

CINBIOS

Catalyst for Industrial Biotechnology



Willem Dhooge

What is Biotechnology

- **OECD based definition:**

the application of science and technology to living organisms, as well as parts, products and models hereof, to alter living or non-living materials for the production of knowledge, goods and services

- **DNA/RNA:** Genomics, pharmacogenomics, genetic engineering....
- **Proteins** and other molecules: proteomics, sequencing/synthesis/engineering of proteins and peptides, improved delivery methods for large molecule drugs....
- **Cell and tissue culture and engineering:** Cell/tissue culture, tissue engineering, tissue scaffolds and biomedical engineering, embryo manipulation....
- **Gene and RNA vectors:** Gene therapy, viral vectors.
- **Bioinformatics:** Construction of databases on genomes, protein sequences; modelling complex biological processes
- **Nanobiotechnology:** application of tools and processes of nano/microfabrication

What is Industrial Biotechnology

- **Process biotechnology techniques:** Fermentation & large volume cell culture using bioreactors, bioprocessing, bioleaching, biopulping, biobleaching, biodesulphurisation, bioremediation, biofiltration and phytoremediation.

- **Industrial Biotechnology:**

the application of science and technology to living organisms, as well as parts, products and models hereof, to alter living or non-living materials for the **production of** knowledge, **goods** and services

Industrial Biotechnology in Flanders, Belgium

- **Genzyme's** state-of-the-art cell culture production facility for therapeutic proteins in Geel is among the largest bio-manufacturing sites in Europe (15,750 m²).
- Boosting **heterologous protein production** in transgenic dicotyledonous **seeds** using Phaseolus vulgaris regulatory sequences; NATURE BIOTECHNOLOGY, 2002, Depicker A, Univ Ghent/VIB
- **Citrique Belge:**
since 1929, now Europe's second largest producer of citric acid, with a capacity of around 100,000 tons per year



Industrial Biotechnology in Flanders, Belgium



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Development of advanced BIOREFinery schemes to be INTEGrated into existing industrial fuel producing complexes (BIOREF-INTEG)



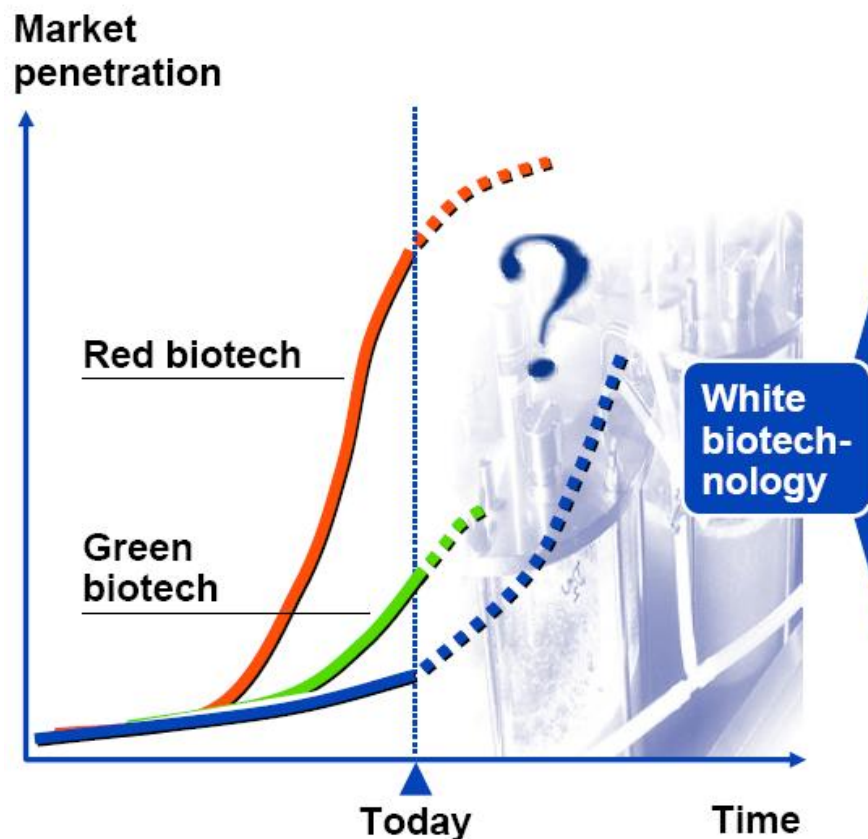
Novel high-performance enzymes and micro-organisms for conversion of lignocellulosic biomass to bioethanol (NEMO)



