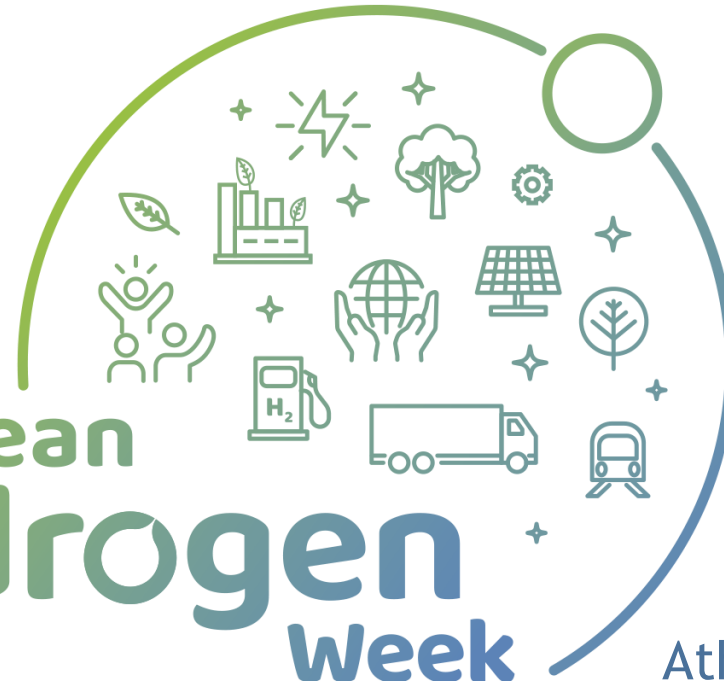


HYDROSOL-beyond

Thermochemical HYDROgen
production in SOLar structured
reactors: overcoming the
challenges and beyond



European
Hydrogen
Week



Athanasios G. Konstandopoulos
CERTH / CPERI / APTL

www.hydrosol-beyond.certh.gr

agk@certh.gr

#PRD2020
#CleanHydrogen





Project Overview

Call year: 2018

Call topic:

