CIRCULAIR

Sustainable Aviation Fuels
from Manure and Straw

CONTEXT

Making Europe a more **circular and climate-neutral society** requires responsible utilisation of residues and wastes, as well as large volumes of **sustainable fuels** for transport sectors like **aviation** and **shipping,** where direct electrification is not viable.

To address these challenges, CIRCULAIR will develop **innovative conversion technologies** for the **cost-effective production of sustainable fuels from abundant agricultural residues** through **hydrothermal liquefaction (HTL).** HTL can convert a wide range of organic feedstocks into fuels and is in particular suitable for wet feedstock. The CIRCULAIR process scheme can **reduce green house gas emissions** as well as **air and water pollution** issues that result from current manure handling practices.

OBJECTIVES

1. Develop and demonstrate **a cost-effective pathway to biofuel production** from abundant feedstock
2. Produce a high share of **on-specification jet fuel from HTL biocrudes**
3. Prepare near-complete **biomass utilisation** by coupling with **green hydrogen**
4. **Enable negative contributions** to the green house gas (GHG) balance of HTL fuel production

Starting date
01/01/2023

Duration
48 months

Total grant / budget
5m€

Consortium
10 Partners
from 6 European countries

Call / Topic
Climate, Energy and Mobility
HORIZON-CL5-2021-D3-03-09
Carbon negative sustainable biofuel production

GA Number
101083944

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INNOVATIONS

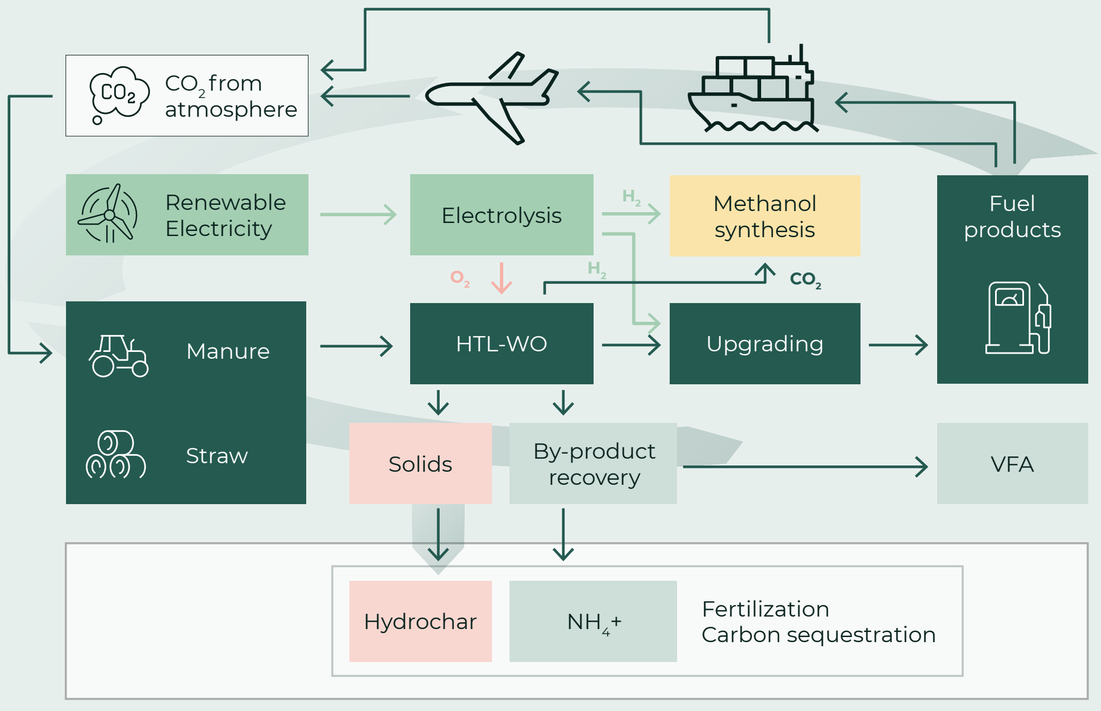
CIRCULAIR's key innovations cover the **entire process chain from feedstock to final fuels and further valuable products. Manures and straw** were chosen as feedstocks, due to their abundance in agriculture and potential synergy effects in the co-liquefaction of these feedstocks. CIRCULAIR investigates the **co-liquefaction** phenomenon and aims at **solving the process water challenge of HTL** by closely **integrating HTL conversion with wet oxidation of HTL process waters.**

In addition, CIRCULAIR will develop innovative approaches to **upgrade HTL biocrudes to on-specification jet fuel** and thereby **prepare the approval process of HTL jet fuel for civil aviation.** Biomass resource utilisation will be maximised by developing **suitable valorisation schemes for all relevant side streams.**

In particular, **volatile fatty acids (VFA)** will be extracted from HTL process waters and **methanol will be synthesised using CO_2 from effluent gas streams and renewable hydrogen.** CIRCULAIR will fill a knowledge gap regarding the **use of HTL chars for soil application,** thereby creating a **negative contribution to the carbon footprint.**

- HTL conversion
- Upgrading to jet fuel
- Utilisation of further valuable products
- Coupling with green H_2
- Soil application of HTL chars

CONCEPT



CONSORTIUM

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