

CIRCULAR BIO-BASED EUROPE JOINT UNDERTAKING: A KEY INSTRUMENT FOR THE NEW EU BIOTECH AND BIOMANUFACTURING INITIATIVE

The Circular Bio-based Joint Undertaking ([CBE JU](#)) is a €2 billion partnership between the European Union and the Bio-based Industries Consortium ([BIC](#)) that funds projects advancing competitive circular bio-based industries in Europe. This public-private partnership is established under Horizon Europe, the EU's research and innovation programme, for the 2021-2031 period.

CBE JU is a **strategic instrument for Europe's biotech and biomanufacturing sector, boosting** the production capacity of **bio-based chemicals and materials** to industrial scale. Its funding supports the development and production of innovative, sustainable and circular bio-based solutions, while making an important contribution to Europe's competitiveness. With the help of innovative biotechnologies, the CBE JU-funded projects also tackle some of the current production challenges like **lowering greenhouse gas emissions, improving sustainability sourcing, reducing and valorising waste, decreasing pollution and increasing energy efficiency**, while preserving biodiversity and fostering an efficient use of natural resources.

CBE JU FLAGSHIP BIOREFINERIES: THE BACKBONE OF THE EU BIOMANUFACTURING FOR CHEMICALS AND MATERIALS

The **15 first-of-their-kind industrial scale flagship production facilities** (in green on the below map) are the best example of how CBE JU has contributed to increasing biomanufacturing capacity at European level. Many more demonstration plants (in yellow) show the potential of the sector and the high number of effective technologies developed in Europe to transition away from fossil-based chemicals and materials.



These innovative and highly replicable industrial facilities significantly **reinforce the backbone of EU biomanufacturing for chemicals and materials**. Newly built and revitalised old industrial sites across Europe will strengthen **EU's strategic autonomy** by reinforcing local supply chains, reducing EU external dependencies and increasing its technological leadership.

Take a look at some biomanufacturing industrial capacities that have been upscaled in Europe with the support of CBE JU. They cover different application areas, spanning from bio-based chemicals to food and feed ingredients, from construction materials to packaging.

BIO-BASED CHEMICALS

The EU is the world's largest producer of sugar beet. The sector currently supports 140,000 sugar beet growers and around 27,000 direct jobs in sugar beet processing. The [AFTERBIOCHEM](#) flagship project in Carling Saint-Avoid (France) is building the first all-in-one biorefinery for transforming the sugar industry's side streams – mainly pulp and non-food waste – into bio-based molecules of industrial interest. This will increase the economic and environmental sustainability of the sugar beet industry. In addition, the biorefinery production process will be flexible enough to adapt to alternative feedstocks, such as organic waste from sewage sludge and household waste, in the future.



BIO-BASED POLYMERS

Modern human societies need plastics that are recyclable, biodegradable and compostable for a wide range of uses. In Delfzijl (the Netherlands) the [PEFerence](#) flagship project is establishing the first industrial scale, cost-effective biorefinery producing 5,000 tonnes/year of Furan DiCarboxylic Acid (FDCA), a biobased chemical, to make high-value products. The goal is to replace a significant share of fossil-based plastics with 100% biobased polymers. These can compete with traditional packaging products in price and performance when produced at scale. The resulting biobased material is more sustainable and completely recyclable.

Modern human societies need plastics that are recyclable, biodegradable and compostable for a wide range of uses. In Delfzijl (the Netherlands) the [PEFerence](#) flagship project is establishing the first industrial scale, cost-effective biorefinery producing 5,000 tonnes/year of Furan DiCarboxylic Acid (FDCA), a biobased chemical, to make high-value products. The goal is to replace a significant share of fossil-based plastics with 100% biobased polymers. These can compete

CONSTRUCTION MATERIALS

Lubricants, adhesives, and plastics are extremely useful materials, but they are made of fossil-based resources, contributing to global warming and pollution. The [SWEETWOODS](#) flagship project is building a first-of-its-kind industrial biorefinery in Imavere (Estonia) to obtain high-value compounds using hardwood waste as a raw material more efficiently and with a lower environmental impact, including reducing waste, GHG emissions, and water and chemical use. The biorefinery is also spurring the creation of a new industry and innovation hub in Estonia focused on forestry-based chemicals and materials.



NUTRACEUTICAL and COSMETICS

[SCALE](#) flagship project in Baillargues (France) strives to build and operate the world's first fully integrated microalgae biorefinery to produce natural active ingredients of high nutritional value for the food supplements, feed, and cosmetics sectors. Led by a French small business, this project aims to reduce the dependency on fossil-based resources for food, feed and cosmetic sectors, replacing them with biobased alternatives and at the same time capturing CO₂ from the atmosphere to feed the algae and reducing the need of land that can be used instead for forestry and agriculture.

ALTERNATIVE PROTEINS

The EU is by far the biggest importer of food worldwide. At the same time, there is an increased need for sustainable alternative proteins. The [PLENITUDE](#) flagship project in Sas van Gent (the Netherlands) aims to produce affordable plant-based proteins for human consumption. The first-of-its-kind biorefinery cultivates fungi which is then harvested and processed for use in a number of consumer products. Such a production process significantly reduces CO₂ emissions when compared to traditional livestock and animal feed production, as well as adopting a circular, minimal waste model.

