



Air Carbon Recycling for Aviation Fuel Technology

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Air Carbon Recycling for Aviation Fuel Technology



- **Funding Programme:** H2020-EU.3.3.3. – Alternative fuels and mobile energy sources
- **Topic:** LC-SC3-RES25-2020- International cooperation with Japan for Research and Innovation on advanced biofuels and alternative renewable fuels
- **Duration:** 3 years project (Starting date: 1 May 2021)
- **Research and Innovation Action (→TRL 3)**

Overall budget

€ 2 897 153,75



EU contribution

€ 2 239 591,25



4AirCRAFT Partners



Advisory Panel group

Sustainable fuels producers
Refineries
Chemical industry
CO2 producers
Large consumers of long-chain hydroc
Logistics, Ports, etc.

Challenge

- Risk of not reaching the objective
- Reduction rate too slow



*In addition to substantially reducing CO₂ emissions, this will require reaching an **artificial carbon cycle**, which balance anthropogenic emissions by removing an equal amount from the atmosphere.*

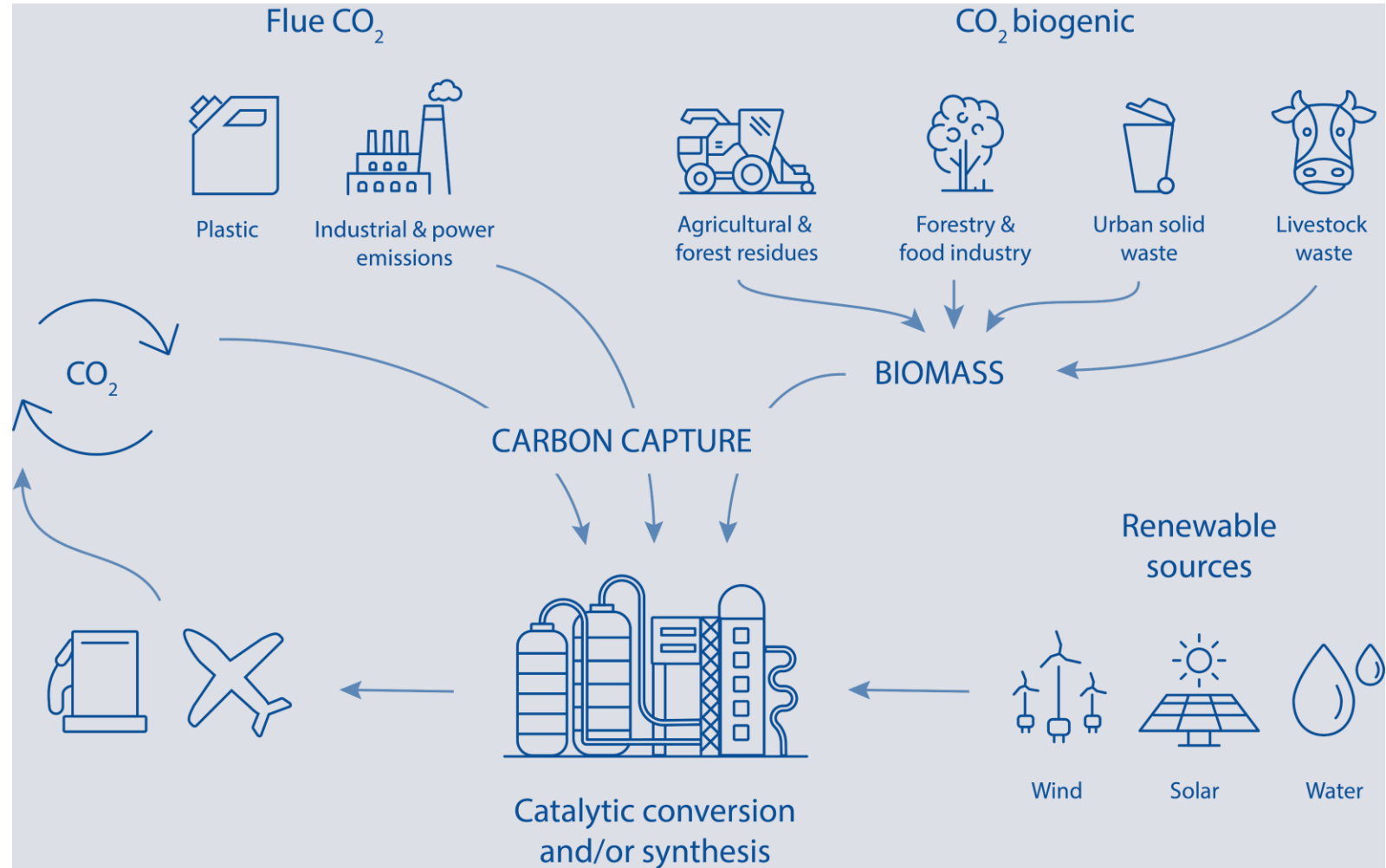
Climate change & environmental degradation: an existing threat to Europe and the world

1. EU Green Deal target: carbon neutral by 2050.
2. Aviation: difficult to decarbonize -→ Worldwide strategic sector
3. Capital-intensive industry – (GHG) emissions (900 millions tons CO₂/year)
4. Air Transport Action Group (ATAG), independent coalition of members organisations and companies throughout the global air transport industry, GHG emissions reduction of at least 50% by 2050 (compared to 2005).

