



BRILIAN
Circular Future for Rural Areas

Biorefineries as Nodes for a Thriving Rural Bioeconomy

Speakers: PILOTS4U, MANUREFINERY,
NOVAMONT, BIOEAST HUB CZ
Coordination: BIOEAST HUB CZ
Webinar 05.05.2025



The project is supported by the Circular Bio-based Europe Joint Undertaking and its members under grant agreement N° 101112436. 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 CBE JU can be held responsible for them.

AGENDA



BRILIAN
Circular Future for Rural Areas

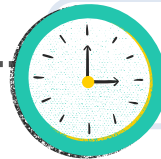


10:00 – 10:10

BIOEAST HUB CZ - Anastasia Perouli

Welcome – House keeping rules

Intro: Decentralizing the Bioeconomy: The Strategic Role of Rural Biorefineries



10:10 – 10:30

Manurefinery - Marco de La Feld, ENCO

Biorefineries and Local Prosperity: Unlocking Economic and Social Gains



10:30 – 10:50

Pilots4U - Stef Denayer

How scale-up can bring innovation from lab to successful biomanufacturing



10:50 – 11:05

NOVAMONT - Anna Ciancolini

Successful examples of biorefineries contributing to regional development



11:05 – 11:30

BIOEAST HUB CZ - Anastasia Perouli

Q&A and closing remarks



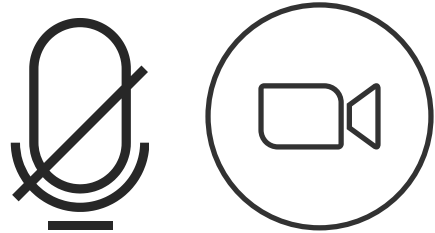
BRILIAN
Circular Future for Rural Areas

WELCOME - HOUSEKEEPING RULES



Anastasia Perouli
perouli.anastasia10@gmail.com

WELCOME – HOUSEKEEPING RULES



Audio & Video:

Please keep your microphone muted unless invited to speak.

You may choose to keep your camera on or off, but turning it on can create a more interactive atmosphere.



Chat & Q&A:

Use the chat box to share comments, engage with other participants and ask your questions.



Time Management:

We aim to end on time, so we appreciate your cooperation in staying focused and concise during discussions.



Recording:

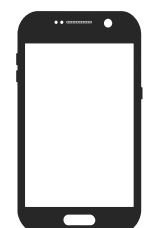
This session will be recorded and shared afterward. If you prefer not to appear in the recording, please keep your video off and refrain from speaking directly.



Respectful Engagement:

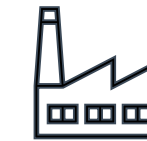
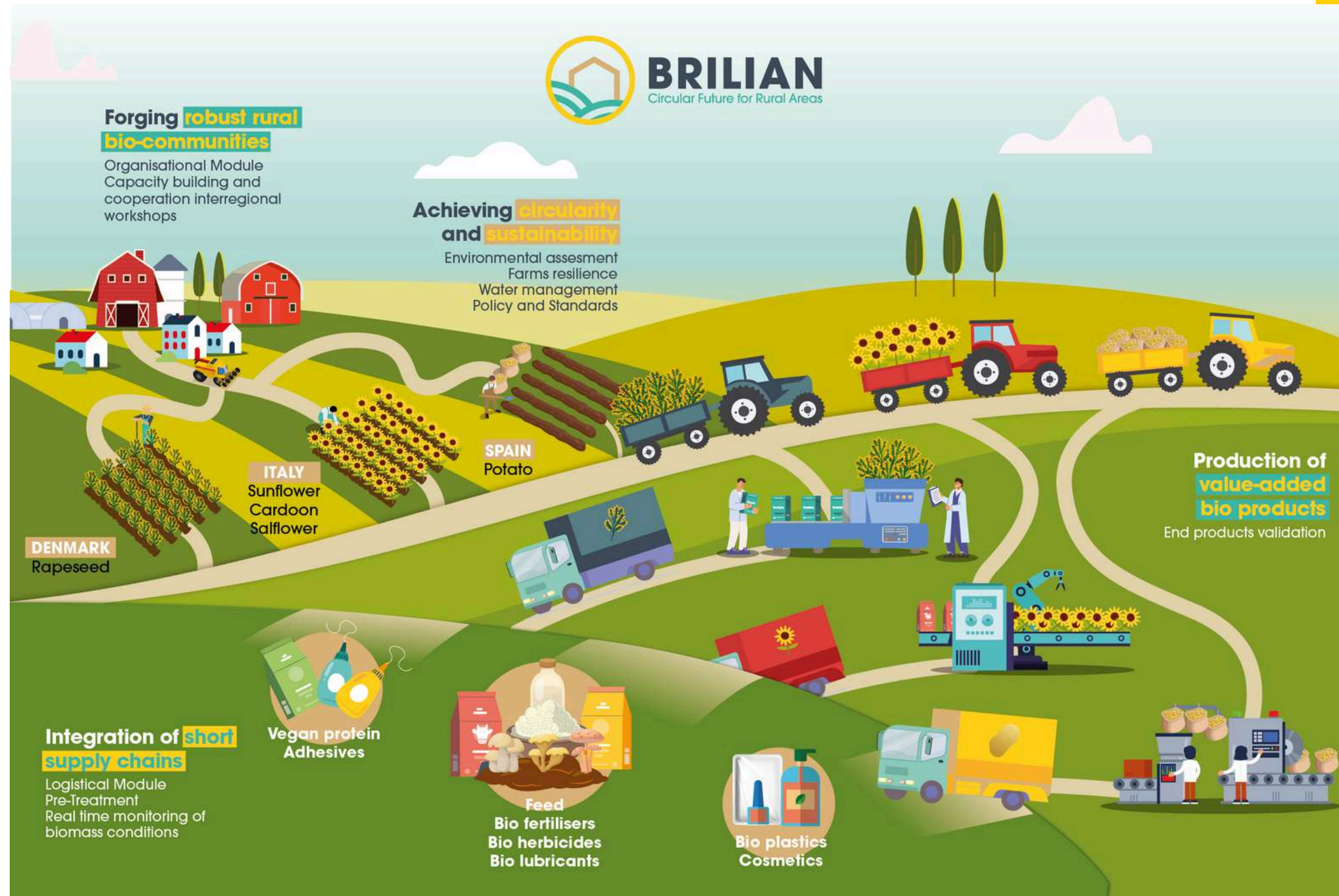
Use the “raise the hand” button to intervene.

Be courteous and respectful in your interactions. Inappropriate behavior or language will not be tolerated.



Smartphone ready:

We will be using Mentimeter today, so please have your smartphones ready.



BRILIAN will support the adoption of sustainable and cooperative business models in rural areas in three pilots located in Italy, Spain and Denmark.

- Support the adoption of sustainable and cooperative business models in rural areas
- Enabling a smoother transition towards bio-based economies.
- Revitalizing these regions
- Promote sustainable economic and social development by transforming primary producers into active players in the supply chain.

- **CBE JU contribution:** €6,167,721 million
- **Duration:** June 2023 – May 2027
- **Feedstock:** Cardoon, safflower, sunflower, potato and rapeseed



Consortium of 13 partners led by CIRCE (Spain).



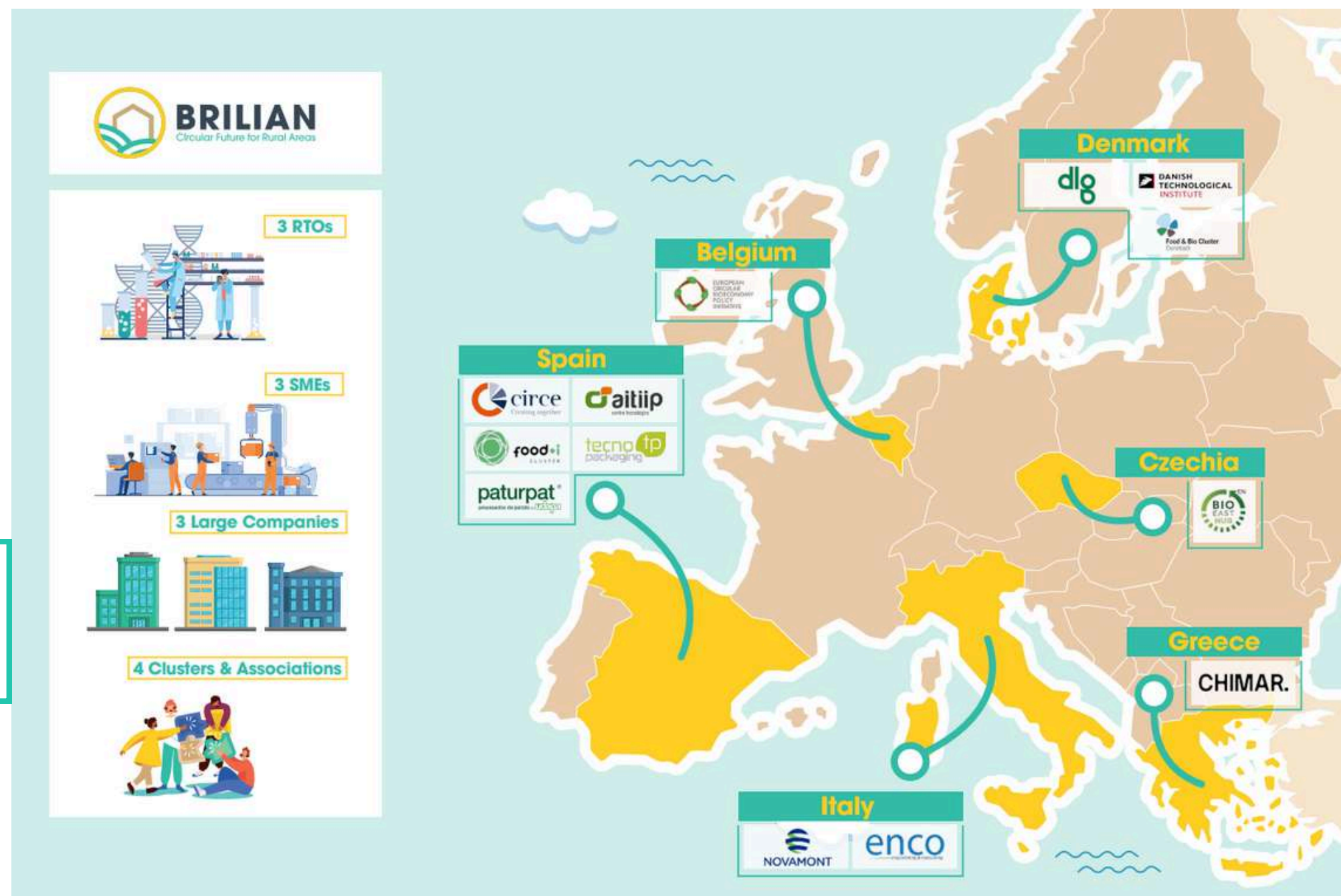
Products: bioplastics, biolubricants, proteins, bioadhesives, bioherbicides, products for animal feed or the cosmetic sector.



10 bio-based value chains.



