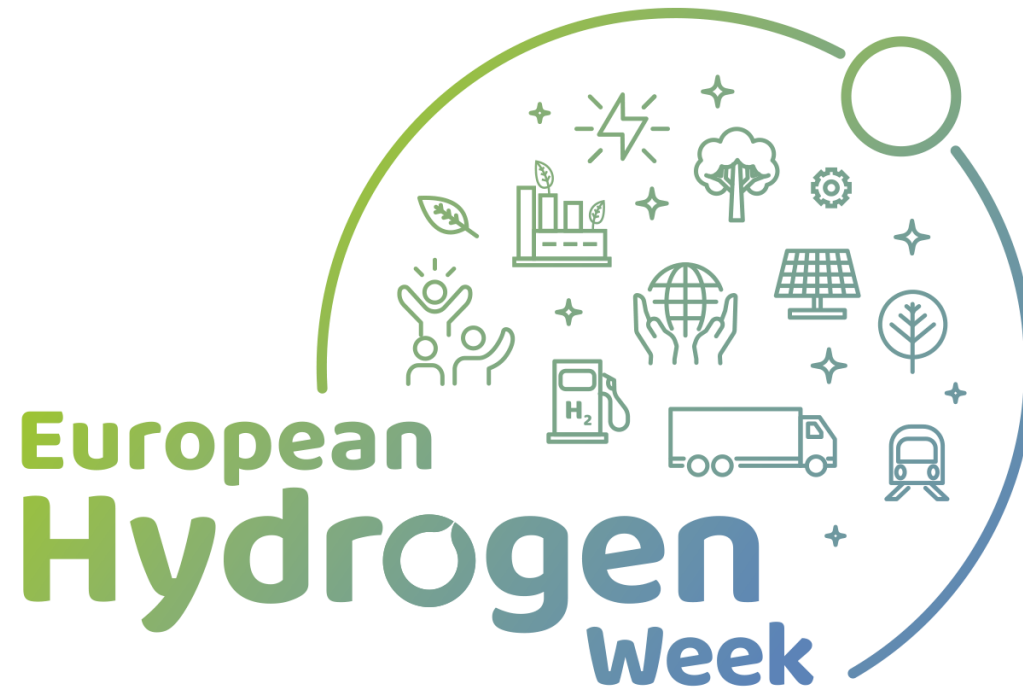


COSMHYC / COSMHYC XL

*Combined hybrid
solution of multiple
hydrogen compressors*

COSMHYC 
INNOVATIVE H2 COMPRESSION

COSMHYC XL
INNOVATIVE H2 COMPRESSION

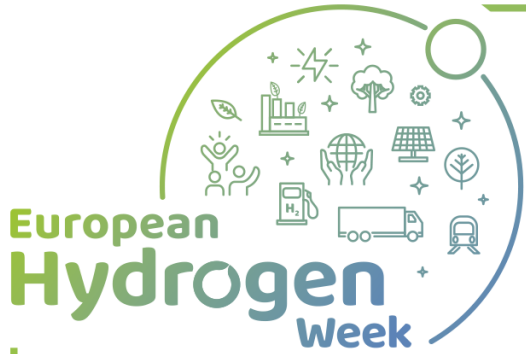


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colomar@eifer.org

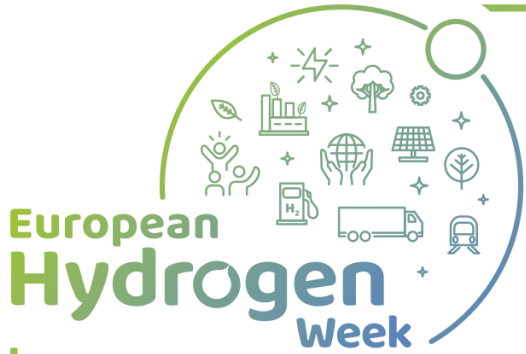
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#CleanHydrogen





