



# Hydrogen Europe: European Hydrogen & Fuel cell Project Database

## Project PECSYS

Technology demonstration of large-scale photo-electrochemical system for solar hydrogen production

The objective of the project PECSYS is the demonstration of a system for the solar driven electrochemical hydrogen generation with an area  $>10 \text{ m}^2$ . The efficiency of the system will be  $>6\%$  and it will operate for six months showing a degradation below  $<10\%$ . Therefore, the consortium will test various established PV materials (thin-film Silicon, crystalline Silicon and CIGS) as well as high potential material combinations (Perovskite/Silicon). It will study and develop innovative device concepts for integrated photoelectrochemical devices that will go far beyond the current state of the art and will allow to reduce Ohmic transport losses in the electrolyte and membranes. The best concepts will be scaled up to prototype size ( $>100 \text{ cm}^2$ ) and will be subject to extensive stability optimization. Especially, the use of innovative ALD based metal oxide sealing layers will be studied. The devices will have the great advantage compared to decoupled systems that they will have reduced Ohmic transport losses. Another advantage for application in sunny, hot regions will be that these devices have a positive temperature coefficient, because the improvements of the electrochemical processes overcompensate the reduced PV conversion efficiency. With these results, an in-depth socio-techno-economic model will be developed to predict the levelized cost of hydrogen production, which will be below 5€/Kg Hydrogen in locations with high solar irradiation, as preliminary back of the envelope calculations have revealed. Based on these findings, the most promising technologies will be scaled to module size. The final system will consist of several planar modules and will be placed in Jülich. No concentration or solar tracking will be necessary and therefore the investment costs will be low. It will have an active area  $>10 \text{ m}^2$  and will produce more than 10 Kg of hydrogen over six month period.

## Project Information

**Type of project :** Research

**Timing :** 01/01/2017 > 31/12/2020

**Project website:** <http://https://www.helmholtz-berlin.de/projects/pecsys/>

**Project Budget :** 2.499.993 €

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## Funding

European Union through FCH JU: **Grant agreement 735218 - CORDIS link**

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## Project partners

**Coordinator :**

3SUN SRL

**Partners :**

[CNR - Consiglio Nazionale delle Ricerche](#)

[JÜLICH - Forschungszentrum Jülich GmbH](#)

ENEL GREEN POWER SPA

SOLIBRO RESEARCH AB

UPPSALA UNIVERSITET

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**Sub project(s)**

**Sub project 1**

**Country:** Germany

**Address:**

Hahn-Meitner-Platz 1 14109 BERLIN

**Sub project categories**

Research

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Project Id: 1062

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