

GHENT
BIO-ENERGY
VALLEY



Faculteit
Bio-ingenieurswetenschappen

GHENT BIO-ENERGY VALLEY

A LEADING EUROPEAN BIO-BASED INDUSTRIAL CLUSTER

Dr. ir. Margriet Drouillon

GHENT BIO-ENERGY VALLEY



A Public Private Partnership for the promotion of sustainable bio-energy activities and economic development in Ghent

PUBLIC ORGANISATIONS



INDUSTRIAL MEMBERS



BIO-ENERGY PRODUCTION



- Biogas technology – anaerobic digestion



- Biodiesel production



- Bio-ethanol production



- Green electricity generation

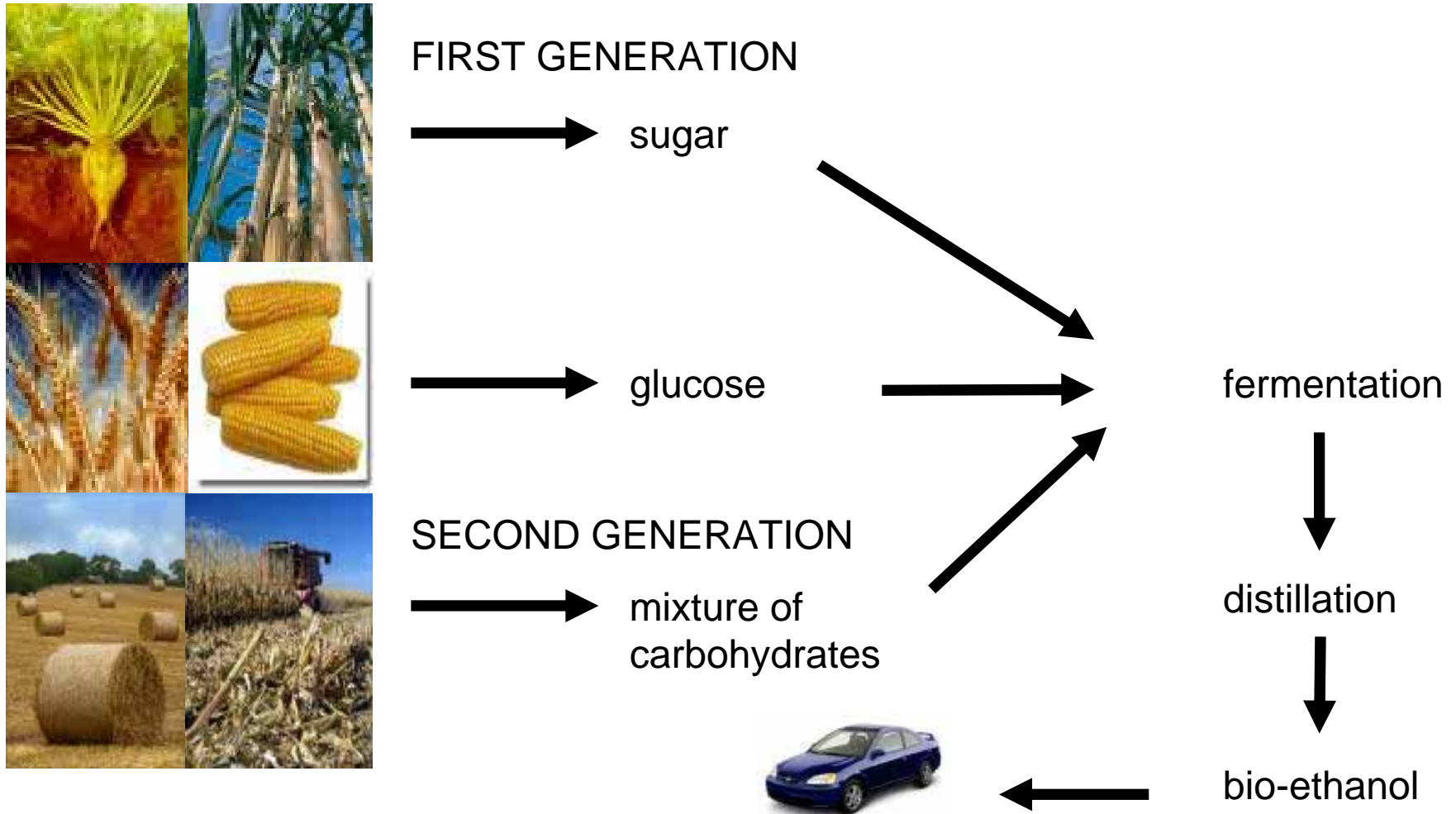


ACTIONS OF GHENT BIO-ENERGY VALLEY

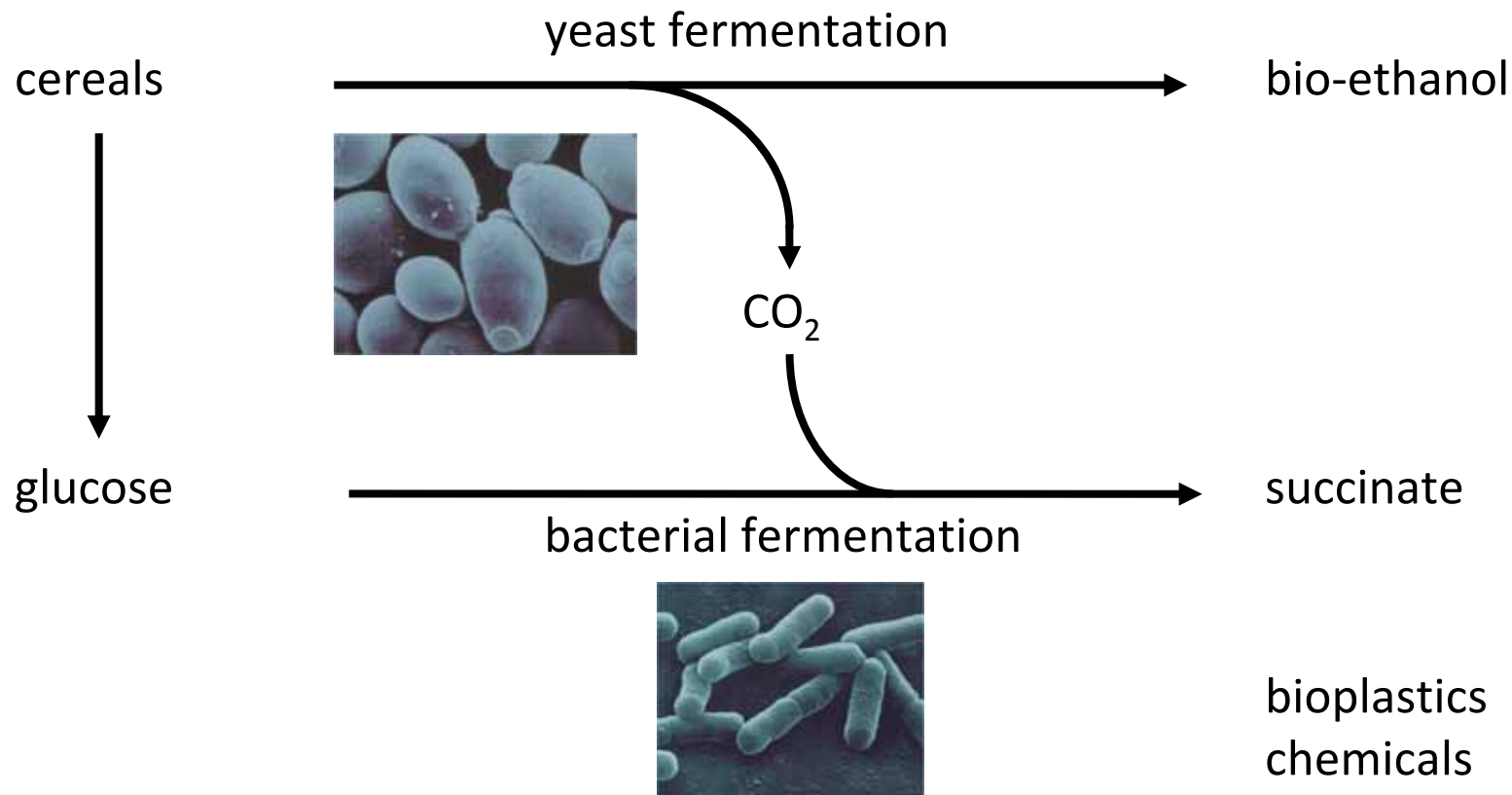


- Technological innovation: building Research and Development expertise in the field of bio-energy
- Cluster formation in the port of Ghent: building synergies between the industrial partners
- Sensibilisation of the public: organisation of information campaigns about bio-energy

