



Hydrogen Europe: European Hydrogen & Fuel cell Project Database

Project NOVEL

Novel materials and system designs for low cost, efficient and durable PEM electrolyzers

Water electrolysis based on PEM technology has demonstrated its applicability to produce hydrogen and oxygen in a clean and safe way. Systems have been demonstrated in a wide range of niche applications with capacities from < 1 Nm³/hrs to 30 Nm³/hrs. PEM electrolyzers offer efficiency, safety and compactness benefits over alkaline electrolyzers. However, these benefits have not been fully realised in distributed hydrogen generation principally due to high capital costs. Principal reasons for high capital costs of present state of the art PEM electrolyser are: - use of expensive materials (noble metals, perfluorinated ion-exchange membranes), - high material usage (e.g. catalyst loading, thickness of bipolar plates), - limited durability of the main components (membrane, electrode, current collectors and bipolar plates), - complex stack design This project will take advantage of the progress beyond the state of the art achieved by the partners involved in the NEXPEL project. In the initial phase of this project, durability studies of electrolyser stacks developed in NEXPEL will be performed. The stacks will be run at different operating conditions (low pressure, constant load, fluctuating load coupled with RES). Invaluable data and post mortem analyses can be extracted from this demonstration part of NEXPEL and fed into the further development of novel materials for and design of cost competitive, high efficiency, small scale PEM electrolyzers for home/community use. The functionality of the novel materials will be proved on the laboratory scale with a small electrolysis stack in the 1-kW_{el} range. By minimising electrochemical losses in the stack, a system design will be developed which enables an overall efficiency > 70 % (LHV). The improved materials will also be made available to current developers of PEM electrolyzers to allow them to quantify the benefits, and to provide early feedback that will drive ongoing performance improvements

Project Information

Type of project : Research

Timing : 01/09/2012 > 30/11/2016

Project website: <http://www.novelhydrogen.eu>

Project Budget : 5.923.912 €

Funding

European Union through FCH JU: Grant agreement 303484 - [CORDIS link](#)

Project partners

Coordinator :

Stiftelsen SINTEF

Partners :

Fraunhofer ICT-IMM Fraunhofer Institute for Chemical Technology ICT, Branch IMM

CEA - Commissariat à l'énergie atomique et aux énergies alternatives

AREVA Energy Storage

Johnson Matthey Fuel Cells Limited

PSI - Paul Scherrer Institut

AREVA H2Gen

Teer Coatings Limited

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Sub project categories

Research

Project Id: 1058

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