

Bio Base Europe Pilot Plant

Turning grams into tonnes



Workshop 29 November 2023

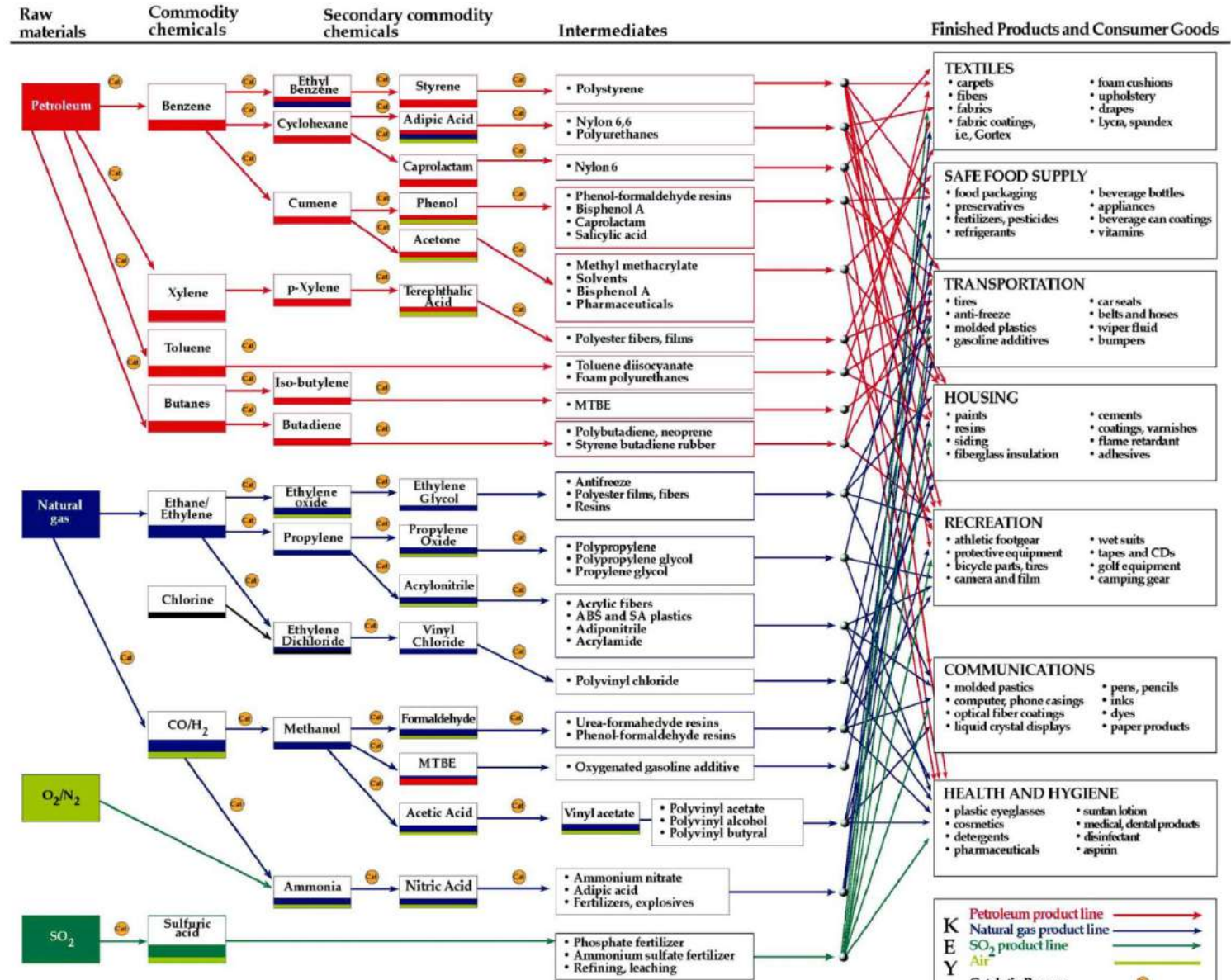
Title: Bio Base Europe Pilot Plant - biorefinery valorisation of aquaculture biomass

