BioRECO$_2$VER

Biological routes for CO_2 conversion into Chemical Building Blocks

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for Research & Innovation

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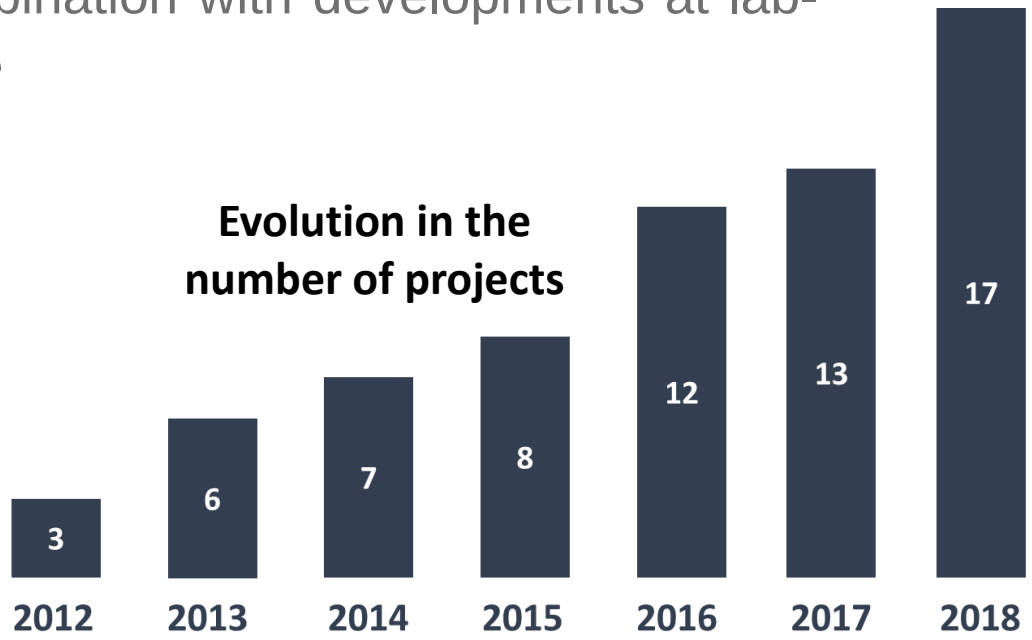
IDENER: Who we are

Research company devoted to the development of applications for the optimisation and systems and processes:

- Scientific computing
- Combination with developments at lab-scale



Biotech Apps

Metabolic engineering

- *Metabolic modelling* (processing and analysis of omics data, study of the role of transcriptional factors in a molecular biology approach, ...)
- *Genetic expression of regulations and genetically modified microorganisms* (design of synthetic biology toolboxes, application in bacterial strains, …)

Process development

- *Green extraction/pretreatment processes*
- *Biopolymers production*
- *Compatible solutes production*
- *Process modelling and optimization*
- *Process engineering*

