

MICROCHCP HYBRID HEATING AND COOLING SYSTEM RUNNING ON SUSTAINABLE LIQUID BIOFUELS

Fit4Micro is a Horizon Europe project aimed at developing a new generation of combined heat, power and cooling system, based on a novel technology of micro gas turbine working on renewable energy. The project's activities will focus on the implementation of the Intercooled Regenerative Reheat Gas Turbine (IRRGT) micro gas turbine: an important phase will be the one concerning the identification of resistant materials and combustors for the turbine, that will also comprehend several test campaigns for assessing its performance and optimizing its technology.



FLAMELESS COMBUSTION FOR LIQUID FUELS DEVELOPMENT AND HIGH TEMPERATURE MATERIAL ASSESSMENT

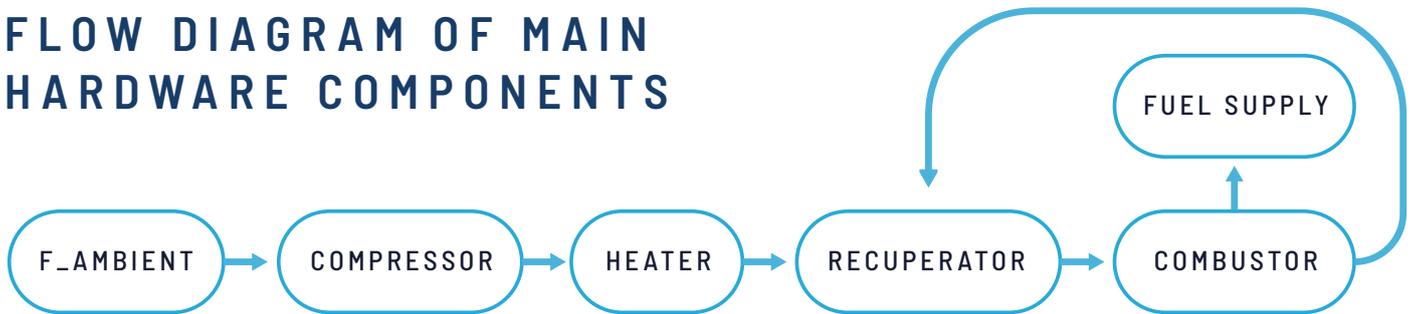


This phase of the project is mainly focused on combustion research, with the main aim of obtaining an optimal combustion with minimum levels of emissions.

During the first three months of the project the operating parameters of the combustor have been defined. The first combustion tests will be carried out in the OWI test lab, where the combustors' parameter settings will be adapted according to the optimization of the micro-gas turbine, including the combustion chamber.

The hardware components of the planned experimental test have been structured in the following diagram:

FLOW DIAGRAM OF MAIN HARDWARE COMPONENTS



Two combustion chambers have been developed at Mitis and will be optimized further, for the high and the low-pressure stages, respectively. Initially, the tests are carried out with natural gas, to then be performed with the Hydrotreated Pyrolysis Oil (HPO) implemented by BTG.

Once implemented the first combustion tests, long term tests will be performed with different material samples, in order to determine the resistance of the materials used. After this phase, the combustor performance will be validated with several tests, determining the emission behaviour and start-stop cycles. In the end, after a detailed investigation of the flameless combustor concept, two new generation combustor prototypes will be developed, one configured for low pressure stage and one for high pressure stage. These two prototypes will be sent to OWI for the evaluation in their test facility. WP3 activities and results - hence the resulting operating parameters of the combustor - represent one of the most relevant elements of the micro CHCP technology developed in Fit4Micro.



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