



“Biomass Low cost Advanced Zero Emission small-to-medium scale integrated gasifier fuel cell combined heat and power plant”

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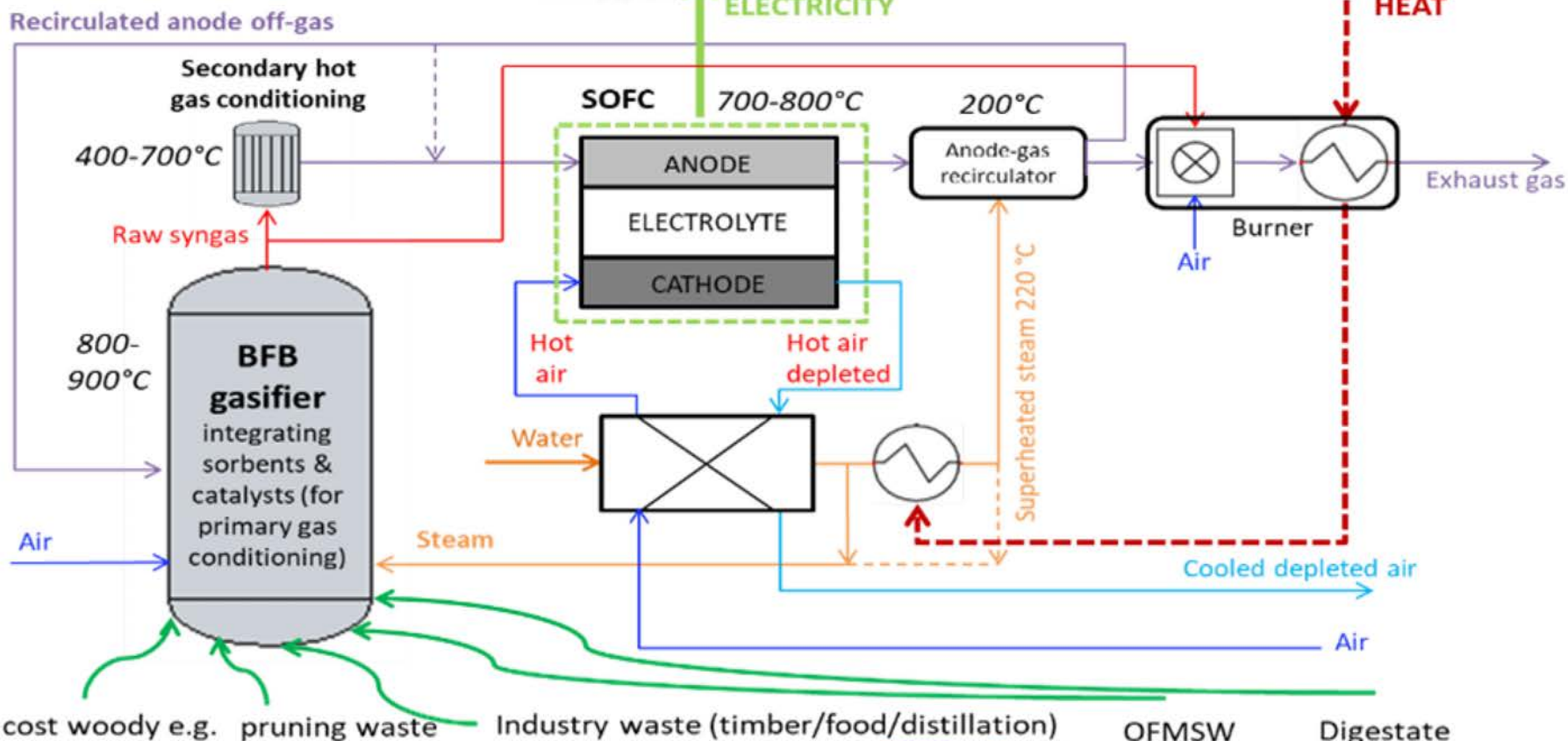
BIOCOGEN 2030