Increase in the products portfolio of primary production by valorising waste



BRILIAN
Circular Future for Rural Areas

DECENTRALIZING THE BIOECONOMY: THE STRATEGIC ROLE OF RURAL BIOREFINERIES

The global shift toward sustainable, bio-based economies is gaining momentum—but to be truly transformative, the **bioeconomy must move beyond centralized systems.**

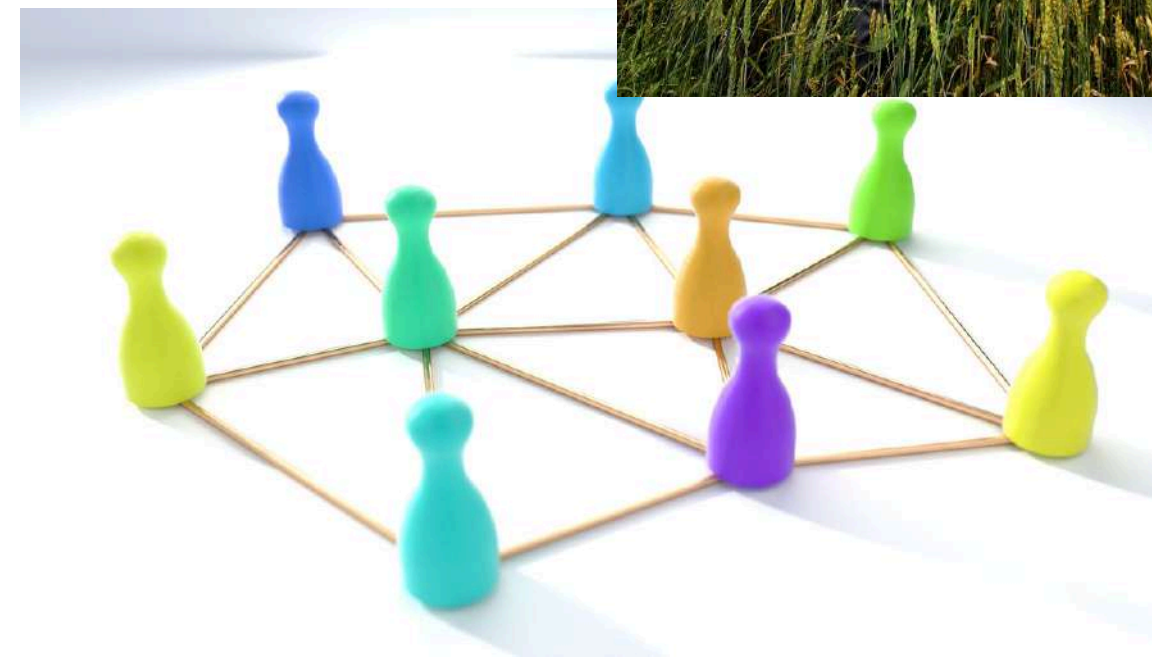
Decentralized rural biorefineries play a critical role in this transformation, enabling **local value creation, reducing waste, and driving regional innovation.**

What Is a Rural Biorefinery?

- Definition: A rural biorefinery converts local biomass—such as agricultural residues, forestry byproducts, or organic waste—into bio-based products, fuels, and chemicals.
- Decentralized Model: Unlike large, centralized biorefineries, rural biorefineries are **smaller-scale, modular, and embedded within local economies.**

WHY DECENTRALIZATION MATTERS

- **Resource Proximity:** Biomass is bulky and expensive to transport. Processing it close to the source lowers costs and emissions.
- **Rural Empowerment:** Localizing processing ensures value stays in rural areas, supporting farmers, landowners, and small businesses.
- **Resilience:** A network of smaller facilities creates a more adaptive, shock-resistant supply chain than single large plants.



CATALYSTS FOR REGIONAL INNOVATION

- **Knowledge Hubs:** Rural biorefineries become centers of technical expertise, attracting universities, startups, and researchers.
- **Circular Economy:** They promote closed-loop systems, encouraging innovation in waste valorization, precision agriculture, and green chemistry.
- **Workforce Development:** New skills and training programs arise to support emerging bioproduct markets, creating quality jobs.



CONCLUSION

- Rural biorefineries are not just production facilities—they're innovation ecosystems.
- By decentralizing the bioeconomy, we not only reduce carbon footprints but also unlock the creative potential of rural regions.
- Investing in rural biorefineries is investing in inclusive, sustainable, and regionally-driven growth.





BRILIAN

Circular Future for Rural Areas

BIOREFINERIES AND LOCAL PROSPERITY: UNLOCKING ECONOMIC AND SOCIAL GAINS

Marco de La Feld
m.delafeld@enco-consulting.it





ManuREfinery

Economic & Social Benefits of Biorefineries for local communities

05/05/2025

Marco de La Feld
ENCO srl



**Circular
Bio-based
Europe**
Joint Undertaking



Co-funded by
the European Union



Bio-based Industries
Consortium

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 CBE JU can be held responsible for them. Grant agreement ID: 101157679.

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.





ManuREfinery

Project Overview

GA n° 101157679

Smart modular mobile biorefining of manure to zero-waste
maximising resource and nutrient recovery for feed and fertiliser
bioingredients in rural areas

Funding programme:
HORIZON EUROPE
CBE JU
BIC

Project duration:
09/2024-08/2028



Co-funded by
the European Union



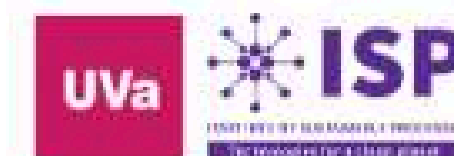
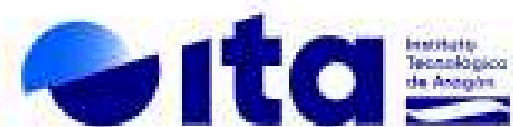
Bio-based Industries
Consortium





ManuREfinery

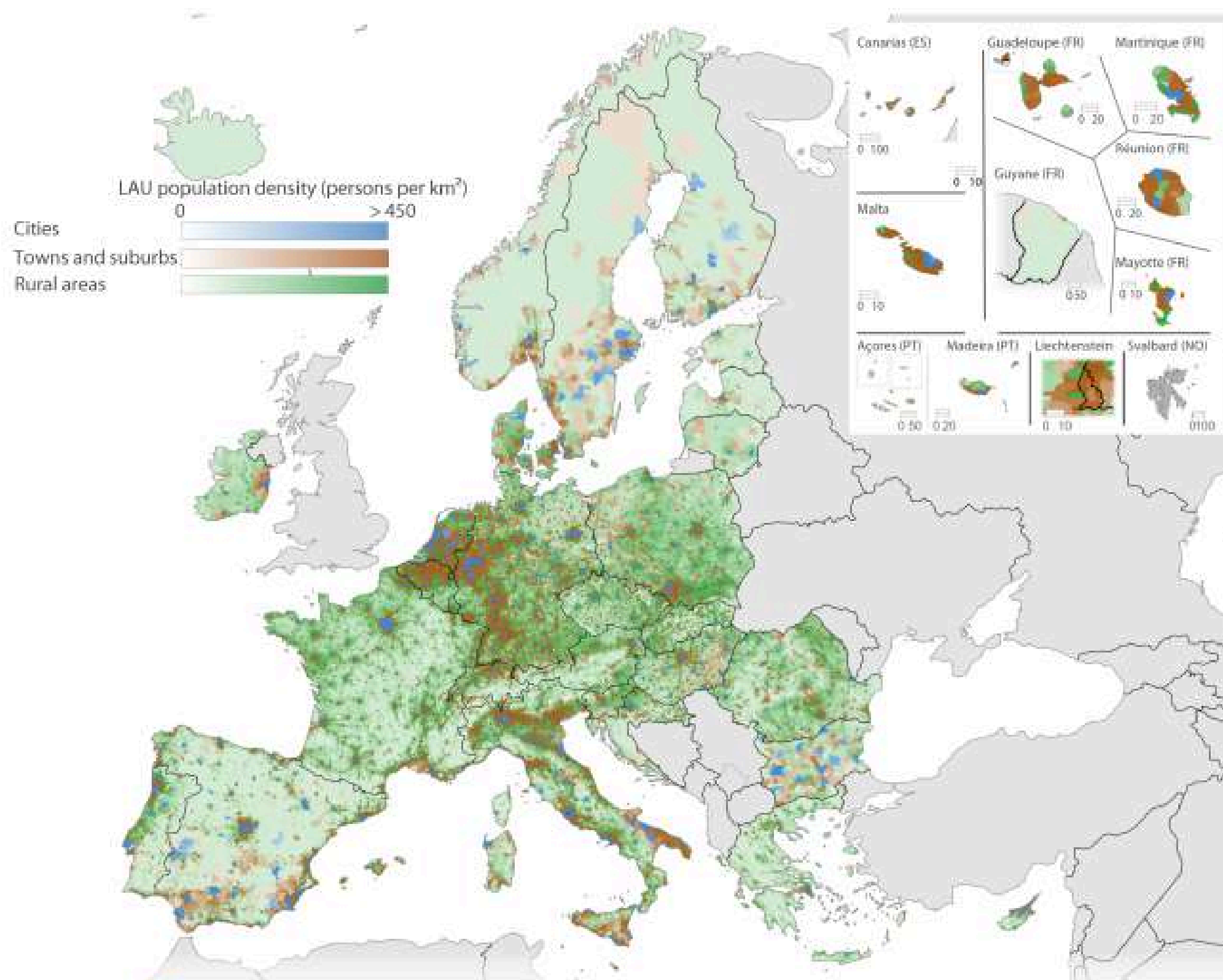
Partners





ManuREfinery

EC definition of Rural Areas



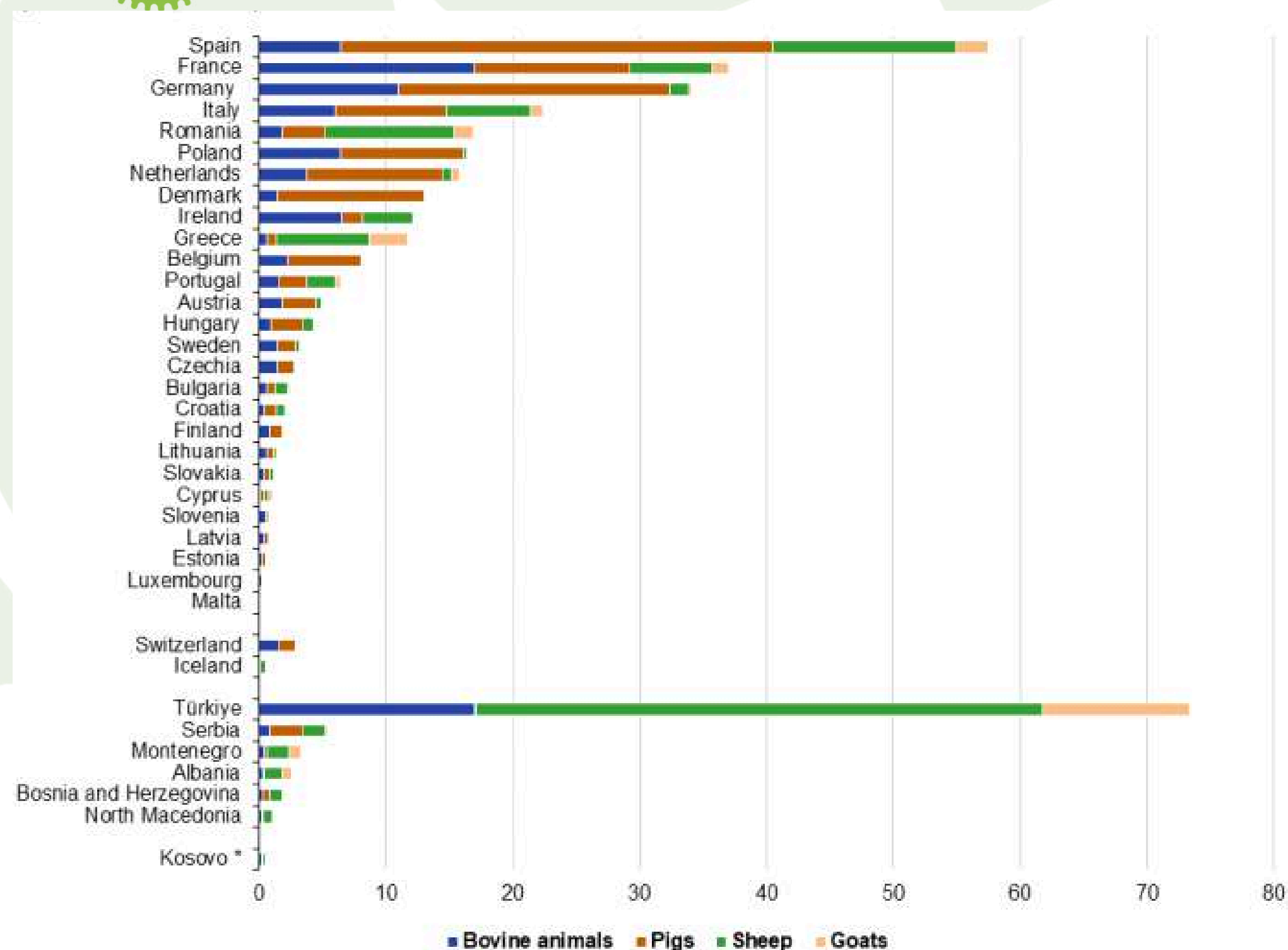
“An area where more than 50 % of the population lives in rural grid cells, as used in the degree of urbanisation.”

