

## GRASSHOPPER

Grid Assisting Modular Hydrogen PEM Power Plant

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### D8.17: Project Leaflet

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Fuel Cells and Hydrogen Joint Undertaking (FCH JU),  
now Clean Hydrogen Partnership  
Project 779430



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## Executive Summary

Under Horizon 2020 funding, dissemination activities should be promoted and should be envisaged to reach the scientific community, industry, civil society, policy makers, investors, customers. Dissemination activities, in this case, of GRASSHOPPER project are focused in spreading the project philosophy, objectives, challenges, progress and results outside the consortium of this project.

This public deliverable, D8.17, called “Project Leaflet” is part of the Task 8.1 “Dissemination activities”. At the beginning of the GRASSHOPPER project, a leaflet was generated for introducing the project to reach different target audience. This first leaflet includes general information about the Project. Once the 100 kW Fuel Cell Power Plant (FCPP) was constructed, a second leaflet was produced to include the outcomes of GRASSHOPPER project after the construction phase. These leaflets have been distributed to the partners and to the Clean Hydrogen Partnership, and they were used in events, meetings or visits to the pilot plant to spread the GRASSHOPPER’s FCPP knowledge, generated during the project

## Document History

Version	Date	Status	Author	Comment
1.0	24/05/2022	Draft	ABENGOA	



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## List of Acronyms and Abbreviations

Abbreviation	Definition
DSM	Demand Side Management
FCPP	Fuel Cell Power Plant
INEA	Informatizacija Energetika Avtomatizacija
JMFC	Johnson Matthey Fuel Cells Limited
MEA	Membrane Electrode Assembly
NFCT	Nedstack Fuel Cell Technology B.V.
Polimi	Politecnico di Milano
ZBT	Zentrum für Brennstoffzellen Technik GmbH



## 1. Introduction

The objective of GRASSHOPPER project is to create a cost-effective, flexible, MW-size FCPP unit based on the learnings from a 100 kW pilot plant design, implementing newly developed stacks and MEA's. This pilot plant is large enough to implement cost savings as well as to validate operation flexibility and grid stabilization capability via fast response. This unit will be validated under a real industrial environment using by-product hydrogen from chlorine production and will be operated continuously for several months for engaging grid support modulation as part of an established on-site Demand Side Management (DSM) programme.

This deliverable (D8.17) is focused in the specific promotional material produced for the diffusion of the project in the form of leaflet. Two different GRASSHOPPER 's leaflets were designed and distributed among the partners for using them in events, the Clean Hydrogen Partnership, and during the visits to the pilot plant in Seville. The first leaflet includes mainly the description of the project and the second one was produced with as-built project information.

## 2. GRASSHOPPER Leaflet

Two different leaflets were generated as marketing material for disseminating the GRASSHOPPER project. The leaflet is a useful format to get across the highlights of the project to the general public and to any specific audience. Around 200 copies of the first leaflet and another 500 copies of the second type, were distributed to the partners to use them in events or meetings for encouraging the dissemination of GRASSHOPPER. In Figure 1, the two type leaflets are shown:



Figure 1– Two type GRASSHOPPER leaflets

The first leaflet (Figures 2 and 3) is an informative document which describes the objectives, activities, the facts & figures. This leaflet also introduces the Consortium partners, Advisory board members and funding sources. For further collaborations, the contact emails are also included. This first leaflet was updated in order to include also the links to the GRASSHOPPER website and YouTube channel.



### 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

PARTNERS

ADVISORY BOARD

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## 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.

Figure 2– GRASSHOPPER first leaflet page 1

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 779430. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research.

