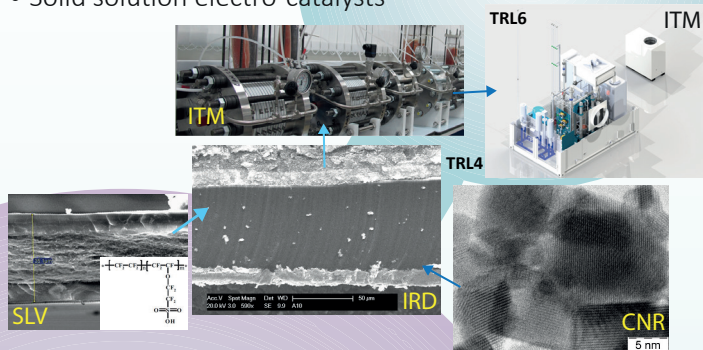


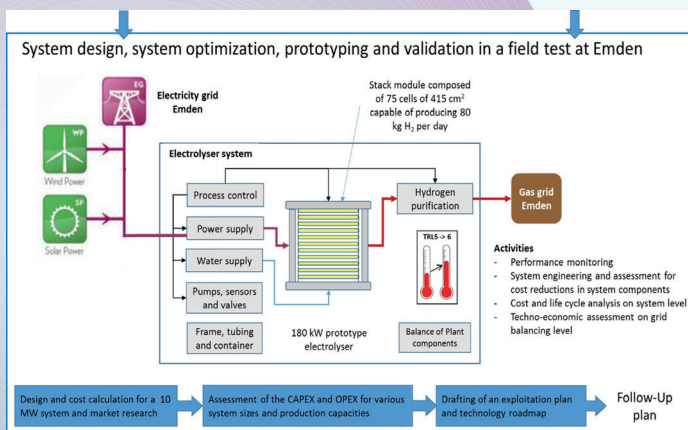
HPEM2GAS's ambition is to realise breakthroughs in PEM water electrolysis for Distributed Hydrogen Production, bringing the technology from TRL4 to TRL6. The project innovations focus on different aspects:

Advantages for stack/system components

- An advanced BoP in terms of:
 - Power tracking electronics,
 - High efficiency AC/DC converters
 - Advanced safety integrated system
- Improved stack design
- Enhanced MEAs
- Aquivion® membranes and ionomer in the electrodes
- Solid solution electro-catalysts



Power-to-Gas



Consiglio Nazionale delle Ricerche- CNR (Coordinator)
www.ita-e.cnr.it



ITM Power (Trading) Limited
www.itm-power.com



Solvay Specialty Polymers Italy S.p.A.
www.solvayplastics.com



IRD Fuel Cells A/S
www.irdfuelcells.com



Stadtwerke Emden GmbH
www.stadtwerke-Emden.de



Hochschule Emden-Leer
www.hs-Emden-Leer.de



Uniresearch B.V.
www.uniresearch.com



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High Performance PEM Electrolyser
for Cost-effective Grid Balancing Applications

Project Workshop

12 February 2019
Emden - Leer, Germany

Project introduction & Results

As more renewables are being integrated to the grid, there is a need to develop high performance electrolyzers to provide superior grid-balancing services and to produce “green” hydrogen for fuel cell vehicles and other applications.

HPEM2GAS addressed these aspects to contribute in making hydrogen the future energy carrier.

HPEM2GAS system specifications and results:

- Efficiency: 81% at 3 A cm⁻² and 75 °C
- Energy consumption: 54.2 kWh/kg H₂ at 3 A cm⁻² & 55 °C
- Degradation rate: 0.2 %/1000 hrs at 3 A cm⁻² & 55 °C
- Max. operating pressure 50 bar at 3 A cm⁻² & 55 °C

Parameter	HPEM2GAS	SoA
Current density A cm ⁻² @ 1.8 V	3	2
Energy consumption kWh/kg H ₂	54	57
Degradation %/1000hrs	0.2	0.25
PGM loading mg/W	0.3	0.5-1.5
CAPEX € (kg H ₂ /day)	<2,500	<2,900

Site test

An important objective of the HPEM2GAS project is to demonstrate an advanced 180 kW PEM electrolyzer equipped with a novel control unit and implemented BoP components at the Emden Council in Germany to validate the stack's and system's robustness to cope with dynamic situations under actual conditions and to demonstrate achievement of TRL6 for the developed system in a field test campaign.



- 09:30 Registration and coffee
- 10:00 Welcome by a member of the Presidium
& the Dean of Technology
- 10:10 Welcome by the City of Emden
- 10:20 HPEM2GAS: a project introduction and overview
- 10:40 Presentation of the FCH JU Program
- 11:00 Presentation Danish Gas Technological Centre
- 11:20 Transfer to the Field Testing Site
- Introduction of Electrolyser
- 13:30 Lunch
- 15:00 Presentation QUALYGRIDS project
- 15:20 Presentation ELY4OFF project
- 15:40 Presentation PRETZEL project
- 16:00 Development electrolyser system
- 16:20 Presentation on the Field Testing in Emden
- 16:40 Harmonisation test procedures
in water electrolysis
- 17:00 Round table

Evening Program

- 18:30 Dinner
- 19:30 Guided tour of the Emden Art Gallery
- 20:30 Networking with drinks at the Art Gallery
- 21:30 Closure of the HPEM2GAS Workshop

Presented by:

Member of the Presidium

Sven Steinigeweg

Representative of the City of Emden

Antonino S. Aricò (CNR-ITAE)

Nikolaos Lymperopoulos (Project Manager FCH JU)

Thea Larsen (CEO DGC and Chairman EUDP Board)

Ben Green (ITM Power)

Local catering

Regine Reissner (DLR)

Pedro Casero Cabezón (Fundación Hidrógeno Aragón)

Regine Reissner (DLR)

Calum McConnell (Managing Director of ITM Power GmbH)

Gunnar Kielmann & Alexander Flat (SWE & HSEL)

Thomas Malkow & Georgios Tsotridis (JRC)

Chaired by Nicholas van Dijk (PV3 Technologies Ltd)

Henri's - Hinter dem Rahmen 5A, Emden

Kunsthalle Emden - Hinter dem Rahmen 13, Emden