EUROPEAN COMMISSION

HORIZON 2020 PROGRAMME
FUEL CELLS AND HYDROGEN JOINT UNDERTAKING (FCH 2 JU)
TOPIC H2020-JTI-FCH-2015-1
Improved electrolysis for distributed hydrogen production

GA No. 700008

High Performance PEM Electrolyser for Cost-effective Grid Balancing Applications

HPEM2GAS

HPEM2GAS - Deliverable report

D4.3 Data-set on stack assembling, testing and validation under realistic operating conditions

Deliverable No.	HPEM2GAS D4.3	
Related WP	4	
Deliverable Title	Data-set on stack assembling, testing and validation under realistic operating conditions	
Deliverable Date	2018-11-08	
Deliverable Type	REPORT	
Dissemination level	Confidential – member only (CO)	
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Checked by		
Reviewed by (if applicable)		
Approved by	Antonino Aricò (CNR-ITAE) - Coordinator	2018-11-08
Status	Final version	2018-11-08

Disclaimer/ Acknowledgment

This project has received funding from the FCH JU and European Union's Horizon 2020 research and innovation programme under grant agreement No 700008. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme and Hydrogen Europe and Hydrogen Europe Research.

Publishable summary

The next generation water electrolysers must achieve better dynamic behaviour (rapid start-up, fast response, wider load and temperature ranges) to provide superior grid-balancing services and thus address the steep increase of intermittent renewables interfaced to the grid. The HPEM2GAS project aims to develop a low cost PEM electrolyser optimised for grid management through both stack and balance of plant innovations, culminating in a six month field test of an advanced 180 (nominal) - 300 kW (transient) PEM electrolyser. The electrolyser developed will implement an advanced balance of plant and improved stack design and components, which will contribute significantly to reducing the electrolyser CAPEX and OPEX costs.

One of the technical objectives of HPEM2GAS is the designing, developing and building of a compact PEM water electrolyser stack prototype, with 75 cells of industrial applicable dimensions (415 cm^2 active area), implementing low-cost coated Titanium cell components and advanced bipolar plates with a cost-effective, durable, flow-field free design. The operating targets for the prototype stack are an average cell voltage in the range of 1.8 V at a current density of 3 A/cm^2 under nominal operation and 2.0 V at 4.5 A/cm^2 under transient operation. This report summaries the development work carried out towards these objectives.