

# Le progettualità sulla bioeconomia in Europa



Sara Cantone, Cluster SPRING – POWER4BIO Project Manager

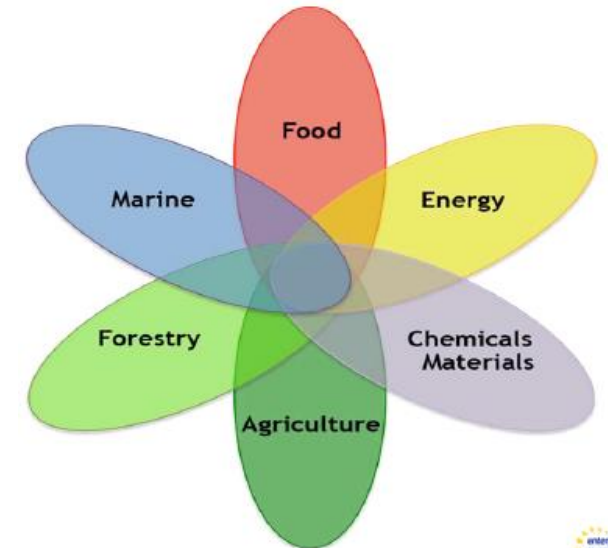
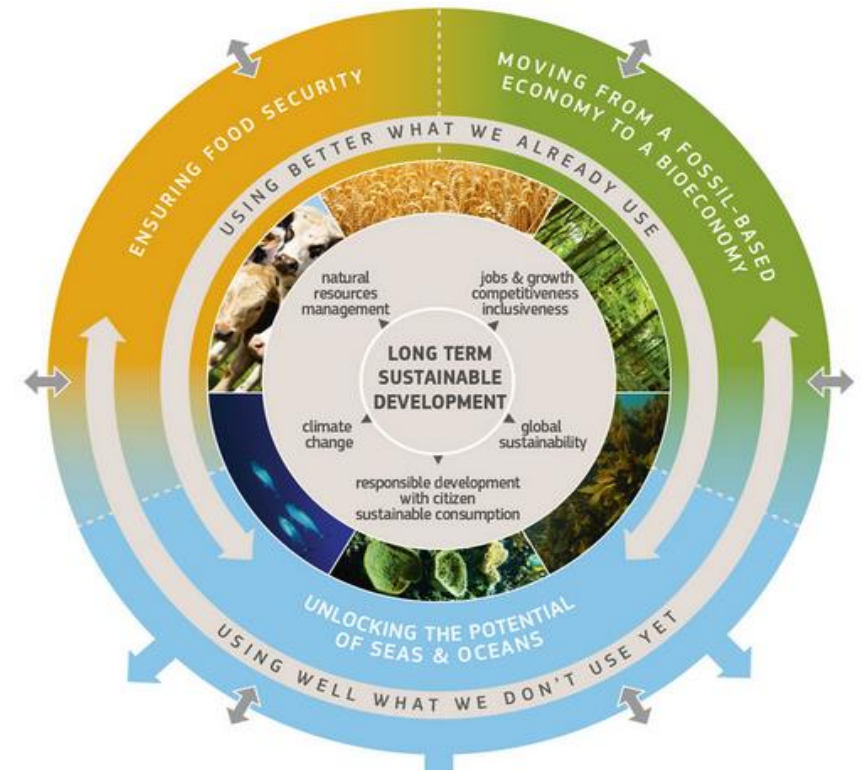
## La Bioeconomia in Europa: un breve accenno

- **2012:** Prima strategia Europea per la Bioeconomia
- **2018:** Nuova Strategia Europea per la Bioeconomia e Action Plan

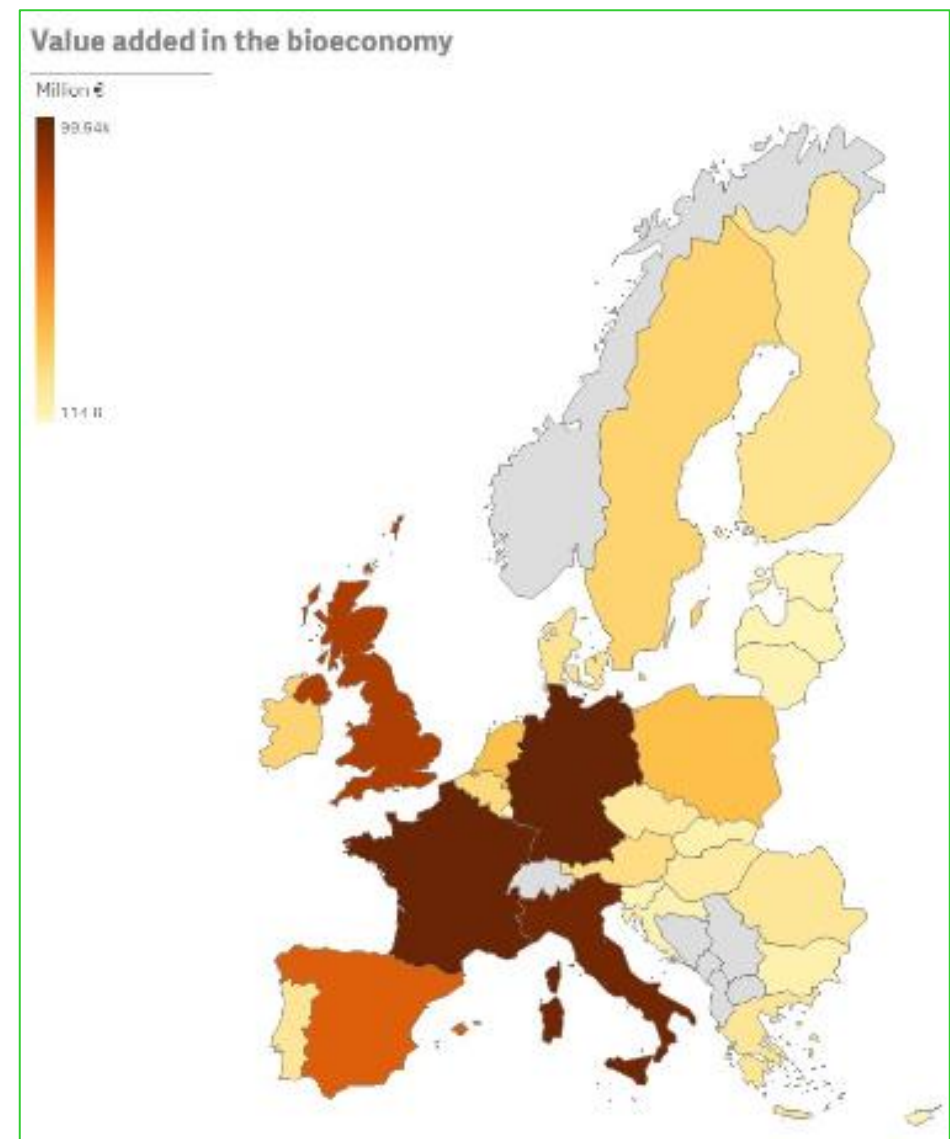
«La **bioeconomia** comprende la **produzione di risorse biologiche rinnovabili** e la loro trasformazione in **cibo, mangimi, prodotti bio-based e bioenergia**.

Ricomprende l'agricoltura, la silvicoltura, l'ittica, la produzione alimentare, l'industria della carta e cellulosa, così come parte del settore chimico, biotecnologico ed energetico.

I settori che la compongono presentano un forte potenziale innovativo grazie all'utilizzo di competenze diverse (scienze della vita, agronomia, ecologia, scienze alimentari e sociali) e tecnologie abilitanti e industriali (biotecnologia, nanotecnologia, ICT e ingegneria), nonché specifiche conoscenze locali”.



# La Bioeconomia in Europa: un breve accenno



ITALIA, 2017: circa 328 miliardi di euro di fatturato, con un aumento del valore della produzione di oltre 6 miliardi rispetto al 2016 (+1,9%) e con circa 2 milioni di occupati.

## La Bioeconomia in Europa: un breve accenno

# Europe's bioeconomy

weaving it all together

## MAIN PRIORITIES

### 1. Strengthen and scale-up the

**bio-based sectors;** this will be done for example by:

- unlocking investments and markets
- deploying innovative bio-based solutions, and
- developing substitutes to plastics that are bio-based, recyclable and marine biodegradable

### 2. Rapidly deploy local bioeconomies across

**the whole of Europe** for example via the transition to:

- sustainable food and farming systems
- sustainable forestry, and
- more diversified revenues for farmers, foresters and fishermen

### 3. Understand the ecological boundaries of the bioeconomy

for example by:

- monitoring progress towards a sustainable bioeconomy, and
- enhancing benefits of biodiversity in primary production



3 aspetti chiave per la Bioeconomia in Europa:

- Sviluppo di nuove tecnologie e processi per la bioeconomia
- Sviluppo dei mercati nei settori della bioeconomia
- Spinta a maggior collaborazione tra decisori politici (policy maker) e attori del settore (stakeholders)

La Commissione Europea lavora per assicurare un approccio coeso alla bioeconomia attraverso diversi programmi e strumenti, compresi la Politica Agricola Comune (PAC), la Politica Comune della Pesca (PCP), HORIZON 2020, le iniziative ambientali europee, l'iniziativa "Blue Growth" per il settore marino e la Partnership Europea Innovativa per l'Agricoltura Sostenibile (PEI-AGRI)

# I finanziamenti Europei: un breve accenno

## FONDI DIRETTI

Gestiti direttamente dalla Commissione europea

3rd Health Programme (3HP)	Asylum, Migration and Integration Fund (AMIF)	Consumer Programme (CP)	Creative Europe (CREA)	European Defence Industrial Development Programme (EDIDP)	EU Aid Volunteers Programme (EUAID)	Erasmus+ Programme (EPLUS)	Europe For Citizens (EFC)
European Maritime and Fisheries Fund (EMFF)	European Statistics (ESTAT)	EU External Actions	HERCULE III (HERC)	<b>Horizon 2020 Framework Programme (H2020)</b>	Internal Security Fund Borders and Visa (ISFB)	Internal Security Fund Police (ISFP)	Justice Programme (JUST)
Pilot Projects and Preparatory Actions (PPPA)	Programme for the Competitiveness of Enterprises and small and medium-sized enterprises (COSME)	Programme for the Environment and Climate Action (LIFE)	Promotion of Agricultural Products (AGRIP)	Research Fund for Coal & Steel (RFCS)	Rights, Equality and Citizenship Programme (REC)	Union Civil Protection Mechanism (UCPM)	Programming Period 2007-2013 (FP7 - CIP)

HORIZON 2020

## FONDI INDIRETTI

Gestiti dagli Stati membri attraverso le autorità locali nazionali come Ministeri (e si parlerà di PON) o le Regioni (e si parlerà di POR).

