Bio Base Europe Pilot Plant: Scaling up from research to industries

Brecht Vanlerberghe, Head R&D Bio Base Europe Pilot Plant
Our playground: circular bio economy

addressing societal challenges: GHG emission, re-industrialisation, jobs, local renewables resources

From lineair fossile economy over circular fossile economy towards circular bio based economy
Deployment IB & Bio economy: What’s missing?
*From LAB to INNOVATION*

**Research:** turning money into knowledge
- mainly (bio)catalyst development
- typically lab environment
- Scientists
- Publications/ IP

**Innovation:** turning knowledge into money
- Techno economical feasibility, LCA?
- Market validation & value chains >> Prototypes
  >> Piloting & demonstration

requires higher TRL Infrastructure
- Industry relevant, scalable equipment
- Skilled people to operate it

>> Money & time
IB & Bio economy = DISRUPTIVE

technological, commercial, operational RISK!

Open acces pilot infrastructures
= reduction technological risk
Bio Base Europe Pilot Plant:

- Multi-purpose pilot facility in the Port of Ghent (B)
- Bio-Based products & processes
- Current number of employees: 67 FTE (70 persons)
- Independent non-for-profit organisation

Investment in infrastructure
- Interreg VL-NL 2008-2013: 13 m€
- Interreg NWE 2013-2015: 1,35m€
- ERDF 2015-2015: 1,26m€
- Interreg VL-NL BioHarT: 0,2mio€
- ERDF « impact » 2017-2020 9,4m€
- ERDF-SPC « BiobaseFlow 2018-2021 3,7mio€
Process Hall 1
Biomass pretreatment, biocatalysis and DSP
Process Hall 2
Fermentations and DSP
Process Hall 3
Green chemistry and ATEX proof DSP
Laboratory
Analysis and process development
Storage

Storage of different kind of biomass
Our unique offer:

‘A flexible and diverse pilot plant that covers the whole process, from green resource to final product, under one roof’
What we do!

PRIVATELY FUNDED PROJECTS

- With companies (60/40 SME’s/Large companies 40%)
- IP owned by & remaining with companies
- > 200 projects, > 100 # companies
  - Process development & optimisation: proof op concept, opex, capex, LCA
  - Upscaling mg to g, kg, ton scale: product validation, market validation
  - First series production: Market development

PUBLICLY FUNDED PROJECTS:
Technology development, scale up and
Creating awareness & building new value chains

- stability midlongterm (financial, operational)
- building “own” expertise/IP
- dissemination
- ongoing: 18 H2020, 3 Interreg projects, 3 Vlaio Project
“Stairway to excellence”

Source: Enabling synergies between European Structural and Investment Funds, Horizon 2020 and other research, innovation and competitiveness-related Union programmes
Guidance for policy-makers and implementing bodies
In brief: Bio Base Europe Pilot Plant
“Stairway to excellence”

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<th>ESIF (interreg &amp; ERDF)</th>
<th>H2020 (19 ongoing and/or granted projects)</th>
<th>Regional project &amp; private projects (3 ongoing/granted)</th>
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<td><strong>Investment in infrastructure &amp; capabilities</strong></td>
<td><strong>Industrial leadership:</strong></td>
<td><strong>Private collaboration:</strong></td>
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<td>Interreg VL-NL 2008-2013: 13 m€</td>
<td>LEIT (Rehap, Falcon, Dafia, Nanopack, BioConCO2)</td>
<td>Over 200 projects</td>
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<td>ERDF 2015-2015: 1,26m€</td>
<td>Innovation in SME (Superbio, Kets4Cleanproduction)</td>
<td>Over 100 companies</td>
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<td>Interreg VL-NL BioHarT: 0,2mio€</td>
<td>Excellent Science:</td>
<td>From 12 EU countries</td>
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<td>ERDF « impact » 2017-2020 9,4m€</td>
<td>Research infra (Erifore)</td>
<td>Also US, Canada, HK, JP</td>
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<td>ERDF-SPC « Bio baseFlow 2018-2021 3,7mio€</td>
<td>Socioal challenges</td>
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<td><strong>SME competitiveness:</strong></td>
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<td>Interreg NWE 2013-2015: Bio Base NWE 1,35m€</td>
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<td>Vlaio-IWT (past)</td>
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<td>Interreg NWE: BioBase4SME</td>
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<td>VISIONS, Biokatalysis, BIOCLUSTER, demoprobio</td>
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<td><strong>Policy improvement:</strong></td>
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<td>Interreg EU: 2016-2020: Smartpilots</td>
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<td>Vlaio-SPC (ongoing):</td>
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<td>CO2PERATE, SPICY, APPLISURF</td>
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http://www.bbeu.org/pilotplant/category/projects/
The CARBOSURF project aims to develop new biobased processes as well as products and solves bottlenecks in the fermentative production of biobased biosurfactants and specialty carbohydrates.

Specifically, it targets different glycolipid biosurfactants with a wide range of application fields and specialty carbohydrates, i.e. complex Human Milk Oligosaccharides that find applications as neutraceutical, pharmaceutical and cosmetic ingredients.

Beyond the development of new processes or solving technical bottlenecks, sufficient amounts of new products will be produced for application testing, in order to evaluate their market potential in a wide range of application fields. Also, the technical, economic, environmental and social sustainability of processes over the whole value chain from biomass to product application will be assessed, with an emphasis on identifying and addressing the bottlenecks in the innovation chain. A valorisation plan will be drafted to complete the innovation process.

