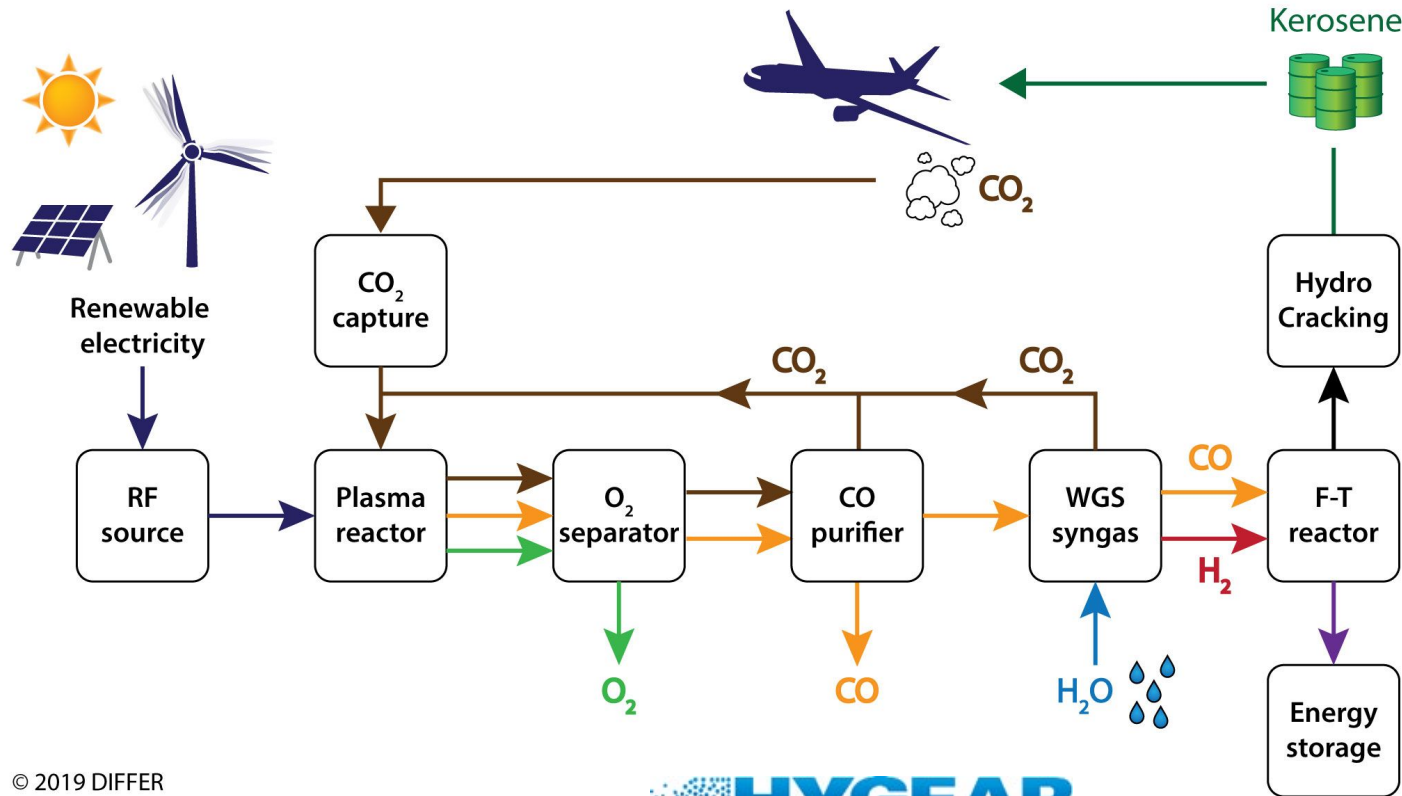


KEROGREEN Concept & Consortium



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Main Results



- Plasma reactor for CO₂ splitting being assembled for container integration (DIFFER)
- Oxygen separator delivered (procurement from Solid Power)
- Oxygen separation successfully demonstrated (DIFFER)
 - demonstrates that product stream of integrated plasmolysis and electrochemical O₂ separation contains 91% less O₂ and 138% more CO than plasmolysis alone. Unexpected cell stability improvement compared with electrolysis alone.
- Underlying research on SOC layer deposition (VITO)
- CO purifier ready for integration (HyGear)
- Integration and test of WGS, FT and HC modules (KIT)
- System Integration started (INERATEC)
- Bulk of integration work scheduled for 2022





- Novel route to sustainable aviation fuel (SAF) departing from recirculated CO₂ and H₂O powered by renewable electricity
- Meeting future aviation air pollution standards by emitting less NO_x, no soot and no Sulphur
- Sustainability assessment on Global Warming Potential in kg CO₂ eq / MJ fuel:
 - High sensitivity on electricity source (renewable mix)
 - High amount of full load hours renewable electricity needed for CO₂-savings
 - Utilization of current grid mix electricity would lead to higher CO₂ emissions

Targets European Commission proposal COM (2021) 561 of 14.07.2021 for EU regulation on ensuring a level playing field for sustainable air transport:

- Jan 2025: 2% Sustainable Aviation Fuel (SAF)
- Jan 2030: 5% SAF, 0.7% synthetic
- Jan 2050: 63% SAF, 28% synthetic
- **25.5 M tonnes SAF production EU capacity needed by 2050!**

One 100kW KEROGREEN container may produce an estimated **15 ton SAF/yr**
Upscaling synthetic SAF plant is major issue !

KEROGREEN follow-up needed to progress beyond TRL4



Communication and Dissemination



- **Co-organisation of** a virtual International Workshop for CCU (IWCCU) with 10 other EU-projects, under the lead of TU/e Eindhoven (Feb 2021)
- In total **14 presentations** (oral, poster, video) at events since September 2020 (e.g. virtual Gaseous Electronics Conference GEC20, CERAMICS 2021, ECS 2021, Future Energy Solutions conference, virtual PhD Symposium "Energie-Campus" der Stiftung Energie & Klimaschutz, virtual Annual meeting of the Process Net group "Energy Process Engineering", virtual „Debattenabend der Stiftung Energie & Klimaschutz“, IWCCU workshop co-organised by 11 EU-projects including KEROGREEN)
- Publication of **3 peer-reviewed scientific articles** (*Plasma Sources Science and Technology; Journal of Energy Chemistry; Energies*)
- Release of **Project Newsletter** (second edition)
- Contribution to **INEA brochure "Towards climate-neutral aviation"**
- **Around 3 news articles** (with/without interviews) in National News papers / Newsletter



Potential Collaboration with EU projects



KEROGREEN aviation grade fuel from recirculated CO₂ would be interested to discuss possible collaboration with H2020 funded projects below:

- **eCoCO₂** (GA 838077): Direct electrocatalytic conversion of CO₂ into chemical energy carriers in a co-ionic membrane reactor
- **SELECT CO₂** (GA 851441): Selective Electrochemical Reduction of CO₂ to High Value Chemicals
- **MOF4AIR CO₂** (GA 837975): CO₂ adsorption by carbon intensive Industry
- **TAKE-OFF** (GA 101006799): Production of synthetic renewable aviation fuel from CO₂ and H₂ (green hydrogen, via ethylene)
- **4AirCRAFT** (GA 101022633): Air Carbon Recycling for Aviation Fuel Technology (catalyst technology) - Int Coop Japan