FCH-02-4-2018 |
Thermochemical
Hydrogen
Production from
Concentrated
Sunlight

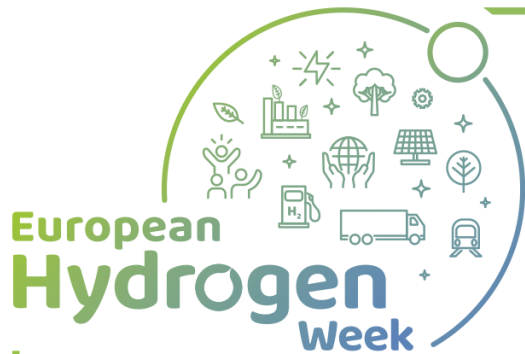
Project dates:
01/01/2019 - 31/12/2022

Total project budget:
2,999,940.00 €

**HYDROSOL-
beyond**

% stage of implementation
01/11/2020: ~50%

FCH JU max. contribution: 2,999,940.00 €



Partners

German Aerospace Center  DLR

HyGear 

Alternative Energies and Atomic Energy Commission 

Abengoa 

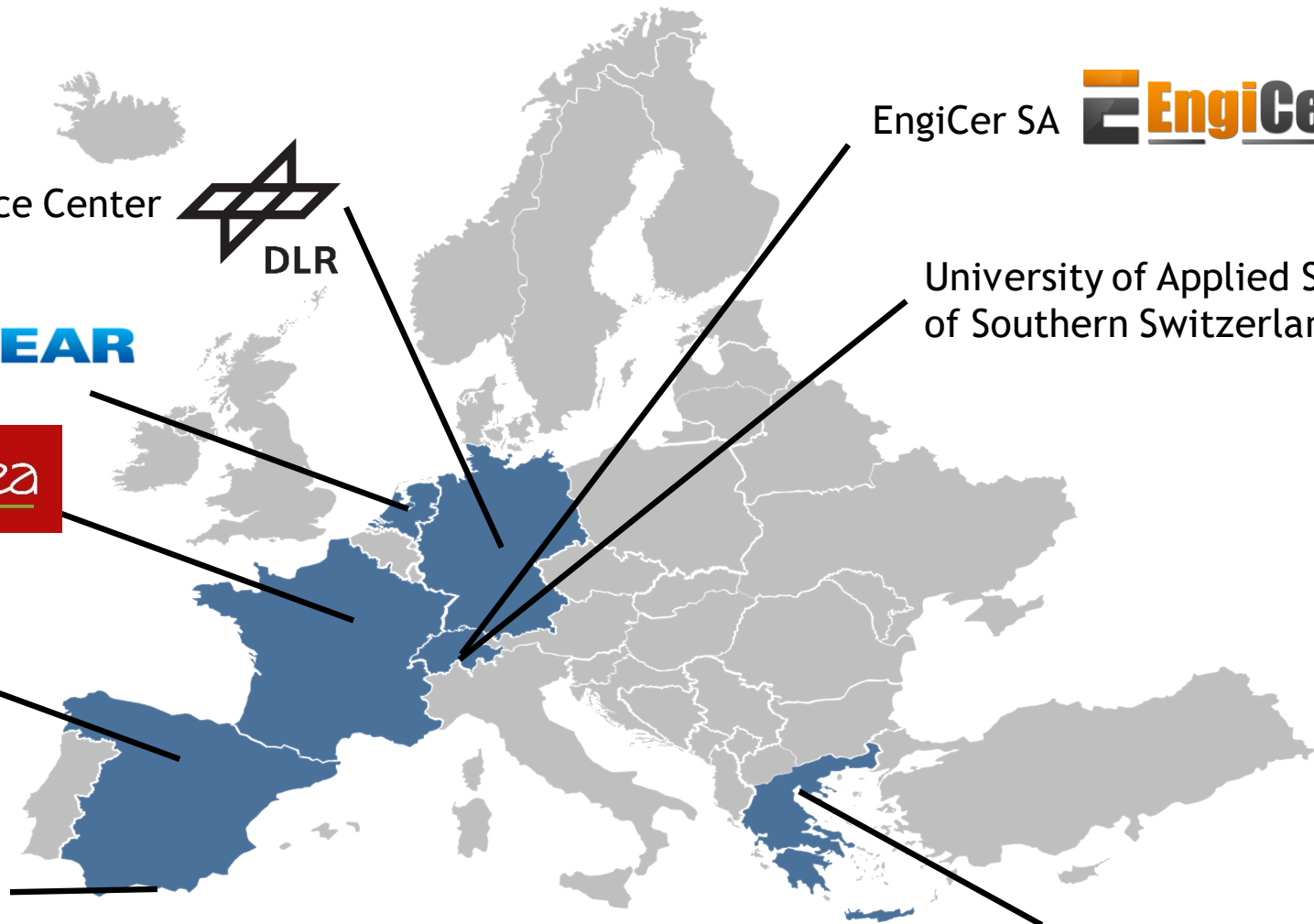
Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas 

