



# Bio Base Europe Pilot Plant:

*Turning grams into  
tonnes*

Dr. Lieve Hoflack  
Project Acquisition Manager  
Bio Base Europe Pilot Plant, Belgium



- *Mission statement*

To enable the transition to a sustainable bio-based economy

*through*

Development, scale-up and custom manufacturing of bio-based product and processes

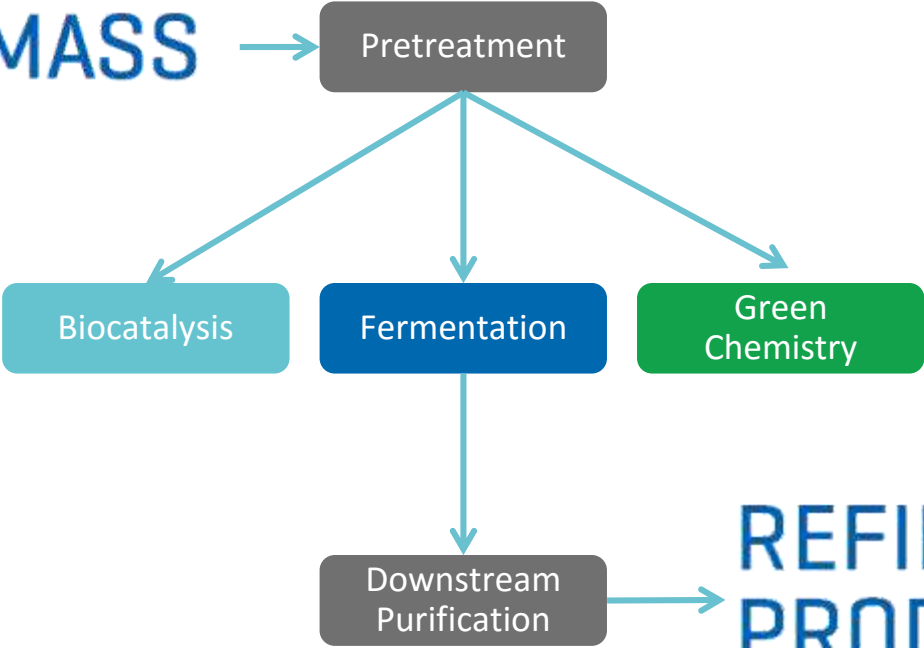
- Number of employees: 70
- No industrial shareholders



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



**BIOMASS**



**REFINED  
PRODUCT**

# Examples



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

...

- Bio-chemicals
- Bio-based building blocks
- Industrial Enzymes
- Solvents
- Polymers
- Flavors and fragrances
- Protein concentrates
- Surfactants
- Nutraceuticals
- Fuels
- Specialty carbohydrates



