COSMHYC

COMBINED HYBRID SOLUTION OF MULTIPLE HYDROGEN COMPRESSORS FOR DECENTRALISED ENERGY STORAGE AND REFUELLING STATIONS

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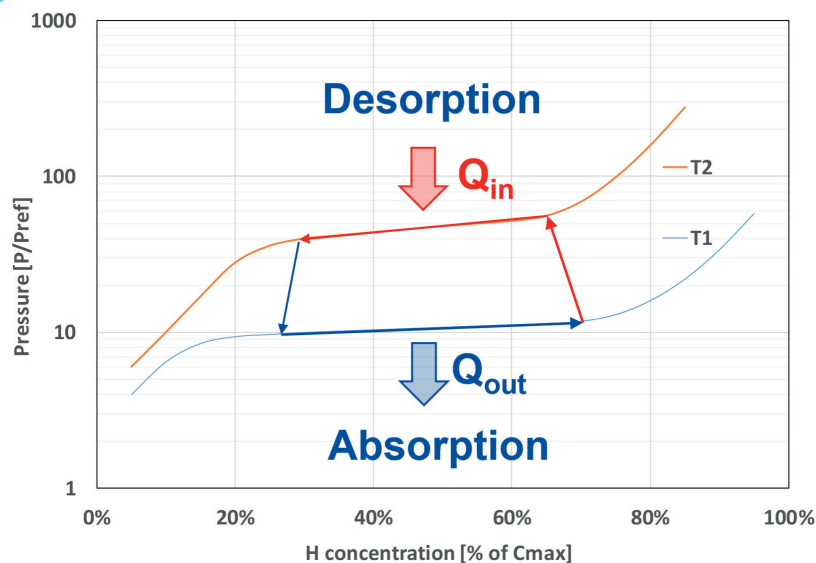INNOVATIVE H2 COMPRESSION

Project ID:	**736122**
Call topic:	**FCH-01-8-2016 -** Development of innovative hydrogen compressor technology for small scale decentralized applications for hydrogen refuelling or storage
Project total costs:	**€ 2,496,830**
FCH JU max. Contribution:	**€ 2,496,830**
Project start - end:	01/01/2017 - 30/09/2020
Coordinator:	**EIFER EUROPAISCHES INSTITUT FUR ENERGIEFORSCHUNG EDF KIT EWIV, DE**
Website:	**www.cosmhyc.eu**

BENEFICIARIES: STEINBEIS INNOVATION GGMBH, LUDWIG-BOELKOW-SYSTEMTECHNIK GMBH, NEL HYDROGEN AS, MAHYTEC SARL, STEINBEIS 2I GMBH

PROJECT AND OBJECTIVES

COSMHYC develops a hybrid compression solution for hydrogen refuelling stations by combining an innovative metal hydride compressor with a mechanical compressor, for a compression from 1 to 1000bar. The objectives are to decrease investment and operational costs, to reduce noise level, to increase the availability of stations, and thus to increase the efficiency of hydrogen delivery. MAHYTEC, EIFER and NEL are currently focussing on the integration of both technologies, which are tested in a comprehensive way. Techno-economic assessment is performed to ensure competitiveness.

NON QUANTITATIVE OBJECTIVES

- Modularly scalable
- Increase reliability, currently no moving part in the innovative compressor
- Perform a cost of ownership assessment

PROGRESS & MAIN ACHIEVEMENTS

- Definition of technical requirements for the compression solution for selected applications (refuelling of FC cars, busses and trains, H2 trailers)
- Production of 3 hydrides without rare earth with appropriate features for the innovative compressor which concept has been finalized
- Design of a new concept of mechanical compression due to improved materials for the diaphragm, performing heating/cooling and noise reduction.

FUTURE STEPS & PLANS

- Long-time testing of COSMHYC compression solution as a virtual compressor following joint test programs and protocols of both compressors & analysis
- Collection of operative and performance data and technical economic evaluation comparing processor concepts for selected applications
- Final economic feasibility and costumer value proposition analysis
- Definition of a roadmap toward exploitation of the different compression solutions developed in COSMHYC for preparing market deployment.

QUANTITATIVE TARGETS AND STATUS

TARGET SOURCE	PARAMETER	UNIT	TARGET	ACHIEVED TO DATE BY THE PROJECT	TARGET ACHIEVED?	SOA RESULT ACHIEVED TO DATE (BY OTHERS)	YEAR FOR SOA TARGET
Project's own objective	Energy consumption	kWh/kg	6	6	✔	N/A	N/A
	Degradation	%/month	1	0.5	✔	N/A	N/A
	Specific costs	k€/kg*day	N/A	3.7	🔧 (SoA exceeded)	5-12	2015
	Electricity consumption	kWh/kg	N/A	<1.5	🔧 (SoA exceeded)	3	2017
	Noise	DB	N/A	<60	🔧 (SoA exceeded)	85	2017