How can plastic waste become a sustainable resource?

We believe it’s all in the circle.
What is chemical recycling of plastic waste?

Plastic is an effective, low-cost material which is useful for many different purposes. Yet according to the Ellen McArthur Foundation, only 14% of plastics are estimated to be recycled worldwide, with some 40% ending up in landfills, 14% going to incineration, and 32% ending up in unmanaged dumps or leaks. Recent analysis suggests that increased investments in chemical recycling technology is needed to ramp up recycling rates.

Why is chemical recycling so important?

Put simply, chemical recycling can transform waste from ‘the bottom of the pile’ into products which meet the highest safety standards. It is the only technology capable of upcycling mixed plastic waste into food-grade plastic feedstock. This means moving a low-value stream up the waste hierarchy, greatly increasing resource efficiency. Chemical recycling involves breaking down plastic waste into monomers – the basic building blocks of plastic. These building blocks can be put back together to produce new plastic as well as other chemicals and substances.

Chemical recycling is a technology which is well suited to handle mixed and soiled plastic waste – which is unfit for mechanical recycling. It allows a larger share of plastic waste to be recycled, and, most importantly – it displaces virgin oil and gas in the petrochemical industry.

Who wants chemically recycled plastic waste?

Our answer is: who doesn’t? Every responsible company around the world that uses plastic from virgin sources today, will be forced to seek recycled solutions.

Quantafuel was recently chosen as the preferred chemical recycling partner for mixed plastic waste by one of the biggest chemical companies in the world, BASF. They know that our solution is unique and satisfies the demands of a growing number of customers who have committed themselves to using recycled material in their products. Among these, you find some of the biggest food-grade plastic feedstock consumers in the world. This is indeed good news for our planet.

EU wants 50 % recycling - we will do our share

Recycling targets drive innovation. In Europe, things are changing quickly as the EU is implementing a target of 50 % recycling of plastic packaging by 2025. With actual recycling rates far below, the world needs innovative technologies that can feed more plastic waste into circular solutions. This is where Quantafuel comes in. Norwegian and Danish authorities have confirmed that Quantafuel’s process is considered recycling, as long as the result is new products, materials and substances instead of fuels.

A unique partnership

Along with circular economy policy in other areas, the 50% recycling target is driving a strong demand for recycled content. BASF’s Chemcycling project responds to this demand.

– Our partnership with Quantafuel allows us to produce plastics and other materials and substances from recycled feedstock. This is a model we need to scale up to reach European recycling targets, says Christian Lach, Lead ChemCycling™ project at BASF SE. Chemical recycling means transforming plastic waste into virgin-like products, materials and substances.

– Our goal is to establish a circular economy involving chemical recycling, and to be successful we could have no better partner than BASF. We hope and expect that chemically recycled plastics will become a recognized standard in European plastic production, says Quantafuel’s CEO, Kjetil Bøhn.

The partnership is a first step to build up a broad supply base for Chemcycled products. This enables us to support our customers in achieving their sustainability targets.

– Hartwig Michels, president Petrochemicals, BASF

Estimated plastic consumption worldwide

Million tonnes per year

Estimated plastic consumption worldwide

- 86 (1990)
- 540 (2030)
Quantafuel's first Plastic-to-liquid (PtL) plant is located in Skive, Denmark and is the first of its kind in the world. The entire production of liquids will be sent to BASF, which will upgrade it into new plastic materials, chemicals or substances which replace fossil alternatives.

The plant is set up to process over 20,000 tonnes of mixed plastic waste, primarily from Denmark and Norway, which would otherwise be incinerated or landfilled. The output is about 16,000 tonnes of recycled feedstock which will be used for new plastic products and a range of other materials and chemicals. The result is a circular economy where we turn waste into value, increase recycling rates and slash emissions from new plastic production.

Quantafuel processes the plastic waste through these main steps:

**Pyrolysis:** the plastic waste is exposed to high temperatures in the absence of oxygen and broken down to liquid hydrocarbons in a gaseous state.

**Catalytic step:** the gas is upgraded to maximize quality and yield. The technology used in this step is developed and owned by Quantafuel and is critical to elevate the product from a complex oil into a high value product.

**Distillation:** the product is distilled into light, medium and heavy fractions which become recycled feedstock for the petrochemical industry.

Circular economy put into context.

The purpose of the circular economy is to avoid waste and to use resources in an optimal way. Achieving “circularity” through the whole value chain will be a goal and a must for every industry moving forward.

A resource efficient solution:

Until recently, a significant amount of Europe’s plastic waste was exported to be dealt with elsewhere. A large share ended up being burnt – a polluting and wasteful solution. Luckily, this is now changing fast. For Quantafuel and BASF, the fact that plastic waste can no longer be shipped across the world represents a big opportunity to contribute towards the circular economy.

Together, we can close the loop by upgrading waste into valuable products and resources. And we can do it with minimal pollution to the environment.

Scaling up:

According to McKinsey & Company, scaling up chemical recycling is critical to achieve a circular plastic economy. Chemical recycling also represents the largest commercial potential in the years to come. BASF, which is one of the biggest producers of plastic in the world, intends to process large volumes of recycled feedstock in the years to come. Fortunately, Quantafuel’s technology can be scaled up.

In Denmark alone, Quantafuel has the potential to process about 35% of the plastic that becomes waste every year. Together, Quantafuel and BASF can help consumer companies complete the move to recycled packaging in the years to come.
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