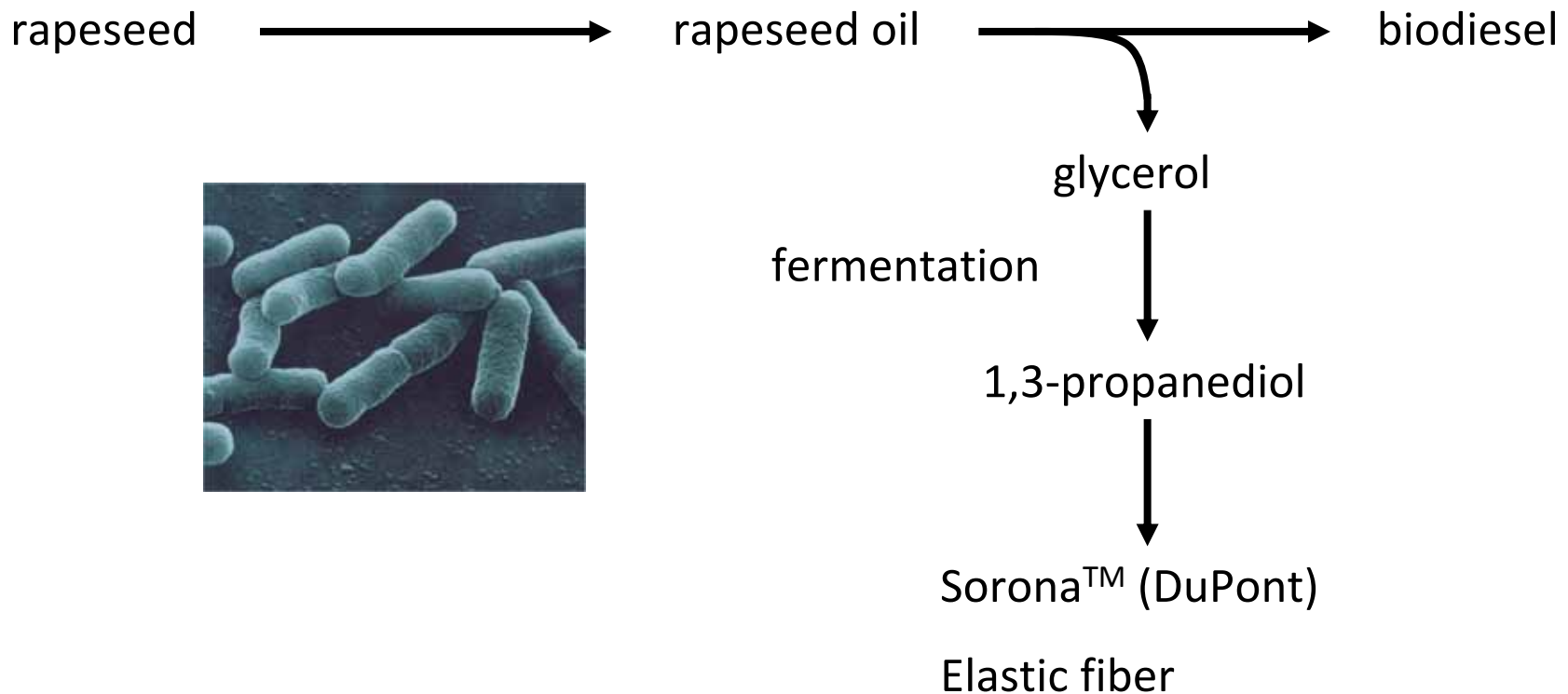
RESEARCH & DEVELOPMENT: BIO-ETHANOL



PRODUCT DIVERSIFICATION: VALORISATION OF BYPRODUCTS OF THE BIO-ETHANOL PRODUCTION



PRODUCT DIVERSIFICATION: VALORISATION OF CO-PRODUCTS OF THE BIO-DIESEL PRODUCTION



RODENHUIZEDOK BIOREFINERY CLUSTER



BIOREFINERY RODENHUIZE DOCKS: THE LARGEST INTEGRATED PRODUCTION COMPLEX FOR BIOFUELS IN EUROPE



250.000 tonnes biodiesel



150.000 m³ bio-ethanol



80 MW bio-electricity

CLUSTER FORMATION AND SYNERGY CREATION BIOREFINERY RODENHUIZEDOK – PORT OF GHENT



INTEGRATION OF THE RODENHUIZE DOCKS POWER PLANT AND BIOREFINERY

- Electrical power plant of Electrabel is already partially running on imported biomass (and coal)
- Advanced plans to run it completely on biomass
- The biofuel production process requires a lot of heat (60 t/h) and electricity (15 MW)
- Trigeneration: integrated production of biofuels, heat and electricity from biomass raw materials

BIOREFINERY RODENHUIZE DOCKS: THE POWER OF CLUSTER FORMATION AND SYNERGY

- Strong integration: complete value chain from raw material to biofuel on a single production site
- Efficient low cost production
- High eco-efficiency of the production process
- Exploitation of the advantages of scale
- Strategic collaboration between the partners



Excellent position in a competitive market



GHENT BIO-ENERGY VALLEY

Deze Eco-car rijdt op biobrandstof

- De Eco-car is een combinatie van energie-efficiënte
- De Eco-car rijdt zwaar over een 1400 km op één liter biobrandstof
- De Eco-car met een bestuurder rijdt aan 50 à 60 km/h
- De Eco-car staat mee aan internationale wedstrijden zoals de Eco-Shell marathon wedstrijd, competitie Michelin en België Topcar

- Met "EnergieTeam" van de Hogeschool Gent wordt de eco-waarde met een optimale en perfecte van techniek en technologie
- optimale verhouding materiaal-gewicht stabiliteit
 - optimale verhouding
 - verhoogde efficiëntie
 - optimale aerodynamica van het toestel