Tanja Meyer, tanja.meyer@bbeu.org

European Project Coordinator



Petro-chemical products



Bio-based products

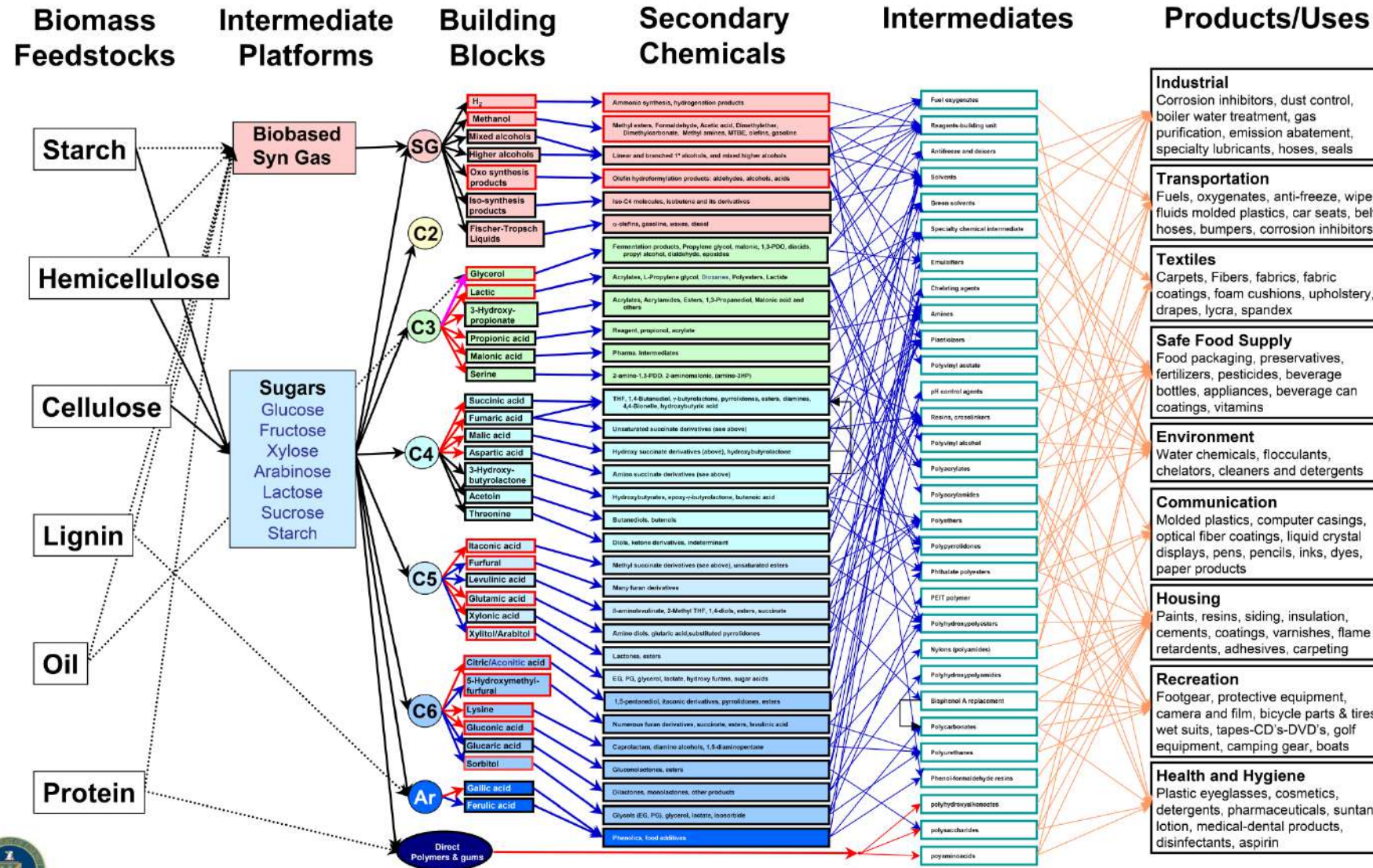
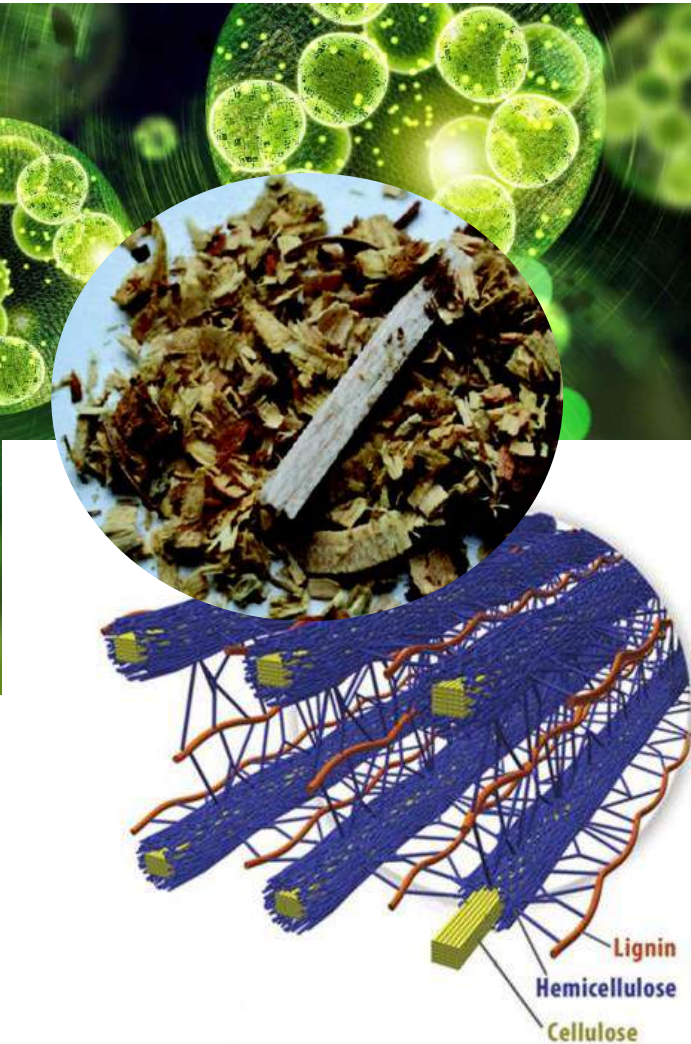
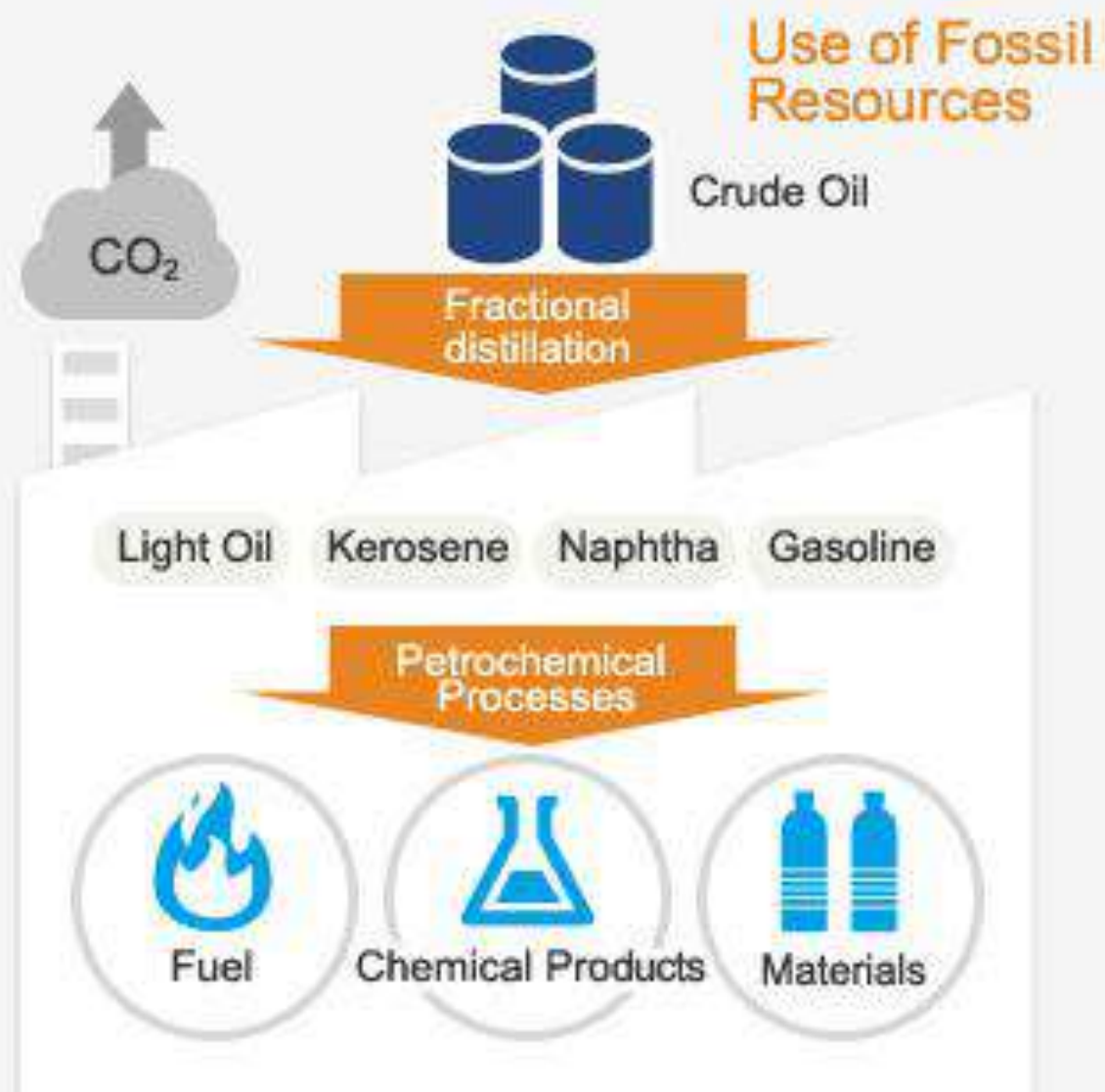
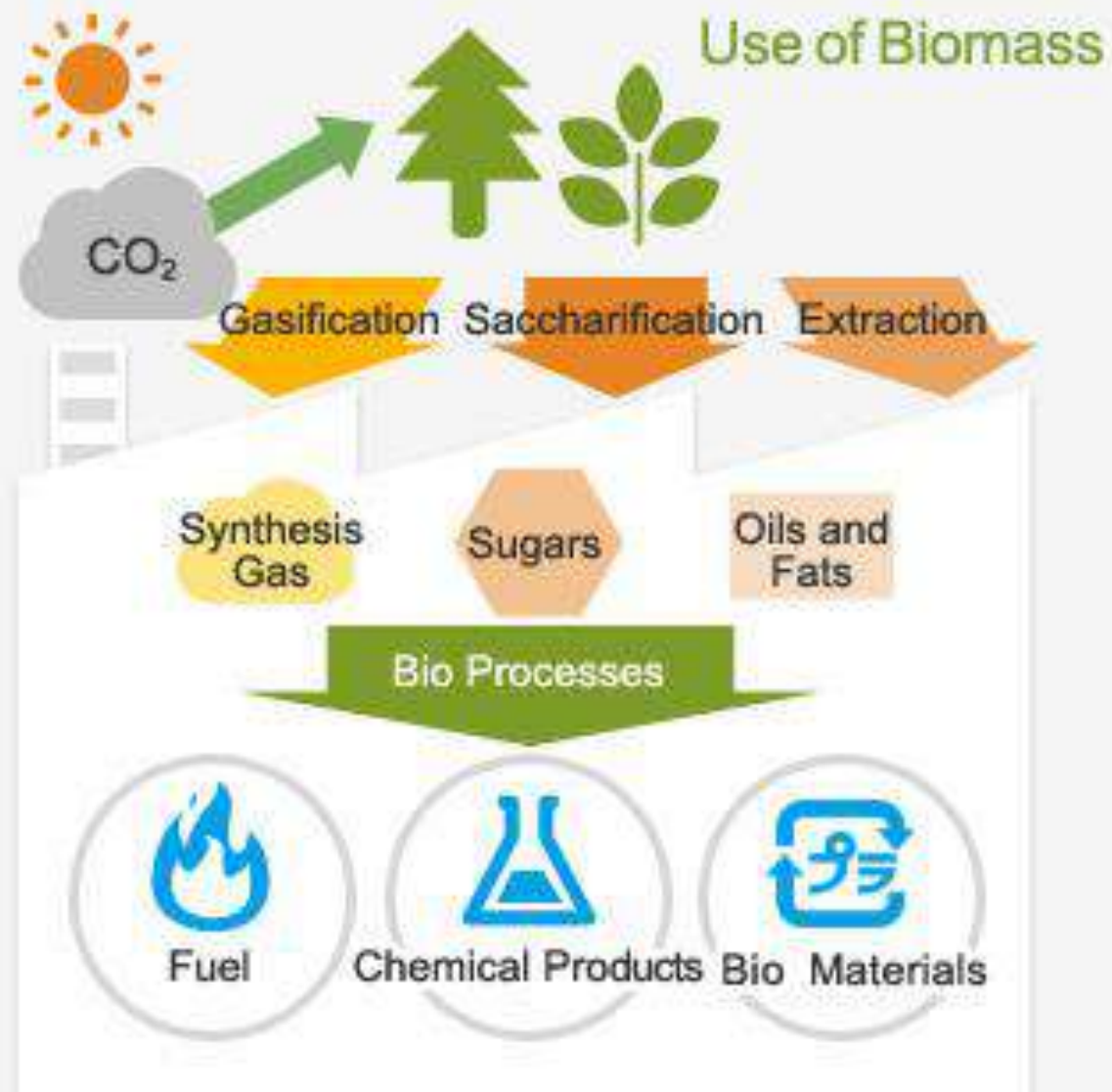


