

Newsletter #2  
March 2023



*Electricity-based, Cyclic and **Economic** Production of **Fuel***

## EcoFuel Status at M24

Since the publication of the first EcoFuel newsletter in March 2022, an intense development work has been undertaken by all EcoFuel partners on the **separate components of the process chain**.

The first reporting period was accomplished mid 2022 and no major deviations, except for some pandemic side effects, mainly slower work in laboratories or supply chain difficulties were reported.

Current development work includes:

- **Set-up of the direct air capture unit,**
- **Development and optimization of stability and long-term performance of the catalysts for the electrochemical process,**
- **Cell design,**
- **Optimization of process parameters, including stability and reproducibility,**
- **design of the conversion process to fuel precursors** comprising the purification of products and the thermo-catalytic alkene oligomerization system.

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006701.*



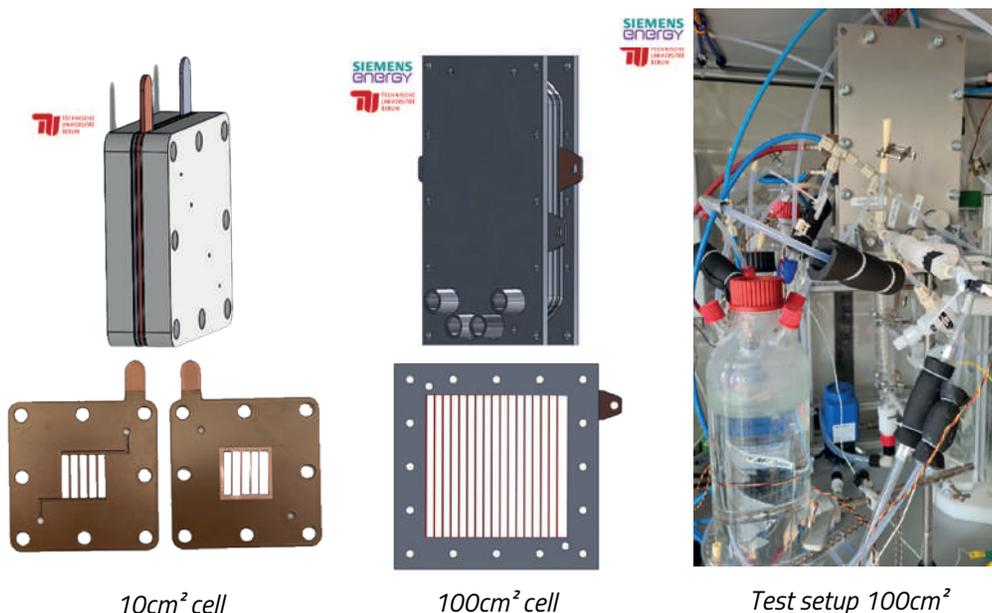
## New Current Collector Concept

At Technical University Berlin, a **new GDE concept** was developed and applied for a patent at the European Patent Office (Title: "Gas diffusion electrode based on porous hydrophobic substrates with a current collector and their manufacture"; Application date: 05.12.2022).

In this invention, a current collector was developed in **combination with a PTFE-based GDE**, which enables the scale-up of these high-performing electrodes.

**The key principle** of this technology is the partial application of a polymer coating which suppresses any kind of side reactions of the current collector material.

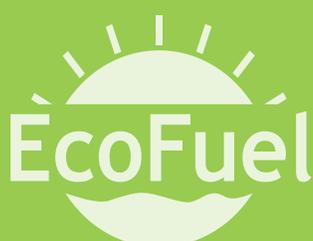
When implemented into an electrolyser, the current collector has the **additional function of electrolyte distributor and electrode/cell stabilisation element**.



In a stepwise approach of **scale-up**, the new current collector was integrated in an electrolyser cell of area 100 cm<sup>2</sup> and tested in cooperation of Technical University Berlin and SIEMENS Energy.

Favoured by the promising results, the **engineering and construction of an electro-chemical system scaled up to 300cm<sup>2</sup>-sized electrodes in a cell stack operating at ~1 kW is currently ongoing.**

## Construction of an Electro-Chemical System



# EcoFuel Main Achievements



## DAC process chain completed

A demonstration unit for the new DAC process was set up at Axiom. The unit is able to capture a stream of 1 kg/h of atmospheric CO<sub>2</sub> and to provide it in the concentrated and pressurised state as feedstock for fuel syntheses. The last project year is dedicated to the experimental operation and evaluation of the DAC process.

## LCA to CCUS & alternative fuels workshop

The LCA to CCUS & alternative fuels workshop, jointly organised by EcoFuel and 8 European funded projects, took place on December 15 – 16, 2022 – ([lca2ccusworkshop.eu](https://lca2ccusworkshop.eu)).

The objectives of this interactive workshop, hosting 60 LCA practitioners on named topics, were:

- **Sharing experiences** regarding the application of LCA to CCUS and alternative fuel technologies;
- **Finding a common ground** on the methodological issues for issuing a common methodological approach.;
- **Providing recommendations** for policy makers.



*EcoFuel is part of the communication platform "CO2 Value Europe database" (<https://database.co2value.eu/>) and the Horizon Cluster5 workgroup on "CCUS & Alternative Fuels" (<https://www.linkedin.com/groups/12656181/>)*

# ECOFuel next steps

The main objectives of the EcoFuel project should be achieved in December 2023, when the associated technologies are developed and an integrated system is in place and demonstrated.

Following the decision milestone in June, further important dates in the second half of 2023 will comprise:

- **1kW electro-chemical system in operation** – end of October 2023
- **Entire process chain operating** - end of November 2023.
- **Final, qualified and assessed fuel candidates** – end of December 2023
- **LCA and TEA results for EcoFuel process chain** – end of December 2023.

Finally, the consortium will organise a **final symposium** to foster interaction with related ongoing projects at European and overseas level and to encourage future collaboration and promote exploitation opportunities.

## Commercialisation

Due to the very positive results achieved so far in EcoFuel, the consortium members are already in discussions with potential industrialisation customers. Potential applications of different EcoFuel pathway components are targeting i) **Green ethylene** on intermediate electrolyser size ; ii) **Green fuel** ; iii) **Production of catalyst coated membranes (CCM)** for proton exchange membrane (PEM) electrolysers.

## Consortium



*AVL List GmbH*



*Siemens Energy*



*Johnson Matthey Plc*



*University of Oxford*



*Budapest University of  
Technology  
and Economics*



*Pretexo*



*Technical University  
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