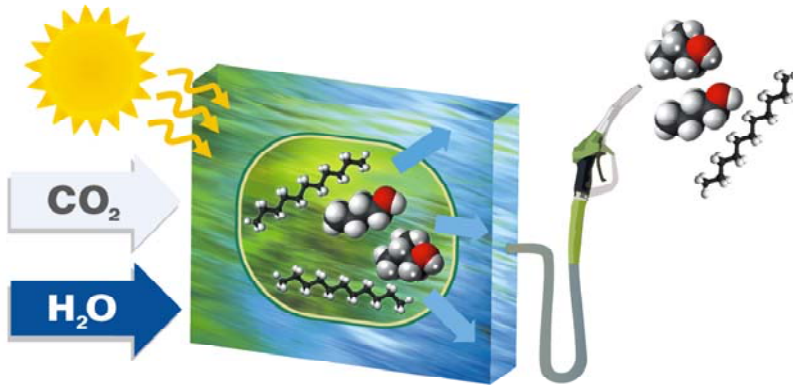


MOTIVATION AND OBJECTIVES



Overview of the biocatalytic conversion route from sunlight, CO₂ and water to solar fuels

Overall objective: Promote the development of high quality, low impact transportation fuels

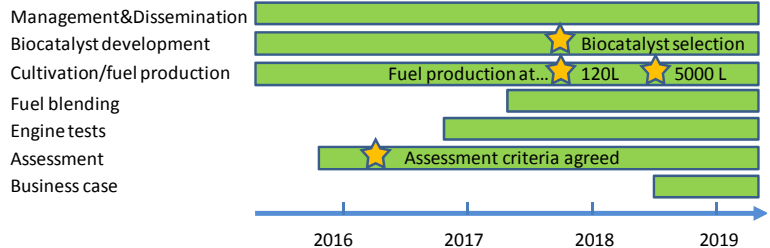
Challenge: Advance base technology of microalgae cultivation in closed bioreactors by enabling phototrophic algae or cyanobacterial microorganisms to produce alkanes and alcohols, which are excreted to the culture broth for direct separation without cell harvesting.

Innovation: Microbial cells turned into self-reproducing biocatalysts allowing the process to directly convert solar energy, water and CO₂ into engine-ready fuel instead of being used to form biomass, as shown in the figure.

- Development of advanced biocatalysts for the direct production of solar fuels
- Upscaling of cultivation volume and raw fuel production
- Upgrading/purification to fuel for blending and engine tests
- Analysis of risks, economics and environmental impact of the pathway

PROJECT PLAN, MILESTONES AND DELIVERABLES

The final goal is to advance the solar fuel technology towards the aim of highly sustainable production of drop-in fuels on arid or marginal land. Economically and environmentally sustainable large-scale systems for geographically independent conversion of solar radiation into chemical energy would support rural communities and substitute significant shares of fossil energy for the benefit of Europe and many other regions.



TECHNICAL APPROACH



WP 2 Biocatalyst development

- 2 cyanobacterial strains 1 microalgae
- Target fuels butanol, medium chain alcohols and alkanes, sesquiterpenes.
- Best strain(s) jointly improved in the last 18 month of the project.

WP 3 Production upscaling

- Final volume 5m³
- Outdoor production of fuel compounds.
- Continuous fuel separation

WP 4 Fuel blending

- Analyse raw products
- Blend on-spec fuels

WP 5 Engine tests

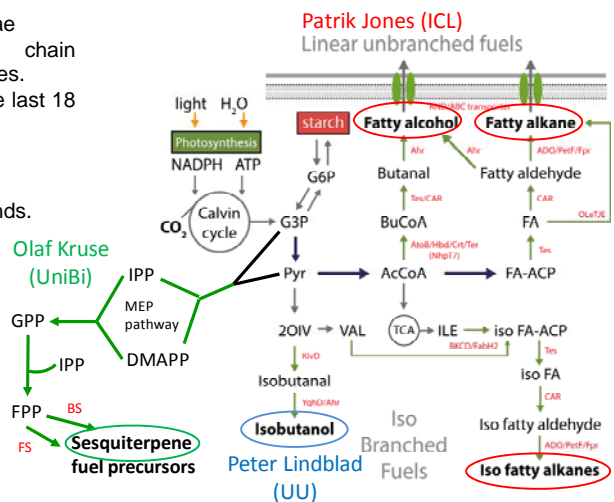
- Analyse raw products
- Blend on-spec fuels

WP6 Assessment

- LCA
- Economic
- Risks

WP7 Business case

- Business case development



Project Facts:

Budget: 6 million EUR
 Duration: 48 month
 Start date: May 2015
 Coordinator: Hilke Heinke, Volkswagen
 Contact: hilke.heinke@volkswagen.de

Project partners

Uppsala Universitet
 Imperial College London
 Università degli Studi di Firenze
 Karlsruhe Institute of Technology
 Centro Ricerche Fiat SCPA
 SYNCOM RTD consulting GmbH
 Universität Bielefeld
 IFP Energies nouvelles
 A4F Algafuel SA
 Neste Corporation
 VOLVO Technology AB



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 640720.