Figure 2. Analogous Model of a Bio-based Product Flow chart for Biomass Feedstocks

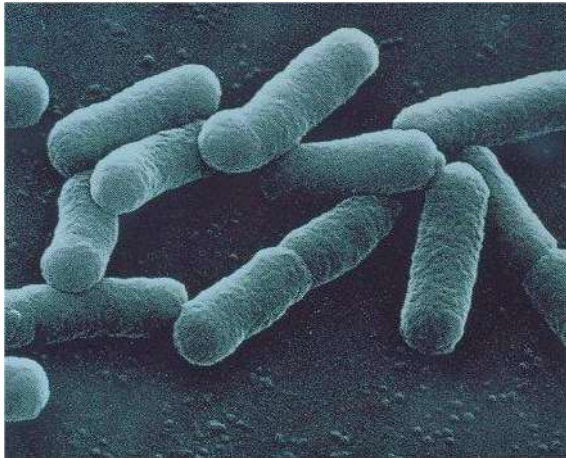
Oil Refinery



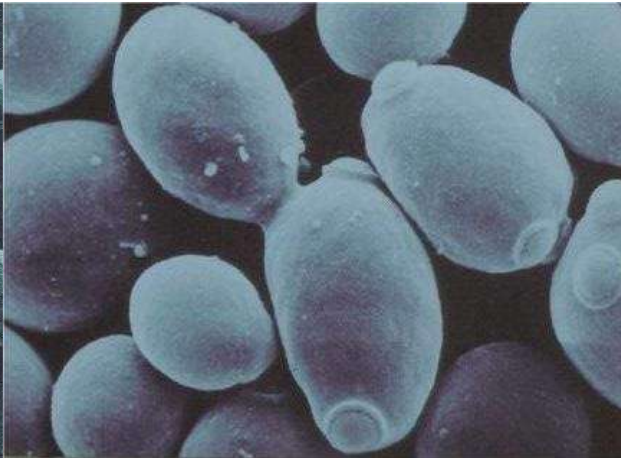
Biorefinery



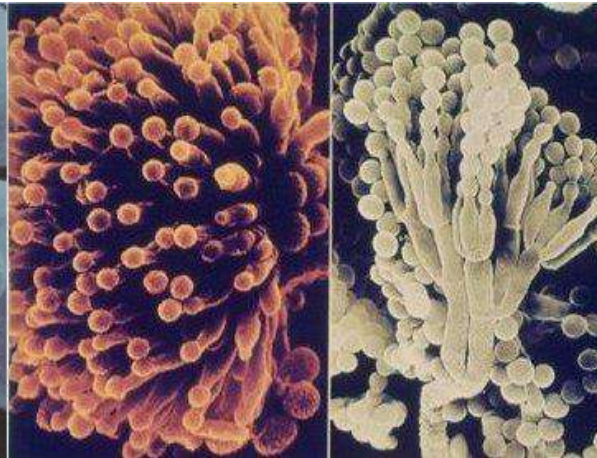
Industrial Biotechnology



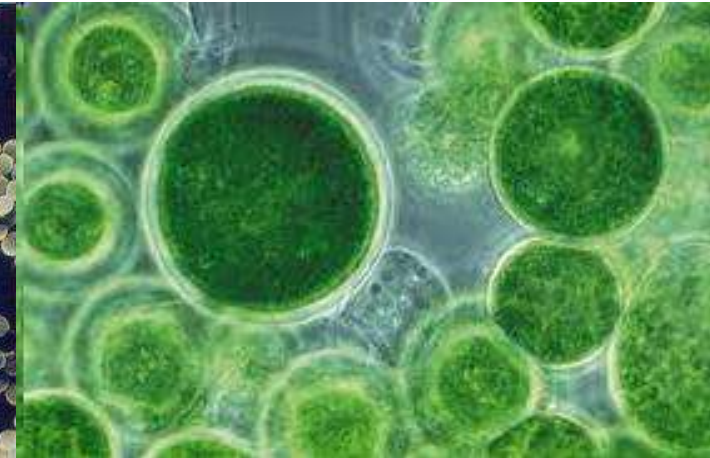
bacteria



yeasts

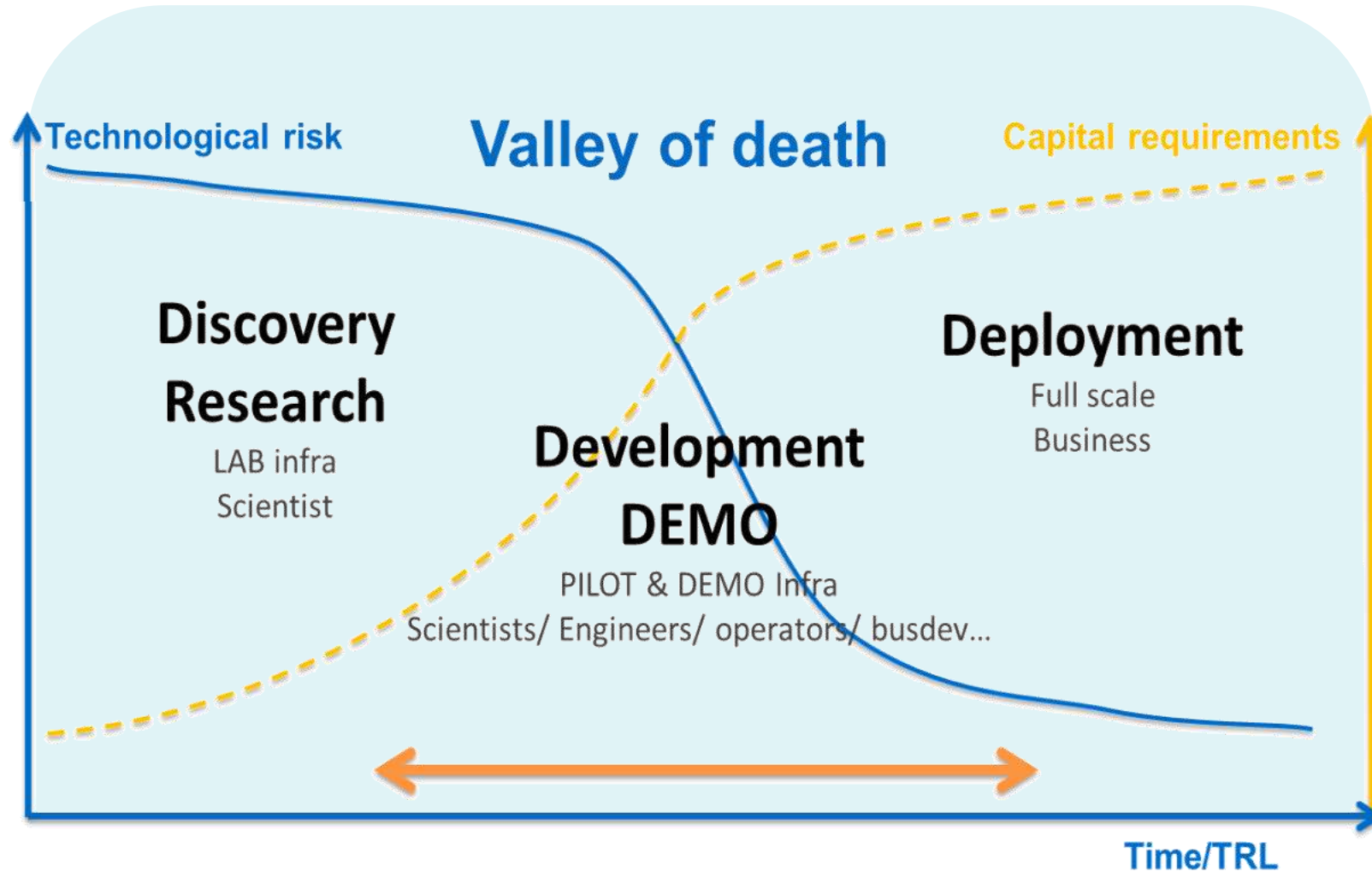


fungi



algae

IB and Bio Economy? Valorisation



Why do we need pilot facilities?



