THE ENERGY FORUM

THE ENERGY NEWSLETTER

CONTACT US:

www.tefindia.com

TEFIndia

theenergyforum

INDIA

- **India showcases Green Hydrogen ambitions at World Hydrogen Summit 2025**
  Press Information Bureau, 20 May 2025

Shri Santosh Kumar Sarangi, Secretary, Ministry of New & Renewable Energy, addressed the World Hydrogen Summit 2025 in Rotterdam, outlining India's strategic roadmap in renewable energy and green hydrogen. Emphasizing India's ambition to become a global green hydrogen leader, he highlighted the country's renewable energy capacity, which now exceeds 223 GW, including 108 GW from solar and 51 GW from wind. He reaffirmed India's vision of energy independence by 2047 and Net Zero emissions by 2070.

The National Green Hydrogen Mission, launched in 2023 with a USD 2.4 billion allocation, targets 5 million tonnes of annual green hydrogen production by 2030, 50 MMT of CO_2 emissions reduction, and over USD 100 billion in investments. India has awarded production capacity to 19 firms and electrolyser manufacturing capacity to 15, while also launching pilot projects across sectors. With supportive policies, dedicated port hubs, and state-level initiatives, India is well-positioned to emerge as a global hub for green hydrogen.

- **India commissions first high-altitude Green Hydrogen fuelling station in Leh, paving the way for a clean transport in extreme climates**
  Urban Acres, 23 April 2025

India has achieved a landmark in its clean energy journey with the inauguration of its first green hydrogen fuelling station in Leh, Ladakh. Situated at an altitude of 3,400 metres, this station—developed by Amara Raja Infra for NTPC Ltd—is part of the National Hydrogen Energy Mission aimed at decarbonising transport and industry.

Built in just two years despite the region's harsh climate, with temperatures ranging from -25°C to 30°C, the facility demonstrates India's growing expertise in sustainable infrastructure. The station has a daily production capacity of 80 kg of green hydrogen and will power five hydrogen fuel cell buses, marking a significant step toward zero-emission public transport in this ecologically fragile and strategically important region.

This project not only highlights the potential of green hydrogen in areas where electric mobility is limited by terrain and climate but also serves as a prototype for nationwide hydrogen mobility solutions. NTPC's initiative positions India among a select group of countries with operational green hydrogen infrastructure in high-altitude environments. As a key milestone in India's hydrogen roadmap, the Leh station underscores the country's commitment to resilient, decentralized, and climate-friendly energy systems, offering a model that can be scaled across similar geographies.

- **Odisha's renewable energy sector set for a 1200 crore rupees transformation across 7 key projects**
  Odisha TV, 25 April 2025

In a strategic move toward strengthening its renewable energy infrastructure, the Government of Odisha has sanctioned seven new renewable energy projects amounting to ₹1,191.47 crore. The approved projects collectively account for a capacity addition of 149.97 megawatts (MW). This includes two wind power projects with a combined capacity of 95.7 MW, four solar power projects totalling 53.67 MW, and Odisha's inaugural battery storage project with a capacity of 0.6 megawatt-hour (MWh). These initiatives are designed to leverage Odisha's natural resources, while contributing to energy security and reduced reliance on fossil fuels.

These projects are expected to play a pivotal role in reshaping Odisha's energy landscape. By integrating wind, solar, and battery storage technologies, the state aims to enhance power reliability, particularly in remote areas, while reducing carbon emissions. Moreover, the developments are projected to attract significant green investment and create employment opportunities across the renewable energy value chain. To date, the SWC has provisionally approved renewable energy investments worth ₹12,387.36 crore, amounting to 1,707.56 MW of capacity. These efforts reflect Odisha's forward-looking approach and reinforce its ambition to emerge as a leader in India's clean energy transition.

