Special Issue

Developments in Underground Hydrogen Storage Technologies

Message from the Guest Editor

As global efforts toward decarbonisation intensify, hydrogen is increasingly recognised as a critical clean energy carrier. To unlock its full potential, robust, largescale, and long-duration storage solutions are essential to complement intermittent renewable sources like wind and solar. Underground Hydrogen Storage (UHS) presents a viable solution, utilising geological formations—such as salt caverns, depleted hydrocarbon reservoirs, and aquifers—for secure and scalable hydrogen storage. This proposal examines recent advancements in UHS, with a focus on the following:

- Site characterisation and geomechanical stability.
- Hydrogen-rock and caprock interactions.
- Sealing integrity and leakage mitigation.
- Monitoring technologies and regulatory frameworks.
- Insights from natural gas and CO2 storage analogues.
- Global case studies from operational and planned UHS projects.

Guest Editor

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Energies is an international, open access journal in energy engineering and research. The journal publishes original papers, review articles, technical notes, and letters. Authors are encouraged to submit manuscripts which bridge the gaps between research, development and implementation. The journal provides a forum for information on research, innovation, and demonstration in the areas of energy conversion and conservation, the optimal use of energy resources, optimization of energy processes, mitigation of environmental pollutants, and sustainable energy systems.

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