TERRIFIC

BIOBASED FLAGSHIP PACKAGING SOLUTIONS

NEXT GENERATION CIRCULAR BIOBASED FLAGSHIP PACKAGING: A CATALYST FOR THE GREEN TRANSITION

Circular Bio-based Europe Joint Undertaking

Bio-based Industries Consortium

Co-funded by the European Union

NOVAMONT
A Versalis Company

Patrizio SALICE
EUBCE 2025
June 11th 2025

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members. Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CBE JU. Neither the European Union nor the granting authority can be held responsible for them.

TERRIFIC

BIOBASED FLAGSHIP PACKAGING SOLUTIONS

TERRIFIC will reform the packaging sector with bio-based solutions that enhance **performance**, **circularity**, and **resource efficiency** throughout the entire value chain.

Circular Bio-based Europe Joint Undertaking

Bio-based Industries Consortium

Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.
Funded by the European Union under Grant Agreement N. 101157635

TERRIFIC Next Generation Circular Bio-Based Packaging

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

Coordinator

NOVAMONT
A Versalis Company

TOPIC ID: HORIZON-JU-CBE-2023-IAFlag-03

- **STARTING DATE:** June 1st, 2024
- **DURATION:** 48 months
- **BUDGET:** 26.5 M€
- **FUNDING CBE-JU:** 16.8 M€
- **WEBSITE URL:** https://terrificproject.eu/

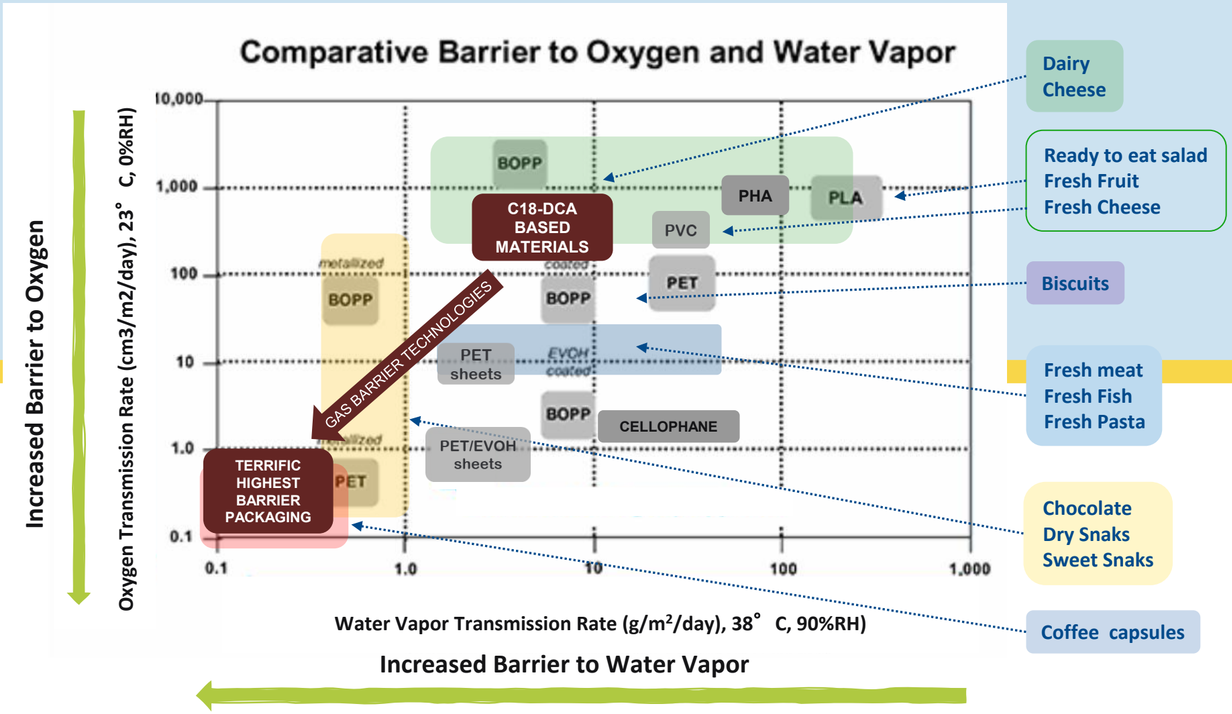
1 Biomaterials producer and Biotech Company
9 Technology Providers
5 End-users (demonstrators)
2 NGOs
1 NFPO

Circular Bio-based Europe Joint Undertaking
Bio-based Industries Consortium
Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.
Funded by the European Union under Grant Agreement N. 101157635

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

CHALLENGE AND INNOVATION



C18-DCA will enable to improve the bulk barrier properties (WVTR) of biopolyesters and biomaterials due to the lipophilic character resulting from the increased number of linear carbon atoms (C18), also with respect to sebacic acid from castor oil (C10).