Rural areas cover 44 % of the EU-28 territory, and account for 19% of the current EU population



ManuREfinery

The need for ManuREfinery



There were 9.1 million agricultural holdings in the EU in 2020, about two-thirds (63.8 %) of which were less than 5 ha in size.

Biorefineries are mostly located in the central part of the EU, creating a mismatch between the concentration of feedstock and facilities.

Of the 1.4 billion tonnes of manure produced annually in Europe

Waste-derived feedstock is utilized in Germany (16 facilities), The Netherlands (15), France (12), Finland (11), Sweden (10) and Spain (10)

Note: includes estimates and provisional data.

* This designation is without prejudice to positions on status, and is in line with UNSCR 124 and the ICJ Opinion on the Kosovo Declaration of Independence.

Source: Eurostat (online data codes: apro_mt_lscatl, apro_mt_lspig, apro_mt_lssheep, apro_mt_lsgoat)



ManuREfinery

The project

Deploying a smart, modular, mobile and sustainable small-scale decentralised biorefinery that will **convert livestock manure into added value biobased feed** (microbial protein, caproic acid, protein-enriched grass cake) **and bioreagents** (sodium nitrate, ammonium bicarbonate, p-rich ashes) for fertilisers.





ManuREfinery

Expected Outcomes



Green Economies

new business models,
fair local returns,
generational renewal



Circular and Sustainable Value Chains

bioeconomy, resource
efficiency, residual
biomass valorisation



Empowering Rural Innovation

skilled job creation,
SME growth,
investments, innovation
boost



Climate and Environmental Wins

reduced land use,
tangible environmental
and climate benefits



ManuREfinery

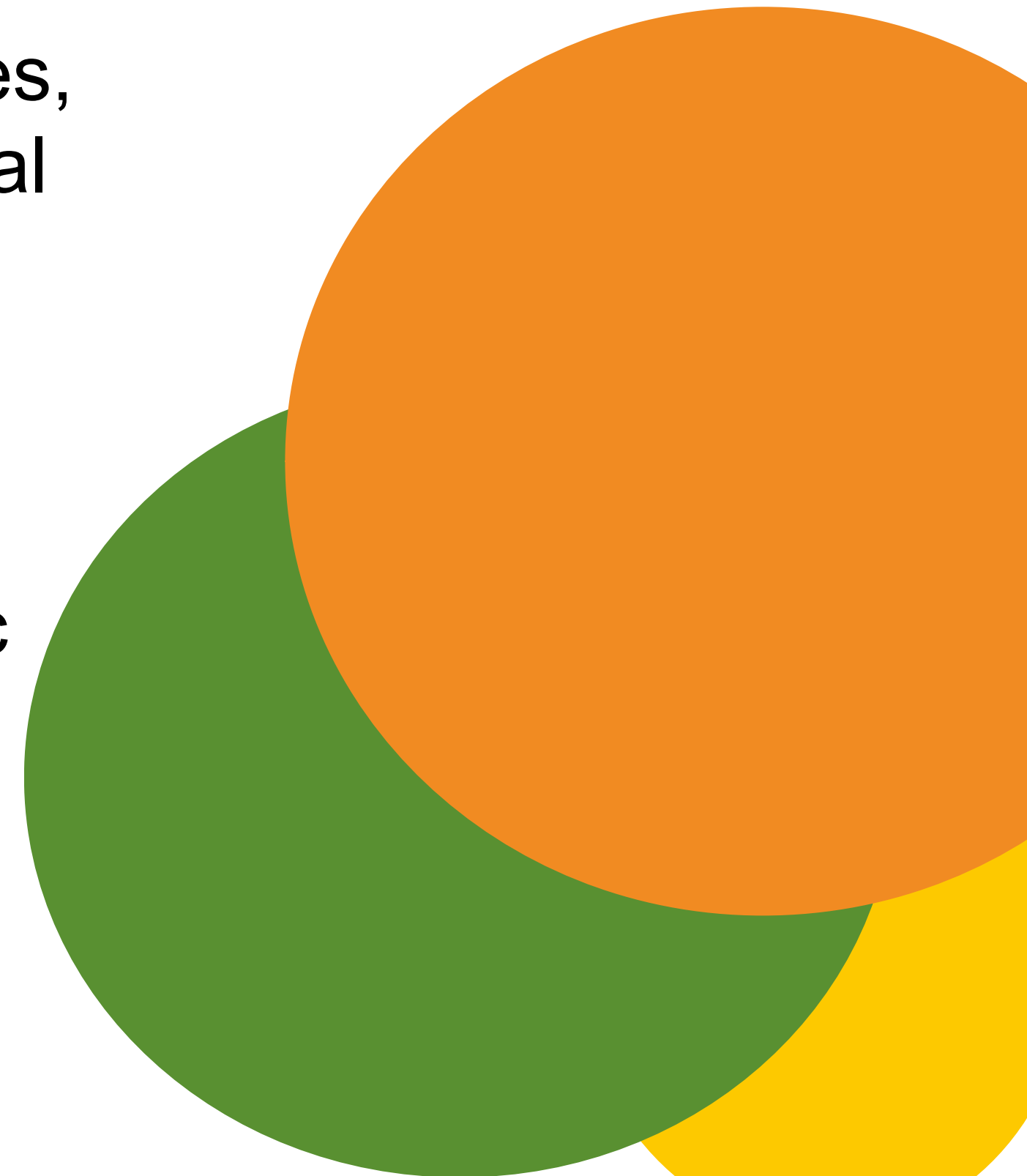
Social Impact

Empowering Small and Medium Farmers:

Provides tools for sustainable agriculture practices, supporting economic resilience and environmental stewardship.

Strengthening Community Sustainability:

Enhances local autonomy in managing waste and producing high-value byproducts like organic fertilizers, reinforcing long-term rural viability.





ManuREfinery

Social Impact

Manurefinery operates between **environmental sustainability** and **rural development**, further benefits for the population include:

Diversified income streams for farmers

- Reduced waste
- New jobs (skilled and unskilled)
- Safer, healthier living conditions
- Community participation
- Holistic, circular model



ManuREfinery

Gender Dimension

“Design for All” principles will be applied to the engineering of the machines, ensuring they are suitable to different anatomical and physiological characteristics.

gathering information on gender equality aspects in the livestock sector and ensuring equal opportunities for men and women in decision processes, and lastly ensuring a broadened access to ManuREfinery's solution for women, who often face barriers to innovations.



ManuREfinery

Marco de La Feld
m.delafeld@enco-consulting.it



ManuREfinery.eu

THANK YOU
for your kind
attention!



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 CBE JU can be held responsible for them. Grant agreement ID: 101157679.

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.