FESR: Fondo Europeo di Sviluppo Regionale

FC: Fondo di Coesione

FSE: fondo Sociale Europeo

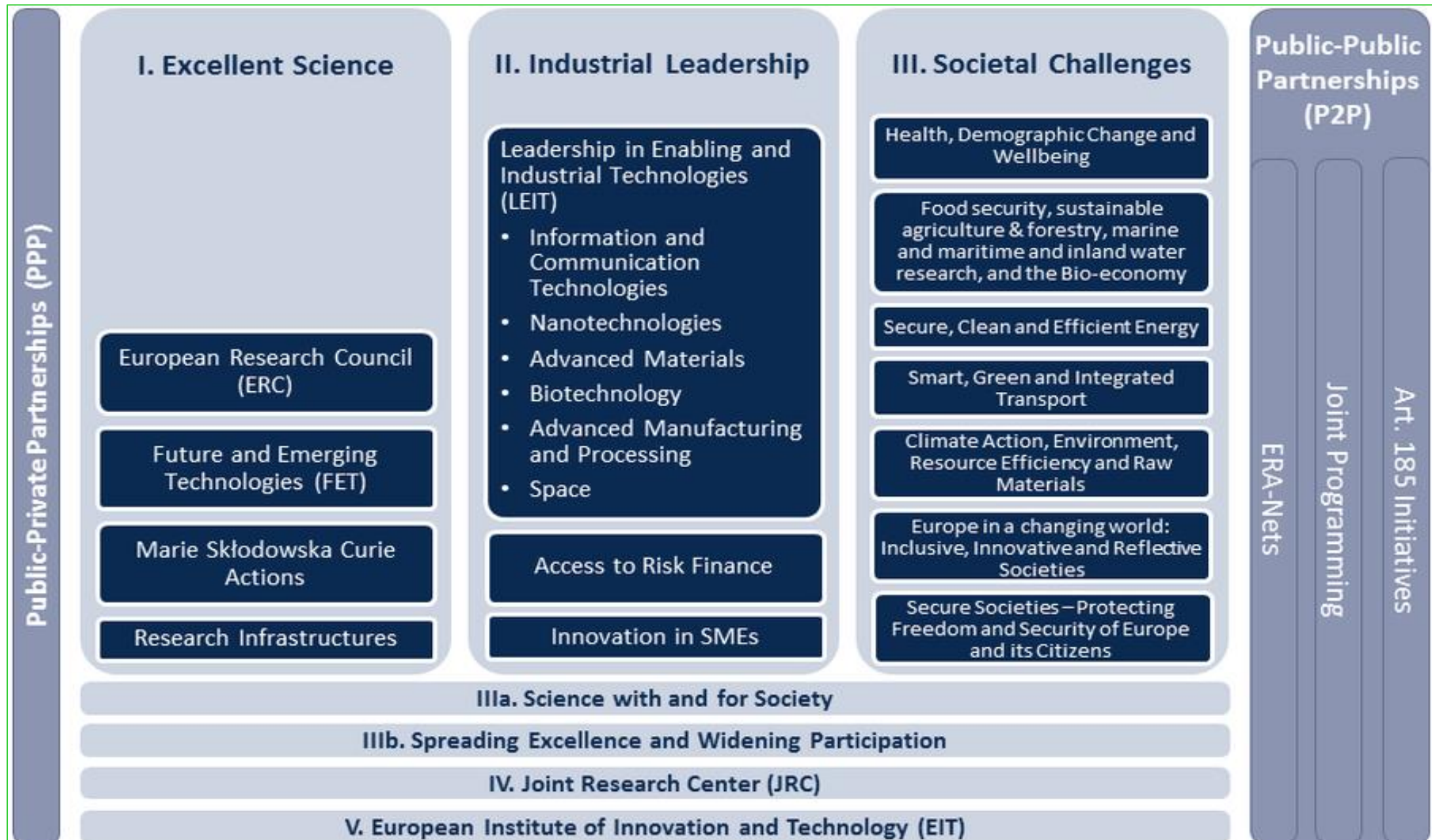
FEASR: Fondo Europeo Agricolo per lo Sviluppo Rurale

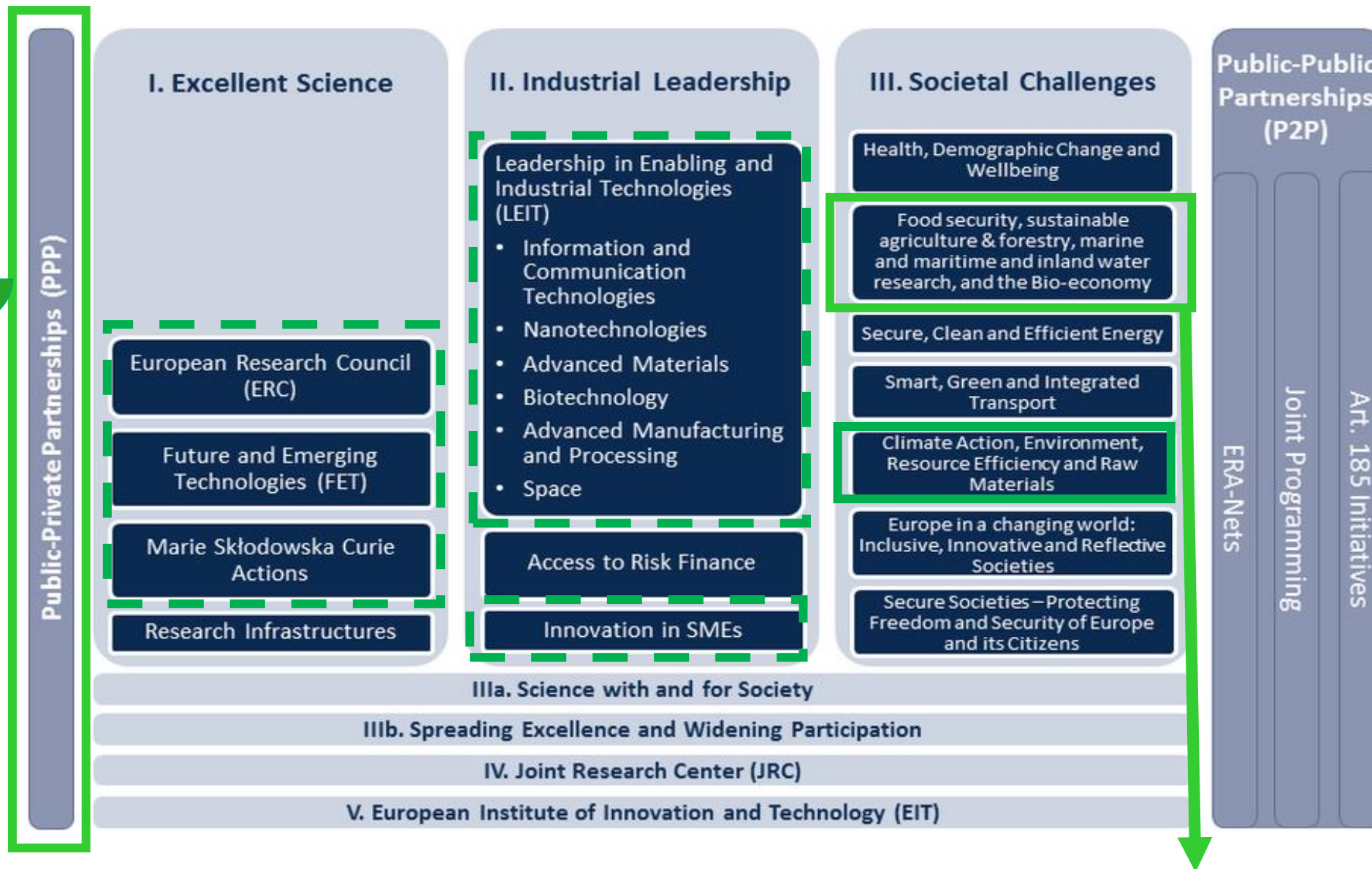
FEAMP: Fondo Europeo per gli Affari Marittimi e la Pesca