Shared Pilot Facilities = risk sharing & reduction



- ✓ **FASTER**
Clear and reliable timelines, KEY to be ahead of competition, building your own pilot/demo unit takes a lot of time
- ✓ **CHEAPER**
A fraction of the cost: a service fee instead of huge CAPEX/OPEX costs
- ✓ **BETTER**
Scale-up is the CORE business of a shared pilot facility

Who are we?



Multi-purpose pilot facility for process development, scale-up and custom manufacturing of biobased products and processes



2008

2010

2023

Founded as non-profit
SME in Ghent, BE

Plant operational

>170 employees
>25 M€ turnover

Who are we?



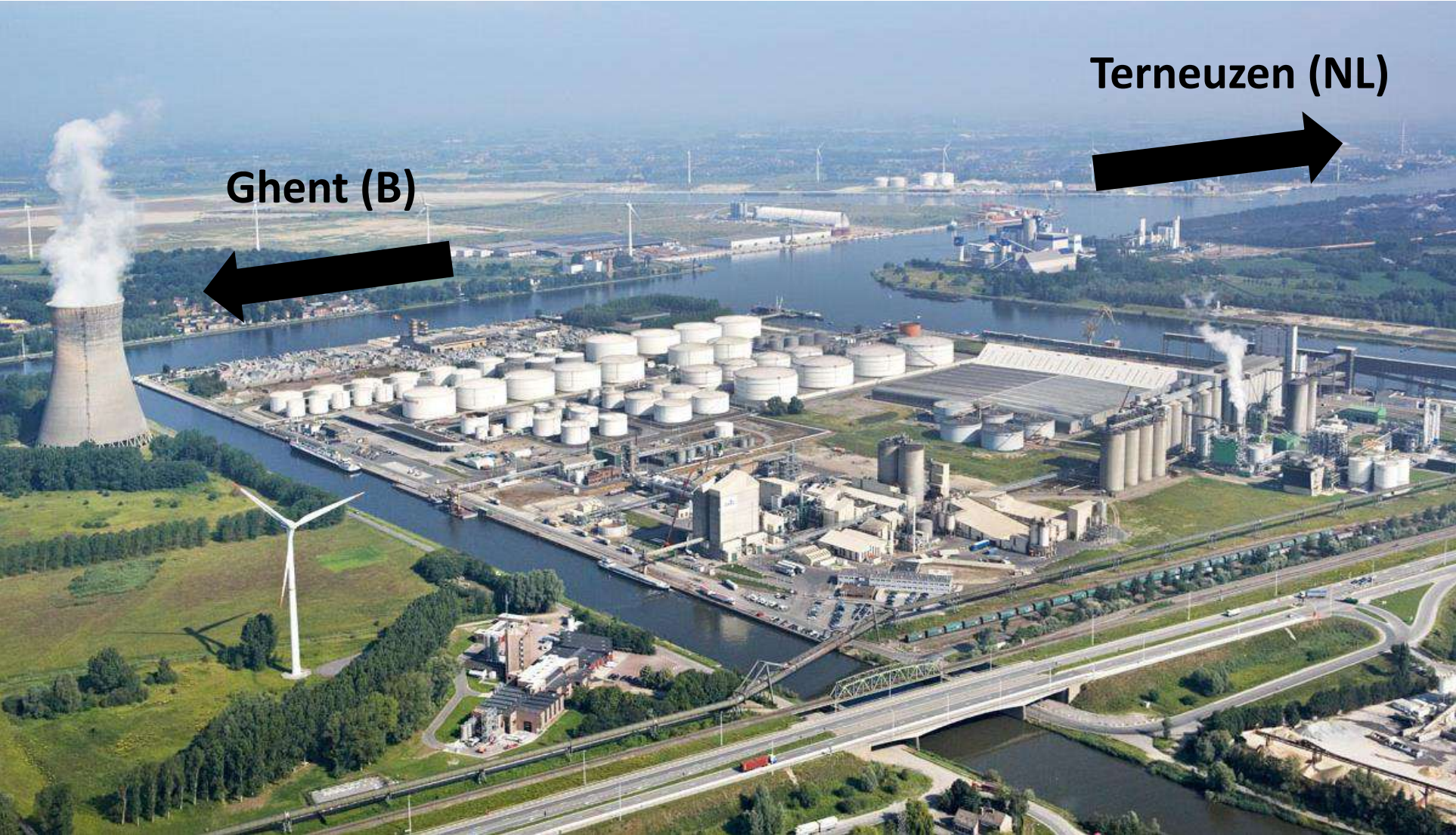
Multi-purpose pilot facility for process development, scale-up and custom manufacturing of biobased products and processes



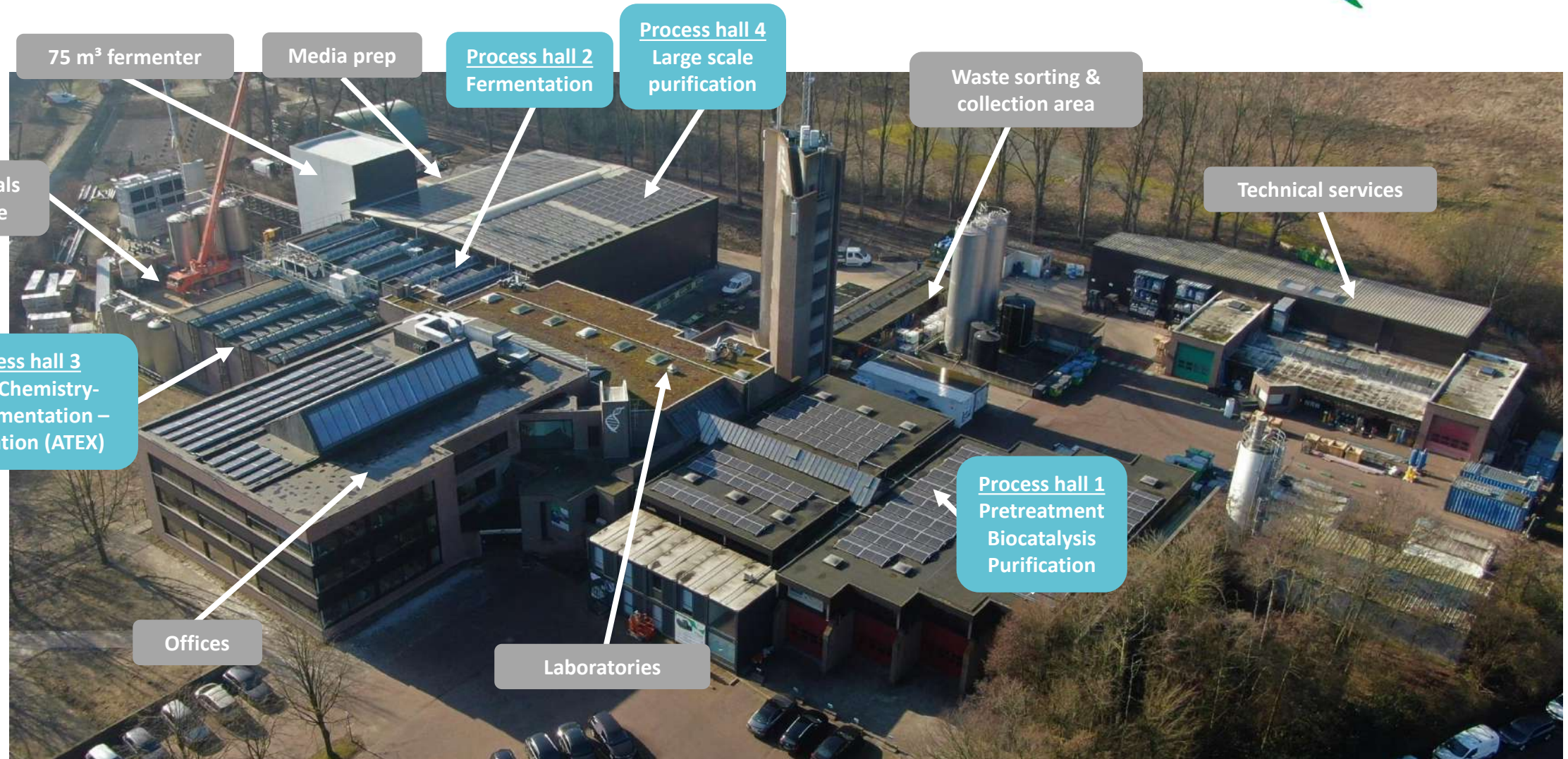
- Founded in 2008 as not-for-profit SME in Ghent, BE
- Operational since 2010
- >170 employees
- Fully independent service provider
- Quality labels