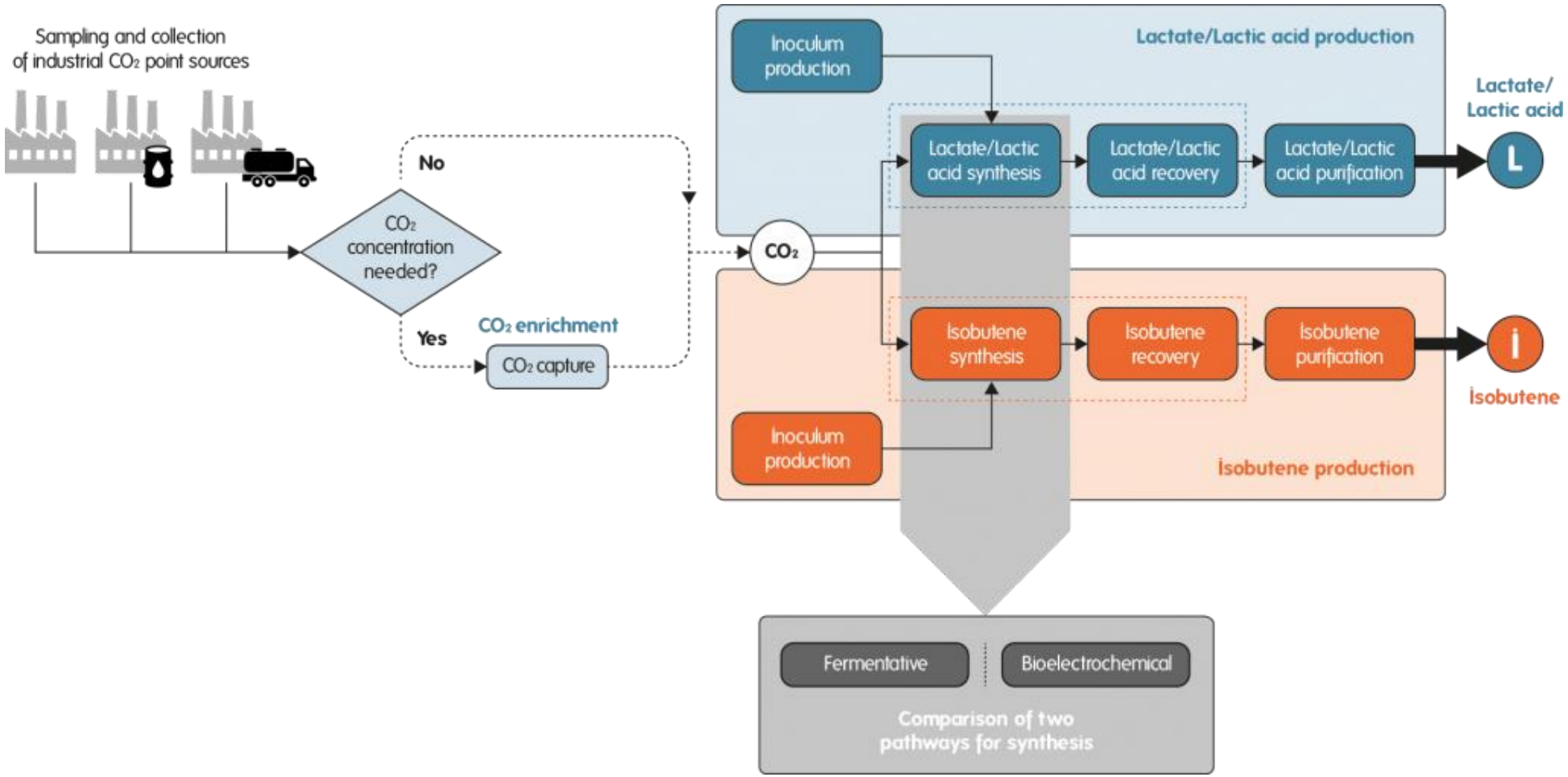
Process assessment

- *Techno-Economic Assessment*
- *Life Cycle Assessment*

Project summary

- BioRECO2VER aims to demonstrate the technical feasibility of more energy efficient and **sustainable non-photosynthetic biotechnological processes for the capture and conversion of CO_2 into valuable platform chemicals**, i.e. isobutene and lactate.
- To overcome several of the existing technical and economic barriers, BioRECO2VER will focus on **minimizing costs, reducing footprint and improving scalability**.
- A hybrid enzymatic process will be investigated for CO_2 capture and conversion of captured CO_2 will be done through **three different proprietary microbial platforms** which are representative of a much wider range of products and applications. Bioprocess development and optimization will occur along two lines: **fermentation and bio-electrochemical systems**.

Project summary



Objectives

BioRECO2VER will reach this through the following specific objectives:

- Development and application of robust enzymes for efficient CO_2 capture from industrial point sources by combining enzymatic absorption with ionic liquid-amine blends
- Development of three different microbial platforms for CO_2 conversion into platform chemicals using carbon-free energy supply
- Development of novel fermenter designs to increase fermentation efficiency and optimize process conditions
- Development of bioelectrochemical systems that use in situ generated H_2 and renewable electricity as the energy source
- Validation of the most promising isobutene and lactate production route at technology readiness level 5 on real off gases
- Modelling and optimization of the modular technology train
- Provide sustainability assessment and proof of socio-economic and industrial feasibility

