



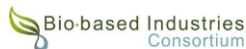
# L'IMPIANTO BIOGAS COME BIORAFFINERIA PER LA PRODUZIONE DI MOLECOLE DAL VALORE AGGIUNTO. IL PROGETTO GOODBYO

ECOMONDO

Rimini, 8<sup>th</sup> November 2024

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CSFT@IIT- Center for Sustainable Future Technologies



The GoodByO project is supported by the Circular Bio-based 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 CBE JU can be held responsible for them.



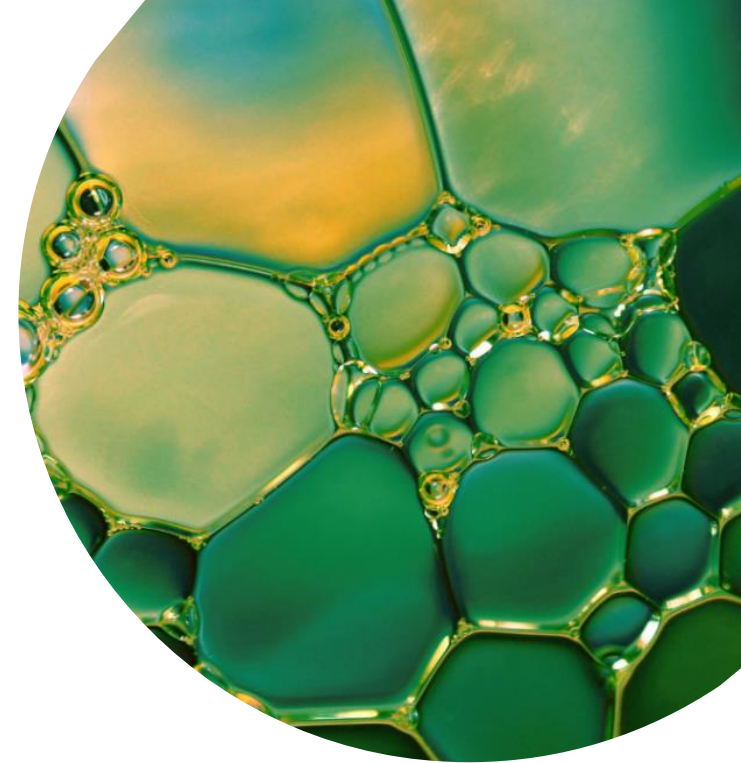
## Multi-commodities microbial-driven BiOrefinery based on food-processing industry wastes, biogenic CO<sub>2</sub> and bioprocess wastewaters

**CBE JU contribution:** € 4 929 060.00 million

**Duration:** October 2024 – March 2028

**Feedstock:** food industry waste and biorefinery gaseous and liquid side-streams

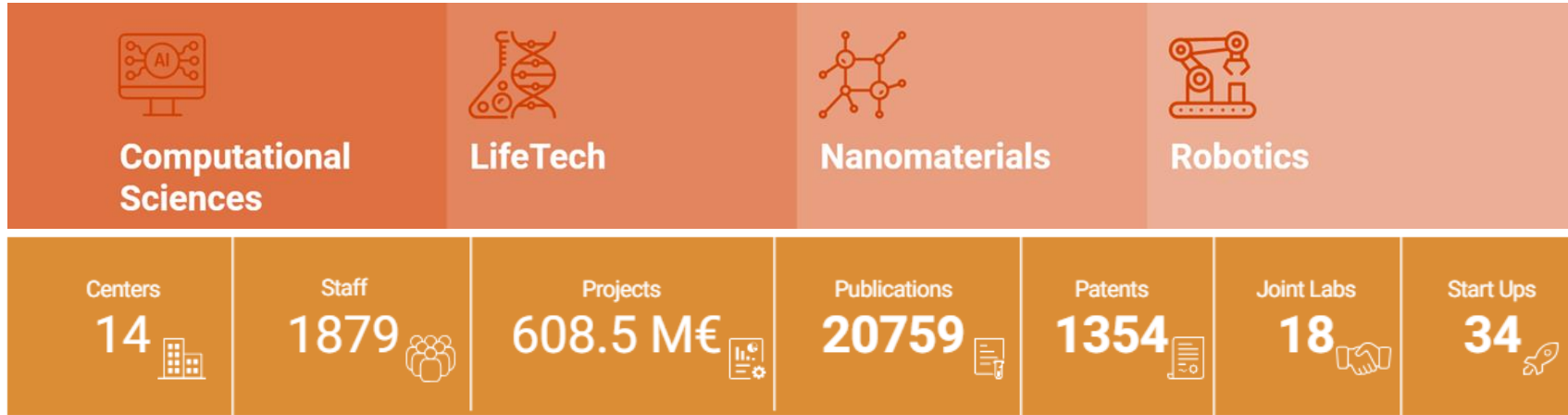
**Main products:** C8 acid, C6 alcohol, carotenoids, microbial proteins, bio-fertilizers, bio-CH<sub>4</sub>