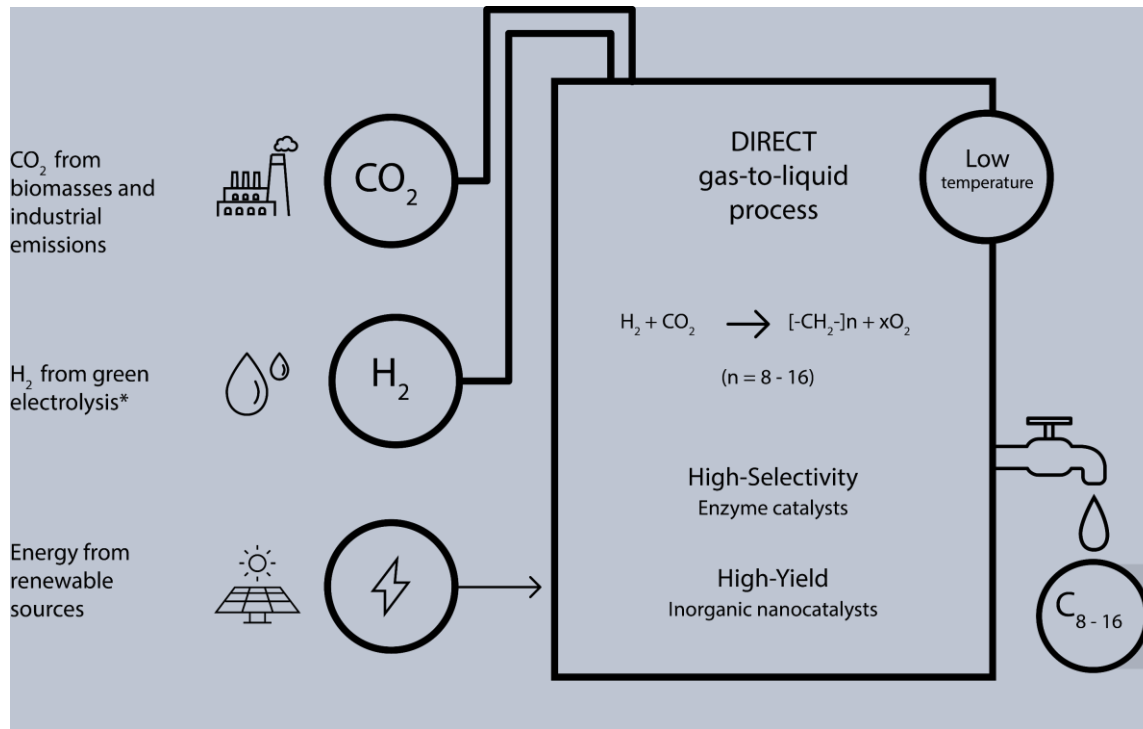
EU-JAPAN-BRAZIL cooperation is well positioned to lead an innovative and sustainable market, where the envisioned future growth of aviation goes hand in hand with the development of **better high energy density fuels with low or net-zero carbon footprint and low production costs.**

-->Opportunities: Aiming for carbon neutral production of liquid fuels

Alternative renewable fuels:
International cooperation
with Japan for Research
and Innovation



Direct CO₂ conversion into C₈-C₁₆ liquid fuels at mild conditions



- **Next generation of stable and selective catalysts** enabling the synthesis of sustainable jet fuel
- **Process intensification**
- **High CO₂ conversion and selectivity towards jet fuels**
- **Proof-of-concept validation**

Expected Impacts



Climate targets:

40%

By 2030, 40% cut in greenhouse gas emissions compared to 1990 levels and at least 27% share of renewable energy consumption.

50%

By 2050, net aviation carbon emissions will be half of what they were in 2005.

**Disruptive
technology**

Precise
control of
active sites in
novel hybrid
catalysts

Inorganic
organic catalyst
worlds coupling in
hierarchical
structures

Catalyst
stabilization
Improvement by
MOFs and
hierarchical solid
oxide scaffolds

ENERGY EFFICIENCY
(mild conditions)