GHENT BIO-ENERGY VALLEY

Towards a sustainable society



THE BIO-BASED ECONOMY

Green biotechnology

primary production



White biotechnology

conversion technology

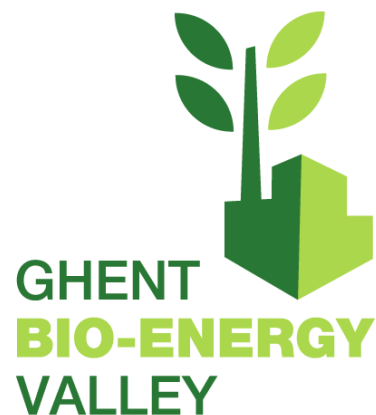


Bio Base Europe

Innovation and training for a sustainable biobased economy

A joint initiative of Flanders and The Netherlands
with a total budget of 21 M€

Founding fathers:

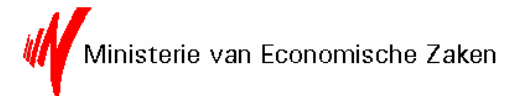
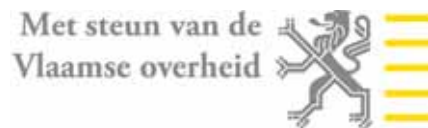




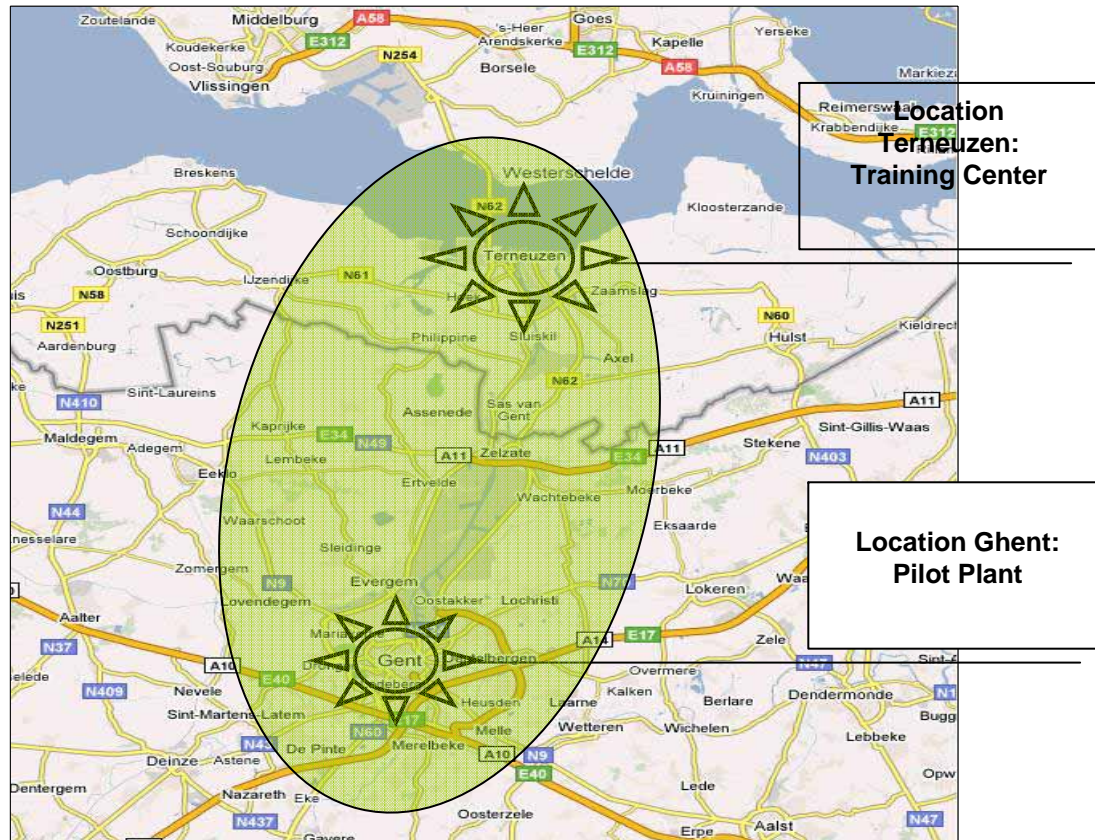
Bio Base Europe

Innovation and training for a sustainable biobased economy

