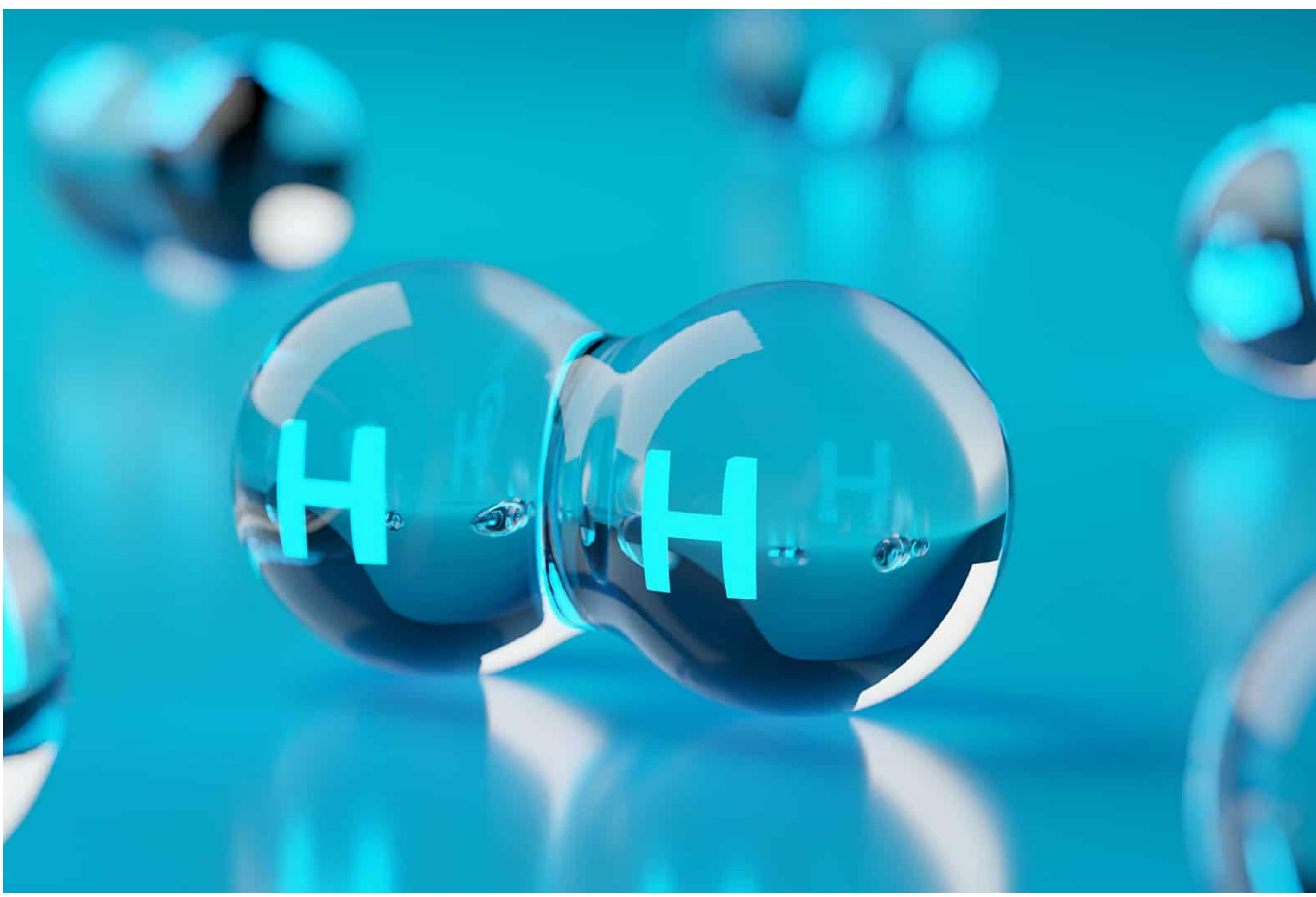
Hydrogen
Technical Section

Solutions.
People.
Energy.SM

Newsletter

Society of Petroleum Engineers

Hydrogen Technical Section



Issue 03

January 2026

Inside this Edition

SPE H2TS Chair´s Message

Welcome to the SPE Hydrogen Technical Section! Started in 2022, H2TS is one of the latest technical sections championed by Bob Pearson, serving SPE members in enhancing their interest in the growing adoption of hydrogen as a clean energy solution. Under the leadership of founding chair Prof. Chris Kalli and past PF Technical Director Hamad Marri, H2TS has built closer links between industry and academia and continues to grow under the new PF Technical Director Greg Stephenson, to help industry by sharing knowledge and creating networking opportunities for oil and gas and energy-transition professionals through various activities in 2026.