EngiCer SA 

University of Applied Sciences of Southern Switzerland 

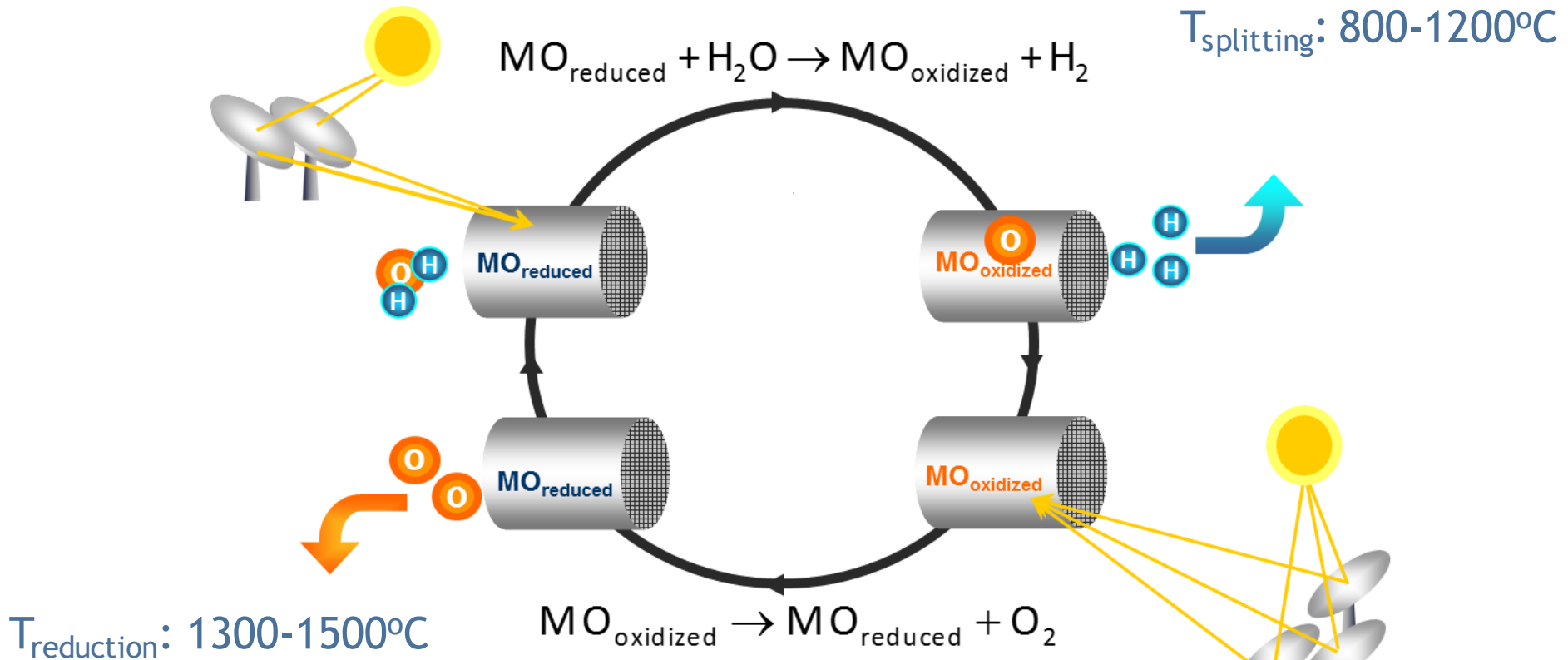
Aerosol and Particle Technology Laboratory 