BRILIAN
Circular Future for Rural Areas

HOW SCALE-UP CAN BRING INNOVATION FROM LAB TO SUCCESSFUL BIOMANUFACTURING

Stef Denayer
stef.denayer@bbeau.org



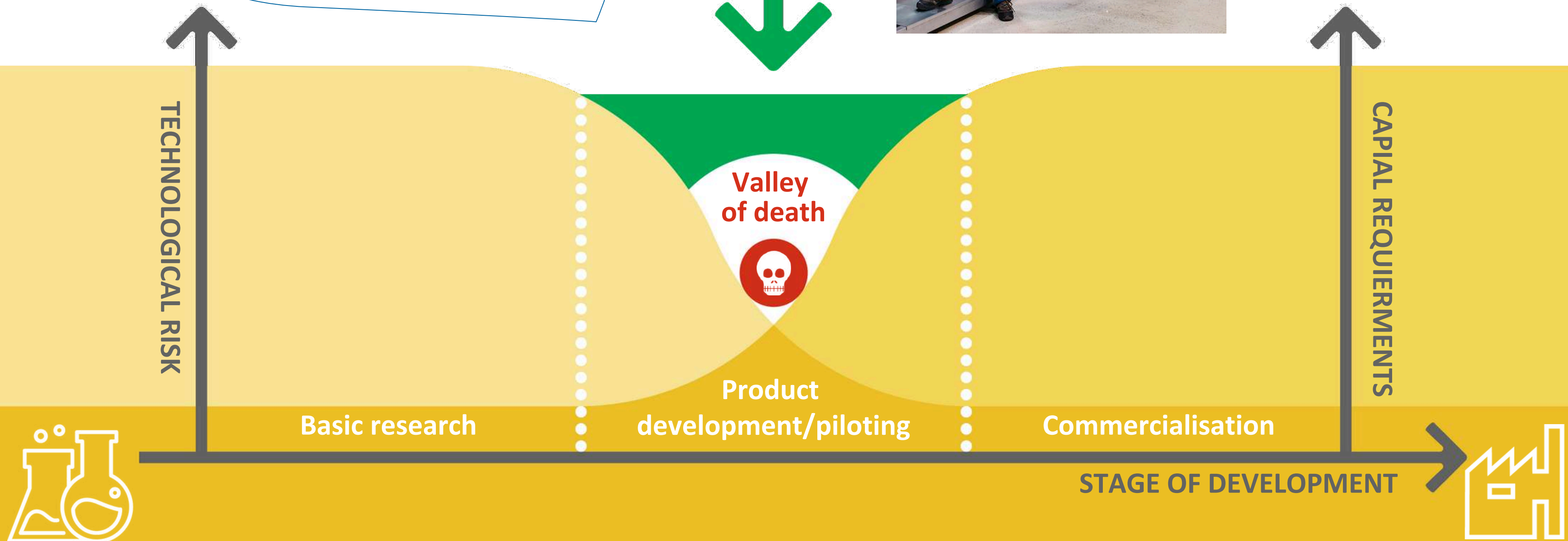


From grams

↓
to tonnes



Pilot and demo
infrastructures
help bridging
the valley of death



Advantages of collaborating with a pilot plant

Better

Scale-up is our
CORE business

Cheaper

Lower
CAPEX/OPEX costs

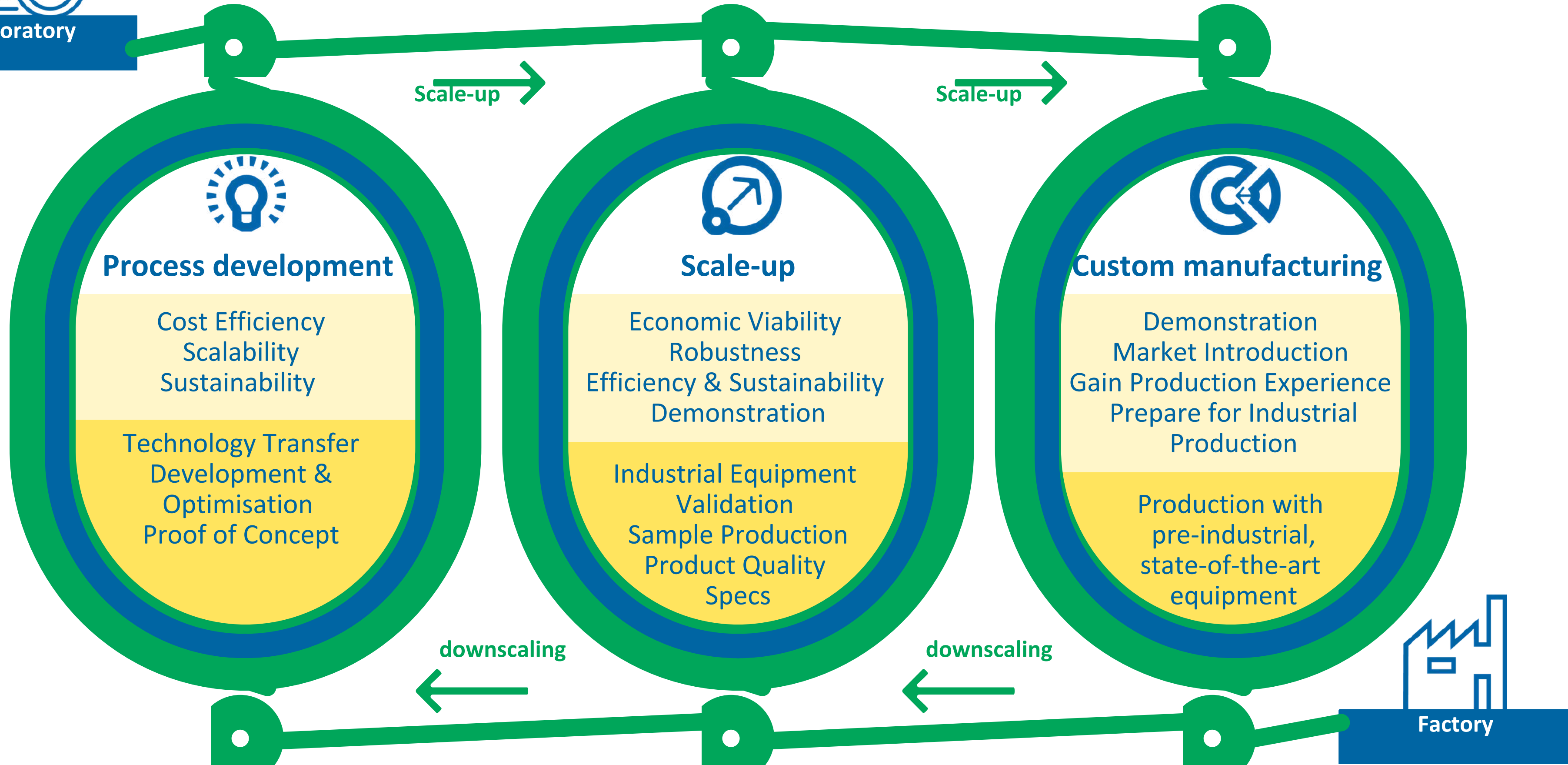
Faster

Readily
available



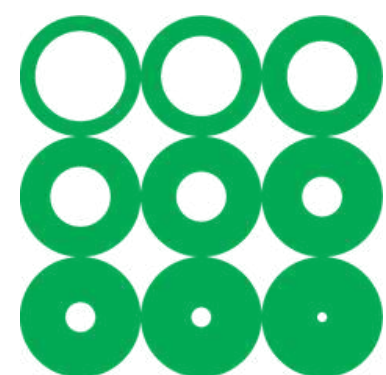
Laboratory

Services



Factory

**A one-stop-
shop for ...**



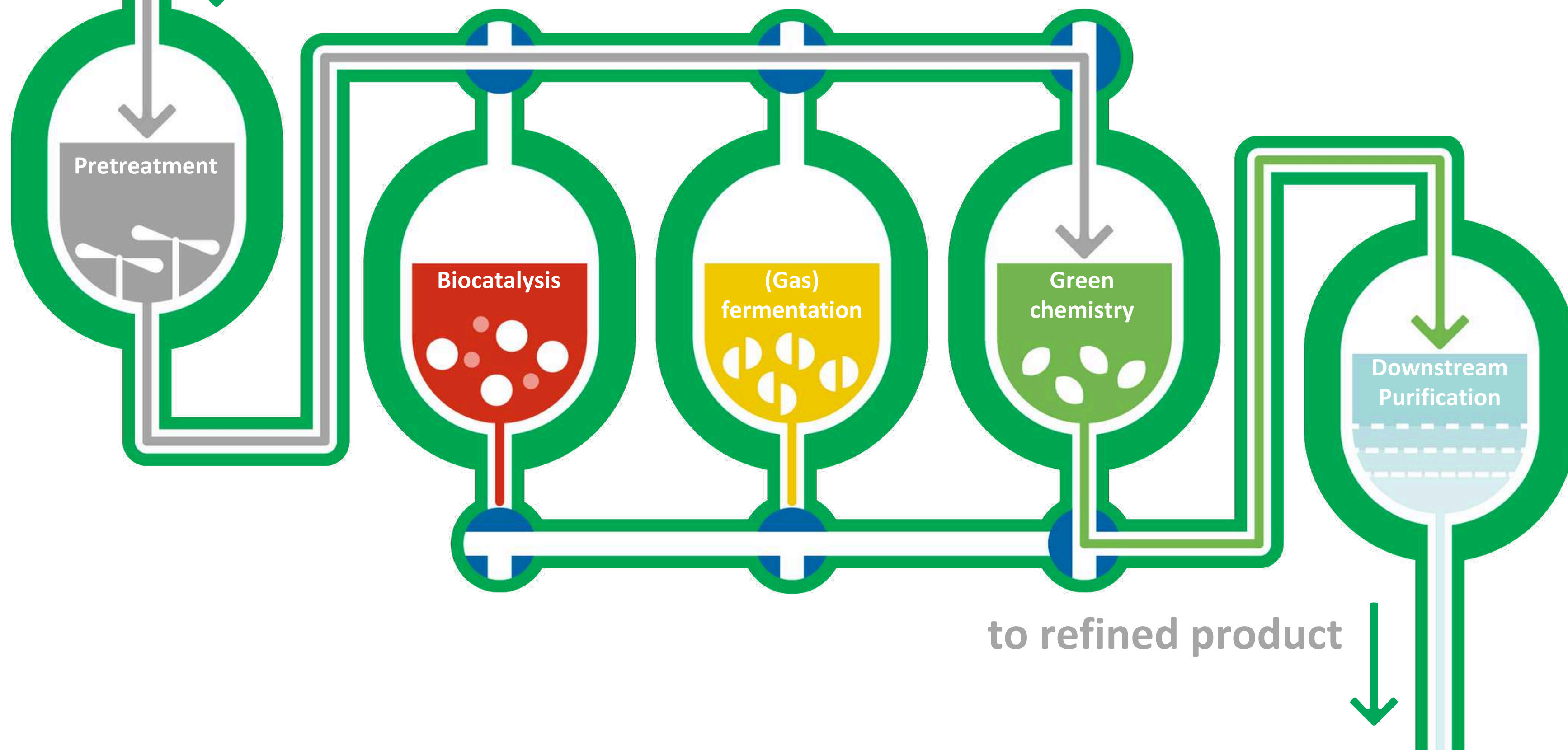
**Biobased processes
and products**



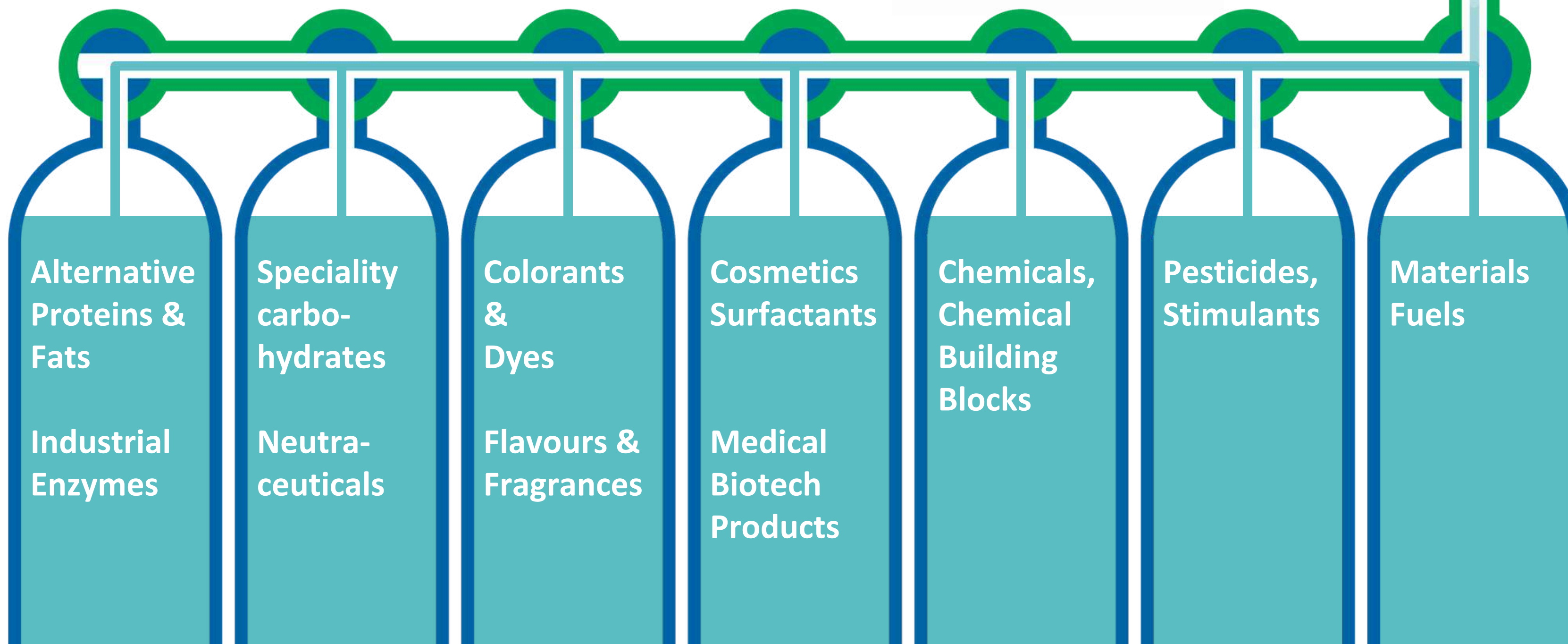
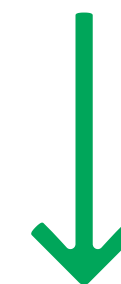
**from
biomass**



through our processes



refined products





Scale-up support leading to industrial scale implementation



Testimonials and Collaboration Results

[Home](#) → [What we can achieve together](#) → [Testimonials and Collaboration Results](#)

WHY DO YOU NEED PILOTING?

