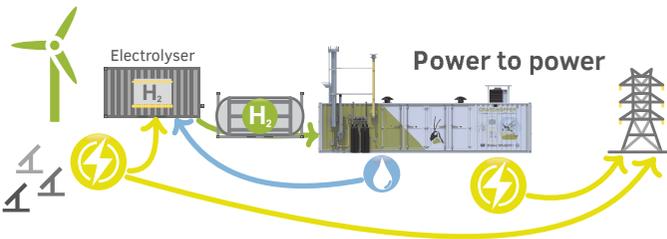
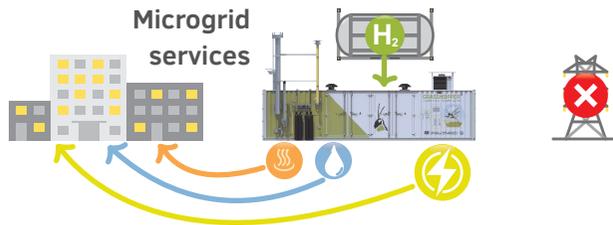
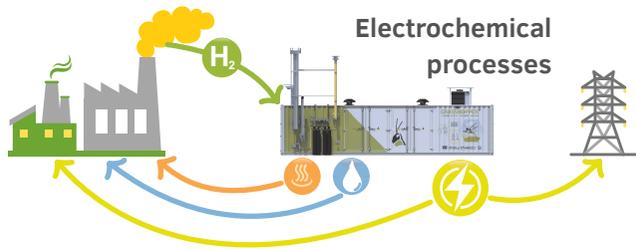


APPLICATIONS



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



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GRASSHOPPER₂

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



Fast Response

Quick load changes without compromising lifetime or efficiency

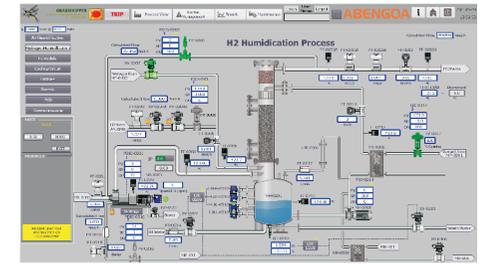


Advanced Control

Optimised design for improved efficiency and lifetime

Autonomous System

Smart autonomous control, no operators on-site.

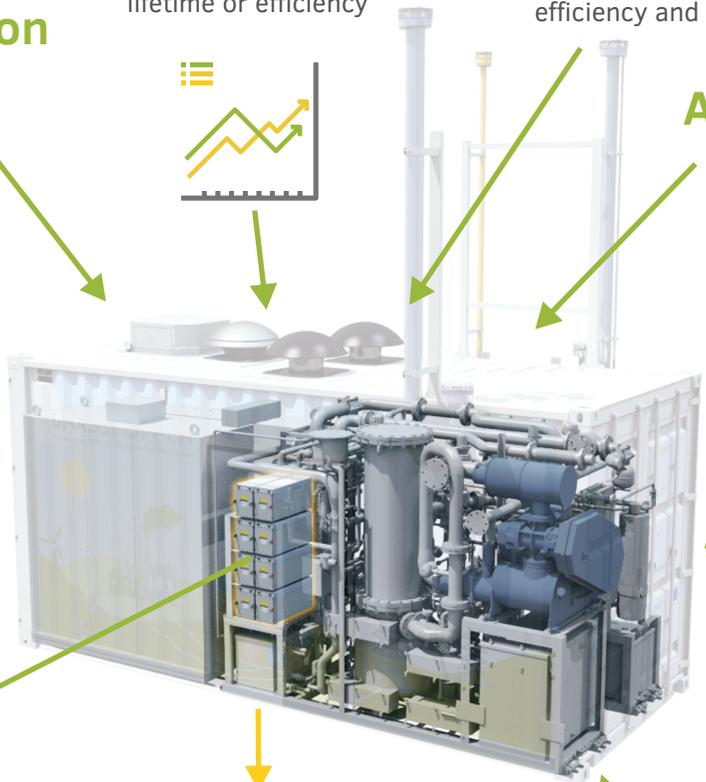


Dynamic Operation

A wide operation range from 20 to 100% of nominal power

Bi-directional Grid Communication

Participation in the electrical market in realtime and smart grid integration



Containerised Solution

“Plug and play”, transportable and modular power plant for temporal or remote locations



Cost Reduction

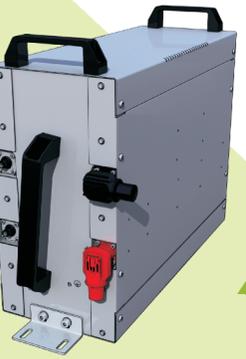
Important efforts to facilitate market accesability



Flexibility

Adaptable for many different applications such as:

- Power to power
- Grid balancing
- Off-grid and emergency generators
- etc



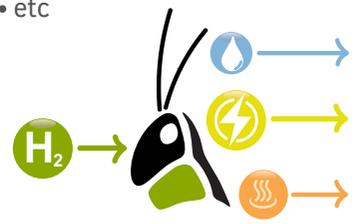
PEM Fuel Cells

Long lasting design with increased power density and efficiency



MEA

Increased durability and cost reduction of stationary CCM



100 kW → **MW**

Development of a market-ready MW solution