**REFINED  
PRODUCT**

# Current infrastructure

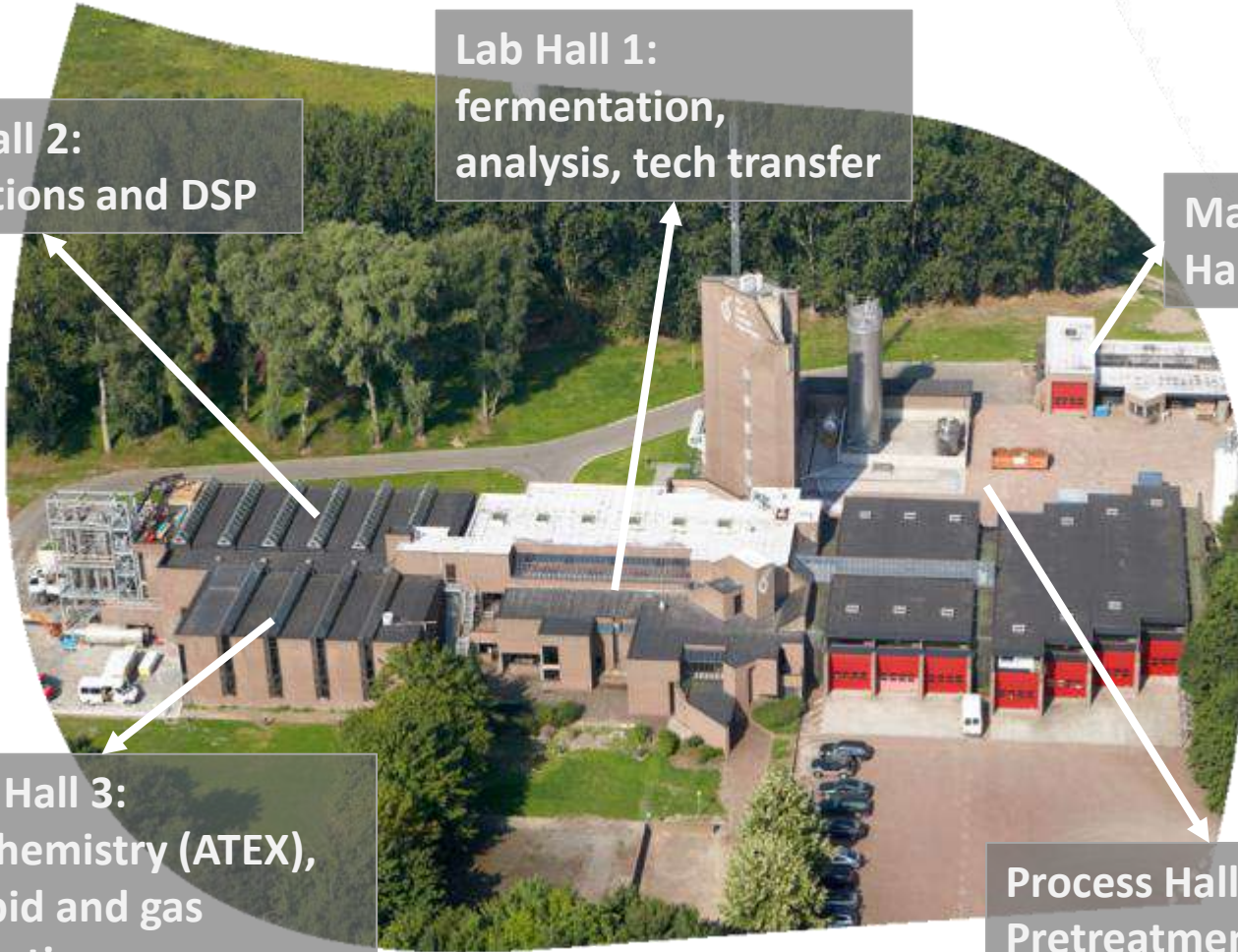
Process Hall 2:  
Fermentations and DSP

Lab Hall 1:  
fermentation,  
analysis, tech transfer

Maintenance  
Hall

Process Hall 3:  
Green chemistry (ATEX),  
anaerobic and gas  
fermentation

Process Hall 1:  
Pretreatment, DSP  
and biocatalysis



## Process Hall 1

Biomass pretreatment, biocatalysis and DSP

## Process Hall 2

Fermentations and DSP





## Process Hall 2

Fermentations and DSP



## Process Hall 3

Green chemistry, ATEX proof DSP, anaerobic and gas fermentation



## Process Hall 3

Gas-fermentation: 10L pressurized gas-fermentor for converting flue gas into chemicals





Laboratory

Tech transfer, analysis, process development



## Blue Hall

Downstream processing, FSSC 22000, Under construction

# Services

- Concept design
- Fermentation optimization
- Downstream processing (DSP) development and optimization
- Techno-economic assessment (in-house developed model)

## Process Development



- From 10 L to 15 m<sup>3</sup> for fermentation + DSP, up to 50 m<sup>3</sup> for other processes
- Generation of samples for application research
- Demonstration of technology at larger scale
- Pilot scale data (mass- and energy-balances, ...)