Dr. Phaneendra Kondapi
Chairperson

About the SPE Hydrogen Technical Section

Started in 2022, H2TS is one of the latest technical sections championed by Bob Pearson, serving SPE members in enhancing their interest in the growing adaptation of Hydrogen as a clean renewable energy.

The Hydrogen Technical Section (H2TS) brings together technical professionals and academia who are active, or have a deep interest, in the use of hydrogen as an energy carrier. The new technical section aims to share knowledge, experiences, leading practice, promote industry awareness, and enhance technical competencies.

Become a member of H2TS: **Edit Technical Disciplines**

Follows us at: **Home - Hydrogen**

SPE H2 Technical Section – LinkedIn

MENA H2TS Work Group - LinkedIn

SPE H2TS Mission

Our mission is to engage and collaborate partnerships between academia, industry, and SPE, and proactively engage students' interests through diverse educational activities, introduce continuing education programs, facilitate knowledge sharing and best practices, collaborate with other technical sections within SPE and improve H2TS visibility and influence.

SPE H2TS Vision

Our Vision 2030 focuses on expanding membership, deepening collaboration within SPE and with external partners, and sustaining a vibrant technical community around hydrogen. It emphasizes execution and empowerment, global outreach, facilitation of knowledge sharing, continuing growth, and professional impact.

