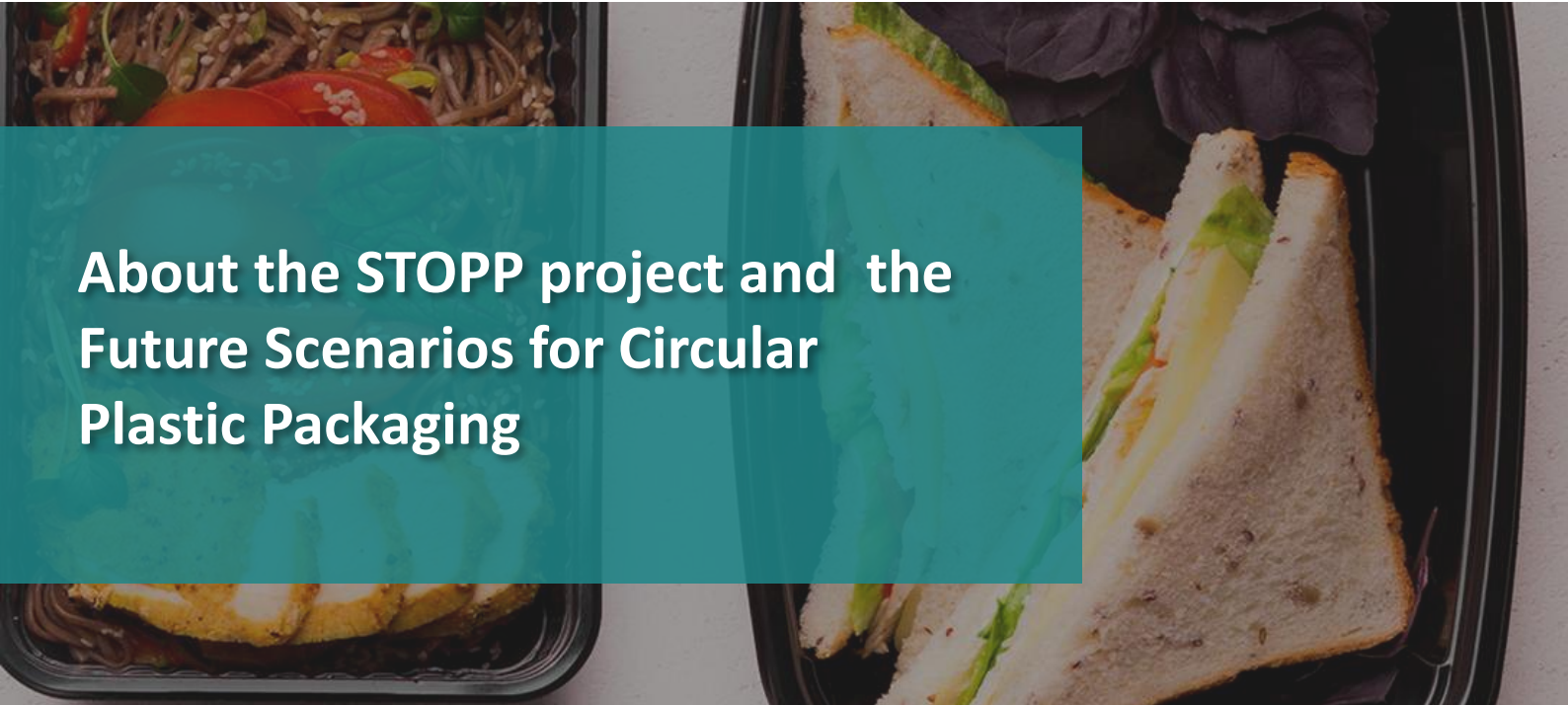




Future Scenarios for Circular Plastic Packaging: A Strategic Outlook





About the STOPP project and the Future Scenarios for Circular Plastic Packaging

The STOPP Project

The [STOPP project](#) aims to revolutionise food plastic packaging by implementing the “5 Rs”: Refuse, Reduce, Redesign, Reuse, and Recycle. Its primary goal is to minimise the environmental impact of plastic waste in line with the EU’s Packaging and Packaging Waste Directive. STOPP seeks to develop several training materials and strategies that support circular economy solutions in the packaging industry. By engaging stakeholders across the value chain, the project focuses on innovative recycling methods, reusable packaging systems, and consumer awareness to drive a large-scale shift towards sustainable food packaging.