Different building blocks from fermentation of sugars and vegetable oils will enable the obtaining of novel biobased barrier biopolyesters

Circular Bio-based Europe Joint Undertaking
Bio-based Industries Consortium
Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.
Funded by the European Union under Grant Agreement N. 101157635

TERRIFIC Next Generation Circular Bio-Based Packaging

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

BIOBASED FLAGSHIP PACKAGING SOLUTIONS


FOOD TRAYS


THERMOFORMED CUPS

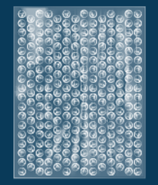

INJECTION MOULDING COFFEE CAPSULES


EXPANDED THERMOBOXES


WOVEN TEA BAGS


LAMINATED BARRIER STICK PACK


MULTILAYER BARRIER FLEXIBLE FILM PACKAGING


LAMINATED BARRIER STICK PACK

- SUSTAINABLE 2G FEEDSTOCK
- BIOBASED (RRM > 95%)
- ADVANCED BARRIER MATERIALS AND TECHNOLOGIES
- MULTIPLE EoL TO MATCH THE WASTE AND COLLECTION INFRASTRUCTURE ACROSS EU
- CONSOLIDATED MARKET POTENTIAL
- NO ACCUMULATION IN OPEN ENVIRONMENT

Circular Bio-based Europe Joint Undertaking
Bio-based Industries Consortium
Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.
Funded by the European Union under Grant Agreement N. 101157635

TERRIFIC Next Generation Circular Bio-Based Packaging

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

MULTIPLE EoL

	REUSE	CHEMICAL RECYCLING	MECHANICAL RECYCLING	REPULPING	COMPOSTING
BIOBASED THERMOBOXES CellMat Technologies	PREFERRED	✓	✓	N/A	✓
BIOBASED FOOD TRAYS ROTTNEROS amazon	N/A	N/A	N/A	PREFERRED	✓
BIOBASED YOGURT CUPS amazon ITENE	N/A	✓*	✓*	N/A	PREFERRED
CBIOBASED COFFEE CAPSULES amazon moses advanced materials	N/A	✓*	✓*	N/A	PREFERRED
BIOBASED AIR BUBBLE FILM amazon	✓	PREFERRED	✓	N/A	✓
BIOBASED TEA BAGS SIOEN amazon	N/A	✓*	✓*	N/A	PREFERRED
BIOBASED BARRIER STICKS dsm-firmenich amazon	N/A	N/A	N/A	✓	PREFERRED
BIOBASED CRISPY SNACK PACKAGING amazon MC Sonae	N/A	N/A	N/A	✓	PREFERRED