SPE H2TS Vision 2030

SPE H2TS Global Representation

SPE H2TS : Meet our team

Leadership Team

Dr. Phaneendra Kondapi
Chairperson

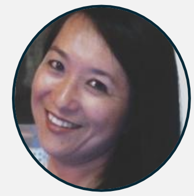
Yurii Moroz
Chairperson elect

Christopher J Kalli
Past Chairperson

Administrative Team

Dr. Aziz Rahman
Admin Chair

Dr. Ibrahim Muritala
Membersgip Chair



Willow Liu
Webmaster

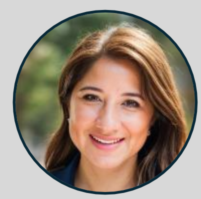
Engagement Team

Dr. Adrian Nengkoda
MENA

Suhail Diaz Valderrama
MENA

Agdy Ali
MENA Study Group Chair

Jeannie Chung
Western Hemisphere



Claudia Molina
Western hemisphere

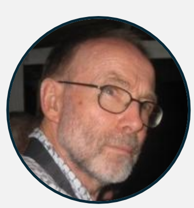
Sonia López Kovács
European Union

Mohammad Bahar
Eastern Hemisphere

Prince Innocent
YP Liaisons

Cindy Dianita
YP Liaisons

Liaisons



Bob Pearson
Champion / Advisor

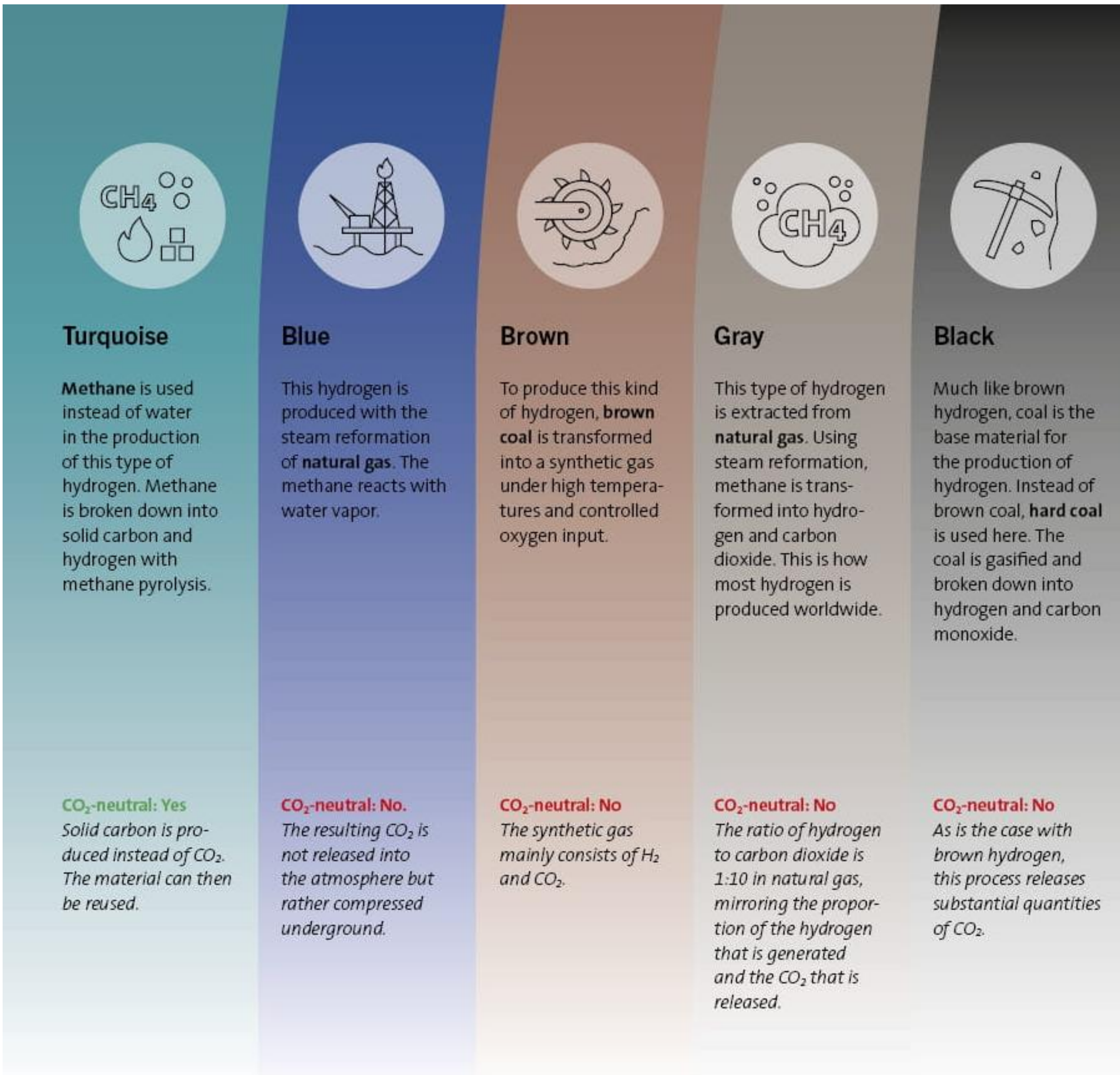
Greg Stephenson
SPE P&F Liaison

SPE H2TS Initiatives and Deliverables

- Capability development through on-line events, online networking, workshops, and conferences.
- Transfer of knowledge and best practices through meetings, events, communications, articles in SPE publications; technical papers and presentations; and SPE Connect.
- Close ties with other SPE Sections and regions that complement and enhance current energy transition initiatives within our industry.
- Closer links between the energy industry and academia.
- Promotion of professionalism, certification, and Distinguished Lecturer programming applicable and nomination of worthy candidates for SPE Awards in the domain.
- Engagement of young professionals seeking to make a career contribution to the development of a sustainable energy future.
- Collaborations with other professional organizations working on Hydrogen R&D, Commercialization, Transportation and Delivery to the end-users.

Hydrogen colors

Although hydrogen is a colorless gas, the energy industry uses a "hydrogen rainbow" of color codes to classify it based on its production method and carbon intensity.



Source: https://www.fst.com/news-stories/sustainability/hydrogen-colors/

Hydrogen colors

White

This is the natural hydrogen that exists in the environment. It is mostly found in layers of rock deep in the earth. It can be extracted with **hydraulic fracturing or thermal fracking**.

CO_2-neutral: No
Thermal fracking is only CO_2-neutral if renewable energy is exclusively used in the process.

Yellow

Here the electric current for the electrolysis comes from the **mix of power sources** available today.

CO_2-neutral: No
Since the global electric power mix was only about 30% renewable in 2023, it is not (yet) carbon-neutral.

Orange

Biomass is used for the production of this type of hydrogen. The process can take place in two ways. Either by heating the biomass and then filtering the hydrogen out of the resulting gases. Or with electrolysis, with the electricity coming solely from waste incineration facilities.

CO_2-neutral: No
CO_2 is one of the gases released as biomass is incinerated.

Purple

The hydrogen is extracted with electrolysis. Electricity from **nuclear power** is exclusively used in this case.

CO_2-neutral: No
While the production with nuclear power is CO_2-neutral, carbon dioxide is emitted over the lifecycle of nuclear electric power, in the mining of uranium or the processing of nuclear fuel, for example.

