Best practice site visit

Underground Sun Storage 2030 (Rubensdorf)

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Activiti 1.4: Best practise site visit: Underground Sun Storage 2030 (Rubensdorf)

Introduction

On December 11, 2024, we visited the hydrogen storage facility in Rubensdorf, part of the *Underground Sun Storage 2030* project (USS 2030). The purpose of this visit was to learn about the technologies and benefits of this innovative solution for seasonal renewable energy storage.

Visit Overview

10:00 – Meeting with Project Partners
We gathered at the site with project partners who provided a detailed introduction to the facility's operation, its technical parameters, and environmental benefits.

Description of the Hydrogen Storage Facility
The visited facility is one of the first of its kind, combining green hydrogen production via electrolysis with underground storage in former natural gas reservoirs. Hydrogen is produced using renewable energy, primarily from solar sources, and stored in underground porous rock formations. This facility allows for efficient seasonal energy storage—excess energy from the summer months is stored and utilized during the winter period.

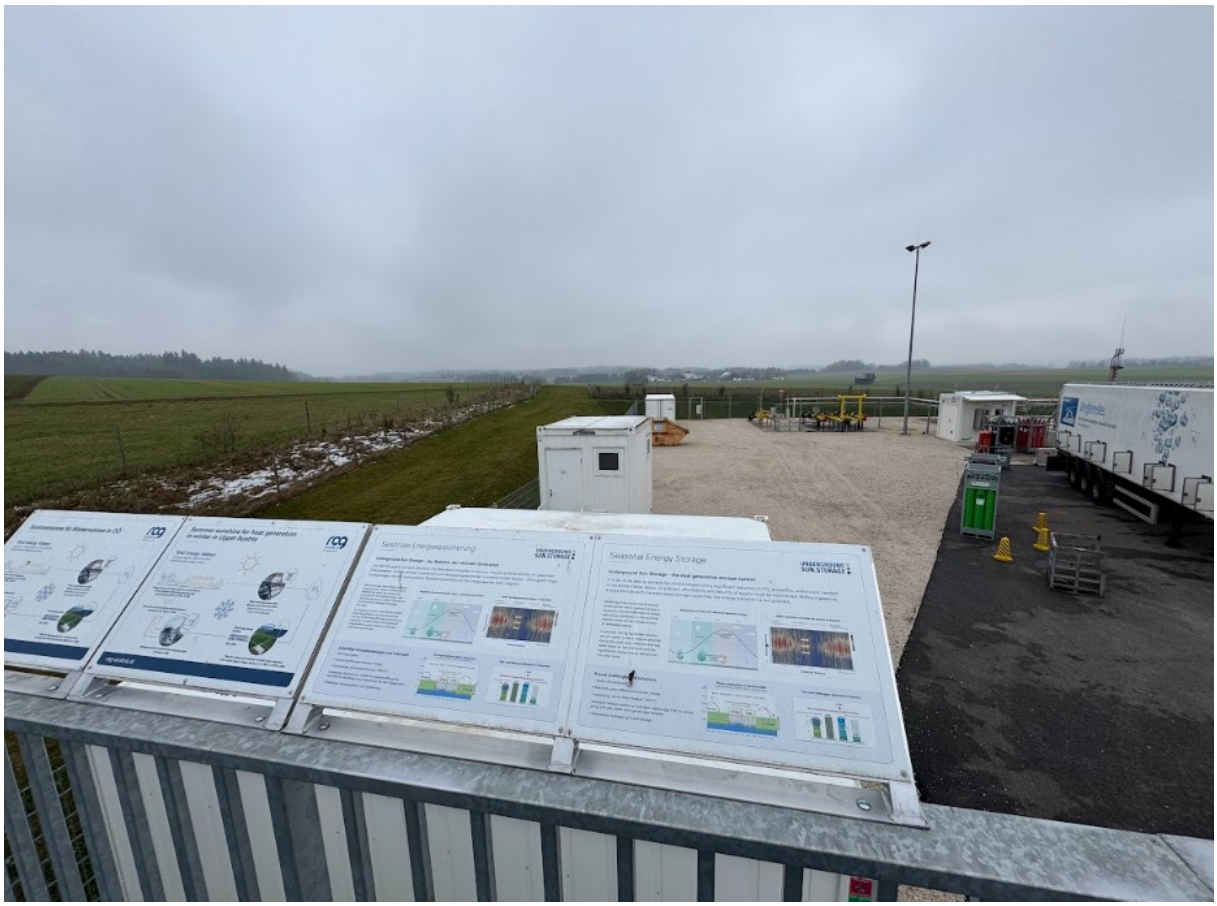
The project is also innovative because it tests the use of the original natural gas pipelines for hydrogen distribution. From Rubensdorf, a pipeline transports hydrogen to Gampeng, where it is blended with natural gas in the local gas grid. Currently, the hydrogen admixture is 10%. In the future, the aim is to use pure hydrogen to supply a steelworks located approximately 50 km away, significantly reducing the carbon footprint of local industry.