## Scale Up



- 1,5 m<sup>3</sup>, 4,5 m<sup>3</sup> and 15 m<sup>3</sup>
- Fermentation
- (Solvent-)based DSP
- Biocatalysis

## Custom Manufacturing



# Business Model

## Open Innovation Projects

- Independence
- Flexibility
- Confidentiality

### Bilateral projects with industry

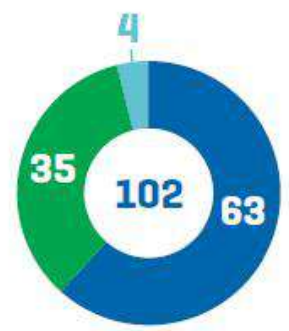
**Confidential**

- Bilateral, privately funded
- Intellectual Property remains with customer
- 129 projects in 2013-2015

### Consortia-based projects

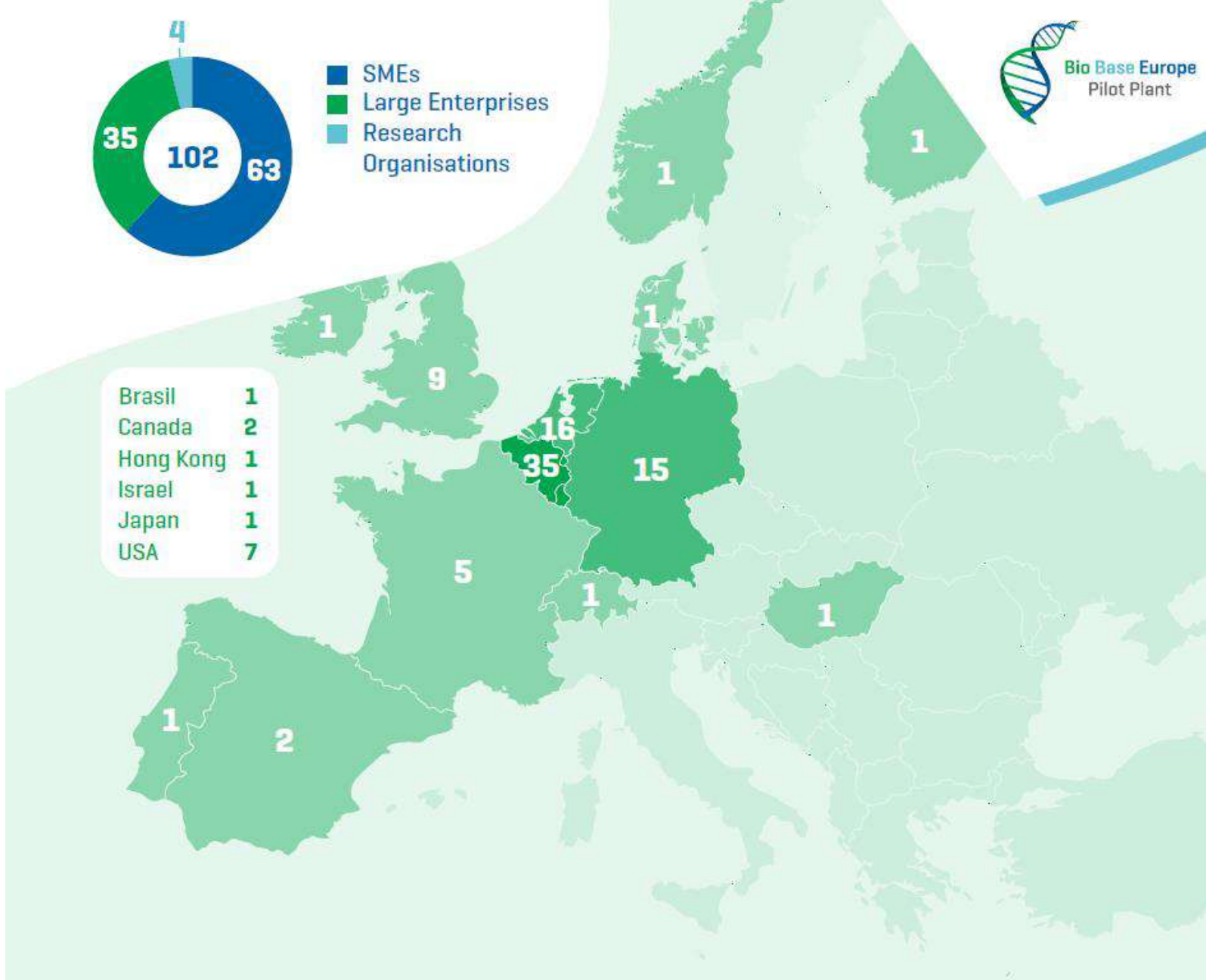
- Partly subsidized, partly privately funded
- Building expertise
- Value chains
- Allows publicity and communication





