Transition Time! A Circular Economy for Plastics

Insights across the plastic value chain, innovative business cases & specific policy recommendations to jointly accelerate the transition

Dutch Sustainable Growth Coalition

Promoting Principles of Circular Design

Conscious Customer & Consumer Use

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Dutch Sustainable Growth Coalition

Foreword

Plastics and the environment are on a collision course: from rising greenhouse gas emissions to plastic ocean waste, the proof is piling up on a daily basis. It is increasingly clear that incremental steps are not enough to tackle this major global challenge: to truly turn the tide, we need game-changing innovations and policies.

The Dutch Sustainable Growth Coalition (DSGC) was founded based on the shared conviction that companies have a social responsibility to offer solutions to the major sustainability issues of our time. As such, we are committed to supporting and accelerating the transition to a circular economy for plastics.

The benefits of this will be immense. In a circular economy, plastics will be kept within an open, semi-open or closed loop, significantly reducing leakage into the environment. Energy and water usage and CO_2 emissions will also be substantially reduced. In this way, landfill waste will be minimised, and the incineration of recyclable plastics will be replaced with innovative technologies that keep materials and value within the economy.

Thanks to its excellent infrastructure, strong knowledge base, and sustainability-focussed business community, the Netherlands is particularly well-positioned to become an internationally recognized hotspot for circularity and game-changing innovation.

In this publication, the members of the Dutch Sustainable Growth Coalition are happy to share various examples of how a circular approach can contribute to closing the loop for plastics. We hope that it will be a source of inspiration for others to join in and follow suit. Moreover, and just as importantly, our publication also includes various concrete policy recommendations aimed at Dutch and EU policymakers. The reason for this is straightforward: only with the right enabling regulatory frameworks and harmonised policies can we accelerate the much-needed turnaround.

The journey to a circular plastics economy will not be easy; we will undoubtedly face many obstacles and dilemmas along the way. Nevertheless, I am confident that when all stakeholders – business, governments, knowledge institutes and civil society – share the same fundamental beliefs and act in partnership, we will be able to rise to the occasion and accelerate this transition.

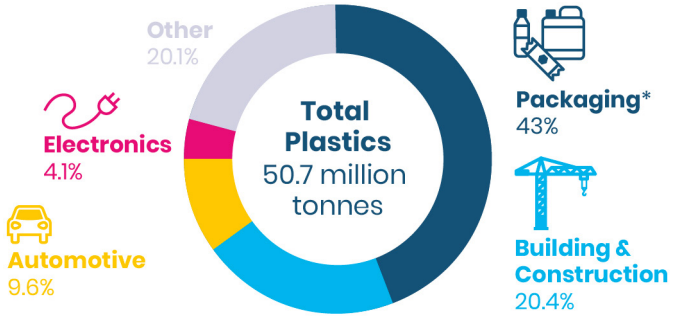
So, let's begin our journey together with no further delay: it really is transition time.

Jan Peter Balkenende
Chairman of the Dutch
Sustainable Growth Coalition

Introduction Paving the path for plastics

In the past 50 years, plastic usage has increased significantly – and with it, the amount of plastic waste. In Europe, plastic production reached nearly 58 million tonnes in 2019, and continues to increase[1]. If we do not take action now, the annual flow of plastic into the ocean will nearly triple by 2040, to 29 million tonnes per year[2]. Plastic leakage into the environment is a key issue, and a lack of collection infrastructure is one of the leading causes. However, it is not the only issue. A holistic approach is required to switch from our linear *take-make-waste* model to a circular economy (CE) for plastics.

Figure 1
Four sectors responsible for 75% of plastic



Source Plastics the Facts, 2020

*including agricultural packaging

This report offers advice to businesses, the European Commission and EU Member States on developing, introducing and reviewing new legislation on plastics based on impact assessments. Moreover, this report outlines various general measures and specific policy recommendations to jointly accelerate the transition towards a CE for plastics.

"Plastic is a valuable resource but, at the same time, if it is misused, a huge burden for the environment"
Frans Timmermans, Executive Vice President, European Commission

At AkzoNobel, we aim to deliver the most sustainable solutions in our industry through our 'People. Planet. Paint.' approach and create a more resilient, prosperous and sustainable economy and society. For us, addressing challenges around materials such as plastics is an important and integral part of our approach.

Klaas Kruithof
Chief Technology Officer
AkzoNobel

Turning challenges into opportunities

Plastic provides us with challenges and opportunities. It is a functional, durable, versatile and lightweight material that underpins our global economy. The transition towards a CE for plastics will enable full potential use of limited resources, significantly reduce greenhouse gas (GHG) emissions, and potentially create up to 700,000 extra jobs by 2040[2]. Ultimately, this will yield an economic gain of 80–120 billion dollars per annum (€65–100 billion per annum), an amount which is currently wasted given a short single-use cycle[3].

In a circular system, plastics remain within an open, semi-open or closed loop, with leakage into the environment eliminated by design. In addition, energy and water usage, as well as GHG emissions, are all taken into consideration and reduced substantially. Ultimately, this will avoid an outcome where valuable resources escape the circular loop and lose their potential value.

Decorative Europe's plastic packaging to use 50% recycled content by 2025

Among the various global environmental issues that require swift and positive action, plastic pollution is one of the most urgent. AkzoNobel is acutely aware of the important issues and concerns around plastic pollution. Accordingly, it's stepping up its efforts to rethink plastic packaging, so that it stays within a circular economy and out of the environment.

It's all part of AkzoNobel's 'People. Planet. Paint.' approach to sustainability – which makes clear its intention to have zero non-reusable waste by 2030. AkzoNobel also has a very specific aim regarding the use of plastic: packaging in Europe should consist of 50% recycled content by 2025.

The simple fact is that consumers are now demanding a lot more from leading brands. They expect products to do more and offer more sustainability benefits. This is something AkzoNobel was well prepared for, because sustainability has long been embedded in the way it does business. So, it's been introducing new functionality and making its portfolio eco-friendlier for a considerable period of time.

Now, the company is going even further by taking a critical look at packaging, production processes and ways of working to cut out as many waste streams as possible as it strives to become a zero-waste company. It's on the right track, having already reduced its waste by 40% in the last eight years. AkzoNobel believes that by doing more, it can make a bigger contribution to the UN Sustainable Development Goals on Sustainable Consumption and Production (SDG 12).

A good example of the progress being made is the Aco-Mix pack that the AkzoNobel Decorative Paints business in Sweden has started to use. It's made of 100% recycled plastic and is completely recyclable. You can read more about AkzoNobel's sustainability ambitions and 'People. Planet. Paint.' approach here.

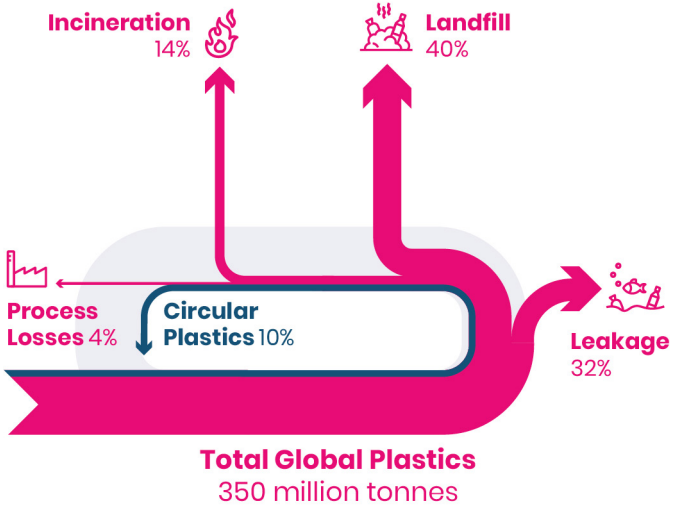
Accelerating a circular economy for plastics

Both environmentally and economically, there is a strong imperative to develop a CE for plastics. There has been step-by-step progress in improving individual phases of the current linear plastics value chain in recent years. However, to accelerate the transition towards a CE for plastics, we need systematic changes and central coordination reinforced through policymaking, innovation, and investment.

The European Commission has already set high ambitions for 2030, as part of the European Green Deal, striving for Europe to become the first climate-neutral continent. To achieve these ambitions, the European Commission wants to:

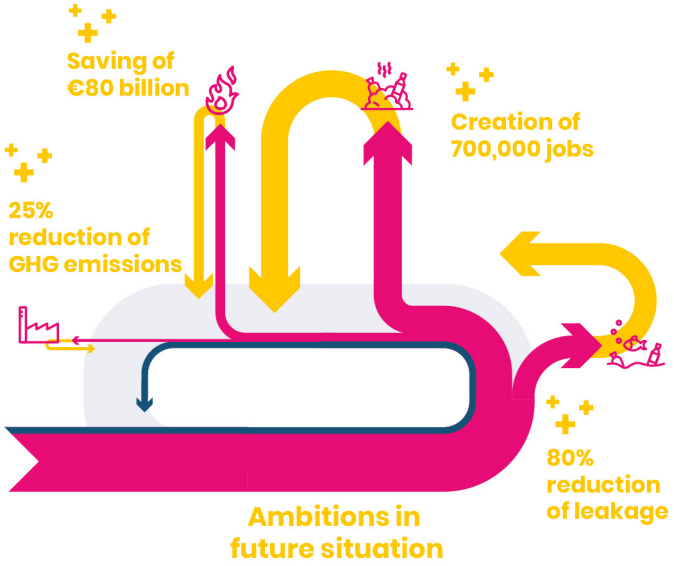
- Set mandatory requirements for recycled content and develop waste reduction measures for crucial products such as packaging, construction materials and vehicles.
- Establish rules for the safe recycling of plastics into food contact materials.
- Increase sorting and recycling capacity fourfold.
- Make all plastic packaging that is placed on the EU market reusable or recyclable at minimum cost.
- Develop labelling, standardisation, certification, and regulatory measures on the unintentional release of microplastics.
- Build on the European Plastics Strategy to lead international efforts in order to reach a global agreement on plastics and promote the uptake of the EU's circular economy approach to plastics.

