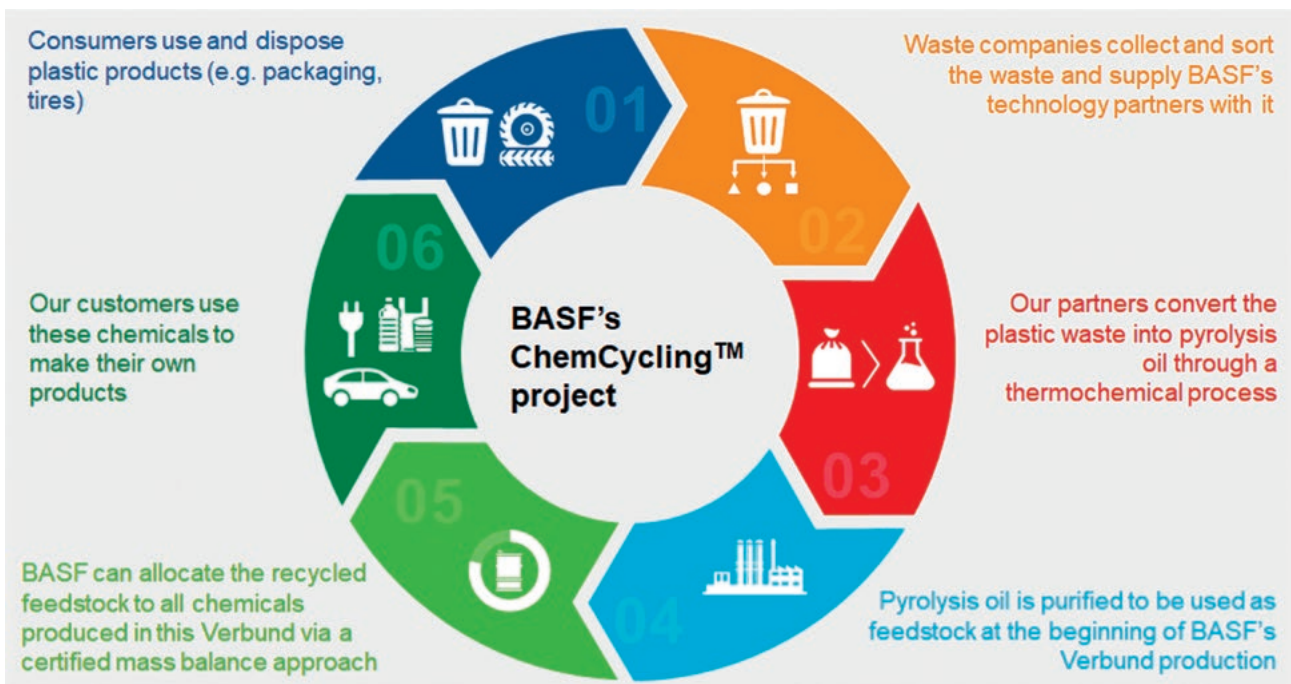


# The ChemCycling™ project

ChemCycling™ is the name of a chemical recycling project launched by BASF with the aim of manufacturing products from chemically recycled plastic waste on an industrial scale. BASF cooperates with technology partners who use a thermochemical process called pyrolysis to transform plastic waste into secondary raw material (pyrolysis oil). We can feed this oil into BASF's production network (Verbund) at the beginning of the value chain, thereby saving fossil resources. The share of recycled material can be allocated to certain products manufactured in the Verbund by using a third-party audited mass balance approach. These products are independently certified and have the same properties as those manufactured from fossil feedstock. Customers can therefore further process them in the same way as conventionally manufactured products and use them in demanding applications.



BASF is developing chemical recycling for use on industrial scale as it enables us to:

Turn plastic waste into feedstock for the chemical industry and thus contribute to a circular economy



Recycle plastic waste for which no other recycling processes are applicable



Replace fossil resources and save CO<sub>2</sub> emissions against conventional plastics production



Increase recycled content in applications which must meet highest demands on quality and hygiene



## What can our customers expect from ChemCycling™?

Many of our customers want high-quality and functional plastics that are produced with recycled feedstock. They have set themselves ambitious targets regarding the use of recycled materials in their applications. With ChemCycling™ we support our customers in achieving these targets. We can offer them certified products to which the share of chemically recycled plastic waste is allocated by using a third-party audited mass balance approach. These products are identical to products made from fossil raw materials in term of functionality and quality. They carry the name affix Cycled™.

## Is ChemCycling™ environmentally benign?

An LCA study conducted by Sphera for BASF, which was reviewed by three independent experts, comes to the clear conclusion that pyrolysis of mixed plastic waste emits 50 percent less CO<sub>2</sub> than its incineration. The study also showed that CO<sub>2</sub> emissions are saved when manufacturing products based on pyrolysis oil under a mass balance approach instead of naphtha. The lower emission result from avoiding the incineration of mixed plastic waste. Moreover, it concluded that manufacturing plastics via either pyrolysis or mechanical recycling results in comparable CO<sub>2</sub> emissions. It was taken into account that the quality of chemically recycled products is similar to that of virgin material and that less input material can be sorted out than in mechanical recycling.

## What kind of waste is used in the ChemCycling™ project?

We focus on post-consumer plastic waste that is not recycled mechanically for technological, economic, or ecological reason. Examples are plastics with residues and mixed plastic waste fractions consisting of different plastic types, such as polyethylene (PE), polypropylene (PP) and polystyrene (PS), which are not further sorted. In addition, it includes used tires.

## How can ChemCycling™ reach market maturity?

On the one hand, the existing technologies for conversion of plastic waste into pyrolysis oil need to be further developed and adapted to ensure a reliable high quality of the secondary raw material. On the other hand, legislation will determine whether the technology will become established in the waste industry. The legislative framework of the EU builds on a technology-neutral definition of recycling and counts chemical recycling as a technology contributing, e.g., towards the recycling targets of plastic packaging. Yet, it is up to the interpretation of individual countries how chemical recycling contributes to meeting their recycling targets. In Germany, for example, chemical recycling is not yet recognized as a process which contributes to fulfilling the plastic packaging waste recycling targets. It would be an important political signal to be able to contribute to the achievement of all recycling targets in Germany (as in other EU countries) also through chemical recycling. Similarly, incentives for recycled content should be applicable to all forms of recycling. Moreover, full acceptance of mass balance approaches is needed, both on EU and national level.