

Circulen

Circular and Low Carbon Solutions



LYB makes circular and low carbon solutions work for your business.



Complementing our industry-leading virgin resin portfolio, our *Circulen* family of mechanically and chemically recycled polymers, as well as those sourced from bio-circular feedstocks are production-ready solutions designed to empower customers and brand owners to achieve their sustainability goals without sacrificing performance.

We bring a team of passionate problem solvers with industry-leading technical and commercial expertise to help secure organizational buy-in by developing comprehensive solutions. Leveraging innovative technologies, we provide high-quality materials suitable for a wide range of applications, including consumer goods, textiles, industrial uses and transportation; as well as highly regulated applications such as food packaging and healthcare.

Our fully integrated ecosystem brings the scale, flexibility and continuous innovation needed to achieve your sustainability goals. Our network of external partners and stakeholders brings flexibility beyond our own facilities. With a clear long-term vision, we are committed to leading in circular and low carbon solutions.

Our flexible *Circulen* solutions help you meet your sustainability goals



Circular solutions

At LYB, we support our customers' sustainability efforts through the *Circulen* family of circular and low carbon solutions. The *Circulen* family offers converters and brand owners three unique technology pathways to achieve their sustainability goals.



Mechanical recycling

For our **CirculenRecover** polymers, we use mechanical recycling technologies to create materials for a variety of common applications. Mechanical recycling involves sorting, washing, grinding and melting plastic waste and transforming it into high-performance products with up to 100% recycled content. These recycled materials can also be blended or compounded with traditionally produced polymers, allowing us to deliver high-quality, customizable resins with measurable reductions in product carbon footprint.



Chemical recycling

Our **CirculenRevive** solution is created by converting hard-to-recycle plastic waste into feedstocks for polymer production through a chemical recycling process. These feedstocks are used instead of traditional ones, with the traceability of recycled content enabled by an ISCC PLUS-certified mass balance approach. These resulting polymers can be used in highly-regulated applications, such as food contact and healthcare. We are building our first commercial-scale chemical recycling plant using our proprietary *MoReTec* technology, which is designed to deliver over 80% plastic-to-plastic yield,¹ run on renewable energy and using an energy-efficient catalytic process. The result: **CirculenRevive** solutions leveraging feedstocks with a 50% lower carbon footprint than fossil-based alternatives.²

Low carbon solutions



Bio-circular feedstock

For our **CirculenRenew** polymers, we use second-generation bio-circular waste and residual oils (such as used cooking oil) to replace fossil-based feedstocks in the polymer production process. Using an ISCC PLUS-certified mass balance approach, our **CirculenRenew** solution offers a lower carbon footprint compared to fossil-based alternatives, and can be used in highly demanding applications like food packaging, healthcare and high-quality requirement films.

¹Yield depending on the quality of the waste plastic feedstock. We define yield as the percentage by weight of the waste plastic (with >85% polyolefin feed) fed to the process that is converted into liquid and gaseous products (pyrolysis oil and pyrolysis gas) that can be used to produce new polyolefins.

²Feedstocks produced via the *MoReTec* process (pyrolysis oil and gas) displace fossil-based feedstocks in the olefins cracking process; the stated carbon footprint reduction is based on a comparison of Life Cycle Assessment (LCA) results for (1) pyrolysis oil and gas produced by the *MoReTec* technology, and (2) fossil-based naphtha feedstock. LCA for pyrolysis oil and gas based on *MoReTec* pilot plant data. LCA for fossil-based naphtha includes carbon emissions associated with the production of fossil-based naphtha feedstock, plus incineration of the equivalent amount of mixed plastic waste required to produce pyrolysis oil and gas via the *MoReTec* process.



From plastic waste to final product: we are building an ecosystem to address the issue of plastic waste and promote a circular economy

Collaborating for circularity across the value chain

At LYB, we recognize that ending plastic waste will require commitment and partnerships across the value chain. This is why we are making significant investments and collaborating with stakeholders including municipalities, waste collectors, start-ups, converters and brand owners to provide products that have lower environmental impact, are easier to collect and sort and help accelerate the circular economy.

Leveraging innovation and technology to find sustainable solutions for your business

We're passionate about solving problems for our customers, finding unique solutions through innovation by taking advantage of our world-class technical expertise. From facilities that use AI-powered advanced sortation, to our proprietary *MoReTec* catalytic recycling technology, to technical centers across the globe that provide a full suite of testing and application development support, we are helping customers and brand owners find creative solutions.

Let us help you explore your business case and provide a range of potential solutions to meet your sustainability goals and business needs.



About us

We are LyondellBasell (LYB) – a leader in the global chemical industry creating solutions for everyday sustainable living. Through advanced technology and focused investments, we are enabling a circular and low carbon economy. Across all we do, we aim to unlock value for our customers, investors and society. As one of the world's largest producers of polymers and a leader in polyolefin technologies, we develop, manufacture and market high-quality and innovative products for applications ranging from sustainable transportation and food safety to clean water and quality healthcare. For more information, please visit www.lyb.com or follow [@LyondellBasell](https://www.linkedin.com/company/lyondellbasell) on LinkedIn.

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