TESTIMONIALS AND COLLABORATION

From 2013 to 2023, BBEPP successfully conducted over 600 bilateral (private) projects with more than 250 small, medium and large sized companies. On top of these, BBEPP was/is involved in more than 80 public project consortia.

These collaboration obviously lead to next steps in the innovation track of these companies such as finalizing investment series, construction of new process lines and facilities, new products on the market and many more.

Collaboration resulting in building a new facility or product line

Establishment of a local legal entity

Collaborations resulting in Investment A, B, C Series

Bridging the gap for start-ups and SMEs

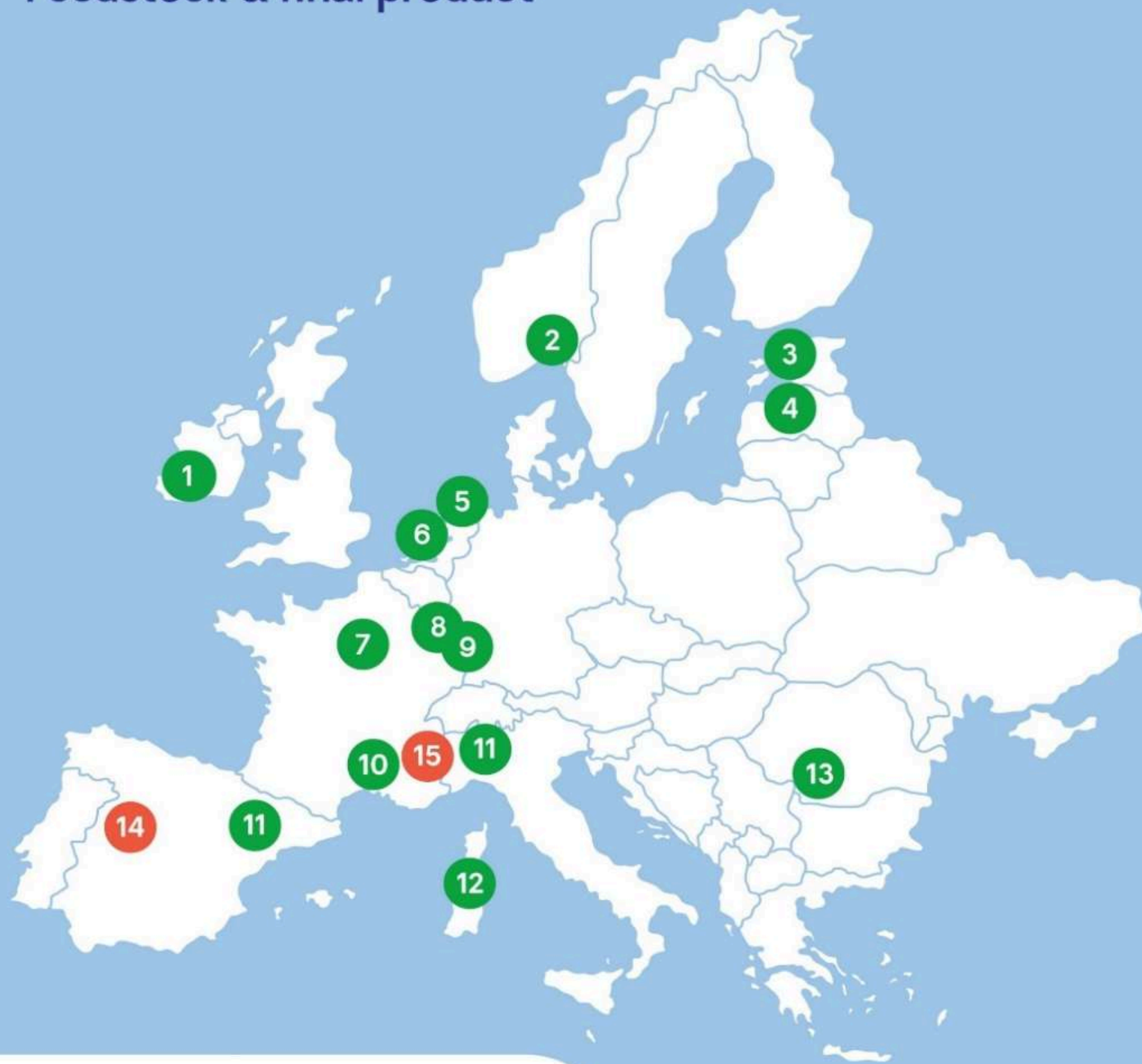
New products on the Market

Technology transfer to large tollers

Spin-Off companies of the Bio Base Europe Pilot Plant

CBE JU flagship projects

Feedstock & final product



 Flagship biorefinery  Call 2022

- | | |
|---|--|
| 1 AgriChemWhey
Dairy sidestreams
↳ Lactid adic, minerals for food and fertilisers | 2 EXILVA
Cellulose
↳ MFC - MicroFibrillated Cellulose |
| 3 SWEETWOODS
Lignin & hardwood residues
↳ High-quality C5/C6 sugars & dried lignin | 4 VIOBOND
Forest-based
↳ Bio-based resins |
| 5 PLENITUDE
Residues of cereal crops
↳ Mycoproteins | 6 PEference
Crop residues
↳ FDCA for bioplastics |
| 7 FARMYNG
Mealworms & agri-food sidestreams
↳ Proteins for animal feed & organic fertiliser | 8 AFTERBIOCHEM
Sidestreams from sugar beet
↳ Flavourings, fragrances, hygiene products, pharmaceuticals, antimicrobials & polymers |
| 9 ReSolute
Sidestreams from pulp & paper industry
↳ Biodegradable, harmless & bio-based solvent: Cyrene | 10 SCALE
Microalgae
↳ Nutritional ingredients for food, feed and cosmetics |
| 11 CIRCULAR BIOCARBON
Municipal solid waste
↳ High-value products from fertilisers to 5G technology | 12 FIRST2RUN
Underutilised oil crops
↳ Building blocks for polyester production & vegetable oils |
| 13 LIGNOFLAG
Crop residues
↳ 2G bioethanol biofuel - building block | 14 SUSTAINEXT
Crops & agro-industrial side-streams
↳ Ingredients for food, feed, cosmetics & fertilisers |
| 15 SYLPLANT
Agri-based & wood based
↳ Alternative protein sources for food & feed ingredients | |



EXILVA – Sarpsborg, Norway



PEFerence – Delfzijl, NL



PLENITUDE - Sas van Gent, the Netherlands



SWEETWOODS - Imavere, Estonia



FARMYNG – Amiens, France



LIGNOFLAG - Podari, Romania



AFTERBIOCHEM - Saint-Avold, France



FIRST2RUN - Porto Torres, Italy



Flagship biorefinery



Flagship biorefinery Call 2020

Flagship project - Plenitude

The first-of-its kind, large scale production of proteins for food applications from alternative sustainable sources using a zero-waste biorefinery process



ENOUGH

Cargill

VIV
ERA

abp

iff

Lactips



mosa meat



WAGENINGEN
UNIVERSITY & RESEARCH

20 BRIDGE2FOOD
ANNIVERSARY

The focus of this project is on finding, developing, and marketing mycoprotein, a food ingredient derived from a filamentous micro-organism, Fusarium Venenatum in:

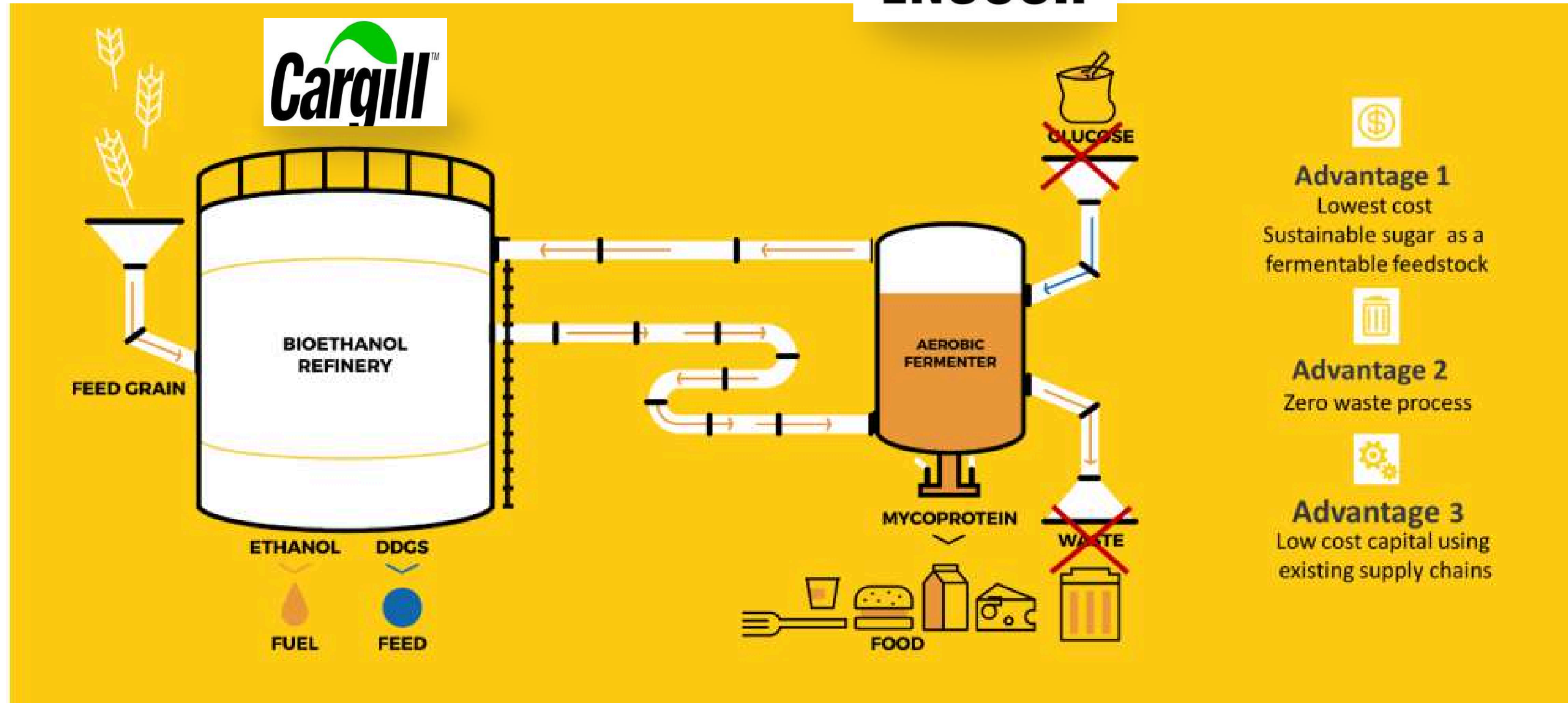
- Food markets (meat, meat-free, dairy-free, and many other applications)
- Petfood
- Bio-plastics
- Cultured meat



Increase the availability of sustainable, safe food-grade protein by successfully building and operating large-scale, first-of-its-kind bio-based value chain producing safe food-grade protein sourced from sustainable sources such as primary grains (wheat), using an integrated biorefinery setup

Flagship project – CBE JU

ENOUGH®



ENOUGH[®]

delicious. nutritious. sustainable.



93%
Less
Water



97%
Less
Feed



97%
Less
CO₂



<https://youtu.be/jgKyFv8WCJw>



Leftovers of barley and the beer from which whiskey is produced.

COP26: How Scottish whiskey is being used in the fight against global warming - Het Journaal, één



Investor Relations January 18, 2024

Evonik manufactures first product from world's first industrial-scale rhamnolipid biosurfactant plant

Evonik has manufactured the first product from its industrial-scale facility for sustainable biosurfactants that has been completed ahead of schedule at its site in Slovakia.