9 June 2020

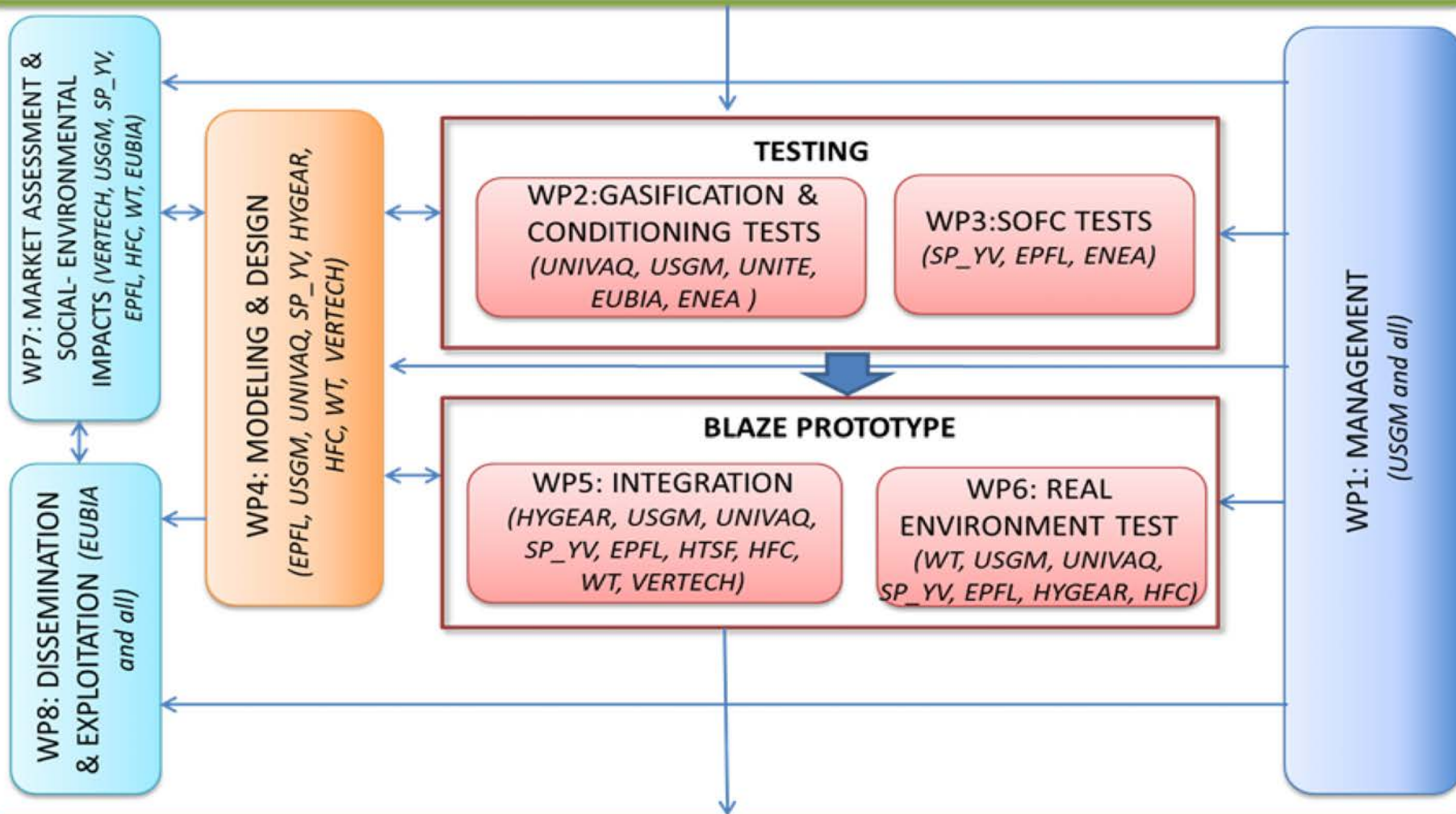
*This project has received funding from the European Union's
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agreement No 815284*



Flexible electricity
supply and heat
integration with agro,
industrial or buildings