Figure 2
90% of plastic escapes global economy



Source McKinsey&Company, How plastics-waste recycling could transform the chemical industry, 2018

Figure 3
Future ambition is to reclaim lost resources



Source McKinsey&Company, How plastics-waste recycling could transform the chemical industry, 2018

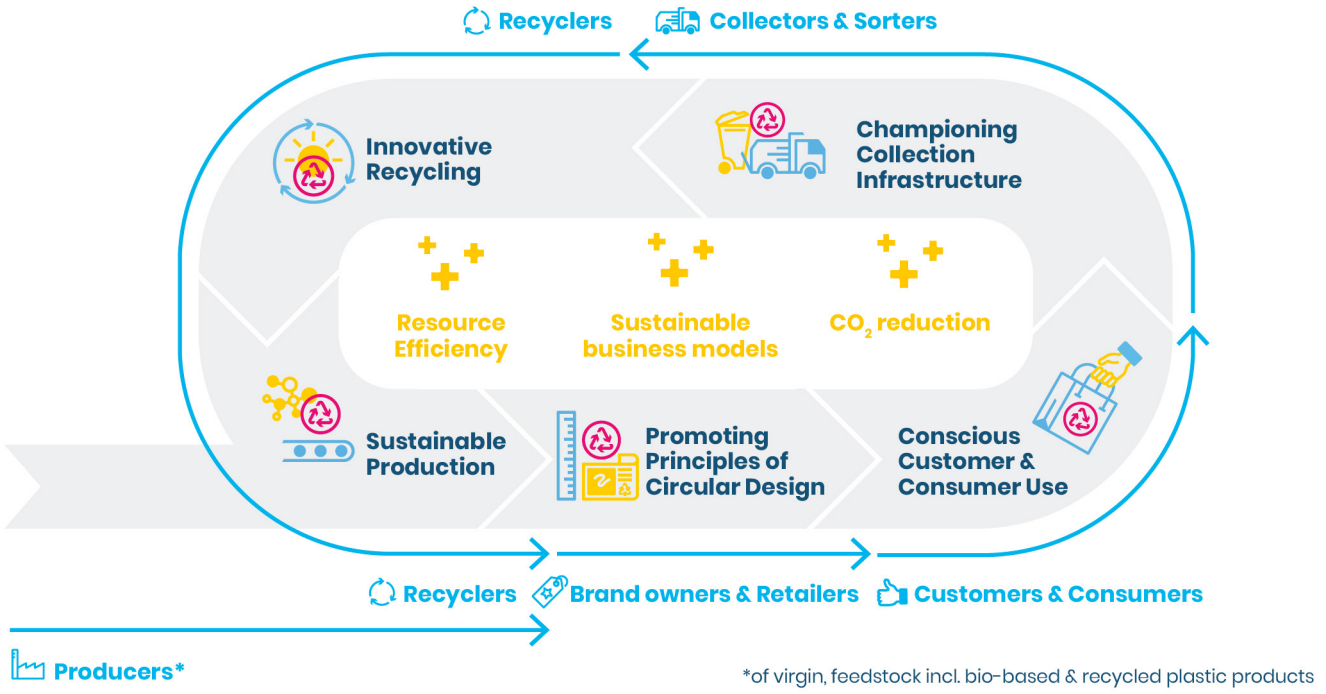
The Dutch Sustainable Growth Coalition (DSGC) wishes to contribute to the European Commission's goals and the UN Sustainable Development Goals. We are a coalition of eight Dutch multinational corporations aiming to drive sustainable growth business models that combine economic profitability with environmental and social progress.

We believe that, together, the private and public sector can accelerate the transition to a CE, thereby accelerating the sustainable and responsible use of plastics. Through several use cases, we want to share the lessons we have learned and the challenges we still face in our quest to develop structural and sustainable ways forwards. Meeting these challenges requires involvement from a wide variety of parties:

- **European Commission & Governments**
- **Academics & Experts** Universities, research institutes, think tanks and knowledge organisations
- **Societal Organisations** NGOs, trade & industry associations and partnerships
- **Business Sector** Relevant organisations across the value chain as shown in Figure 4

We aligned the scope of this publication with various goals, including the European 2025 and 2030 plans. We will propose concrete measures to accelerate the CE for plastics for every phase of the plastics value chain. Only through parallel action across the separate stages can we drive systemic change.

Figure 4
All key players are required to attain a circular economy for plastics



Promoting Principles of Circular Design

An inevitable consequence of our linear *take-make-waste* model is waste, including plastic waste. As much as 80% of a product's environmental impact is a direct consequence of decisions made in the design phase[4]. Waste can be designed out, advancing the circularity of plastics.

Insights into the current situation

Less material, zero waste

At present, there are thousands of different plastic resin types. By focussing on those types that can potentially remain valuable as a material after recycling, the industry can improve circularity on a large scale. It will make the disassembly, and thus the sorting and recycling process, of these plastics easier.

Secondly, if organisations are to optimise the design of plastic products, the zero-waste hierarchy must be understood and incorporated by all its departments. For each specific plastic product, one should evaluate which 'R-option' (see Figure 5) will lead to the lowest overall environmental impact, which can be calculated through a comprehensive Life Cycle Assessment (LCA). This method considers factors such as energy demand, chemical substances and GHG emissions. Hazardous materials, in particular, should be designed out, since they can otherwise pose a challenge further down the value chain.

Figure 5
The 10 R's of the zero -waste hierarchy

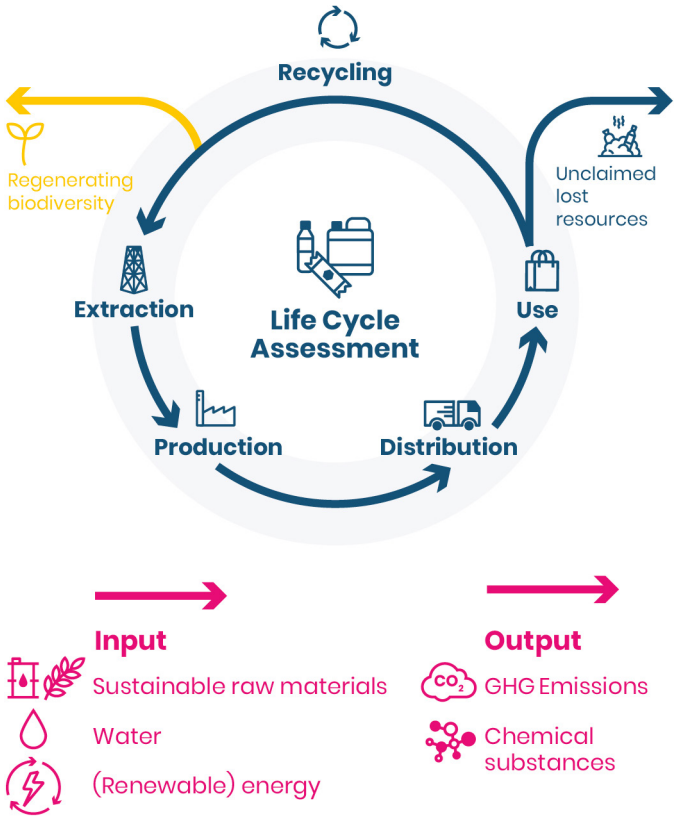
Remaining challenges
Improving quality and collaboration

One of the main challenges in design is to improve the quality of recycled plastics so they can be used in new products. Considerable technical innovation and know-how to improve quality are already available. However, in practice, these technologies are not yet widely applied because current incentives focus on increasing the quantity rather than quality (e.g. strength, colour, smell) of recycled plastic material.

A design that facilitates the ten Rs of the plastic waste hierarchy will pose several other challenges. For instance, if the overall environmental impact of re-using recycled plastics is taken into account, there might be consequences such as an increase in the use of other materials and weight to maintain similar product characteristics. The question is whether we should use lightweight plastics or focus on the recyclability of the product.

The answer will differ between organisations across the value chain. It is these conflicts of interest that involve the entire plastics value chain. That is why we need to develop EU-wide quality criteria and certification. Design decisions will then be based not on individual interests but objective instruments like an LCA. For example, lower GHG emissions by switching to non-fossil feedstock to produce plastics may result in more land and water usage. Using LCAs, we can quantify these various factors and rationally weigh the costs and benefits of different techniques and materials and use this information for certification.

Figure 6
Factors at play in Life Cycle Assessment



For Philips, plastics is a critical material that we need to bring our innovations to market. At the same time we are committed to reducing the ecological impact of our products by increasing recycled content, improving energy efficiency, and avoiding the use of hazardous substances. We realize that we need to improve the recycling of plastics to ensure we can sustainably use this material in our products. We can play a role by introducing recycled plastics into our products and truly close the loop. We are working closely together with our suppliers and partners to improve the quality of recycled plastics to the point where we can apply it across our portfolio.

Robert Metzke
Global Head of Sustainability
Philips

Policy recommendations
Providing flexibility while stimulating circular design

To limit the complexity of plastic products, legislators and the industry should jointly develop sector-specific standards and establish clear circular design guidelines. Together, they can set up roadmaps that phase out specific materials, based on a thorough impact assessment and the availability of more sustainable alternatives. These roadmaps will stimulate safe design choices and design for circularity, leading to more efficient processing and high-quality recycling. Specifically, we advise:

Adjusting the Eco-Design Directive to function as a framework directive for reference purposes. Also, include various industry guidelines that can be adapted and updated based on the latest market developments.

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Senseo Viva Café Eco

For more than 10 years, Philips has been working on the application of recycled plastics and the integration of plastics from electronics waste in new products. Until now, recycled plastics were mostly used in its internal parts that cannot be seen from the outside, as it was impossible to create good surface quality with recycled plastics.

Since Philips uses most plastics in the visible housing parts of its appliances, the amount of recycled plastic that could be introduced was limited; it was reaching the end of what was technically possible. Its challenge was to find new recycled plastics sources with good visual properties in order to start using recycled plastics in both internal and external plastic parts.

The Philips Senseo team decided to take up this challenge and develop the Senseo Viva Café Eco: Philips' first product with all visual plastic parts and non-food contact parts made from recycled materials. Key to solving the technical challenge was co-developing the new recycled plastics with suppliers MGG Polymers and Sitraplas within the European research project PolyCE.

Experts from the Philips Innovation, Quality, Design and Procurement teams worked together with experts at these suppliers to co-develop the new materials. By focusing on both post-consumer and post-industrial materials and installing new colour-sorting technologies in the recycling process, two new materials were developed and successfully introduced into the Senseo Viva Café Eco.

In total, Philips introduced more than 75% recycled plastics into the non-food contact parts of the Senseo Viva Café Eco – a record high for the company. The quality of these circular recycled plastics is as good as virgin plastics and, because the material will become available as a standard recycled plastics grade, it will allow Philips to expand its use to other product categories.

