

Individual, reliable, mission-focused

Sovereign value cycles in the food industry

A sustainable and resilient food industry

A task for society as a whole Germany is faced with a huge transformation process to transition its economy and society to a circular system and reach a sustainable state by 2050. In its Sustainable Development Goal (SDG) 12, the United Nations addresses sustainable development in areas including production and consumption and the supply of safe food. At the European level, the Green Deal and the Circular Economy Action Plan, which was updated in 2020, have set out additional key guiding principles over the coming decades. These are not about developing individual regions, but about the principles of how economic activity is carried out. Germany's fourth largest industry, the food industry, is playing a central role in this transformation process. The role of the circular economy and bio-economy in tackling the upcoming technological, structural and regulatory challenges is just as important as the secure supply of raw materials and the resilience of the value chain.

CIRCONOMY® – mission-oriented, industry-wide and supra-regional networking initiatives to transform the food industry

Existing networking initiatives focus on the industry-specific or technology-specific interaction of research and industry. What is missing in practice is the mission orientation set out by the Commission of Experts for Research and Innovation (EFI) as a requirement in its 2021 report. Through the CIRCONOMY® brand, Fraunhofer is addressing this requirement and pooling R&D capacities and expertise in multi-disciplinary, multi-sector and mission-led networks, the CIRCONOMY® Hubs, which are not geographically limited in scope.

Through individual, highly agile groups, they provide integral support to the food industry as a lead market in urgent areas such as securing the supply of safe food. This drives crucial innovation policy objectives for Germany and Europe.

Sovereignty as a prerequisite for resilient value chains in the food industry

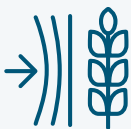
Traceability, sustainability and, above all, resilience need to be considered and rethought in volatile value chains in the food industry to achieve the transition to a sovereign supply of safe, healthy and tasty food and to achieve the acceptance of society. Digitalization offers significant potential to design the value chains sustainably, and is viewed as a central tool for interaction, integration, analysis, synthesis and optimization that forms a crucial foundation for CIRCONOMY®, too.

Your path to the circular economy

1. Common profiling and networking for the food industry as a lead market
2. Establishing industry-wide, supra-regional networking
3. Mission-oriented, agile cooperation in a reliable data space
4. Tailored proposals for solutions



The focus within the food industry

Waste minimization	Food safety	Packaging	Sustainable food	Resilience
 <p>Minimizing food waste in harvesting and production through digital monitoring and plant control. Improving the available data for identifying and quantifying residual and ancillary flows and quality assessment for alternative uses.</p>	 <p>Creating transparency and traceability through digitalization. Using "intelligent" packaging (e. g. with deterioration indicators) and using intelligent systems to continuously and thoroughly ensure an adequate hygiene status.</p>	 <p>Establishing new recyclable and biodegradable packaging systems and packaging reuse systems as well as minimizing food and packaging waste. Putting new material and chemical recycling processes into practice.</p>	 <p>Production of healthy and tasty ingredients and food by:</p> <ul style="list-style-type: none"> ■ Exploiting new sources of raw materials (e. g. alternative protein sources) ■ Establishing new cultivation systems with small CO₂ and water footprints ■ Utilizing new production processes 	 <p>Establishing resilient production systems through:</p> <ul style="list-style-type: none"> ■ Risk assessment and monitoring ■ Decentralization to create modular, agile production facilities ■ Digitalization of value chains

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The transition to a circular economy requires systemic innovations as well as a value system that takes into account monetary aspects of sustainability impact and therefore the added ecological and social value of value cycles. This will also enable producers and consumers to make sustainable decisions. The CIRCONOMY® Hubs will address the multi-layered challenges of the future to put robust solutions, such as maximizing the use of ancillary flows, closing carbon cycles, high-quality recycling and suitable methods of assessing sustainability, on the path to industrial use.

Sustainability in the food industry – a holistic approach

A holistic approach to the transformation to a sustainable food industry is key to protecting our natural resources, and therefore an integral part of reducing greenhouse gas emissions. In the food industry, volatile supply networks pose the challenge of reconciling the techno-economic obstacles with the increased quality standards for the secure supply of safe food. This will involve expanding the existing standards and ensuring increased transparency and therefore also sovereignty of food supply. To achieve this, we need to focus on five priority areas.

Fraunhofer as a key partner for the food industry

From detailed industry-specific issues to production systems using multiple technologies, our experts in the different institutes are able, thanks to our internal network, to deal with a wide range of concerns in the food industry. Our expertise in sustainability assessment, digitalization and data management, circularity, food innovation, manufacturing engineering and process development allows us to create customized innovations for sovereign value cycles and to design them sustainably. We tackle these fundamental issues in the form of R&D research projects and collaborations with industry, pooled in the CIRCONOMY® Hubs.

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