

Building a safe hydrogen economy



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Greater market uptake of hydrogen technology depends on public confidence in its safety. The Clean Hydrogen Partnership is funding projects on the safe development and use of this energy source in a wide range of settings, and supporting the work of the European Hydrogen Safety Panel (EHSP).

Ensuring that safety keeps up with innovation

Rapid development and implementation of hydrogen technology means more and more consumers are using it for the first time, in their homes, businesses and in transportation. A lack of experience and of harmonised laws, standards and regulations might jeopardise wider hydrogen uptake.

Several Clean Hydrogen Partnership funded projects are developing the know-how, systems, and training programmes to reduce these risks. For example, the HyTunnel-CS project consortium is researching the safety of hydrogen-powered vehicles in enclosed spaces like tunnels and parking garages. The HyTunnel-CS project has produced an innovative design for a hydrogen fuel tank that remains safe in a fire.

MultHyFuel project, due to end in December 2023, is studying harmonised permitting requirements and risk assessment methodologies for hydrogen refuelling stations in multi-fuel contexts. Other applications being examined include use of liquid, or cryogenic hydrogen (PRESLHY project), and hydrogen-powered passenger ships (e-SHYIPS project). HyResponder project is training firefighters to respond to

hydrogen-related accidents. The EHSP is helping the Clean hydrogen Partnership in promoting a high-level hydrogen safety culture and ensuring that developments in technology are accompanied by safety innovations.

Teaching the skills

As fuel cell and hydrogen technology gains market share, more skilled workers are needed to design, build, operate and maintain it. Since 2021, the Clean Hydrogen Partnership has been supporting nine projects studying hydrogen safety through research, experiments and the design of solutions. Project results are made public via conferences, publications, online events and platforms.

The TeachHy project has developed an MSc course in fuel cell and hydrogen technologies. Eighty percent of the content is delivered online and the rest via in-person lectures by a network of participating universities. Hydrogen safety is one of the seven compulsory core modules. In future, the Clean Hydrogen Partnership will continue its work on hydrogen safety through projects and through the activities of the EHSP.

RAISING THE BAR ON SAFETY

Fuel cell and hydrogen technology needs to attain at least the same level of safety currently in place for fossil fuels, while avoiding overly restrictive measures.



A CULTURE OF SAFETY

A culture of safety, training and regular maintenance is being developed along the chain of production and use. **The goal?** To make hydrogen a leading clean energy carrier that contributes to decarbonisation of European economy. **Key results?** In September 2021, the EHSP published a Safety Planning and Management document, to help EU hydrogen projects incorporate safety lessons learnt. In addition, the EHSP published an analysis of events recorded in the updated European Hydrogen Incidents and Accidents Database (HIAD 2.0). The analysis includes lessons learned and recommendations for different hydrogen sectors and applications.



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MORE

Clean Hydrogen Partnership
PRESLHY project
HyTunnel project
HyResponder project
MultHyFuel project
TeachHy project
The e-SHyIPS project

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KEY ACHIEVEMENTS

19

recommendations formulated by PRESLHY on regulations, codes and standards to anticipate and mitigate accidents

14

European countries covered by a review of hydrogen refuelling station permitting procedures undertaken by MultHyFuel

11

national training workshops organised by HyResponder

12

partner universities form the core of TeachHy

70

associate partners – universities, vocational training bodies, industry – involved in TeachHy

IMPACTS

BEST PAPER AWARD

presented at the 9th International Conference on Hydrogen Safety (ICHS2021), for the EHSP's analysis and summary of lessons learned from events listed in the hydrogen incidents database (HIAD 2.0).

HIGH LEVEL OF SAFETY

achieved for liquid hydrogen production, storage, transportation and end uses, thanks to current codes, standards, regulations, and guidelines

GUIDELINES

for engineers on the safe design and operation of liquid hydrogen infrastructure published by PRESLHY in 2021

ACTIVE PARTICIPATION

by PRESLHY consortium members in regulations, codes and standards bodies, working groups and technical committees to ensure integration of project recommendations

GAPS

in the legal and administrative framework for hydrogen refuelling stations identified by MultHyFuel

REVISED

international curriculum on hydrogen safety training for responders developed by HyResponder