instead of assessing its success as a standalone project.”

How can a global plastics treaty help?

“Global recognition of reuse as a key solution paired with reuse targets can tip the financial equation. It can help move the conversation from “will we do reuse or not?” to when and how. It is difficult to dedicate business resources to something you do not necessarily have to do, as there will always be competing priorities. Legislative pressure can help tip the scales and unlock the necessary capex and opex investments.”

CASE STUDY 3.4

Closed Loop Partners – NextGen Cup

What is your solution?

“We explore reusable cup systems that could revolutionize the way we drink our morning cup of coffee or iced drink on-the-go. Through the efforts of the NextGen Consortium, we are testing, funding and scaling these systems.”

What is your long-term vision for this solution?

“We aim to launch an open-loop saturated market pilot for cups.”

What is needed to get there?

“We have seen the success of reuse in closed systems like schools and sports venues. Now we need to expand that success to the more

challenging environment of open-loop systems. To do that, we must ensure that operational realities, environmental mandates and consumer requirements are aligned. A significant percentage of reusable packaging must be returned by customers for reuse to scale. We see a successful approach to scale as one that emphasizes citizen education, iterative testing and the right policy levers that acknowledge regional cultures and markets.”

How can a global plastics treaty help?

“In theory, setting global standards is a good idea, but in practice this is challenging, as it must be customized geographically. If the treaty can set up best practices, these can serve as blueprints, and can help build standardization through education.”

CASE STUDY 3.6

Vytal – reuse

What is your solution?

“The Vytal tech platform makes the use of reusable containers for food and beverages easy, efficient and cheap.”

What is your long-term vision for this solution?

“Our vision is to become the operating system for the circular economy by combining the rental of a durable good (e.g. smart reusables) with the sale of a consumable (e.g. food/drink). By serializing reusable containers, we achieve efficiency for circulating containers and added value for consumers without us touching the containers. We charge our B2B [business-to-business] customers and compensate our suppliers on a pay-per-use model. At the end of the lifetime, suppliers receive back the container material for recycling.”

What is needed to get there?

“Capital is the largest constraint. Regulators should create a level playing field for reusables to compete with single use. Reusables get more efficient with scale, yet we need to commit investments to scale the necessary reuse infrastructure and adoption to make it economically more attractive.”

How can a global plastics treaty help?

“Standards and quality criteria should guarantee that reuse is used when it is actually better than single use, e.g. it doesn’t make sense to transport heavy reusables across long distances. Perhaps we need better and stronger standards for life cycle assessments, as these are often not very reliable. To create a level playing field, we also need to make single use more expensive, e.g. by limiting virgin plastic packaging production and accounting for adverse externalities.”

4. Recycling

CASE STUDY 4.1

ECOCE

What is your solution?

“We are a non-profit environmental civil association, created and sponsored by the food and beverage industry, to promote adequate management of packaging waste in Mexico.”

What is your long-term vision for this solution?

“We started with PET and only the beverage industry was involved. Now we have already included other plastics and a broader collective EPR plan. Now, we want to go to the next level: flexible packaging. We want to keep up the PET recycling rate but also include other materials.”

What is needed to get there?

“Regarding national policy, we need to harmonize regulations, as states have different perspectives on single-use plastics. Also, the description of single-use plastic is different among states, which creates technical barriers. Regulations can be confusing and sometimes contradicting, which creates uncertainty.”

How can a global plastics treaty help?

“Our hope is for the treaty to be ambitious but realistic. It is very important to set goals, but the solutions in some countries in the EU are different to the ones we develop in Latin America. We need to think about different geographies. We have a lot of municipalities; for instance, 570 in one state and they regulate themselves in a very autonomous way, also depending on Indigenous customs.”

CASE STUDY 4.2

Equatorial Coca-Cola Bottling Company (ECCBC) and UNIDO – Ecojil

What is your solution?

“As part of the EU funded programme “SWITCH to Circular Economies” (SWITCH2CE), the Ecojil pilot aims to establish the first bottle-to-bottle recycling scheme in the Moroccan kingdom.”

What is your long-term vision for this solution?

“We have clear KPIs for the intended collection and recycling rate as well as for the reintegration of the recycled content in bottles. Once this pilot is completed, we aim to have it serve as a blueprint to replicate in other regions.”

What is needed to get there?

“The high capital investment that is needed for this kind of projects makes it challenging and requires a leap of faith. Standardization, streamlined operations, a clear legal framework and policies that support the direction can increase trust and therefore unlock investment.”

How can a global plastics treaty help?

“The treaty can support in standardization and by having clear policies that drive a circular economy and provide guidance on the use of recycled plastic in food applications.”

CASE STUDY 4.3

Veolia – Bottle-to-bottle recycling in Indonesia

What is your solution?