# I finanziamenti Europei: HORIZON 2020

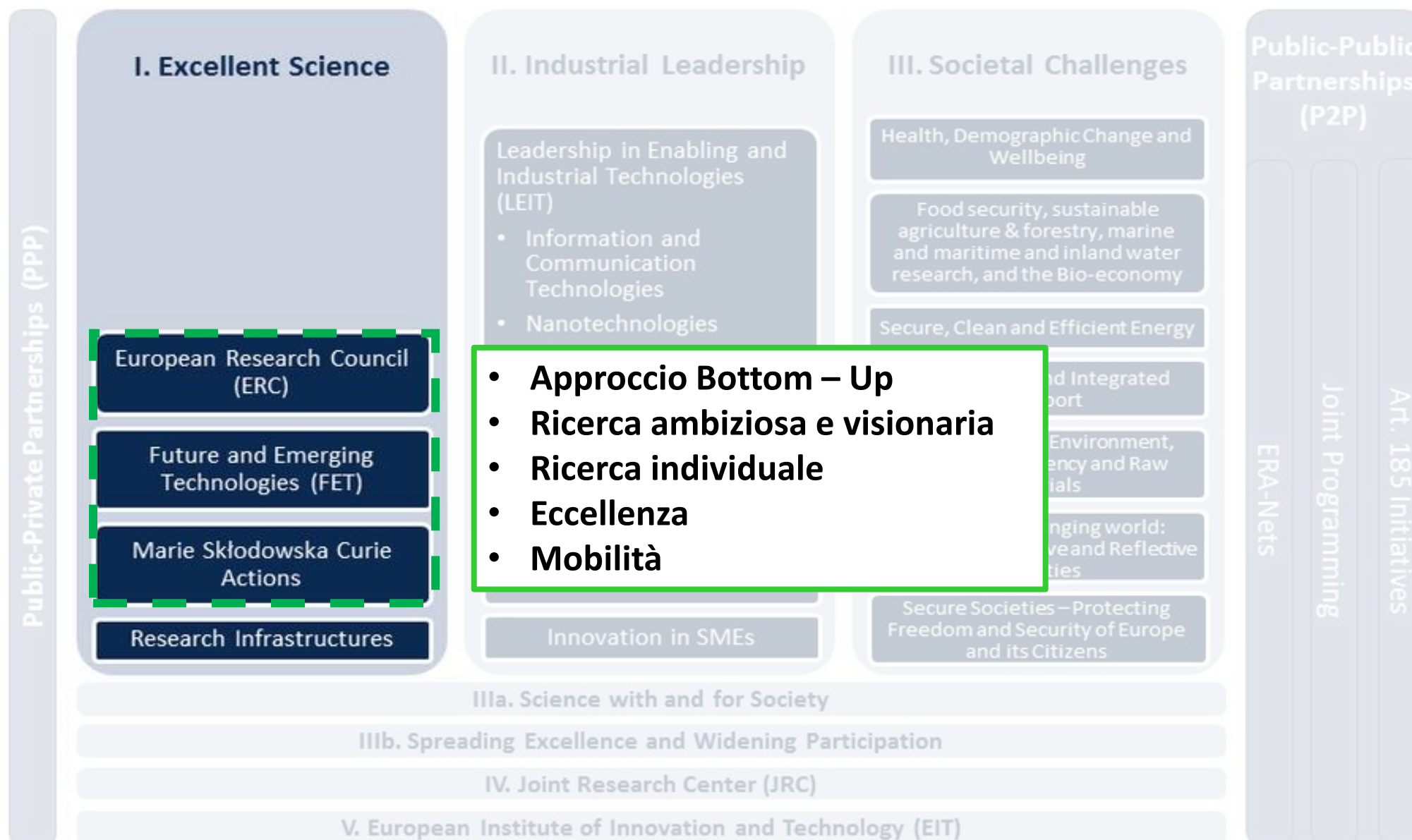
Durata: 2014-2020

Budget: 80 miliardi di euro





**Societal Challenge 2 (SC2): Food security, sustainable agriculture, marine and maritime research & the bioeconomy**





## La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati

European Research Council  
(ERC)

### SENSOILS

Grant agreement ID: 647857

Status

Ongoing project

Start date

1 September 2015

End date

31 August 2020

Funded under:

H2020-EU.1.1.

Overall budget:  
€ 1 978 475

EU contribution  
€ 1 978 475



Food production is predicated on the application of nitrogen fertilisers, which can contribute significantly to the production of greenhouse gasses and eutrophication of agroecosystems. The use of nitrogen fertilisers must, therefore, be optimised.

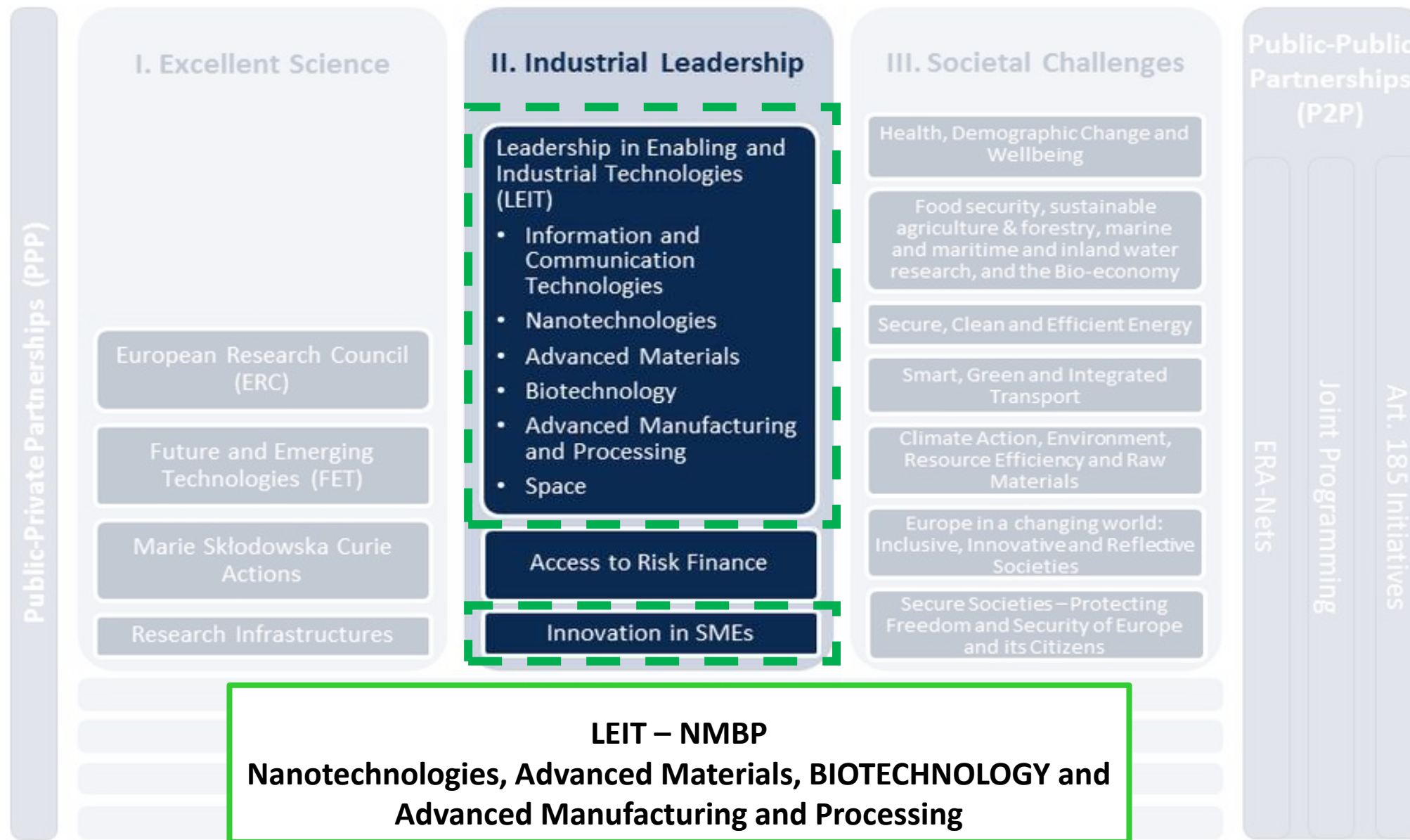
The recent development of transparent soils in my group gives great scope to unravel the processes involved in the reactive transport of nutrients in soil and their interaction with the soil biota. My team will combine principles of optics, chemical engineering, the physics, chemistry, and biology of soils, and plant biology to image and characterise nitrogen movement in soil at the micro-scale. We will develop a new generation of transparent soil analogues that measure the biological and chemical status of soils. This will enable, for the first time, to characterise transport at the surface of soil particles and to elucidate the role of root–particle–particle contacts, exudation and microbial transformation on the bioavailability of nitrate and ammonium.

Marie Skłodowska Curie  
Actions



PROTINUS “PROviding new insight into INteractions between soil fUnctions and Structure”

The project assembles a multi-disciplinary team from the EU and three associated countries, namely France, Italy, Denmark, New Zealand, Mexico and Japan, coming from Research Institute and Universities as well as private companies. These teams combine advanced, experimental and theoretical research expertise in soil physics and chemistry, microbiology, image analysis, computer sciences, and systems modelling.



# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati

## Innovation in SMEs: SMEs Instrument

### A sustainable, biodegradable alternative to plastic packaging

A Danish biotech company is developing a sustainable food packaging solution that completely disintegrates in less than a month.



#### Project information

## EcoFLEXY

Grant agreement ID: 877470

[Project website](#)

Start date

**1 September 2019**

End date

**31 December 2019**

Funded under:

**H2020-EU.3.**

**H2020-EU.2.3.**

**H2020-EU.2.1.**

Overall budget:

€ 71 429

EU contribution  
€ 50 000



Coordinated by:

**CELLUGY**



#### Programme(s)

**H2020-EU.3. - PRIORITY 'Societal challenges**

**H2020-EU.2.3. - INDUSTRIAL LEADERSHIP - Innovation In SMEs**

**H2020-EU.2.1. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies**

#### Topic(s)

**EIC-SMEInst-2018-2020 - SME instrument**

# La Bioeconomia in HORIZON 2020

L'obiettivo generale di questo Programma di Lavoro è quello di aiutare l'Europa a costruire basi solide per sostenere la sicurezza alimentare, le risorse naturali e la crescita sostenibile, con miglioramenti e innovazioni per trovare alternative efficienti e resilienti all'attuale economia basata sulle risorse fossili.

Verranno testate, dimostrate e trasmesse soluzioni efficaci alle maggiori sfide della Bioeconomia per la terra e il mare, attraverso l'intera filiera agroalimentare ***dal suolo alla società***.

La ricerca e innovazione Europea sbloccheranno il potenziale delle bio-risorse disponibili nei diversi settori della bioeconomia e della blue-economy, in maniera sostenibile e responsabile nei confronti di ambiente e società.

I. Excellent Science

II. Industrial Leadership

III. Societal Challenges

Public-Public  
Partnerships  
(P2P)

Health, Demographic Change and  
Wellbeing

Food security, sustainable  
agriculture & forestry, marine  
and maritime and inland water  
research, and the Bio-economy

Secure, Clean and Efficient Energy

Smart, Green and Integrated  
Transport

Climate Action, Environment,  
Resource Efficiency and Raw  
Materials

Europe in a changing world:  
Inclusive, Innovative and Reflective  
Societies

Secure Societies – Protecting  
Freedom and Security of Europe  
and its Citizens