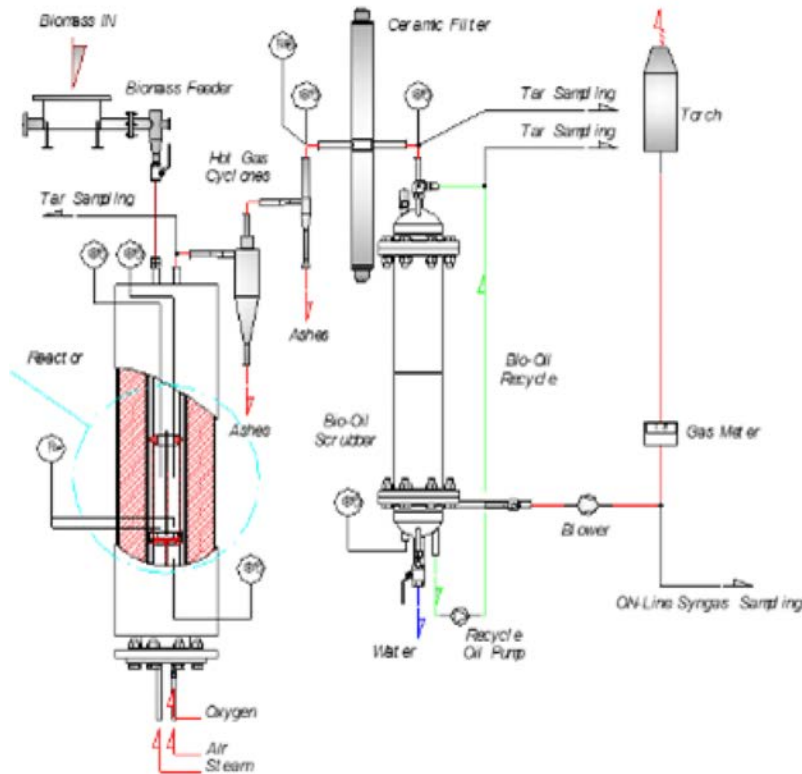
Objectives: to develop Biomass, Low cost, Advanced and Zero Emission small-medium scale CHP plant «BLAZE»



Results: Breakthrough in the cost reduction and performance increase of biomass small and medium CHP

WP2: BIOMASS ASSESSMENT, GASIFICATION AND CONDITIONING

A wide spectrum of biomass feedstock available in Europe is assessed and tested for bio-syngas production and compatibility with solid oxide fuel cells, tar removal, and hot gas cleaning and conditioning.