Bio Base Europe
Innovation & Training for a sustainable biobased economy



Industrial Biotech: where are we today



Industrial applications today

Bio-feedstock

- Replacement of oil and gas with biomass



Bio-processes

- Replacement of chemical synthesis by fermentation or biocatalysis



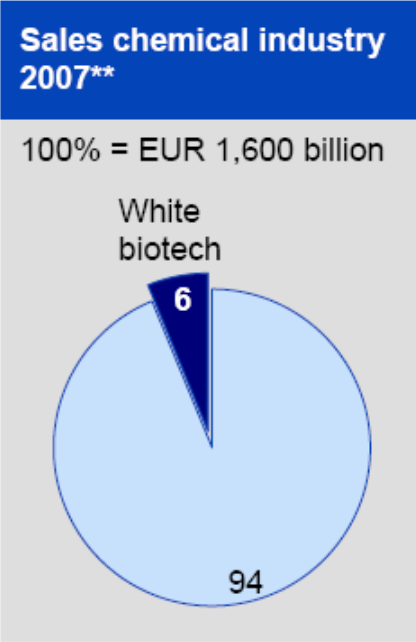
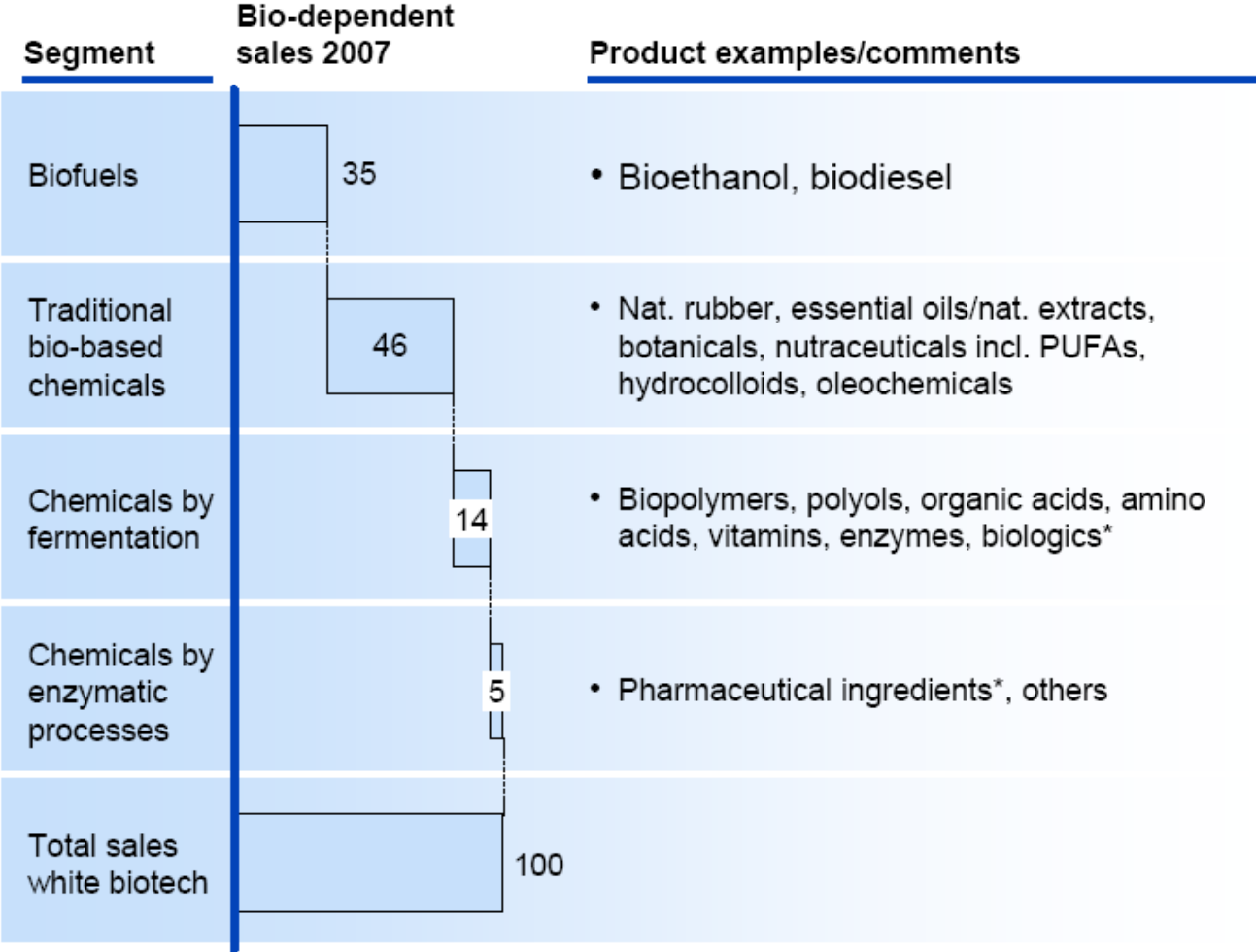
Bio-products