ERA-Nets

Joint Programming

Art. 185 Initiatives

IIIb. Spreading Excellence and Widening Participation

IV. Joint Research Center (JRC)

V. European Institute of Innovation and Technology (EIT)

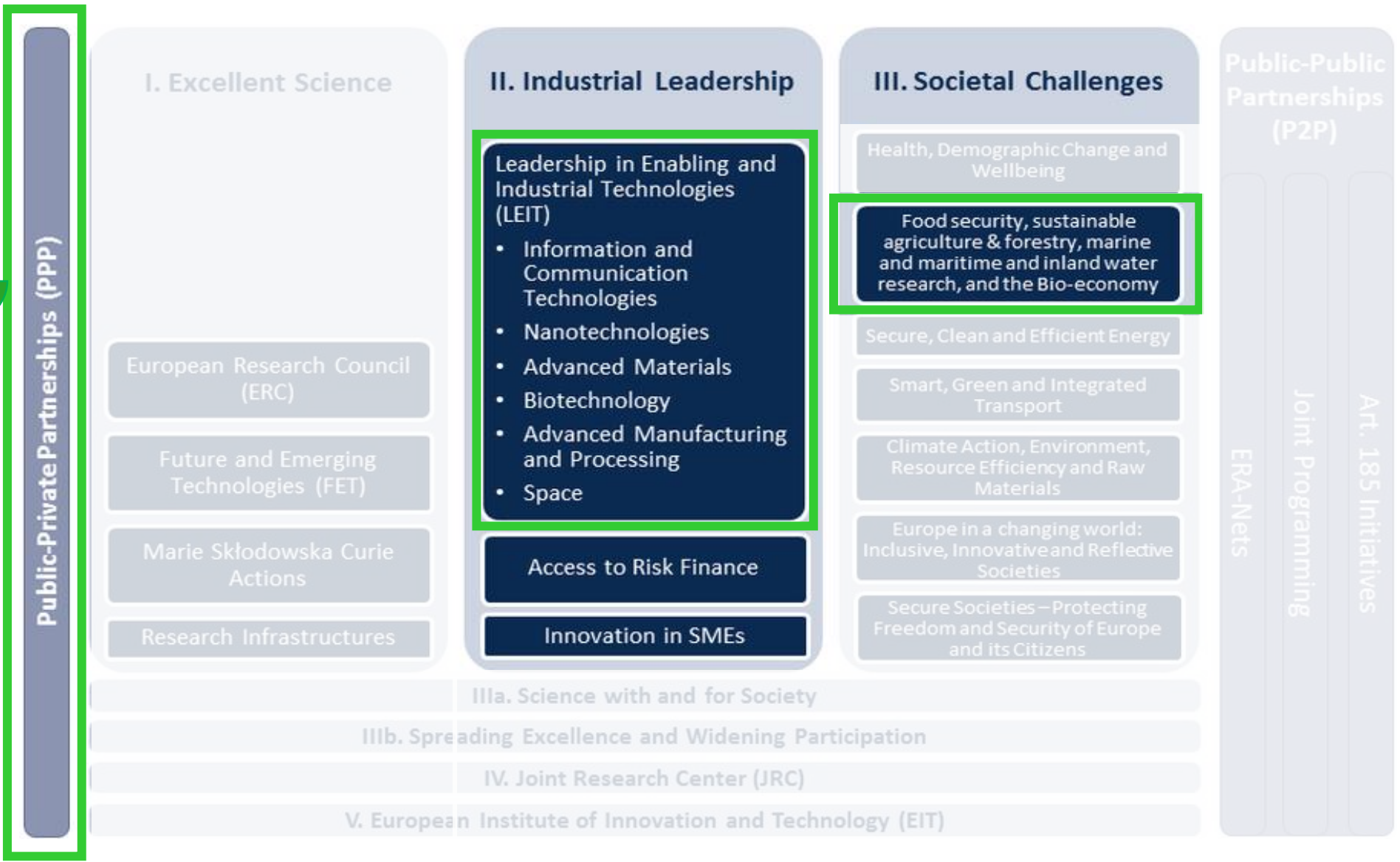


La Bio-Based Industries Joint Undertaking (BBI JU) è una Partnership Pubblico-Privata da 3.7 milioni di euro tra [EU](#) il [Bio-based Industries Consortium](#) (BIC). Lavora all'interno di Horizon 2020 seguendo l' Agenda Strategica ("Vision and Strategic Innovation and Research Agenda – SIRA") sviluppata dalla parte industriale.

- 975 milioni di euro di fondi europei (horizon 2020) e 2,7 milioni di euro di investimenti privati
- Mobilita capitali e fondi aggiuntivi pubblici e privati

### Focus

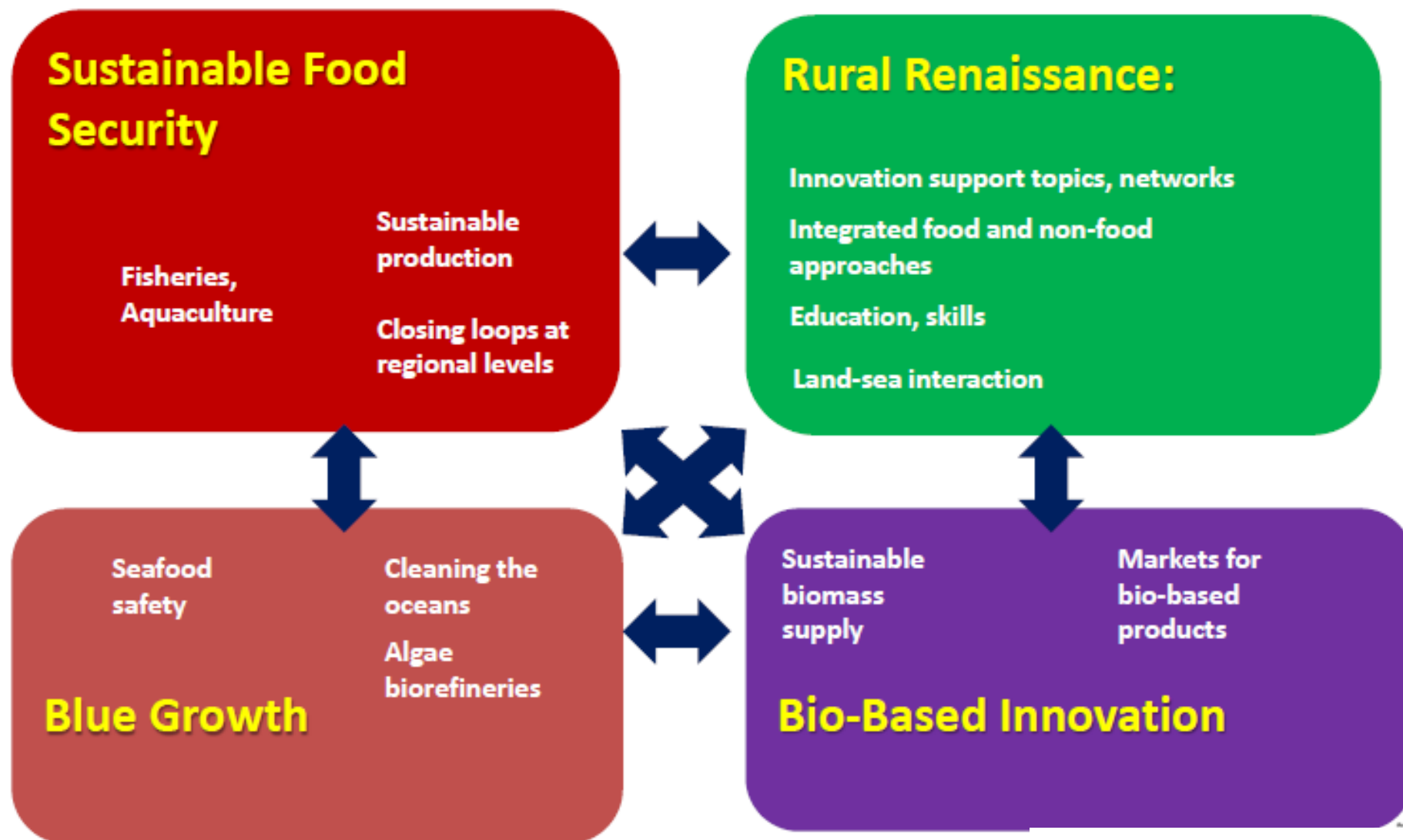
- **Materie prime:** sostenere la produzione sostenibile di biomassa con maggior produttività e costruendo nuove filiere produttive
- **Bioraffinerie:** ottimizzare processi efficienti tramite R&S e dimostrare la loro fattibilità economica in bioraffineriedemo/flagship di grande scala
- **Mercati, prodotti e politiche:** sviluppare mercati per i prodotti bio-based e ottimizzare la cornice normativa e legislativa



Societal Challenge 2 (SC2): Food security, sustainable agriculture, marine and maritime research & the bioeconomy



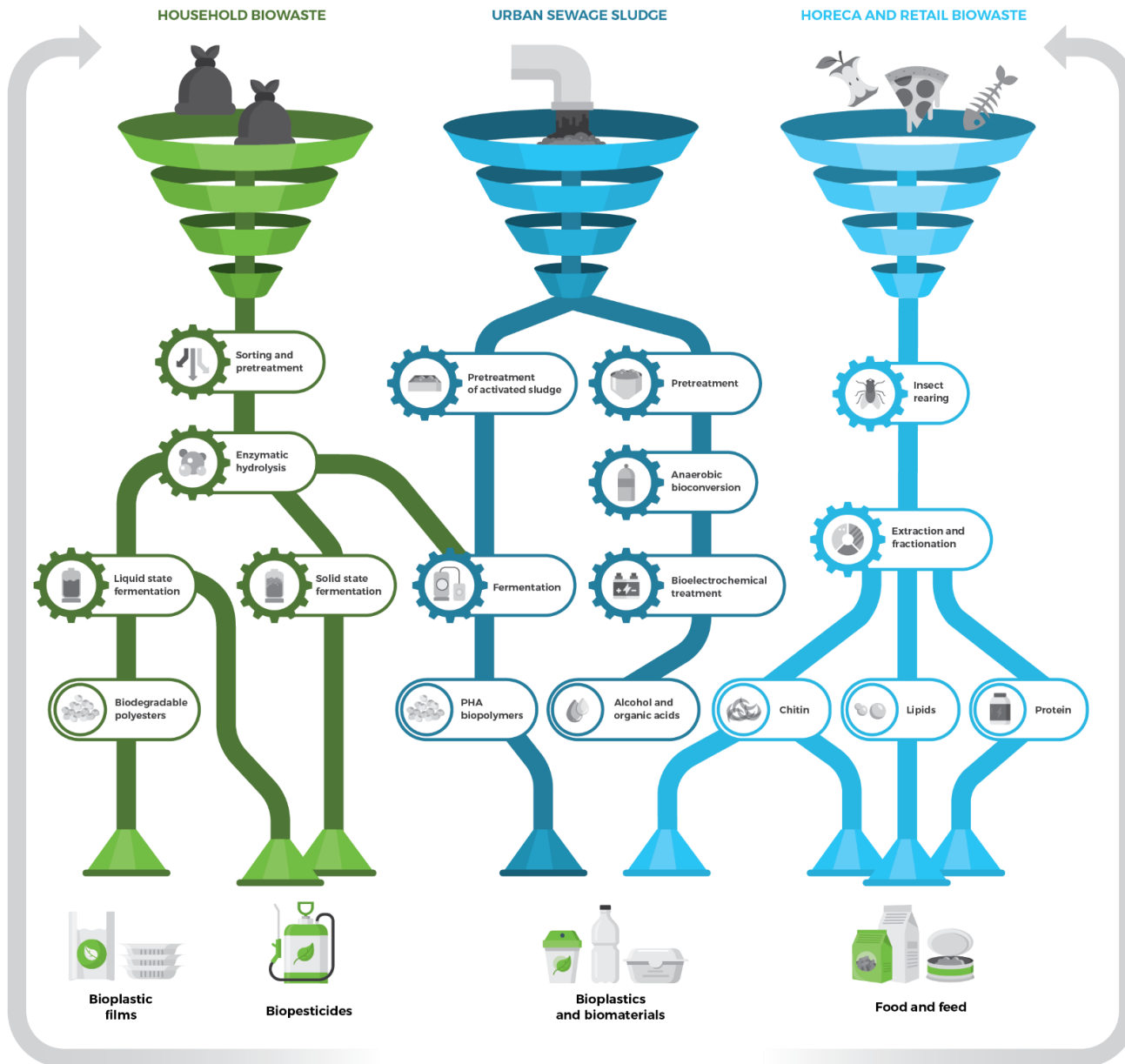
Societal Challenge 2 (SC2): Food security, sustainable agriculture, marine and maritime research & the bioeconomy





# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati

Call: CE-SFS-25-2018 - Integrated system innovation in valorising urban biowaste



# SCALIBUR

**SC2**  
Environment  
and climate-  
smart food  
production and  
consumption

In the SCALIBUR project, leading waste management companies, technology developers and research organisations have teamed up with four European cities to **demonstrate innovative solutions** to transform urban food waste and sewage sludge into high value-added products, helping cities to increase their recycling rate and creating **new circular economy business opportunities**.



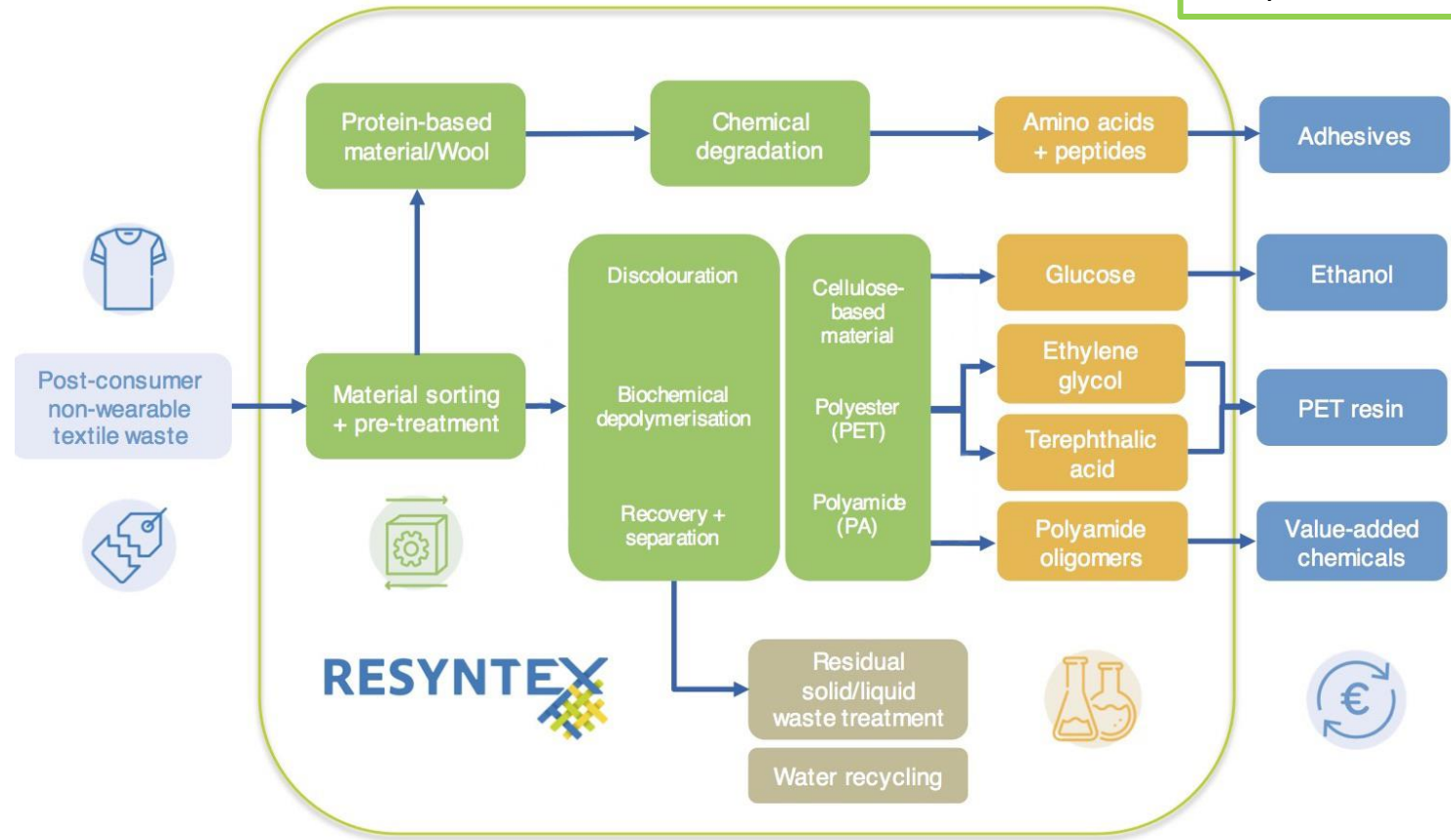
# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati



**SC5**  
Moving towards a circular economy through industrial symbiosis

## Discarded textile now a raw material for the chemical and textile industries

Not enough textile waste is recycled across Europe. To tackle this, the RESYNTEX project created a new circular economy model for the textile and chemical industries, by recovering secondary raw materials from unwearable textile waste.



# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati

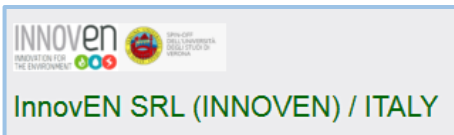


**SC2**  
Ensuring sustainable use of agricultural waste, co-products and by-products



**NoAW : No Agro-Waste.**

Innovative approaches to turn agricultural waste into ecological and economic assets. Driven by a "near zero-waste" society requirement, the goal of NoAW project is to generate innovative efficient approaches to convert growing agricultural waste issues into eco-efficient bio-based products opportunities with direct benefits for both environment, economy and EU consumer. To achieve this goal, the NoAW concept relies on developing holistic life cycle thinking able to support environmentally responsible R&D innovations on agro-waste conversion at different TRLs, in the light of regional and seasonal specificities, not forgetting risks emerging from circular management of agro-wastes (e.g. contaminants accumulation).