Green

The electricity for the electrolysis comes exclusively from **renewable energy sources** such as photovoltaics and wind energy.

CO_2-neutral: Yes
The hydrogen is only produced using a CO_2-neutral and environmentally friendly process.

Source: https://www.fst.com/news-stories/sustainability/hydrogen-colors/

SPE H2TS Past Events

SPE Energy Transition Symposium
8-10 September 2025, Houston, Texas,

Had a great discussion at the Society of Petroleum Engineers International Energy Transition Symposium on the state of Hydrogen with expert speakers:

- **Ram Seetharam** ROICE Program Executive Director of University of Houston
- **Pedram Fanailoo** Director for Low Carbon Segment (NA) DNV,
- **Ibrahim K. Muritala** Global Hydrogen Leader with of American Bureau of Shipping (ABS)
- **Cullen Hall** of GenH2

Moderated by:
Jeannie Chung and **Phaneendra B. Kondapi** as part of SPE H2TS

Speakers shared their experiences and perspectives on the breakthroughs in production, transportation, storage and technology that changed the landscape of Hydrogen in the recent past. It was really an interesting and meaningful conversation on the colors, pricing compared to green Hydrogen, scaling infrastructure, financial risks, policies and investments, offshore Hydrogen to liquid Hydrogen that's shaping the Hydrogen energy economy.

SPE H2TS Past Events

SPE ADIPEC
3-6 November 2025, Abu Dabhi, UAE

H2 MENA Working Group at ADIPEC

Suhail Díaz moderated one of the H2 and new energies sessions as part of the technical committee.

As well presented the paper SPE-229133-MS: ***Technical Pathways for Middle East Data Center Decarbonisation – Leveraging Global Best Practices and GCC Case Studies.***

Karthik Perumal presented the paper SPE-229156-MS: ***Pink Gold – The Middle East & North Africa's Nuclear-Powered Hydrogen Revolution*** in collaboration with Suhail Díaz, Abhijit Suboyin, and Syed Oubee Khadri, all part of H2 MENA Working Group committee members

Past Events

Digital Flow Assurance Symposium
19-20 November 2025, Doha,Qatar

The Digital Flow Assurance Symposium 2025 concluded with strong participation from industry, academia, and emerging engineers across more than 10 countries

Technical Panels focused on AI, digital twins, multiphase flow assurance, energy transition, and data-driven solutions, as well there were several discussions and talks related to Hydrogen during the symposium.

Closing remarks by Dr. Ibrahim Hassan, Mr. Ahmed Al Lawati, **Dr. Aziz Rahman** (Symposium Chair); recognized participants, volunteers, and judges.

https://digital-flow-assurance-s-54lnwlx.gamma.site/

2026 SPE Events

SPE Europe Subsurface Conference

21 April 2026 | Bergen, Norway

Features technical content on CCS, AI, reservoir contributions to energy transition, drilling, and production.

SPE Europe Energy Conference & Exhibition 2026:

23–25 June 2026 | Istanbul, Türkiye

Covers innovation, operational challenges, and collaboration in the energy sector, including hydrogen topics.

2026 Hydrogen Conferences

Europe:

- **Hyvolution Paris:** Jan 27-29 (Paris).
- **European Hydrogen Energy Conference (EHEC):** Mar 11-13 (Seville, Spain) - Focus on science & tech.
- **Hydrogen Days:** Mar 11-13 (Prague) - Research & policy.
- **Connecting Hydrogen Europe:** Jun 17-18 (Madrid, Spain) - Project deployment & partnerships.
- **World Hydrogen Summit & Exhibition:** May 19-21 (Rotterdam, Netherlands) - Global hub for projects & CCUS.

Americas:

- **World Hydrogen & Carbon Americas: Mar 10-12 (Location TBD).**
- **Hydrogen Americas Summit & Exhibition: Oct 6-7 (Location TBD).**

Global/Other:

- **Global Hydrogen Outlook 2026: Jan 14 (Online/TBD).**
- **Hydrogen Asia: March (Location TBD).**
- **World Hydrogen & Carbon Week: Nov 24-27 (Location TBD).**

