

## KEY FIGURES DSEC



**350+**  
Employees



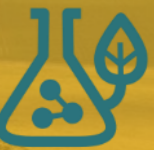
**300 M€**  
Latest project value



**500+**  
Projects completed  
in 65+ countries



# BIO-BASED INDUSTRIES



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Serving the World Bio-based industry

## Process integrator dedicated to Agro-processing industries

De Smet Engineers & Contractors (DSEC) is a private company located in Belgium, created in 1989:

- Acting as an engineering & general contractor company specializing in the agro-industrial and bio-based industry fields,
- Fully integrated world-class provider of project management, engineering, procurement and construction services.



## Biorefineries & Bio-based chemical plants



DSEC carries out projects from their initial conceptual stage (audits and engineering studies) up to complete delivery, including commissioning and performances demonstration (turnkey management - EPCM or full turnkey construction - EPC).

## Implementing External Technologies and beyond

- Capability to develop full projects from feedstock handling to product conditioning, including offsites and construction works
- Full understanding of Technology Providers' downstream requirement through DSEC's large experience in the agro industry (filtration, evaporation, separation, drying, chromatography, ion exchanges...)
- Experience in assessing and validating all stages of process development and products definition so as to reach a comprehensive concept before effective project start (Pilot ► Demo ► Industrial)
- Experience in 2G cellulosic sugars, lignin and lignocellulose, bio solvents.

## Industrial Biotechnology: a large range of processes that DSEC can develop

- Catalytic reaction (polyols)
- Fermentation and bioconversion
- Membranes technologies
- Separation technologies (solid / liquid)
- Cross-sectional, interdisciplinary bio-refinery approach through valorisation of food processing side/waste streams by the biochemical/biofuels industry for the economical and environmental benefit of both activities.



Reliability through experience

# 2G Fermentable sugars production plants

## PARTICULAR FOCUS ON TECHNOLOGY PROVIDER'S DEVELOPMENT IN THE 2G FERMENTABLE SUGAR PRODUCTION

- Biomass pre-treatment (wood, straw, bagasse, agroindustry wastes, energy crops...)
- Enzymatic hydrolysis
- Lignin processing
- Catalytic reaction

Green field implementation or add-on to existing 1G facilities

# Biomolecules & bio-plastics

## EXPERIENCE IN THE DESIGN AND IMPLEMENTATION OF BIOMOLECULES PRODUCTION PLANTS

- **Bio-based organic acids:** Butyric acid, Glycolic acid, Lactic acid
- **Bio-solvents:** Ethyl acetate, Levoglucosenone (LGO), Propanediol (PDO)
- **Bio-plastics:** PLA, PET bio-recycling, Compound/Filler



# DSEC is your partner for...

## PROJECT DEFINITION

- PDP development based on technical process description from supplier & client
- Technical & technological assessments
- Selection of appropriate technology & unitary operation
- Integration of an add-on into & existing facility
- Utilities engineering & interfaces design
- CAPEX & OPEX development

## PROJECT IMPLEMENTATION

- Overall Project Management including cost control & scheduling
- Detailed Design of all activities (Civil & Structure, Piping, E&I...)
- Procurement of equipment & materials
- Workshop quality control & FAT
- Expediting services
- Integration of all related project activities
- Plant automation standardization
- Site activities management including implementation of site HSSE
- Plant commissioning & start-up assistance

Reliability through experience

# DSEC's Assets for the Bio-based Industry



- Efficient Integration of new developments and flexibility in dealing with changing environments
- Strong track record accumulated for more than 30 years, working in 65 countries and completing more than 50 Large Scale Projects (which major bio-based projects referenced are listed opposite)
- Integrated, robust, validated process and final product definition, before transfer of technology (Pilot ▶Demo ▶Industrial)
- Repeated experience with key industry players, Client IP protection
- In-house specialists in Bio-based organic acids, Bio-solvents, Bio-plastics ...
- Focus on efficiency and energy saving
- Full independence from equipment suppliers allowing optimization of projects' Global Sourcing Strategy
- Execution of all downstream process units applicable for the Bio-Industry such as: filtration, evaporation, separation, drying, chromatography, ion exchange, ...
- Familiar with all types of raw material: seeds, grain, molasses, beet, chicory, bagasse, wood, straw, ...

# Industrial References in Bio-based Industries

PRODUCT	CUSTOMER	COUNTRY	CONTRACT	YEAR
BIO-ETHYL ACETATE from bioethanol	Crop Energies	Germany	EPCM	2024 > 2025
BIORECYCLING of PET in PTA & MEG	Carbios	France	EPCM	2024 > 2025
BIO-SOLVENT (Cyrene) & LGO from sawdust	Circa	France	EPCM	2023 > 2025
TANNIN From chesnut wood biomass	Silvateam	Italy	Engineering services, FEED studies, Detailed engineering, Cost estimates	2023 > 2024
CELLULOSE, HEMICELLULOSE and LIGNIN From woody biomass	Bloom Biorenewables	Switzerland	FEL2	2023
LACTIC ACID from wood waste	TripleW	Belgium	FEL2 + FEL3	2023
2G SUGARS, LIGNIN from woody biomass	Fibenol	Estonia	FEED followed by EPCM Greenfield project	2018 > 2023
PROPANEDIOL, BUTYRIC ACID from (raw) glycerol	Metabolic Explorer (METEX)	France	FEED followed by EPCM Greenfield project	2017 > 2020
2G SUGARS, BIO-CHEMICALS from woody biomass, wheat straw, sugarcane bagasse	Several undisclosed customers	E.U. Brazil	Several Pre-FEED and FEED studies	2016 > 2023
AMINO ACID from sugars	Ajinomoto-Eurolysine	France	Several EPCM Brownfield units	2015 > 2018
2G BIOFUELS from woody biomass, wheat straw, sugarcane bagasse, cane straw	Several undisclosed customers	E.U. Brazil Australia	Audit, Pre-FEED, FEED studies, Cost estimates, Engineering services	2015 > 2023
2G BIOFUEL from miscanthus/wheat straw	INA	Croatia	Basic Engineering OSBL	2019 > 2020
LACTIC ACID from sugar	Galactic	Belgium	Engineering services	2013 > 2018

# MEETING OUR CUSTOMER'S NEEDS