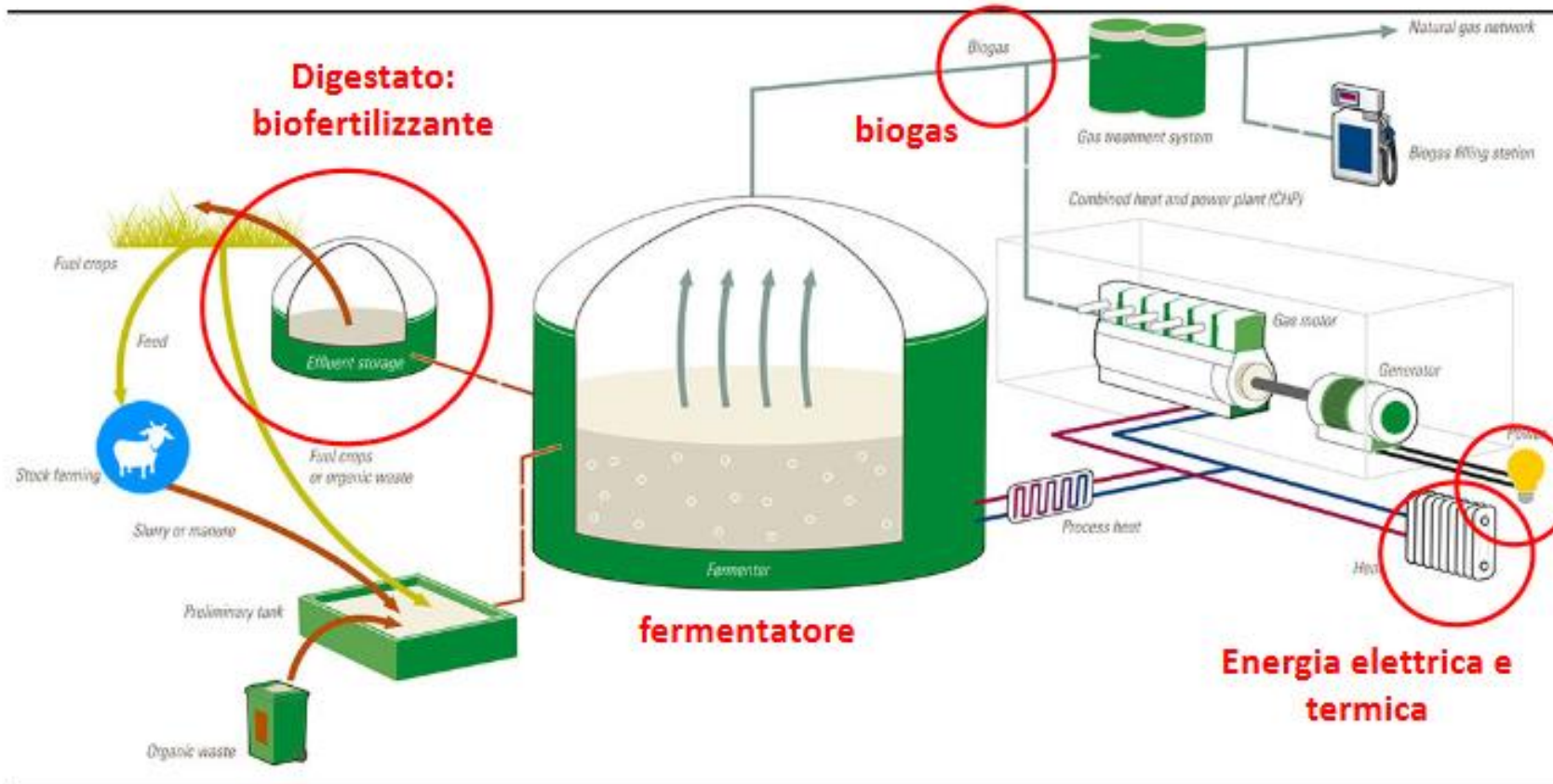


## La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati



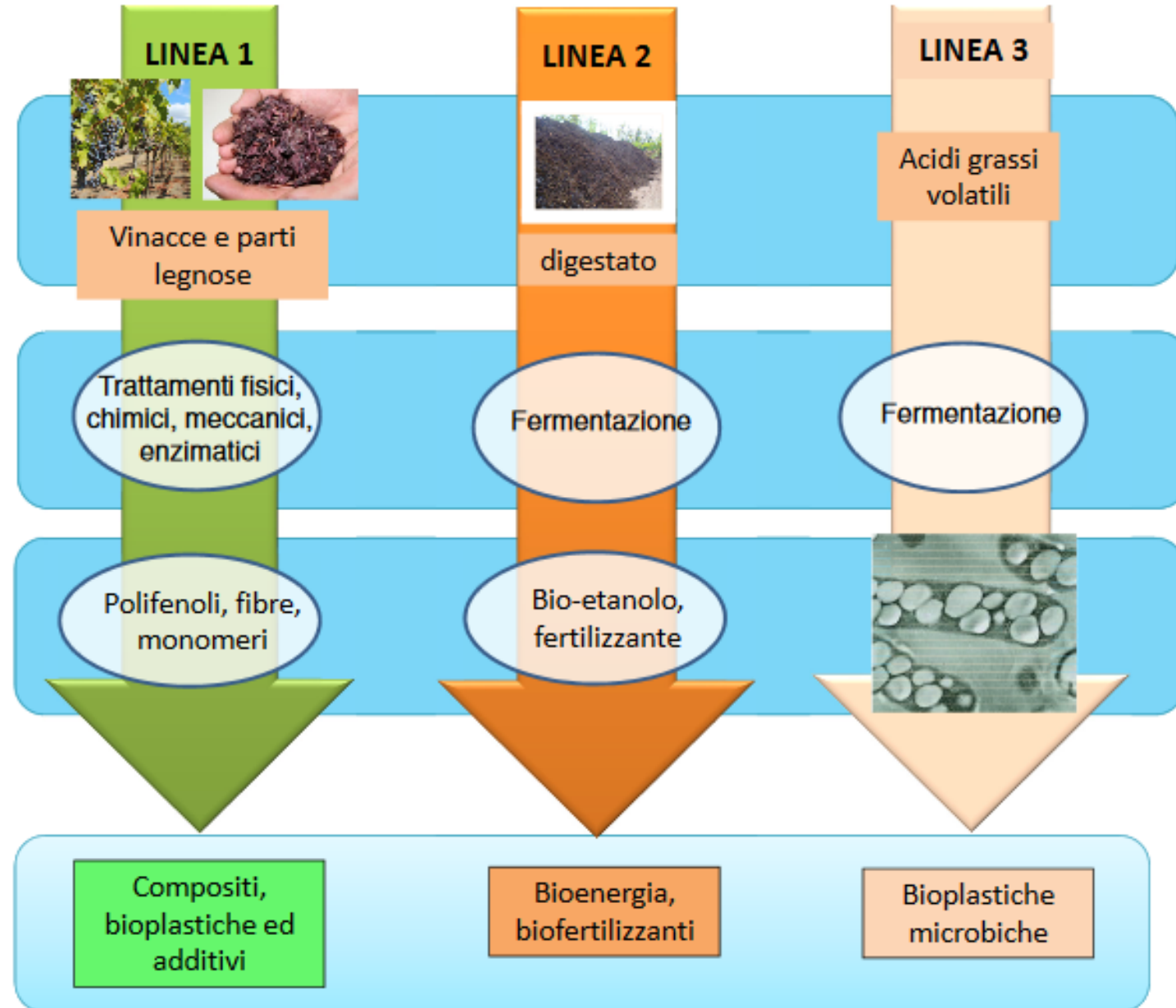
NoAW si occupa in primo luogo di ottimizzare una tecnologia già esistente e promettente per il trattamento dei rifiuti agricoli e di allevamento

### la DIGESTIONE ANAEROBICA

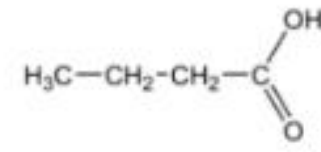
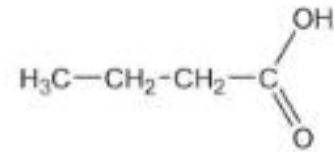
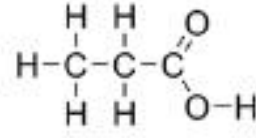
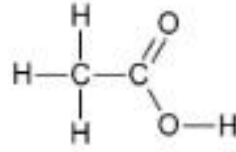


La **digestione anaerobica** è un processo biologico attraverso il quale la degradazione della sostanza agricola avviene attraverso colture batteriche naturali e spontanee che operano in assenza di ossigeno.

## La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati



# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati



Acidi grassi volatili: derivano dalla fermentazione delle fibre legnose



Fermentazione



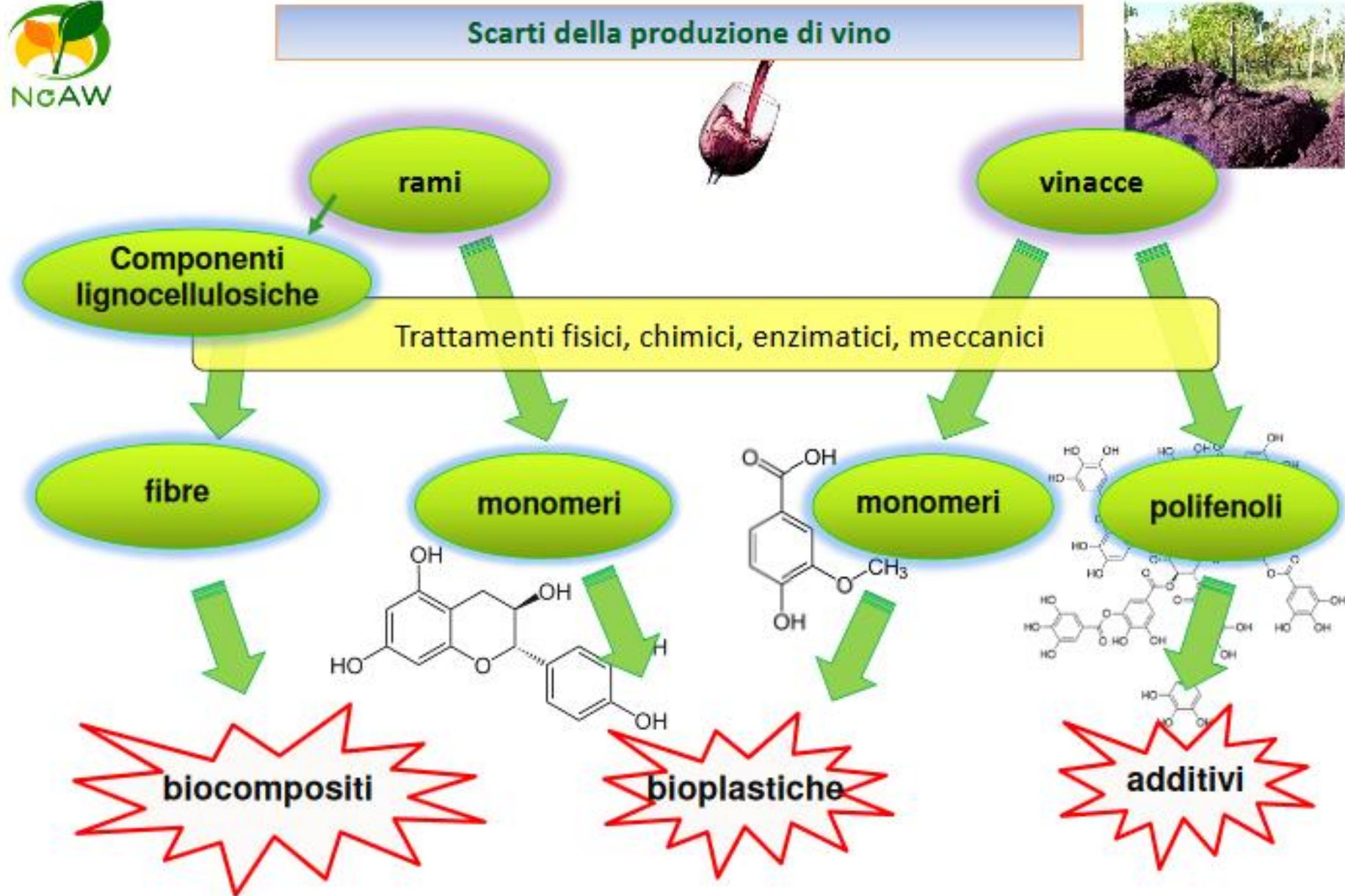
**Poliidrossialcanoati**



Bioplastiche compostabili e biodegradabili in acqua di mare

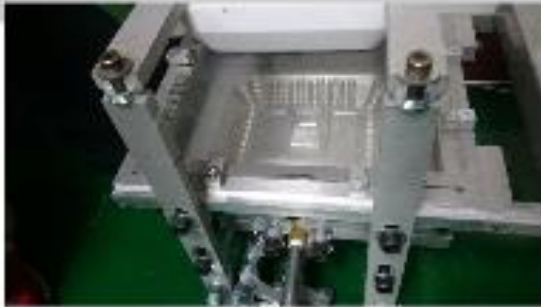
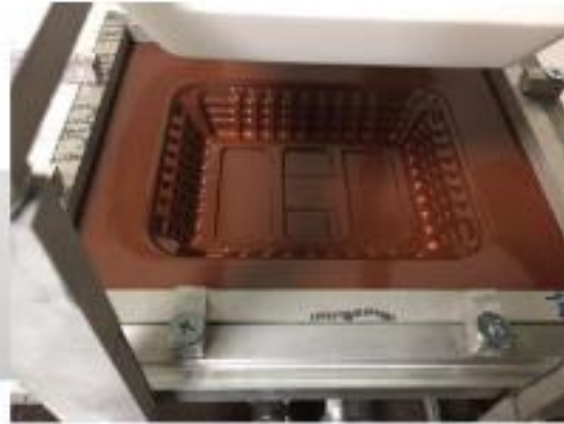


# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati





## Produzione di un contenitore rigido con proprietà antibatteriche e biodegradabile







## Fungal enzymes catalyse a revolution in the European biotechnology sector

To achieve a truly bio-based economy, biomass biorefineries should benefit not only from the use of bio-based feedstock but also from the use of greener and more efficient biochemical technologies. Largely untapped fungal enzymes are paving the way.



