KEY PRINCIPLES FOR VALUE NETWORK COLLABORATION ENHANCING CIRCULARITY

A set of guiding key principles to foster collaboration in a value network to increase circularity in the European chemical sector.

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Guidance

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Key principles for value network collaboration enhancing circularity

This document outlines a set of guiding key principles to foster collaboration in a value network to increase circularity in the European chemical sector. These guiding principles are intended to help set an agenda for value chain partners to initiate a dialogue aimed at identifying the steps that should be taken by the diverse stakeholders—both directly involved (e.g., feedstock suppliers, product manufacturers) and indirectly involved (e.g., policymakers, consumers)—to improve circularity within the specific value network.

From a value chain to a value network thinking

Traditionally, within a linear economy value is added to a product as it moves from one actor to the next along the value chain. Each actor of the value chain aims to maximise its own profit and interacts predominantly with the value chain actor after him. This results often in a disconnect between early and later stages of the value chain and missed opportunities to enhance a transition to low-carbon circular products.

Circular economy focuses on making the linear value chain circular via an increased cooperation among value chain partners enhancing the application of the different R-strategies (refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose, recycle, recover (see Table 1).

Circularity can be much further optimized by looking beyond specific value chains and thus focusing on the optimized use of the value of resources, materials and products within value networks, where there is collaboration between all actors of the traditional value chain and with other sectors.

Key principles

Identify all the relevant stakeholders in the value network and beyond

- Start by listing all relevant stakeholders in the value network. Then identify the key stakeholders—those who are critical to the project's success and those who might present a risk to it. Don't forget SMEs.

Look for shared ambitions between stakeholders that entail win-win situations to drive the collaboration

- Try to identify any obstacles or hurdles faced by a stakeholder that could be addressed simultaneously by tackling an obstacle or hurdle for another stakeholder as well. Win-win solutions that contribute to circularity and that makes economic sense for two or more parties will help drive collaboration. Also, list possible threats, hurdles and barriers. Are there any opposing interests, and how might these be addressed? What might be the important hesitations of the least convinced stakeholder?

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Make clear why collaboration would be useful, and which issues need to be tackled

- What is the goal of the collaboration? What are the desired outcomes? What are the issues and hurdles that need to be addressed?

Share information on technology status, barriers, logistical challenges, legislative framework hurdles

- Share information along the stakeholders that is necessary for the value chain collaboration, while respecting competition compliance and the protection of confidential information. What is the status quo? Consider aspects such as technological information that is allowed to be shared, barriers to certain technologies, gaps in knowledge and expertise, logistical, sorting, and collection challenges, permitting duration and uncertainty, hurdles in legislative frameworks, etc. Is there an economy of scale that can be achieved through harmonisation, for example, in the supply of circular/low-carbon feedstock, leading to more affordable products?

Agree on how to share necessary data transparently and with integrity via harmonised methodologies

- Decide what data are necessary for transparent collaboration and ensure that the data have been collected and calculated using the same harmonised methodologies.

Design for circularity in possible solutions and apply integrated process development (LCA thinking, R strategies)

- Use design for circularity frameworks when rethinking products such as the 10 R-strategies (see Appendix) and use LCA to compare the impacts of each product solution
- Assess how the Refuse, Rethink and Reduce strategies are applied to this product and how these strategies can be strengthened?
- What are the different materials utilised in a product? What is the purpose and performance needs for each of these? Are they necessary? Can they be replaced by more circular materials? Are there other solutions/product that are more circular and have a lower LCA footprint that can provide the same functionality? Can the weight or volume of 1 of the materials be decreased?

Design for longevity & increase number and length of lifetimes of a product

- Design a product to be durable and so the number of lifetimes can be increased in the Use phase.
- Assess the reusability, repairability, and possibilities for repurposing and remanufacturing the product and how can it be improved?
- Assess how logistics can be provided or improved to better facilitate Reuse, Repair, Repurpose and Remanufacture

Design for recycling

- Assess the recyclability and recovery possibilities of the product and identify how these can be improved. For example, how can the product be designed for easier disassembly into separate materials, and how can the sorting, collection, and recycling of each material be improved?
- Evaluate how logistics can be provided or improved to better facilitate Recyclability and Recovery, as well as Repair, Repurpose, and Remanufacture.
- Assess the recyclability & recovery possibilities of the product and how it can be improved.