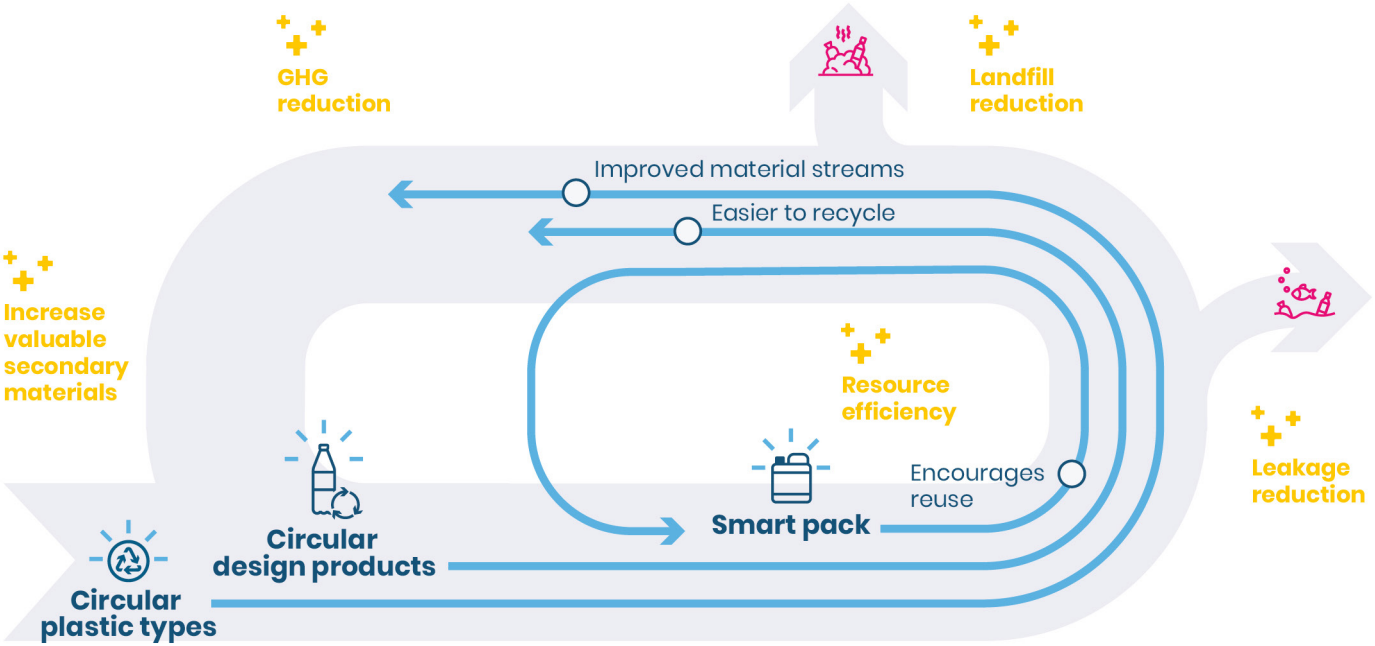
Policy recommendations

Designing for advanced recycling, boosting quality and supply

We see insufficient quality and capacity within the EU to meet the current demand for recycled plastics in high-quality applications. With the European Commission's upcoming plans to set a minimum percentage of recycled content in plastic products, the plastics demand will only rise further. This development calls for investments in both quality and capacity. Specifically, we advise:

- Developing clear quality criteria for recycled plastics in upcoming revisions of the EU Packaging and Packaging Waste Directive. These criteria should consider innovations such as advanced 'chemical' recycling and improvements across the value chain. The criteria will require a clear, unambiguous definition of the recyclability of plastic products.

Figure 7
Promoting circularity across the value chain



Unilever aims to lead with a renewed circular approach for all our products and packaging, creating a circular economy in which plastics contribute to sustainable solutions. I am encouraged by the shared ambitions of governments, academics & businesses – ranging from start-ups to international corporates – to jointly create breakthrough innovations and drive a circular economy for plastics.

Annemarieke de Haan
General Manager
Unilever Benelux

Developing ambitious but realistic requirements to stimulate the uptake of recycled plastic content in new products, while at the same time stimulating the supply of high-quality recycled plastics.

In the Packaging and Packaging Waste Directive, we urge the European Commission to develop new metrics, based on the "what goes in goes out" principle, to attribute recycled plastic feedstock in new products based on the mass-balance approach.

Debuting Magnum tubs created from recycled plastic

Unilever recently faced a new challenge: delivering the Magnum brand experience with pint-sized packaging that was fully reusable, recyclable, and made from post-consumer recycled material. Through close collaboration with the Magnum packaging team, Unilever was able to achieve this circular solution, guided by four key principles.

The first was design for recyclability: Unilever Magnum sought a full polypropylene solution to help realise its ambition to make the tub and lid 100% recyclable by 2025. The second was mechanical recycling: compounds with a high percentage of recycled content do not comply with food contact safety. Third was certified circular products: virgin resins from difficult-to-recycle used plastics produced through feedstock recycling. And the last principle was certified renewable products: resins from bio-based feedstock that doesn't compete with the human food chain and help mitigate the effects of climate change.

Around 600,000 of the new tubs have been available in Belgium, Spain and the Netherlands since 2019. Over 7 million more were launched in August 2020 to cover the whole of Europe, and will be available in 2021.

Based on the results of a "cradle-to-gate" study on Sabic-certified circular polymers, the carbon footprint reduction using the new tub is about two kilograms of CO_2 for every kilogram of polyolefins produced via chemical recycling in comparison to fossil-based methods.*

**This reduction includes the benefit from the avoidance of mixed plastic waste diversion to energy recovery.*

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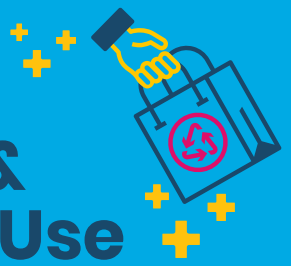
Conscious Customer & Consumer Use



In recent years, end-users have become more aware of how their purchasing decisions affect their ecological footprints. As the most significant stakeholders of brands and companies, consumers can significantly influence the lifecycle of plastics. Nevertheless, producers are ultimately responsible for advancing the uptake of recycled plastics and improving their quality.

Insights into the current situation

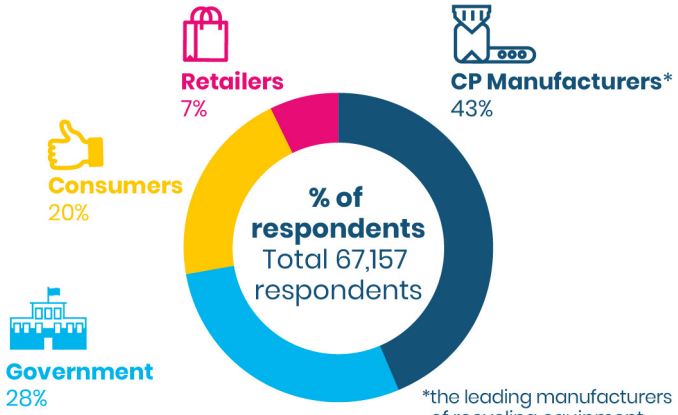
Challenging existing business models

In recent years, producers and their customers have increasingly focussed on meeting end-user and consumer needs. They have made products and packaging easy to handle, smaller and lightweight for on-the-go use, and appealing to the eye. Now, consumers are also demanding more sustainable brands and products. While nobody will deny the importance of responsible end-user behaviour, this alone cannot combat plastic waste; we must avoid shifting responsibility for this issue from the industry to the consumer.

One way that producers and their customers can lift responsibility from consumers and governments is by moving towards a product-as-a-service business model. This model would enable companies to retain ownership over their products and take responsibility for improving their waste management processes. Extended Producer Responsibility (EPR) schemes are another solution. These obligate producers to ensure that products are reprocessed at the end of the first lifecycle. Through the concept of extended producer responsibility, companies are ultimately held responsible for managing the various phases of the plastics lifecycle, from sourcing raw materials to new secondary raw materials.

Figure 8

Who should act on plastic waste?



Source Kantar, "Who cares, who does" 2019

Through the concept of extended producer responsibility, companies are ultimately held responsible for managing the various phases of the plastics life cycle, from sourcing raw materials to new secondary raw materials.

Remaining challenges

Shifting from quantity to quality

Waste management companies face the challenge of operating within a system that focusses on quantity rather than quality. As stated in chapters 1 and 3, quality criteria are needed in the design, collection and sorting phases to prevent the downcycling of plastics. Another way to improve quality is by educating consumers. EPR schemes still rely on end-users returning packaging for disassembly and remanufacturing. Consumers thus play a vital role in the effort to recycle more plastics. This reflects the wider challenge facing EPR schemes: producers have limited control over other phases within the plastics value chain.

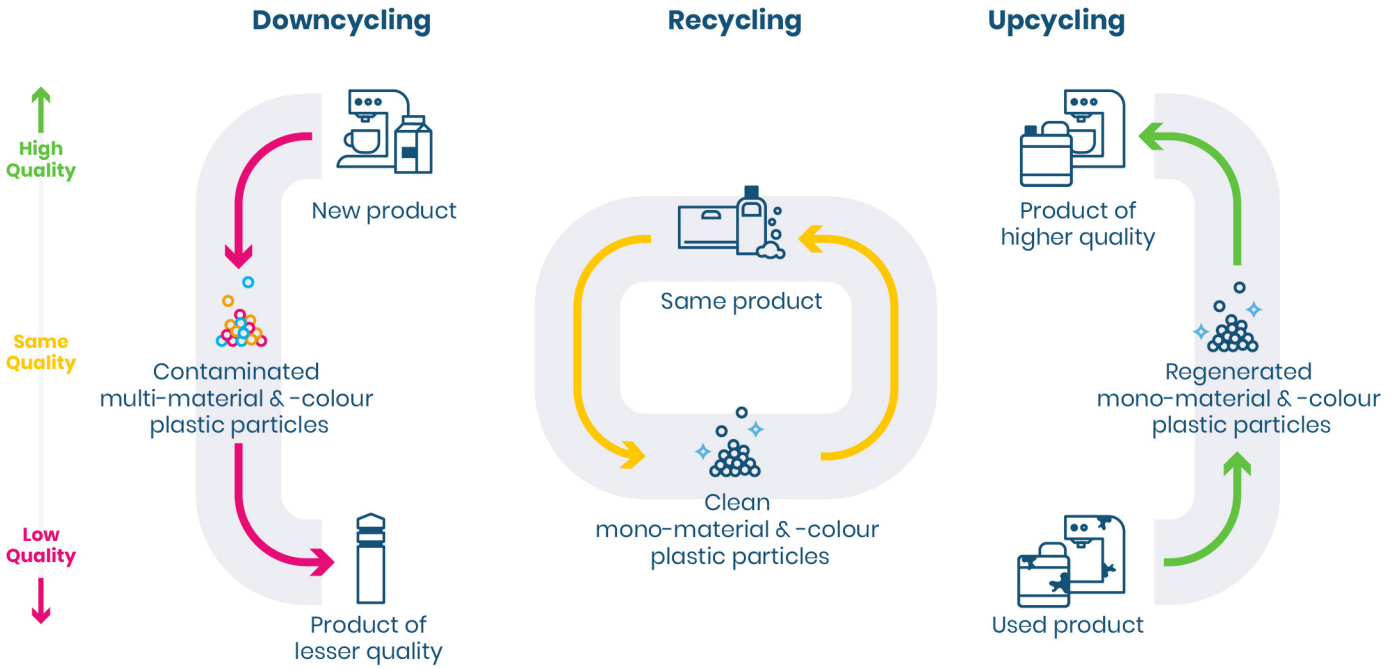
Policy recommendations

Developing innovative technologies to support conscious decision-making

Information provision by the plastics value chain should be made more appealing. New digital technologies enable businesses and consumers to track information about a specific product's entire value chain. Such technologies can make these groups part of the plastics lifecycle. Specifically, we advise:

Encouraging the development of new digital technologies through the New Circular Economy Action Plan (NCEAP). These technologies can provide more information about the composition of plastic material streams and optionality for the most adequate processing method.

