





Consortium

Under the coordination of Clariant Produkte (Deutschland) GmbH, five other companies and research institutes from Germany, Austria, Hungary and Romania are participating in SUNLIQUID.

SUNLIQUID Project Partners

CLARIANT 
Clariant Produkte (Deutschland) GmbH, Germany
Clariant Products Ro SRL, Romania

 Bavarian Research Alliance
Bavarian Research Alliance GmbH, Germany

 **ENERGIE INSTITUT**
an der Johannes Kepler Universität Linz
Energy Institute at the Johannes Kepler University Linz, Austria

 **ExportHungary**
ExportHungary, Hungary

 **IBB**
Netzwerk GmbH
Industrielle Biotechnologie Bayern Netzwerk GmbH, Germany

Project Profile

Project

SUNLIQUID (sunliquid® large scale demonstration plant for the production of cellulosic ethanol)

Funding Programme

The SUNLIQUID project receives funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under Grant Agreement No. 322386.

Project Duration

April 2014 – July 2022

EU Contribution

EUR 23 million

Coordination

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sunliquid® large scale demonstration plant for the production of cellulosic ethanol



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Cellulosic Ethanol from Agricultural Residues Ready for Commercial-Scale Production

Clariant is building a new commercial-scale production plant for cellulosic ethanol made from agricultural residues, based on the sunliquid® technology. The plant with an annual capacity of 50,000 tons cellulosic ethanol will be located in Podari (Romania). Cellulosic ethanol is an advanced, truly sustainable and climate-friendly biofuel. It is produced from agricultural residues such as cereal straw, which are sourced from local farmers. The new facility will generate new green jobs, business opportunities and economic growth in this rural area. With this new flagship plant, Clariant intends to demonstrate that the large-scale production of cellulosic ethanol based on the sunliquid® process is technically mature and economically viable.

The sunliquid® process developed by Clariant uses non-food biomass for the production of cellulosic ethanol. With its process-integrated enzyme production, the sunliquid® technology offers high yields at minimum costs. Since July 2012, Clariant has been validating and optimizing the technical and economic process on an industrial scale at its pre-commercial cellulosic ethanol plant in Straubing (Germany). The pre-commercial plant serves as a model for a commercial-scale production plant and is a must-have step towards commercialization.

Main features of the sunliquid® technology

- High ethanol yields with minimum production costs
- Flexible use of various lignocellulosic raw materials
- Chemical-free pre-treatment
- Integrated enzyme production with feedstock and process specific enzymes
- Simultaneous fermentation of C6 and C5 sugars
- Energy self-sufficient and nearly carbon-neutral

Objectives

In support of demonstrating the technological feasibility and competitiveness of the sunliquid® process to produce cellulosic ethanol from agricultural residues at commercial scale, the EU-funded project SUNLIQUID was initiated. Within the scope of SUNLIQUID, Clariant and its project partners carry out a detailed site selection process and establish a highly efficient feedstock handling and logistics system.

Main Objectives of the Project

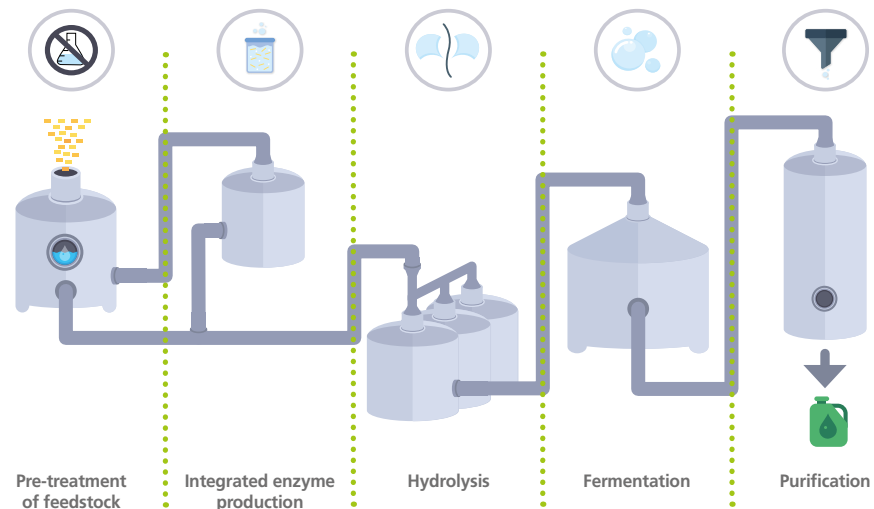
- Carry out a detailed site selection process for the cellulosic ethanol plant
- Establish a highly efficient feedstock supply and logistics system
- Contracting local farmers and logistics providers for straw supply, transportation and storage
- Implementing a highly efficient and chemical-free pre-treatment system for feedstock

Benefits for the European Society

The project is a decisive step towards establishing the innovative sunliquid® technology on the European market. The biofuel produced on this basis can be used in today's car fleet within the current energy infrastructure. It has the potential to pave the way for supplying Europe with more sustainable and climate-friendly fuel. By 2030, almost 16 % of the fuel demand in Europe could be covered by advanced biofuels such as cellulosic ethanol. This could create 300,000 new jobs and generate additional revenues of EUR 15 billion in Europe alone.*

The sunliquid® process can be applied to various feedstock that are available locally. This promotes local fuel production, reduces dependence on fossil fuels and creates additional earnings possibilities for the agricultural sector. Tapping into the full potential of plants, the sunliquid® process makes use of currently under-utilized inedible biomass, which contributes to the excellent energy balance of cellulosic ethanol. This way, up to 95 % of CO₂ emissions can be saved compared to fossil fuels.

The sunliquid® process for the production of cellulosic ethanol from agricultural residues



Benefits at a glance

- Reduction of greenhouse gas emissions
- Creation of green jobs, especially in rural areas
- Boost of local economies and creation of additional business opportunities
- Mobilization of currently under-utilized non-food biomass

* Source: ICCT, Wasted