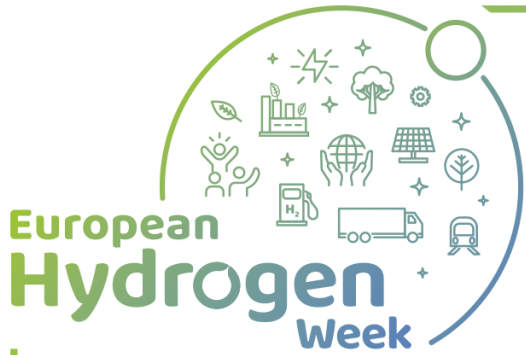
Project Overview : COSMHYC

- Call year: 2016
- Call topic: FCH-01-8-2016 - Development of innovative hydrogen compressor technology for small scale decentralized applications for hydrogen refuelling or storage
- Project dates: 01/01/2017-28/02/2021
- % stage of implementation 01/11/2021: 100%
- Total project budget: 2 496 830 €
- FCH JU max. contribution: 2 496 830 €
- Partners: EIFER, MAHYTEC, NEL HYDROGEN, LBST, STEINBEIS 2I



Project Overview : COSMHYC XL

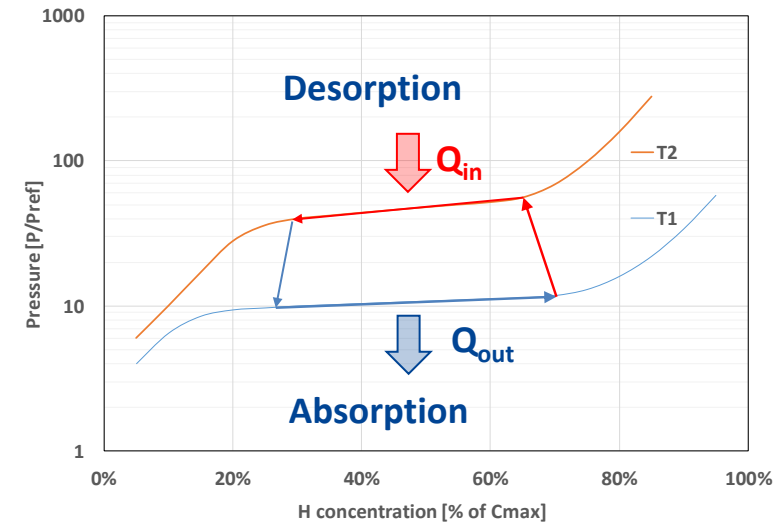
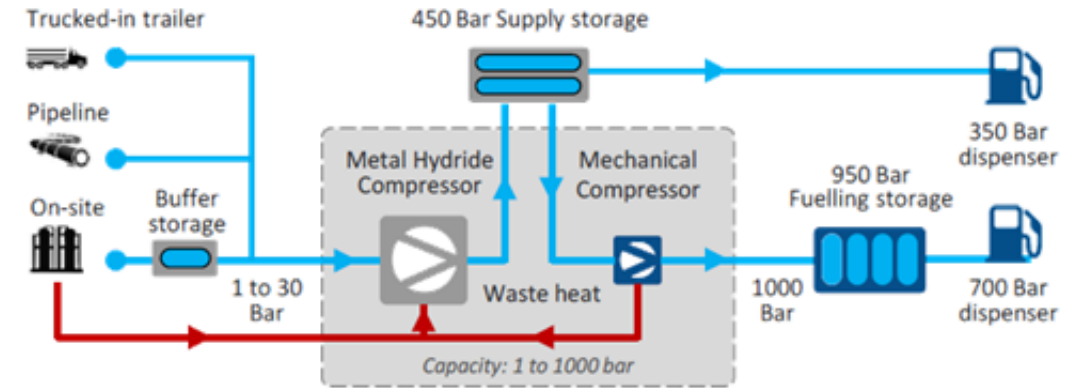
- Call year: 2018
- Call topic: FCH-01-7-2018 - Improvement of innovative compression concepts for large scale transport applications
- Project dates: 01/01/2019 - 31/12/2022
- % stage of implementation 01/11/2019: 70%
- Total project budget: 2 749 613,75 €
- FCH JU max. contribution: 2 749 613,75 €
- Partners: EIFER, MAHYTEC, NEL HYDROGEN, LBST, STEINBEIS 2I