- SMEs
- Large Enterprises
- Research Organisations

Brasil	1
Canada	2
Hong Kong	1
Israel	1
Japan	1
USA	7



**Geographical distribution of partners for the 223 bilateral projects executed from 2008-2017**

# Why outsource your development and scale-up to us?



*Survey amongst our clients:*

1. **Faster:** Accelerated development: faster time to market (1 year and more)
2. **Cheaper:** Saved development costs (75-100%)
3. **Better:** Improved characteristics of the process or final product (thanks to scale-up expertise)
4. **Stronger:** Improved network (we link customers to opportunities if we see them)



# Customer appreciation

*Survey amongst our clients:*

Strengthening relationships with/  
convincing customers

Convincing investors

Developing new capabilities /  
Working with new technologies

Convincing people within the company



## CONSORTIA-BASED PROJECTS:

Technology development, scale up and  
building new value chains

-Ongoing projects-

### FP7 & Horizon2020:

MARISURF (Marine biosurfactants)

**SUPERBIO** (Voucher for service)

REHAP (Wheat straw and wood to chemicals)

DAFIA (MSW and marine waste to chemicals)

FALCON (Lignin for fuels and chemicals)

NanoPack (Antimicrobial Packaging)

BIOCONCO2 (Gas fermentation)

**KET4CleanProduction** (voucher for service)

### VLAIO

CO2OPERATE (Gas fermentation)

SPICY (Fermentation of chemicals by yeast)

Applisurf (Biosurfactant applications)

### INTERREG:

BioHArT (Lignin to aromatics)

**BioBase4SME** (Training & voucher)

SmartPilots (Multifunctional pilot-Infra)

### BBI-JU

PULP2VALUE (Sugarbeet pulp to chemicals)

CARBOSURF (Biosurfactants &  
specialty carbohydrates)

DEMETER (Enzyme production  
for AD)

AFTERLIFE (PHA from agro-food wastewater)

RESOLVE (Biobased solvents)

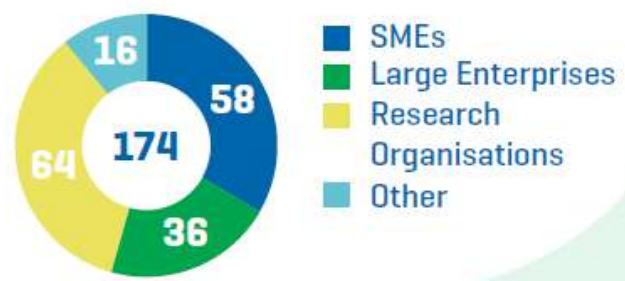
Pilots4U (Biobased pilot & demo network)

CASPER (PHA from whey)