Figure 9
Upcycling restores material value



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Policy recommendations

Stimulating the uptake of recycled content and recyclability in EPR schemes

High-quality plastics grades, both for food and non-food applications, are short in supply, quality is volatile, and recycled plastics are far more expensive than virgin plastics. Sufficient supply and competitive pricing are essential if Europe is to compete with other markets like the US, China and Japan. Therefore, in addition to existing measures that stimulate recyclable products, it is essential to implement financial incentives. Eco-modulated fees, for instance, can stimulate the uptake of recycled content in new products. Higher demand for recycled plastics in new products will boost the supply of recycled plastics with superior quality. Specifically, we advise:

Stimulating effective EPR schemes, including eco-fee modulation within those schemes based on the recyclability and recycled content of a product.

Taking context into account

Context is extremely relevant when developing new products and making choices that aim to reduce their overall environmental impact. Although public opinion is an important accelerator for change, there is also a risk that the direction of choice is no longer based on the most sustainable options. For example, in aviation operations, finding lightweight plastic cutlery alternatives with an equal or lower environmental impact is challenging because of the recent Single-Use Plastics Directive. Specifically, we advise:

Amending the existing Single-Use Plastics Directive to enable companies to choose the most sustainable option in a specific context based on an LCA, such as recyclable, lightweight plastic cutlery and packaging in aviation.

Re-using food-graded materials

KLM Royal Dutch Airlines is the first airline in the world to recycle PET bottles to make tools for repairing and maintaining its aircraft. Empty bottles are collected at the end of every flight and transformed into filament, the material used in 3D printers. This process means an empty water bottle can end up as part of a 3D-printed piece of equipment, saving Engineering & Maintenance time and money.

The main challenge in implementing this solution was that the collected PET bottles are classified as “food-graded” and thus may be used in food packaging. Food-graded materials should be used for applications requiring this to retain the highest possible value in the recycling process. However, the plastics used for KLM engineering tools do not require this classification. Therefore, KLM searched for a partner for a “material swap”. This partner uses KLM’s PET bottles in a food-graded application, providing plastic pallets in return. The start-up Reflow then turns these pallets into R-PET filament, which achieves the best 3D print quality. In this way, all the materials in the value chain are used in the most efficient way, and all parties benefit.

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Policy recommendations

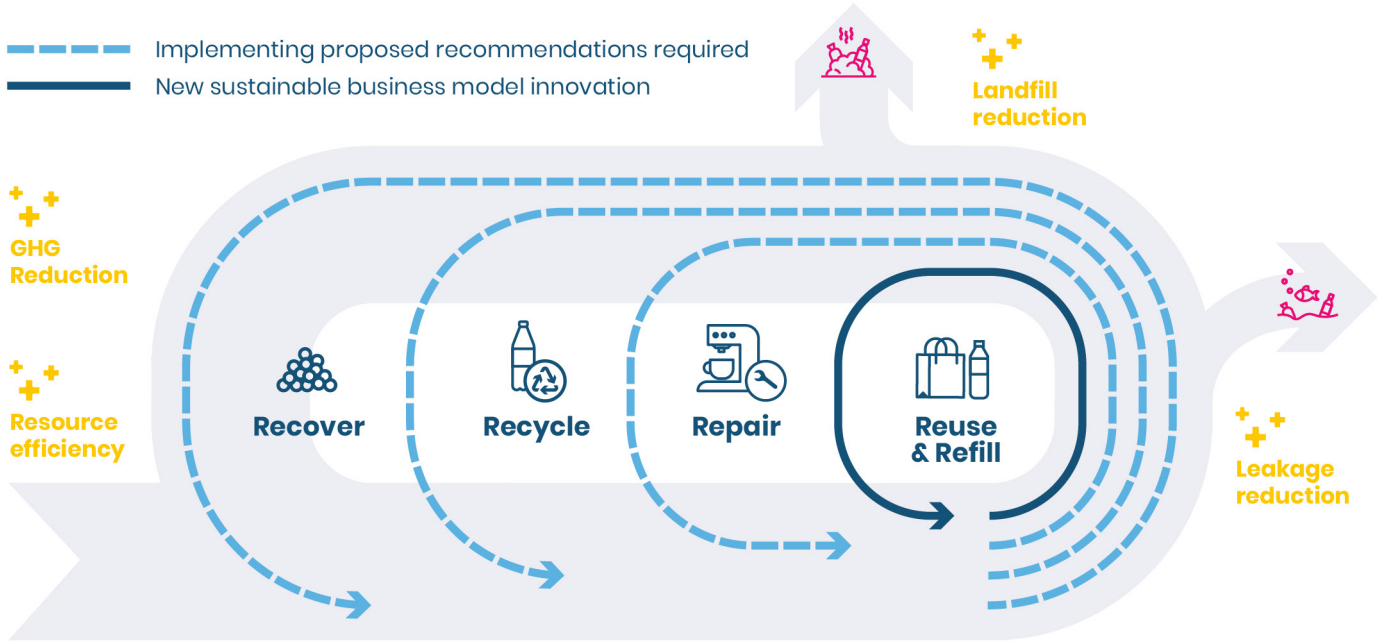
Defining food safety criteria for recycled plastics

Current legislation on food safety for recycled plastics prescribes that recycled content for food contact applications must come from former food contact materials. In practice, a material's origin does not guarantee its suitability for food applications. Safety and quality assurance should be determined based on the recycled material's characteristics, regardless of its origin. Specifically, we advise:

Developing clear requirements for recycled plastics used in food applications, based on criteria including the quality of the material and risk of contamination.

Developing requirements that encourage the upcycling of materials and ensure safety by design.

Figure 10
Driving responsible customer- & consumer use



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Policy recommendations

Reviewing the classifications of plastics across their lifecycles to ensure circularity

Current waste legislation limits the potential for a circular economy for specific materials, including plastic. It prescribes that materials that are not suitable for immediate use (i.e. unprocessed materials) should be classified as waste and treated likewise in distribution. This limits repair, re-use and recycling. To address this issue, we advise:

Initiating a reclassification of existing 'end-of-waste', 'by-product' and 'raw material' criteria as part of the Waste Framework Directive to stimulate the repair, re-use and recycling of materials in the first place, and support alternative recovery options if required.

Improving the quality of sorted waste by introducing general quality standards for by-products and clear end-of-waste criteria in the Waste Framework Directive.

Improving quality across the value chain and developing standardised quality grades

Currently, there are no quality standards in place for recycled plastics, and there is no clarity on the level of quality required for different product categories. As a result, various quality levels are unavailable, and high-quality food-grade material is used for low-grade applications. Clear quality standards for each step of the plastics value chain – in particular, clarity on quality grades at EU level – could address this challenge. This would provide a strong incentive to use recycled plastics, facilitating the development of a market where they are used in a range of high-value applications, such as textiles and packaging. Specifically, we advise:

Introducing quality requirements in the Packaging and Packaging Waste Directive (PPWD), in addition to existing quantitative recycling targets for each material.

Ensuring the quality of plastics is maximised throughout the value chain by introducing incentives to improve quality in the sorting and recycling stages and by eliminating substances that complicate processing, sorting and recycling.

Developing EU-wide quality grades using input and acceptance criteria and taking into account safety and relevant material properties.

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Our *From Drink to Ink* project is inspiring colleagues and other partners to drive innovation forwards. Only with this kind of creativity, ability to connect processes, and new collaboration can we bring about the transition to more sustainable material use.

Jacomien Dijkstra
SVP Transformation
KLM

Championing Collection Infrastructure

If demand for plastics follows its current trajectory, global plastic waste volumes will grow from 260 million tonnes per year in 2016 to 460 million tonnes by 2030[4]. In Europe, still only around 30% of all plastic waste is collected for recycling[5]. This proportion must increase, but limited EPR schemes, fragmented waste management systems and contradictory legislation and policies impede progress. At the same time, the quality of collected waste must also increase. High-quality recycling relies on effective separate waste collection and sorting techniques.

Insights into the current situation

Effective collection infrastructure

Existing collection infrastructures often vary across countries, regions and even municipalities. The responsibility for these systems lies within municipalities, district authorities or the relevant EPR schemes. This fragmentation makes it challenging to create a harmonised collection infrastructure.

In a large part of the world, collection infrastructures are ineffective or even completely absent. Significant investments are needed to set up proper collection infrastructures so plastics can be processed on a large scale. Developing markets should be aided in building their infrastructure systems through the sharing of past experiences, existing knowledge and relevant insights.