**SUSTAINABLE
DEVELOPMENT
GOALS**

7 AFFORDABLE AND
CLEAN ENERGY



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



13 CLIMATE
ACTION



12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



11 SUSTAINABLE CITIES
AND COMMUNITIES



17 PARTNERSHIPS
FOR THE GOALS



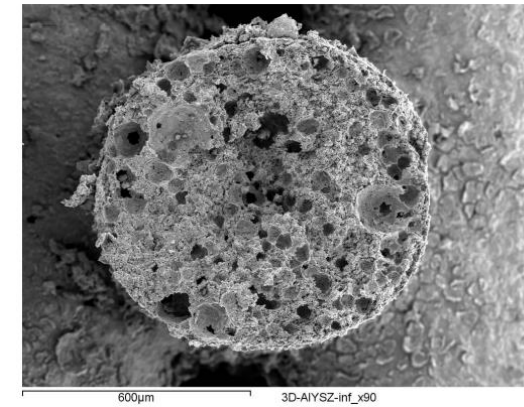
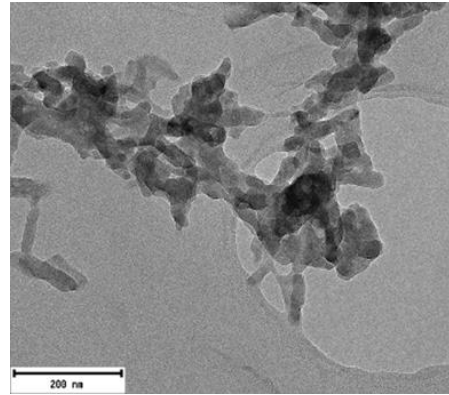
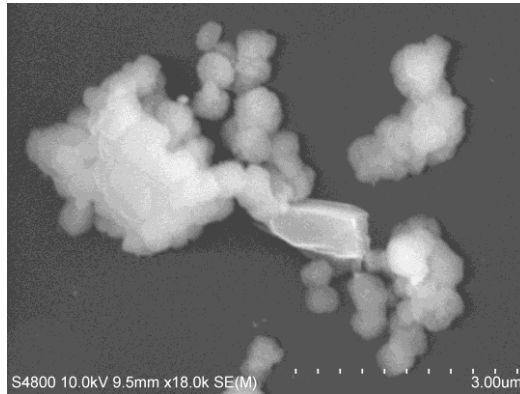
- **Scientific Workshop** (Spring 2023) – rational design and manufacturing of catalytic materials for sustainable synthesis of high density hydrocarbons.
- **Technical Workshop** (Spring 2024) – next generation of catalysts for the direct CO₂ conversion into renewable liquid fuels.

- **External advisory board! – OPEN TO NEWCOMERS!!**

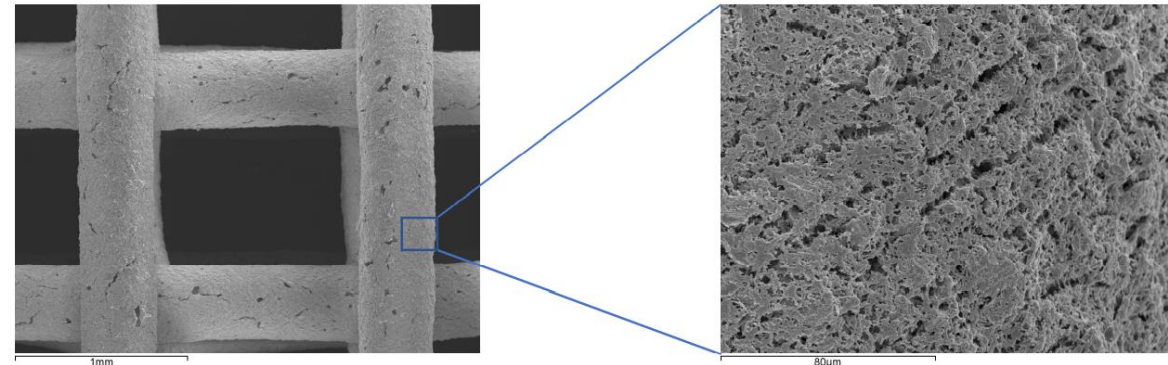
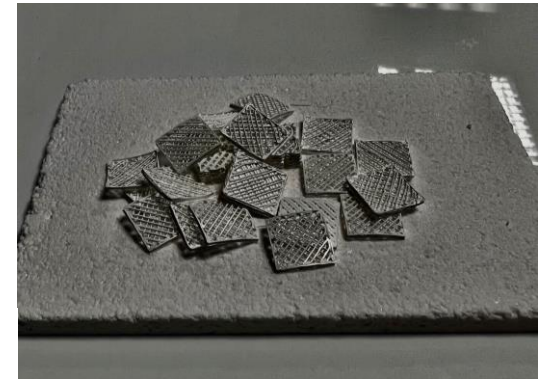
If you are part of hard-to-abate sectors, fuel certicators, CO₂ emitters, large consumers of long-chain hydrocarbons, chemical industry and sustainable fuels producers, etc...

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4AirCRAFT - Objectives



- Novel catalysts and Advanced Catalysts Carriers
- Meso-macro-structured reactors
- Structural and mechanistic investigations
- Proof of concept and Impact (LCA)



Acknowledgement



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M. APARICIO

*... and all our
Researchers and
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