



European  
Bioeconomy  
Alliance

## Best-practice case studies

EUBA members' contributions to the EU  
Bioeconomy Strategy and Green Agenda

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## Introduction

This brochure aims to highlight on the ground projects and examples across the bioeconomy value chain. The projects are a collection of contributions from European Bioeconomy Alliance (EUBA) members showing in concrete ways how these sectors already contribute to the goals of various EU Strategies and its Green Agenda.

These projects outline technologies and solutions to use or reuse biobased materials and create alternatives to fossil-based ones, or to reduce and/or capture their CO<sub>2</sub> emissions, supporting the transition away from a fossil-fuel based economy.

They are just the tip of the iceberg of the break-through potential that the bioeconomy holds in helping achieve EU sustainability goals.



## Sugar beet paper – Reducing environmental impacts by 16% Netherlands



### DESCRIPTION:

Sugar beet paper is a ground-breaking innovation by Dutch beet sugar manufacturer **Cosun Beet Company** and paper producer Crown Van Gelder. Beet fibre from beet pulp, a co-product of the sugar making process, is used to replace 20% of wood fibre required for making paper. This has considerable environmental benefits.

Paper made with beet fibre has a 16% lower aggregate environmental impact than paper made solely from wood pulp. It produces 6% less CO<sub>2</sub> emissions and enables an 18% decrease in land usage, thereby contributing to the objectives of the EU Climate Strategy. Sugar beet paper also requires 10% less fresh water for production and, with sugar beets sourced from local farms within a 150km radius of the paper manufacturers' plant, cuts down significantly on transport emissions. As a type of paper with a comparatively small environmental impact that can also come into direct contact with food, sugar beet paper is an important innovation in sustainable packaging. This innovation can help reduce waste and make sustainable products the norm in the EU. Cosun Beet Company have made the paper part of their own industrial packaging portfolio.

### CONTRIBUTION TO EU PRIORITIES:

- Circular Economy Action Plan – Ensure less waste and make sustainable products the norm in the EU
- Climate Strategy – Reduction of CO<sub>2</sub> emissions



## Climate-neutral fermentation through CO<sub>2</sub> capture Belgium / Benelux



### DESCRIPTION:

Alco Bio Fuel, Messer Benelux and Ijsfabriek Strombeek have invested in a CO<sub>2</sub> capture process at the Alco Bio Fuel ethanol refinery in Ghent. As renewable ethanol is produced, 160,000 tonnes of CO<sub>2</sub> are captured annually for use in other sectors – avoiding the need for CO<sub>2</sub> of fossil origin. At Alco Energy Rotterdam, an additional 400,000 tonnes of CO<sub>2</sub> is captured yearly.

### CONTRIBUTION TO EU PRIORITIES:

- Climate strategy: European renewable ethanol production is integral to meeting EU climate objectives, and it makes a strategic contribution to energy independence and food security. Ethanol production creates not just renewable fuel to reduce emissions from road transport, but also high-quality and high-protein animal feed. In this project, it also creates CO<sub>2</sub> for use in greenhouses and beverage applications.
- Innovation: European ethanol biorefineries are constantly innovating and improving their sustainability. ePURE members' ethanol reduces emissions by more than 75% on average compared to fossil petrol. Thanks to capturing the biogenic CO<sub>2</sub>, the emission savings of ethanol can be as high as 95%. With the new innovations come additional co-products to reduce Europe's fossil dependence.



## BASAJAUN - Sustainable wood construction chains demonstrating innovative materials and building systems

Sweden, Finland, Germany, France, Spain



### DESCRIPTION:

BASAJAUN project demonstrates how wood construction chains can be optimized to foster both rural development and urban transformation whilst being connected with sustainable forest management in Europe. A full-scale medium-sized demo building is being constructed in France that integrates various innovative materials, products and structural components. Funded by the Horizon 2020 grant agreement no. 862942, [www.basajaun-horizon.eu](http://www.basajaun-horizon.eu).

Basajaun demonstrates both innovative and circular products in the wood sector. It showcases resilient, sustainable value chains linking forestry, manufacturing and building industries also through digital solutions and ensuring innovation, value added and employment both in rural and urban areas.