The Future Scenarios for Circular Plastic Packaging

This document explores future scenarios for circular plastic packaging within the framework of the STOPP project, which aims to reduce the environmental impact of food plastic packaging through the principles of Refuse, Reduce, Redesign, Reuse, and Recycle. Aligned with the EU’s Packaging and Packaging Waste Directive, it examines four potential trajectories shaping the industry between 2025 and 2040, influenced by consumer behaviour, regulatory developments, and technological advancements. By analysing different approaches—ranging from convenience-driven models to strict regulatory enforcement and collaborative circular economy strategies—the report provides insights into how businesses, policymakers, and stakeholders can navigate the evolving landscape of sustainable packaging solutions.

Scenario 1

Pack it easy!





Scenario 1 - Pack it easy!

In a world where efficiency reigns, food packaging is optimized for convenience. Consumers favour lightweight, easy-to-use packaging that facilitates quick transactions and minimizes hassle. Ecommerce growth leads to packaging designed for rapid delivery, often at the expense of sustainability. Brands focus on practical solutions that meet immediate consumer needs, sidelining environmental considerations.

Key drivers of this scenario

This scenario emphasizes individual aspirations, convenience and efficiency, where consumers prioritize unique packaging that reflects personal identity and brand differentiation. The focus is on single-use, convenient and customized packaging,

Scenario deep dive

Food consumption practices:



In this scenario, food packaging is a means of selfexpression for consumers. Choices are driven by personal values, tastes, and lifestyles, leading to a diverse range of packaging options that reflect individual identities. Brands focus on customization, allowing consumers to tailor products to their preferences. This trend emphasizes the importance of packaging as a reflection of personal identity rather than just functionality or sustainability.

Scenario 1 - Pack it easy!



Packaging features:



Packaging is designed for busy lifestyles, focusing on ease of use and functionality. Products are packaged in a way that facilitates quick consumption, with smaller, user-friendly sizes that cater to on-the-go eating. With an emphasis on efficiency, packaging also offers a means to deliver real-time information about products, including sourcing, nutritional content, and allergen information.

Intelligent sensors and indicators also allow manufacturers to monitor factors such as temperature, humidity, and shelf life in real time, thereby minimizing the risk of spoilage and contamination. Packaging features stress accessibility, including resealable closures to keep food fresh while on-the-go; light weight and flexible packaging like stand-up pouches.

Policy and regulations:



In this scenario, there is minimal regulatory guidance on sustainability. New regulation focus on health and safety for individual consumers.

Sustainability emphasis:



In this scenario, sustainability is secondary, and recycling efforts are streamlined but not prioritized. Consumers do value sustainable packaging, but they feel it is the brand's responsibility to provide it. Brands incorporate recyclable materials and promote the recyclability of the packaging. Chemical recycling is increasingly used.

What does this mean for the key stakeholders of the plastic packaging value chain?

Scenario 1 - Pack it easy!



For plastic producers:



In this scenario, plastic producers do not face challenges related to increased legislation. To make plastic packaging convenient for consumers but also efficient in resource use, mono-material packaging design is highlighted in importance. For a range of different forms of packaging that are convenient for customers, the waste stream can be homogenized by simplifying material usage with mono-material packaging.

Biobased raw materials also offer convenience for consumers while sustainable. Challenges in this scenario are related to communication with consumers; how to inform the consumer on the composition of the packaging and its intended disposal route.

For reuse operators:



In this scenario, Reuse operators concentrate on the service and the superiority of reusable packaging compared to single-use packaging. Reuse operators understand end-users and their needs and wants in addition to the reuse operator's customers, such as restaurants, as they are the drivers in the market in this scenario.

Accordingly, the reuse operators concentrate on designing better-looking packaging solutions that are easy to wash and transport efficiently to compete with more convenient single-use packaging. They compete with efficient bulk packaging with safe and good-looking packaging creating e.g. social value for the end-users. At the same time, reuse operators highlight the convenience of their solutions. Communication becomes the key: it is crucial to inform customers on how the reuse system works, what benefits it has and why the system is superior to SUPs.

As legislation on sustainability of the packaging is limited in this scenario, sustainability of reuse is not playing a large role in communication, but the individual needs are linked to social or emotional value, and the safety or convenience aspects of the system is highlighted.

Scenario 1 - Pack it easy!



