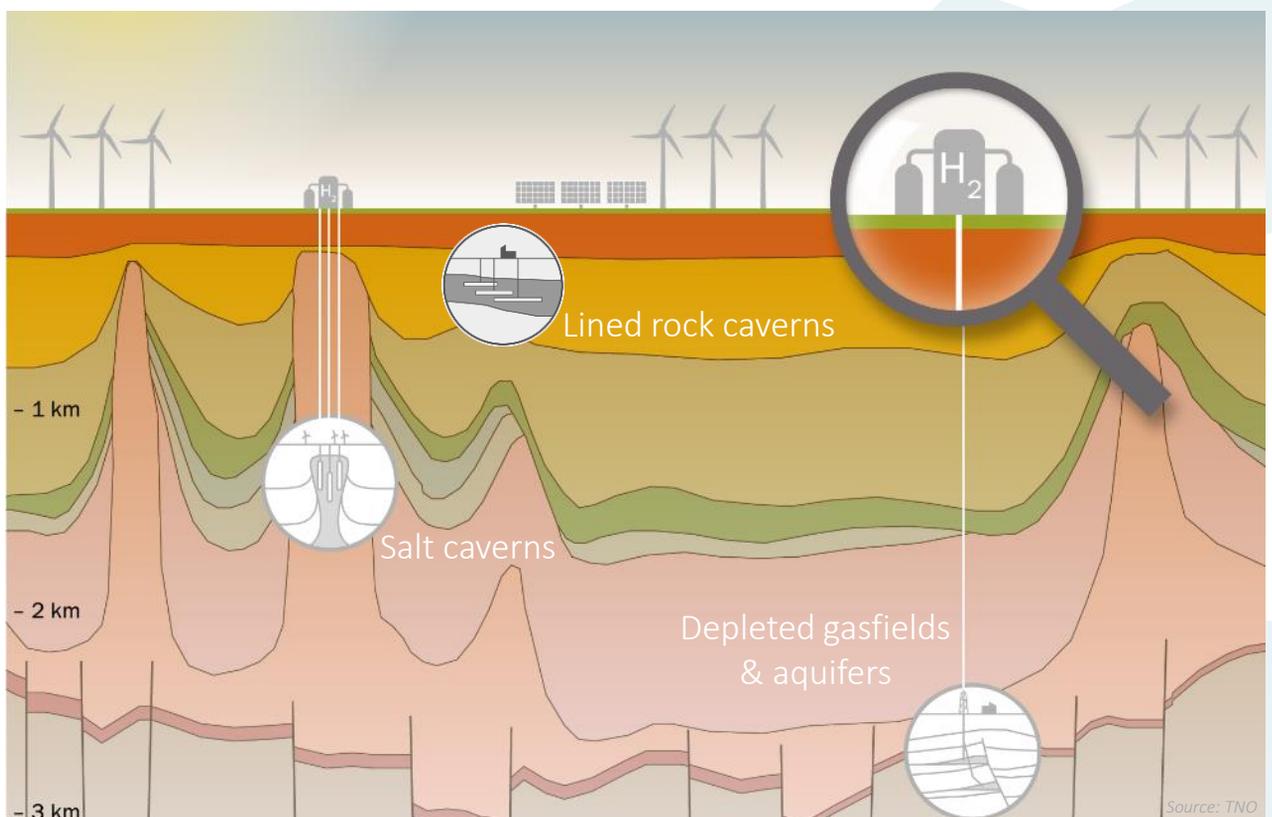


## Task: Underground Hydrogen Storage

Hydrogen is expected to become a pivotal and cross-sectoral energy carrier in the future renewable energy system. While being generated from variable wind and solar energy and foreseeing a wide range of applications in electricity, heating, transport and industry sectors, hydrogen can provide flexibility and balancing capacities at hourly, daily and inter-seasonal timescales. Like for natural gas in the present-day energy system, large-scale underground storage of hydrogen will be vital to maintain secure and affordable supply as the world becomes increasingly dependent on renewable energy sources.

Subsurface reservoirs such as gas fields, aquifers and solution-mined salt caverns represent proven and mature options for large-scale storage of natural gas and its components carbon dioxide and nitrogen. In many places in the world these gases have been trapped in porous and sealed reservoirs over geological time intervals of millions of years. Despite the fact that hydrogen is the most abundant element of the universe, natural accumulations in the subsurface are rare. The storability of hydrogen in subsurface formation is being investigated and tested in both experimental set-ups and demonstration projects. While results reveal that this is a viable technology, many steps need to be taken before underground hydrogen storage is ready for upscaling and commercialization.

The hydrogen TCP aims to accelerate hydrogen implementation and widespread utilization to optimize environmental protection, improve energy security and promote economic development internationally.



Source: TNO

## Accelerate underground hydrogen storage implementation

### H<sub>2</sub> Conversion & Contamination



Impacts of reservoir and fluid processes on quality and recoverability of stored H<sub>2</sub>

### Surface Facilities & Wells



Concepts, designs and materials for safe and effective storage of H<sub>2</sub>

### Storage Integrity



Integrity and stability of subsurface reservoirs and seals under H<sub>2</sub> storage operations

### Economics & System Integration



Pathways and business models for commercialization and integration of H<sub>2</sub> storage in the future energy system

### Storage Performance



Estimation, ranking and optimization of H<sub>2</sub> injection, production and storage capacities in subsurface reservoirs

### Planning, Regulation & Safety



Tools, guidelines and best practices for safe and responsible subsurface H<sub>2</sub> storage development and operations

## Get involved

Currently more than 70 experts from over 35 organizations in 18 countries are involved in the task definition with a wide range of disciplines.



The Hydrogen Technology Collaboration Programme was established in 1977 under the International Energy Agency's auspices to pursue collaborative hydrogen research and development and information exchange among its member countries. For more information, scan the QR code!

<https://www.ieahydrogen.org/task/task-42-underground-hydrogen-storage/>

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