*available for bioproducts not contaminated with organic waste

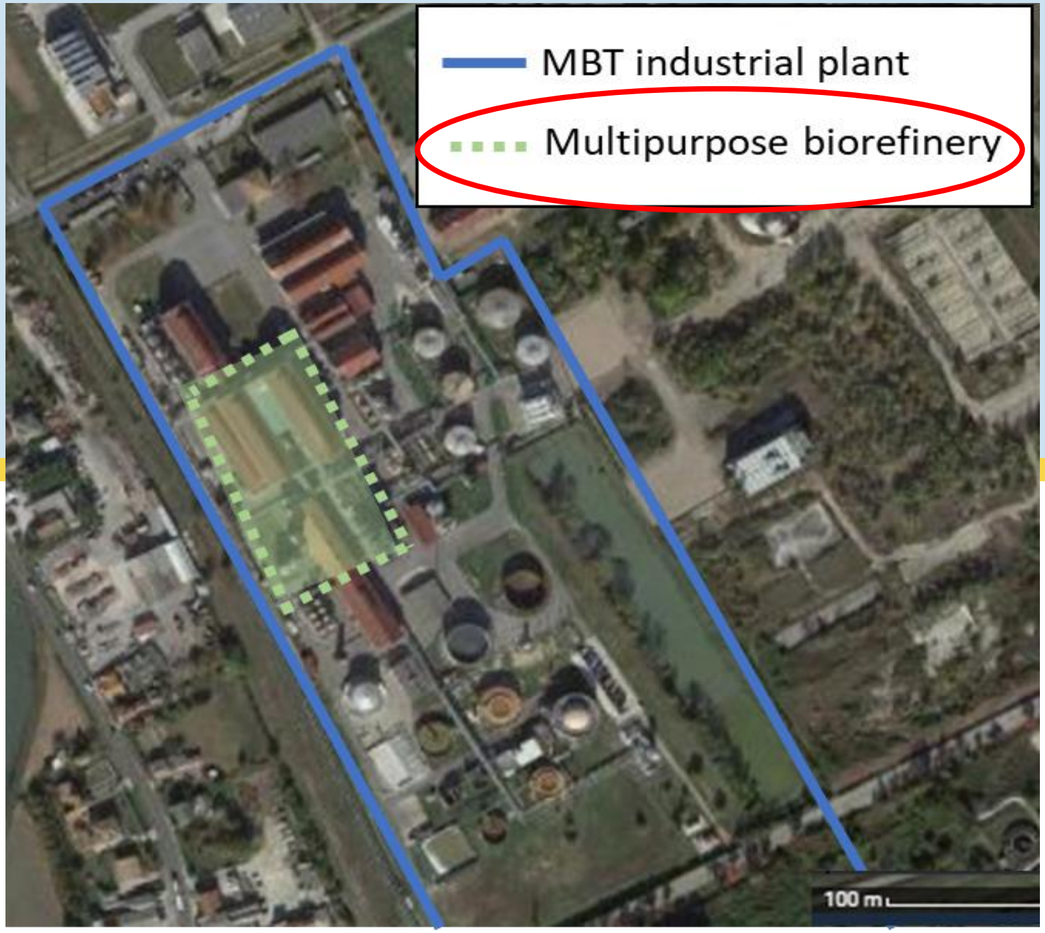
Designed to be compatible with multiple EoL (mechanical recycling, chemical recycling, composting, repulping, anaerobic digestion) meeting the needs of the different waste management infrastructure in EU

Circular Bio-based Europe Joint Undertaking
Bio-based Industries Consortium
Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.
Funded by the European Union under Grant Agreement N. 101157635

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

THE MULTIPURPOSE - MULTIFEEDSTOCK PLANT BY NOVAMONT



The circular interconnection between barrier properties, biobased content, and sustainable EoL of packaging products is enabled by investments on biobased building blocks, biopolymers and biomaterials

NOVAMONT is leading this vision by investing in an **FIRST-OF-ITS KIND MULTIFEEDSTOCK & MULTIPURPOSE PLANT**:

- CAPACITY: >150 ton/year
- 10 M€ INVESTMENT

Circular Bio-based Europe Joint Undertaking
Bio-based Industries Consortium
Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.
Funded by the European Union under Grant Agreement N. 101157635

TERRIFIC Next Generation Circular Bio-Based Packaging

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

SOURCING FEEDSTOCK

Feedstocks validated in previous projects

OFMSW (SCALIBUR), absorbent hygiene product waste (EMBRACED), sugars from hardwood leftovers (VEHICLE), wastewater recovered cellulose (DEEP PURPLE), agricultural waste (PRIME, GRACE)

High-Oleic Used Cooking Oils from the food industry and sugars from beet processing residues (EFFECTIVE), Used Cooking Oils from restaurants & canteens (WAYSTUP), Sugars from hardwood leftovers (VEHICLE)

Cellulose from absorbent hygiene product waste (EMBRACED), mushrooms processing residues (FUNGUSCHAIN), biogenic CO2 (COSMOS), OFMSW (CIRCULAR BIOCARBON)

Circular Bio-based Europe Joint Undertaking
Bio-based Industries Consortium
Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.
Funded by the European Union under Grant Agreement N. 101157635