As legislation on sustainability of the packaging is limited in this scenario, sustainability of reuse is not playing a large role in communication, but the individual needs are linked to social or emotional value, and the safety or convenience aspects of the system is highlighted.

As reuse operators concentrate on the quality of the service, the whole value chain from production to use cycles and return logistics is planned to be as seamless as it possibly can. The value for each actor is highlighted as well – there cannot be actors who do not benefit from the system. The system is built as efficient as possible to compete with the efficiency of use and dispose – models. An efficient and convenient system would mean e.g. a deposit-free system that is accompanied by multiple collection points, possibly intuitive tracking of the packaging and logistics, which ensures the efficiency of the system.

In this scenario, the challenge is whether reusable packaging can be further scaled up so that the solution becomes feasible and desirable financially. As the regulation on sustainability is minimal in this scenario, reusable packaging cannot rely on legislation i.e. legislation does not help the reuse operators to sell their solution with the sustainability aspect. At the same time, it is very difficult to get financial support to establish and scale up such a system, as there is limited push on sustainability to drive the change towards reuse.

For recyclers:



Recyclers activities in this scenario are related to building networks around the efficient handling, collection and sorting of packaging. Users are part of a bigger network to make it functional. Challenges in this scenario are the shift from linear models and massification to better source segregation, as well as finding and developing efficient technologies to recycle, while convenience and efficiency are the prevailing defaults for recycling businesses.

The opportunities here is to develop the sorting processes so that consumers become part of the networks, and the efficiency for them increases up the second value chain, as well as better data management, and the possibility of developing Digital Product Passport.

Scenario 1 - Pack it easy!



For policy makers:



In this scenario policy makers face specific challenges: making consumers act sustainably without emphasizing it as it is not the main concern of individual. The challenge is in making environmental sustainability part of everyone's personal values while navigating cognitive dissonances among citizens: what they are doing vs what they think they are doing.



Scenario 2
Sustainably yours!



Scenario 2 - Sustainably yours!

This scenario reflects a shift towards personal values influencing consumer choices. Individuals prioritize sustainability and demand packaging that aligns with their eco-conscious lifestyles. While efficiency is still important, the emphasis is on creating a personal connection with consumers through sustainable practices, leading to a more environmentally friendly packaging landscape.

Key drivers of this scenario

This scenario emphasizes individual aspirations, and the industry offers a portfolio of alternative responses to meet consumer demand.

Scenario deep dive

Food consumption practices:



Consumers are motivated by personal values and sustainability, seeking products that reflect their commitment to environmental responsibility while still focusing on personal experience.

Packaging features:



In this scenario we witness an Increased use of bioplastics and biodegradable plastics. Brands also explore innovative, reusable, and refillable packaging options.

Scenario 2 - Sustainably yours!



Policy and regulations:



Regulations are less prescriptive, allowing for more market-driven solutions. The focus might be on providing consumers with choices, with less emphasis on mandatory sustainability practices, unless there is a clear consumer demand for such options.

Sustainability emphasis:



In this scenario packaging displays clear labelling and information about the environmental impact of packaging materials, allowing consumers to make informed choices. Industry combines a mix of mechanical and chemical recycling solutions.

What does this mean for the key stakeholders of the plastic packaging value chain?

For plastic producers:



In this scenario, the main challenge appears to be in reaching a consensus across the whole value chain of what is sustainable and what is not. Finding a strategy that fits consumer expectations on sustainability as well as is sustainable for both the environment and businesses in the value chain. Managing the changes in strategy and business models and aligning these strategies across the value chain are of key importance. Clear communication with the individualistic end-users is crucial as the most sustainable practices in each case are not always instinctual.

Scenario 2 - Sustainably yours!



For reuse operators:



In this scenario, reusable packaging operators concentrate on knowing their customers, transparent communication of how their product align with customer's values, high quality of the product, being a more convenient solution than SUPs and fully focus on the company's target in the operation.

In the scenario, packaging is more local and less standardized reuse systems are established to ensure short distances between different facilities along the value chain, such as a restaurant and a washing facility, if restaurant does not wash the packaging themselves. The more local systems and high-quality packaging are enabled by the consumers that are driven by their internal values and choose reusable packaging to actualize their values.