- Products with new characteristics (e.g., biopolymers, enzymes, nutrition/health ingredients)



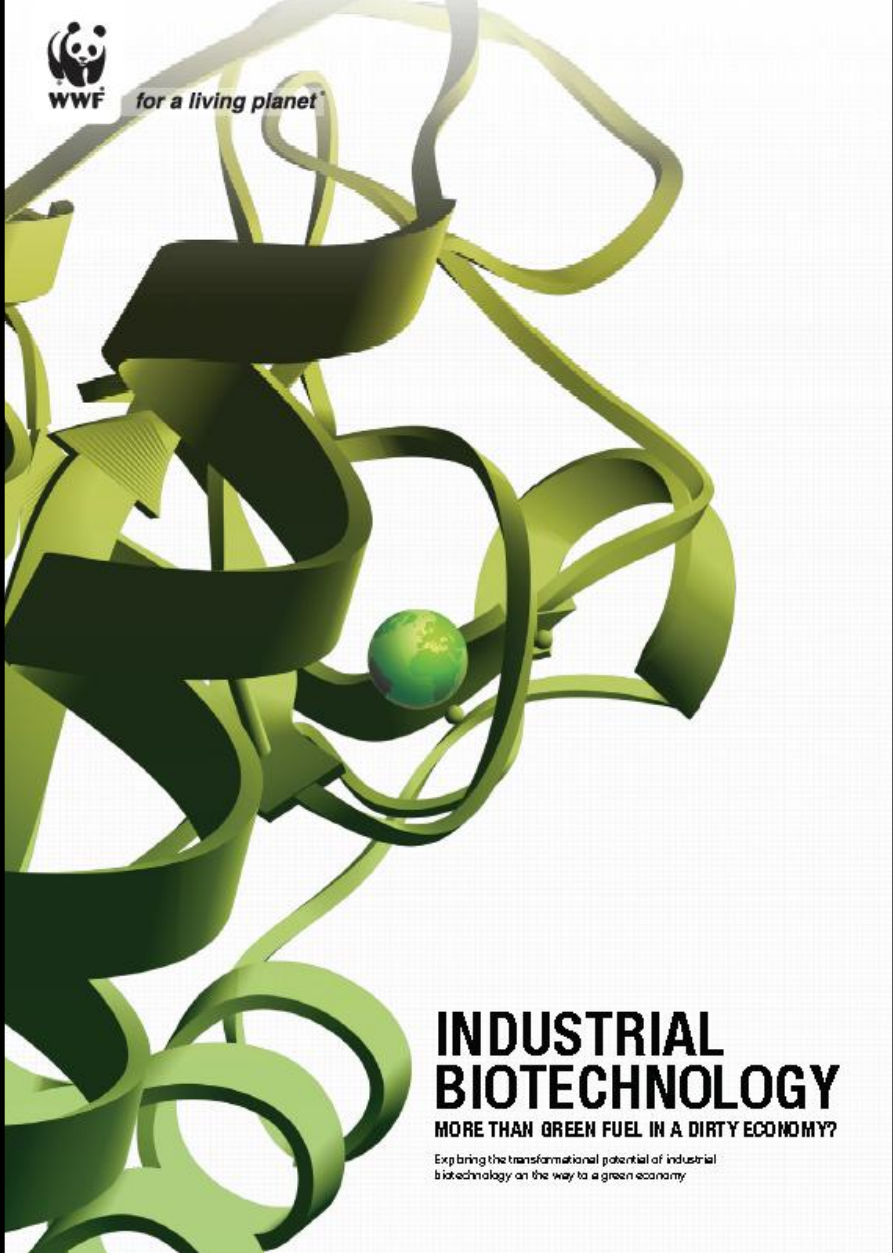

Source: McKinsey 2009

Contribution of industrial biotech in chemistry




Source: McKinsey

Potential by 2030:
Eliminating between
1 and 2,5 billion
tonnes of CO₂e

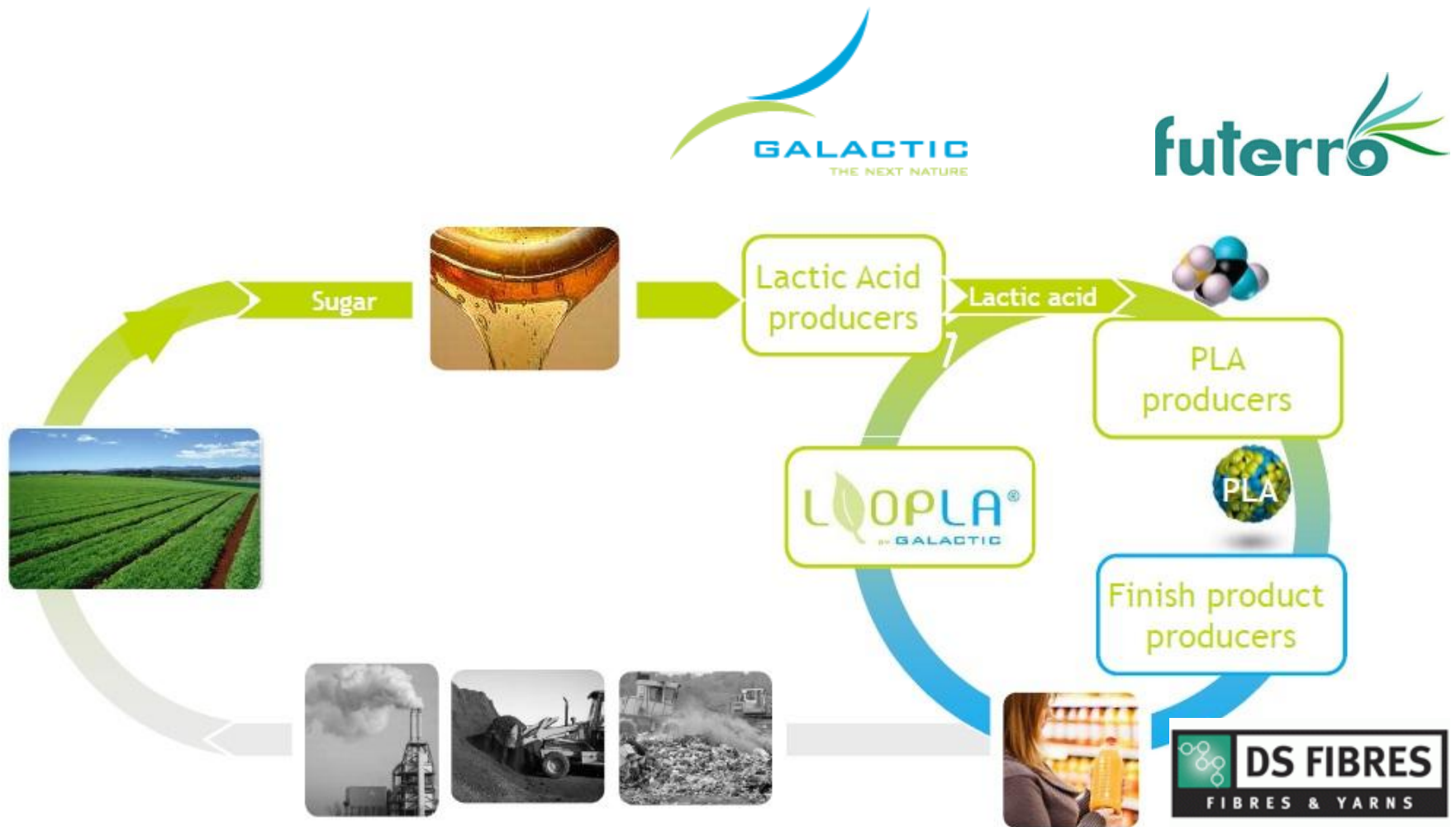


INDUSTRIAL BIOTECHNOLOGY
MORE THAN GREEN FUEL IN A DIRTY ECONOMY?

Exploiting the transformational potential of industrial biotechnology on the way to a green economy



A Belgian example of closed loop C2C



The role of clusters

- **Science as key driver**
 - *Creating networks of excellence is key*
 - *Creating synergies between technologies*
 - *Integrate academia & industry*
- **Link all over the Value Chain**
 - *From feedstock to final product*
 - *From research to application*
- **Integrate SMEs**
 - *Drivers of innovation*
 - *Create value out of knowledge*
- **Facilitate access to finance**
 - *Integrate VCs & investment organisations*

CINBIOS – industrial biotechnology cluster

A common initiative of :



Financially supported by IWT



CINBIOS, provides an essential link between companies from various industrial sectors, and between these companies and the knowledge centers (universities, colleges and research institutions) working in the field of **industrial biotechnology, biocatalysis and biorefinery**.

www.cinbios.be

CINBIOS – Target groups

Different Flemish sectors:

- *(Oleo)Chemistry*
- *Bio-energy*
- *Agro-industry*
- *Food*
- *Textile*
- *Paper/pulp*
- *.....*