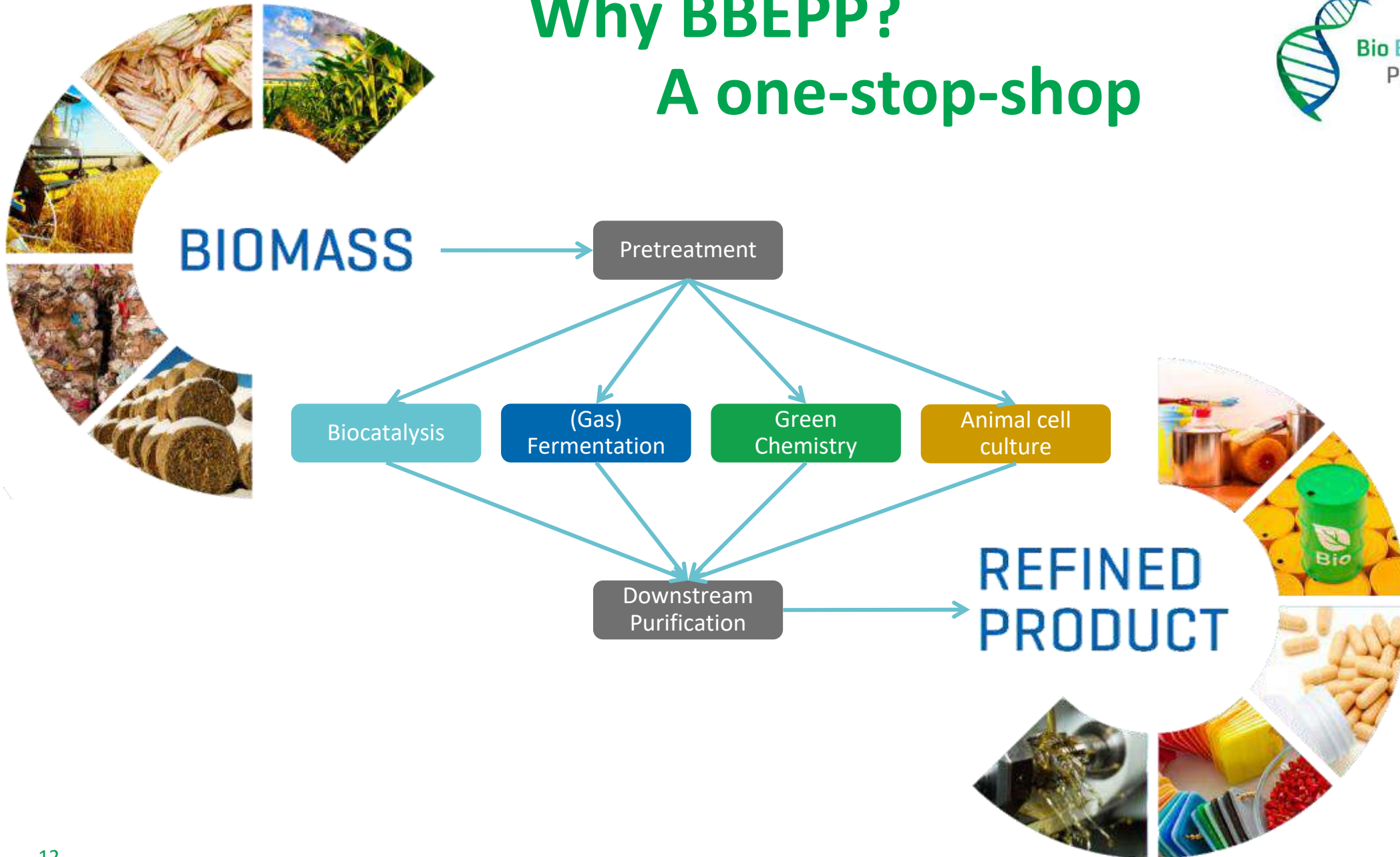
Where are we located?



Our facility



Why BBEPP? A one-stop-shop



A one-stop-shop



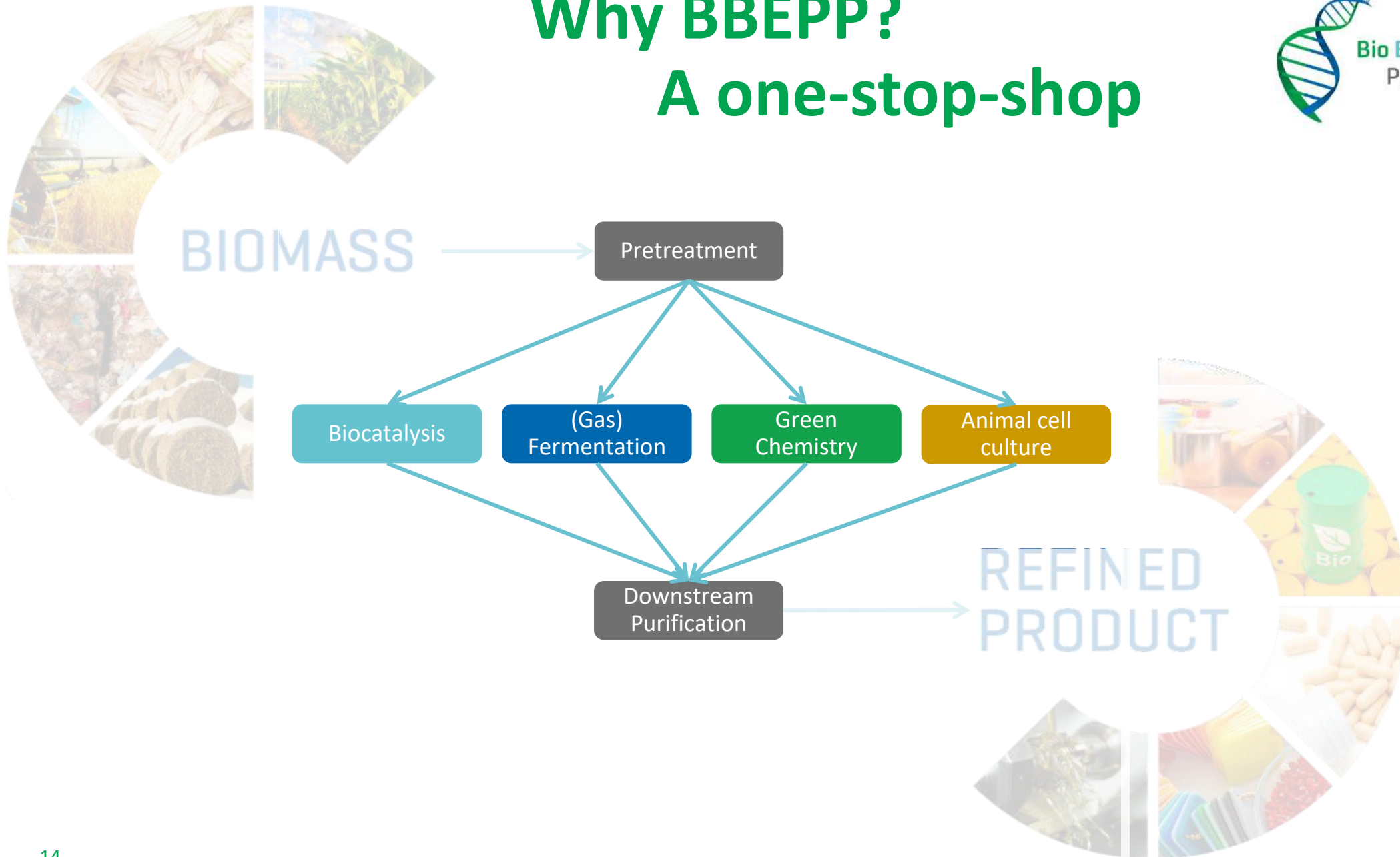
- Corn stover
- Paper pulp
- Oils and fats
- Husks, bran, straw
- Agro-industrial by-products
- Bagasse, beet pulp, seed press cakes
- Algae/ marine biomass
- Non-food crops
- Syngas
- Defined media: glucose, sucrose, etc.

...

