

# Ideas instead of bans

Plastic products also play an important role in a sustainable economy. Circular flows of raw materials improve the carbon balance. This starts with the design and includes intelligent processes for resource-efficient and environmentally friendly recycling.

## Circular economy: A dynamic interaction of many technologies

### Production:

Chem parks are an example of resource efficiency in production. By locating chemical and chemical-related companies at sites with industry-wide infrastructure, it is possible to use by-products and waste products, waste heat and water as a basis for further products and processes.

### Design:

Recycling-friendly design is an important product requirement, but can negatively influence durability and resilience. Durable products with good material properties, for example in lightweight construction, can have high environmental benefits, even if they are not (yet) recyclable. Toss them out? No.

### Products:

Demonstrating improved safety, durability and high utility? Yes.

LANXESS focuses on the most environmentally friendly life cycle possible for products. The circular economy calls for new solutions from many players. Technological innovation and openness to new designs are required from all decision-makers.

### Chemical recycling:

Materials are broken down into chemical building blocks. Processes such as pyrolysis (thermal splitting), hydrogenation (addition of hydrogen to other chemical elements) or depolymerization (decomposition of macromolecules into their constituent parts) are suitable for plastics. These building blocks equal the quality of the original building blocks. Chemical recycling can treat waste that is too complex or too contaminated for mechanical recycling and should be examined as an alternative.

### Mechanical recycling:

This usually involves mechanical or physical steps such as sorting, washing, melting and filtering. The material then returns to the material cycle: plastic bottles can be turned back into bottles. Or granulate can become a noise barrier. Such downcycling is not always desirable, though.

### Reuse:

A lot more than bottles can be reused. Machines can also be leased or purchased used. Trade fairs and business models already exist to serve this growing market.

### Bioeconomy:

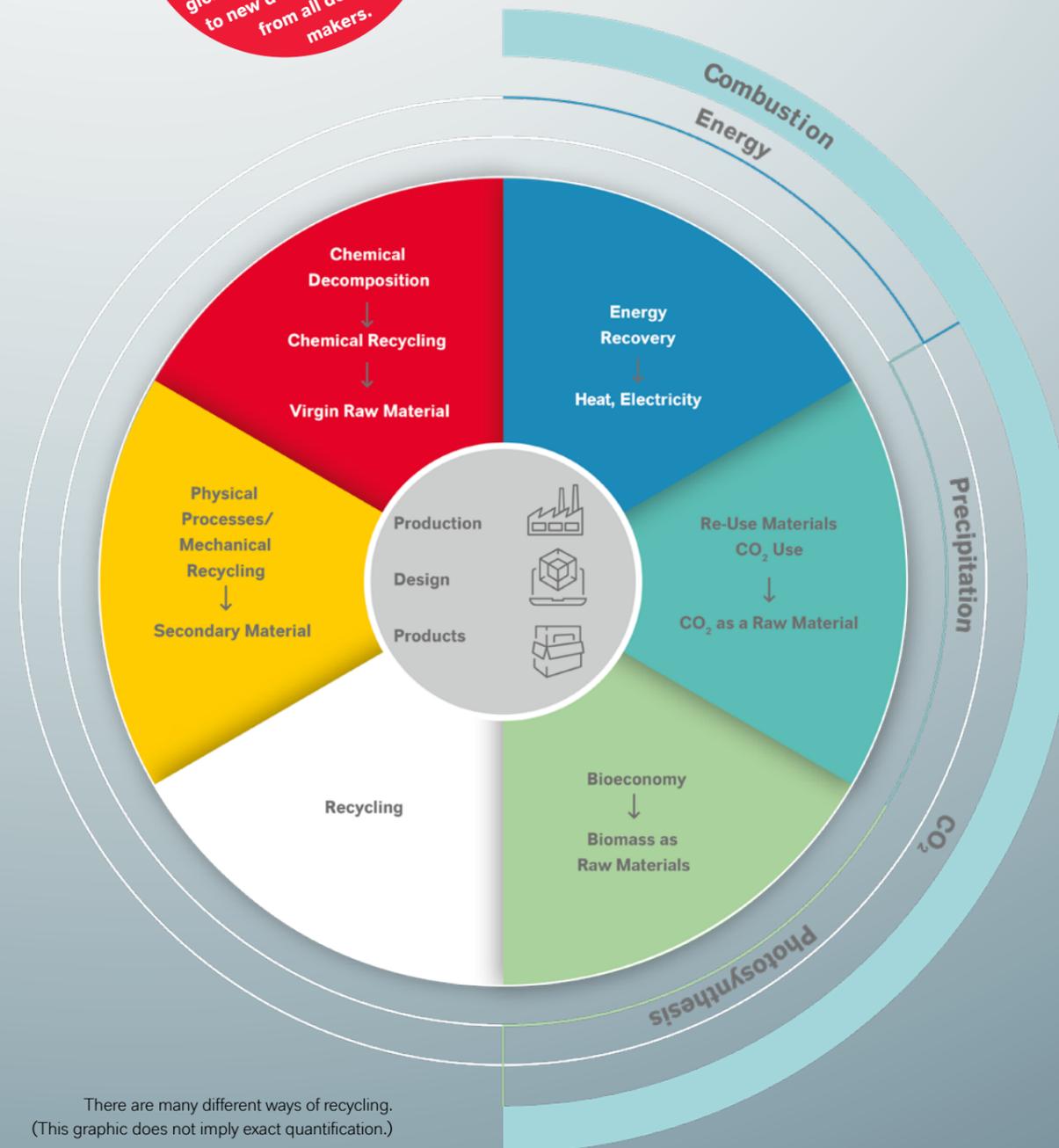
CO<sub>2</sub> can be used as a raw material in a variety of biotechnological processes. Microorganisms are used to bind CO<sub>2</sub> into biomass or convert it into valuable materials. As in the chemical use of CO<sub>2</sub>, the sustainability of the process must be carefully examined. Last but not least, photosynthesis of plants can be used to bind CO<sub>2</sub> in biomass such as algae. The recycling industry demands new solutions from many players. The focus of sustainable management is on durable, repairable products that are manufactured in a resource-saving manner and have a long service life.