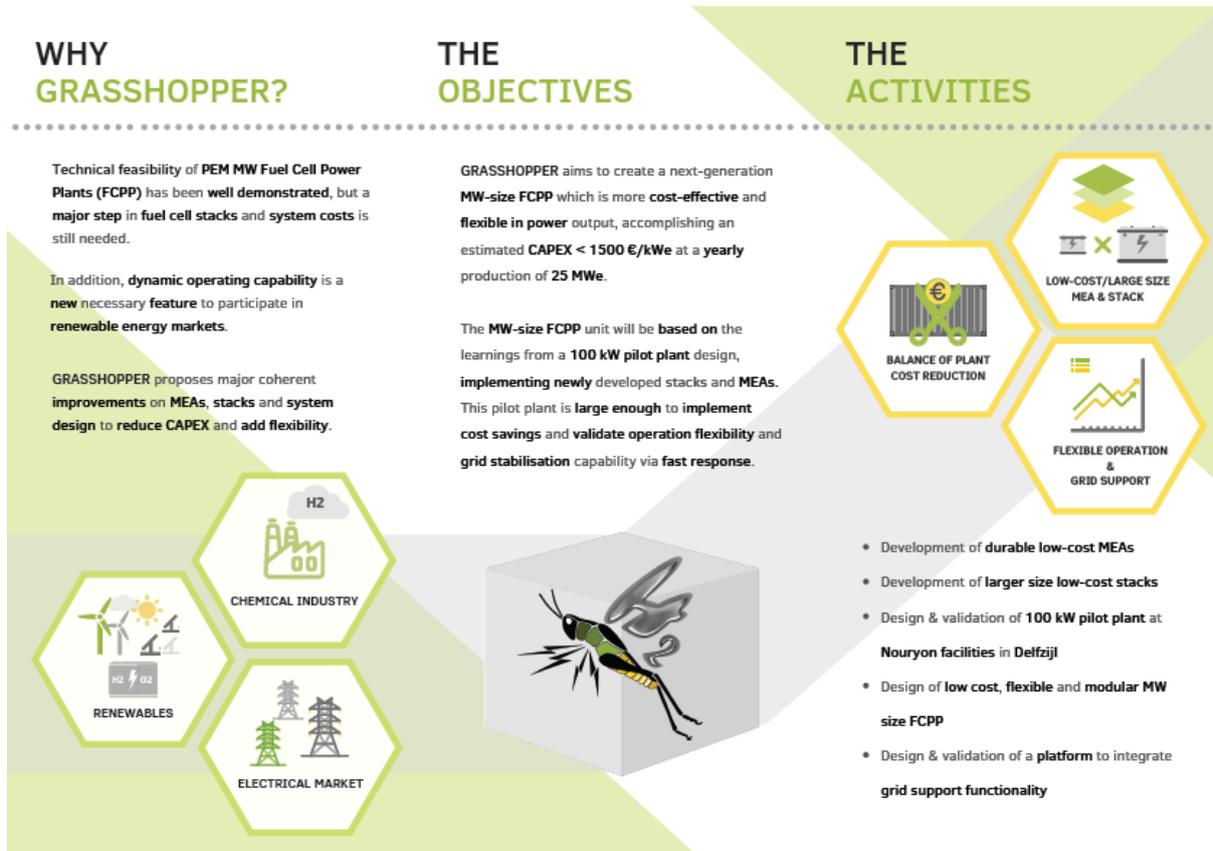


Figure 3– GRASSHOPPER first leaflet page 2

In October 2021, a second leaflet (Figures 4 and 5) was produced after the 100 kW pilot plant construction, and with the purpose of using it as main dissemination paper tool for the foreseen visits to the pilot plant and following events (as the European Hydrogen Energy Conference 2022). This last leaflet was generated for outlining not only the main systems, key parameters and applications for pilot plant and MW scale sizes but also, for including a real photo of the pilot plant and 3D images.



### APPLICATIONS

Parameter	Pilot Plant / MW scale
Power Range	20-100% of Nominal load
Nominal Power	100 kW / 1-2 MW
Load Change	50% in 20 s Min to Max in 60 s
Start-up time	<15 minutes
Dimensions	20' HC / 40' HC Container
Grid Connection	3x400 V 50 Hz+PNE (Configurable)
Auxiliary consumption	Nitrogen: For inertisation Water: None (only at start) Electricity: <5 kW in standby Cooling for non CHP applications
Heat Power ratio	<1
Heat temperature	65-70°C
Local emissions	None

### THE CONSORTIUM

PARTNERS

**ABENGOA** **INEA** Informatics Energy Automation

**JM Johnson Matthey** Preparing science, enhancing life **Nedstack** www.nedstack.com

**POLITECNICO MILANO 1863** **ZBT**

ADVISORY BOARD

**Nouryon** **GOFLEX**

**SWW wunsiedel wir bewegen** **Tennet** Taking power further

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[youtube.com/c/GrasshopperProject](https://www.youtube.com/c/GrasshopperProject) [www.grasshopperproject.eu](http://www.grasshopperproject.eu)  
info@grasshopperproject.eu

### GRASSHOPPER

Grid Assisting Modular Hydrogen PEM Power Plant

Next Generation of Modular, Flexible and Cost Effective Fuel Cell Power Plant

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Figure 4– GRASSHOPPER second leaflet page 1

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 779430. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation programme, Hydrogen Europe and Hydrogen Europe Research.

