

Natural Hydrogen Fuel

Prelims - General Science | Physical, Social, Economic Geography of India and the World

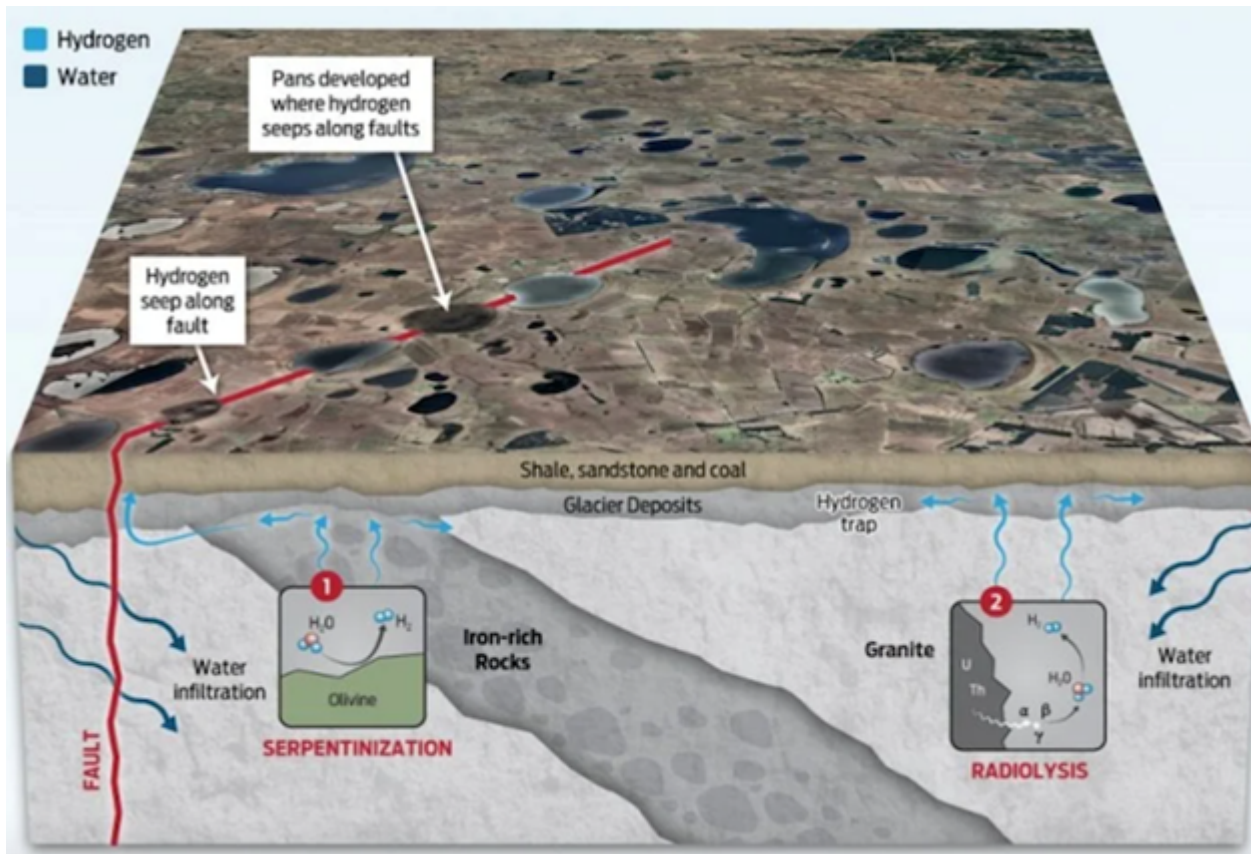
Why in News?

According to research firm Rystad Energy, by the end of 2023, 40 companies, including start-ups, were searching for deposits of natural hydrogen around the world, up from just 10 in 2020.

- **Hydrogen** - It is a gas of diatomic molecules with the formula H_2 , officially called "dihydrogen", but also called molecular hydrogen.
- It is a colorless, odorless, flammable gas.
- **Natural Hydrogen** - It refers to hydrogen gas that is found in its natural form beneath Earth's surface.

Natural Hydrogen is sometimes known as **white Hydrogen or gold Hydrogen or geologic Hydrogen**.

- **Generation** - It occurs as a free gas in geology, produced by
 - **Serpentinisation**, the interaction of water and iron-containing rocks.
 - **Radiolysis of water** by radioactive rocks, and from organic matter at depth.
- Helium co-exists with hydrogen in a few reserves points that radiolysis plays a role in its generation.



- **Discovery** - It was 1st discovered by accident in Mali, contains no carbon and produces only water when burned.
- **Areas for geological hydrogen generation** - Gas seeps, volcanic outgassing, mines and in also in active mountain ranges with tectonic activity
 - **Examples:** The Pyrenees, Alps, and Himalayas
- **Current reserves** - Hundreds of hydrogen seeps have been in various countries, including Spain, France, Albania, Colombia, South Korea, Canada and
 - Australia - Eyre Peninsula and Kangaroo Island
 - United States - Kansas, Nebraska

Favourable Geological Structures for Natural Hydrogen in India

- Hard rock formations of diverse ultramafic/mafic and basaltic assemblages
- Andaman and Himalayan ophiolite complexes
- Greenstone volcanic-sedimentary sequences in cratons (Dharwar, Singhbhum)
- Sedimentary basin (for example, in Vindhyan, Cuddapah, Gondwana and Chhattisgarh)
- Basement rocks with fractures
- Areas where active hydrothermal systems as represented by hot springs exist

- **Current production** - It is manufactured mostly from natural gas through an energy-intensive and polluting process.

*Production of **Green Hydrogen** involves a process that involves splitting water into hydrogen and oxygen using renewable electricity.*

- **Significance** - If harvested in a sustainable manner, it may provide a **clean and potentially low-cost fuel**.

Quick Facts

- **Serpentinization** - It is a geological process where ultramafic rocks, rich in minerals like olivine and pyroxene, are altered by water and converted into serpentine minerals which releases hydrogen gas during the process.
- **Radiolysis** - It is the process in which subatomic particles naturally emitted by radioactive rocks such as granite cause certain molecules to break apart, releasing hydrogen.

Reference

[The Hindu| Potential of Natural Hydrogen Fuel](#)