- **India's hidden energy goldmine: Tapping into natural Hydrogen for a cleaner, independent future**
  The Hindu, 02 May 2025

As hydrogen demand is expected to rise from 6 million tonnes in 2020 to over 50 million tonnes annually by 2070, the recent discovery of natural hydrogen reserves in the Andamans could be a game-changer. Preliminary academic studies estimate India could hold up to 3,475 million tonnes of natural hydrogen. If proven viable, this could significantly reduce the need for expensive hydrogen manufacturing, enabling faster and more affordable decarbonisation.

However, natural hydrogen exploration is in its infancy, with major technical, logistical, and safety challenges. Unlike oil and gas, there are no standardized methods to locate and extract natural hydrogen. Its high diffusivity and reactivity demand specialized materials and advanced safety protocols. To kick start the process, India could model efforts like the SRRA project under the National Solar Mission. A nationwide hydrogen resource mapping initiative using petrophysical, gravity, and magneto telluric surveys could identify promising reserves.

Additionally, adapting existing gas pipelines for hydrogen transport, investing in safe underground storage, and exploring in-situ production technologies will be critical. While the cost of natural hydrogen is expected to be lower than manufactured hydrogen, the upfront investment in exploration and infrastructure will be decisive in unlocking its full potential.

- **India set to open Civil Nuclear Sector with key legal reforms**
  Indian Express, 19 May 2025

In a landmark move that could reshape India's tightly controlled atomic energy landscape, the government is preparing to introduce two major amendments to nuclear laws in the upcoming monsoon session of Parliament. The first proposed change aims to ease provisions under the Civil Liability for Nuclear Damage Act, 2010, by capping equipment vendors' liability in the event of a nuclear accident. This would limit their financial exposure to the contract's original value and may also impose a time-bound window for liability.

The second amendment seeks to open up nuclear power plant operations to private players, a shift from the current regime where only state-run companies like NPCIL and NTPC are allowed to operate such facilities. This change could potentially allow foreign companies to hold minority stakes in future projects, signalling a new era of global collaboration in India's nuclear sector.

The push for these reforms comes shortly after the U.S. Department of Energy granted Holtec International clearance to transfer small modular reactor technology to Indian firms. This regulatory nod removes a major hurdle under U.S. law, paving the way for Indo-U.S. nuclear cooperation. With international roadblocks cleared, New Delhi now faces the critical task of enacting domestic legislation to unlock foreign investment in nuclear energy.

WORLD

- **Stanford researchers unveil solar panels that generate electricity at night, even under moonlight, rain, or cloud cover.**
  Telengana Today, 20 April 2025

In a major leap forward for renewable energy, Stanford University researchers have developed a groundbreaking solar panel technology that can generate electricity even at night. This innovation utilizes a process called *radiative cooling*, where heat escapes from surfaces into the sky during clear nights. By harnessing this natural phenomenon, the new panels convert the temperature difference between the panel and the surrounding air into usable electricity. Nicknamed *'moonlight panels'*, these modified commercial solar cells are equipped with thermoelectric generators to capture heat dissipated into the atmosphere. Although they currently generate around 50 milliwatts per square meter—much less than the 200 watts per square meter from daytime solar panels—it's enough to power small devices like LEDs and environmental sensors. More importantly, the technology is in its early stages, and researchers are optimistic about its future potential. By bridging the gap in power generation during non-sunny hours, this technology could significantly improve energy access in remote and off-grid areas.

- **Europe shocks the world with $134 billion Hydrogen Project as the world's largest construction site.**
  Sustainability Times, 17 April 2025

The construction industry, traditionally one of the largest contributors to carbon emissions, is undergoing a quiet but powerful transformation. At the heart of this shift is hydrogen—specifically, hydrogen fuel cell generators that offer a clean, sustainable alternative to diesel. With the global push for decarbonization gaining momentum, projects like the UK's High Speed 2 (HS2) are leading the charge toward greener construction. The HS2 project has become a beacon of sustainable innovation, utilizing hydrogen fuel cells to power construction sites. At the Victoria Road site in London, two inconspicuous white containers—housing hydrogen power units (HPUs)—quietly supply all necessary electricity. This real-world application demonstrates the immense potential of hydrogen in reducing the construction sector's environmental footprint.