“Veolia worked in partnership with Danone Aqua to build the largest PET bottle-recycling plant in Indonesia. The facility recycles and processes PET plastic bottles and turns the material into food-grade pellets that are used to produce new bottles.”

What is your long-term vision for this solution?

“We need a strong combination of reduce, reuse and recycle actions. The goal of our solution is both collecting and recycling waste that is currently not being recycled as well as helping brand owners to achieve their targets to increase recycled content in their packaging.”

What is needed to get there?

“We are on track with scaling it up, but we need more recycling facilities in the country. One bottleneck is the capacity of recycling facilities, but another struggle is the low global demand. We have commitments and offtake agreements from

some clients, but as soon as the price becomes higher than virgin plastic, it becomes less appealing to buy recycled content for those parties that do not have these commitments in place.”

How can a global plastics treaty help?

“A global plastics treaty will reinforce the supply chain that we have implemented by creating local, legally-binding constraints and incentives. It will also ensure stronger commitments from brand owners for rPET [recycled PET] purchase, which is critical to scale further investments in recycling infrastructure globally.”

5. Collection, cleaning and sorting

CASE STUDY 5.1

Citeo – EPR

What is your solution?

“Citeo is the French producer responsibility organization (PRO) for the implementation of EPR in household packaging and graphic paper. PROs operate along the value chain by helping companies to reduce the environmental impact of their packaging.”

What is your long-term vision for this solution?

“Our long-term vision is to expand EPR activities, therefore not only focusing on collection and recycling but by including all R strategies, including reduction, reuse, consumer awareness and education. To do this, we aim to drive new solutions and to understand the global challenges of EPR. It was one of the reasons why we created an international coalition on EPR, the producer responsibility coalition.”

What is needed to get there?

“We noticed that many are speaking about EPR without really understanding it. Therefore, we need to have a clear definition of the concept to clarify what EPR is and what it is not. How, for example, it differs from a fiscal tool, and also how it is evolving to take account of new activities – not limited to recycling to which many stakeholders restrict it.”

How can a global plastics treaty help?

“We believe that the article dedicated to EPR in the revised draft text should be maintained, with a binding approach, specifying certain minimum principles but allowing national approaches. This will enable a dedicated financial system not part of the national budget, but which will nonetheless provide funding for local infrastructure through the collection of fees.”

CASE STUDY 5.2

Pinovo – Clean blasting

What is your solution?

“With paint being the biggest source of microplastic emissions into the environment (as per Pew Trusts, EU Commission and Earth Action), Pinovo, based in Norway, uses a clean blasting technology for surface treatment, thereby stopping paint microplastics from damaging ocean health.”

What is your long-term vision for this solution?

“Our aim is for clean blasting solutions to become the industry standard.”

What is needed to get there?

“We need more awareness of the problem of paint microplastic pollution. Therefore, we work with scientific communities, governments and the

industry. Paint does a very good job protecting assets, but it must not be mismanaged, i.e. released into the environment, at the time of application, maintenance or end-of-life.”

How can a global plastics treaty help?

“It will increase the focus on microplastics. In addition, the global element is very important, because we need a level playing field for paint companies and customers. In the absence of global alignment on regulation, ships, for example, can be sent to countries with less strict regulation for dry docking and repainting.”

CASE STUDY 5.3

SweepSmart – Small-scale sorting facilities for upcoming economies

What is your solution?

“We develop model waste-sorting facilities for different scales for upcoming economies, where semi-mechanized waste handling solutions can strike an ideal balance between mechanization and manual labour.”

What is your long-term vision for this solution?

“We want to expand to more countries, make bigger centres and improve collection.”

What is needed to get there?

“Monetary investments, capex but also opex to maintain a solid business case. EPR could be a

good mechanism for that and should be stratified with higher fees for more difficult plastic types, such as multilayer and for waste that ends up in remote places like islands.”

How can a global plastics treaty help?

“By establishing legally-binding targets. It would also be helpful to harmonize policies on collection fees, source segregation, health, safety standards, etc. Also, the formalization of the informal sector is important, supporting them with an identity card and social security.”

CASE STUDY 5.4

The Circulate Initiative – NextWave Plastics

What is your solution?

“NextWave Plastics is a member-led, collaborative and open-source initiative of leading multinational companies co-founded by Lonely Whale and Dell Technologies and convened by The Circulate Initiative. Its members, which include, among others, Dell Technologies, HP and Heng Heap International, develop product use-cases to showcase the viability of integrating into their supply chains ocean-bound plastics found in areas such as Indonesia, Philippines and Malaysia.”

What is your long-term vision for this solution?

“For our members to set goals beyond ocean-bound plastics, including reducing their use of virgin plastics. We have expanded geographically and work to address low-value plastics such as film.

What is needed to get there?

