



# Hydrogen Europe: European Hydrogen & Fuel cell Project Database

## Project FLUIDCELL

Advanced m-CHP fuel CELL system based on a novel bio-ethanol Fluidized bed membrane reformer

FLUIDCELL aims the Proof of Concept of an advanced high performance, cost effective bio-ethanol m-CHP FC system for decentralized off-grid, by improving technology developments from previous EU projects. The improvements will be achieved by development of a) better system integration using a fluidized bed catalytic membrane reactor working at low temperature (<500°C) b) innovative materials; Pd pore filled (PdPF) membrane, low temperature autothermal ethanol steam reforming (AESR) catalysis and c) most advanced FC technologies. Low temperature allows lower thermal duty, higher compactness, use of less expensive materials and long term stability. The H<sub>2</sub> is produced from bioethanol which is non-toxic, high energy density, easy handling fuel which can be obtained from cellulose or lignocellulose. Compared with standard AESR, the use of a membrane reactor allows operating at lower temperatures while also suppressing the methane formation via the in-situ recovery of H<sub>2</sub>. The fluidized bed system allows operating at a virtually uniform temperature which is beneficial in terms of both membrane stability and durability and for the reaction selectivity and yield; since the possible carbonaceous depositions are better exposed to contact with steam and, therefore, faster gasified; in addition, the feedstock is in contact with all the catalyst particles and the fluxes and temperatures are homogeneous, avoiding any polarization phenomena along the membrane. The use of the H<sub>2</sub>-selective Pd membrane, as proposed in FluidCELL, can circumvent the constraint of high temperatures by shifting the equilibria, allowing higher H<sub>2</sub> yield at much lower temperatures. Besides, the possible detrimental erosion of the membrane produced by fluidized bed will be diminished by considering the use of PdPF membranes where Pd is located inside the nanopores of a ceramic support located below a ceramic protecting layer; this innovative membrane will be for the first time used in fluidized bed reactors.

## Project Information

**Type of project :** Research

**Timing :** 01/04/2014 > 30/04/2018

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

**Project Budget :** 4.193.549 €

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## Funding

European Union through FCH JU: Grant agreement 621196 - [CORDIS link](#)

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## Project partners

**Coordinator :**

[TECNALIA](#)

**Partners :**

[CEA - Commissariat à l'énergie atomique et aux énergies alternatives](#)

[Polimi - Politecnico Milano](#)

[University of Perugia](#)

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[Sub project\(s\)](#)

**Sub project 1**

**Country:** Spain

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**Sub project categories**

Research

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Project Id: 970

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