Inform relevant stakeholders, including consumers, policymakers, and society at large, through multiple channels

- Inform stakeholders generally on circular economy and more specific knowledge with scientific evidence on pro and cons of certain products and materials and on the hurdles for circularity and how they can be addressed? Possible channels could be social media, trainings and workshops.
- Which knowledge should be shared to reach the goals of this collaboration?

Which stakeholders of the following (non-exhaustive) could be relevant to include?

- Investors & shareholders, Leadership team, Employees, Local, national and European governments, Upstream suppliers, Downstream customers (SMEs and multinationals), Partner associations, Competitors, Consumers, Sorters, Collectors, Recyclers, NGOs, Local community members & residents, Community groups, Schools & universities, Members of the public.

Appendix

Table 1: The potential interpretation for the chemical industry of the R-strategies and a link to concrete examples of implementation by the chemical companies.

Phase	R-strategy	Chemical sector interpretation	Concrete examples
Design phase	Refuse	Consider the necessity to manufacture products and the necessity to use specific raw materials or substances when manufacturing products on an LCA and risk-based approach.	• Refuse single use products and find alternative multi-use products. • BASF and Citroën have reduced the overall weight and decrease resource consumption of a car by increasing functionality to combine sustainable mobility with affordability. E.g. refusing an onboard audio system, since most consumers have their own mobile device. • BASF has developed OxsilanR, a thin film technology protecting metals from corrosion, e.g. before painting. This enables higher productivity with lower materials use and better safety, health & environmental profiles compared to the conventional phosphating processes.
	Rethink	Develop new business models that prioritize service over volume-based sales (e.g. Chemical leasing).	• Kemira both as a product and service provider; YARA providing digital & outcome based agricultural tools reducing the volume of fertilisers and pesticides applied.
	Reduce	Focus on efficiency improvements to reduce the amount of materials and energy used in the production.	• Detergents with higher performance & concentration to reducing the required resources and refillable packaging from Unilever and KAO.
Use phase	Reuse	Use of materials or substances after their initial use, for the same purpose for which they were originally designed, without prior recycling step.	• Reuse of packaging material, Reuse of recovered solvents or heat transfer fluids.
	Repair	Foster service-based business models and technical solutions focusing on maintenance and repair that help to extend the life of equipment and products.	• PV back sheet coating from DOW to repair cracked PV modules and self-sealing tyres. • Debonding characteristics of adhesives allowing dismantling, enabling repair and reuse. • Concrete repair mortars from Sika for restoration work, repair of spalling of damaged concrete in construction structures.
	Refurbish	Foster service-based business models focusing on refurbishment that help to extend the second life of products.	• Provide materials used in refurbishing.
	Remanufacture	Rebuilding of a product to specifications of the original manufactured product using a combination of reused, repaired and new parts, including the repair or replacement of worn out or obsolete components.	• Innovative polymers from Allnex that can be easily remanufactured via heat, change in pH or decrosslinking or dissolving.
	Repurpose	Explore innovative ways to utilize discarded products or components for a function that it was not originally produced or designed for.	• Repurposing synthetic end-of-life tyres for rubber crumb on artificial grass sport fields.
End-of-Life	Recycle	Advance chemical recycling techniques complementary to other recycling techniques to recover and reuse materials that were previously considered non-recyclable to close the loop on chemical materials.	• Many chemical companies are investing into chemical recycling, complementary to mechanical recycling. For example, an advanced recycling (pyrolysis) plant of 50,000 tons/year is being built by LyondellBasell and 25,000 tons/year by SABIC and Plastic Energy. • Auping and Covestro have worked together to design and launch a two-material mattress that is full recyclable, with a digital product passport accessible through the QR code on the tag of the mattress including how to return it. • Sika's Cradle-to-Cradle roofing membrane with pre-consumer recycled content from scrap material during the manufacturing process.
	Recover	Extract energy or materials from waste that cannot be recycled or reused.	• Incineration of waste with energy recovery (electricity and/or steam production). • Re-mining landfilled waste as a feedstock to produce coagulants to clean water by Kemira.

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