Founded in 2003,  
IIT's research relies on a constant cross-fertilization of knowledge and technologies among the different research domains.

Headquarters: Genova, Italy

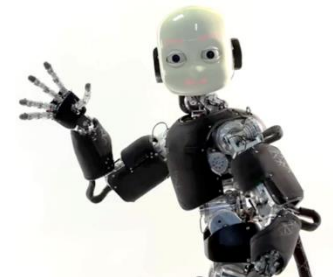
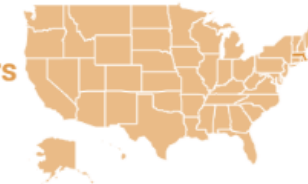


50.000 m<sup>2</sup>  
of labs

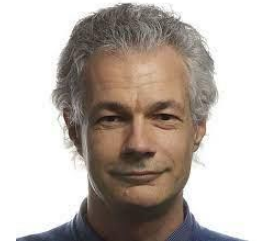
1 headquarters  
+11 centers  
in Italy



2 centers  
in US



<https://www.iit.it/en-US/>



Center Coordinator:  
FABRIZIO PIRRI

## Our Mission

develop innovative and sustainable materials, bioprocesses and technologies for:

- the CO<sub>2</sub> capture and utilization
- the production, storage, and use of green H<sub>2</sub>
- the accumulation and management of electrical energy
- the valorization of waste



