



# EBIO

BIOFUELS THROUGH  
ELECTROCHEMICAL  
TRANSFORMATION  
OF INTERMEDIATE BIO-LIQUIDS

## The H2020 EBIO project:

### Turning low value crude bio liquids into sustainable road transport fuels

*The Horizon 2020 EBIO project will generate energy dense biofuels through Electrochemical transformation of intermediated liquified biomass*

Virtual Consortium Meeting, December 07, 2020 – EBIO H2020 Project Press Release

The EBIO is a new project funded by **Horizon 2020**, the EU Framework Programme for Research and Innovation, with a length of 4 years and a budget of almost 4M€. The core of EBIO is the **electrochemical upgrading of liquefied biomass to stable and energy dense bio-oils and further refinery co-processing to premium transport fuels**. Remarkably, the project contributes to the achievement of **United Nations Sustainable Goals number 7**, affordable and clean energy by providing innovative ways to procure biofuels, **and 12**, responsible consumption and production by adopting waste as an input source in a circular economy paradigm. The EBIO consortium provides complementary world class expertise along the **entire value chain** and strong **industrial commitment** to maximise wide exploitation of the results through industrial implementation.

The project's technology is key to tackle the transition to a competitive **low-carbon economy** with compact and **cost-efficient** solutions for **sustainable energy production**. The proven concepts contribute to accelerating and reducing the cost of the next generation of sustainable renewable energy generation. EBIO's innovative ambitions are testament of the **European Union's targets on carbon neutrality** and are essential for renewables in order to be established as dominant primary energy source in the continent and contributes towards establishing a solid European innovation base and building a sustainable renewable energy system.

The research focus in EBIO is the electrochemical conversion of two low-valued and typical industrially available bio-liquids into green fuels and biochemicals: **fast pyrolysis liquid and black liquor**. With only these two as feedstock, a successful implementation of EBIO technology will lead to a **production of at least 60Mt of biofuels per year** in Europe where the project is implemented. The innovative concept of EBIO's electrochemistry technology is able to operate in mild conditions **avoiding the use of expensive infrastructure** while minimizing the environmental impact and providing an additional degree of freedom compared to catalytic reactions. Moreover, the exploitation of existing facilities has a twofold advantage: **easy and rapid scale-up** together with a **high public acceptance**, in turn enlarging the feedstock basis for the production of competitive energy dense hydrocarbons (advanced fuels and chemicals).

The vision of EBIO covers **the entire value chain, from feedstock suppliers to end-users in the refinery and chemical sectors**. The selection of the feeds, pyrolysis liquids and kraft mill black liquor, is based on their availability as of date. In addition, those crude bioliquids are representative for the full spectrum of qualities of feedstocks that will become commercially available in the next decade such as bio-liquids outputs from the Hydrothermal Liquefaction (HTL) processes. The **process of upgrading liquified biomass to environmentally friendly transport fuels** consist of successive depolymerisation, hydrogenation and decarboxylation, optimised by developing electrode materials, cell designs, separation processes and efficient integration into existing biorefinery infrastructure. The **uniqueness of EBIO is that no external source of hydrogen will be needed at the first stage hydro-processing of pyrolysis oil**, as protons and electrons are going to be generated in situ from water. Via an integrated approach covering the entire process, **EBIO will validate the new technology at small pilot scale (TRL4) and forms the basis** for further

scale up activities beyond the current proposal. The experimental development is supported by a broad sustainability analysis including economic feasibility, environmental footprint and impact on society and rural development. The advances in the scientific and engineering knowledge will form the basis for a technological feasible concept with environmental, social, and economic benefits.

The expected achievements of the projects encompass a **near-seamless integration of electrochemistry into biorefinery processes**, a **full process design and integration with existing utilities**, a detailed techno-economic evaluation to provide a realistic estimation of the manufacturing costs and assessment of societal and environmental challenges and effects.

#### About EBIO:

EBIO – *Turning low value crude bio liquids into sustainable road transport fuels* started on the 7<sup>th</sup> of December 2020 and runs for 48 months.

The consortium, coordinated by Sintef AS (Norway), counts **9 beneficiaries** from **7 countries**: B.T.G. Biomass Technology Group BV – BTG (The Netherlands), Johannes Gutenberg-Universität Mainz – JGU (Germany), Universiteit Twente - UT (The Netherlands), Condias GMBH (Germany), Türkiye Petrol Rafinerileri Anonim Şirketi – TUPRAS (Turkey), Poyry Sweden AB – AFRY (Sweden), ETA – Florence Renewable Energies (Italy), Agencia Estatal Consejo Superior De Investigaciones Científicas – CSIC (Spain).



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006612.

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