#PRD2020
#CleanHydrogen

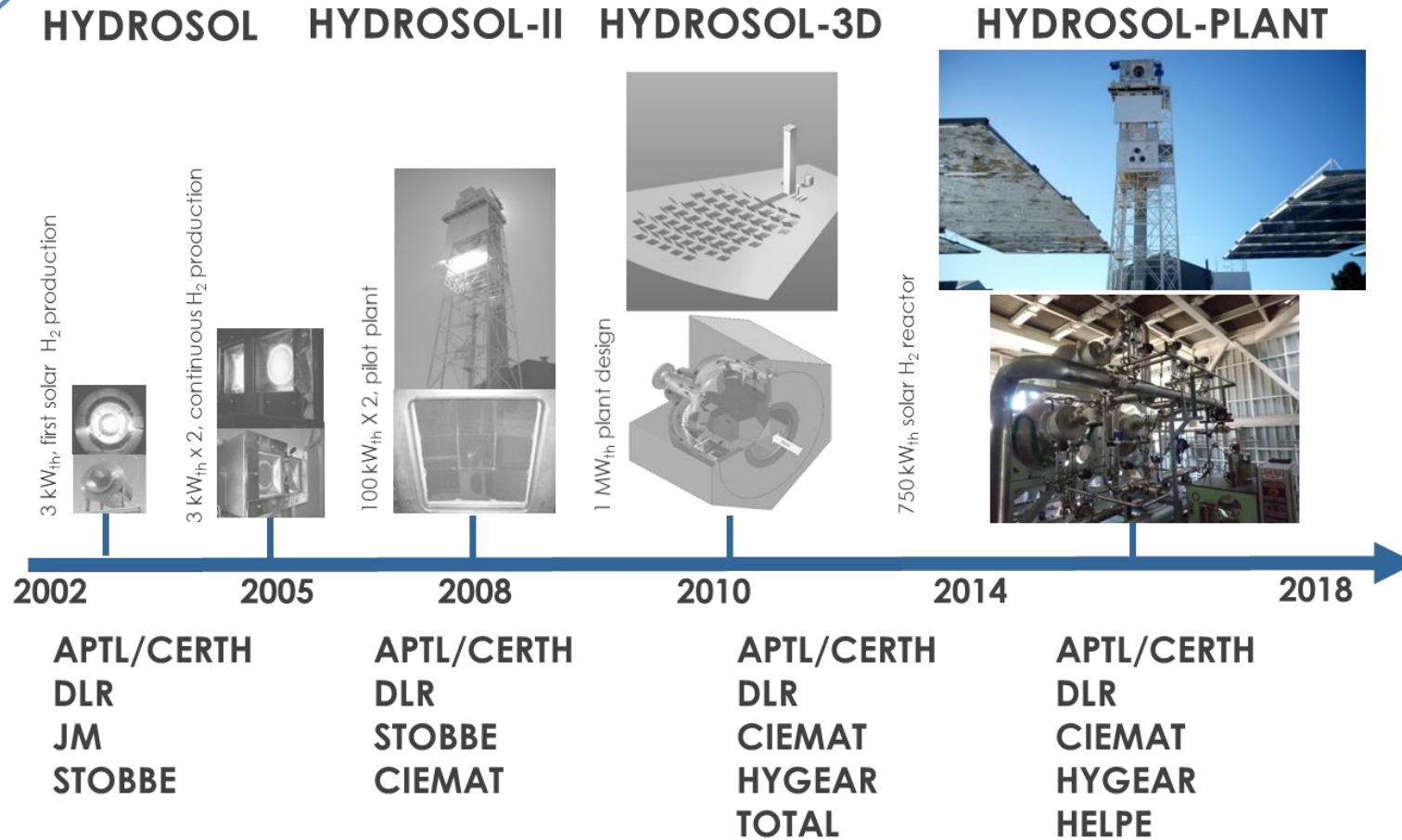


The HYDROSOL technology

Redox materials capable of performing direct water dissociation with the aid of concentrated solar irradiation



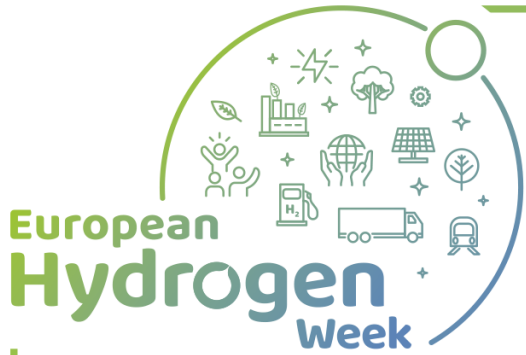
Project history: link to former Hydrosol projects



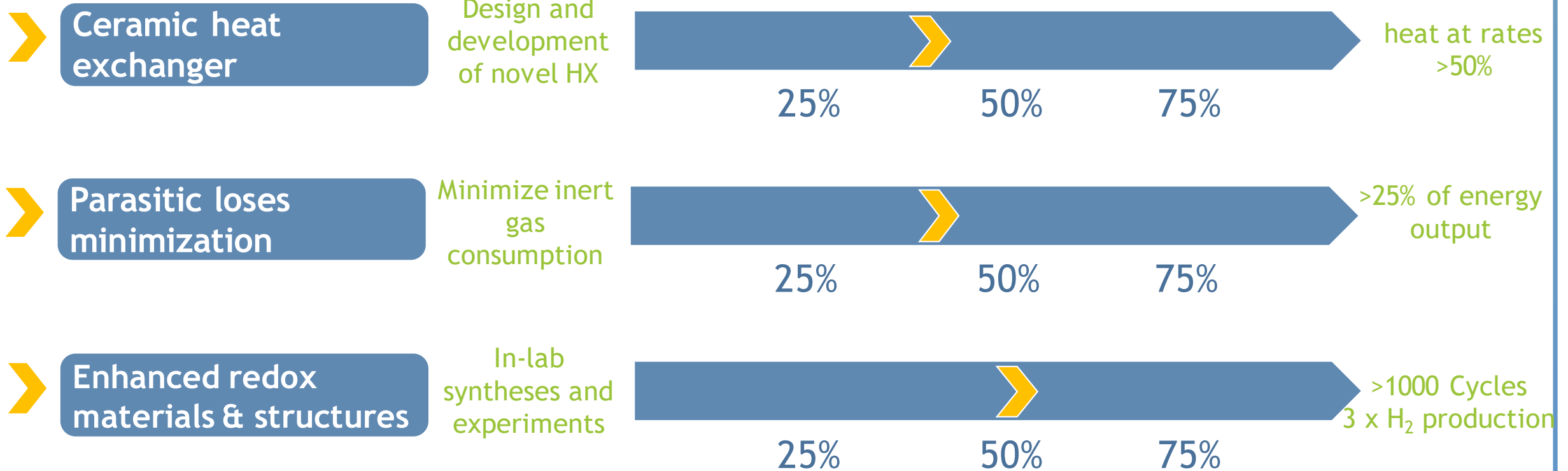
Project history: Major recent achievements