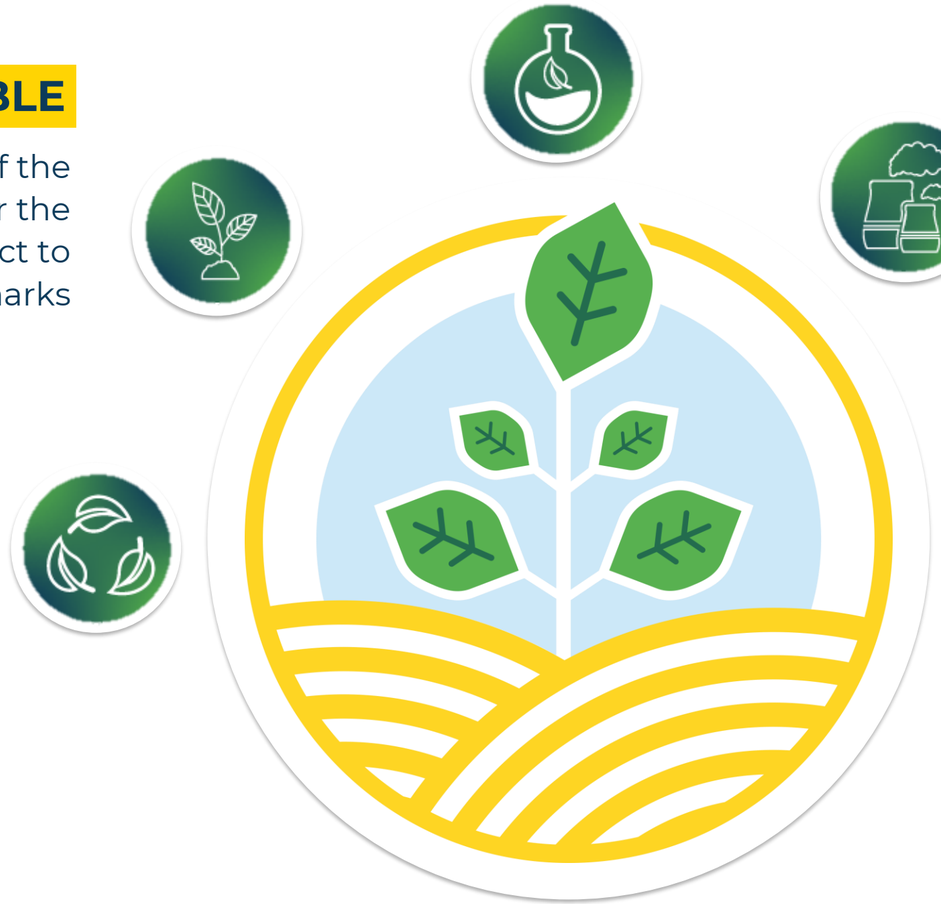
TERRIFIC Next Generation Circular Bio-Based Packaging

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

OBJECTIVES

BIOBASED FLAGSHIP SOLUTIONS

Biobased, recyclable, compostable and high-performing flagship packaging products



SUSTAINABLE

Sustanability, circularity and safety of the biobased materials developed for the flagship packaging products with respect to existing fossil or bio-based benchmarks

CIRCULAR

Circularity and resource efficiency through the validation of multiple end-of-waste scenarios for the developed fagship products

FIRST-OF-ITS-KIND BIOREFINERY

Multipurpose biorefinery to obtain biobased building blocks at TRL 8, which will successfully produce biomaterials with more than 95% of Renewable Raw Materials

REPLICABLE

Replicability demonstrated through a multi-actor approach to create an interactive innovation model with the engagement of all the actors in the value chain for the exploitation of new business opportunities.

Circular Bio-based Europe Joint Undertaking
Bio-based Industries Consortium
Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.
Funded by the European Union under Grant Agreement N. 101157635

TERRIFIC Next Generation Circular Bio-Based Packaging

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

IMPACTS

- Valorising unexploited by-products and side streams
- Decreasing 40% CO_2 eq ton along the entire value chain
- Developing IP for innovative achievements (multipurpose flagship plant, innovative biomaterials)
- Enhancing regional economic growth and business opportunities
- Enhancing packaging solutions for storage and transit, from factory to shelf
- Enhancing products quality and offerings, reducing products spoilage, promoting innovative and competitive solutions in comparison to alternatives
- Improving mechanical and barrier properties, enhancing food safety and longer shelf life