SPE Hydrogen News

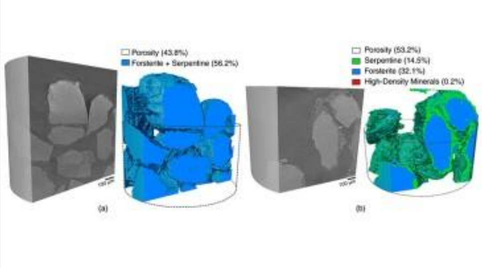
JPT JOURNAL OF PETROLEUM TECHNOLOGY

KTH Scientists Develop Catalyst for Faster Hydrogen Production

IEA Lowers Predictions for Production of Low-Emissions Hydrogen

Hydrogen Supply Chain Deal Plans To Link Australia and Japan

Ammonia-Enriched Fuel Gas Significantly Reduces Emissions

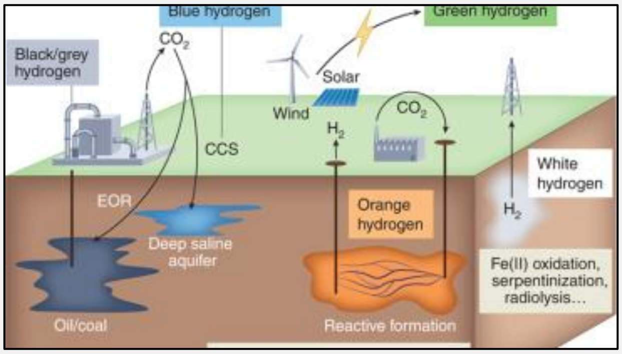


Experimental Study Generates Enhanced Hydrogen With Olivine Sand

SPE Hydrogen News

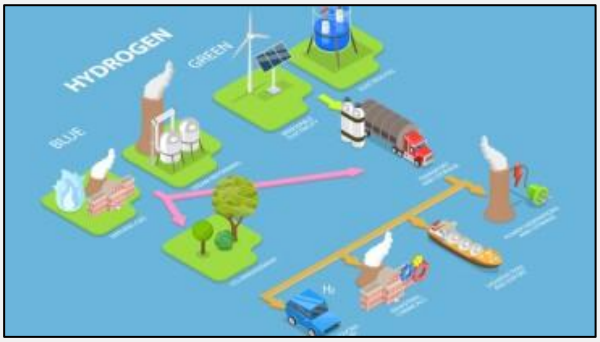
THE WAY AHEAD™
WRITTEN BY AND FOR YOUNG PROFESSIONALS

Hydrogen in Oil and Gas: Decarbonizing the Industry Through Strategic Integration



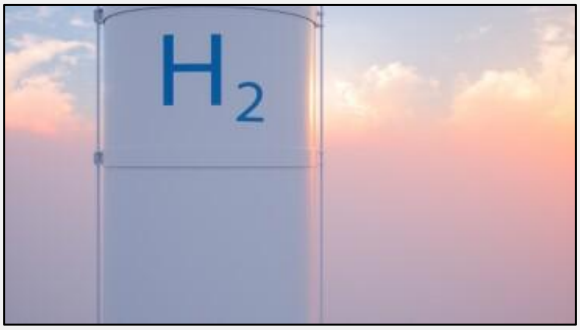
For young professionals, natural hydrogen presents unique opportunities to shape an early-stage industry and contribute to the broader energy transition.

Hydrogen in Oil and Gas: Decarbonizing the Industry Through Strategic Integration



This article highlights how oil and gas companies are leveraging existing infrastructure, expertise, and emerging technologies to lead in the development of the hydrogen economy.

OSU Researchers Investigate Potential of White Hydrogen



This article highlights how oil and gas companies are leveraging existing infrastructure, expertise, and emerging technologies to lead in the development of the hydrogen economy.

Hydrogen Reading

Technical Papers:

Workflow Enables Technoeconomic Optimization of Underground Hydrogen Storage in Aquifers

Porous Underground Gas Storage Can Rapidly Provide Multiple Services to the Grid

SPE 220865 Optimizing Hydrogen Storage in the Subsurface Using a Reservoir-Simulation-Based and Deep-Learning-Accelerated Optimization Method *by Esmail Eltahan, The University of Texas at Austin, et al.*

JPT® JOURNAL OF PETROLEUM TECHNOLOGY

Additional Reading:

Establishing the supply chain for hydrogen shipping

Coupling electrolysers with offshore wind turbines to unlock green energy potential