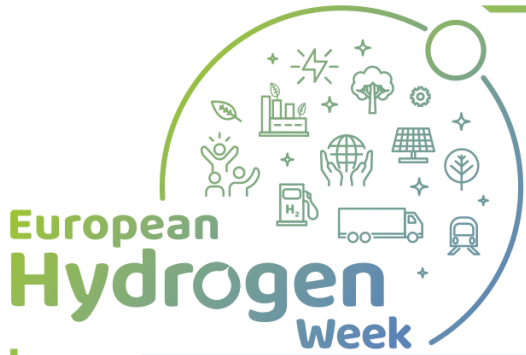
- Largest solar redox thermochemical platform for solar H₂ production to date
- Several on-sun thermal tests were performed at the platform. Reactors' cavity structural integrity maintained
- 2 reactors tested on solar platform, 1 reactor tested on solar simulator
- Highest temperatures achieved: on platform → T=1200°C; on simulator → T=1350°C
- H₂ production on solar platform and on solar simulator



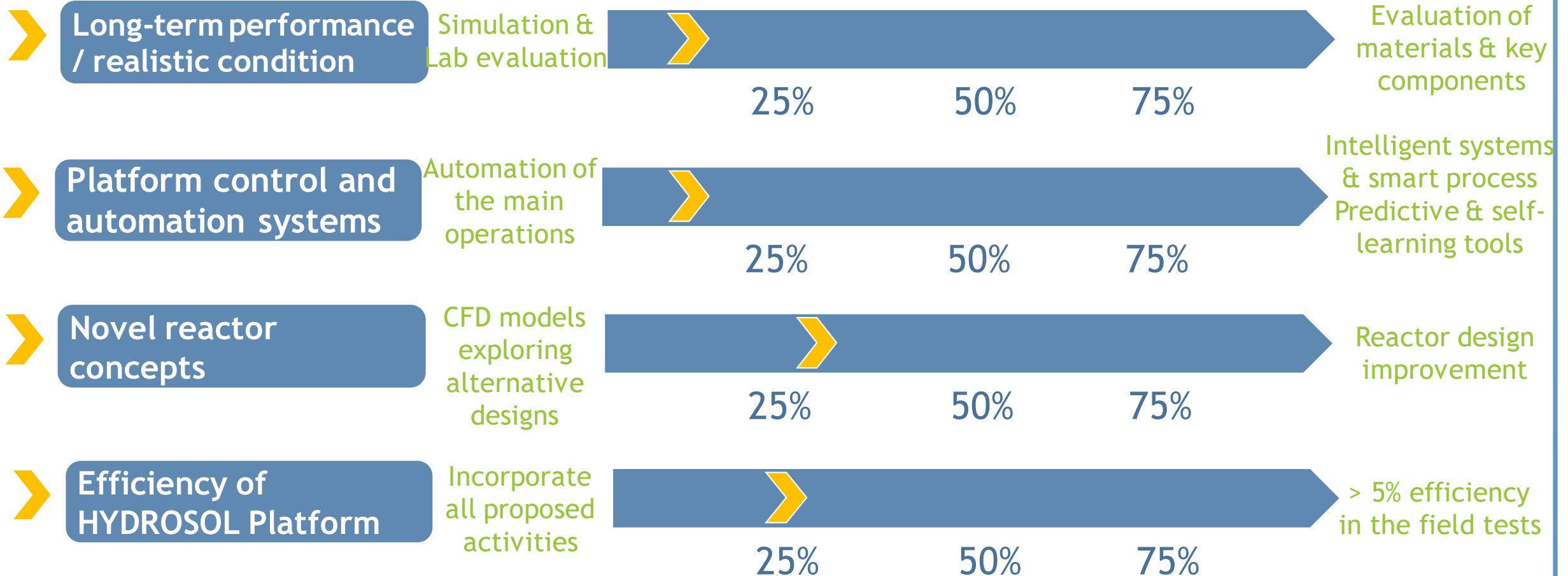


Hydrosol-beyond: Scientific and Technical targets





Hydrosol-beyond: Scientific and Technical targets

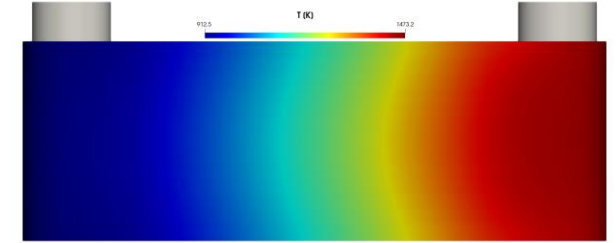
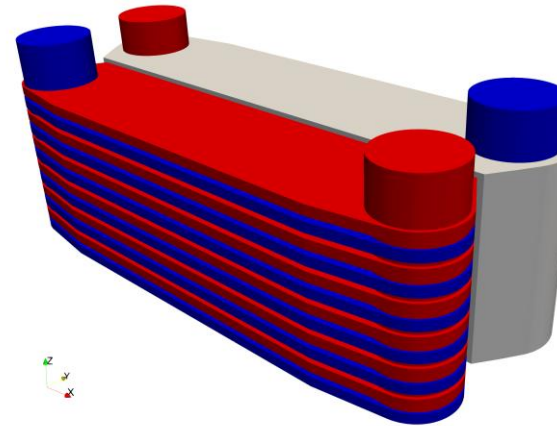


Risks, Challenges and Lessons Learned

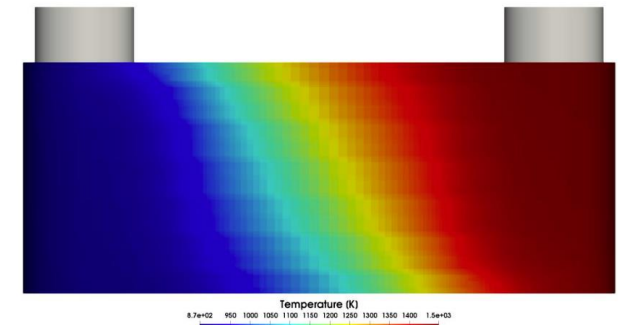
Deviation from the original proposal - modification of the Heat exchanger Concept