- New triple-digit million-euro facility in Slovakia completed ahead of schedule
- Meets high demand for biobased, biodegradable rhamnolipids for cleaning and personal care applications
- Latest milestone toward sustainability-driven biosolutions

Essen, Germany. Evonik has manufactured the first product from its industrial-scale facility for sustainable biosurfactants that has been completed ahead of schedule at its site in Slovakia. The new plant is the first worldwide to produce sustainable rhamnolipid biosurfactants. Evonik's





NEWS!

AmphiStar embarked on a 5m€ SPRIN-D challenge on circular manufacturing!

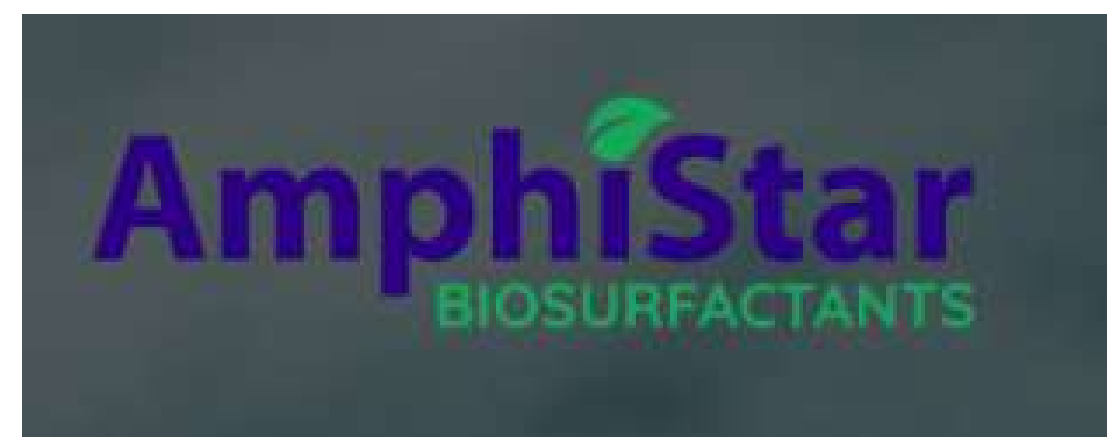
NEWS!

AmphiStar 6 M€ Pre-Series A

◦ AmphiStar ◦

Making Biosurfactants Mainstream

AmphiStar is the first company to develop, scale-up, produce and sell sophorolipid biosurfactants which are 100% sourced from biobased waste- and side streams. These biosurfactants are amphiphilic molecules which can be applied in home care, personal care, cosmetics, industrial cleaners, textiles, agrochemicals and many more. The latter is possible thanks to e.g. their excellent wetting, degreasing and foaming functionalities, their mildness and non-irritating nature.





TripleW Raises \$16.5m Series B Led by Firstime VC Climate Fund



March 22, 2023

The investment will accelerate the expansion of TripleW's lactic acid technology by transforming existing waste management facilities in Europe and the US.

Microbial protein value chain

RAW MATERIALS

Industrial gasses



Pre-treatment biomass



Micro-



PRODUCTION

Fermentation



Protein filtration and purification



END PRODUCTS

Food, feed and fine chemicals



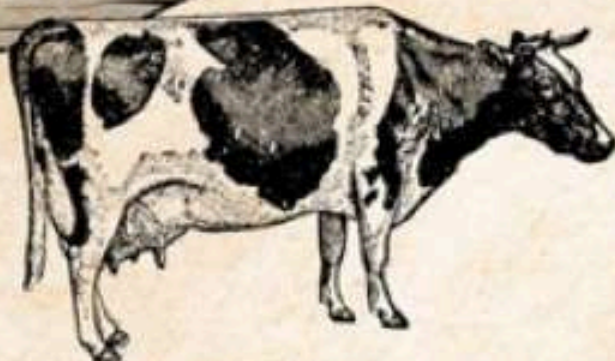
THOSE VEGAN COWBOYS



IN THE OLD DAYS



GRASS ➡



COW ➡



MILK ➡



CASEIN & FAT ➡



CHEESE MAKING AND RIPENING ➡

Water, microbial rennet and other ingredients are added.

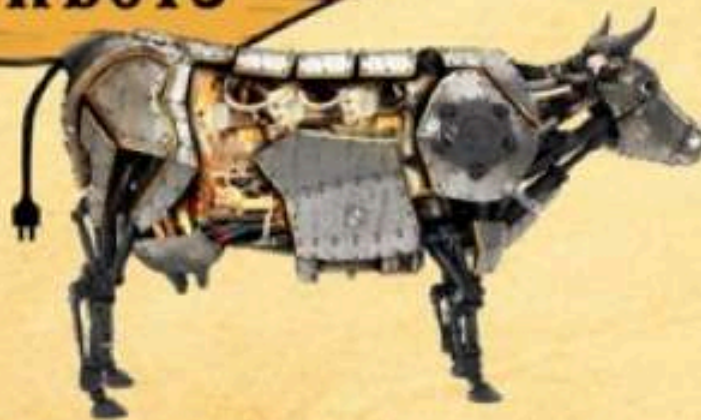


DAIRY CHEESE

IN THE GOLDEN AGE OF THOSE VEGAN COWBOYS



GRASS ➡



STAINLESS STEEL COW ➡

Microflora make casein and whey proteid, identical to these created by dairy cows. Fermentation is used to make casein in mass.

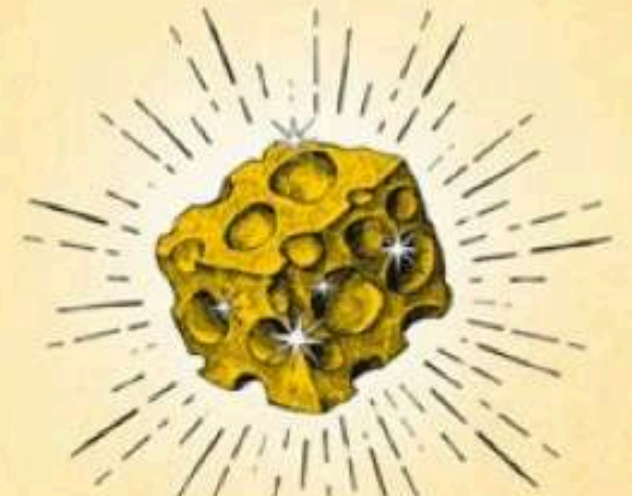


CASEIN ➡



CHEESE MAKING AND RIPENING ➡

Water, fat, microbial rennet and other ingredients are added.



PLANTBASED CHEESE





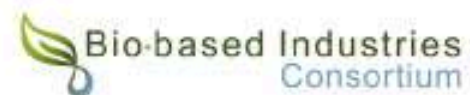
THOSE VEGAN
COWBOYS

THANK YOU!!!



BRILIAN
Circular Future for Rural Areas

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members under grant agreement N° 101112436. 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 CBE JU can be held responsible for them.



Stef Denayer
stef.denayer@bbeu.org





BRILIAN
Circular Future for Rural Areas

**SUCCESSFUL EXAMPLES OF BIOREFINERIES
CONTRIBUTING TO REGIONAL DEVELOPMENT**



Anna Ciancolini
anna.ciancolini@novamont.com

5 th MAY, 2025

Successful examples of biorefineries contributing to agricultural development

ANNA CIANCOLINI
Head of Agronomic Research and
Development Department

Who we are



Who we are

The **Novamont Group** is an industrial company with its roots in the Montedison School of materials science, created to pursue the ambitious project of various researchers: **the integration of chemistry and agriculture.**

Established in 1990, it is today a **Benefit Company, B Corp certified** and among the international players in the field of bioplastics and **biochemicals** wholly or partly derived from biomass.

In 2023, it was acquired by Eni Versalis, Italy's leading chemical company, whose strategy is strongly oriented towards specialising its portfolio through chemistry also from renewable sources.



Our DNA

Novamont: a group with a triple vocation

INDUSTRIAL STRUCTURE

Mater-Bi / Bioplastics

total production capacity

>170.000 ton/y

People

~ 650

Biomethane

Origo-Bi / Biopoliesters total
production capacity

>117.000 ton/y

Tetrahydrofuran - THF

Dielectric oils and
biolubricants **Matrol-Bi**

Bio BDO from fermentation
total production capacity **30.000
ton/y**

Pelargonic Acid
Azelaic Acid
(Matrica - JV Novamont Eni
Versalis)

RESEARCH AND DEVELOPMENT

13

industrialized
proprietary
technologies
of which 4
first of a kind

> 25%

people dedicated
to research,
development and
innovation
activities in 2023

~ 1.600

patents / patent
applications in
2023
135 patent
families

3

research centers

3

technology hubs
with pilot plants
and demo plants

TRAINING CENTER

478

training activities since 1996 for young researchers and expert figures
multidisciplinary training paths activated with national and international
universities and research centers.

2022: launch of **OFFICINE NOVAMONT**, a training space where
collaboration and creativity are emphasized as elements of success for the
company.

Circular bioeconomy

The three pillars of our circular bioeconomy model



The reindustrialization of disused sites

Biorefineries for bioproducts built from the reindustrialization of disused or no longer competitive production sites. Development of innovative and more sustainable processes that aim to contribute to the decarbonization of the economy.



The integrated agricultural value chain and scraps valorization

Research and innovation for the development of more sustainable agricultural value chains. Research and innovation for the transformation of waste and by-products into new bioproducts.



Products as solutions

Products intended to help reducing the risk of accumulation of persistent substances in compost, treated water, sludge, and soil, contributing to overcome the problem of pollution. Products also designed to be reused and recycled.

The agricultural value chain integrated in the local areas



Novamont has always promoted research projects targeted on different local areas according to their specificities.

- **Promotion of low input oleaginous dry crops able to restore organic carbon in marginal land**
- Training in good soil management practices to promote sustainable agriculture
- Contribute in reducing environmental impact on soil and water through the use of: biodegradable mulch films, fitosanitary products based on pelargonic acid, biolubricants for agricultural machineries
- Cascading use of all crop components to make products and co-products ranging from biochemicals to animal feed and to meet the energy needs of the industrial process
- **The collaboration with Coldiretti began more than 10 years ago in the experimental fields of central Italy.**

Product as solutions

Mater-Bi

The innovative family of biodegradable and compostable bioplastics

MATER-BI



Mater-Bi products are not just products, they are developed with the aim of addressing specific environmental, economic and social challenges, such as the management of organic waste or the pollution, with the potential to generate positive effects for the community



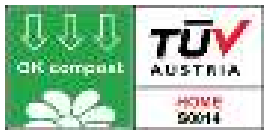
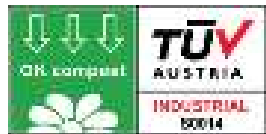
- 1. biodegradable and compostable in industrial composting
- 2. biodegradable and compostable in home composting
- 3. biodegradable in soil according to major European and American standards: UNI EN 13432, EN 17033 and ASTM 6400



It is designed not to release persistent microplastics into the receiving environment, shows no ecotoxicological effects and is capable of biodegrading at low temperatures. The main areas of application are waste collection, large retail, food service, packaging and agriculture



The result of an integrated value chain that actively facilitates the creation of virtuous cycles for the reuse and recycling of materials



Application sectors of Mater-Bi

Where biodegradability and compostability represent real added value



Retail

Carrier bags and fruit and vegetable bags adopted by large retailers can be reused for the separate collection of organic waste



Waste management

Bioplastics help to improve the management of organic waste, reducing its potential for contamination and thus promoting the production of high-quality compost



Agriculture

Soil biodegradable products simplify plastic waste management operations and greatly reduce the risk of pollution in a sector where there is a high rate of dispersion into the environment



Packaging e Foodpackaging

Compostable packaging can be disposed of with organic waste, providing a solution for all the traditional packaging that today cannot be recycled or ends up in organic waste



Foodservice

Compostable foodservice ware simplifies waste management when it is not possible or practical to use washable and reusable ware, such as at large events or in closed circuits

Bioproducts for agriculture

Mater-Agro

A new model of participatory innovation between agriculture and industry



Mater-Agro is the company (85% Novamont, 10% Coldiretti, 5% CAI) dedicated to farmers and created to promote a participatory innovation model between agriculture, research and industry, helping farmers to maintain good crop yields through sustainable agronomic solutions.