An offshore wind and hydrogen marriage comes with big and expensive choices

An offshore wind and hydrogen marriage comes with big and expensive choices

Unlocking Offshore Hydrogen

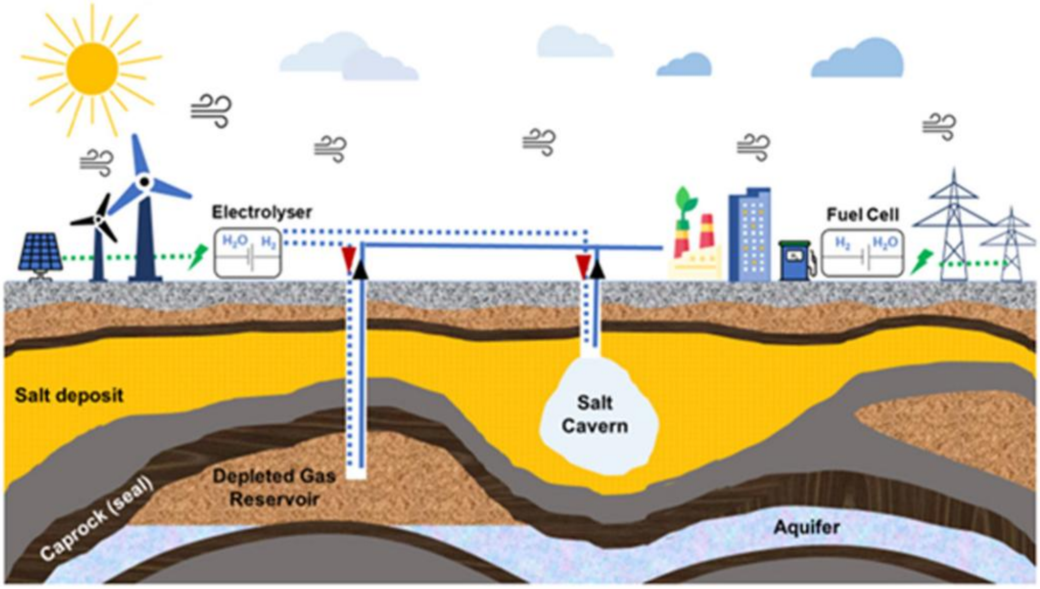
Subsurface Hydrogen Storage: Opportunities and Technical Challenges

Why subsurface storage ?

As hydrogen emerges as a key energy carrier for a low-carbon future, storing it at scale becomes essential. Subsurface hydrogen storage, placing hydrogen deep underground in geological formations,offers a way to balance supply and demand, support renewable energy integration, and improve energy security. Unlike surface tanks, underground storage can accommodate very large volumes, making it suitable for seasonal storage when excess renewable electricity is converted into hydrogen and stored for later use.

Several geological options exist, including salt caverns, depleted oil and gas reservoirs, and deep saline aquifers. Salt caverns are currently the most promising because of their tight sealing properties and existing industrial experience. However, expanding storage beyond salt formations is important to enable wider geographic deployment.

Technical challenges remain. Hydrogen's small molecular size can lead to leakage, and its interaction with rocks, fluids, and microorganisms may affect storage integrity and gas quality. Materials compatibility, well integrity, and monitoring technologies also require careful design and testing. Addressing these challenges through research, regulation, and pilot projects is crucial.
Ultimately, subsurface hydrogen storage matters because it enables hydrogen to play a reliable, large-scale role in future clean energy systems.



Young Professionals & Students Corner

Why Hydrogen Matters for Early-Career Engineers

by Sonia López Kovács

Hydrogen is rapidly emerging as a key pillar of the global energy transition, and for early-career engineers, it represents more than a new energy source, it represents a new career landscape. As industries seek lower-carbon solutions while maintaining reliability and scale, hydrogen offers a bridge between traditional energy systems and future sustainable technologies.

One of the most important reasons hydrogen matters for early-career engineers is its strong connection to existing oil and gas expertise. Skills in subsurface engineering, reservoir modeling, well integrity, flow assurance, materials, and safety are directly transferable to hydrogen projects. Concepts such as gas storage, containment, leakage prevention, and infrastructure integrity are central to both fields. This means young engineers do not need to "start over" but can build on their foundational training while contributing to emerging technologies.

Hydrogen also opens doors to diverse technical pathways. Engineers can work in hydrogen production (including blue and green hydrogen), subsurface storage, pipeline transport, facility design, monitoring systems, and risk management. The interdisciplinary nature of hydrogen projects encourages collaboration across geoscience, mechanical, chemical, electrical, and digital disciplines, an ideal environment for early-career professionals to broaden their skill sets.