- Addition of a cold channel at the top of the stack to ameliorate mechanical performance
- Leads to $\sim 100^{\circ}\text{C}$ decrease on the top external surface
- Lower deformation risks
- Lower demands in external insulating shell thickness

Original Concept



Currently proposed Concept





Exploitation Plan/Expected Impact

Exploitation Plan

Is currently under preparations

The consortium is Planning to focus on three Key Exploitable Results:

1. **Solar Hydrogen production Process**, including Solar plant & materials performance
2. **Novel reactor design**
3. **Novel high temperature heat exchanger design**

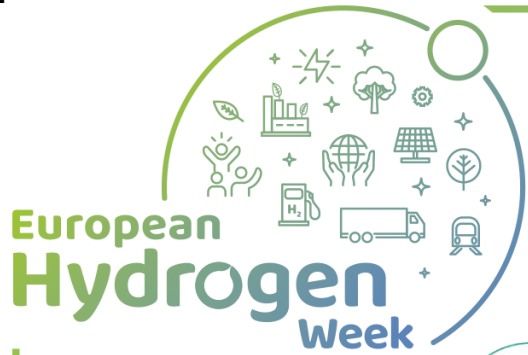
In order to ensure success of the proposed Exploitation Plan, the Consortium is in close collaboration with the [HORIZON results Booster Team](#)