Unlike diesel generators, hydrogen fuel cells emit only water vapor, eliminating carbon emissions entirely. As the most abundant element in the universe with triple the energy density of gasoline, hydrogen is often hailed as the fuel of the future. Companies like GeoPura, in collaboration with Siemens Energy Ventures, are leading the charge. Founded in 2019, GeoPura produces renewable hydrogen and leases HPUs to power construction projects and events. With plans to scale its fleet to 3,600 units by 2033, the company is committed to accelerating the shift toward zero-emission construction.

However, economic and logistical hurdles remain. Hydrogen is still costlier than diesel, and infrastructure for its production and distribution is still developing. Yet, with growing investment and technological innovation, these barriers are gradually being dismantled. As hydrogen fuel cells gain traction, the construction industry stands on the cusp of a green revolution. The question now is not *if* hydrogen will transform the sector—but *how soon*. Projects like HS2 show the future is already being built—cleaner, quieter, and emission-free.

- **Innovative Hydrogen and Ammonia Production at UIC: Promise and Peril**
  Eco News, 27 April 2025

Researchers at the University of Illinois Chicago (UIC) have unveiled a transformative fusion process involving hydrogen and nitrogen, with far-reaching implications for sustainable ammonia and hydrogen fuel production. While the approach holds promise for decarbonizing key sectors, it also presents potential environmental challenges that warrant critical attention. UIC engineers have developed a novel method to generate hydrogen from water using solar energy and biochar—carbon-rich material derived from agricultural waste such as cow manure and sugarcane husks. This technique reduces the energy requirement for electrolysis by up to 600%, achieving notable efficiency using minimal power, even below that of household batteries. The system also incorporates carbon capture for reusing CO_2 in beverage and plastics industries, enhancing its environmental credentials.

In parallel, UIC researchers introduced a lithium-mediated ammonia synthesis process that functions under low temperatures and regenerative conditions, outperforming conventional high-pressure methods. This process reduces production costs by 60% and meets Department of Energy benchmarks for selectivity and efficiency. Furthermore, the ammonia produced can serve as a hydrogen carrier, offering a safer and more economical approach to hydrogen fuel transport. Despite its potential, the hydrogen-nitrogen fusion raises serious environmental concerns, particularly regarding CO_2 by-products. Without robust carbon management, large-scale deployment may offset gains. Social and economic implications, including industry disruption and regulatory needs for biochar sourcing, also demand careful consideration.

- **Japan's hydrogen gamble: Lessons in ambition, adaptation, and energy security**
  The Print, 03 May 2025

Japan was the first country to bet big on hydrogen. Since its 2017 Basic Hydrogen Strategy, it has aimed to build a full-scale hydrogen economy, driven by energy insecurity, technological leadership, and decarbonisation goals. Now, with hydrogen demand projected to triple by 2050, Japan is recalibrating. The 2023 update to its strategy introduced a "Safety + 3E" framework—focusing on safety, energy security, economic efficiency, and environmental sustainability—and a massive $100 billion investment roadmap. Yet challenges persist.

Green hydrogen remains expensive, and Japan's heavy reliance on imports risks replicating its dependence on fossil fuels. Meanwhile, only a fraction of global renewable hydrogen projects are operational, making future supply uncertain. Without clear domestic hydrogen allocation across sectors, investment clarity remains lacking. Japan's broad hydrogen use—in power, transport, and residential sectors—may stretch resources thin. Experts suggest targeting hard-to-abate sectors like steel, aviation, and shipping instead. And while Japan has led in innovation, it still lacks robust infrastructure, pricing benchmarks, and a mature trading market. One bright spot: the Tokyo Commodity Exchange's hydrogen trading pilot, launched in 2024, marks the world's first step toward building a formal hydrogen marketplace. Japan's journey is a cautionary tale in balancing ambition with execution. As global hydrogen strategies unfold, precision, not just vision, will be key.

