

The REFOLUTION project: Unlocking the potential of biofuels production in Europe

The Horizon Europe REFOLUTION project will deliver a cost-effective production of advanced biofuels in aviation and marine sector via a process that can be implemented in existing European refineries.

Oslo, 24-25 January 2023 | Kick-off Consortium Meeting

Among solutions to reach an EU net zero emissions economy by 2050, advanced biofuels have the potential to decarbonize the transport sector by saving several gigatons of CO₂ emission per year. Ambitious targets by 2050 were set for the green transition of air and marine transports, respectively with a blending mandate of 63% for sustainable aviation fuels¹, and a 70% reduction in emissions from ships². However, the development of advanced biofuels is hampered by a conjunction of several factors: the complex conversion of biomass feedstock, the massive investments needed for each new refinery unit, the lack of certification for market adoption and social acceptance concerning the biofuel production itself.

REFOLUTION is a new 4-years-long project funded by Horizon Europe, which will tackle these limitations by delivering **a cost-effective production of advanced biofuels for the aviation and marine sectors** via a process that can be implemented **in existing European refineries**.

The project consortium gathers 14 leading EU entities covering the full biofuel value chain, coordinated by the SINTEF Research Institute. A **strong commitment from industry** will maximise the exploitation of results and ensure a successful implementation. A number of key industrial partners include three SMEs working on biomass technologies, namely BTG, BTG Bioliquids and BTG-neXt, and four large companies: the OMV, NESTE and CEPESA refineries and the catalyst manufacturer GRACE. Other leading research centres are involved, such as VTT Technical Research Centre of Finland, CNRS French National Centre for Scientific Research, and DLR German Aerospace Center; academia is also represented by the University of Rostock and the University of Groningen. Finally, ETA Florence Renewable Energies will provide support to the knowledge transfer and to the communication of results.

“REFOLUTION tackles three key barriers to achieving climate goals for the transport sector - establishing routes to sustainable biofuels for difficult to de-carbonize aviation and marine

¹ ReFuelEU Aviation Initiative <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0561>

² IMO Strategy on reduction of GHG emissions from ships
https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Resolution%20MEPC.304%2872%29_E.pdf.

fuels, scaling-up production routes to pre-commercial volumes and taking the first steps towards certifying for safe use in commercial engines” said Duncan Akporiaye (SINTEF), coordinator of the project.

Co-integration, co-processing and co-refinery are the three pillars of its concept. The project will develop and demonstrate an innovative process to convert biomass derived pyrolysis oil (FP) into advanced biofuels combining different co-processing technologies. It will apply Fluid Catalytic Cracking (FCC) co-processing of bio-oils for aviation and marine applications at TRL7, and hydrotreating bio-oil for marine at TRL6 targeting the integration with refinery for large-scale biofuel production. At the same time, it will contribute to increased digitalisation in refinery and will develop innovative tools for green carbon tracking along the whole process, allowing the optimisation of carbon content and the validation of new standards.

REFOLUTION is designed to answer the challenge of cost-effective biofuels in existing plants to facilitate their **market uptake**. The implementation of this technology is expected to **reduce the CAPEX by 50% and OPEX by 45%**.

This Horizon Europe Innovation Action will deliver a comprehensive toolbox of models, standards, social assessment and exploitation pathways for interfacing with current refinery models and available documentation for further replication in other existing refineries.

In line with the Green Deal’s objectives, the REFOLUTION action will contribute to decarbonize the aviation and marine transport leading Europe towards a sustainable, circular and net-zero emission economy.



The REFOLUTION project consortium in Oslo. @ETA Florence

About

REFOLUTION is a Horizon Europe Innovation Action. The project has a total duration of 54 months from January 2023 to January 2027. The project Kick-Off meeting took place on 24-25 January 2023 in Oslo, Norway, hosted by SINTEF.

The consortium, coordinated by SINTEF (Norway), counts **14 partners** from 8 European countries: VTT, NESTE (Finland), OMV (Austria), University of Rostock, DLR, GRACE (Germany), BTG Biomass Technology Group, BTG Bioliquids, BTG-NeXt, University of Groningen (The Netherlands), CNRS (France), ETA Florence Renewable Energies (Italy), CEPSA (Spain).



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