Impact

Attract major stakeholders and external experts

Establish doctoral and master dissertation thesis

Promote interdisciplinary training by encouraging mobility and personnel exchange among the consortium partners



Dissemination Activities

1

Publications
in Scientific
Journals

Publication on a “Study on operational parameters” in the Journal of Solar Energy

IECON; Int. Conf. & Expo on Adv. Cer.&Comp.; Energy Storage World Forum; EU Control Conf.; Int. Conf. on Smart Energy Systems & Technology; Journées Nationales de l'Energie Solaire

15

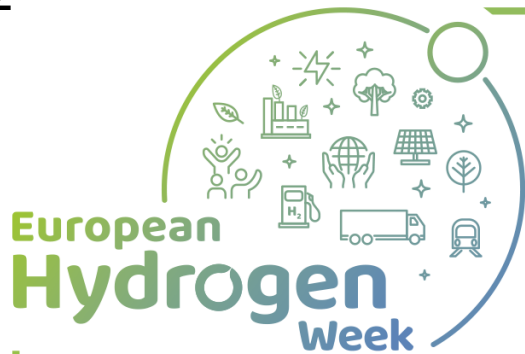
Participation
at Scientific
Events

FCH JU Progr. Review Days; Global Energy & Renewable Energy Summit; Hydrogen+Fuel Cells; US Hydrogen & Fuel Cells Energy Summit; SolarPACES; World Hydrogen Energy Conf.;

10

Dissemination
via networks

Website; Press releases; creation of project LinkedIn, twitter & Researchgate accounts



Communications Activities

HYDROSOL-beyond website

- <http://www.hydrosol-beyond.certh.gr/>



LinkedIn Account

- HYDROSOL-beyond Profile



Twitter Account

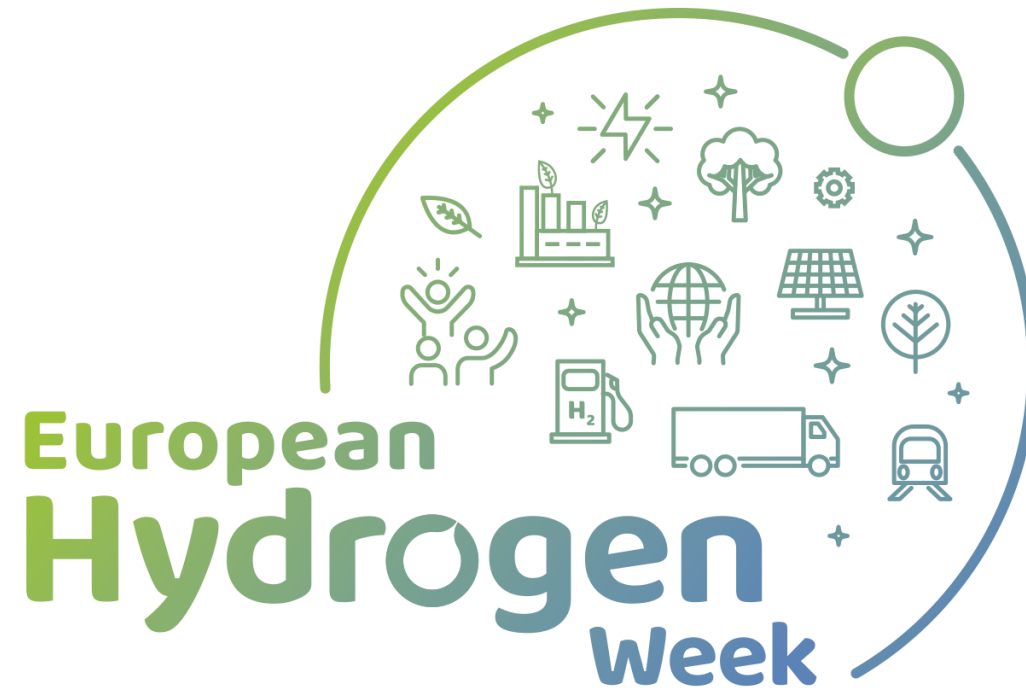
- HYDROSOL-beyond Profile



Channel on YouTube

- Videos related to HYDROSOL-Technology





European
Hydrogen
Week

#PRD2020
#CleanHydrogen