As the efficiency of the system is not the primary focus, systems in place offer more analog solutions, with no tracking or tracing of the packaging. However, the system benefits from being a deposit-based solution. As there is competition between different service providers, customer and consumer convenience is highlighted. Competition affects the price of the reusable solution as well – high quality, but relatively low price.

As in this scenario sustainability may be a customer's personal value, but not a collective driver of sustainable packaging strategies, reuse operators concentrate on satisfying the needs of the customers by offering packaging that relates to their values. Thus, transparent communication and proving that reusable plastic packaging is the most sustainable and also a safe alternative becomes increasingly important. The proofing might involve testing, LCA's, or other ways to scientifically prove the superiority of reusable packaging in comparison to SUPs.

Scenario 2 - Sustainably yours!



For recyclers:



With conscious consumers, it is easy for the companies to conduct actions that make them understand the consumer better and create recycling incentives that are easily adopted by the motivated consumers. With motivated consumers it is also possible to develop bio-plastic solutions and new standards regarding production and packaging.

Challenges, however, are between the different stakeholders, for example in how to find common agreements to adopt common standards, so that the change is truly sustainable, and consumers can trust the information provided by the manufacturers. In this scenario legislation and policies, such as ESPR and ISO standards improve this mutual approach.

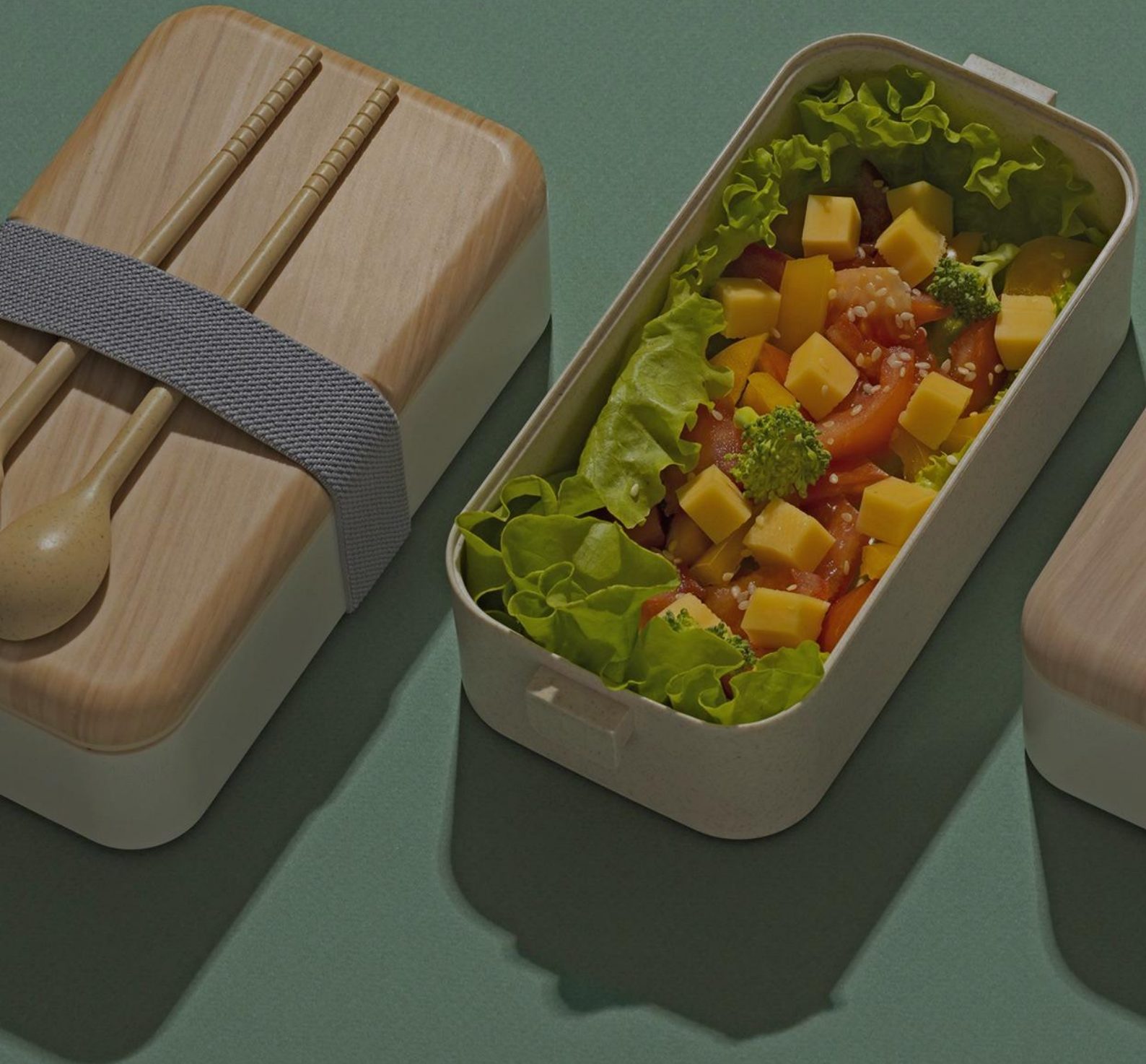
For policy makers:



In this scenario policy makers use consumer's motivations and interest to act sustainably to formulate more ambitious targets for regulations related to sustainable packaging impact. Greenwashing claims are however a growing concern for policy makers.

Scenario 3

Green by law!





Scenario 3 - Green by law!

In response to growing environmental concerns, governments implement stringent regulations on food packaging. Companies adapt by streamlining operations to comply with these regulations, focusing on efficient production methods that minimize waste. While this scenario enhances compliance and reduces environmental impact to some extent, the primary motivation remains efficiency rather than a genuine commitment to sustainability.

Key drivers of this scenario

This scenario emphasizes collective consciousness and efficiency/optimization.

Scenario deep dive

Food consumption practices:



In this scenario consumers are likely to engage in collective buying and resource-sharing practices, emphasizing community wellbeing and sustainability over individual preferences.

Packaging features:



Initiatives to standardize materials across brands are introduced to improve recyclability and efficiency in processing. More packaging is designed with mono-materials to simplify recycling processes, as mixed materials complicate sorting and recycling.

Scenario 3 - Green by law!



Policy and regulations:



Stronger Packaging Waste Regulation, mandate the use of recycled content and set standards for food safety in packaging. Many fossils fuel based, and non-recyclable packaging materials are now banned, and companies face heavy taxes and fines for packaging that is not recycled.

Regulations are drafted to balance sustainability with economic viability, ensuring that packaging solutions are not only environmentally friendly but also affordable for consumers.

Sustainability emphasis:



In this future, there is a significant shift away from plastic packaging. Consumers demand climate friendly packaging solutions, and brands innovate to meet these expectations. Reusable and recyclable packaging becomes the norm, supported by a well-established infrastructure for returning and reusing materials. This scenario reflects a collective movement toward environmental responsibility, where packaging is designed not only for functionality but also for its ecological impact.

What does this mean for the key stakeholders of the plastic packaging value chain?

Scenario 3 - Green by law!



For plastic producers:



In the green by law scenario, a lot of material development is expected from plastic producers. Navigating dynamic regulations is expected to be a challenge for both product development and business strategies. Resistance from consumers may add to the challenge of complying with expectations from different directions. New requirements for materials also set new requirements for sorting systems and the whole value chain which is why the value chain is “forced” to coordinate. Increased reuse also requires product development from plastic producers.

For reuse operators:



Sustainability legislation helps reuse operators to scale up. As reusable packaging is part of legislation, reuse operators benefit from taxation that is allocated to support packaging reuse.

As all the functions are streamlined for efficiency, reuse operators have streamlined their operation to scale up rapidly. Mandatory standardization of the packaging and collective use of collection and/or washing points are in place, combined with the establishment of a dense network of packaging collection points.

As the reusable packaging is pushed by regulation in restaurants and in retail, packaging is produced at lower price without sacrificing the safety of the packaging. The government allows and even mandates recycle use in recyclable packaging, to lower the costs of the packaging.

Consumers' individual values or aspirations play a smaller role in this scenario, but the convenience of the solution is nevertheless valued, to ensure consumers return the packaging.

Scenario 3 - Green by law!



For recyclers:



In this scenario, legislation is driving all of the activities. Companies consult and help their customers to change their actions to correspond to the requirements of the legislation. Well-translated, ambitious legislation motivates the recyclers and forces the industry to look for ways to improve recycling efforts. Another opportunity lies in building synergies to improve cost efficiency and incentivize mutualization of assets and development of common standards.

For policy makers:



In this scenario policy makers try to find a balance between food and safety regulations and ambitious recycling procedures. Stronger regulations (i.e.: taxes for single use) have been developed. Practical solutions have been analyzed, having in mind different variables (possibilities to insert a certain process/technology in a society for instance).

