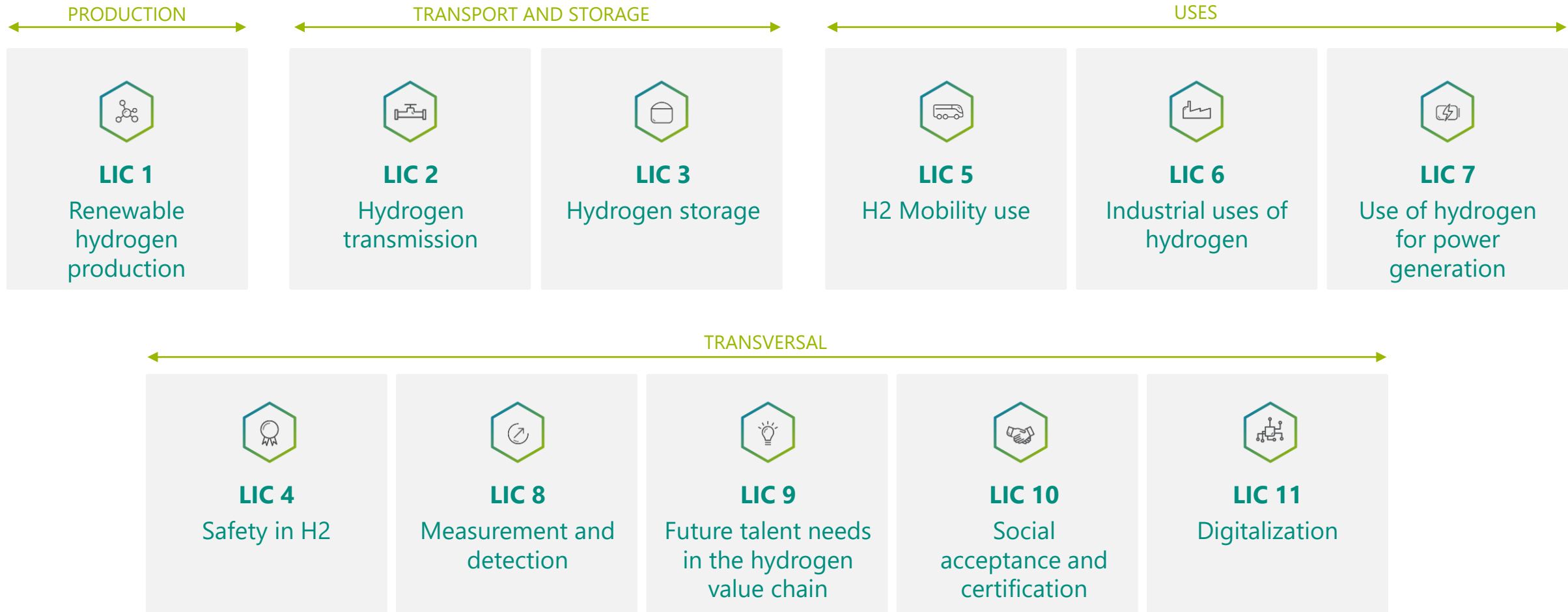


Key Lines of Interest for technological development (KLI)

Key Lines of Interest in Technological Development (KLI)

The Hydrogen Technology Observatory, in a collaborative process with the **Technology Intelligence Working Group**, has defined its Key Lines of Interest (KLIs) to monitor the most relevant technological advances in these fields:



Details of Key Lines of Interest for technological development (KLI)



KLI 1: Renewable hydrogen production

Focused on the evolution of renewable hydrogen production technologies by electrolysis including incipient technologies such as those involving seawater or wastewater. With special focus on efficiency, stack degradation, impact of partial load of the nominal power, LCOH¹ evolution, etc. In any case, it does not rule out other renewable hydrogen production technologies with less (e.g., biomass gasification).



KLI 2: Hydrogen transmission

Large-scale transport of hydrogen via pipelines, including repurposing natural gas infrastructure for hydrogen, and the associated facilities and key components (compressor stations, valves, etc.).



KLI 3: Hydrogen storage

It includes the study of large scale (e.g. underground) and small scale (e.g. metal hydride) storage systems. It also includes the use of hydrogen storage carriers (methanol, ammonia, LOHC², etc.) in the context of multi-molecule terminals, liquid H₂ storage, as well as hydrogen purification systems in transport and storage.



KLI 4: Safety in H₂

Safety aspects associated with the value chain of hydrogen and carriers.



KLI 5: H₂ Mobility use

It covers the various hydrogen-based mobility options, including road transport (light, medium and heavy-duty vehicles) and rail transport, as well as applications in aviation and maritime transport. It also covers all associated infrastructure (HRS³ and hydrogen tanks) and the use of hydrogen-derived fuels (e-fuels).



KLI 6: Industrial uses of hydrogen

Industrial applications in sectors such as steel, cement, metallurgy, chemicals, ceramics, fertilizers, paper and other industries that have a high demand of heat in their processes and are difficult to electrify. It also includes the production of e-fuels.

Details of Key Lines of Interest for technological development (KLI)



KLI 7: Use of hydrogen for power generation

This line is dedicated to the use of hydrogen in combined cycle gas turbines (CCGT⁴) for electricity production, as a backup to renewable production. It also incorporates technologies at lower technology readiness levels aimed at generating electricity from hydrogen.



KLI 8: Measurement and detection

It identifies the availability of equipment for monitoring and controlling infrastructure, including the components required to determine the quality and purity of hydrogen. It also covers the equipment needed to measure energy transmitted and consumed (meters, chromatographs, etc.) and to detect or mitigate potential leaks in the network (related to LIC 2).



KLI 9: Future talent needs in the hydrogen value chain

This line seeks to address training needs in the hydrogen value chain, highlighting the importance of developing educational and training programs that are aligned with the demands of the hydrogen market. It focuses on designing an effective training strategy that will maximise the economic and environmental opportunities that hydrogen offers in Europe.



KLI 10: Social acceptance and certification

This line aims to address the challenges of the perception and social acceptance of the different hydrogen technologies in all the value chain (production, transportation, storage, use, etc.), in order to develop the knowledge and guidelines necessary to achieve widespread support for the implementation of hydrogen. Likewise, it covers the identification of the methodologies required to certify hydrogen as renewable and sustainable.



KLI 11: Digitalización

Application of digital methodologies such as BIM and digital twin to the design, operation and maintenance of infrastructures associated with the hydrogen value chain. Integration of IoT sensors, edge computing and artificial intelligence algorithms for operational optimization, predictive maintenance and efficient asset management. Includes advanced automation, interoperability between heterogeneous systems and cybersecurity criteria from design.

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