

COSMHYC: THE IMPACT

Technology developments within this project will make an important contribution to the recently started large-scale roll-out of hydrogen passenger vehicles, buses and trains.

More precisely, it will significantly contribute to the achievement of the Fuel Cell and Hydrogen 2 Joint Undertaking (part of the European Research and Innovation programme Horizon 2020) objectives **by increasing the energy efficiency of the compression process by at least 20%**.

Thanks to the triple effect of energy efficiency, reduction of capital costs and maintenance optimization, COSMHYC will lead to an **overall reduction of about 20% of the hydrogen costs at the refuelling station**.

The COSMHYC innovative compression concept will meet high flow requirements, while **reducing the noise level below 60 dB at 5 m**. Besides, the COSMHYC compression solution will use neither platinum nor rare earth elements.

Finally, it will also be possible to use the COSMHYC compressor for decentralized energy storage, enabling the **competitive storage of electricity from renewable sources**.

COSMHYC: THE PARTNERS



EIFER European Institute
for Energy Research
www.eifer.kit.edu



MAHYTEC SARL
www.mahytec.com



Nel Hydrogen
www.nelhydrogen.com



Steinbeis 2i GmbH
www.steinbeis-europa.de



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For further information and to follow our project progress please visit www.cosmhyc.eu

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COSMHYC

INNOVATIVE H2 COMPRESSION



Innovative compression solutions for efficient hydrogen mobility



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COSMHYC: THE VISION

Fuel cell based electric mobility is a key element to respond to climate change and to accelerate energy transition, if hydrogen is coming from renewable sources. Today, **Fuel Cell Electric Vehicles (FCEVs)** can achieve the same quality of service as conventional cars at very low emission levels.

Approximately 4 000 FCEVs are currently on the roads all over the world and manufacturers announce the mass production of affordable FCEVs by 2020. A well-developed **hydrogen infrastructure and efficient technologies for hydrogen refuelling stations** are key to FCEVs market deployment.

Ease of use, speed and efficiency of the refuelling process are essential for the successful adoption of hydrogen in transport. FCEVs use hydrogen stored in a pressurized tank and are fuelled with gaseous hydrogen at pressures of 350 bar or 700 bar.

Thus, hydrogen compression is a key component of the refuelling process – and continuous cost reductions and efficiency improvements are crucial for the technology's success.

COSMHYC: THE OBJECTIVE

COSMHYC develops and tests a hybrid compression solution for hydrogen refuelling stations.

An innovative compressor is associated with a booster by optimizing both technologies for a compression from 1 to 1000 bar.

The objectives are to lower investment and operational costs, to address the noise level related to the booster, to increase the availability of stations and, more globally, to increase the efficiency of hydrogen conditioning and delivery. The research and development work carried out in COSMHYC is funded by the Fuel Cells and Hydrogen 2 Joint Undertaking over the course of three years (2017–2019).

COSMHYC: THE ACTIVITIES

- ▶ **Adaptation of the booster and development of an alternative compression technology.**
- ▶ **Integration of both technologies and test of the prototype under real conditions in the facilities of Nel Hydrogen in Denmark.**
- ▶ **Continuous techno-economic assessments to ensure that the integrated compression solution will contribute to make hydrogen a competitive fuel.**