Carbon dioxide ▾



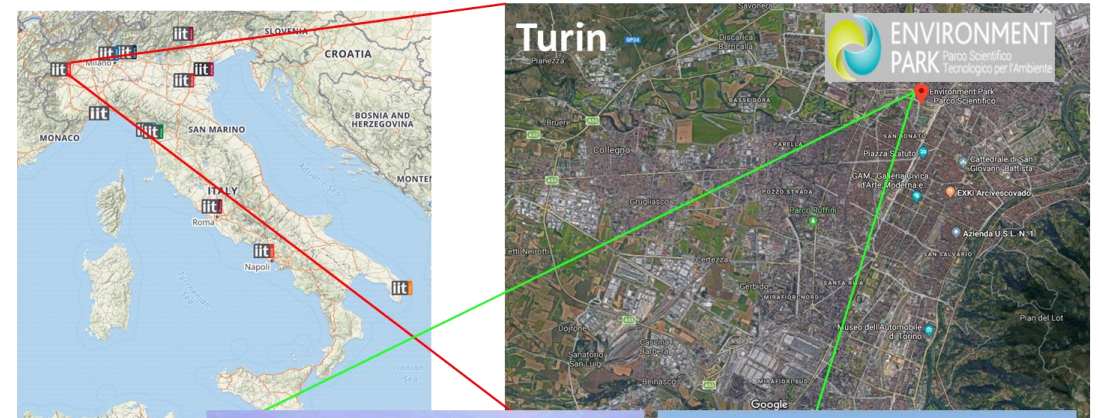
Hydrogen ▾



Energy ▾



Waste ▾






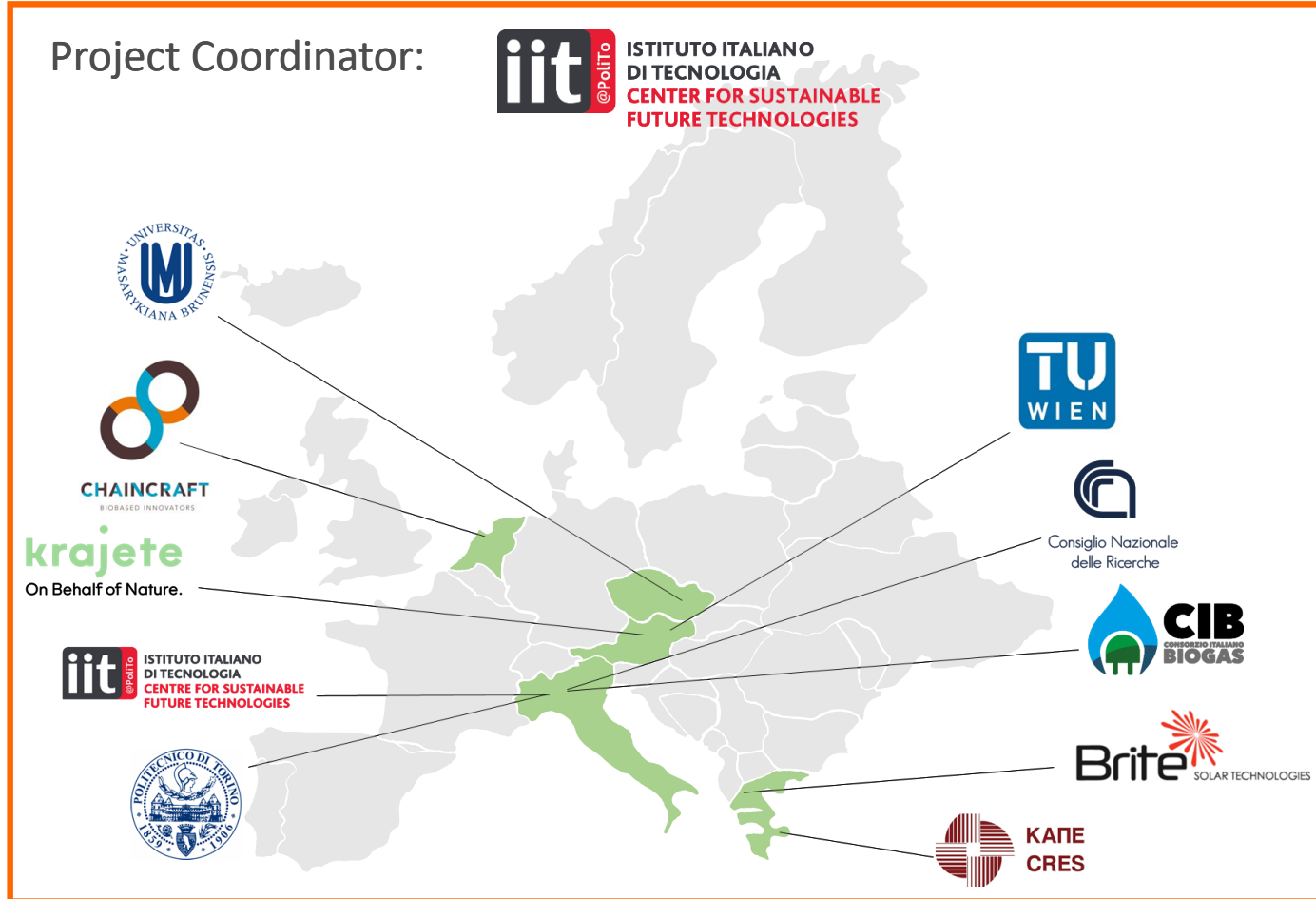
Established in 2018 within the Environment Park in Turin