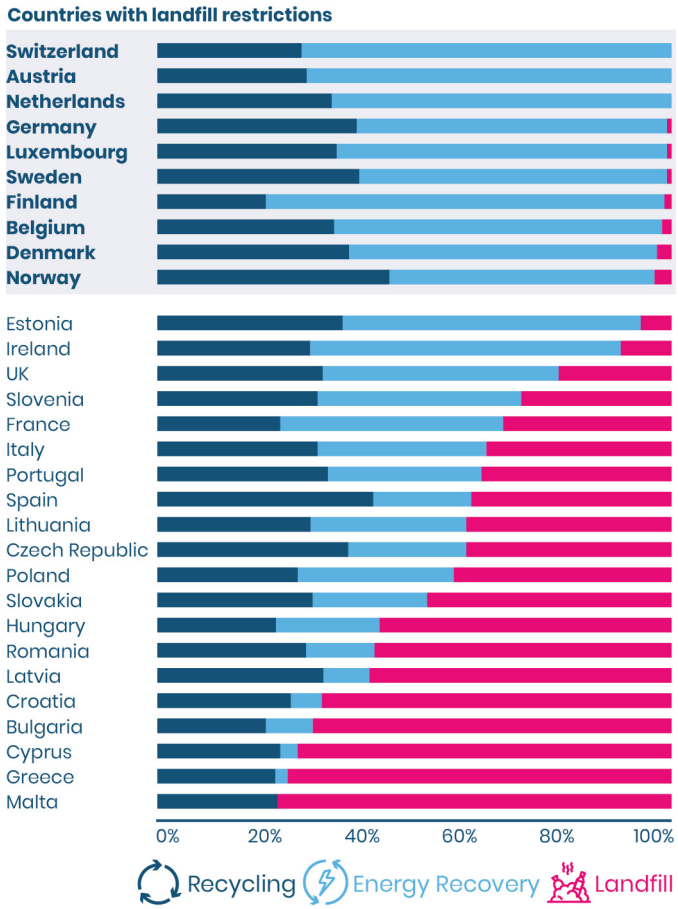
The NCEAP, which the European Commission has adopted, aims to ensure reduced waste and make Europe more resource-efficient. Part of its strategy is to encourage waste prevention and circularity. The NCEAP's ambitions and its drive to seize innovation opportunities show real potential. The joint efforts of public and private bodies can enable substantial improvements in waste collection and, further down the value chain, create a new marketplace for secondary raw materials.

Remaining challenges
Preconditions for reform

The NCEAP and EU Waste Framework Directive (WFD) both aim to improve the quality of collected waste, one step in the right direction. At the same time, the volume of recycled plastic material must increase. For initiatives like the WDF and NCEAP to succeed, certain preconditions must be satisfied. The current definition of waste does not enable collection to drive circularity, since waste from one producer could very well be raw material for another producer.

Furthermore, plastic waste distribution is hampered by legal barriers, making it challenging to export or import plastic waste to or from another country, even when it offers excellent processing capabilities. In this way, legal barriers cause delays in waste shipments from processors to pre-treatment and post-treatment plants, resulting in reduced material movement, lower volumes and higher costs.

Figure 11
Post-consumer waste rates per country



Proudly reproduced from Plastic the facts, 2019
Source Conversio Market & Strategy GmbH

Although plastics represent only 6% of total HEINEKEN packaging, we are working hard to manage its impact. We apply an *eliminate, re-use, recycle* approach. A good example is the introduction of reusable and recyclable cups at festivals. But the journey is not an easy one. Any solution should be sustainable, without creating unintended tradeoffs, and it must make business sense as well. Also, recycling infrastructures, especially given our global footprint, are not always available. This means we need to work closely with suppliers and other partners to develop solutions that are smart and impactful at the same time.

Petra Hissink
Director
Global Sustainable Development
HEINEKEN

Policy recommendations

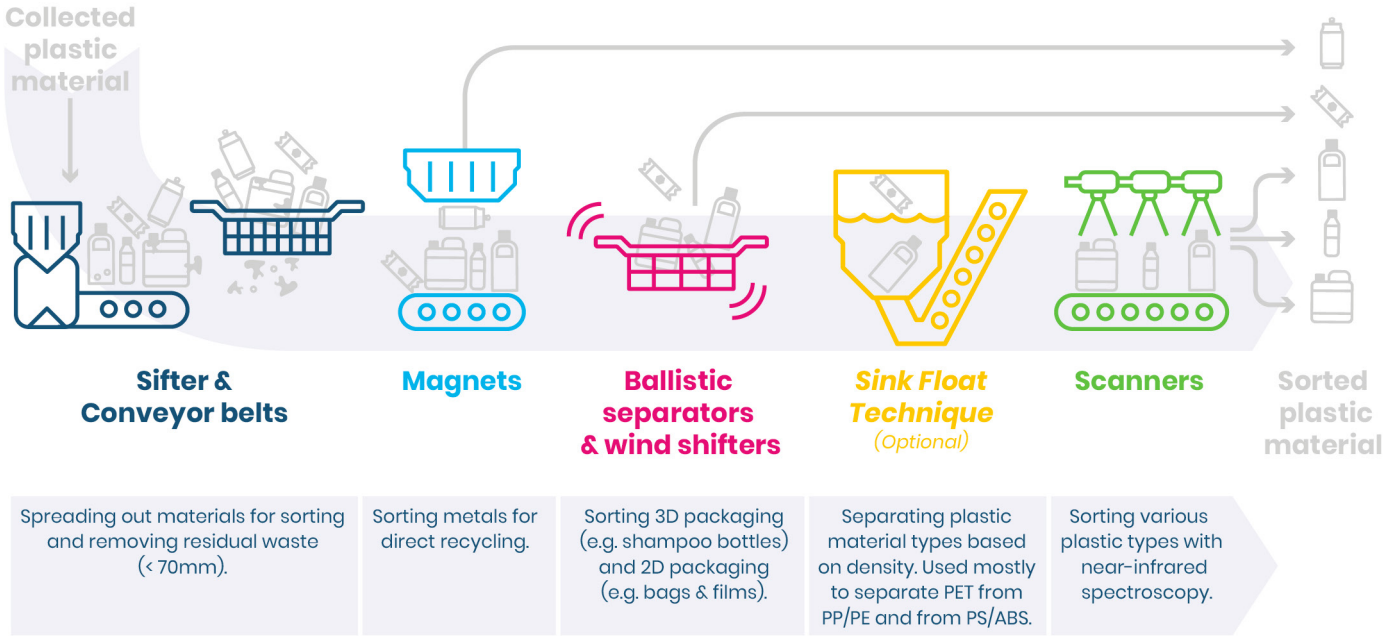
Categorising international waste

Current EU regulation on animal by-products classifies catering waste from outside the EU as Category 1 waste, which must be incinerated within 24 hours upon arrival in the EU. Category 1 waste includes packaging such as meal boxes. In the aviation industry, this packaging is mostly made from plastic due to its lightweight character. The regulation is based on outdated risk assessments. Revising the classification would enable aviation to recycle plastic packaging. Specifically, we advise:

Updating risk assessments to support a revision of *Regulation (EU) 1069/2009* so catering waste can be recycled.

Figure 12

Post-collection sorting techniques



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Policy recommendations

Harmonising collection schemes

Collection infrastructures and associated policies are often decentralised, leading to complexity and confusion for businesses and consumers. Harmonising collection structures and policies will stimulate circularity.

Furthermore, governments should encourage the collection of *all* plastic waste and support innovative sorting technologies to ensure proper polymer separation and increase the supply of high-quality recycled plastics. Specifically, we advise:

Enforcing the NCEAP and related policies. Enforcement can aid the EU-wide harmonisation of collection infrastructures and policies regarding plastic waste and other materials, while at the same time offering sufficient space for new innovative solutions, such as post-collection sorting techniques.

Encouraging innovation in sorting techniques by providing certainty of the long-term input of specific polymer types and developing an effective market for secondary raw materials.

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Facilitating the movement of plastics to optimise processing capacity in the EU

Recently, new amendments to the Basel Convention were adopted. They concern the transboundary movement of plastic waste and are generally broadly supported. However, they also create two new challenges. The first is finding alternative locations for the proper processing of plastic waste. The second is developing new technologies to improve processing in those locations so that the plastics will retain their value, and the overall environmental impact will decrease. Specifically, we advise:

Facilitating the transport of waste through the EU WFD and the EU Waste Shipment Regulation. This will enable the most sustainable processing options for materials, developing a single, centralised market for plastics in Europe.

Ensuring a broad understanding of the Basel Convention and related transboundary movements and providing insights into alternative processing options.

Substantially investing in recycling infrastructure within the EU, and facilitating economies of scale for processing plastic waste into secondary raw materials.

Eliminating plastic from millions of cans in the UK

Single-use plastics can be harmful if they end up in the environment. This includes the plastic six-pack rings used to hold together multipacks of canned drinks, such as beer. In the UK, HEINEKEN took on the challenge of finding an eco-friendly solution that would be durable, fully recyclable and plastic-free, while still meeting the demands of beer and cider drinkers.

After years of development and investment, HEINEKEN found its solution in an innovative cardboard topper. Called the 'Green Grip', this new topper is designed to minimise material usage and reduce waste. It is 100% recyclable and compostable and, importantly for consumers, is also robust and easy to grip.
This innovation was piloted at HEINEKEN UK's Manchester brewery and is being rolled out in the Tadcaster and Hereford breweries, for a total investment of £22 million (over €24.5 million and almost $30 million) in new technology and production facilities. This forms parts of HEINEKEN's commitment to eliminating all plastic rings and shrink-wrapping from its entire portfolio of beer and cider multi-pack cans in the UK by the end of 2021.

Together, the Green Grip topper and the removal of shrink-wrapping on consumer packs will eliminate over 517 tonnes of plastic waste annually – the equivalent of 94 million plastic bags.

HEINEKEN

Policy recommendations

Creating effective EPR schemes

We can improve circularity and generate more secondary raw materials of high quality by creating well-designed collection, sorting and recovery systems. These should be managed transparently and cost-efficiently, while also meeting EU- and country-specific recycling targets for various materials. For EPR schemes to succeed, a holistic approach is needed. Specifically, we advise:

Developing a new continuous improvement programme that includes sharing best practices for new and existing EPR schemes to ensure responsible sectors have sufficient authority and influence in each crucial processing phase.

Allocating a portion of the fees collected by EPR schemes to improve collection infrastructure. This will increase the scope and quality of what is collected, sorted and recycled, including packaging that is currently difficult to recycle.

Investing substantially in innovation to improve both the quantity and quality of recycled plastics. The emphasis should be on effective collection infrastructure and new sorting techniques that support automated plastic resin sorting and colour sorting.

Avoiding plastics being discarded as waste by allocating investments to waste management companies and recyclers that focus on upcycling.

Working towards zero landfill

There is a significant risk that the EU will not meet its plastic packaging recycling targets for 2025 and 2030[6]. To realise its new ambitions, substantial investments in recycling capacity are required. In the medium term, targeted investments would reduce the incineration of plastics, especially recyclable plastics, and the need for landfill. The ultimate goal would be to eliminate landfill. Specifically, we advise:

Substantially investing in the capacity to process plastics sustainably within the EU, by allocating substantial EU budgets as part of Green Recovery plans.

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Sustainable Production & Innovate Recycling

Every year, 25% of plastic waste in Europe is sent to landfills rather than recycled[1], constituting a major loss for the economy and the environment. Furthermore, any recycling that does occur can be very costly because waste materials tend to be complex and contaminated. Often, the only viable alternative is downcycling, with recyclers opting for lower-quality applications. Nevertheless, advanced recycling technologies can help close the loop and turn the linear plastic waste economy into a circular one.