This strategy leverages existing gas infrastructure, presenting an economically efficient and environmentally friendly approach to integrating hydrogen into the energy system. The tour also highlighted how the facility connects to the regional energy infrastructure and detailed the safety measures in place for handling hydrogen.

Future challenges and solutions:

- **Construction of a Research Facility**:
  By 2025, a specialized research facility will be built in Gampern, Upper Austria, at a small former natural gas storage site. This facility will enable interdisciplinary technical and scientific studies under real-world conditions.

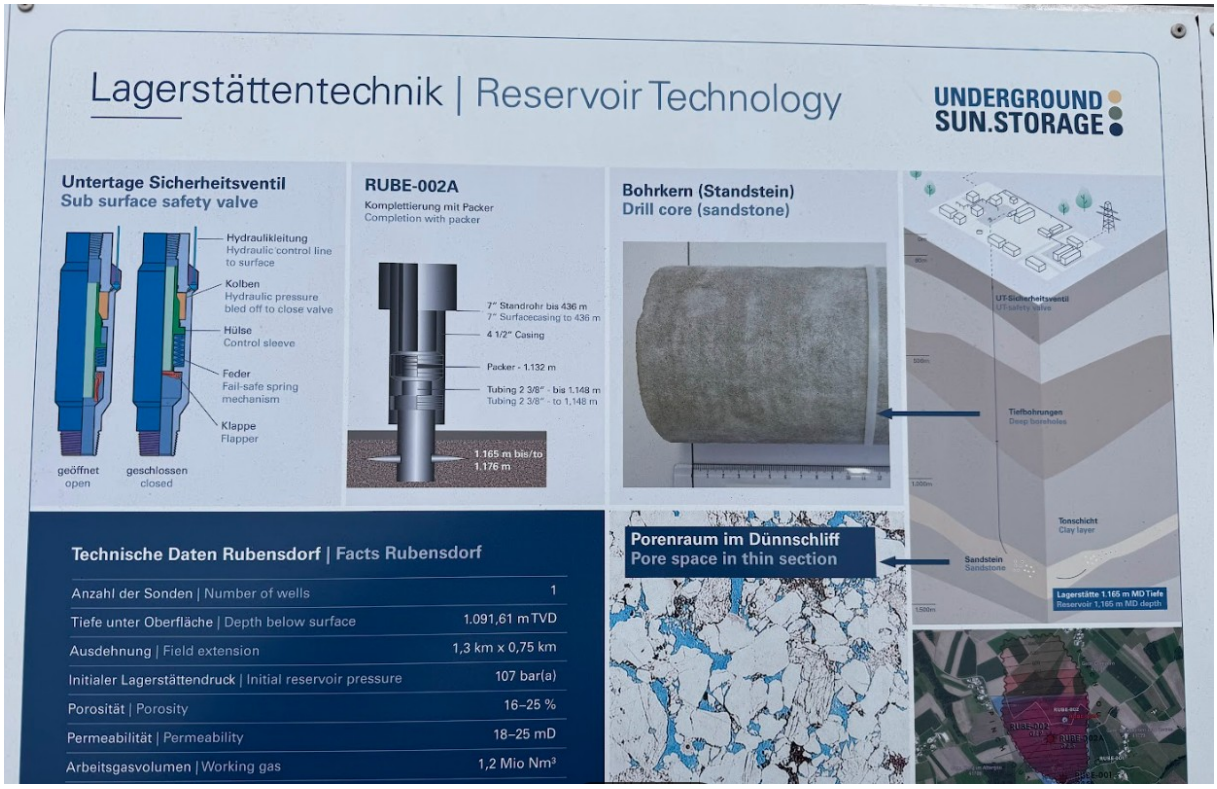
- **Development of Hydrogen Processing Technologies**:
  The project focuses on developing suitable technologies for hydrogen processing to ensure its efficient use across various sectors.
- **Modeling Future Energy Scenarios**:
  The aim is to create models of future energy scenarios that incorporate hydrogen into the energy system and assess its impact on decarbonization.
- **Techno-Economic Analyses**:
  The project will conduct techno-economic analyses to evaluate the economic viability and scalability potential of hydrogen storage technologies.