scheme of the 3 kWth BFB plant

photo of the whole facility

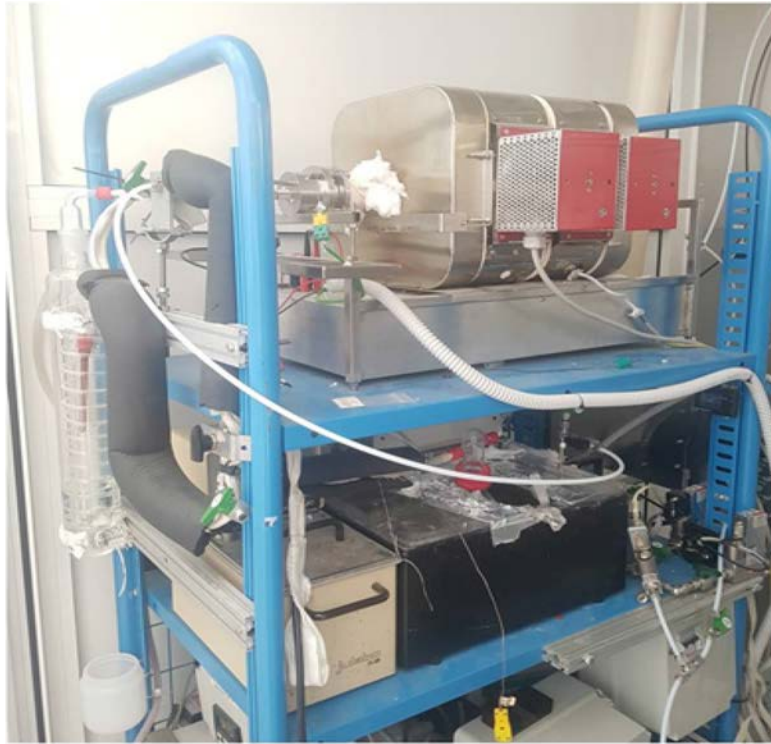
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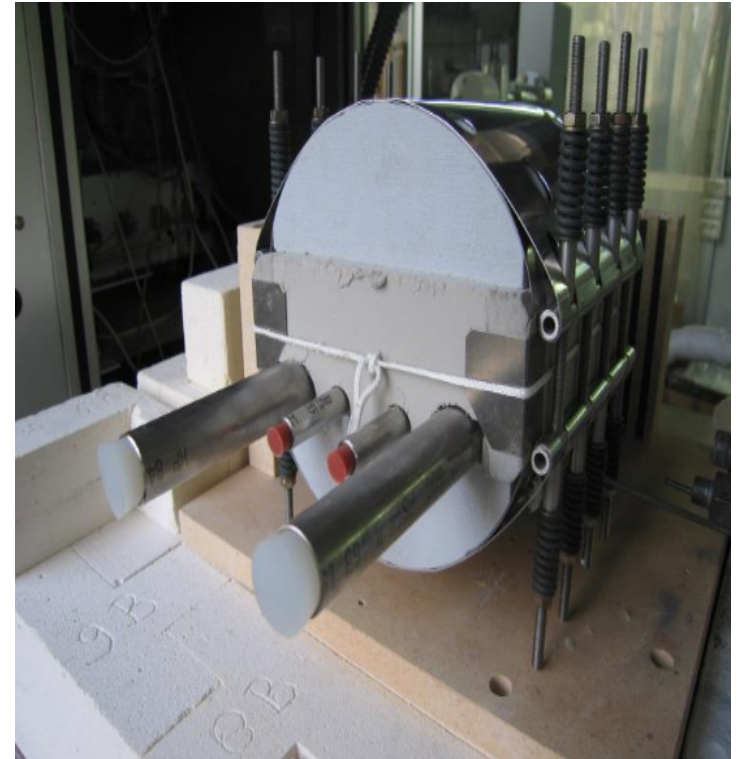
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WP3: SOLID OXIDE FUEL CELLS (SOFC) TESTS

The benchmarking of kinetics, performance, and durability of SOFC cells is carried out in order to optimize the cell's response to the characteristics of the bio-syngas obtained from different types of biomass.



SOFC single cell test rig - gas and contaminants mixing stations (ENEA)