Project Summary: COSMHYC

Objectives: combining a conventional compressor with an innovative compression technology, to reduce the overall compression costs & noise pollution. In particular:

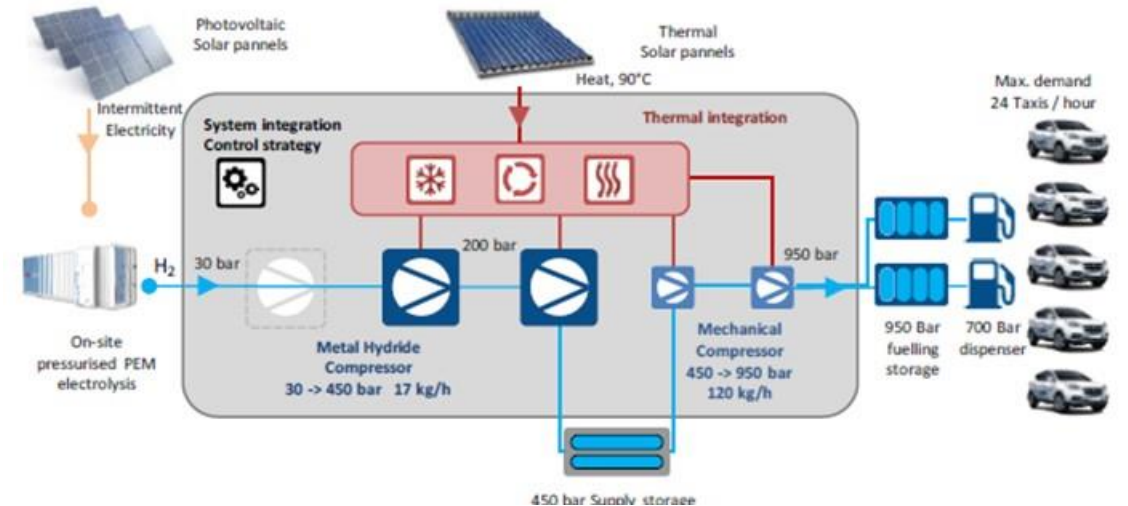
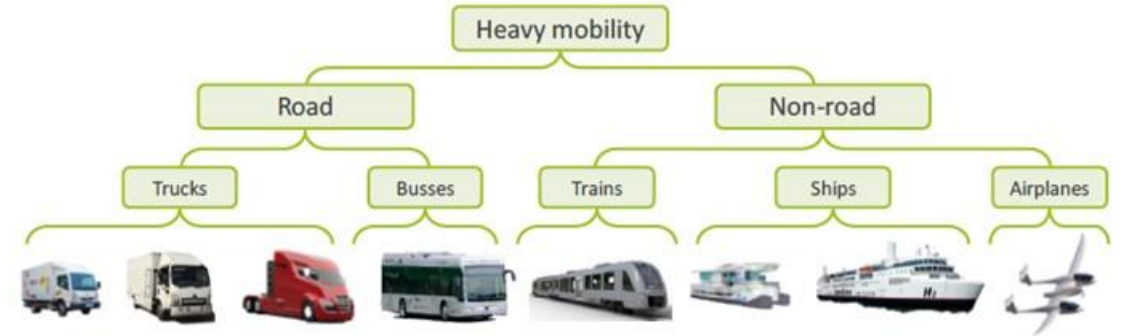
- No critical raw materials
- Reducing investments costs down to **<2000 €/ (kg*day)** (SOA ~3000 €/ (kg*day) for innovative compression technologies)
- Reducing energy consumption to **<6 kWh/kg** (SOA: 3-12,5 kWh/kg for innovative compression technologies depending on pressure)
- Reducing maintenance costs by **<50%** compared (SOA: >5% of CAPEX)
- Improving life time by decreasing the degradation down to **1% per year** (SOA: 20% in 1000h)