With a total project budget of €5.961.743, CARBOSURF receives €2.730.605 funding through the 2014 call (Research and Innovation) of the Bio-Based Industries Joint Undertaking.
PULP2VALUE
Processing Underutilised Low value sugar beet pulp into VALUE added products

Scope of the project
PULP2VALUE aims to extract between 20 and 50 times more value from sugar beet pulp (approx. 13 million tonnes annually in Europe). To obtain this, multiple extraction techniques were developed to isolate more valuable products from the pulp.

Activities of Bio Base Europe Pilot Plant
- Identification, optimization and Integration unit operations
- Production prototypes for application development & market testing
Network of expert organisation:

• We support **SMEs** and **start-ups** in the biobased sector – training & networking
• We offer **financial support** towards services that can help the company to bring their innovation to market: €100 K max, 50-100% funded

**Available trainings and services**

1. Technical assistance such as process development and scale-up to pilot scale
2. Life Cycle Assessment
3. Application testing
4. Market research, feedstock analysis, techno-economic evaluation
5. Social acceptance
6. Business planning and business plan support

http://www.nweurope.eu/projects/project-search/bio-innovation-support-for-entrepreneurs-throughout-nwe-regions/
SMEs can receive services for a maximal total value of € 60 000. 75% is funded by the project. Up to 25% needs to be cofunded by the applicant.
Building a shared pilot & demo infrastructure is challenging... Running it even more!!!

- **High Capex:** Infra & expensive equipment
- **Critical mass:** Is a 24/7 activity, different capabilities, expertise and skills
- **Recurring investment in new & replacement infrastructure & equipment:**
  State-of-the art changes & wear

fragmentation to be avoided for capital and service – efficiency
Cross boarder collaboration and use to be facilitated & stimulated

>> Appropriate policy & policy instruments required
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
Key Best Practices:

BUILDING INFRA (Capex)

- Overcoming market failure
- Open access pilot and demo infrastructure investments through ERDF & regional support (ERDF might be limited in some regions)
- within appropriate context: ECOSYSTEM & « no castles in the sky »
  - Regional smart specialisation should be real, not a wish

OPERATING INFRA (OPEX) triple (quadruple?) helix

- Regional bio economy policy / smart specialisation strategy
- Co development of infrastructure/ capabilities low to higher TRL -SPC
- Portfolio of policy instruments for projects/ earmarked budgets including higher TRL (R&D & Innovation)
- Higher TRL to be promoted/ favoured eg by higher success rate for collaborative projects between industries and academia or for research project going upto TRL 5 (cfr H2020)
- « Business developers », innovation agents, Spearheadclusters « PPP »

Non technological barriers:
Vouchers schemes: Interreg NWE, Superbio, Prodem, (Seal of excellence within ERDF?) upto 100k€ (% cofunding by applicant)

Crossborderer initiatives (RIS3, Vanguard, …), crossborderer use to be enabled in regional instruments (enabling policy instruments in support lacking)
Brecht Vanlerberghe
Head R&D Bio Base Europe Pilot Plant

Budget 1091 k€ 90% funded
From 01-06-2017 to 31/5/2019
Objectives:

- Create a network of open access pilot and multipurpose demo-infrastructures for the European bio-economy to improve visibility & access to these facilities
- Analysis of the current capabilities versus the needs of the European bio based industry
- Plan with remedies, actions and proposals for bridging the identified gap
what does open access mean?

- In the context of infrastructure, open access involves physical infrastructure (in this case pilot equipment) being made available to clients other than the owners, for a fee (Source: Wikipedia)

- Joint investment in pilot infrastructure that can be used, for a fee, by any entrepreneur in need of scale-up
Scope: Pilot & demo infrastructure

- Pilot scale: TRL4 - TRL6
- Demonstration scale: TRL7 - TRL8
- Public and private
- Open access
- In EU28
How & when to interact?

- I have open access pilot or demo infrastructure and want to join the network
- I want to use the open access facilities from the network
- I want to share my opinion regarding what equipment, services and scale-up centers are needed

Find info @ www.biopilots4u.eu
I have open access pilot or demo infras and want to join the network?

- Pilot plant owners please fill in information of your assets, online form is ready to use:

www.biopilots4u.eu/add-asset
I want to use the open access facilities from the network - Asset Register

- Asset Register: searchable by
  - Bio-economy discipline
  - Keyword regarding equipment need
  - Searches lead to list of pilot facilities

- Available for searches spring 2018
I want to share my opinion regarding what equipment, services and scale-up centers are needed.

Survey of industry needs: www.surveymonkey.co.uk/r/Pilots4U

Where can you find the survey?
- Our website (www.biopilots4u.eu)
- On Twitter (@BioPilots4U)
- On Facebook

About the survey:
- Less than 20 min
- Completely anonymised if you decide so
- Summary of the results in our website

Help us distributing it!
So what will happen next?

- Assessment of future needs of potential users of pilot and demonstration facilities

- Comparison of the survey results with our equipment database

- Development of business cases to address gaps in provision
Thank you, any questions?

www.biopilots4u.eu

▶ Asset database: www.biopilots4u.eu/add-asset
▶ assay about industry needs: https://www.surveymonkey.co.uk/r/Pilots4U

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Questions?

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