From a career development perspective, hydrogen projects often involve pilot programs and first-of-a-kind developments, giving young engineers early exposure to innovation, decision-making, and leadership opportunities. Being involved at this stage allows early-career professionals to grow alongside the technology, positioning themselves as future subject-matter experts.

Finally, hydrogen provides a strong sense of purpose. Many early-career engineers are motivated by the opportunity to work on solutions that contribute to emissions reduction, energy security, and long-term sustainability. Hydrogen enables engineers to apply rigorous technical thinking to real-world challenges that matter on a global scale.

For early-career engineers, engaging with hydrogen today—through SPE technical sessions, research, and industry projects—is not just about staying relevant. It is about shaping the future of energy and building a career that combines technical excellence with meaningful impact.

SPE H2TS Editorial Message

As we begin a new year, it is a pleasure to welcome you to Issue 03 of the SPE Hydrogen Technical Section (H2TS) Newsletter. This edition reflects the remarkable momentum our community continues to build as hydrogen advances from a promising concept to a central pillar of global decarbonization strategies.

The past year has demonstrated how rapidly the hydrogen landscape is evolving. Our section has grown in visibility, strengthened its international collaborations, and contributed meaningfully across technical discussions, events, and publications. It is with great pride that we share one of our most significant achievements: H2TS has been selected as a recipient of the 2025 Technical Section Excellence Award, an honor reserved for only a small portion of SPE's global technical sections. This recognition affirms the dedication, innovation, and teamwork of our members.

In this issue, you will find a comprehensive view of the latest developments shaping the hydrogen industry — from subsurface storage technologies and production pathways, to major technical events, reading recommendations, and highlights of the hydrogen research community. We also showcase the work of our committees, our global network of liaisons, and our expanding presence at high-impact conferences across regions.

Our mission remains clear: to foster knowledge sharing, support professional growth, bridge academia and industry, and empower the next generation of engineers and scientists contributing to a more sustainable energy future. Hydrogen will continue to challenge us technically and strategically, but it will also unlock opportunities for innovation, collaboration, and meaningful progress.

Thank you to all contributors, volunteers, and members who make this community thrive. Your engagement is the energy behind our success. Together, we will continue advancing the role of hydrogen within the SPE family and across the global energy landscape.

Sonia López Kovács
SPE H2TS European Union

Hydrogen Glosary

Hydrogen: A very light gas and the most abundant element in the universe. It can be used as a clean energy carrier because it produces only water when used as fuel.

Energy Carrier: Something that stores and transports energy rather than creating it. Hydrogen carries energy produced from other sources, such as wind or solar power.

Green Hydrogen: Hydrogen produced using renewable electricity (like wind or solar) to split water into hydrogen and oxygen. It has very low environmental impact.

Blue Hydrogen: Hydrogen made from natural gas, where the carbon dioxide produced is captured and stored underground to reduce emissions.

Grey Hydrogen: Hydrogen produced from fossil fuels without capturing carbon emissions. It is currently the most common type but has a high climate impact.

Electrolysis: A process that uses electricity to split water into hydrogen and oxygen. This is the main method for producing green hydrogen.

Electrolyser: A device that performs electrolysis. It is a key piece of equipment in hydrogen production.

Hydrogen Storage: The process of keeping hydrogen for later use. Storage can be done in tanks, pipelines, or underground formations.

Hydrogen Glosary (Cont.)

Subsurface (Underground) Storage: Storing hydrogen deep underground in natural geological formations, such as salt caverns or depleted gas fields, to hold large amounts of energy.

Salt Cavern: A large underground cavity created in salt rock. Salt caverns are well suited for hydrogen storage because salt is very tight and prevents leaks.

Depleted Oil and Gas Reservoir: Underground rock formations that previously held oil or gas. They may be reused to store hydrogen.

Leakage: Unintended loss of hydrogen from storage. Because hydrogen molecules are very small, preventing leakage is an important challenge.

Energy Transition: The shift from fossil fuels to cleaner, low-carbon energy sources to reduce climate change.

Renewable Energy: Energy from natural sources that are continuously replenished, such as wind, solar, and hydropower.

Seasonal Storage: Storing energy for long periods (months) so it can be used when demand is high or renewable production is low.

Fuel Cell: A device that converts hydrogen into electricity, producing water and heat as by-products.

Carbon Capture and Storage (CCS): A technology that captures carbon dioxide emissions and stores them underground to prevent them from entering the atmosphere.