- Biochemicals
- Biobased building blocks
- Industrial Enzymes
- Solvents
- Polymers
- Flavors and fragrances
- Biopesticides and biostimulants
- Surfactants
- Nutraceuticals
- Fuels
- Specialty carbohydrates



Why BBEPP? A one-stop-shop



What do we offer?



Process Development

- Concept design
- Fermentation optimization
- Downstream processing (DSP) development and optimization



Scale-up

- From 10 L to 15m³ for fermentation (soon also 75m³) + DSP, up to 50m³ for other processes
- Generation of samples for application research
- Demonstration of technology at larger scale
- Pilot scale data (mass balances, ...)

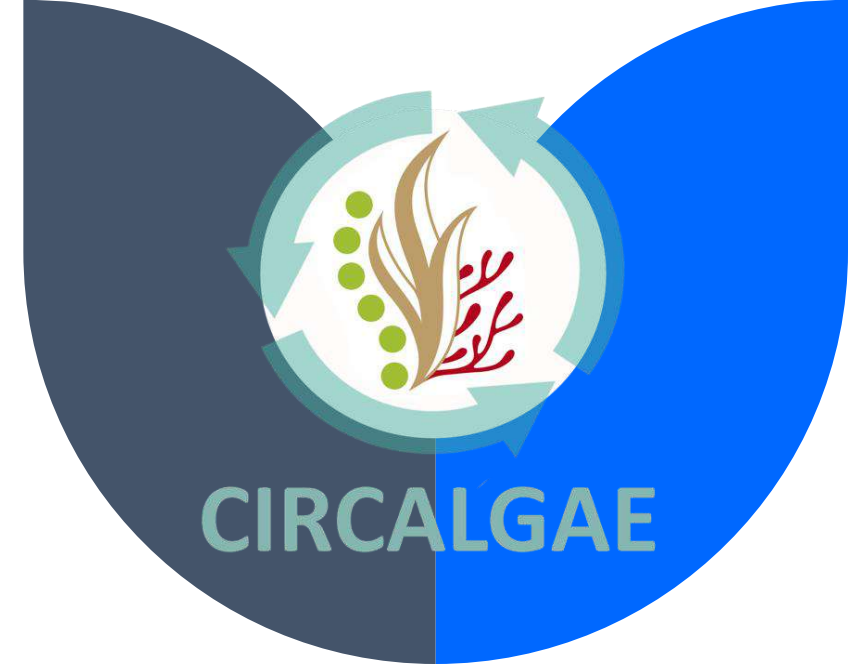


Custom Manufacturing

- 1.5m³, 4,5m³ and 15m³ (soon 75m³) in house
- access to 85m³, 100m³ and 250m³ through partners
- Fermentation
- (Solvent-)based DSP
- Biocatalysis

Example Project

CIRCular valorisation of industrial **ALGAE**
waste streams into high-value products to foster
future sustainable blue biorefineries in Europe



HORIZON-CL6-2021-CIRCBIO-01-09

Unlocking the potential of algae for a thriving European
blue bioeconomy

Introduction



Algae biomass is highly underexploited, and its efficient exploitation is one of the main challenges in the current and future EU blue/marine sustainable policies.

The extracted phycocolloids only represent 15-30% of the total algal biomass, while the rest is discarded as several effluents and solid residues and managed as waste.

The heterogeneity of algae biomass in terms of composition, recalcitrance, and bioactivity, together with limited processing volumes hinders the creation of new cost-efficient value chains for the market to fully grasp the whole potential of the marine world.

HORIZON-IA PROJECT

ESTIMATED COSTS

€ 10,332,894

COORDINATION:

KTH/Chalmers University

DURATION

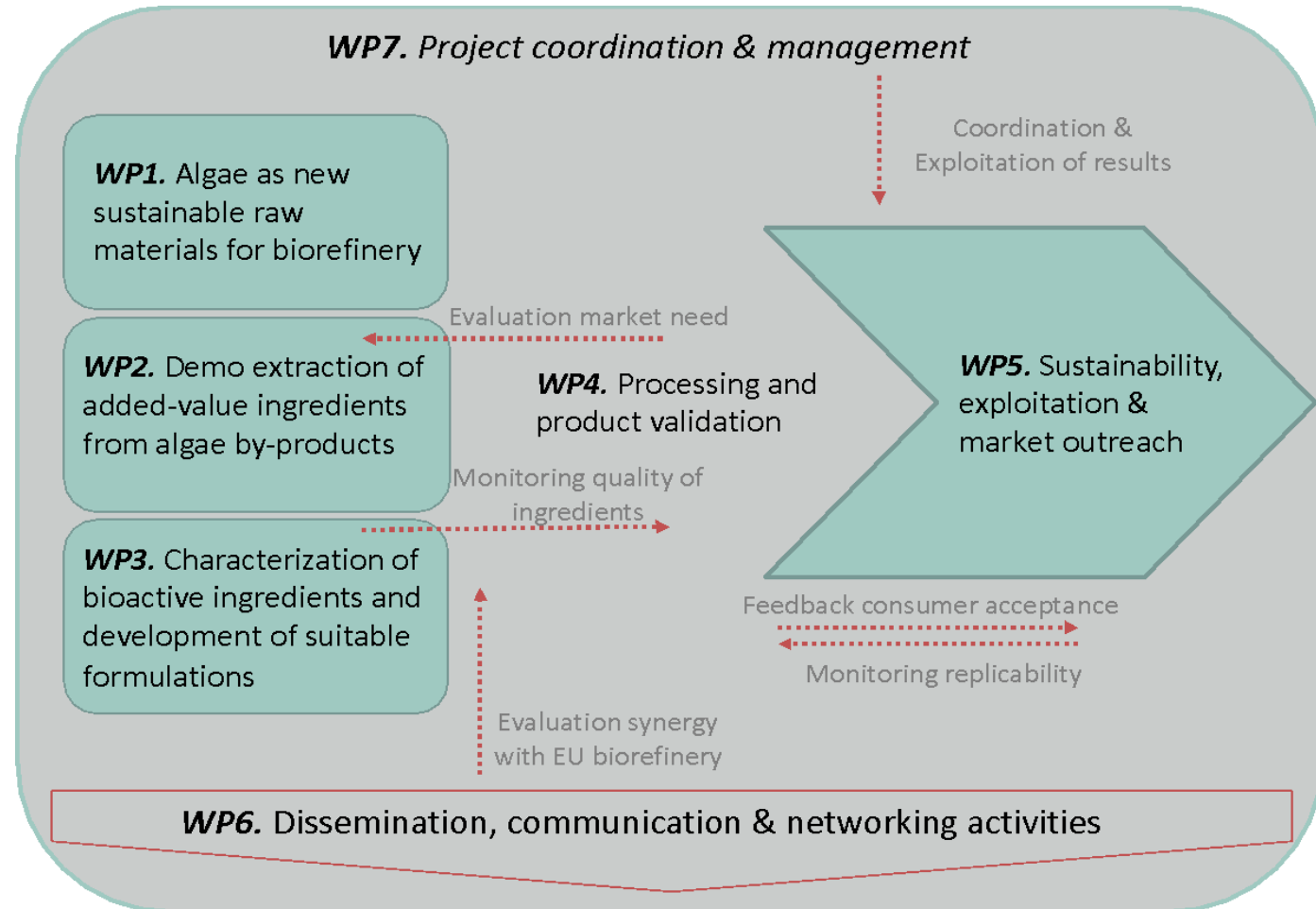
Oct 2022 - Nov 2026

CONTACT PERSON

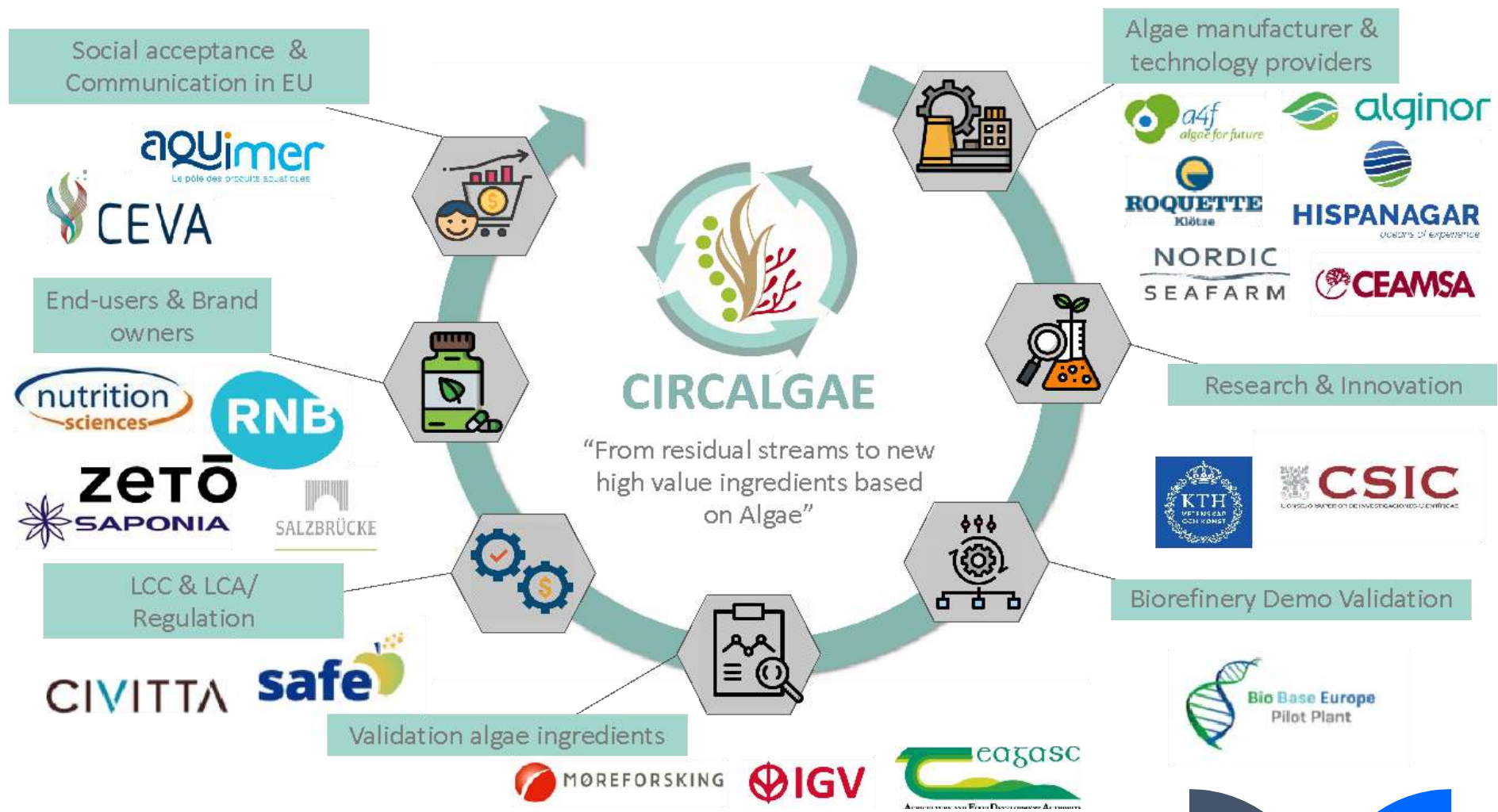
Rakesh Nair

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rakesh.nair@bbeu.org



CIRCALGAE consortium through the value chain



CIRCALGAE's approach to boost the blue bioeconomy relies on the main source of **macro- and microalgae exploitation** to date and applies a **cascade biorefinery concept** to fully valorise the massively produced and vastly **underexploited discards and waste streams from these industries** (which can add up to 95% of the initial biomass in dry weight).

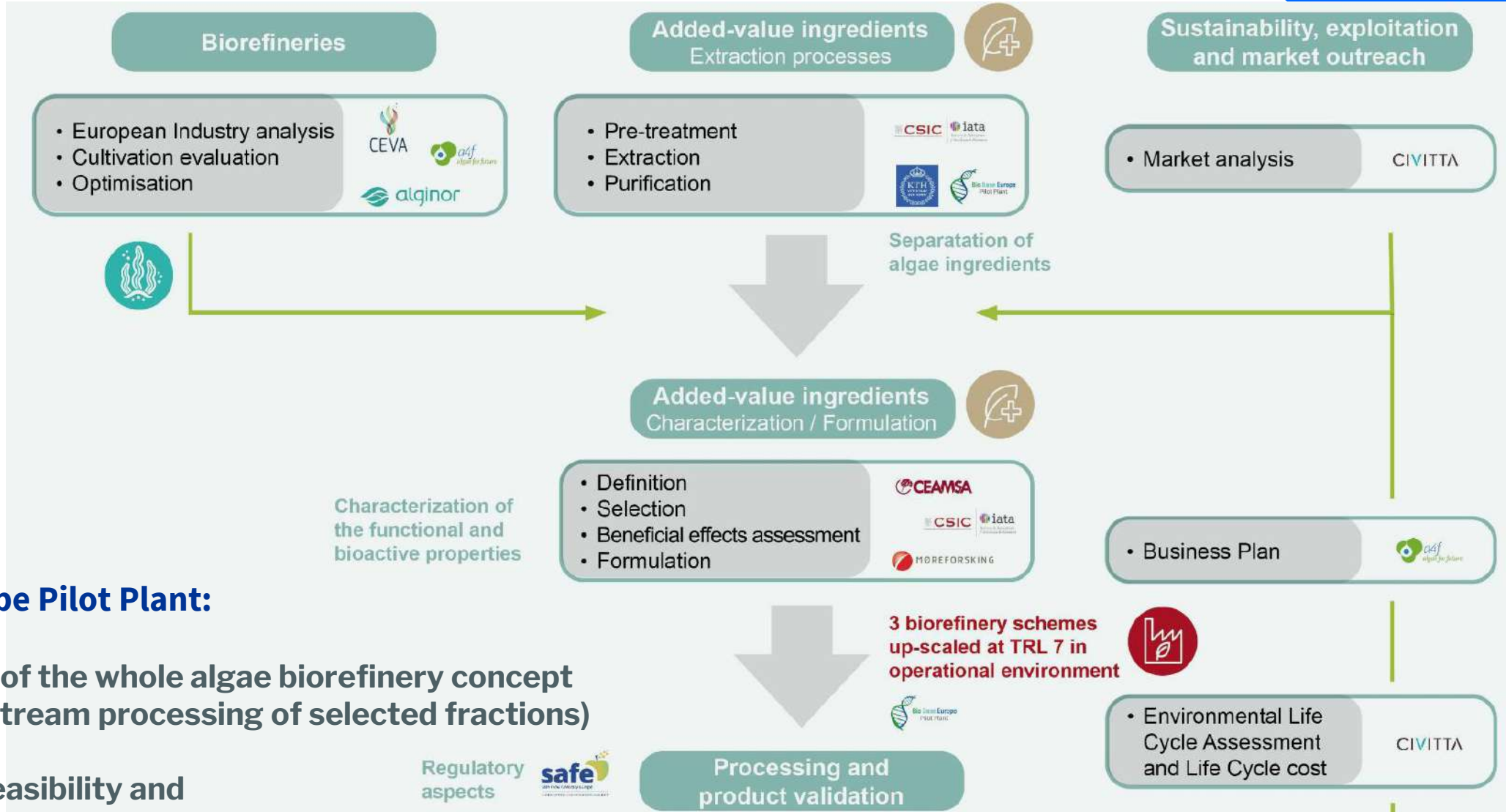
CIRCALGAE will demonstrate in industrial scale the transformation of these biomasses into value-added ingredients to be used in specific texturized or vegan foods, health-promoting food ingredients, protein rich feed, and cosmetic formulations incorporating texturizing or highly bioactive ingredients for topical use.



Objective

Objective

CircAlgae Approach



Characterization of the functional and bioactive properties

Role of Bio Base Europe Pilot Plant:

Demo scale validation of the whole algae biorefinery concept (extraction and downstream processing of selected fractions)