SOFC short stack tests

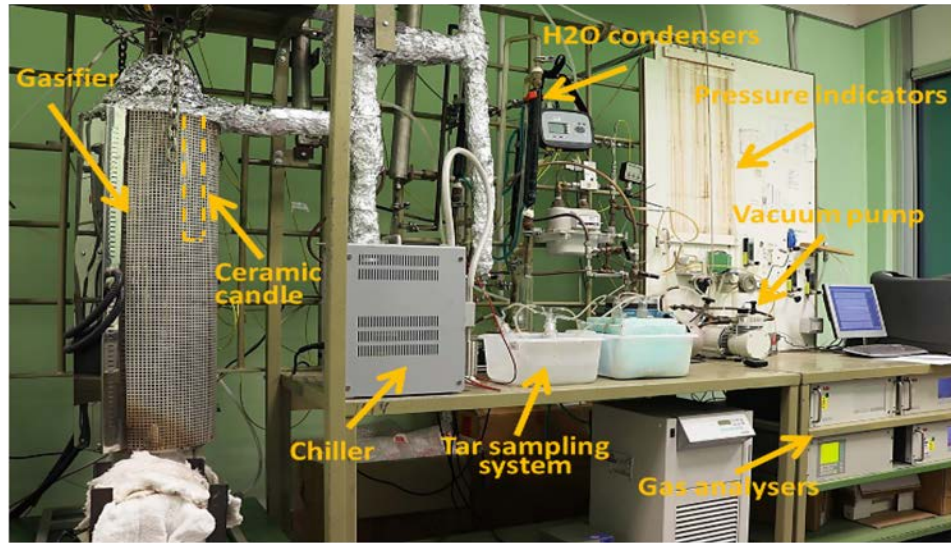


Fig. 2. UNITE gasification and UNIVAQ catalyst and sorbent test rig

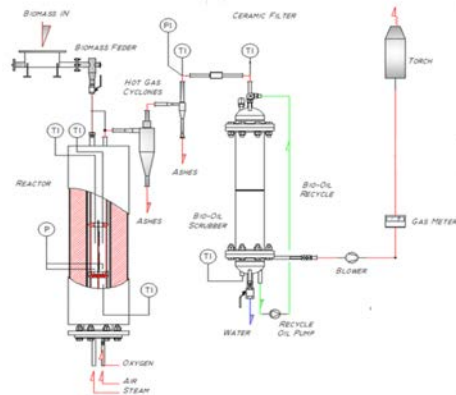
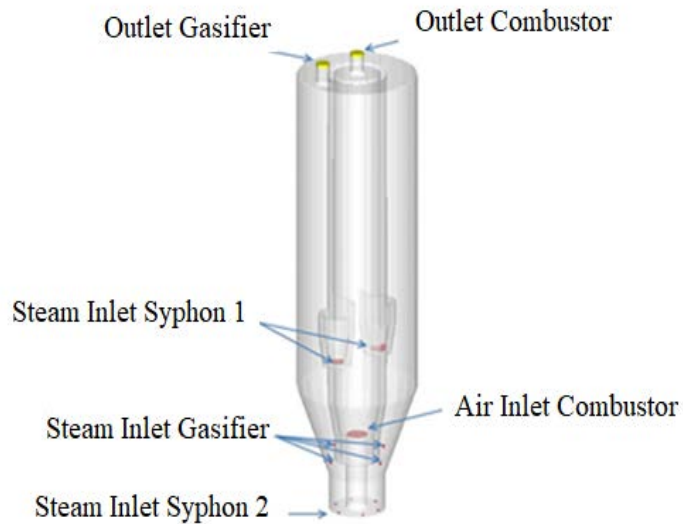
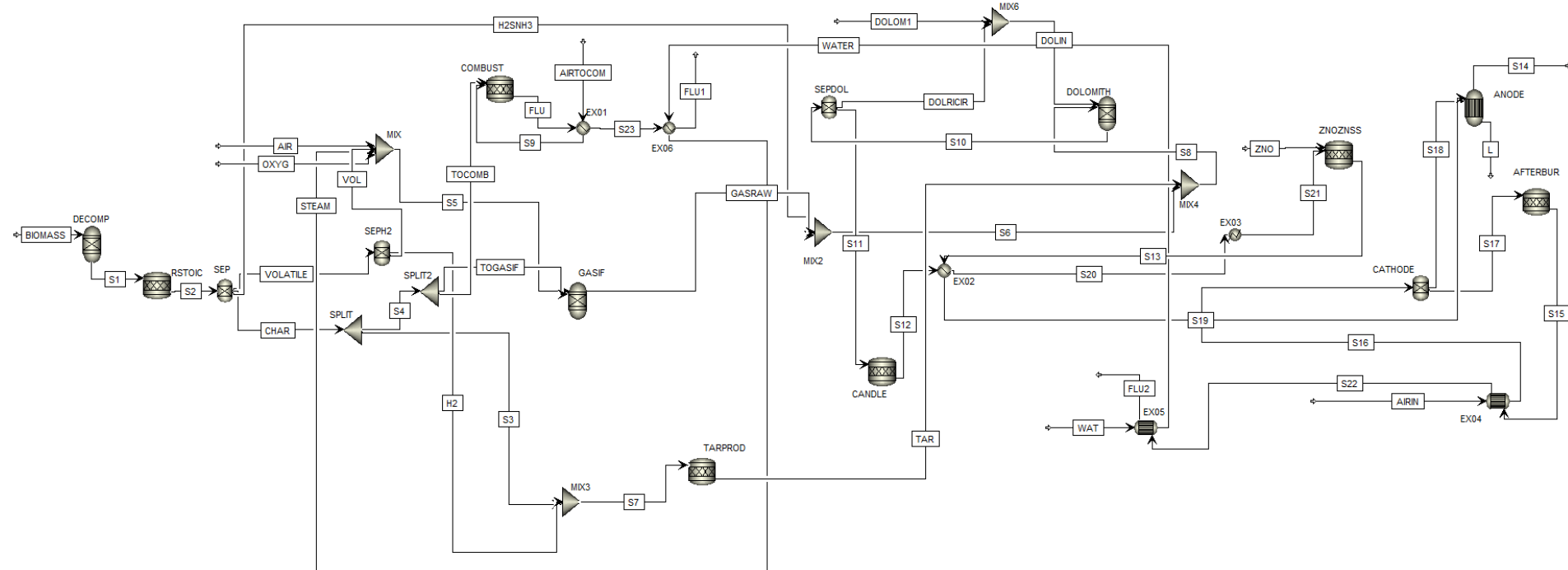
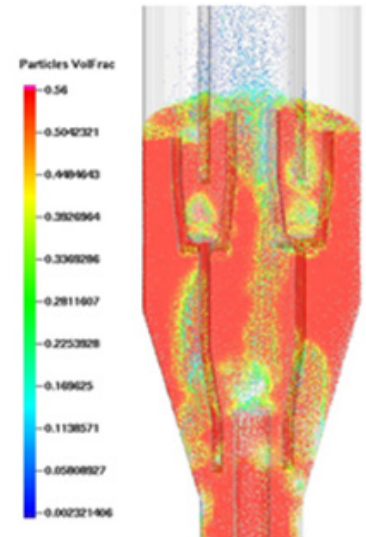