Insights into the current situation

Creating new grades of plastic

Plastics are classified into seven main resin types[7]. However, in practice, there are many more types, adding to the complexity of plastics reprocessing. In 2018, around 80% of the plastics produced in Europe were made from naphtha, a virgin plastic raw material[1]. There is growing demand for oil, but reserves are limited. This scarcity drives the present-day need for plastics made from renewable resources, such as recyclates, bio-based feedstock and mixed-waste plastic. Current recycling rates are meagre. Of the 61.8 million tonnes of plastics produced in Europe in 2018[1], only around 7% (4.9 million tonnes) consisted of recyclates[8].

Producers can future-proof their business models by providing new, higher-quality plastic grades through mechanical recycling, advanced recycling or bio-based plastics. Initially, a new grade of plastic produced with one of these three methods is sold as premium-grade so converters and brand owners, in turn, can also sell their sustainable products as premium-grade. This development does, however, require a growing conscious consumer base that is willing to pay extra. Indeed, 74% of consumers are willing to pay

At DSM, we have made the ambitious commitment to deliver bio- and/or recycled-based alternatives for our entire high-performance engineering plastics portfolio. We will realise this through the contribution of key partners across the value chain. More broadly, only together – through collaboration and partnership – can our industry successfully transition toward a bio-based and circular economy.

Helen Mets
Executive Vice President
DSM Materials

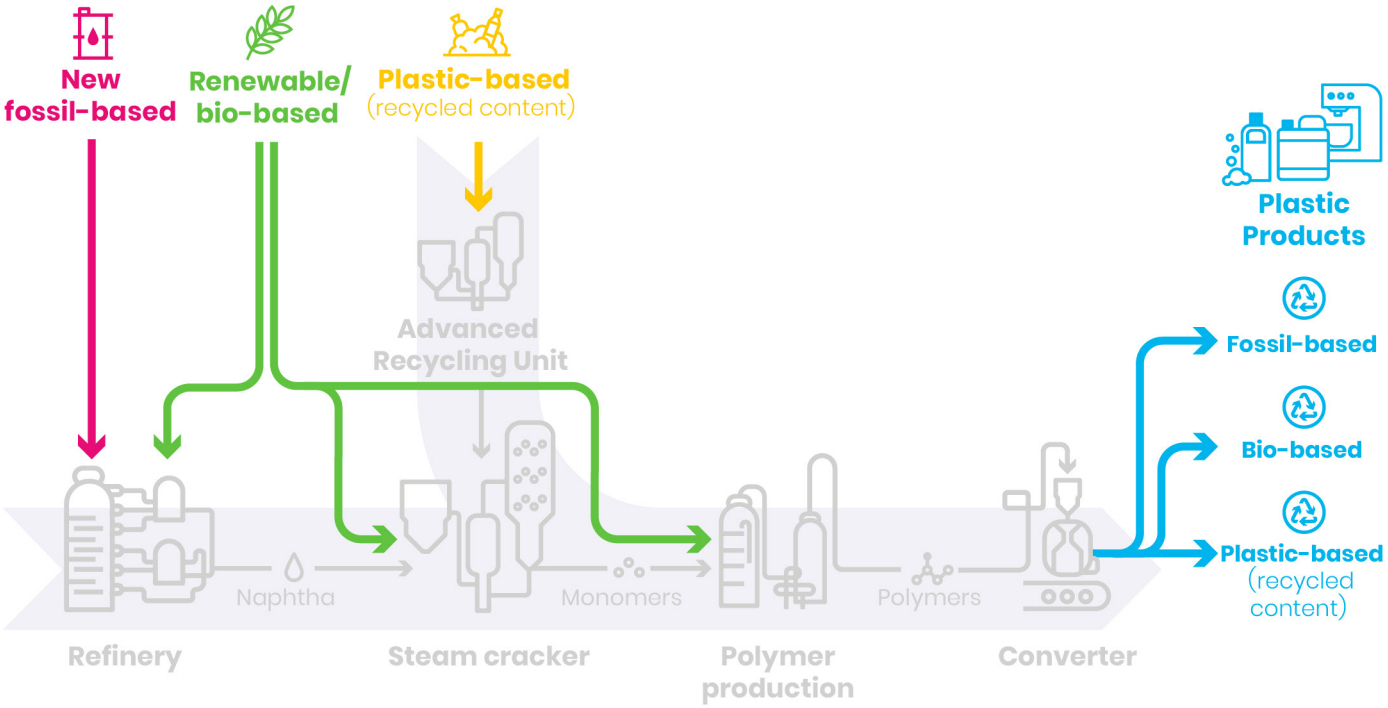
extra for sustainable packaging[9]. Ultimately, once the production of new plastic grades has been advanced and scaled up, they will be economically competitive with fossil-based virgin plastic.

At the moment, 99% of recycled plastics are recycled mechanically[10]. This method reprocesses plastic waste by shredding and remelting it into a new resin without significantly changing its chemical structure. The new resin can then be introduced back into the value chain. Mechanical recycling enables the recovery of conventional plastics such as PE, PET, PP, ABS, PC and PS.

At the same time, this method poses several serious challenges. For instance, it requires high-quality input streams from pre- and post-consumer markets. But post-consumer plastic waste input is diverse, complex and often contaminated, making the separation process unnecessarily expensive.

Another issue is downcycling: as a result of insufficiently high input quality, plastics are often recycled into applications with lower quality requirements, such as non-food-grade products. Because these recycled polymers are lower in quality yet more expensive than new, fossil-based plastic, the business case to use recyclates is negative across many sectors.

Figure 13
How plastic is made



Remaining challenges

Optimising plastic-to-plastic conversion technologies

Advanced recycling technologies, defined as plastic-to-plastic (P2P) or plastic-to-fuel (P2F), can offer a solution for plastics that are difficult to sort and process mechanically. These techniques make it possible to recycle mixed plastic waste streams that contain PE, HDPE, LDPE, PP, and mixed PP. They can break down mixed plastic waste into its base elements, making it possible to use them again as virgin-grade raw material. This is particularly advantageous for the food industry.

In total, there are five different types of plastic recycling method:

Mechanical recycling is the most common recycling method. It focusses mainly on a limited number of plastic resin types (e.g. PET, HDPE), as these types are available in sufficient volumes. The technique requires well-sorted input streams, washed and cleaned of additives to avoid impurities, that are then shredded into small pieces for re-use. Given the level of contamination and polymer degradation over time, mechanically recycled plastics are often downcycled and generally cannot be used for food applications.

Solvolysis is a solvent-based purification method that dissolves polymers and separates them from additives, colourants and other materials. This method is suitable for recycling, for example, expanded polystyrene (EPS) from the construction sector and processing it into clean PS. It can also be used to separate layers in multi-layer PE and PP packaging. Solvolysis is reasonably low-energy and has a high raw material yield. Its output is nearly virgin-grade.

Depolymerisation covers processes that break down plastics into their initial plastic building blocks (monomers), at relatively low temperatures. The monomers are then converted back into pure or near-virgin-grade polymers. However, this method is only suitable for a specific group of plastics called polycondensates, which includes polyesters or polyethers such as PET and PS. Depolymerisation also requires feedstock that is homogeneous and pure.

Pyrolysis is a thermal process using oxygen-free conditions and a temperature above 400°C. It converts plastics into smaller hydrocarbons such as diesel or naphtha, which can be the starting point for the production of new plastic. The process can cope with 'difficult-to-recycle' plastics, including mixed types of plastics. This allows plastics that would otherwise be too degraded or contaminated to be reintroduced into the production cycle for upcycling. Although pyrolysis has a high energy demand, it still leaves a smaller CO_2 footprint than the alternative of incineration. Moreover, companies such as LyondellBasell are working on improving the efficiency of pyrolysis by significantly lowering its energy usage and speeding up the conversion process.

Introducing sustainable alternatives for high-performance Engineering Materials portfolio

In their many shapes and forms, high-performance engineering plastics are a lever of modern-day quality of life. At the same time, most of these plastics are based on fossil resources, putting pressure on our environment. As such, end-consumers and regulatory authorities are increasingly demanding more sustainable alternatives – that is, materials that work better for both people and planet.

By leveraging a toolbox of different technologies and approaches – including fermentation or chemical conversion of bio-based feedstocks, mechanical recycling, and mass-balance accounting of bio-based and/or chemically recycled feedstock – DSM is developing sustainable alternatives for its entire high-performance engineering plastics portfolio. The full portfolio of advanced alternatives will contain at least 25% recycled and/or bio-based content (by weight in the final product) and be fully in place by 2030. Several key bio- and recycled-based grades are already commercially available.

By taking this ambitious step in its sustainability journey, DSM, together with its partners across the value chain, is enabling its customers to meet the demands of consumers and regulatory authorities and make more sustainable choices. Importantly, DSM's customers can easily shift to a more sustainable solution without having to retool or requalify materials and seize the sustainable opportunities ahead. A more circular and bio-based economy awaits!

DSM

Gasification is a P2F or plastic-to-chemicals conversion. It is a thermal process that is more flexible when it comes to feedstock. Non-recyclable mixed waste, including unrecoverable plastics, is heated or 'gasified' under low-oxygen conditions to produce synthesis gas. This gas can be a raw material for the production of chemicals such as methanol or fuel.

Every recycling method has its pros and cons and should be considered a specific solution to a particular problem. For example, if mechanical recycling is not possible, most countries see incineration as the next best alternative. However, the carbon footprint of an Advanced Polymer Reprocessing Facility (a-PRF) can be 21% smaller than that of a conventional Plastics Reprocessing Facility (PRF), where a significant proportion of plastics are incinerated or sent to landfill[11]. Hence, an a-PRF would be the better alternative.

Advanced recycling offers a range of potential solutions to the limitations of plastics as a circular material, providing a way to close the loop. The challenges that remain are defining what constitutes an advanced recycling technology, and scaling it up further.

Only by supplementing mechanical with advanced recycling methods can we reshape the management of plastic waste. Together, these methods can reduce annual plastic emissions from 233 to 144 million tonnes of CO2 per year[12].