<https://www.iit.it/csft-polito>

# GOODBYO

## Consortium

-  3 UNI
-  3 RTOs
-  3 SMEs
-  1 ASSOCIATION



# Microbial-driven Sugar-based Biofactory

The Context



Biogenic  
CO<sub>2</sub>



Waste-  
waters



**Product**

# Microbial-driven Sugar-based Biofactory: EU commercial scale examples

The Context

**Lactic acid** – Corbion N.V., Netherlands

**1,3 Propanediol** - METabolic Explorer S.A., France

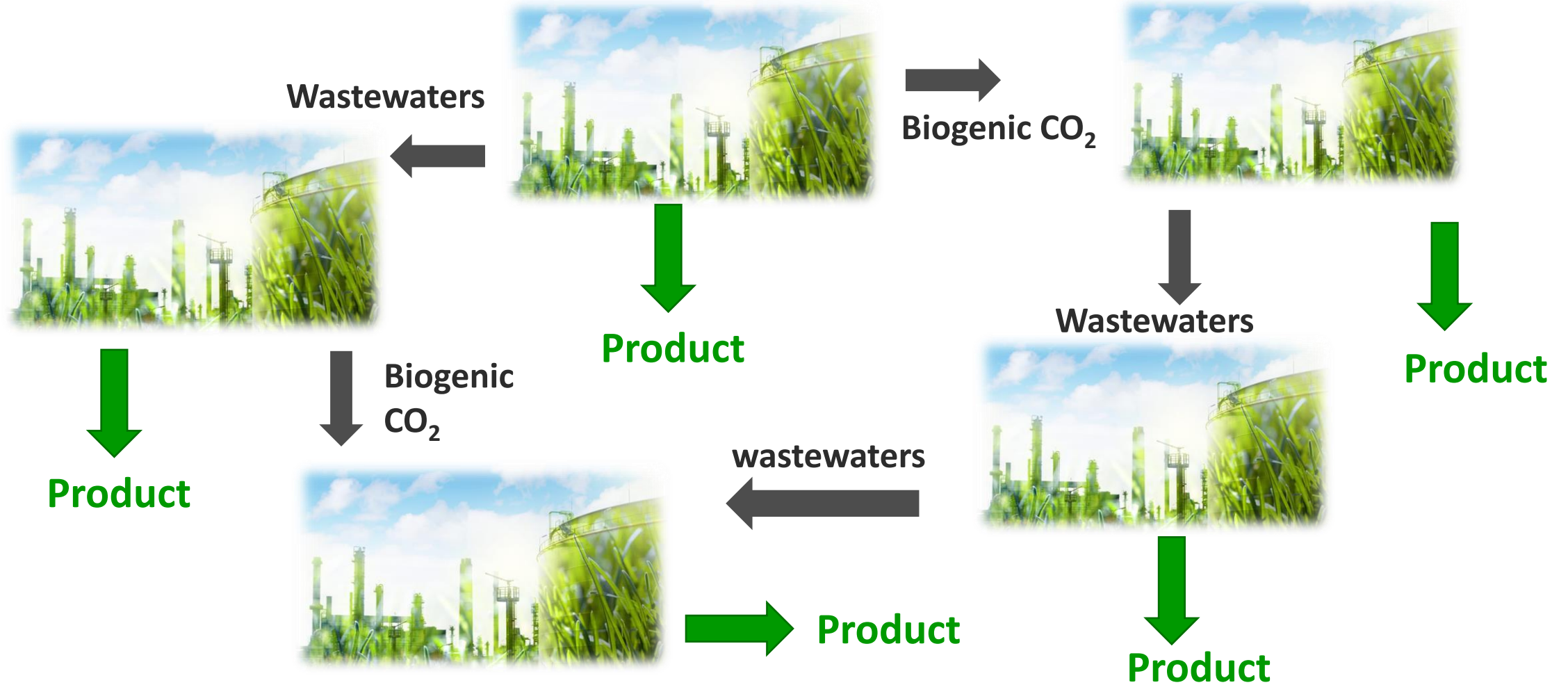
**1,4 Butanediol** - Novamont S.p.A., Italy