### CONTRIBUTION TO EU PRIORITIES:

- Circular Economy Action Plan
- Climate Strategy



## EMBRACED Italy - Veneto



### DESCRIPTION:

Establishing a multi-purpose biorefinery for the recycling of the organic content of absorbent hygiene products (AHP) waste in a circular economy domain.

Absorbent Hygiene Products (AHPs) have become essential everyday products to society. As with every consumer product, AHPs also end up in solid waste after their use. AHP waste, which includes post-consumers nappies, adult incontinence products, feminine hygiene items, wipes, etc. are currently considered a non-recyclable fraction of the municipal solid waste, with 8,500,000 tons of such waste incinerated or landfilled in Europe each year. Hence, diverting AHP waste from landfill or incinerators is important.

EMBRACED establishes a demonstration plant of an integrated biorefinery, based on the valorisation of the cellulosic fraction of waste towards the production of bio-based building blocks, polymers and fertilizers. The project follows a circular economy approach, closing the cycle of raw materials and minimizing the use of primary resources.

The goal of EMBRACED is to develop profitable business cases, business models and business plans, tuning the biorefinery model to different local conditions across EU countries.

EMBRACED aims to reduce GHG emissions by ca. 430 kg CO<sub>2</sub>eq per ton AHP waste against incineration. The project will also to reduce the land use required for the production of bio-based polyesters by 90 times compared to other sources.

### CONTRIBUTION TO EU PRIORITIES:

- Circular Economy Action Plan – ensure less waste, recover and valorize waste streams into new products
- Climate Strategy - reduce of CO<sub>2</sub> emissions
- Innovation – develop innovative and sustainable bio-based products
- Industrial Strategy – create of new jobs
- Farm to Fork - have a positive environmental impact on land use



## Enzymes as enablers of the bioeconomy

EU



### DESCRIPTION:

Enzymes are proteins found in all living organisms that increase the efficiency of chemical reactions. They are particularly important for the bioeconomy as they enable the efficient conversion of renewable biomass into bio-based products, providing an alternative to energy-intensive chemical processes based on fossil fuels. Enzymes such as cellulase can break down biomass into usable compounds for further processing and can also assemble bio-based products such as bio-based polymers for use in a variety of sectors, including food and feed, agriculture, detergents, paper and pulp, textiles, bioenergy, and specialty chemicals. This supports the transition away from a fossil-based economy towards a circular bioeconomy.

### CONTRIBUTION TO EU PRIORITIES:

- Farm to Fork Strategy: The bioeconomy sectors, including industrial biotechnology as an enabling technology, have important roles to play in contributing towards sustainable food systems, improving industrial efficiencies and reducing food waste. Biorefineries are key as they valorise every component of renewable feedstock to produce a wide range of products and ingredients for food and feed.
- Climate Strategy & Chemicals Strategy for Sustainability: Increased efficiency of industrial processes results in reduced greenhouse gas emissions and resource use.
- Industrial Strategy: Industrial biotechnology, including enzymes, is recognized as a key enabling technology for Europe's Industrial Future
- Innovation: EU research and innovation, including public-private partnerships like the Circular Bio-based Europe Joint Undertaking, are key to develop and scale-up sustainable bio-based solutions, including cutting-edge biotechnology solutions.





