IMPACT project
New investments in downstream processing and gas fermentation

Prof. Wim Soetaert
2009: start of the building phase of the pilot plant
- Interreg project with 21 M€ budget
- Abandoned fire station to be converted into a pilot plant

2010: The Bio Base Europe Pilot Plant became operational
Abandoned fire station (2009)
Industrial biotechnology process hall
Biorefining process hall
Green chemistry process hall
Bio Base Europe Pilot Plant

- **Industrial biotechnology Process hall**
- **Green chemistry Process hall**
- **Biorefining Process hall**
- **Laboratories**
- **Utilities**
- **Technical service**
Bio Base Europe Pilot Plant

• **Multipurpose pilot plant** with its own specialized personnel

• **One-stop-shop**: the whole value chain from the biomass to the final product can be performed in the same pilot plant

• **Open innovation model:**
  – Independent facility
  – **Service or partnering model** for performing pilot projects
  – **Accessible**: The Bio Base Europe Pilot Plant is open for all companies and research partners from chemical, energy, agro-industrial, food,… sector
A one-stop-shop…
Bio Base Europe Pilot Plant

Activities:

- **Development and optimization** of biobased processes covering a wide range of technologies: biorefining, biomass pretreatment, fermentation, bioconversion, green chemistry, up-stream and down-stream processing,…

- **Scale-up** of biobased processes up to 50 m$^3$ scale

- **Custom manufacturing**: production of multi ton quantities of bioproducts for testing the application and market potential
TRL: Technology Readiness Levels

- TRL 9
  - Industrial production
- TRL 8
  - Pilot and demonstration
- TRL 7
  - Basic Research
- TRL 6
  - Bio Base Europe Pilot Plant
- TRL 5
- TRL 4
- TRL 3
- TRL 2
  - Fundamental research
- TRL 1
  - System Test, Launch & Operations
  - System/Subsystem Development
  - Technology Demonstration
  - Technology Development
  - Research to Prove Feasibility
  - Basic Technology Research
Biorefineries: factories of the future
We help companies to cross the valley of death
We help companies to cross the valley of death

– Our pilot infrastructure is ready for use
– Substantial know-how is already present
– We can significantly speed up your innovation project
– Risk mitigation: Faster to the market for less money

More innovation, more jobs, sustainable growth

Building a greener economy
2015: European recognition

Selected as the European model pilot plant for industrial biotechnology, one of the six European Key Enabling Technologies (KETs)
2015: inauguration of two 15 m$^3$ fermenters
2015: inauguration of two 15 m³ fermenters
2017: start of the IMPACT project

- ERDF project (European Regional Development Fund)
- 9.36 Million euro investment
- Expansion of the demonstration facilities for
  - Gas fermentation
  - Downstream processing
What’s at stake?  
Global warming
Greenhouse gas emissions

- **Electricity and Heat Production**: 25%
- **AFOLU**: 24%
- **Buildings**: 6.4%
- **Transport**: 14%
- **Industry**: 21%
- **Other Energy**: 9.6%

Total: 49 Gt CO₂eq (2010)

- **Energy**: 1.4%
- **Industry**: 11%
- **Transport**: 0.3%
- **Buildings**: 12%
- **AFOLU**: 0.87%

**Direct Emissions**

**Indirect CO₂ Emissions**
Gas fermentation:
Converting waste gases into useful chemicals

Industry
Transport
Households
Agriculture

Waste Gases → microbes → Base chemicals

$\text{CO}_2$ – $\text{CO}$ – $\text{H}_2$

✓ Abundant feedstock
✓ Green house gas reduction
✓ Avoid overexploitation of biomass
New value chain steel2chemicals
Steel mill gas to chemicals

Iron ore + coal → Steel mill → Syngas CO/H2 → Gas fermentation
Ethanol → dehydration → Ethylene → Sustainable fuel
N° 1 base chemical for the chemical industry
Gas fermentation equipment

- Gas fermenters at lab and pilot scale
- Gas supply
- Gas conditioning
- Product recovery
- Safety systems
Downstream processing equipment

Conversion

Industrial biotechnology
Green chemistry

Impure product in solution

Downstream processing
Product isolation and purification

Purified product

Sales
Downstream processing equipment

- Membrane filtration
  - Microfiltration
  - Ultrafiltration
  - Nanofiltration

- Demineralisation
  - Electrodialysis
  - Ion exchange

- Biomass recovery
  - Centrifugation
  - Homogenisation

- Solvent processing
  - Solvent extraction
  - Distillation & evaporation

- Product conditioning
  - Spray drying
  - Product homogenisation
New process hall for downstream processing

- Red process hall: biorefining
- White process hall: white biotechnology
- Green process hall: green chemistry
- Blue process hall: downstream processing
New process hall for downstream processing
New process hall for downstream processing
What’s at stake?

• Bio Base Europe Pilot Plant is globally one of the leading scale-up facilities for industrial biotechnology and the biobased economy

• The IMPACT project is indispensable for
  – Investment in new technologies
  – Continuing our growth

Keeping our top position in the biobased economy
Speed up your innovation project!
Contact our business development team

www.bbeu.org