**Succinic acid**- Roquette, France



# Microbial-driven Multipurpose Biofactory

The Context



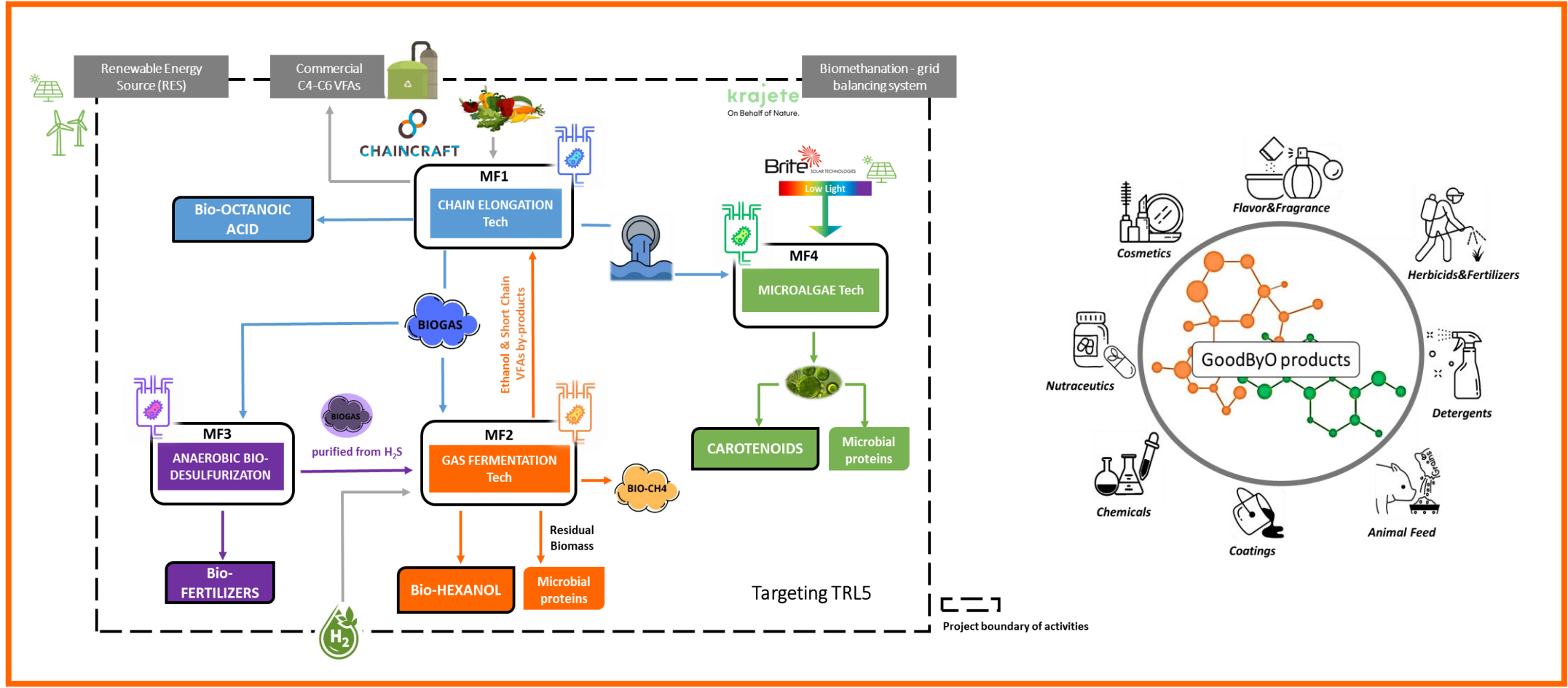


# GOB BYO Ambition

Creating a groundbreaking microbial-based multi-commodities biorefinery based on food waste, biogenic CO<sub>2</sub>, and bioprocess **wastewaters** to enhance the environmental impact and the cost efficiency of both existing and innovative bio-based value chains!