CINBIOS – mission & objectives

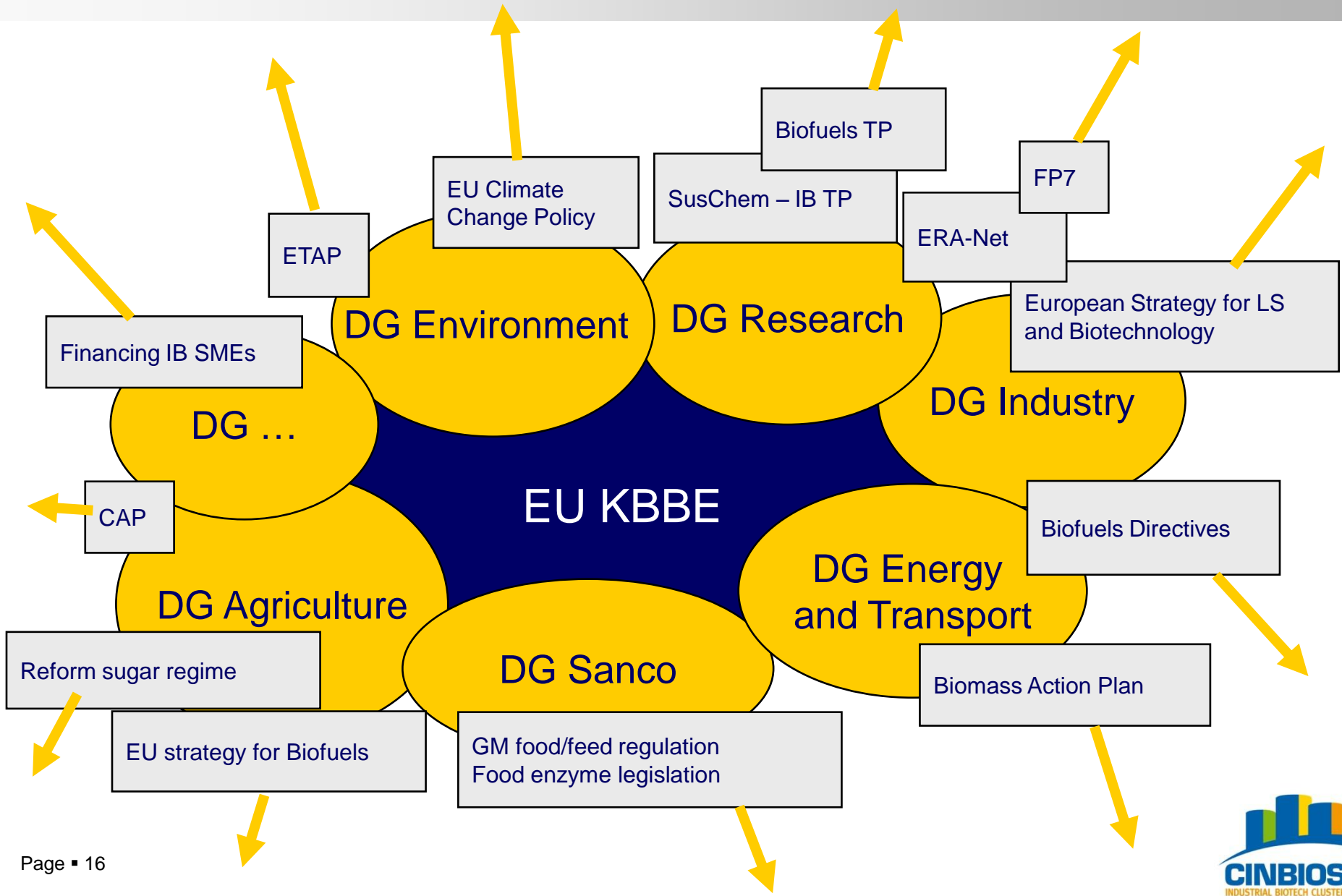
The **mission** of CINBIOS is to maximize Flanders' potential in the field of industrial biotechnology by facilitating and encouraging structured and coordinated collaboration between the various academic and industrial players

The CINBIOS main objective is to support the innovation process by:

- Centralizing and make available the nationally and internationally available scientific information and technological knowledge
- Initiating demand-driven research projects in Flanders.
- Supporting the valorisation of the available academic and industrial knowledge and expertise in industrial biotechnology

OECD study (2009); The Bioeconomy to 2030: Designing a Policy Agenda

- 1. Prepare the foundation for the long-term development of the bioeconomy
- 2. Reverse the neglect of agriculture and industrial biotechnologies
- 3. Prepare for a costly but beneficial revolution in healthcare
- 4. Turn the potentially disruptive power of biotechnology to economic advantage
- 5. Reduce barriers to biotechnology innovation
- 6. Promote the integration of biotechnology research across commercial applications
- 7. Create an ongoing dialogue among governments, citizens and firms



CINBIOS – contact details

Willem Dhooge, PhD

Project manager Industrial Biotechnology, FlandersBio

Email: willem.dhooge@flandersbio.be

Tel: +32 (0)9 241 80 46

Sofie Dobbelaere, PhD

Technological Adviseur Industriële Biotechnologie, Universiteit Gent

Email: sofie.dobbelaere@ugent.be

Tel: +32 (0)9 264 59 05



The banner features a blue background on the left with the text 'FORUM FOR INDUSTRIAL BIOTECHNOLOGY' in white and yellow, '9 NOVEMBER 2010, LAMOT, MECHELEN' in white, and 'A CINBIOS EVENT' in white. On the right, there is a photograph of industrial biotechnology equipment. Below the photo are logos for FlandersBio, Ghent Bio-Energy Valley, and essencia.