## A sustainable route to sustainable plastics

2,5-furandicarboxylic acid (FDCA) is one of the top 12 value-added chemicals derived from biomass because it is a renewable precursor for the production of poly(ethylene-2,5-furandicarboxylate) (PEF). PEF is the polymer expected to substitute petroleum-derived poly(ethylene-terephthalate) for manufacture of sustainable plastics. EnzOx2 delivered three routes to FDCA production from 5-hydroxymethylfurfural (HMF) or 5-methoxymethylfurfural (MMF).

The team optimised the previously developed two-enzyme cascade for conversion of HMF into FDCA and proposed a new cascade involving two oxidases and one peroxygenase. Scientists also achieved 99 % conversion by using one oxidase in the presence of catalase to remove the generated hydrogen peroxide that was shown to inhibit the last oxidation step. Finally, since large-scale production of FDCA-based bioplastics will be based on MMF, a self-sustained three-enzyme cascade for this route was developed and patented.

## Lipid-derived molecules for pharmaceuticals, foods, and fragrances

Unspecific peroxygenases opened the door to a wealth of compounds originating from biomass lipids. Among the many outcomes are a patent for controlled one-carbon chain shortening of fatty acids, a novel reaction chemistry that could deliver tailor-made acids rare in nature. Regarding steroid transformations, scientists found a peroxygenase that catalyses the selective oxygenation of testosterone to obtain 4-hydroxytestosterone, an active pharmaceutical ingredient used for the synthesis of anti-breast cancer drugs. This reaction was recently upscaled and positively evaluated for industrial implementation. Peroxygenases also enabled the patented selective synthesis of 4-hydroxyisophorone and 4-ketoisophorone, of interest to both pharmaceuticals and F&F sectors.

## La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati



# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati



The total effort in the project is relevant, being **1.665 MMS** with a total eligible **COST OF 25.022.688,75 €** and **AROUND 30 MIL €** of estimated Additional Activities (Granted: 16.995.882,00 €)

Flagship demonstration of an *integrated biorefinery for dry crops sustainable exploitation towards biobased materials production*



**A**  
**Alma Mater Studiorum  
Università di Bologna**  
Bologna (Italy)  
unibo.it

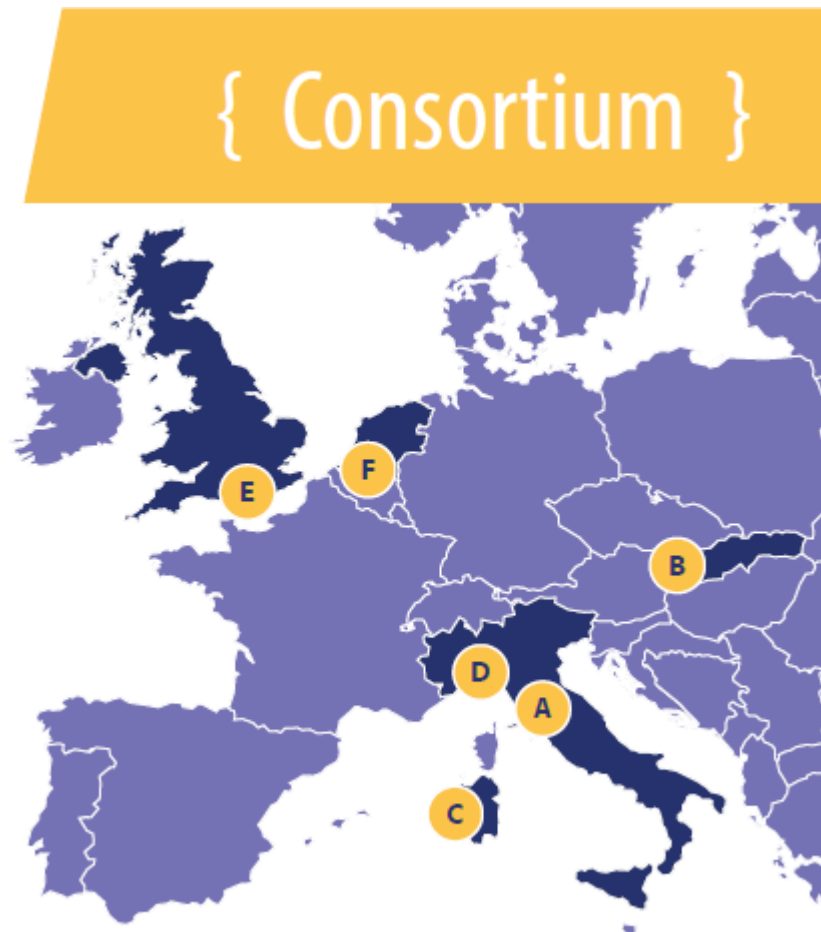
**B**  
**Biophil Central Europe SRO**  
Bratislava (Slovakia)  
biophilgroup.com

**C**  
**Matrica S.p.A.**  
Porto Torres (Italy)  
matrica.it

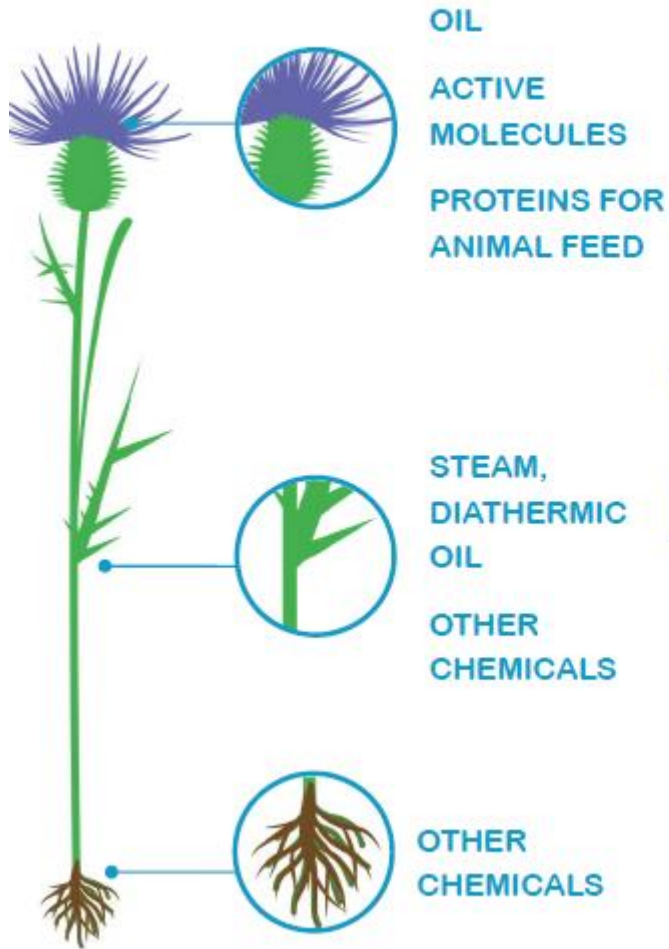
**D**  
**Novamont S.p.A.**  
(Coordinator)  
Novara (Italy)  
novamont.com

**E**  
**SIP Ltd**  
London (UK)  
sip.com

**F**  
**SoliQzBV**  
Breda (The Netherlands)  
soliqz.com



## OUTPUT FOR THE BIOPLASTICS AND BIOCHEMICALS VALUE CHAIN



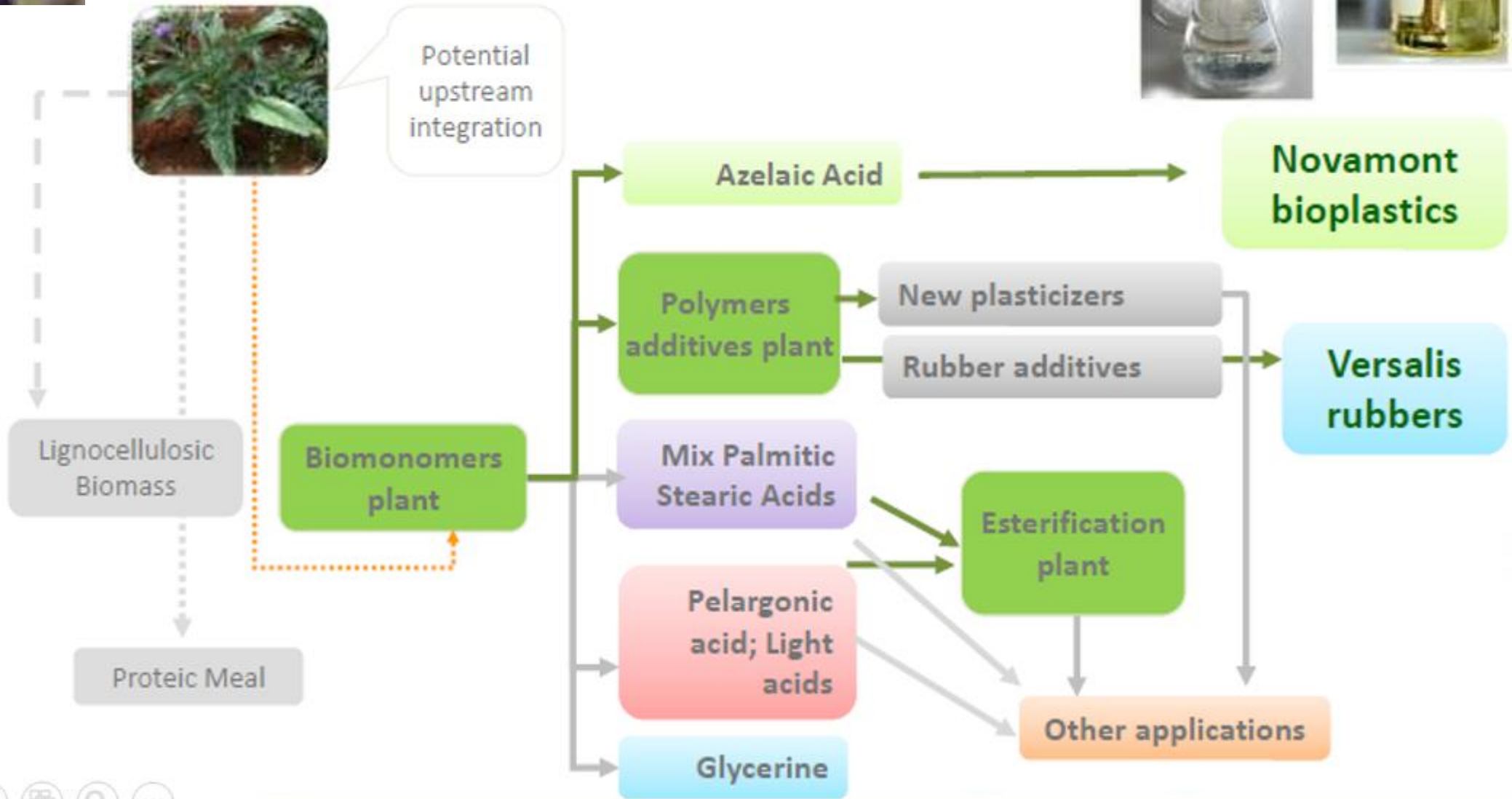
AGREEMENT BETWEEN NOVAMONT AND COLDIRETTI (THE LARGEST AGRICULTURAL ORGANISATION IN EUROPE) FOR THE DEVELOPMENT OF INNOVATIVE AGROINDUSTRIAL VALUE CHAINS FOR BIOPLASTICS AND BIOPRODUCTS