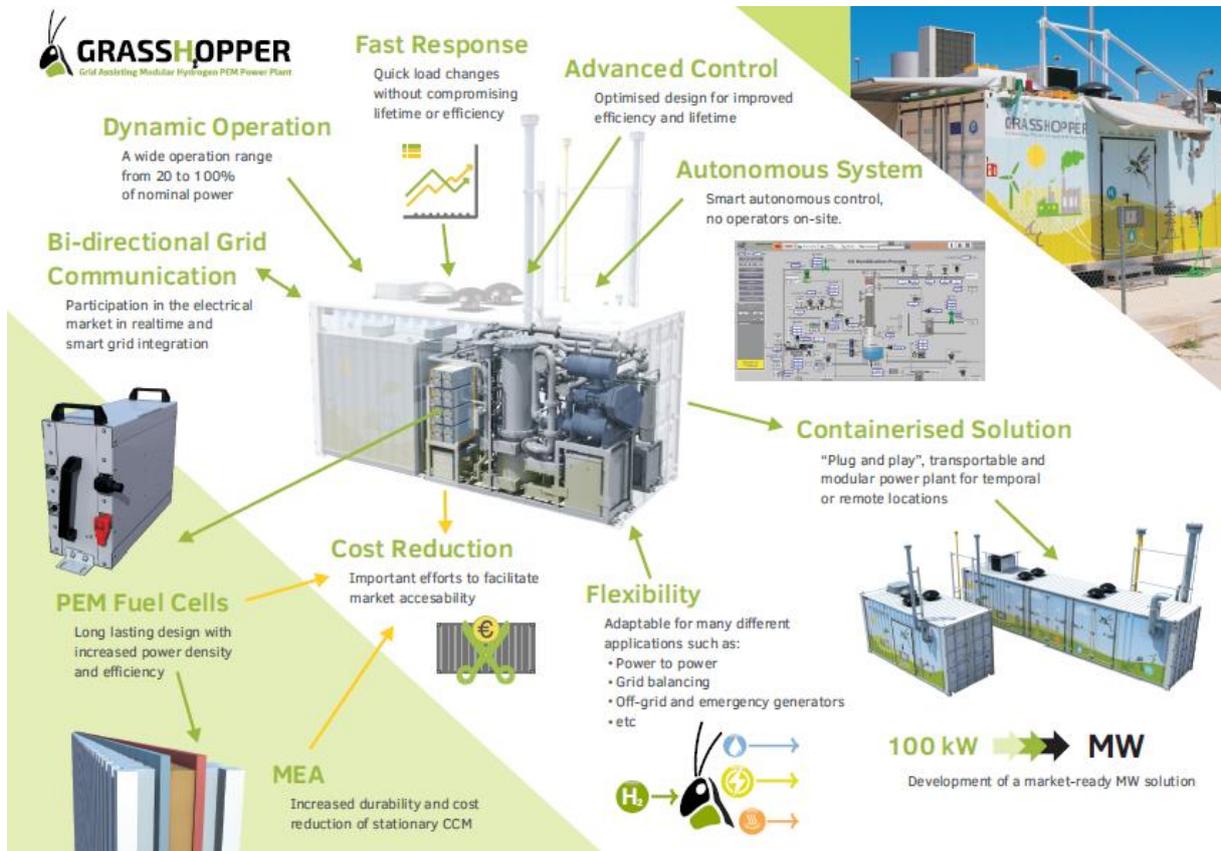


Figure 5– GRASSHOPPER second leaflet page 2

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 779430. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research.



### 3. Conclusions

During the GRASSHOPPER project, there were designed and generated two type of leaflets in printed form for distribution in the 100 kW pilot plant´ visits, meeting, conferences and events.

The first leaflet is a general document describing the objectives, activities, the facts and figures. While the second one, produced in October 2021, is focused in the outcomes of the GRASSHOPPER project after the pilot plant construction, including a real photo.

The GRASSHOPPER ´s leaflets were distributed among the members of the Consortium, the Clean Hydrogen Partnership. They were very useful during the events and for the visits to the pilot plant in Seville (Spain).

The leaflets are thereby supporting the objectives of dissemination about the GRASHOPPER project.



## 4. Annexes

### 4.1 Annex A: Consortium

Table 1 – Consortium.

Participant organization name	Short name	Country
INEA INFORMATIZACIJA ENERGETIKA AVTOMATIZACIJA DOO	INEA	Slovenia
NEDSTACK FUEL CELL TECHNOLOGY BV	NedStack	Netherlands
JOHNSON MATTHEY FUEL CELLS LIMITED	JMFC	United Kingdom
ABENGOA INNOVACIÓN SOCIEDAD ANÓNIMA	Abengoa, AI	Spain
ZENTRUM FÜR BRENNSTOFFZELLEN-TECHNIK GMBH	ZBT	Germany
POLITECNICO DI MILANO	Polimi	Italy



## 4.2 Annex B: Dissemination contact points

Table 2 – Dissemination contact points.

Partner identification and basic Information		
Project Partner	Responsible for Dissemination Activities	E-mail
INEA	Pia Kuralt	pia.kuralt@inea.si
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