



# Hydrogen Europe: European Hydrogen & Fuel cell Project Database

## Project BIONICO

Biogas membrane reformer for decentralized hydrogen production

BIONICO will develop, build and demonstrate at a real biogas plant (TRL6) a novel reactor concept integrating H<sub>2</sub> production and separation in a single vessel. The hydrogen production capacity will be of 100 kg/day. By using the novel intensified reactor, direct conversion of biogas to pure hydrogen is achieved in a single step, which results in an increase of the overall efficiency and strong decrease of volumes and auxiliary heat management units. The BIONICO process will demonstrate to achieve an overall efficiency up to 72% thanks to the process intensification. In particular, by integrating the separation of hydrogen in situ during the reforming reaction, the methane in the biogas will be converted to hydrogen at a much lower temperature compared with a conventional system, due to the shifting effect on the equilibrium conversion. The fluidization of the catalyst makes also possible to (i) overcome problems with temperature control (formation of hotspots or too low temperature), (ii) to operate with smaller particles while still maintaining very low pressure drops and (iii) to overcome any concentration polarization issue associated with more conventional fixed bed membrane reactors. Dedicated tests with different biogas composition will be carried out to show the flexibility of the process with respect to the feedstock type. Compared with any other membrane reactor project in the past, BIONICO will demonstrate the membrane reactor at a much larger scale, so that more than 100 membranes will be implemented in a single fluidized bed membrane reactor, making BIONICO's in this way a more easy operation can be carried out so that a stable pure hydrogen production can be achieved. BIONICO project is based upon knowledge and experience directly gained in three granted projects: ReforCELL, FERRET and FluidCELL.

## Project Information

**Type of project :** Research

**Timing :** 01/09/2015 > 31/12/2019

**Project website:** <http://www.bionico-project.eu/>

**Project Budget :** 3.396.640 €

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## Funding

European Union through FCH JU: **Grant agreement 671459 - CORDIS link**

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## Project partners

**Coordinator :**

Abengoa Innovación

**Partners :**

ABENGOA RESEARCH SL

TECNALIA

JOHNSON MATTHEY PLC

ENC ENERGY SGPS SA

ENC POWER LDA

I.C.I CALDAIE SPA

QUANTIS

RAUSCHERT KLOSTER VEILSDORF GMBH

TECHNISCHE UNIVERSITEIT EINDHOVEN

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Sub project(s)

Sub project 1

**Country:** Italy

**Address:**

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**Sub project categories**

Research

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Project Id: 919

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