### Energy recovery:

This refers to combustion with energy recovery, which in turn is fed into the production cycle.

### Material CO<sub>2</sub> use:

CO<sub>2</sub> can be used as a raw material for plastics, fuels and building materials, for example. Whether as a combustion product or process gas, CO<sub>2</sub> is a carbon source that the industry must make better use of in order to become less dependent on oil. Especially for organic chemistry, carbon is the primary element. In addition, CO<sub>2</sub> use, combined with energy efficiency measures, contributes to emission reduction.



There are many different ways of recycling. (This graphic does not imply exact quantification.)

# Running smoothly

LANXESS is focusing on the most environmentally friendly life cycle of products.

### The proportion of recycled materials increases

LANXESS takes its environmental responsibility very seriously. The Group is working on the increasingly efficient use of energy and raw materials and uses all available technologies, to further reduce emissions and waste. Already today LANXESS supports the transition with its products towards a more sustainable and low-carbon society. The focus is on the entire life cycle of products. Recycling management begins with product design and includes the environmentally efficient benefits, for example in electric mobility. Recyclability is one of several ecological aspects. LANXESS already has products with a significant proportion of recycled materials in the portfolio.

### As good as new products

LANXESS is researching options that make product recycling more attractive and lighter. The goal: less and less primary raw materials into the product cycle. An example of innovation are product types of the Tepex brand, which use recycled fibers in a matrix of recycled thermoplastic material. Thermoplastics are plastics that can be deformed by heat. This process can be repeated as often as required. "Tests on first samples of material showed that these types of recyclates are the best in terms of mechanical properties and flame retardancy equal to their counterparts made of virgin material," explains Dirk Bonefeld, Manager of LANXESS Bond Laminates. In September, LANXESS opened two new bond-laminate production lines for Tepex in Brilon. The company is responding to the strong demand for heavy-duty components for light cars and for consumer electronics.

### LANXESS relies on industry-wide cooperation

The transition to a circular economy cannot be achieved by a single company alone. That is why LANXESS relies on strategic alliances and develops new solutions with partners, especially in the field of chemical recycling. LANXESS has also been part of Operation Clean Sweep (OCS) since 2016 and has signed the voluntary industry commitment of PlasticsEurope. OCS – initiated by plastics producers in Europe – has set itself the goal of reducing granulate losses. This is aimed at all those involved in the supply chain, from production to storage and transport to compounding and further processing. The number of OCS signatories in Europe doubled in 2018 compared to the previous year. Currently, about 98 percent of European plastics production is covered by OCS. In the Plastics 2030 declaration, European plastics manufacturers promote achieving high reuse and recycling rates of 60 percent by 2030 - an important goal towards 100% recycling of plastic packaging in the EU-28 by 2040.

[opcleansweep.org](http://opcleansweep.org)  
[bit.ly/plastics2030](https://bit.ly/plastics2030)  
[bond-laminates.de](http://bond-laminates.de)