Policy makers have relied on powerful public discourses, in which media attention can be easily caught to rally the cause. On remaining challenge is to make sure that consumers do not exit the collective buying and resource sharing at the first chance.

Scenario 4 Circular synergies!





Scenario 4 - Circular synergies!

This future scenario emphasizes the importance of collective action among stakeholders in the food packaging sector. Through collaboration, the industry develops resilient solutions that prioritize sustainability and adaptability. Innovations in sustainable materials emerge as a result of partnerships between brands, consumers, and regulators. The focus shifts towards creating a circular economy, where packaging is designed for reuse and recycling, fostering community involvement and long-term sustainability.

Key drivers of this scenario

This scenario embodies a collectivist approach with a strong emphasis on resilience.

Scenario deep dive

Food consumption practices:



In this scenario, a collectivist mindset prevails, emphasizing resilience and sustainability. Consumers are driven by a desire for climate-friendly practices, leading to widespread adoption of reusable, compostable, and recyclable packaging. This reflects a societal shift towards collaborative transformation in packaging practices.

Purchasing decisions are often influenced by social norms and community values. Consumers may be more inclined to support brands that demonstrate social responsibility and contribute to community welfare, leading to a preference for packaging that reflects these values.

Scenario 4 - Circular synergies!



Packaging features:



The scenario envisions a future where sustainability is seamlessly integrated into the food packaging lifecycle with a strong emphasis on using a portfolio of recyclable, biodegradable, or even edible materials. We see the emergence of alternative approaches, such as packaging made from edible materials, such as seaweed or starch, which can reduce waste significantly.

Policy and regulations:



Regulations become more stringent regarding packaging sustainability and waste management, reflecting societal norms that prioritize the common good. Governments implement policies that encourage or mandate the use of reusable and recyclable packaging, aligning with collective values.

Sustainability emphasis:



This scenario emphasizes collaboration among industry stakeholders to create a circular economy, where packaging materials are continuously reused and recycled. The focus is on creating a sustainable system that minimizes waste and maximizes resource efficiency. Brands provide clear instructions to consumers on how to properly dispose of packaging. Education on the benefits of reusable and recyclable packaging has shifted consumer habits towards more sustainable choices.

What does this mean for the key stakeholders of the plastic packaging value chain?

Scenario 4 - Circular synergies!



For plastic producers:



In the circular synergies scenario, material development and new materials are at the core and the whole value chain has successfully adapted to these changes. Materials and products designed for circularity offer opportunities. Challenges are heavily concentrated on cooperation in collective action.

For reuse operators:



This scenario is the golden age for reusable packaging. However, in this scenario, there is a stronger competition between different solutions. Value creation and capture models have become increasingly important.

As consumers are driven by sustainable values and seek social value from the packaging they use, the packaging is designed in a way that allows consumers to experience its social value. Communication and operations of the reuse operators are transparent – they inform their customers (e.g. restaurants and retailers) and end users of their sustainability impact. As sustainability is in the forefront, reusable packaging operators have redesigned their value chain and its sustainability aspects to keep their communication transparent. They have incorporated campaigns that also promote social sustainability. In this scenario it has been easier to establish and scale up reuse systems, as consumers can quickly adapt to the reuse system even at the cost of convenience, if they experience that it is the most sustainable way.

Scenario 4 - Circular synergies!



For recyclers:



The activities in this scenario challenge the recyclers to expand their role. Designing materials fulfilling the new requirements by law, preparing collective activities, and extending the current technologies for new materials and beyond recycling are different approaches to it. However, to get everyone engaged has been challenging.

Opportunities lie in partnering, and thus gaining valuable information in, for example, new materials. Moreover, product innovation, adoption of Safe and sustainable by design (SSbD) approaches, and encouraging the use of bio-based materials have offered new opportunities.

For policy makers:



In this scenario, regulation includes combined approaches to support a portfolio of recycled, recyclable, compostable packaging, Clear, pedagogical communication about new processes and practices have been developed.

Different collaborative platforms have been created to enhance communication between consumers policy makers and the different actors of the value chain. Policy makers are increasingly involved in various public private partnerships with different actors of the value chain (at city, and regional levels). Policy makers focus on stronger rewarding laws for positive behaviour.



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