“We need more robust recycling infrastructure to increase the supply of recycled plastics, supportive policies for a level playing field, and to improve the livelihoods of the millions of informal waste workers who are the backbone of the recycling sector in emerging economies.”

How can a global plastics treaty help?

“We are encouraged to see the draft treaty acknowledge the essential role of waste-pickers, as well as the focus on the impact of plastics on the marine environment (in addition to human health and the environment more broadly). Specific elements including addressing abandoned fishing gear – which some NextWave members use in their products – will also help mitigate plastic waste.”

CASE STUDY 5.5

The Ocean Cleanup – Post-ocean plastic recycling

What is your solution?

“The Ocean Cleanup is a non-profit project developing and scaling technologies to rid the oceans of plastic. To achieve this, we use a dual strategy: intercepting floating plastic in rivers to cut the inflow of pollution, and cleaning up what has already accumulated in the ocean and will not go away by itself.”

What is your long-term vision for this solution?

“Our goal is to clean up 90% of floating ocean plastic by 2040. Once the oceans are clean, we can put ourselves out of business.”

What is needed to get there?

“For responsible management of our ocean plastic catch, greater recycling capacity is required in

North America to avoid the need to ship the plastic to Europe for recycling. Taking an ecosystem approach to solving ocean plastic pollution, and breaking silos to bring stakeholders together, is also imperative to find a lasting solution.”

How can a global plastics treaty help?

“The problem is that ocean pollution is outside of national jurisdictions. This is “legacy plastic” and must be covered in the global plastics treaty. We need to set clear targets to actively intercept plastic flowing in riverine environments to curb the continental effluence of plastics into water, soil and air. Effective monitoring and measurement will form the basis of accountability within the treaty. Remediation is monitoring. Monitoring is data. Data is accountability.”

6. Tracking and tracing

CASE STUDY 6.1

BanQu – Supply-chain traceability software

What is your solution?

“BanQu is a blockchain-based traceability solution used by leading global brands to capture supply and ESG data needed to optimize value chains – while proving sustainable or using compliant sourcing. Two examples of our initiatives are as follows:

First, we supported The Dow Chemical Company with 2Life, which effectively traces materials, ensuring compliance with regulations and sustainability standards and supporting the transition towards a circular economy. It encourages responsible recycling practices and facilitates the integration of recycled materials back into the supply chain, opening up new market opportunities for Dow’s REVOLoop™ post-consumer recycled resin.

Second, PETCO uses BanQu for visibility throughout their plastics recycling value chain in South Africa for EPR compliance.

Both Dow and PETCO use BanQu to digitize and formalize the informal waste sector.”

What is your long-term vision for this solution?

“For supply-chain traceability to the source to be the norm. With tools such as BanQu’s platform, companies can use data as a tool to drive both profit and purpose. Data is the tool, not the goal. With data and stakeholder commitment, sustainable and impactful business growth is possible.”

What is needed to get there?

“We need to build transparency and trust, backed up by legislation.”

How can a global plastics treaty help?

“The informal sector must be formalized and digitized, as they rely on paper-based processes and there is no traceability of waste collected.”

SAP – Responsible design and production

What is your solution?

“Our software helps companies calculate EPR obligations, plastic taxes and corporate commitments to optimize material choices.”

What is your long-term vision for this solution?

“We aim to utilize AI to further accelerate change. We want to make sure our tool is dynamic to types and sizes of markets with an equal focus on the Global North and South. We want to tackle challenges around transparency and insights, and to support disclosure and inform design processes.”

What is needed to get there?

“The more consistency in methodologies, the better. We are starting to see that emerge, for example with plastic taxes where countries are learning from each other, and commonalities are starting to emerge, but it could be further harmonized.”

How can a global plastics treaty help?

“The global plastics treaty could help harmonize methodologies and avoid having each country developing methodologies from scratch.”

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References

1. Organisation for Economic Co-operation and Development (OECD). (2021). *Plastic waste management*. Retrieved from <https://www.oecd.org/environment/plastic-pollution-is-growing-relentlessly-as-waste-management-and-recycling-fall-short.htm>
2. International Labour Organization (ILO). (n.d.). *Climate action: How the green transition can create decent jobs for all*. Retrieved from https://www.ilo.org/global/topics/green-jobs/news/WCMS_840345/lang--en/index.htm
3. United Nations Environment Programme (UNEP). (2022, March 2). *UNEA-5.2 takes a historic step: Ends plastic pollution and drives ambitious action on nature*. Retrieved from <https://www.unep.org/news-and-stories/story/everything-you-need-know-about-plastic-pollution>
4. United Nations Environment Programme (UNEP). (2023, December 28). *Intergovernmental Negotiating Committee on Plastic Pollution*. Retrieved from <https://www.unep.org/inc-plastic-pollution>



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