



# Hydrogen Europe: European Hydrogen & Fuel cell Project Database

## Project UNIfHY

UNIQUE gasifier for hydrogen Production

Through development and scale up activities on materials and reactors for the integration of advanced biomass steam gasification and syngas purification processes, UNIfHY aims to prove from a process, pilot and industrial scale point of view continuous pure hydrogen production from biomass, increase well-to-tank efficiency and contribute to a sustainable energy portfolio, exploiting results achieved in past R&D EU projects on hot gas catalytic conditioning. The project is based on the utilization of plant components of proven performance and reliability and well established processes (UNIQUE coupled gasification and gas conditioning technology, Water-Gas Shift, WGS, system and Pressure Swing Adsorption, PSA, system), thus targeting up to 20 years plant durability with availability >95%. The project benefits from the already existing laboratories and UNIQUE gasifiers in order to maximize results (technology development at process-, system- and industrial-scale) with minimum risk and budget requirement (laboratories, pilot and industrial gasifier already available). Indirectly heated (100 kWth) and oxygen (1 MWth) steam fluidized bed gasifier power plants are tested without and with hot gas condition systems, meanwhile new materials for atmospheric pressure WGS are realized and utilized to develop a WGS reactor, that together with a ZnO reactor to reduce the sulphur compounds will be integrated with a tailored PSA in a portable purification unit, connected downstream the 1 MWth gasifier in order to yield pure hydrogen. The result will be the assessment of the two UNIfHY technologies (indirectly and oxygen gasifiers coupled to the Portable Purification Unit) for continuous production of hydrogen (up to 500 kg/day). The huge experimental and process/system simulations activities encompass also related routes (different catalysts, also sorbents, etc.) in order to evaluate different paths and reach, at least at simulated system level, global conversion efficiency in hydrogen up to about 70%. Finally, owing to the high level of thermal, chemical and plant integration (tar and methane reforming and particulates abatement carried out directly in the gasifier freeboard, reuse of purge gas in the process, etc.), the reduction of space and components and the investment cost savings are expected to be about 50%, bringing to a hydrogen production cost of about 5€/kg.

## Project Information

**Type of project :** Research

**Timing :** 01/09/2012 > 31/03/2016

**Project website:** <http://www.unifhy.eu/>

**Project Budget :** 3.433.607 €

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## Funding

European Union through FCH JU: **Grant agreement 299732 - CORDIS link**

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## Project partners

### Coordinator :

UNIVERSITA DEGLI STUDI GUGLIELMO MARCONI - TELEMATICA

### Partners :

[HyGear B.V.](#)

[ENEA - Agenzia per le Nuove Tecnologie, l'Energia e lo sviluppo economico sostenibile](#)

[Air Liquide Group](#)

UNIVERSITA DEGLI STUDI DI ROMA LA SAPIENZA

UNIVERSITA DEGLI STUDI DELLAQUILA

UNIVERSITE DE STRASBOURG

ENGINEERING, PROCUREMENT & CONSTRUCTION UG

PALL FILTERSYSTEMS GMBH

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## Sub project(s)

### Sub project 1

**Country:** Italy

**Address:**

VIA PLINIO 44 00193 ROMA

**Sub project categories**

Research

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Project Id: 1108

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