**Biodegradable mulch
films and auxiliary
applications**



**Plant protection
products based on
pelargonic acid**



Biolubricants



**Dry crops
agricultural value
chain**



Experimental farm

Mater-Bi in agriculture

Innovative biodegradable solutions in soil



Which applications are targets for biodegradable and compostable plastics?

IN FUCTION OF

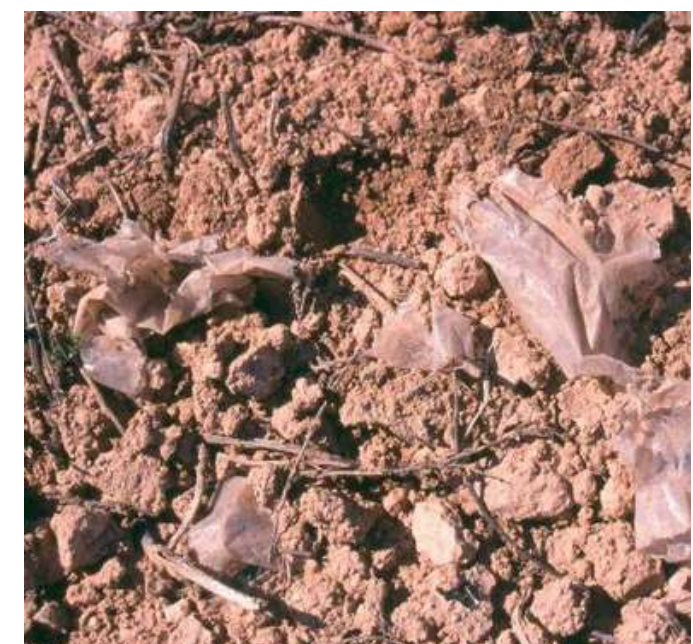
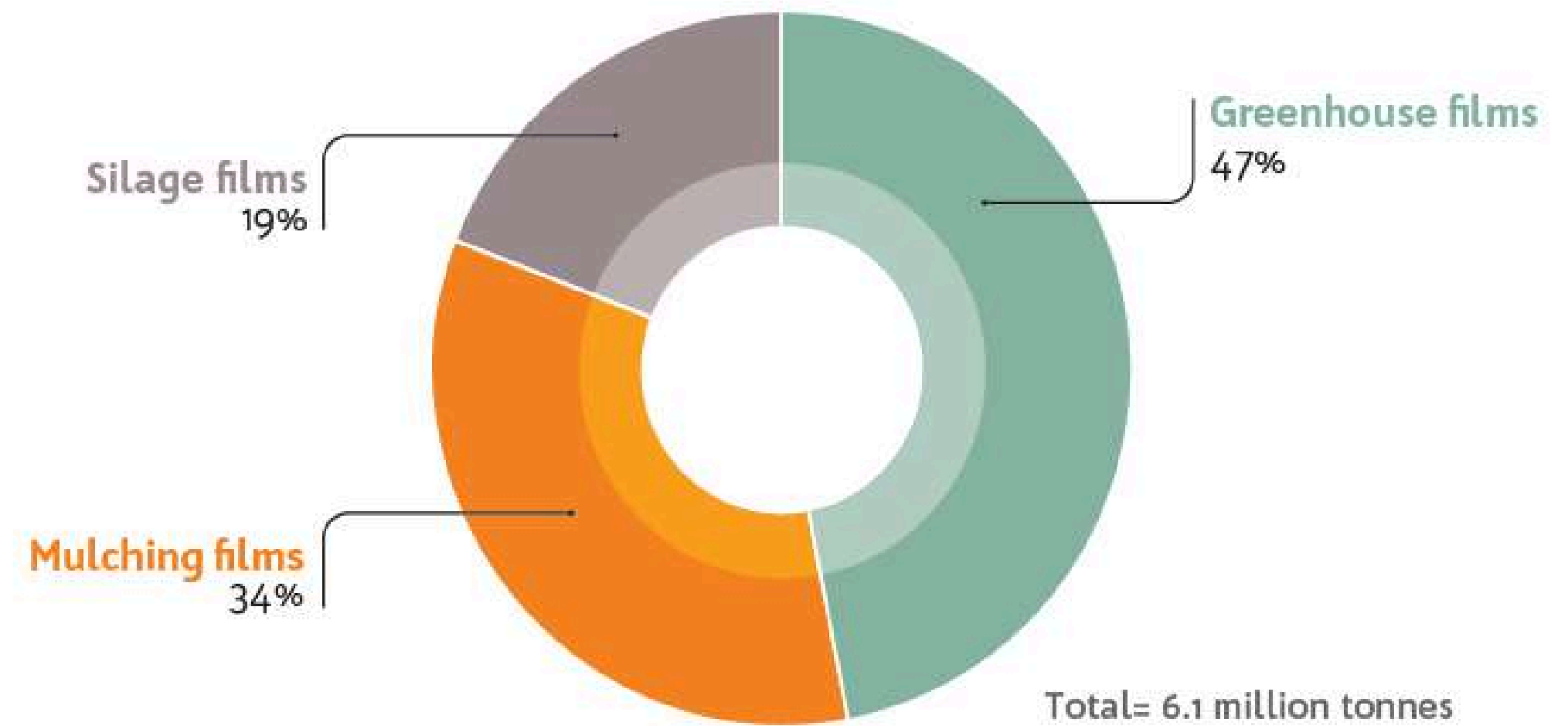
Extent of use
Short lifespan (= high turnover)
Difficult/expensive removal
High recycling costs/no possibility of recycling in the area
High possibility of leakage in the environment
High «soiling»/dirt (% of soil or other inert materials at end of life)



Plastics in agriculture

- At global level 12.5 Mt plastics/yr are used in agriculture, corresponding to 3-5 % of the total plastic production (359 Mt/yr)*
 - Mulch films represent about 40 % of the total (Sintim and Flury 2017).
 - The global agricultural film market is expected to increase by 50% from 6.1 million tonnes in 2018 to 9.5 million tonnes in 2030
 - 5% of all plastic waste in Europe is agricultural plastic.**
 - The European mulch market amounts to 80,000 t, of which 95% (76,000 t) is of non-renewable and non-biodegradable origin.**
 - The benefits of using plastics in agriculture include increased yields and production efficiency alongside reduced food loss and waste, however their use also incurs high environmental, economic and social costs, primarily from increased pollution.
- *

Global use of plastic films in agriculture in 2018 (FAO, 2021)



Mater-Bi soil biodegradable mulch film



- Used by growers since **over 20 years** and **fully established agronomic solution** for a wide range of crops (with short and medium crops cycle)
- At the end of the cultivation cycle, Mater-Bi soil biodegradable mulch films **do not have to be collected and disposed of, but have to be incorporated into the soil** where, through **microorganisms**, they biodegrade, transforming into carbon dioxide, water and biomass
- **Reduction of labor costs** for removal and disposal
- **Reduction** of potential negative impacts caused by **improper disposal** operations and **landfill**
- Opportunities also for **organic farming** where herbicides are not allowed and weeds control is more difficult: Novamont is the first company to have certified a material according to the «**AIAB Technical Means**» specification
- Some **crops normally grown without plastic** films can benefit from the use of biodegradable mulches (e.g. processing tomatoes, vine)

Biodegradation in soil of Mater-Bi mulch film



OK bio-degradable SOIL

Is a certificate awarded to those materials that are completely biodegradable in soil without negative effects (toxicity) on the soil biodegradation substrate – Certificate issued by TÜV Austria



EN 17033:2018 – EUROPEAN STANDARD WHICH DEFINES:

The characteristics of biodegradable film in terms of complete biodegradability in soil without negative effects (toxicity) on the biodegradation substrate (soil)

- Characteristics of the finished product (initial tensile and optical properties)
- Certificate of conformity issued according to DIN CERTCO protocol



CRITERIA

- **Biodegradation (conversion to CO₂):** $\geq 90\%$ in 24 months compared to a reference material, measured in soil at room temperature (according to EN ISO 17056)
- **Ecotoxicology:** growth tests on plants, tests on earthworms, nitrification tests (according to EN ISO 11268-1-2)
- **Heavy metal values:** lower than the thresholds established by standards (according to EN ISO 17294-2; EN ISO 12846;)



ISO 23517: 2021

Same structure as EN17033 so specifies test methods and evaluation criteria by addressing the following characteristics:

- a) control of constituents constituents;
- b) biodegradation;
- c) negative effects on terrestrial organisms.

Integrated solutions for the territories

Soil biodegradable mulch film on processing tomato: a non-traditionally mulched crop

Experience in Italy and Spain



WHERE WE STARTED FROM

- Italy and Spain are the biggest processing tomatoes producers in EU (Eurostat).
- Plastic mulch films are used in processing tomatoes to **enhance plants growth, improve yield, control weeds and optimize inputs** (water, herbicides, fertilizers)
- In **Spain** mulch films are extensively used and many plastics residues remained in the field after harvesting*
- In **Italy** not everywhere plastic mulches were used, due to the impossibility to mechanically harvesting tomatoes in the presence of a plastic mulch