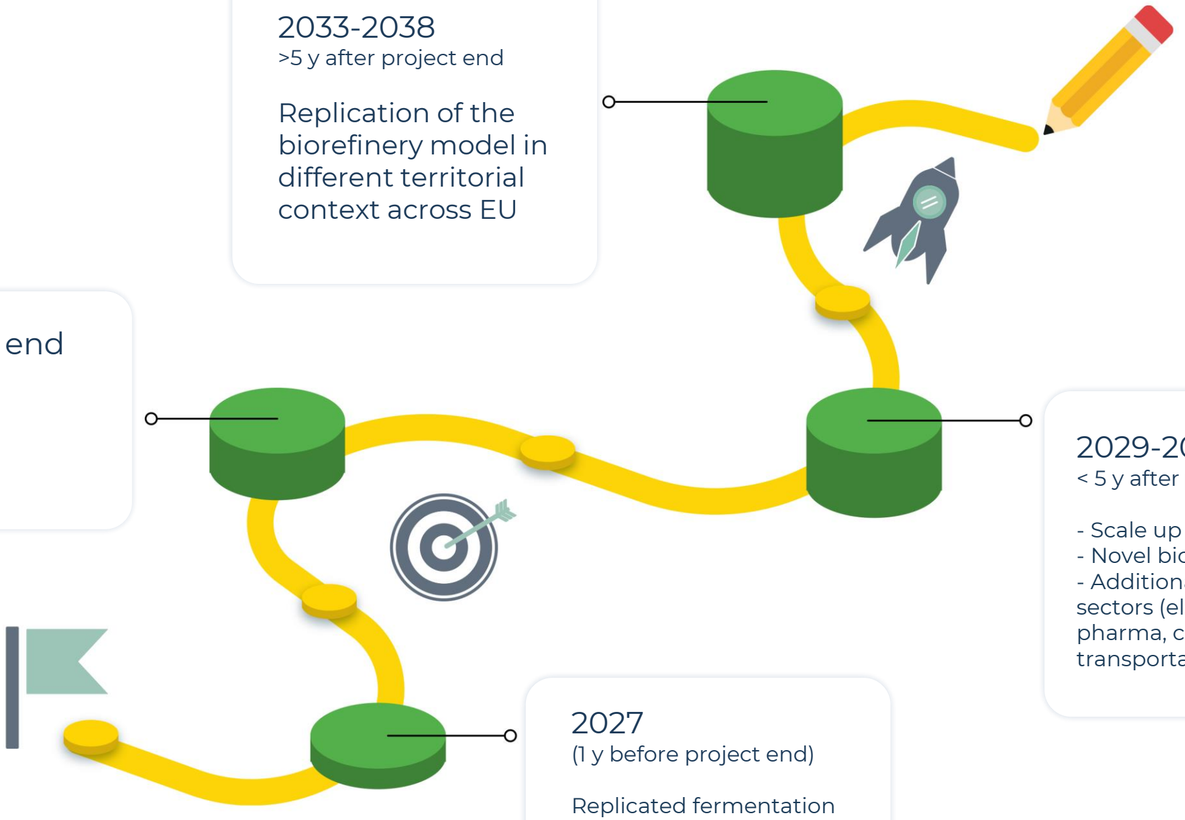
Circular Bio-based Europe Joint Undertaking
Bio-based Industries Consortium
Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.
Funded by the European Union under Grant Agreement N. 101157635

TERRIFIC Next Generation Circular Bio-Based Packaging

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

ROADMAP



2028: Project end

- Project KERs
- MIG roadmap
- Novel biobased biochemicals

2027
(1 y before project end)

Replicated fermentation technology in the multipurpose biorefinery

2029-2033
< 5 y after proiecr end

- Scale up fermentation
- Novel biobased polymers
- Additional application sectors (electronics, pharma, cosmetics, transportation)

2033-2038
>5 y after project end

Replication of the biorefinery model in different territorial context across EU

Multipurpose biorefinery as an accelerator tool to produce industrially-relevant amount of C18-DCA and other biobased building blocks and to speed-up technological, business and market development in the EU biobased industry in a replication perspectives following a modular approach and market trends

Circular Bio-based Europe Joint Undertaking
Bio-based Industries Consortium
Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.
Funded by the European Union under Grant Agreement N. 101157635

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

www.terrificproject.eu

CONTACTS

TERRIFIC
BIOBASED FLAGSHIP PACKAGING SOLUTIONS

NOVAMONT
A Versalis Company

Project Manager
Patrizio Salice

patrizio.salice@novamont.com

Circular Bio-based Europe Joint Undertaking

Bio-based Industries Consortium

Co-funded by the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members. Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CBE JU. Neither the European Union nor the granting authority can be held responsible for them.