Consortium

Project details

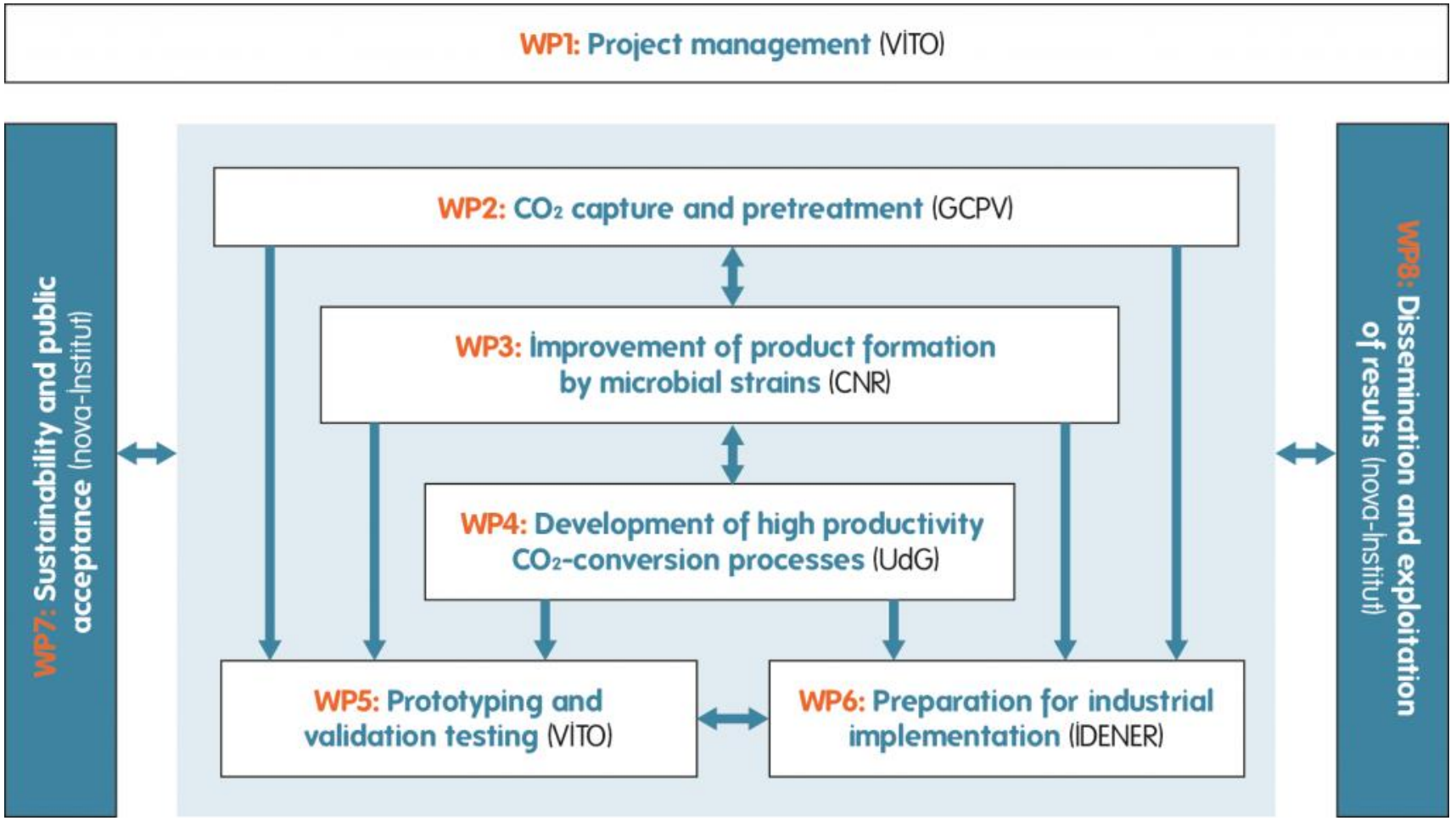
4	6.812.188	12	9
Duration (Years)	Max. grant amount	Partners	Countries

4 RTO/Universities

4 SMEs

4 Large Industries

Workpackages



Expected impacts

The BioRECO2VER project will provide beneficial impacts on the efficient microbial production of CO_2-based valuable platform chemicals from industrial off-gases.

- Establishment of an optimized modular technology train from CO_2 source to final marketable products (deviation of model with respect to experimental results <15%, process improvement through optimized set of operation and design parameters)
- More favorable sustainability assessment of the microbial CO_2 conversion (lower carbon footprint compared to gas fermentation at non-optimized conditions, processes relevant for >5% of industrial CO_2 emissions in Europe)
- Proof of socio-economic and industrial feasibility (equivalent variable costs compared to conventional process and replication of the process for at least 2 other major industrial CO_2 emitters).