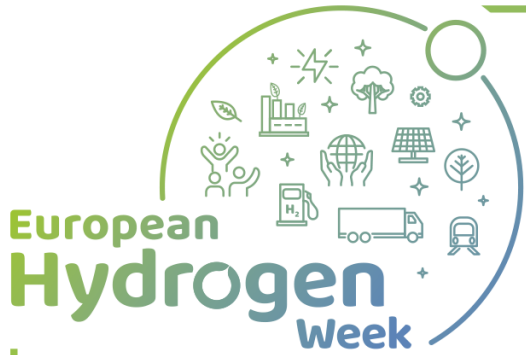


Project Summary: COSMHYC XL

Objectives: developing an innovative compression solution for extra large hydrogen refuelling stations, based on the combination of a metal hydride compressor and a diaphragm compressor. In particular:

- No critical raw materials (in particular no rare earth nor platinum)
- Overall compression ratio of 500 with metal hydrides, 950 bar with mechanical compressor
- Further reduce energy consumption by 30%
- Demonstrate feasibility of 2t/day
- Demonstrate 6 months of real operation, potential for <1% degradation/1000h
- Demonstrate modularity for different use cases





Project Progress/Actions - Aspects (up to 3)

COSMHYC : Pressure level



Achievement to-date

200 BAR



429 BAR

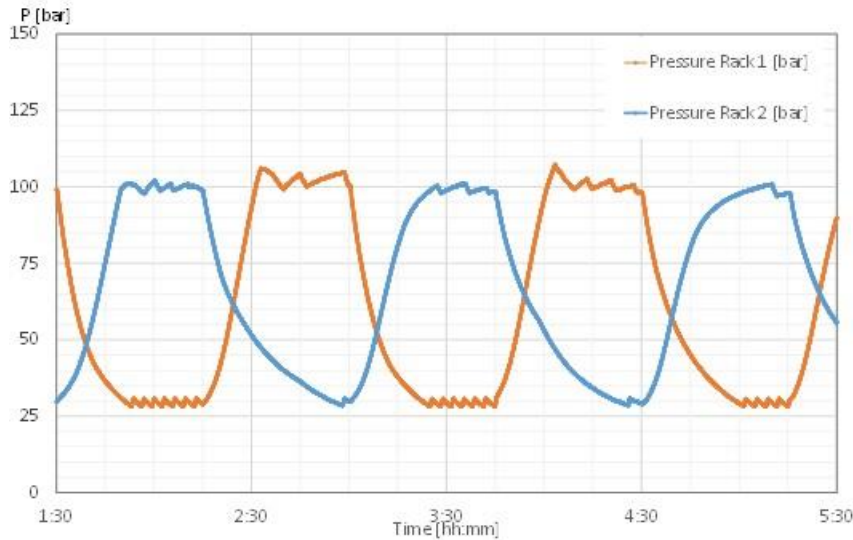
450 BAR

25%

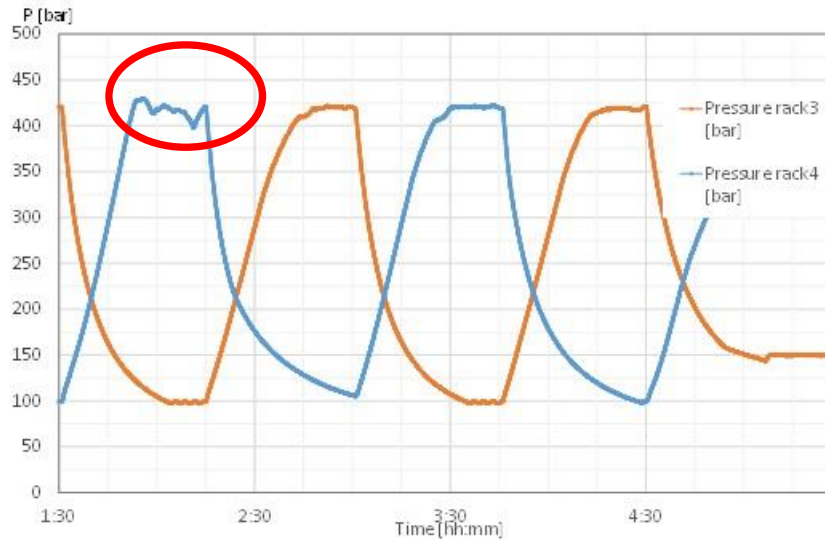
50%

75%

STAGE 1



STAGE 2



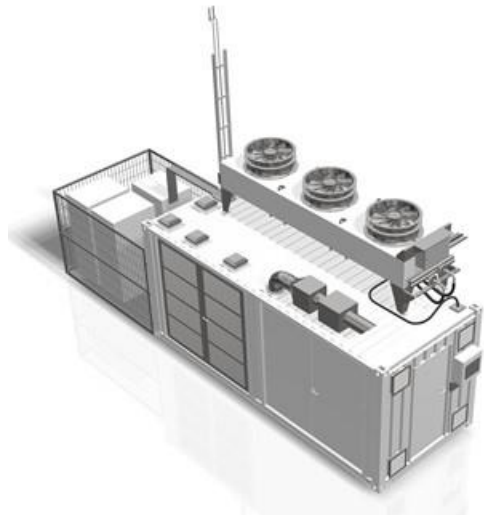
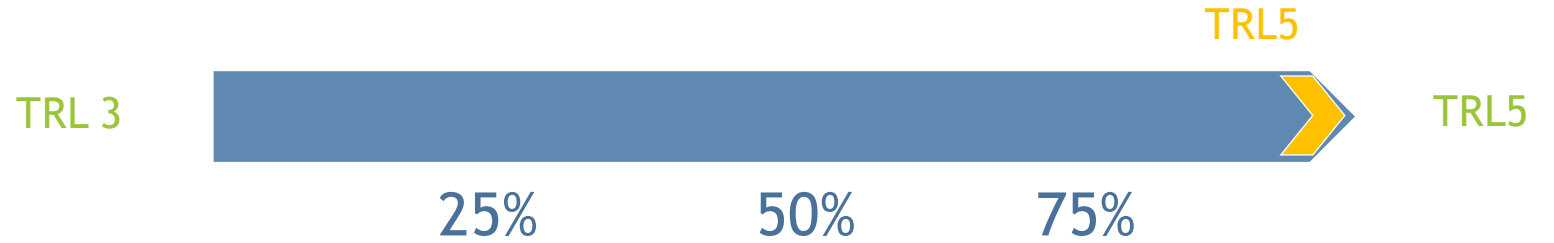
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Project Progress/Actions - Aspects (up to 3)

