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HYDROGEN PRODUCTION USING NUCLEAR ENERGY FOR THE FIRST TIME IN THE WORLD

- The Department of Atomic Energy launched the world's first hydrogen production plant using nuclear process heat generated from the Fast Breeder Test Reactor at the Indira Gandhi Centre for Atomic Research (IGCAR) in Kalpakkam, based on the copper-chlorine thermochemical cycle.
- The facility was inaugurated by Dr. Ajit Kumar Mohanty, Secretary of the Department of Atomic Energy and Chairman of the Atomic Energy Commission, in the presence of Sreekumar G. Pillai, Director of the Indira Gandhi Centre for Atomic Research.
- This plant has been established as a technology demonstration facility to validate hydrogen production using nuclear energy through the indigenous copper-chlorine thermochemical process developed by the Bhabha Atomic Research Centre (BARC) in Mumbai.
- The successful integration of nuclear process heat with hydrogen production marks a pioneering technological advancement, opening a promising pathway for large-scale, carbon-free hydrogen production using advanced nuclear reactors.
- Hydrogen is considered a key future energy carrier. It is also expected to play a crucial role in the global transition toward clean and sustainable energy systems.
- Among various hydrogen production technologies being developed globally, the copper-chlorine thermochemical cycle is considered one of the most promising due to its relatively lower operating temperature and high thermodynamic efficiency.
- By utilizing nuclear heat from fast reactors, this process significantly reduces dependence on fossil fuels and completely eliminates greenhouse gas emissions associated with conventional hydrogen production methods.
- This plant will also support future research aimed at scaling up nuclear-assisted hydrogen production technologies for commercial deployment.

- Speaking at the inaugural event, Dr. Ajit Kumar Mohanty stated that integrating nuclear energy with emerging clean energy technologies like hydrogen production is a vital pathway toward a sustainable energy future.
- Nuclear energy, with its unique ability to provide reliable, carbon-free electricity as well as high-temperature process heat, will contribute to India's energy security, decarbonization goals, and long-term sustainable growth objectives.
- "I congratulate the continuous dedication of the scientists, engineers, and technical teams at Bhabha Atomic Research Centre and Indira Gandhi Centre for Atomic Research who turned an advanced scientific concept into an operational reality."
- He added that this achievement stands as a testament to India's growing capabilities in advanced nuclear technologies and clean energy systems.

'HYDROGEN' TRAIN TESTED AT 120 KM/H SPEED

- A high-speed trial run was successfully conducted yesterday at a speed of 120 km/h on the Jind–Sonipat route in Haryana.
- The Railway Board has approved the operation of hydrogen trains as an alternative to coal and diesel engines, aimed at curbing carbon emissions.
- Following this, an ultra-modern hydrogen train was indigenously developed at the ICF factory in Perambur, Chennai, Tamil Nadu, at a cost of Rs.118 crore.
- Under the supervision of a special team from the Research Designs and Standards Organisation (RDSO) of the Railway Department in Lucknow, Uttar Pradesh, a test run of a 10-coach hydrogen train was successfully conducted yesterday at a speed of 120 km/h between Jind and Sonipat.
- Following this, our country is set to join the list of nations operating hydrogen trains, after countries like Germany, China, and Japan.
- Earlier, to execute this project, Indian Railways established hydrogen production, storage, and refueling facilities in the Jind region of Haryana.
- Likewise, various safety features including hydrogen leak detection devices, fire detection equipment, and continuous monitoring technology have been fitted.
- This train uses hydrogen fuel cells instead of diesel. Consequently, operating this train releases only clean water vapor instead of toxic emissions like carbon dioxide.