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[@BlazeH2020](https://twitter.com/BlazeH2020)
info@blazeproject.eu



CLEAN ENERGY FROM SMALL AND MEDIUM- SCALE DECENTRALIZED SYSTEMS

- The BLAZE CHP system is applicable to capacities ranging from 25 kWe up to 0.1-5MWe.
- The technology is able to operate with high efficiency, also at partial loads.
- The system represents a solution for the balancing of local grids and contributes to providing flexibility to the energy system.



COST COMPETITIVENESS

- The thermal and chemical integration of the gasifier with the solid oxide fuel cell allows to achieve lower capital and installation costs than other biomass technologies in the same capacity range.
- The bubbling fluidized bed gasifier is able to use a large variety of biomass types including many low-cost residues from forestry, agriculture and organic waste, thus keeping the operational costs low.



HIGH ENERGY EFFICIENCY-ZERO EMISSIONS

- The system can achieve a net electric efficiency up to 50% and overall combined heat and power efficiency up to 90%.
- The CO₂ balance of the system is neutral, and the flue gas emissions are equal to zero or negligible.

Project Consortium



Università degli Studi
Guglielmo Marconi, Italy
(Coordinator)



UNIVERSITÀ
DEGLI STUDI
DI TERAMO

Università degli Studi
di Teramo, Italy



Università degli Studi
dell'Aquila, Italy

HYGEAR

Hygear BV, Hygear Fuel Cell Systems B.V.,
The Netherlands

walter tosto

Walter Tosto SPA, Italy



Solid Power SA, Switzerland

EPFL

Ecole Polytechnique Federale
de Lausanne, Switzerland

etaflorence
renewableenergies

ETA Florence Renewable Energies,
Italy



VERTECH
GROUP

Vertech Group,
France

ENEA

Agenzia Nazionale per le
nuove tecnologie, l'energia
e lo sviluppo economico
sostenibile, Italy



European Biomass
Industry Association,
Belgium



**BIOMASS LOW COST
ADVANCED ZERO EMISSION
SMALL-TO-MEDIUM SCALE
INTEGRATED GASIFIER FUEL
CELL COMBINED HEAT AND
POWER PLANT**

BLAZE PROJECT

BLAZE is a Horizon 2020 project to develop an innovative, highly efficient and fuel-flexible combined heat and power technology from biomass.

The project will demonstrate the use of a biomass gasifier integrated with a fuel cell, as cost-effective way to produce renewable electricity and heat from residual biomass.

The CHP system will integrate technologies with proven performance and reliability: bubbling fluidised bed gasifier, hot gas cleaning and conditioning, industrialised solid oxide fuel cells and off-gas recirculation.

The project is in line with the SET-Plan Key Action 8 on renewable fuels and bioenergy and it contributes to feed the innovation cycle, laying the basis for the next generation of biomass technologies in the EU.



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ACTIVITIES

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.

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.

SYSTEM INTEGRATION

After the modeling and design the overall thermal system integration and the coupling of the gasifier with the cleaning system and the SOFC, is realized.

REAL ENVIRONMENT PERFORMANCE TESTS

The whole integrated system is tested in a real industrial environment and monitored for performance, risk and safety analysis.

MODELING AND PILOT DESIGN

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

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.

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.

THE PROCESS