These activities are supported within the "Vorzeigeregion Energie" initiative of the Climate and Energy Fund, financed by the Ministry for Climate Protection (BMK). The project was successfully submitted under the "WIVA P&G" framework and is now in progress.

Climate Minister Leonore Gewessler highlighted the importance of innovative renewable energy storage solutions on the path to achieving climate neutrality by 2040. Theresia Vogel, Managing Director of the Climate and Energy Fund, emphasized the dynamic development of hydrogen research and the significance of partnerships with RAG Austria AG in advancing green hydrogen applications.

The project builds on previous initiatives, *Underground Sun Storage* and *Underground Sun Conversion*, which demonstrated the feasibility of safely storing hydrogen in underground natural gas reservoirs with a blend of up to 20%. Laboratory tests suggest this proportion could be increased to 100%. Under USS 2030, the potential for storing pure hydrogen, produced from renewable sources, in former natural gas reservoirs will be explored through a field experiment led by RAG Austria AG.

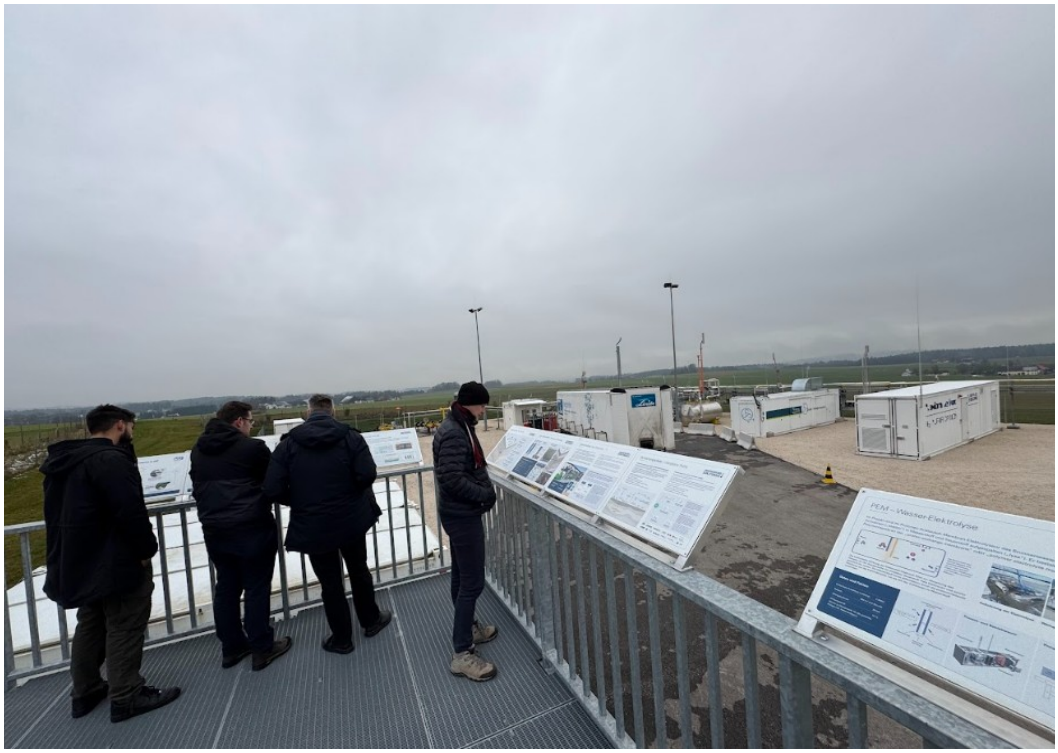


11:30 – Departure

The visit concluded with a summary of key points, and we departed the site at 11:30 AM.

Conclusion

The visit to the hydrogen storage facility in Rubensdorf provided valuable insights into renewable energy storage technologies, their environmental and economic benefits, and the potential of this technology in the future. The *Underground Sun Storage 2030* project not only showcases an innovative approach to energy transition but also demonstrates how existing infrastructure can be effectively repurposed for new sustainable applications. This project has significant potential to contribute to industrial decarbonization and increase the share of renewable energy in the energy mix.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