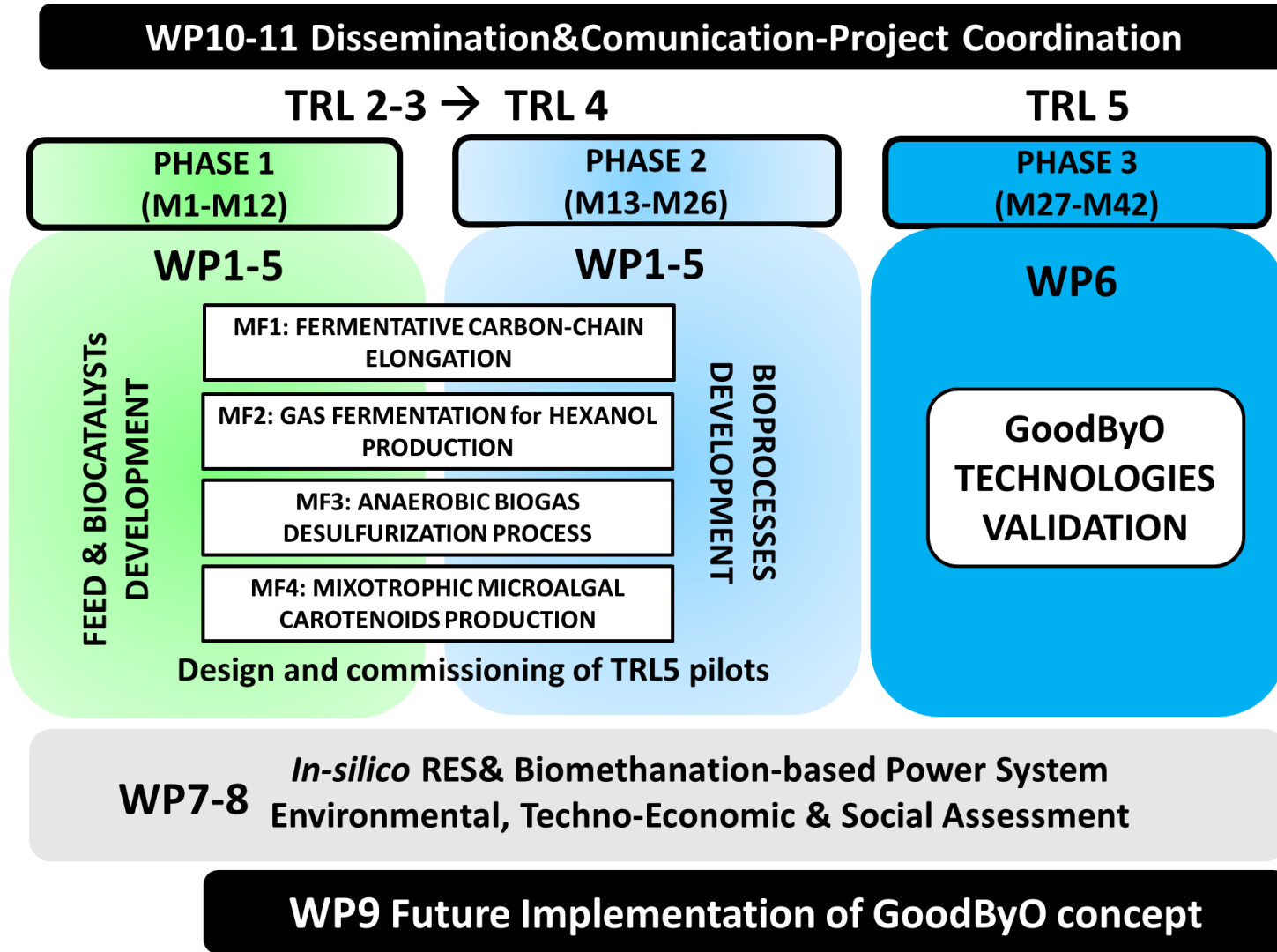
This visionary concept will be applied at **ChainCraft B.V. bio-plant** (Netherlands) by valorizing its **Biogas** and **liquid side-streams** as sustainable zero-cost feedstocks.