Soil biodegradable mulch film on processing tomato

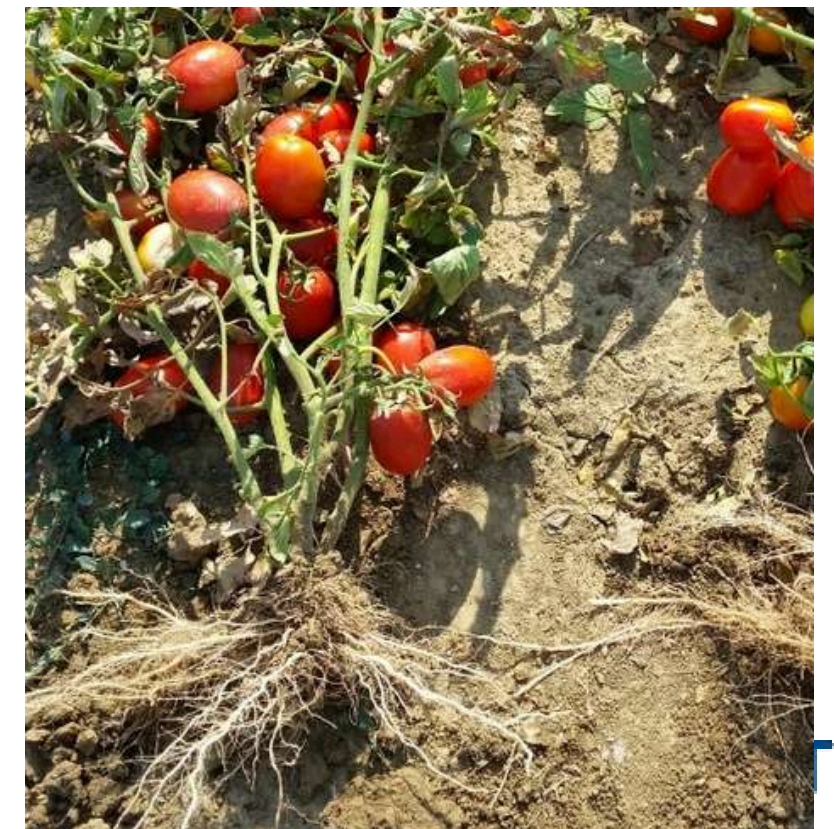
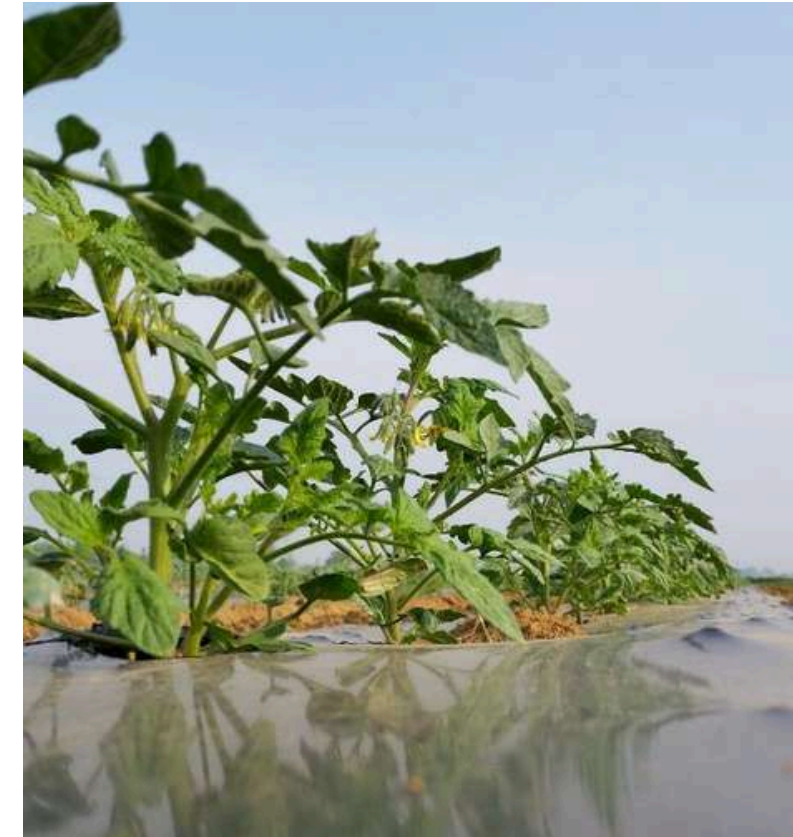
Experience in Italy and Spain

EFFECTS OF BIODEGRADABLE MULCH FILMS

- **Effective control of weeds**, avoiding the use of herbicides, which can compromise the growth of young seedlings
- **Rapid growth of seedlings** in the early stages of the crop cycle
- Approximately **15-20% lower irrigation water consumption**
- **Better root development**
- **Full mechanization from laying to harvest**
- **Yield increase: in quantity (+ 10-30%) and quality**

WHERE WE ARE NOW

- ✓ In **Spain** (Navarra) Mater-Bi mulch films substituted **80% of the plastic mulch films**
- ✓ In **Italy** (Apulia region) **40% of the processing tomato cultivations are covered with biodegradable film**



Models for the territory – integrated bioplastics solutions

Marina de Cabo Cope – South Spain (Murcia)

WHERE WE ARE NOW - THE SOLUTION

In local farms use **certified biodegradable mulch film** and **certified compostable clips and twines** and optimization of conventional non biodegradable plastics end of life

The **growers positively evaluated** the use of **biodegradable mulch films** and **compostable clips and twines**

Technical global solutions were proposed to **minimize the production of plastic waste** at source and simplify the end of life

Spanish and European legislation included biodegradable mulch films and compostable clips and twines certified in accordance with standards (EN 17033 – biodegradable mulch and EN13432 - compostability) among the **environmental solutions** for the possibility of obtaining **subsidies**



Models for the territory – integrated bioplastics solutions

Clips and twine for greenhouse production in South Spain (Andalucia)

WHERE WE STARTED FROM

- Plastic clips and twines are among the most difficult and expensive plastic to be properly disposed of

WHERE WE ARE NOW

- **Compostable clips and twines** were used in greenhouses conditions on different crops: tomato, cucumber, pepper in trials
- The **functionality** of compostable solutions was **equivalent** to the plastic traditional materials
- The compostable clips and twines at the end of the crop cycles were removed from the greenhouse together with the crop green waste and taken to a nearby **industrial composting plant** where they will be converted in **compost** which can then be used in the fields



Models for the territory – integrated bioplastics solutions

Banana sleeves in Martinica

THE PROBLEM

Difficult waste management of plastic waste from banana production (banana bunch sleeves) on an island

In Martinique 105 ha are cultivated with bananas on a total agricultural area of 113 ha

THE SOLUTION

Use of **soil biodegradable and compostable bags** to reduce the plastic waste at source and produce organic matter (compost)

PROJECT CASDAR financed by ADEME (F)

Different local partners (ECODIAM) plastic producers, Banamart and ARMEFLHOR



New bioproducts

Tailored solutions in environmentally and health sensitive areas

BIOLUBRICANTS



MATROL-BI

Matrol-Bi is a line of biolubricants and dielectric fluids of vegetable origin that are rapidly biodegradable. Optimal solutions for environmentally sensitive areas such as agricultural, forestry, marine or urban areas.

PHITOSANITARY BIOPRODUCTS



AGER-BI

AGER-BI is our family of professional plant protection products for agriculture, based on plant-derived pelargonic acid. The pelargonic acid used in Ager-Bi plant protection products is obtained from vegetable oils, through a pioneering process that does not use ozone.

Ager-Bi and Sunpower: a complementary and winning solution



sunpower®

AGRICULTURAL USE

AGER-BI UNIVERSAL is an innovative professional plant protection product based on pelargonic acid obtained from vegetable oils. It provides **weed and sucker control in a variety of crops, including grapevine, hazel, olive, pome fruit** (apple, pear, quince) and proven **efficacy in pre-harvest desiccation of potato, seed alfalfa and peanut**.

AGER-BI CONTROL TOBACCO based on pelargonic acid obtained from vegetable oils, is an innovative professional contact-acting plant Phyto regulator with proven efficacy for the selective control of primary and secondary **tobacco axillary shoots**.

distributed by



EXTRA AGRICULTURAL USE

SUNPOWER is the pelargonic acid-based herbicide for professional use with desiccant action, produced and marketed by Versalis. It is a natural-origin, non-systemic plant protection product **authorized for weed control of annual and perennial weeds in urban and industrial environments**.



Models for the territory – integrated bioherbicide solutions

Bioeconomy project in North Italy (Veneto Region)

Memorandum of understanding between **Symbola**, **Consorzio Valdobbiadene Prosecco Superiore DOCG** and **Novamont** for the study and implementation of technical solutions for the **transition to sustainable agriculture** in the Prosecco Superiore production area transition to sustainable agriculture – **soil biodegradable mulch films and pelargonic acid-based herbicide**



UNIVERSITÀ
DEGLI STUDI
DI PADOVA



Tear-off mulch film system



08/05/2020

A Valdobbiadene il prosecco sposa i bioerbicidi



Nei vitigni del Consorzio del Conegliano Valdobbiadene Prosecco saranno utilizzati bio erbicidi e teli biodegradabili per la pacciamatura

di Maria Pia Terrosi



Take home messages

- **Contribution to improving the sustainability of the territory** by facilitating the end-of-life management, enabling the use of cleaner feedstock materials for composting plants, potentially reducing the need for using inputs such as herbicides, fertilizer, irrigation water and reduction of persistent residues in the environment (substitution of persistent active ingredient).
- Novamont's solutions proved to be **efficient and robust more sustainable alternatives** in terms of **agronomical effects** and **field performance** in various climatic conditions, crops and fully exploitable at commercial scale in many different territories
- **Several benefits for farmers:** potential to biodegrade in soil permits farmers to leave the films in the field saving the time and the fuel usually spent for removing them, and on the same time not tearing away significant quantity of the soil which normally remains attached on the conventional films that consequently have to be treated before being recycled. During plowing stage, the biodegradable film incorporated in the soil becomes part of the soil's organic matter maintaining the soil's fertility intact

National and international research projects

Most relevant collaborative projects

Solid collaborations with the major Italian and international entities in the field of agricultural development and bioproducts for agriculture



“The challenge of our millennium is in the balance between the technical means that humanity possesses and the wisdom in how we will make use of them”.

Umberto Colombo

Thank you for your attention!



THANK YOU!!!



BRILIAN
Circular Future for Rural Areas

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members under grant agreement N° 101112436. 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 CBE JU can be held responsible for them.



Anna Ciancolini
anna.ciancolini@novamont.com





BRILIAN

Circular Future for Rural Areas

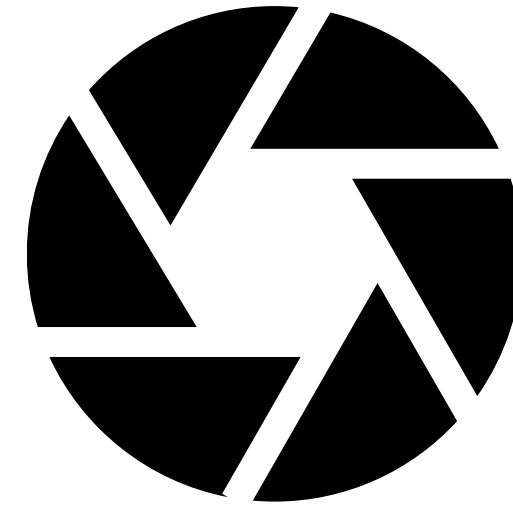
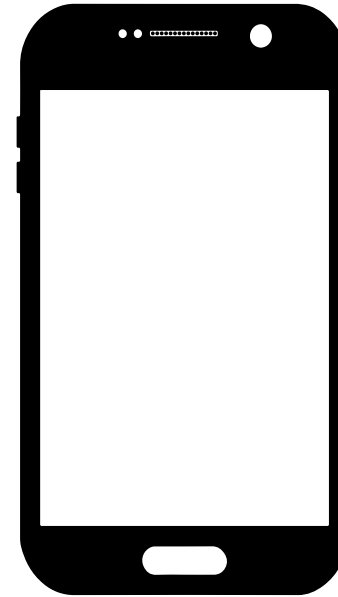
DISCUSSION & Q&A



BRILIAN
Circular Future for Rural Areas

FEEDBACK SESSION

LET US KNOW YOUR OPINION



Access at menti.com
Use code: 7496 5024



BRILIAN

Circular Future for Rural Areas

HOW TO ENGAGE

Find them all the webinars [HERE](#)
& register to our [Newsletter](#)

TRAININGS

30.05.2025



#1 Policy
Alignment:
Toward a
Coherent



#2 Private
and public
funding
instruments



#3 The role
of
governance
and



#4
Biorefineries
as Nodes for
Rural



#5
Sustainability
of the
Bioeconomy



Join the Advisory Board of Farmers

<https://brilian.eu/advisory-board-of-farmers/>

THANK YOU!!!



BRILIAN
Circular Future for Rural Areas

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members under grant agreement N° 101112436. 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 CBE JU can be held responsible for them.



Anastasia Perouli
BIOEAST HUB CZ
perouli.anastasia10@gmail.com