## The Beverage Carton Industry Roadmap to 2030 and Beyond

EU



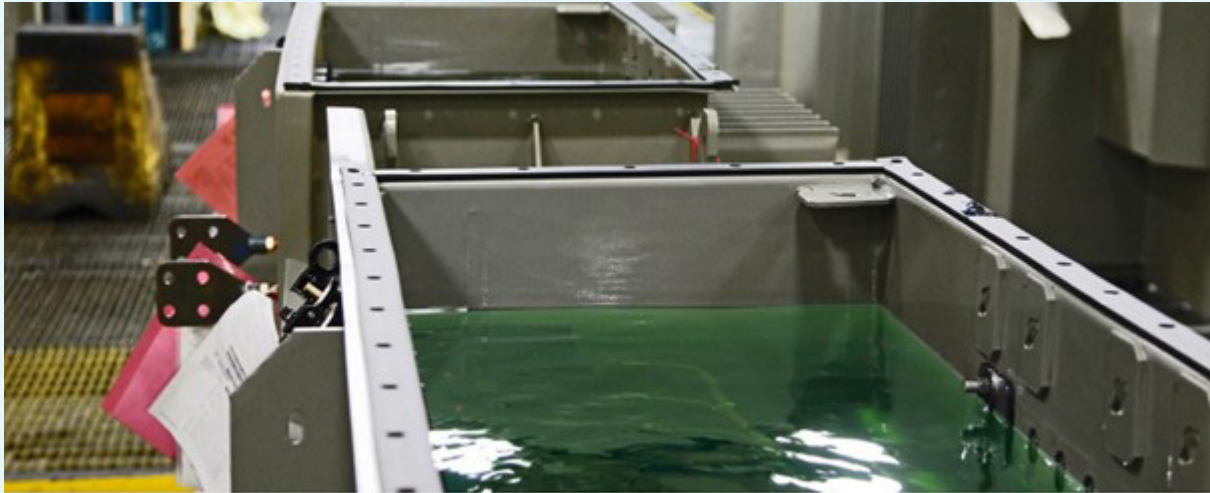
### DESCRIPTION:

Beverage cartons are a recyclable low carbon packaging solution, and as such contribute to a variety of societal and environmental objectives. Building on the benefits of beverage cartons, ACE's (the Alliance for Beverage Cartons and the Environment) members have adopted an ambitious vision for the future: we will deliver the most sustainable packaging for resilient food supply systems which is renewable, climate positive and circular.

Our industry has adopted tangible and ambitious commitments for 2030 and beyond that will enable us to continue our sustainability journey and move towards our vision. For example, our members commit to produce beverage cartons only from renewable and/or recycled materials, to decarbonize our value chain in line with the 1.5° target, to achieve a 90% collection and a 70% recycling rate. However, we cannot achieve this alone. We need an enabling EU policy framework to provide predictability and stability for investments and innovation over the next decade. We will measure and report on our progress on a regular basis and where metrics do not currently exist, we will contribute to developing the metrics to do so.

### CONTRIBUTION TO EU PRIORITIES:

- Farm to Fork
- Innovation
- Industrial Strategy
- Climate Strategy



## Biodegradable transformer oil made from processed vegetable oil

EU



### DESCRIPTION:

Transformers function to reduce the voltage of electrical power from the grid, to make it suitable for domestic and local industrial use. Transformer oil made from processed vegetable oil is biodegradable and safer for the environment than its mineral alternative. Traditionally, mineral oils are used to insulate and cool the transformer unit, but interest in vegetable alternatives is growing and holds several advantages: due to its high flash point, the temperature at which the oil spontaneously ignites, the risk of fire is considerably lower than when mineral oil is used. And if any leaks do occur for some reason, vegetable oil is biodegradable. This product contributes to the objectives of the Circular Economy Action Plan by helping "close the loop" of product lifecycles through greater recycling and re-use. It also contributes to the EU Biodiversity Strategy as it prevents damage to the environment and biodiversity caused by alternative mineral oil leaks.

### CONTRIBUTION TO EU PRIORITIES:

- Biodiversity - reducing pollution
- Circular Economy Action Plan - enhancing circularity through reuse and recycling



## Resource and energy efficient cellulosic fibers Austria, Czech Republic



### DESCRIPTION:

The Lenzing Group operates two biorefineries: one in Lenzing (Austria) and one in Paskov (Czech Republic), which convert wood into pulp, biobased co-products and energy. Lenzing leads the innovative fiber production for textiles and markets the co-products, acetic acid, furfural, xylose, soda or lignosulfonate, to other industries. The biorefineries are energetically self-sufficient. The surplus renewable energy is supplied for on-site use in fiber production. This is a prime example of the cascading use of biomass and 100% utilisation of wood without generating any waste.

### CONTRIBUTION TO EU PRIORITIES:

- Biodiversity: Wood is sourced from sustainably managed European semi-natural forests, where protection of biodiversity is a management priority.
- Innovation: Lenzing creates innovative fiber products for the textiles and nonwovens industries.
- Circular Economy Action Plan: Cascading use of natural resource wood for high resource efficiency.
- Climate Strategy: Renewable energy (steam and electricity) from biomass as a co-product from biorefineries.