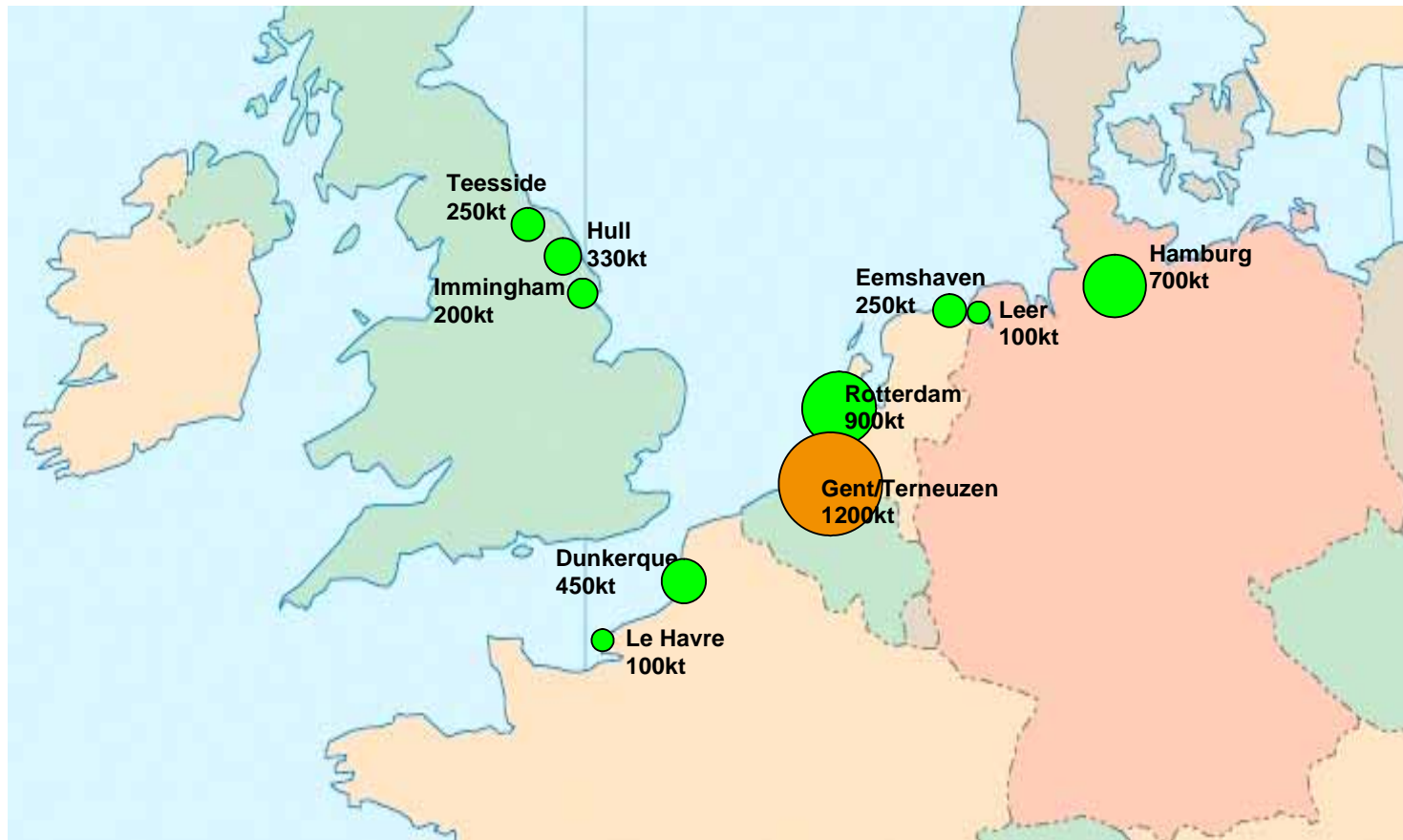
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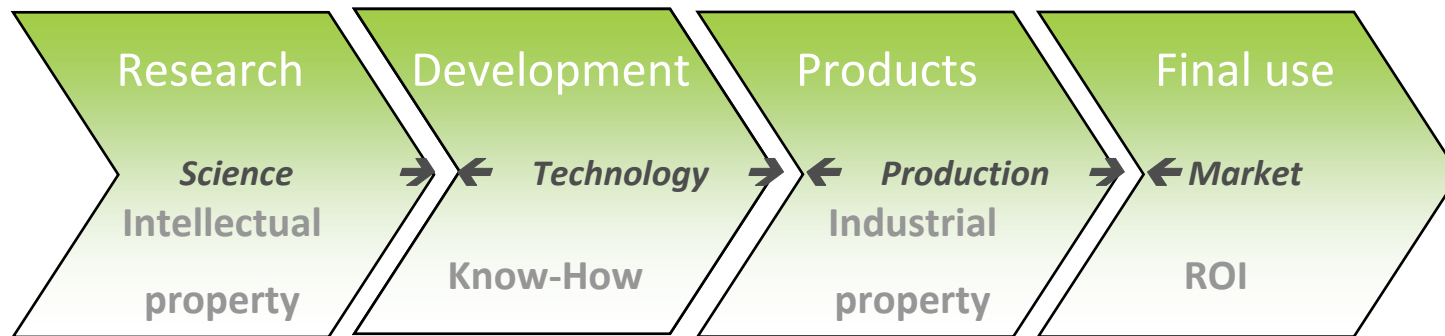
BIO BASE EUROPE: INNOVATION AND TRAINING FOR A SUSTAINABLE BIO-BASED ECONOMY



GHENT – TERNEUZEN: ALREADY THE LARGEST BIOFUEL CLUSTER IN EUROPE



PROBLEM STATEMENT 1: GAP IN THE INNOVATION CHAIN



Need for a multipurpose pilot plant for biobased products and processes:

- Knowledge and expertise is present but...
- Insufficient translation of knowledge into industrial innovation
- Not enough value creation on scientific results

