# Mexico: Ten Achiwa X

## Green Hydrogen Storage in Salt Caverns and Hub in Veracruz

## The challenge

The production and storage of green hydrogen continue to pose challenges for the widespread adoption of the technology. High costs compared to traditional alternatives, along with resource management, logistics, and commercialization hurdles, present key opportunities for market development.

Large-scale storage, in particular, remains a significant challenge, requiring specific conditions for pressure, temperature, and materials. These factors contribute to high costs and can limit cost-effective storage capacity. Additionally, transportation and conversion into hydrogen derivatives depend on the distance between production sites and end-use locations, further complicating efforts to achieve competitive costs and conditions.

As part of the International Hydrogen Ramp-Up Programme (H2Uppp), a collaboration was established with Linde, Cydsa, and Geostock to assess the feasibility of developing a green hydrogen hub in Veracruz. Given the region's potential for production, storage, and commercialization, this hub could become the first of its kind in Latin America.

## The solution

The study, titled Ten Achiwa X—meaning "Hydrogen" in the Nahuatl, language of the indigenous peoples—will conduct an in-depth analysis of multiple variables to comprehensively assess the feasibility of establishing such a hub. Should the project be realized, it could create a significant new opportunity for Mexico to advance the development of its hydrogen and derivatives market.

The study will be based on the assumption that hydrogen can be produced competitively from renewable energy sources and stored in existing salt caverns in the region. From there, the hydrogen can be used directly or converted into derivatives such as ammonia and methanol, facilitating both national and international commercialization.

A key focus will be analyzing hydrogen storage technology in salt caverns, recognized as the most cost-effective solution for large-scale storage. Additionally, Mexico has the potential to develop more hydrogen production projects with access to low-cost storage, supporting its use as an energy vector or in derivative applications.

Additionally, the key elements required for the hub's development will be analyzed, including local and international demand, existing and necessary infrastructure, potential users, hydrogen consumers and processors, as well as port facilities that could be leveraged and expanded through this project.

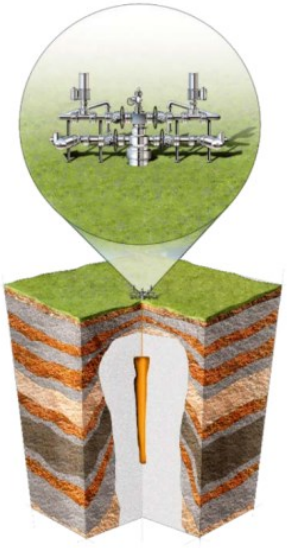

*Fig. 1*

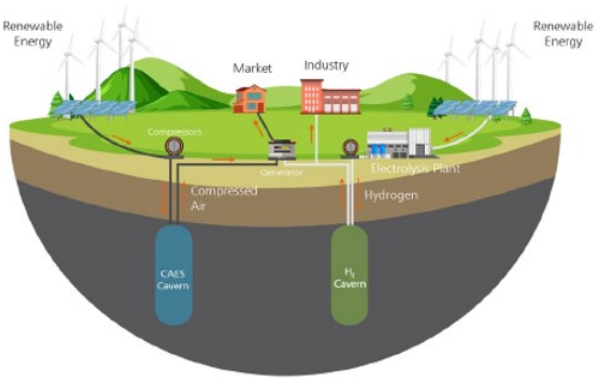


*Fig. 2*

*Schematic representation of green hydrogen storage in salt caverns*

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## How it will be done

The project will conduct a techno-economic feasibility assessment for producing and storing green hydrogen in salt caverns in Mexico, considering factors such as water supply and compliance with RED II DA renewable energy standards. It will also determine the infrastructure requirements necessary for establishing a green hydrogen hub. Additionally, the feasibility and strategic approach for developing the hub will be evaluated, including its potential impacts and opportunities for job creation. A key component of the project will involve stakeholder consultations with local industry and local government, ensuring effective communication and collaboration throughout the process.

## Expected impact

The feasibility study will assess whether the development of a green hydrogen hub could potentially support the decarbonization of the local petrochemical industry, enable cleaner shipping, and facilitate the export of hydrogen-based products. By evaluating the viability of introducing an innovative solution in a region strategically positioned for industrial gas exports—such as ammonia and other derivatives—the study aims to determine if the project could help expand the hydrogen market.

Furthermore, the study will examine the potential contributions to clean energy generation, green hydrogen production, and large-scale storage, and how these factors might reinforce Mexico's sustainable energy infrastructure.

Located in the southern region of Veracruz, the proposed hub's proximity to the industrial development corridor and existing petrochemical sector may present opportunities for a strong market for green hydrogen and its derivatives, both nationally and internationally. However, these outcomes are contingent upon the results of the feasibility study, which will provide a comprehensive evaluation of the project's potential.hydrogen and its derivatives both nationally and internationally.

| The project at a glance | |
|---|---|
| Duration | 2 years |
| Country | Mexico |
| Objectives | Evaluate and formulate a strategy to establish a green hydrogen hub in southern Veracruz, around salt caverns for storage, with the aim of boosting the decarbonisation of local industry and creating export opportunities for green hydrogen and its derivatives to Germany |
| Partners | Linde,Geostock, Cydsa and GIZ |
| Outputs | • Feasibility study of production and storage of green hydrogen in salt caverns<br>• Analysis of potential and opportunities to develop a green hydrogen hub |

*Fig. 3 Reference Project: Shalapa, Veracruz Mexico.*

The International Hydrogen Ramp-up Programme (H2Uppp) of the German Federal Ministry for Economic Affairs and Energy (BMWE) promotes projects and market development for green hydrogen in selected developing and emerging countries as part of the National Hydrogen Strategy.

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