The objective of the GLAMOUR project is the design, scale-up and validation of an integrated process that converts the waste bio-based feedstock such as crude glycerol into aviation and marine diesel fuels. The focus of the project will be a combination of high pressure auto-thermal reforming/gasification using chemical looping to produce syngas and the integration of Fischer-Tropsch compact reactor integrated with 3D printed structured catalyst. The GLAMOUR process will achieve full conversion of the crude glycerol into syngas and in syngas into crude diesel oil (MDO) with an energy efficiency of 65%. These improvements would increase the overall revenue of the process up to 35% and the CO₂ emission savings up to 70%.

The project will focus on the scale up of the two processes up to TRL5 demonstration for 1000 hrs by using 2 kg/h of glycerol in a packed bed chemical looping system and a downstream FT reactor.

PROJECT OBJECTIVES

- To develop, test and scale-up new catalyst formulations for chemical and chemical looping reforming
- To select, test and scale-up a new 3D printed structured catalyst for FT synthesis
- To integrate and demonstrate the glycerol-to-syngas conversion and fuel synthesis in a single process prototype at TRL5 after 1000 hrs of operation
- To perform the overall techno-economic analysis and optimisation of the process for full scale applications
- To assess the overall economics of the process
- To implement the business plan of the GLAMOUR process of the entire value chain
- To improve the social sustainability of bio-fuels and inform policy makers.

PROJECT PROGRESS & UPDATES

During the first year of research and development, GLAMOUR has already reached some interesting results. Argent Energy has made significant progress in the purification of glycerol. Tests of different glycerol feedstocks were conducted at the University of Manchester and progressed were made in improving quality with a simple purification step. Current technologies to produce liquid synthetic fuels on an industrial scale has been reviewed by Sirtec Nigi and Ciao to Fisher-Tropsch liquid (FT-SPK) to be used as jetfuel and into marine diesel oil (MDO) with an energy efficiency of 85%. These improvements would increase the overall revenue of existing 2nd generation bio-diesel plants reducing the cost for large scale biomass-to-liquid production processes up to 35% and the CO₂ emissions up to 70%

The project will focus on the scale up of the two processes to achieve a final TRL5 demonstration for 1000 hrs by using 2 kg/h of glycerol in a packed bed chemical looping system and a downstream FT reactor.

The GLAMOUR Consortium comprises 10 partners from 6 countries with strong multidisciplinary competences required for carrying out the work plan and match project objectives.