PROBLEM STATEMENT 2: LACK OF PROCESS OPERATORS FOR BIO-BASED INDUSTRIES

- Declining student interest for technical studies
- Lack of visibility and public knowledge about the bio-based economy
- Shortage of operators for process industries in general

 **Need for a dedicated training facility for bio-based industries**

BIO BASE EUROPE: INNOVATION AND TRAINING FOR A SUSTAINABLE BIO-BASED ECONOMY (1/2)

Bio Base Europe Pilot Plant (Ghent):

- Scale-up and optimisation of bioprocesses at pilot plant scale (10 m³)
- Production of pilot quantities of new bioproducts for testing the application and market potential

BIO BASE EUROPE: INNOVATION AND TRAINING FOR A SUSTAINABLE BIO-BASED ECONOMY (2/2)

Bio Base Europe Training Center (Terneuzen):

- Education and training of process operators for biobased and processing industries
- Information and network facility

THE BIO BASE EUROPE PILOT PLANT (1/2)

Activities:

- Development and optimization of biobased processes: proven and non-proven technologies: biomass fractionation, fermentation, bioconversion, green chemistry, up-stream and down-stream processing

THE BIO BASE EUROPE PILOT PLANT (2/2)

Activities:

- Scale-up of biobased processes up to 10 m³/ton scale
- Custom manufacturing: first production of ton quantities of new bioproducts for testing the application and market potential

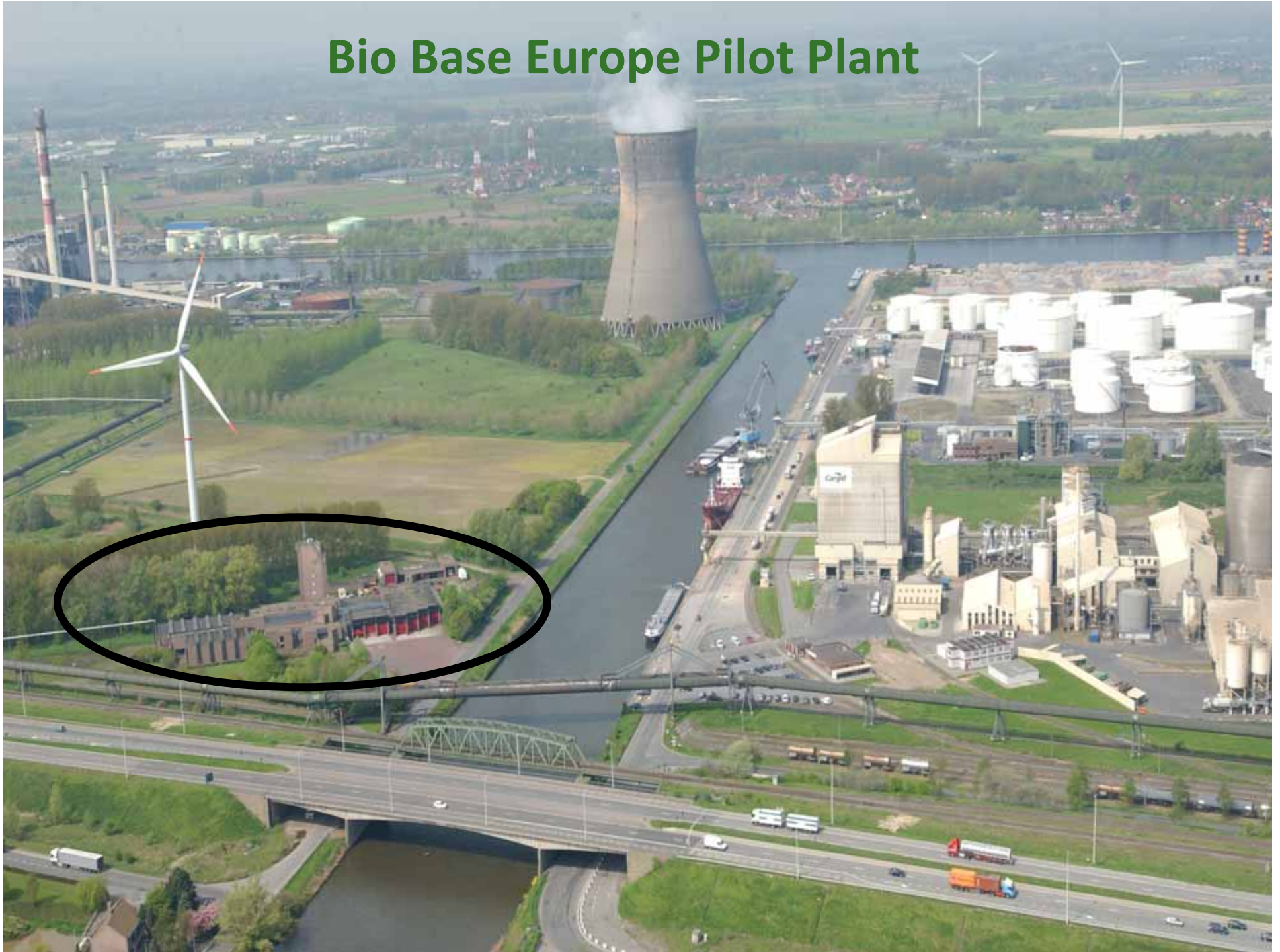
THE BIO BASE EUROPE PILOT PLANT

- **Multipurpose** pilot facility with its own specialized personnel
- **One-stop shop:** the whole value chain from the green resource to the final product can be performed in the same plant
- **Open innovation model:**
 - Pilot projects are performed for customers that maintain the rights to the developed technology
 - The Bio Base Europe Pilot Plant is open for business to all European companies in the chemical, agro-industrial, energy, food,.... sector