Fig. 3. ENEA gasification and EPFL/SP stack SOFC test rig

WP4: MODELING AND DESIGN



The design and implementation of the modifications on gasification and conditioning are performed at pilot scale.



WP5: INTEGRATION (SOFC STACK)



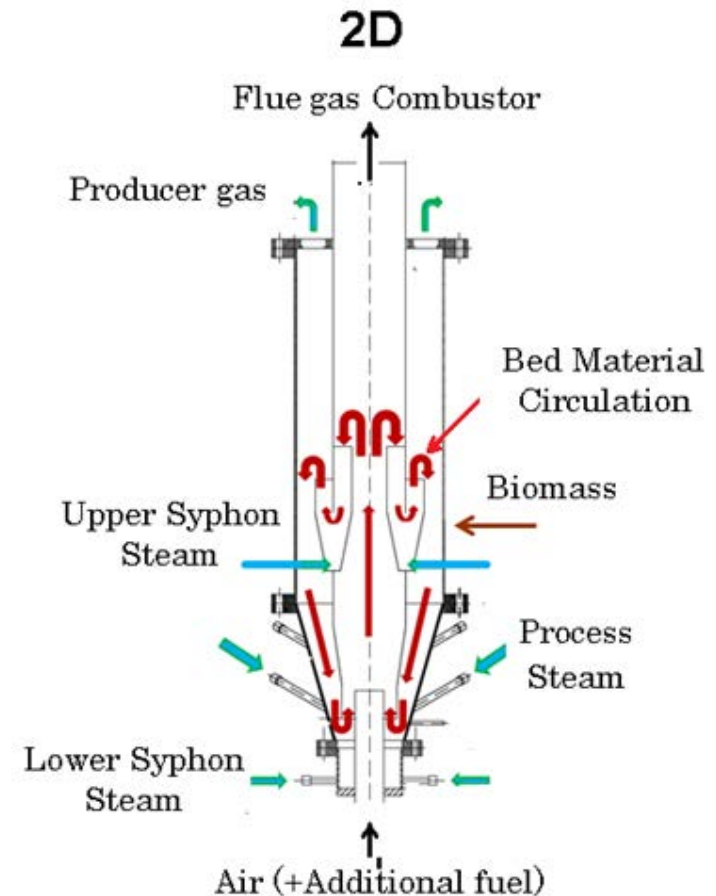
Large Stack Module (LSM)

- Power output 25 kWe, integrating 4 stacks of 6.5 kWe
- Fuel: H₂, SMR (preliminary)
 - Max convertible flow H₂: 280NL/min
 - Max convertible flow CH₄: 70NL/min
- Oxidant: Air
 - Maximum tolerated flow 5600 NL/min
- 1699 x 792 x 1385 mm
- 1505 kg



WP6: REAL TEST (100 kWth Gasifier)