## OPPORTUNITIES FOR FARMERS, SHEPHERDS AND OTHER STAKEHOLDERS IN THE AGRICULTURAL SECTOR

- Valorisation of marginal rural areas (i.e. cardoon trinaseed, ad hoc machinery, agronomic protocols and agronomic support)
- Reduction of environmental impact for soil, water and air through the use of:
  - biodegradable mulch films
  - pelargonic acid for weed control
  - biolubricants
- Availability of local production of proteins for animal feed
- Energy efficiency and independency
- On-field innovation approaches

# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati





## Establishing a multi-purpose biorefinery for the recycling of the organic content of Absorbent Hygiene Products waste in a circular economy domain



60  
months

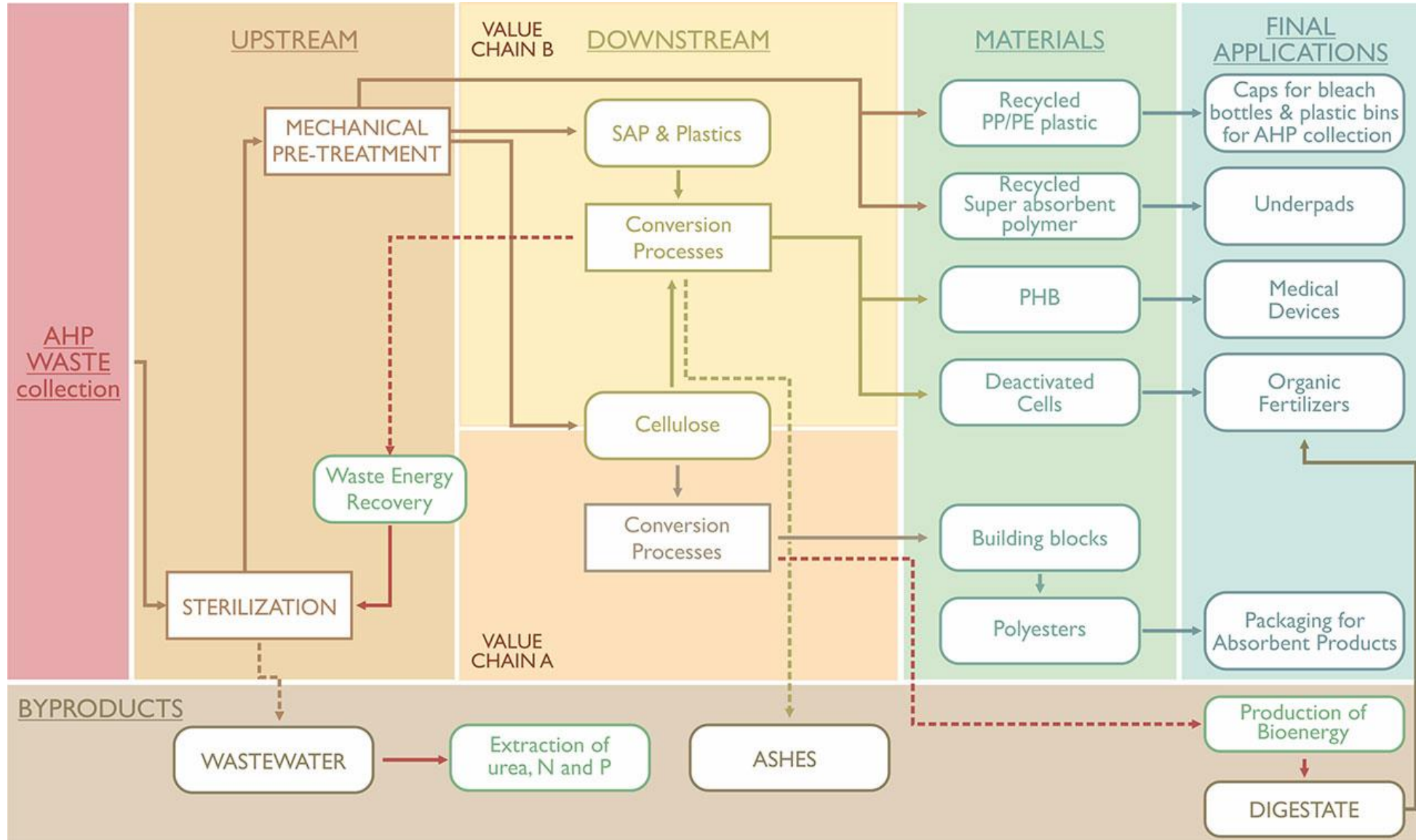
7  
countries  
involved

€ 10,500,000 EU funding  
€ 17,200,000 total cost

13  
consortium  
partners

**10,000 tons/year of Absorbent Hygiene Products  
(baby diapers, fem care, adult incontinence)  
waste that will be upcycled into valuable materials**

# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati



# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati



The BioBarr project will focus its efforts to respond to the **industrial and technological challenge of developing a new fully biodegradable food packaging** with barrier performances that allow at least 10% extension of the shelf life, overcoming so the obstacles in performance that have up to date limited the food applications of totally biodegradable biopolymers.



For overcoming the limiting factor in PHA food applications, BioBarr aims to enhance PHA vapour and gas barrier properties through material functionalization.

In the first research line, the approach consists of the use of biodegradable materials with adequate properties to be compounded in multi-layer structures specific for the food product category to be packed, in order to optimize functional properties. The innovation consists of laminating PHA with PLA (polylactic acid).

The second challenging research line in BioBarr is surface treatments (nanofilm metallization with AlOx or SiOx or metallization Aluminum process) of PHA films. New materials will be validated on a restricted number of food products in the sector of bakery, representative of different shelf-life requirements and duration, with the purpose to increase shelf-life at least by 10%.





# La Bioeconomia in HORIZON 2020: Alcuni esempi di progetti finanziati

Coordination and Supporting Actions (CSA)

## POWER4BIO-project

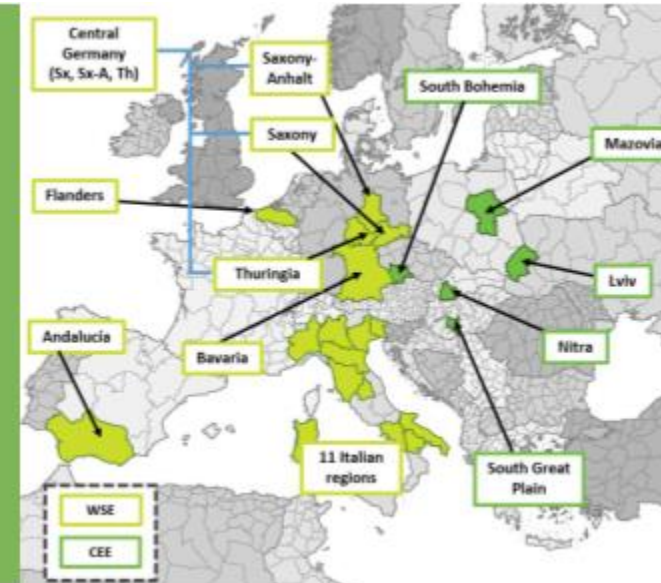


Sustainable Processes and Resources  
for Innovation and National Growth  
Italian Cluster of Green Chemistry

SC2  
Rural  
Reinassance

- **Aim:** Empowering regional stakeholders to boost the transition towards bioeconomy regions in Europe by providing them with the necessary tools, instruments and guidance to develop and implement sound sustainable bioeconomy strategies.
- **Duration:** October 2018 – March 2021
- **3-years funding by Horizon2020**

- 10 participant regions
- 5 regions from Western and Southern Europe with medium to very high bioeconomy maturity
- 5 regions from Central and Eastern Europe with low to medium bioeconomy maturity



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818351.



- **Increased capacity of regional/local policy makers and stakeholders to structure their bioeconomy** and to support the emergence of a thriving bio-based sector. Adequate knowledge and best practice exchange and networking within and among regions, across the EU.
- **Improved capacity of policy makers and stakeholders to make informed decisions**, based on a thorough knowledge of the different business models, their respective advantages and disadvantages, and the best approaches to promote them.
- **Ambitious regional strategies and roadmaps** leading to regional biobased sectors that are sustainable, inclusive and adapted to local assets and conditions.
- **Enhanced research and innovation capacities**, and appropriate transfer of research results to regional/local stakeholders

## Alcuni link utili

**Strategia Europea sulla Bioeconomia:** Commissione Europea “A sustainable Bioeconomy for Europe Strengthening the connection between economy, society and the environment Updated Bioeconomy Strategy”

[https://ec.europa.eu/research/bioeconomy/pdf/ec\\_bioeconomy\\_strategy\\_2018.pdf#view=fit&pagemode=none](https://ec.europa.eu/research/bioeconomy/pdf/ec_bioeconomy_strategy_2018.pdf#view=fit&pagemode=none)

Sito BBI-JU: <https://www.bbi-europe.eu/>

Brochure sui progetti finanziati dalla BBI-JU: <https://bbi-europe.eu/sites/default/files/media/bbiju-projects.pdf>