Hydrogen Resources

The Future of Hydrogen – Analysis - IEA
https://iea.blob.core.windows.net/assets/5bd46d7b-906a-4429-abda-e9c507a62341/GlobalHydrogenReview2021.pdf

The Department of Energy Hydrogen Program Plan | Hydrogen Program
U.S. Department of Energy (DOE) Hydrogen Program and National Clean Hydrogen Strategy

- https://www.energy.gov/eere/fuelcells/h2scale
- https://www.energy.gov/eere/fuelcells/hydrogen-storage
- https://www.energy.gov/sites/prod/files/2018/12/f58/fcto-webinarslides-hydrogen-carriers-120618.pdf
- https://www.energy.gov/sites/default/files/2021-12/h2iq-12082021.pdf
- https://www.hydrogen.energy.gov/pdfs/hydrogen-program-plan-2020.pdf

ACS Executive Summary
MIT's Drake Hernandez sees a future with hydrogen solutions | ExxonMobil

Explainer: harnessing the power of hydrogen — Chevron

BrightLoop™ Low-Carbon Hydrogen Production » Babcock & Wilcox

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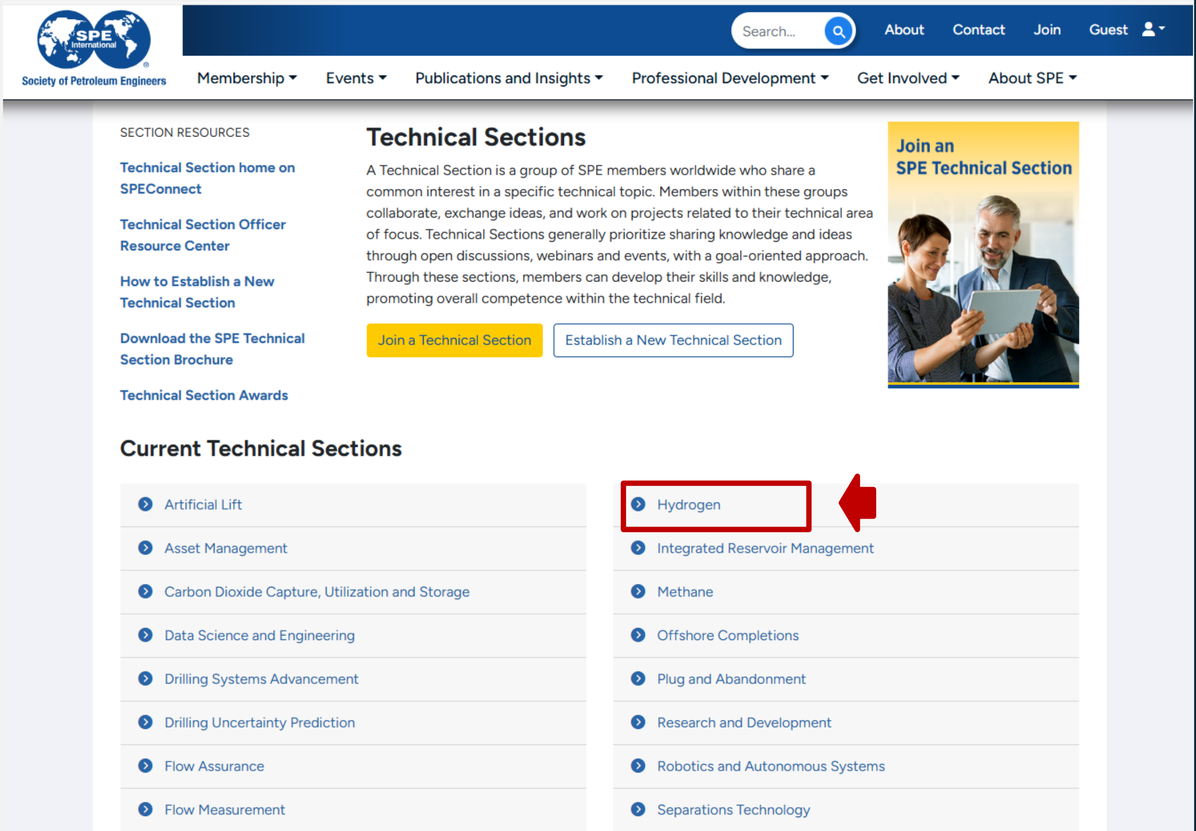
If you are a professional **SPE member** and you wish to engage in our **Hydrogen Technical Section** discussion posts, please click here to join our community.



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