



# Hydrogen Europe: European Hydrogen & Fuel cell Project Database

## Project PEMBeyond

PEMFC system and low-grade bioethanol processor unit development for back-up and off-grid power applications

In this project a cost-competitive, energy-efficient and durable integrated PEMFC based power system operating on low-grade (crude) bioethanol will be developed for back-up and off-grid power generation. Back-up and off-grid power is one of the strongest early markets for fuel cell technology today. Wireless communication systems are rapidly expanding globally, and the need for reliable, cost-competitive and environmentally sustainable back-up and off-grid power is growing, especially in developing countries. Cost-competitive PEMFC power system compatible with crude bioethanol would allow direct use of easily transported and stored, locally produced sustainable and low-emission fuel also in developing countries, further adding value and increasing the number of potential applications and end-users for fuel cell and hydrogen technology. The PEMBeyond system will basically consist of the following functions integrated as a one complete system: a) Reforming of crude bioethanol, b) H<sub>2</sub> purification, c) Power generation in PEMFC system. Optimized overall system design combined to use of improved system components and control strategies will lead to improvements in cost, efficiency and durability throughout the complete system. Latest automotive reformat compatible PEMFC stacks will be used, possessing high potential to reducing stack manufacturing costs. On top of this, the stacks as a part of a low-grade H<sub>2</sub> compatible fuel cell system design will allow both FC system simplifications (e.g. no cathode humidifier needed) and complete system simplifications (e.g. higher CO ppm and lower H<sub>2</sub>% allowed) leading to decreased cost. Optimizing the target H<sub>2</sub> quality used will be an important task with the regard to overall system cost, efficiency and durability. An extensive techno-economic analysis will be carried out throughout the project to ensure attractiveness of the concept. A roadmap to volume production will be one of the main deliverables of the project.

## Project Information

**Type of project :** Research

**Timing :** 01/05/2014 > 31/10/2017

**Project website:** <http://pembeyond.eu/>

**Project Budget :** 4.586.324 €

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## Funding

European Union through FCH JU: Grant agreement 621218 - [CORDIS link](#)

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## Project partners

**Coordinator :**

[Teknologian tutkimuskeskus VTT Oy](#)

**Partners :**

[Powercell AB Sweden](#)

[Fraunhofer ICT-IMM Fraunhofer Institute for Chemical Technology ICT, Branch IMM](#)

[GENPORT SRL - SPIN OFF DEL POLITECNICO DI MILANO](#)

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**Sub project(s)**

**Sub project 1**

**Country:** Finland

**Address:**

VUORIMIEHENTIE 3 02150 Espoo

**Sub project categories**

Research

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Project Id: 1063

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