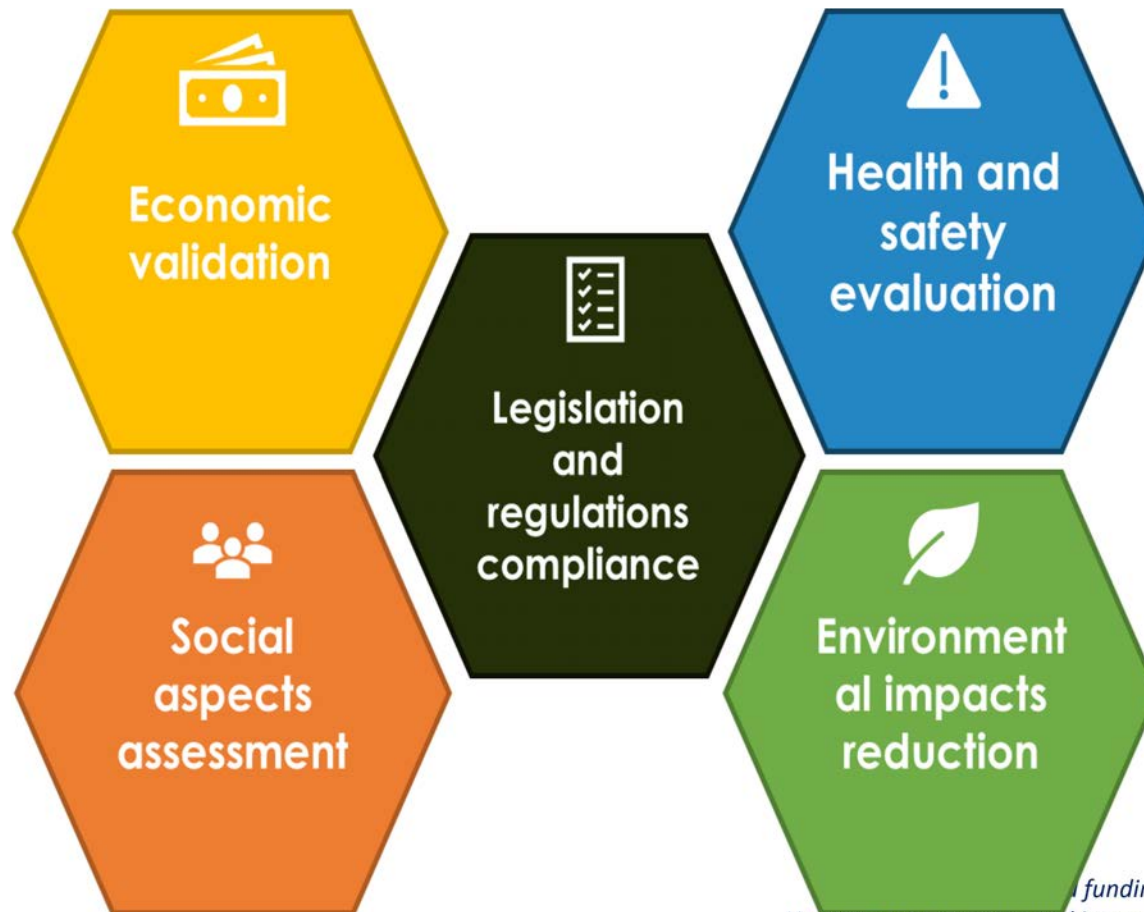
Toghter with **WT** and **USGM**, **UNIVAQ** developed the 100 kWth dual fluidized bed gasifier used in **BLAZE**



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WP7: TECHNO-ECONOMIC, SOCIAL AND ENVIRONMENTAL ASSESSMENT

Feasibility studies are developed to quantify the impacts and to deploy the best alternatives for cost-efficient small and medium-scale biomass CHP, with increased resource efficiency and positive socio-economic impact.



WP8:DISSEMINATION COMMUNICATION AND EXPLOITATION OF RESULTS

A detailed market assessment and efficient business strategies for the successful implementation and replication of the BLAZE CHP system is carried out, as well as a plan to promote knowledge-sharing among the most relevant stakeholders, media and citizens.