## ORYZITE - a plastic substitute made from rice husks.

Spain

**copa\*cogeca**  
european farmers    european agri-cooperatives

### DESCRIPTION:

Camara Arrosera del Montsià, an agriculture cooperative from the Ebro Delta in Spain, growing PDO rice "Arroz del Delta del Ebro" has thanks to a particular technological innovation, created ORYZITE, a plastic substitute made from rice husks.

This new material is the result of a circular economy project and the valorisation of rice by-products after more 10 years of research and product development.

The production of Oryzite, which is carried out in the same plant where Cámara Arrocería del Montsià processes the rice, has multiple benefits such as reducing CO<sub>2</sub>, or reducing the carbon footprint and energy consumption. Thus, the rice husk has become a very useful and innovative component, giving rise to Oryzite as a clear example of circular economy: it uses the least amount of resources and produces the least waste. This revolutionary material can replace plastic in products from various industries such as automotive, logistics, packaging or furniture.

Oryzite yields the same volume of injection-ready moulded plastic with fewer fossil-fuel-based polymers, contributing to a more sustainable planet.

The manufacturing process of Oryzite obtains 16 kg per kW consumed, so it's good in terms of productivity and energy consumption.

### CONTRIBUTION TO EU PRIORITIES:

- Circular Economy Action Plan – Ensure less waste and make sustainable products the norm in the EU
- Climate Strategy – Reduction of CO<sub>2</sub> emissions
- EU Bioeconomy Strategy
- Innovation



## Biobased polymers offer sustainable alternatives to plastics

EU

europa  
bioplastics

### DESCRIPTION:

Bioplastics contribute substantially to achieving the ambitious climate goals set out in the European Green Deal as well as socio-economic targets, such as creating more jobs and growth, and fostering vibrant and sustainable rural areas. Consumption and demand for bio-based products in Europe are showing strong progress, and bio-based applications are achieving one of the highest substitutions of fossil-based materials in the European bioeconomy. Additionally, compostable plastic packaging is contributing to reaching the ambitious recycling and landfill reduction targets by helping to separately collect more municipal kitchen waste. Companies such as IFF, are at the forefront of these innovations. The international chemical company is using EU sugar beets to commercialise a biomaterial platform for performance advanced materials in packaging, home, and personal care. These bio-based and biodegradable materials address the increasing demand for sustainable innovative materials that are circular by design and reduce GHG emissions without compromising product performance.

### CONTRIBUTION TO EU PRIORITIES:

- Circular Economy Action Plan - Creating circular packaging solutions and reducing waste
- Climate Strategy - Reducing CO<sub>2</sub> emissions
- Innovation - Leading-edge R&D for innovative materials



## Carbohydrates as replacement of phenol formaldehyde resin for insulation

Global / EMEA/NA/SA



### DESCRIPTION:

Phenol formaldehyde resins were traditionally used as adhesive in the production of mineral wools (Glass & Stone wool).

Crop-based carbohydrates can successfully substitute phenol formaldehyde resins in these industrial processes with beneficial effects on both economic and environmental sustainability. The replacement of these fossil-based resins addresses and eliminates the negative toxicological effects of formaldehyde release from the production processes, and it equally presents economic advantages according to the different bio-based ingredients used as a replacement.

Starch is renewable and biodegradable, and as such it and its derivatives are a well-suited raw material for the sustainable use of agricultural products in the bio-based industry.

### CONTRIBUTION TO EU PRIORITIES:

- Climate Strategy - Reduction of CO2 emissions
- Innovation
- Circular Economy Action Plan - Ensure less waste and make sustainable products the norm in the EU.

## About EUBA

The European Bioeconomy Alliance (EUBA) is a unique cross-sector alliance dedicated to mainstreaming and realising the bioeconomy's potential in Europe.

## Our Mission

EUBA is committed to helping lead the transition away from a fossil-based society by raising awareness of EU, national and regional leaders on the bioeconomy's benefits.

## What brings us together

- The production and use of renewable resources for making innovative value-added everyday products and materials;
- The commitment to maximising the unused potential of European renewable resources encouraging the production of bio-based products and materials "Made in Europe";
- A dedication to resource-efficiency and sustainability.

## EUBA Members