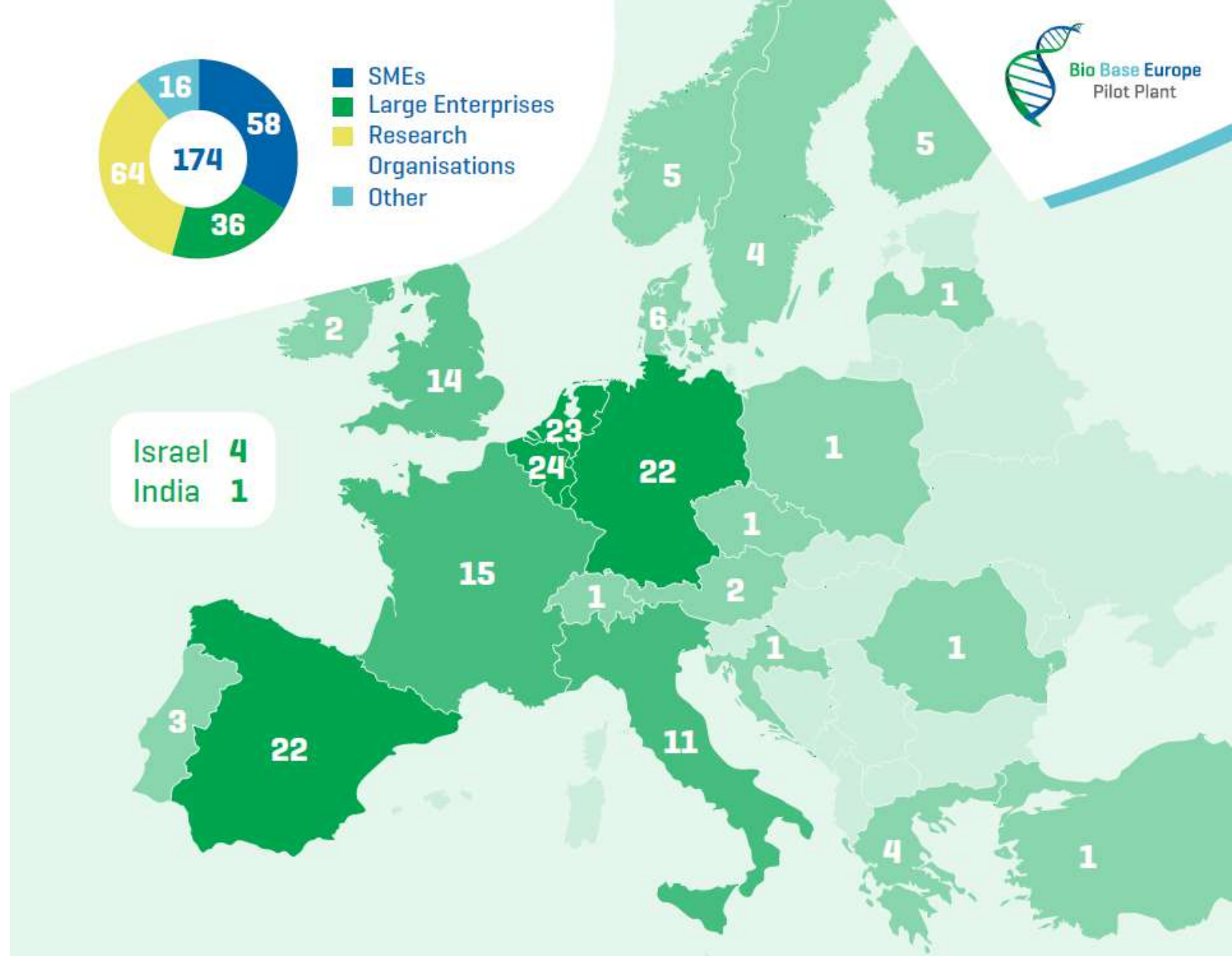
Prolific (Agro-food sidestream recovery)

iFermentor (Nisin production)



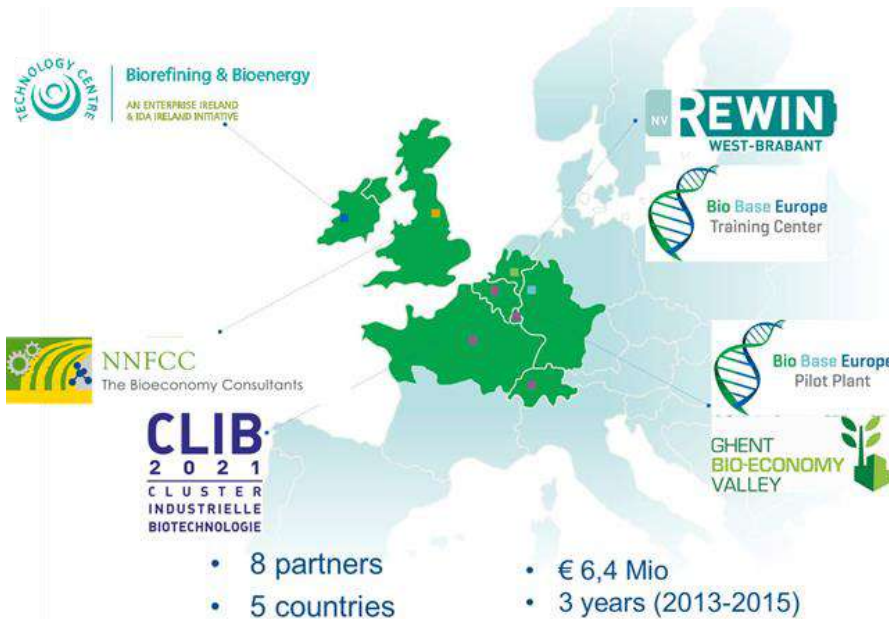


Israel 4  
India 1



**Geographical distribution of project partners within consortium based projects (2008-2017)**

# Vouchers schemes?



**INNOVATION COUPONS**

Worth up to €30.000 to assess the feasibility of an innovative biobased idea.