- **World's largest Green Hydrogen plant powers clean energy future from the heart of Nevada**

  Eco News, 07 May 2025

In North Las Vegas, Nevada, Air Liquide has launched the world's largest liquid hydrogen production facility, producing up to 30 tons of liquid hydrogen per day. This cutting-edge plant plays a key role in accelerating the clean energy transition, delivering enough hydrogen to fuel over 40,000 vehicles in California, while supporting the state's Low Carbon Fuel Standard. What sets the facility apart is not just its scale, but its green innovation. Using electrolysis powered by renewable electricity, renewable natural gas, and advanced carbon capture technologies, Air Liquide avoids traditional fossil-based hydrogen. This combination makes it a global benchmark for low-carbon hydrogen production.

With a $250 million investment, the project also supports regional growth—creating 700 construction jobs and 25 full-time roles, while boosting the clean energy economy in Nevada. Supported by an efficient logistics network, the plant ensures reliable hydrogen distribution across the region. Air Liquide's North Las Vegas plant is a clear signal that large-scale, clean hydrogen is not just viable—it's already driving the future of sustainable energy. Could global collaboration, like with Exolum in the UK, take hydrogen innovation even further?

Would you like to include a call-to-action or contact info in the newsletter?

- **Germany pioneers breakthrough in Green Nickel extraction using Hydrogen Plasma**

  Eco News, 14 May 2025

In a landmark advance for sustainable metallurgy, researchers in Germany have successfully extracted and purified nickel from low-grade ores in a single step using hydrogen plasma—a high-energy state of matter typically seen only in fusion experiments. This ground-breaking process was developed by Isnaldi R. Souza Filho and his team at the Max Planck Institute for Sustainable Materials. By using an electric arc furnace to generate hydrogen plasma from a hydrogen-argon gas mix, they achieved rapid reduction of nickel oxides into ferronickel within minutes.

This method bypasses the carbon-heavy, multi-stage processes traditionally used to extract nickel, which often rely on extreme temperatures, fossil fuels, and harmful chemicals. When powered by renewable energy, this innovation has the potential to reduce nickel's carbon footprint by up to 84%. With global demand for nickel expected to double by 2040—largely driven by electric vehicles and clean energy infrastructure—this development could not come at a better time. While scaling the process and sourcing green hydrogen present challenges, the technology offers a cleaner, more efficient path forward. As the Max Planck team works toward commercial-scale implementation, this breakthrough may signal the dawn of a new, low-emission era in industrial metal production.

- **America's hidden Hydrogen wealth could surpass Oil and Dubai's fortunes**
  Eco News, 15 May 2025

A ground-breaking discovery by the United States Geological Survey (USGS) may reshape the global energy landscape—and the economic future of America. According to a newly released continental-scale map, vast reserves of naturally occurring, or geologic, hydrogen lie beneath U.S. soil, with over 30 states showing high potential. If harnessed, this clean energy source could transform these states into energy superpowers, surpassing even the wealth of oil-rich Dubai.

For years, scientists believed that hydrogen could not accumulate in Earth's crust in meaningful quantities. That belief was overturned by USGS geologists Geoff Ellis and Sarah Gellman, who revealed that geologic hydrogen reserves may contain twice the energy of all proven global natural gas supplies. They developed a methodology to locate these hydrogen-rich zones, identifying key areas in the Midwest, the Rocky Mountains, the Four Corners region, and along the Eastern Seaboard.

This naturally produced hydrogen offers a clean, renewable alternative to fossil fuels, without the high costs and emissions of industrial hydrogen production. With applications in fuel cells, industry, and agriculture, geologic hydrogen could supply the U.S. with sustainable energy for centuries. The challenge now

The Energy Forum, a New Delhi based Independent think tank, conducts intensive research and consults on a wide range of issues related to the global energy sector, with focus on energy space. It aims to put collective knowledge and experience in making the planet a better place to live in by formulating new paradigms for sustainable transitions and engendering robust developmental narratives. TEF is supported by a network of scientists, economists, policy makers, diplomats, researchers and academics considered experts in their respective fields.

THE ENERGY FORUM

Contact Us:

Website: *www.tefindia.com*
Twitter Handle: *TEFIndia*
LinkedIn: *theeneryforum*