RODENHUIZEDOK BIOREFINERY CLUSTER



Bio Base Europe Pilot Plant















THE BIO BASE EUROPE PILOT PLANT



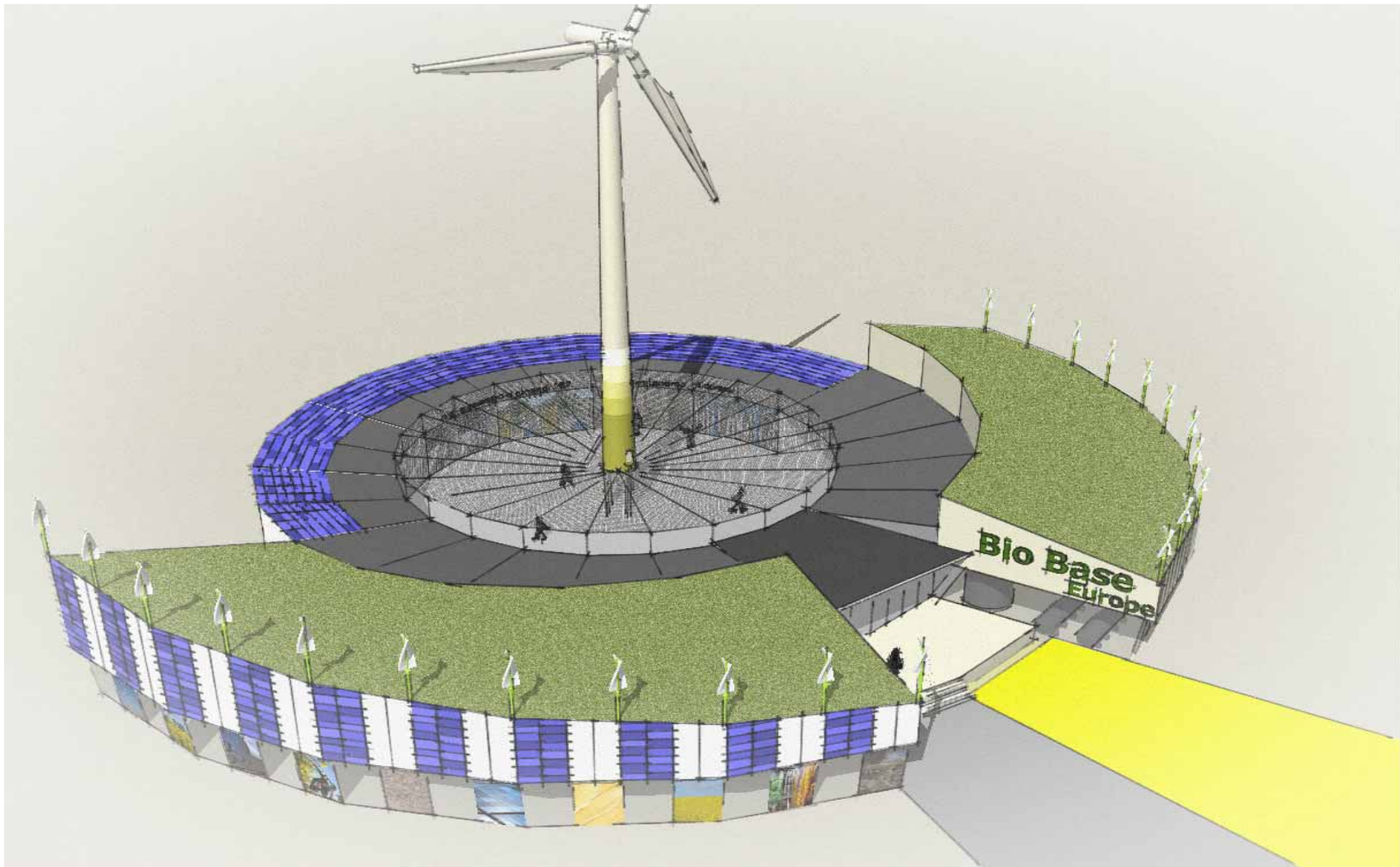
THE BIO BASE EUROPE PILOT PLANT



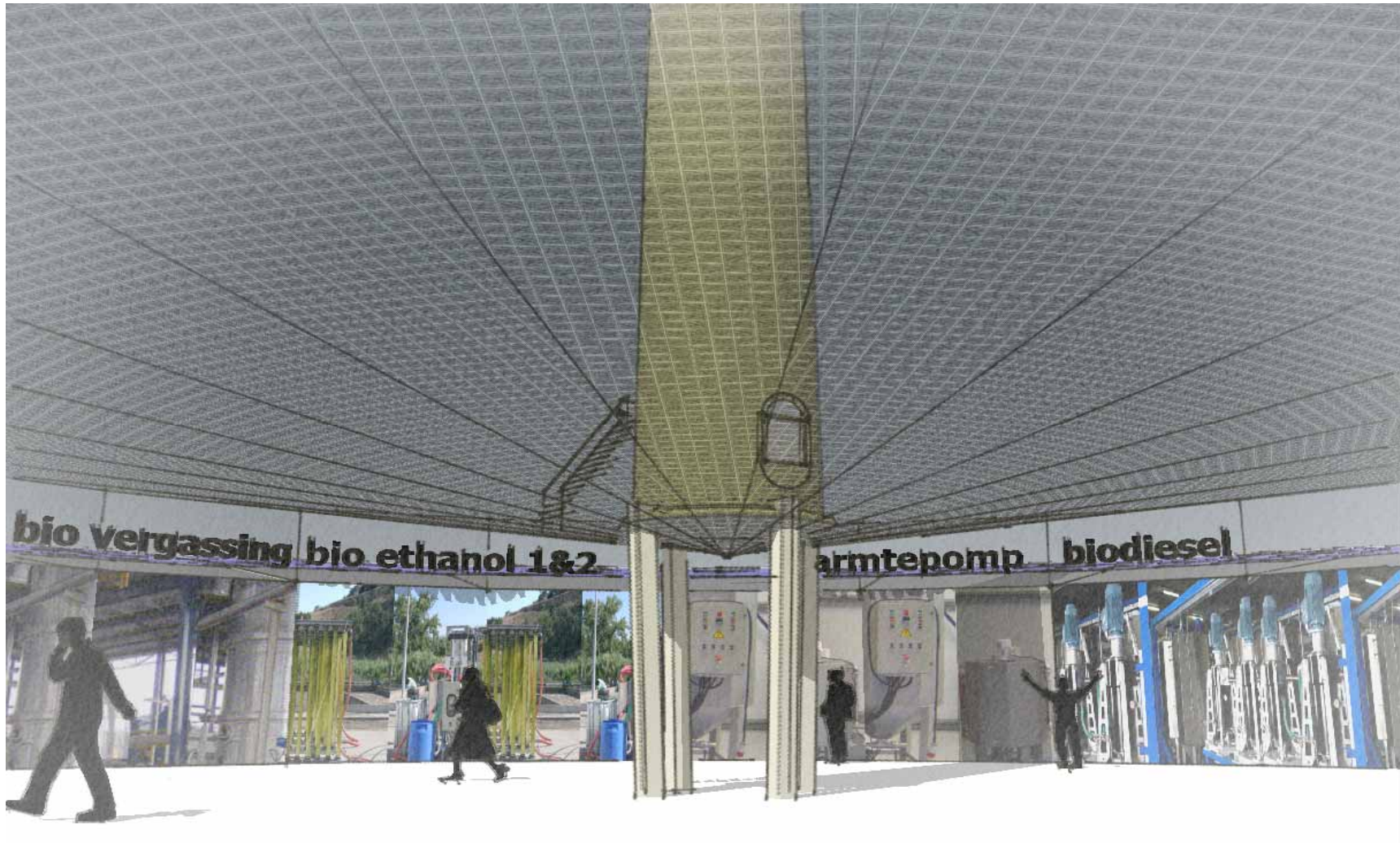
THE BIO BASE EUROPE PILOT PLANT



BIO BASE EUROPE TRAINING CENTER



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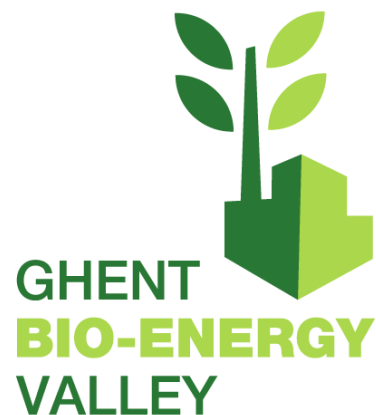
BIO BASE EUROPE TRAINING CENTER



BIO BASE EUROPE



Speeding up the development of a sustainable bio-based economy in Europe



GHENT HAS EXCELLENT CONDITIONS FOR BUILDING THE BIO-BASED ECONOMY

- The Port of Ghent has traditionally been very strong in the handling of agricultural commodities
- The Ghent region is a world class player in the field of biotechnology
- The biofuel production and the Bio Base Europe Pilot Plant are laying the industrial base for building the bio-economy

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THANK YOU FOR YOUR ATTENTION!

Dr. ir. Margriet Drouillon

Prof. Wim Soetaert