- Reaching out to stakeholders in the bio-based economy
  - Bio-innovation agents
- **Innovation support** to SMEs to assess the feasibility of a **bio-based idea**
  - Access to **Bio Base NWE network** with leading **bio-based experts**
  - **Innovation coupons** for technological support
- Programs and tools for **training and education**
- Representing SMEs in the **European bio-economy strategy** roll-out



European Union  
European Regional  
Development Fund

Improving policies in support of shared pilot facilities to increase their impact on the Key Enabling Technology Industrial Biotech and the European Bio-economy



### Optimizing support mechanisms for SPF:

- Investments in hardware/infrastructure , maintenance and replacement of equipment
- Covering operational costs incl. overhead

### Optimizing support for SFP users:

By promoting innovators to use SPF

- Innovations have an increased chance to make it to the market
- the long term viability of the SPF are supported

### Facilitate interregional cooperation for pilot activities:

- by promoting regional innovators to use an SPF from outside the region
- by co-investment of different regions in the same SPF



# Examples of innovations: Human milk oligosaccharides of Inbiose (FP7+ BBI-JU)



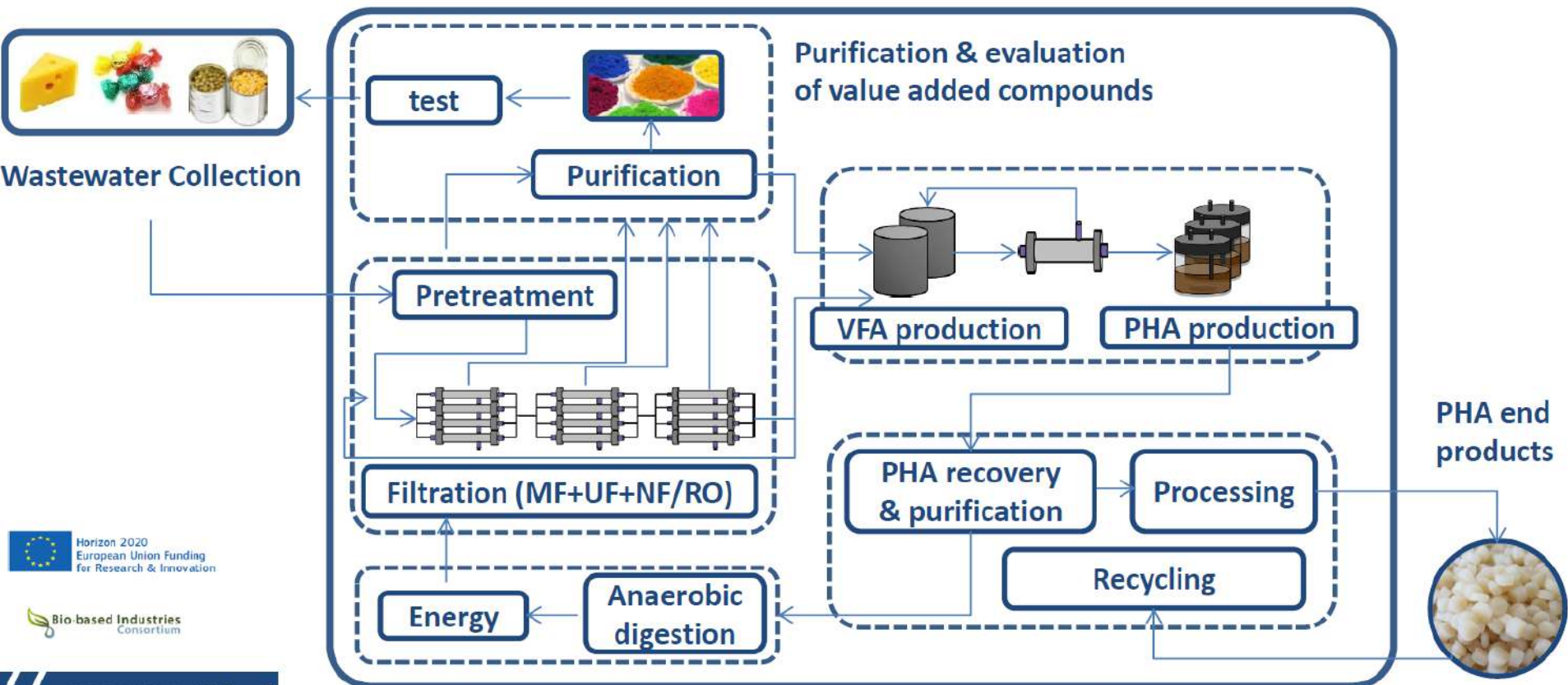
**inbiose**  
Your partner for specialty carbohydrates