Figure 14
Advanced techniques providing solutions

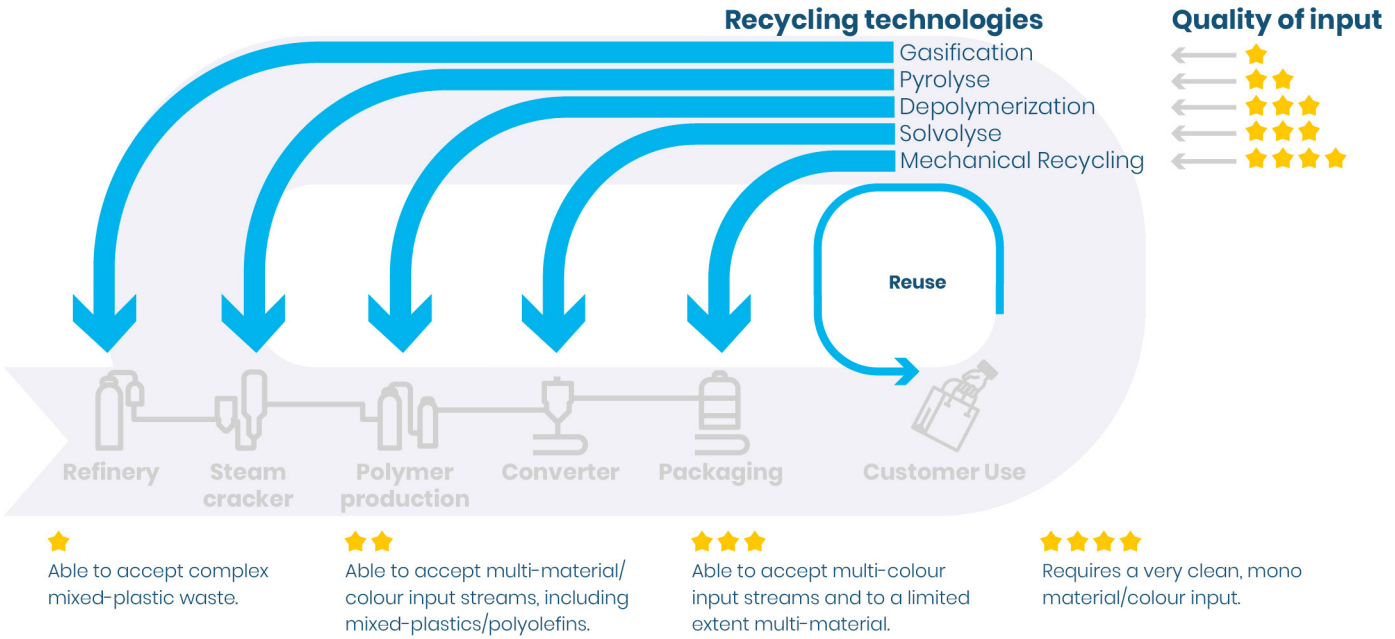


Figure 15
Mass balance

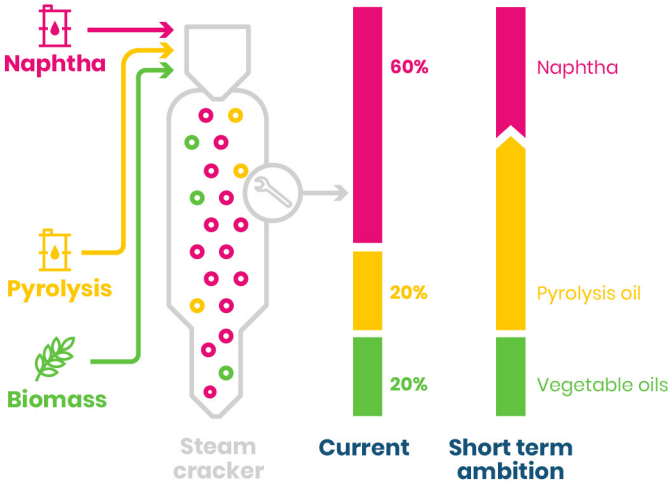


Table 1
Chain of Custody Models

	Examples of Supply Chains	Draft Product Claims
Identity preserved, physical segregation	Fully segregated Supply chain	Associated information with input/output
		Recycled plastic (>95%)
Mass balance/ Controlled blending	Blending recycled material	x% recycled plastic content
	Mixing of recycled feedstock	
Mass balance	Pyrolysis to feedstock	Product contains recycled plastic (possibly % + reference to details info)
	Depolymerization to plastics	x% recycled plastic content
Book and claim	Compensation of recycling (certificate only)	Contributes to uptake of recycled plastics materials

Mass balance approach

Mass balance is a system enabling the certification of circular polymers: plastic sold with the label 'bio-based' or 'recycled content' can be certified as such. A product only receives this certification if enough bio-based input is used in production. But, for production to run smoothly, a constant flow of feedstock is required. For this reason, recycled and virgin feedstock is often mixed during production using existing commercial equipment. This makes it impossible to identify the exact origin of a specific output stream. The mass balance system provides an interim solution to this issue, making it possible to calculate and measure the amount of recycled or bio-based content in an output stream.

Given the mass balance method as a potential Chain of Custody model, each tonne of mixed plastic waste fed into the cracker can be measured, and with it the amount of plastic output that can be classified as recycled. With the right agreements on how to use the method, it could become a certification system, and with the support of the right parties evolve into a standard.

Certification encourages plastics converters to re-use output from advanced plastic recycling technologies, since the material includes an assurance that the recycled content claim can be substantiated. Certification also guarantees reliable traceability and benefits brand owners, retailers and consumers. It opens the doors to trade and transfer materials within a specific market and internationally, making advanced recycling a more appealing option for feedstock producers.

Policy recommendations
Scaling up sustainable production & recycling innovation

Addressing unfair & unequal competition for renewable plastic

There is a strong need to drive fair competition by addressing price differences between recycled, bio-based, and new (fossil-based) plastics. There is also a need to address the incineration of plastics as a way of achieving renewable energy targets, something that is still allowed under the EU Renewable Energy Directive (REDII). Moreover, so-called 'recycled carbon fuels' made from non-recyclable plastics have been added to the national renewable energy targets for transport fuel. This addition incentivises recyclers to choose energy recovery over using the material to make new plastics. To deal with these issues, we advise:

Incorporating incentives into the REDII and the EU Chemicals Strategy for Sustainability (CSS) to process mixed plastic waste and biomass for new high-quality materials in the EU, thereby broadening the scope of the current stimulus for biofuels.

Reducing GHG emissions through circular plastic solutions

Scaling up advanced recycling technologies in the EU will significantly reduce GHG emissions (by up to 50% compared with incineration). That is why we advise:

Stimulating the competitiveness of sustainable action by rewarding reductions in GHG emissions across the value chain. This reward will create a strong business case for circularity.

Creating co-funding opportunities to scale advanced technologies for the chemical conversion of biomass and complex plastic waste to reduce GHG emissions.

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Everybody wins with circular chemicals: they help society since plastics that aren't currently recycled will be re-used, and they create great business opportunities for producers and customers. Shell's global ambition is to re-use one million tonnes of plastic waste every year by 2025. The Netherlands is well-positioned to play a key role in this sustainable innovation, thanks to its strategic location, excellent infrastructure and strong chemicals sector. We want to play our part and collaborate with others to make the Netherlands a *circular hotspot* and provide customers with more sustainable chemical products.

Marjan van Loon
President Director
Shell Nederland

Policy recommendations

Creating clarity around bio-based & biodegradable plastics & solutions for complex plastic waste streams

Because there are multiple forms of plastics, such as bio-based and biodegradable, certain types can appear more sustainable than they actually are. Clarity on this is desirable and necessary. Specifically, we advise:

Developing a clear policy framework for bio-based and biodegradable plastics, outlining the pros, cons and responsible application of these materials.

Phasing out substances of concern & developing sustainable alternatives

The EU can set global standards to ensure substances of concern, especially those of great concern, are phased out internationally. Specifically, we advise:

Developing new methodologies to track and minimise the presence of substances of concern in recycled materials, and facilitating the development of sustainable alternatives.

Accelerating the use of plastic waste as feedstock

Shell has a global ambition to use one million tonnes of plastic waste a year as feedstock for its crackers at its global chemical sites by 2025. This ambition builds on its commitment to address the societal challenges of plastics, as one of the founders of the global Alliance to End Plastic Waste.

Today, Shell uses pyrolysis liquid made from hard-to-recycle plastics in its ethylene cracker at the Norco chemicals plant in Louisiana (US). The fully circular, ISCC-PLUS-certified pyrolysis liquid is supplied by partner Nexus Fuels LLC, who will deliver 60,000 tonnes over the next four years. The liquid is used as feedstock for the production of chemical products.

Moreover, Shell Moerdijk in the Netherlands is now ready and certified to use feedstock made from plastic waste. As such, Moerdijk will play its part in realising Shell's 2025 ambition and providing customers in the Netherlands and the rest of Europe with circular chemical products.

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Policy recommendations

Recognising advanced recycling technologies

Governments should recognise advanced recycling as an innovation that can contribute to achieving EU recycling targets and SDGs. We should promote this new technology within the EU Waste Hierarchy and, to close the loop, promote plastic-to-plastic (P2P) conversion over plastic-to-fuel (P2F).

Various P2P conversion technologies are at different maturity stages, expressed in Technology Readiness Levels (TRLs). In addition, various vital sectors within the EU could jointly develop new sustainable solutions. For example, advanced recycling technologies such as depolymerisation, solvolysis, pyrolysis, and gasification can contribute to the EU's competitiveness and its circularity. Specifically, we advise:

Encouraging investments in advanced processing technologies, thereby developing a market for high-quality secondary raw materials.

Recognising advanced recycling technologies as a valuable and promising innovation and promoting them, both in general and by revising the EU Waste Hierarchy.

Composing a clear definition of what an advanced recycling technology is. A clear definition would contribute to national recycling targets because it avoids the confusion that can lead to inaction. For this reason, we recommend distinguishing between P2P conversion and P2F, and between plastic-to-chemicals conversion (output) and various distinct technologies, as this publication does.

Developing an EU standard for various Chain of Custody models. This standard will incentivise feedstock producers to bridge the gap between today's linear economy and the sustainable circular plastics economy of the future. Accurate traceability and verification measures can provide relevant and accurate information on the origin, processing, and more, of secondary raw materials.

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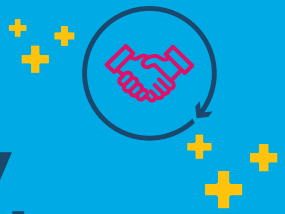
Conclusion Collectively Closing the Loop



If anything, this report demonstrates that there are already various substantial initiatives working towards realising a CE for plastics. All these initiatives have one thing in common: they bring together the entire plastics value chain. Indeed, this is because addressing the challenges surrounding plastic waste requires the collective knowledge, resources and efforts of multiple parties. These parties are:

Legislators. They range from the European Union to national governments, regional authorities, and municipalities. They can support the transition towards a circular economy by developing enabling legal frameworks and creating effective incentives to accelerate change.

Experts and academics. They are essential to initiating new research, collecting and creating new knowledge and insights, and developing a strong knowledge base from which new solutions can emerge. Knowledge and innovation are crucial.