The Project structure



# GOOD BYO Targets



Technological Outcomes: OBJ 1 to 5			
Microbial Factory	Feedstock	Products	Target product/year in 500m3 reactors
1- Chain elongators	Food-waste + GF effluent	Bio-octanoic acid	2000 ton
2- Acetogens	CO <sub>2</sub> (biogas)+H <sub>2</sub>	Bio-hexanol	2450 ton
3- Photoautotrophic S-bacteria	CO <sub>2</sub> +H <sub>2</sub> S (biogas)	Desulfurized biogas	2.3 Mln m <sup>3</sup>
4- Microalgae	Wastewater & light	Carotenoids	14 ton

Environmental Outcomes: OBJ 7	
LCA category	Improvement compared to benchmarks
Global warning potential	> 30%
Water Use	> 30%
Freshwater Eutrophication	> 30%
Land Use	> 30%
Fossil resources	> 30%



Economical Outcomes: OBJ 6 & 8		
Products	Target selling price	Benchmark selling price
Bio-octanoic acid	<3.6 euro/kg	3.5 euro/kg (Palm-based)
Bio-hexanol	<5 euro/kg	4 euro/kg (fossil-based)
Carotenoids	<4000 euro/kg	6500 euro/kg (microalgae)





## Benefits to society and the environment



Reduced greenhouse gas emissions



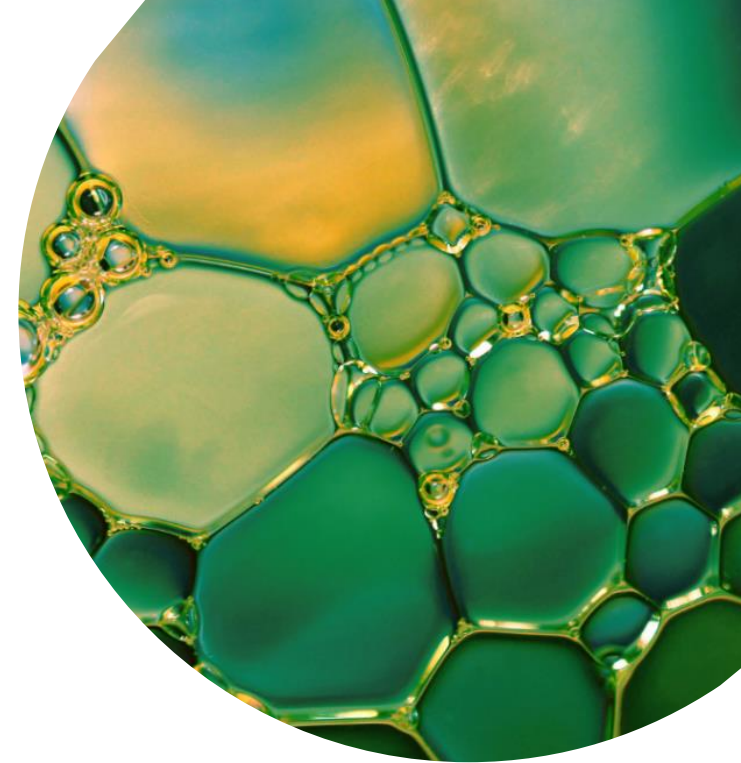
Reduced depletion of freshwater resources



Reduced waste production and disposal



Defossilization of the manufacturing industry



# Replicability of GoodByo concept in anaerobic digestion plants.



Fertilizers



**Chemicals** through Gas Fermentation tech



**Cosmetics** ingredients through Microalgae tech



**Microbial proteins**



**Bio-CH<sub>4</sub>**

# Replicability of GoodByo concept in anaerobic digestion plants.



## Focused project task:

- Evaluate of the current regulatory framework and policy analysis of the biogas and biomethane (in the main current EU markets then Germany - France - Italy);
- Understand which limitations are present for the future implementation of **GoodByO** technologies in existing anaerobic digestion plants .



CHAINCRAFT  
BIOBASED INNOVATORS



Consiglio Nazionale  
delle Ricerche



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