COSMHYC : Prototype

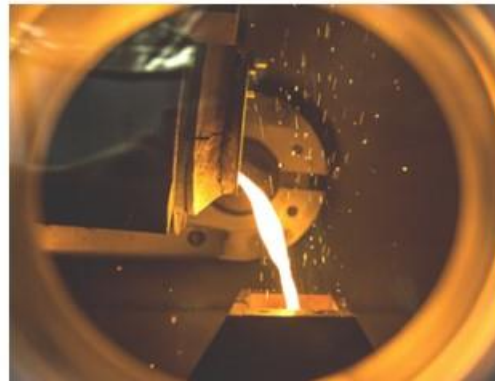
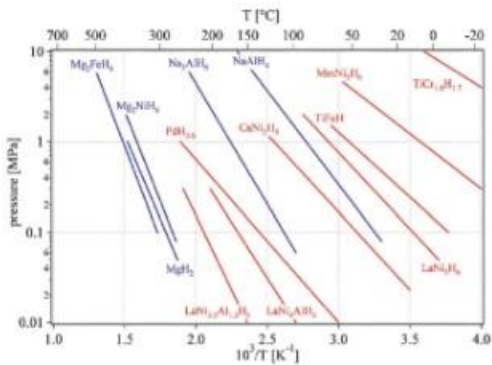
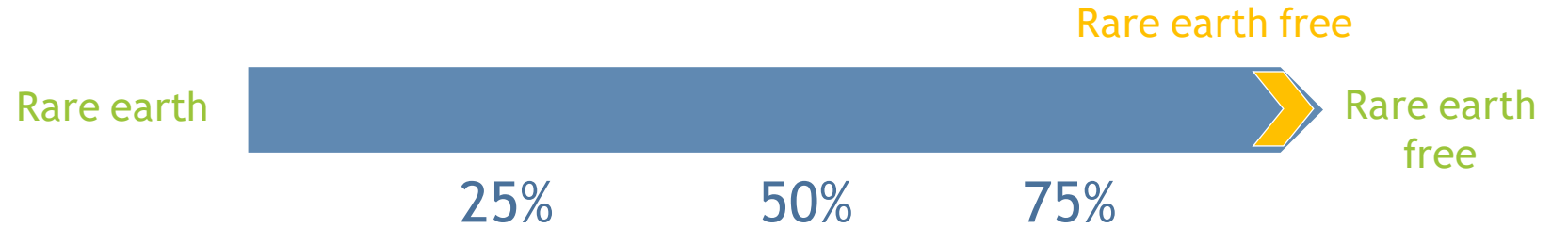
➤ Achievement to-date

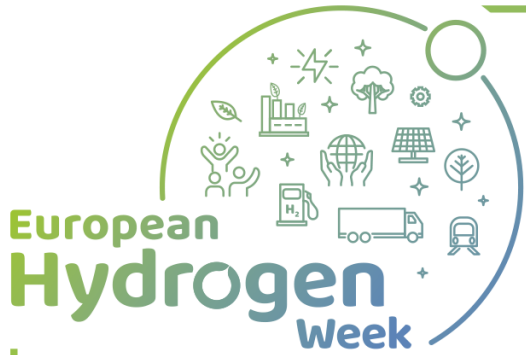


Project Progress/Actions - Aspects (up to 3)

