

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, large-scale, 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

Dr. Nilesh Kumar Jha

Centre for Sustainable Energy and Resources, School of Engineering, Edith Cowan University, Joondalup, Australia

Deadline for manuscript submissions

closed (20 February 2026)



Energies

an Open Access Journal
by MDPI

Impact Factor 3.2
CiteScore 8.3



mdpi.com/si/252514

Energies
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
energies@mdpi.com

[mdpi.com/journal/
energies](https://mdpi.com/journal/energies)





Energies

an Open Access Journal
by MDPI

Impact Factor 3.2
CiteScore 8.3



[mdpi.com/journal/
energies](https://mdpi.com/journal/energies)



About the Journal

Message from the Editor-in-Chief

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.

Editor-in-Chief

Prof. Dr. Enrico Sciubba
Department of Mechanical and Industrial Engineering, University
Niccolò Cusano, 00166 Roma, Italy

Author Benefits

Open Access:

free for readers, with article processing charges (APC) paid by authors or their institutions.

High Visibility:

indexed within Scopus, SCIE (Web of Science), Ei Compendex, RePEc, Inspec, CAPlus / SciFinder, and other databases.

Journal Rank:

CiteScore - Q1 (Control and Optimization)