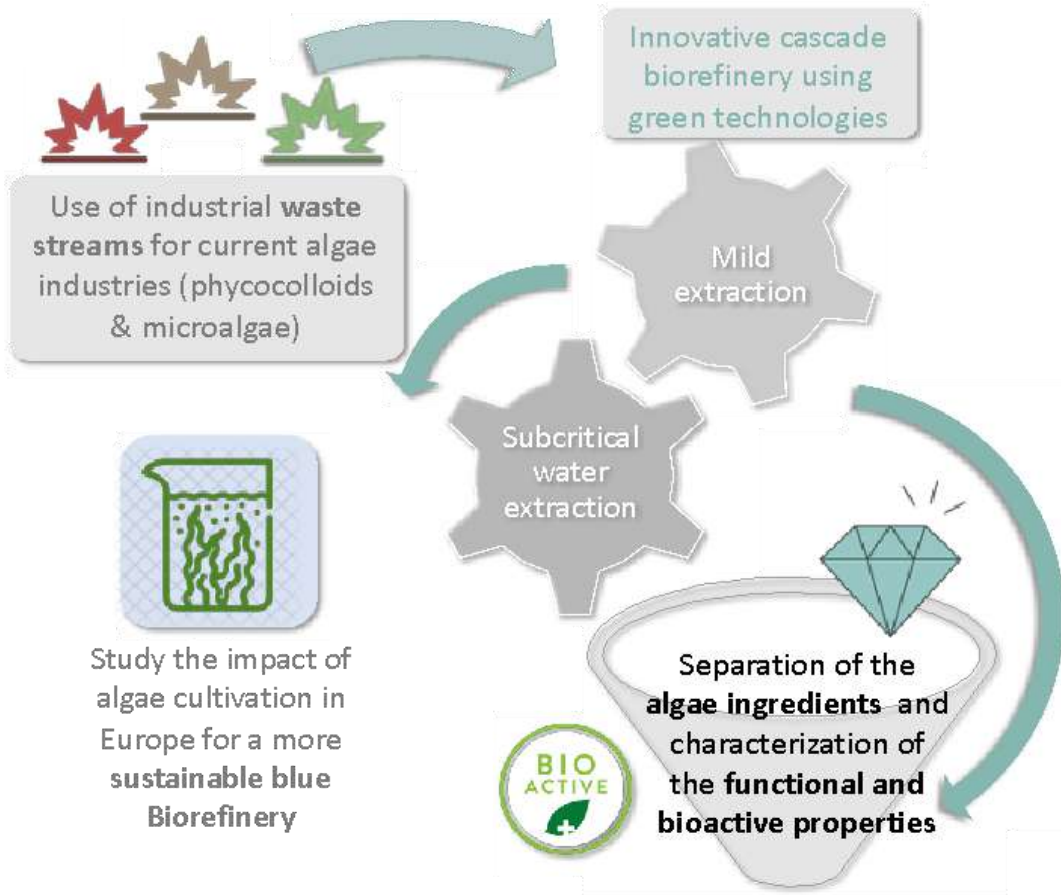
And to demonstrate feasibility and deliver product for testing in industrial prototypes for food, feed, cosmetics and biomedical formulations.

CIRCALGAE Application

Re-shaped Blue Biorefinery

Novel Algae formulations

Validation Demo Cases



Validation of algae ingredient in 12 demonstrator products





Bio Base Europe
Pilot Plant

Process Hall 1

Biomass pretreatment, biocatalysis and DSP

Process Hall 2

Fermentations and DSP



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Pilot Plant

Process Hall 3

Green chemistry and ATEX proof DSP



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Pilot Plant

Laboratory

Analysis and process development



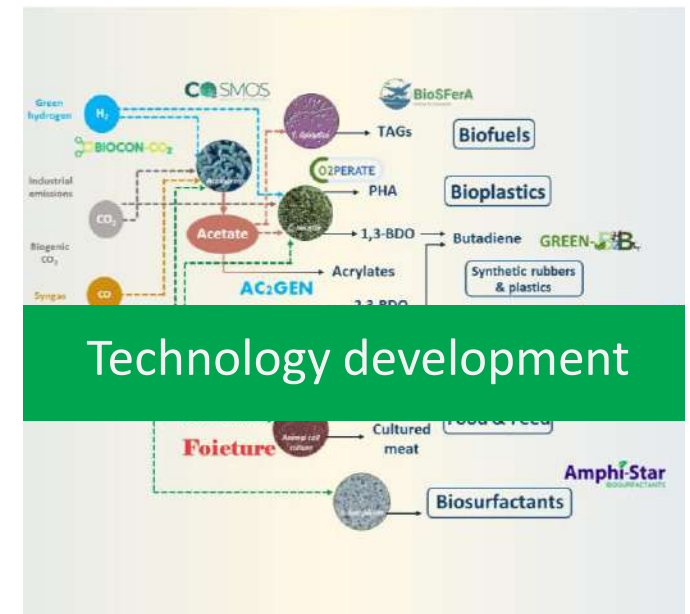
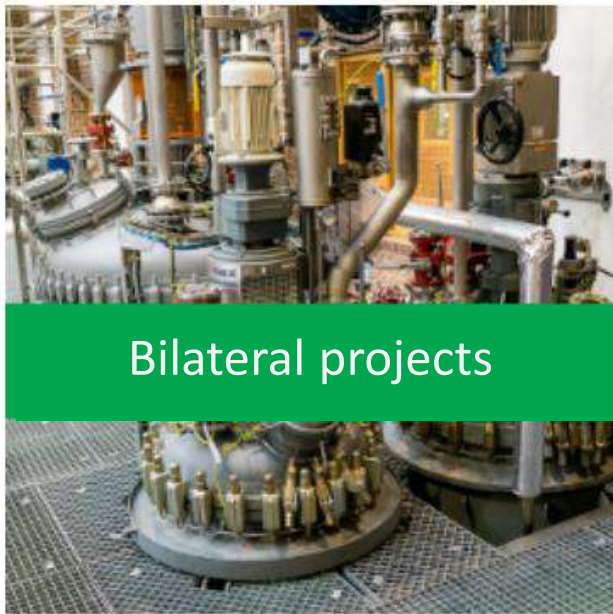
Bio Base Europe
Pilot Plant



Storage

Storage of different kind of biomass

What do we do?



More insights at our YouTube channel



Come fly with us: A swirling and sensational virtual visit of the Bio Base Europe Pilot Plant!

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6 VIND IK NIET LEUK DELEN OPSLAAN



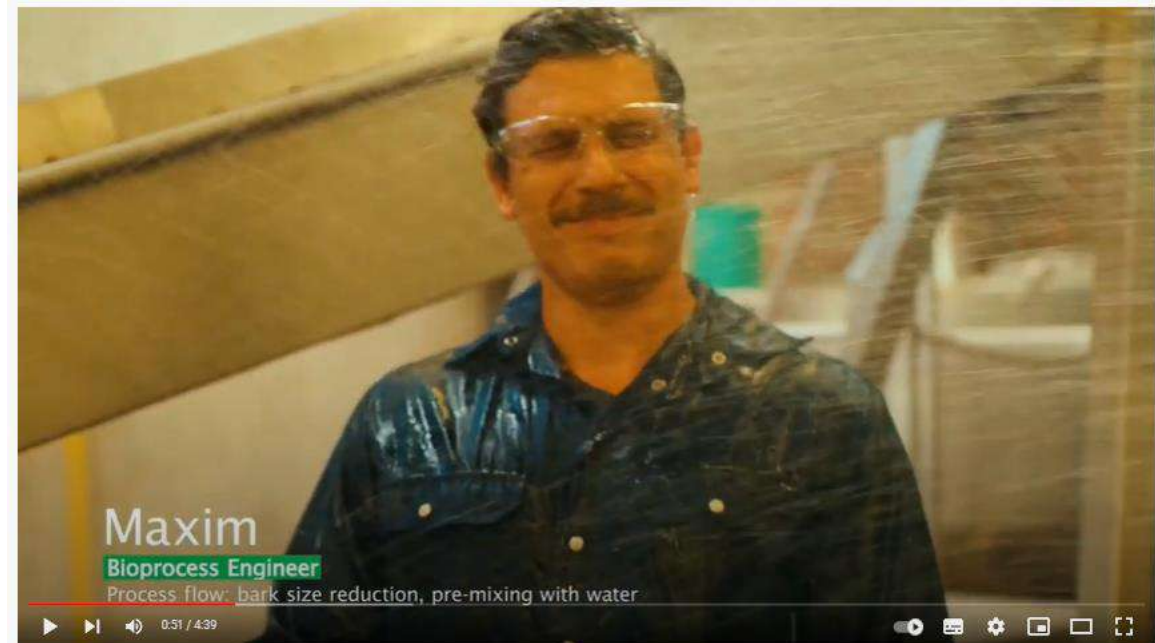
Bio Base Europe Pilot Plant
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ABONNEREN

Buckle up and join us for a sensational flight through a particular and unique universe!
MEER TONEN

A virtual visit to the pilot plant

Our one-stop-shop concept – the REHAP project



Bio Base Europe Pilot Plant: A one-stop-shop!

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2 VIND IK NIET LEUK DELEN OPSLAAN



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Our staff members take you on a trip from BARK to 2,3 BUTANEDIOL, all process steps under one roof.

https://www.youtube.com/watch?v=8_2ZAXpzO-M&ab_channel=BioBaseEuropePilotPlant

https://www.youtube.com/watch?v=K24a2RWoZpc&ab_channel=BioBaseEuropePilotPlant

We offer all stages to success



Interested to have us as your upscaling partner?

Tanja Meyer

tanja.meyer@bbeu.org

European Project Coordinator

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