COSMHYC & COSMHYC XL: Metal hydrides

➤ **Achievement to-date**





Communications Activities

Several communication activities performed all along the projects

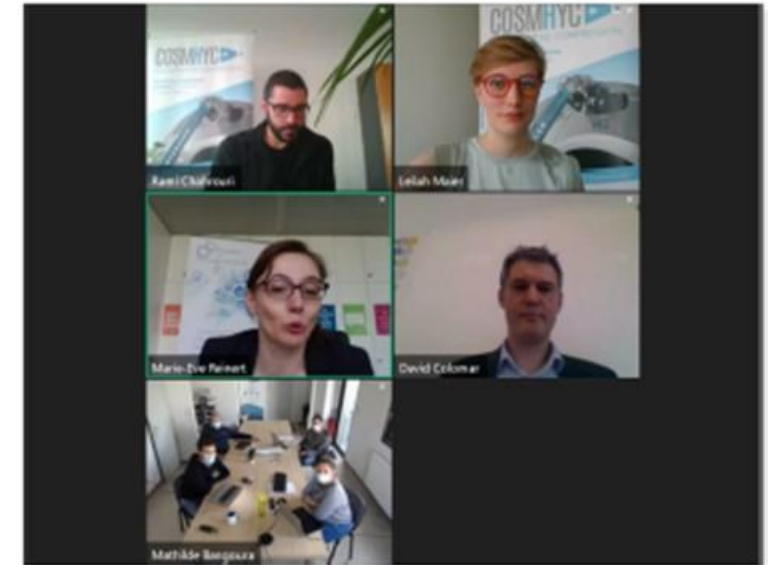
WEBPAGE



VIDEO

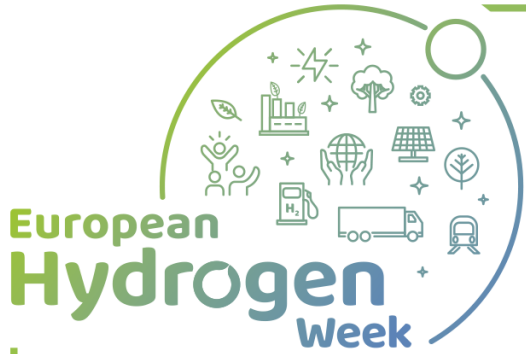


FINAL EVENT...



#PRD2021
#CleanHydrogen





Risks, Challenges and Lessons Learned

Main findings: technology works ! But a large potential for further improvements remain (purity management, optimization of thermal integration, costs reductions...)

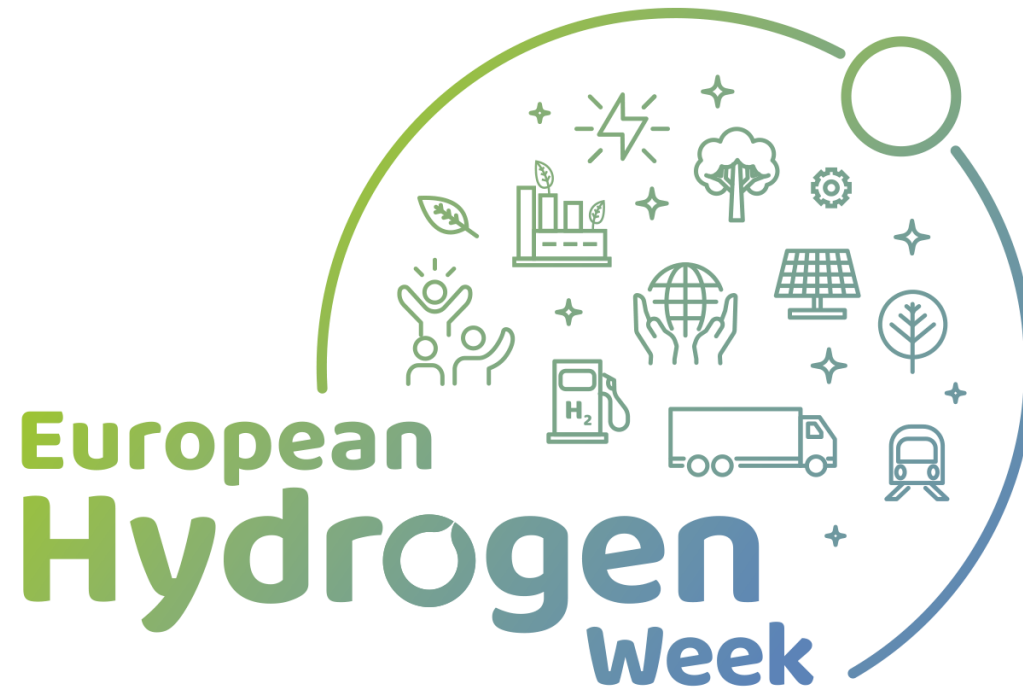
Unexpected challenge: difficulties to find reliable “basic” H2 components : Urgent need to strengthen the EU supply chain on H2 components !

Next steps: starting construction of COSMHYC XL prototype, initiating demonstration (COSMHYC DEMO)

Thank you for your attention !

COSMHYC 
INNOVATIVE H2 COMPRESSION

COSMHYC^{XL}
INNOVATIVE H2 COMPRESSION



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