

# THE FACTS & FIGURES

**Full name:** GRid ASsiSting Modular HydroGen  
PEM PowER Plant

**Acronym:** GRASSHOPPER

**Start date:** 1 January 2018

**Duration:** 36 months

**Total budget:** 4.4 M€

**EC funding:** 4.4 M€

**EC contract:** 779430

**Work packages:**

**WP1:** Coordination (INEA)

**WP2:** Flow field modeling and validation (ZBT)

**WP3:** Realization of improved MEAs with long  
lifetime and lower costs (Johnson Matthey)

**WP4:** Improved stack design and pilot production  
(Nedstack)

**WP5:** System modeling and performance  
optimization (Politecnico di Milano)

**WP6:** Development and validation of modular, low-  
cost power plant (Abengoa Innovación)

**WP7:** Platform for FCPP to Grid integration (INEA)

**WP8:** Dissemination and exploitation (Abengoa  
Innovación)

# THE CONSORTIUM



**ABENGOA**

**INEA** Informatics  
Energy  
Automation

**JM Johnson Matthey**  
Inspiring science, enhancing life

**Nedstack**  
PEM FUEL CELLS  
*To be sure.*

 **POLITECNICO  
MILANO 1863**

**ZBT**



**Nouryon**

**GOFLEX**

**SWW**  
wunsiedel  
wir bewegen

**Tennet**  
Taking power further

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[www.grasshopperproject.eu](http://www.grasshopperproject.eu)

# GRASSHOPPER

**Grid Assisting  
Modular Hydrogen PEM Power Plant**



**NEXT GENERATION  
OF MODULAR, FLEXIBLE AND  
COST EFFECTIVE FUEL CELL  
POWER PLANT**



This Project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under the European Union's Horizon 2020 Research and innovation programme under grant agreement No 779430.



# WHY GRASSHOPPER?

Technical feasibility of PEM MW Fuel Cell Power Plants (FCPP) has been well demonstrated, but a major step in fuel cell stacks and system costs is still needed.

In addition, dynamic operating capability is a new necessary feature to participate in renewable energy markets.

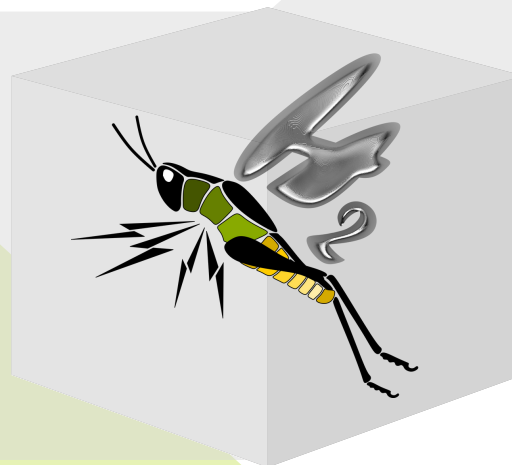
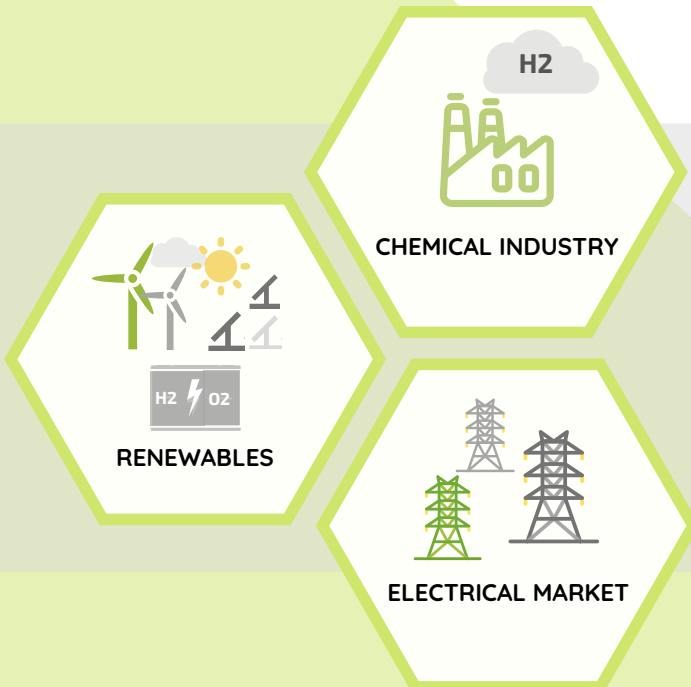
GRASSHOPPER proposes major coherent improvements on MEAs, stacks and system design to reduce CAPEX and add flexibility.

# THE OBJECTIVES

GRASSHOPPER aims to create a next-generation MW-size FCPP which is more cost-effective and flexible in power output, accomplishing an estimated CAPEX < 1500 €/kWe at a yearly production of 25 MWe.

The MW-size FCPP unit will be based on the learnings from a 100 kW pilot plant design, implementing newly developed stacks and MEAs. This pilot plant is large enough to implement cost savings and validate operation flexibility and grid stabilisation capability via fast response.

# THE ACTIVITIES



- Development of durable low-cost MEAs
- Development of larger size low-cost stacks
- Design & validation of 100 kW pilot plant at Nouryon facilities in Delfzijl
- Design of low cost, flexible and modular MW size FCPP
- Design & validation of a platform to integrate grid support functionality