Societal and non-profit organisations, trade & industry associations, and partnerships. They can ensure that the transition to a circular economy and the necessary solutions become a priority for governments, politicians, knowledge institutions and the business community. They can also provide neutral and independent fora for cooperation to develop and facilitate impactful, innovative solutions.

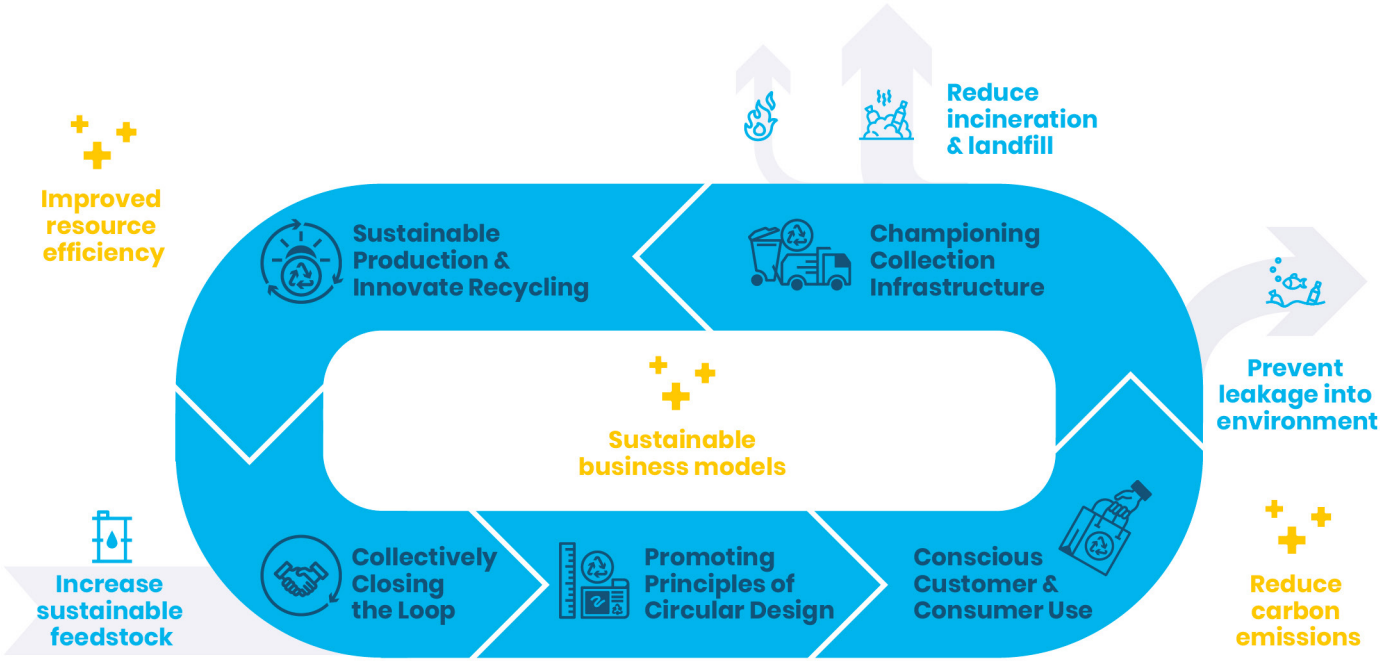
FrieslandCampina aims to have a positive impact. To us, good packaging does more than keeping food safe. It should also safeguard nature. When recycled back into new food safe packaging, plastic has a low CO_2 footprint and very limited impact on nature. This makes plastic a good candidate for a circular packaging economy.

Patrick van Baal
Global Packaging Development Director
FrieslandCampina

All business sectors throughout the plastics value chain (including raw material producers, converters, brand owners, waste collectors and processors, recyclers, and end-users). The whole business community should make it their responsibility to develop innovations using a holistic approach across the entire value chain that looks beyond their own position and processes.

All players should work towards shared solutions, adopting an overarching perspective across the entire value chain. Organisations can reform the plastics value chain by promoting circular design principles, encouraging conscious customer and consumer use, championing collection infrastructures, developing advanced sorting techniques, scaling up sustainable production, and adopting new advanced recycling technologies. This way, we can collectively close the loop.

Figure 15
Key interventions for a Circular Plastic Economy



Key interventions

Create scale through collaboration across the value chain	Ensure plastic will become new secondary raw materials.	Guarantee materials remain within a circular economy	Set up effective & harmonized collection systems	Scale renewable feedstock & advanced recycling

Looking towards a circular future

Going forward, the members of the DSGC underline the need for collective action to close various plastics loops, starting with a shared vision of a sustainable and circular future for plastics. We believe an enabling policy framework, cutting-edge knowledge and innovation, together with ambitious sector leaders, will generate breakthrough structural solutions. These solutions require an international outlook. We therefore recommend:

1 **Facilitating a circular economy in trade agreements** – Mainstreaming circular economy objectives in free trade agreements, in other bilateral, regional and multilateral processes and agreements, and in EU external policy-funding instruments.

2 **Prioritising a circular future** – Making substantial investments in innovation in the next fifty years to drive both the quantity and quality of recycled plastic, focusing on developing advanced infrastructures and new technologies for collection and sorting.

3 **Scaling solutions globally** – Promoting innovations in different parts of the world, from a shared ambition to accelerate the transition to a CE for plastics, keep value within a circular economy, and keep plastic waste out of the environment.

We are on the right track and recognise that parts of the solution can be achieved by simply putting this report's recommendations into action. At the same time, we acknowledge that there is still a long way to go, and urgent action is needed. Now is the time to power through and accelerate the transition towards a CE for plastics.

The first fully recyclable cheese packaging

FrieslandCampina introduced a fully recyclable and lighter version of the resealable packaging for cheese. With this, the company achieves a plastic reduction of 30% for its most sold cheese packaging in Europe. This can lead to a decrease of more than 300,000 kg of plastic per year and reuse in other applications. This is the first cheese packaging of its kind in the market.

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Key Reports

This DSGC-publication builds upon various key reports, including:

The Pew Charitable Trusts and SYSTEMIQ
Breaking the Plastic Wave

Ellen MacArthur Foundation
The New Plastics Economy: Catalysing action

Ellen MacArthur Foundation
The New Plastics Economy: Rethinking the future of plastics & catalysing action

European Academies Science Advisory Council
Packaging plastics in the circular economy

European Commission
A Circular Economy for Plastics

Centre for European Policy Studies
The Role of Business in the Circular Economy

World Business Council for Sustainable Development
The circular bioeconomy: A business opportunity contributing to a sustainable world

Initiatives

Existing initiatives that ambition to accelerate the CE for plastics (on alphabetic order).

Ellen MacArthur Foundation's New Plastic Economy initiative: Umbrella initiative containing

1. The New Plastics Economy Global Commitment, uniting over 400 organizations behind one common vision and an ambitious set of 2025 targets (e.g. 100% of plastic packaging to be reusable, recyclable or compostable, for more see link)
2. the Plastics Pact, a network of national implementation initiatives (UK, France and Chile so far) aligned around a common vision and set of ambitious targets, exchanging learnings and best practices across regions. They are an international think tank providing valuable insights through publications. Unilever, FrieslandCampina and Philips are a member.

European Circular Plastics Alliance On 20 September 2019, over 100 companies, organizations and public authorities signed a declaration to reach the EU target of re-using 10 million tonnes of recycled plastics in the EU by 2025. This alliance focusses on creating demand for recycled plastic and identify issues with regard to supply and quality. Unilever signed this declaration.

European Plastic Pact: Bringing together frontrunner companies and governments to accelerate the transition towards a European circular plastics economy. The Netherlands and France started this initiative, but over eighty other organizations (governments, companies, non-governmental organizations and business associations) from across Europe helped to shape the final text of the European Plastics Pact. Unilever and FrieslandCampina have signed this pact.

Global Plastic Action Partnership Existing statements, such as the New Plastics Economy vision, which has been endorsed by more than 1000 organizations since its launch, and the call for a UN Treaty on Plastic Pollution, backed NGOs by 29 major global companies. UK , Canada, Dow, Pepsi Co, Coca Cola, Nestle.

Legal Limits on Single-Use Plastics: According to a report from UN Environment more than 127 countries have adopted some sort of legislation on plastics bags as of July 2018. They focus on plastic bags, learning opportunities and substitutions effects.

NextGen Cup: First initiative of the NextGen Consortium, a partnership of food and beverage industry leaders (such as Starbucks and McDonalds), to address single-use food packaging waste globally. They drive new models for packaging beverages by adopting a three-stage approach:

1. identify high-potential cup solutions,
2. test them and provide resources and expertise,
3. match solutions to value chain partners and provide piloting opportunities.

Plastic Pact NL The Dutch Plastic Pact is an agreement between the Ministry for Infrastructure and Water Management and companies positioned in the plastic value chain. Goals until 2025 include producing 100% recyclable plastics or reducing plastics volume by 20%. The focus of the pact is to be a frontrunner on design for circularity, consumer behavior changes and public – private collaboration. FrieslandCampina, HEINEKEN, Unilever and Philips signed this pact.

PREVENT Waste Alliance The alliance, with prevention as a main driver, consists of 30 (mostly German) organizations from the private sector, academia, civil society and public institutions contributing to minimize waste, eliminate pollutants and maximize reutilization of resource.

SAP's Plastics Cloud A data-driven solutions pilot-program launched by SAP to help reduce and eliminate waste of single-use plastics. First phase focused on collecting existing and live data from across the UK plastics supply chain as source for new ideas of waste reduction. As second phase, SAP is working on new global marketplace or suppliers of recycled plastics and plastic alternatives (via its Ariba Network).

The Alliance to End Plastic Waste (AEPW) The AEPW is made up of over 40 global companies that committed to invest $1.5 Billion over the next five years to develop, deploy and scale solutions that will minimize and manage plastic use and waste.

Colophon

DSGC Publication 'Transition Time! – A Circular Economy for Plastics' Published by The Dutch Sustainable Growth Coalition (DSGC), 2021.

The Dutch Sustainable Growth Coalition (DSGC) is a CEO-led coalition of eight Dutch multinational corporations: Thierry Vanlancker (AkzoNobel), Geraldine Matchett and Dimitri de Vreeze (DSM), Hein Schumacher (FrieslandCampina), Dolf van den Brink (HEINEKEN), Pieter Elbers (KLM), Frans van Houten (Philips), Marjan van Loon (Shell) and Annemarieke de Haan (Unilever). The DSGC is supported by the Dutch Confederation of Industry and Employers VNO-NCW with president Ingrid Thijssen and facilitated by Accenture with country managing director Irine Gaasbeek. Chairman of the DSGC is Jan Peter Balkenende.

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