- No abundant natural source, production by fermentation
- Price range: 10 €/kg – 1.000 €/kg (reference sugar: 0.5 €/kg)
- Research phase with national funding
- Spin-off from Ghent University in 2013 – Belgian SME
- Development phase with BBEPP and European funding (FP7 + BBI-JU)
- Infant formula on EU market: this year / US market: last year

# Advanced Filtration Technologies for the Recovery and Later conversion of relevant Fractions from wastewater (AFTERLIFE)

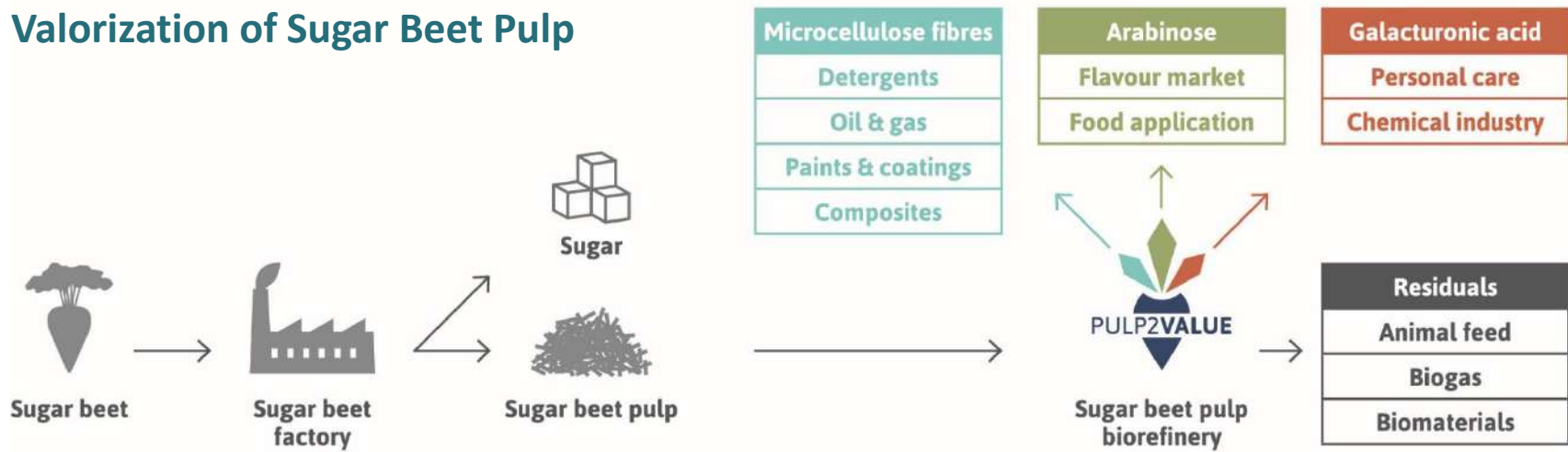
Role of Bio Base Europe Pilot Plant: Scale-up of PHA production and DSP



# Pulp2Value



## Valorization of Sugar Beet Pulp



- **Role of Bio Base Europe Pilot Plant**

Process Testing and Optimization, Addressing Technological Hurdles, Validation of Integrated Process Routes at Ton Scale

- **Partners**



[www.Pulp2Value.eu](http://www.Pulp2Value.eu)





## More information?

Bio Base Europe Pilot plant: <http://www.bbeu.org/pilotplant/>



Lieve Hoflack

[Lieve.hoflack@bbeu.org](mailto:Lieve.hoflack@bbeu.org)



Brecht Vanlerberghe

[Brecht.vanlerberghe@bbeu.org](mailto:Brecht.vanlerberghe@bbeu.org)