# **NEXTIRS**

# DAILY EDITORIAL ANALYSIS

**TOPIC** 

GREEN HYDROGEN AND THE FINANCING CHALLENGE

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#### Context

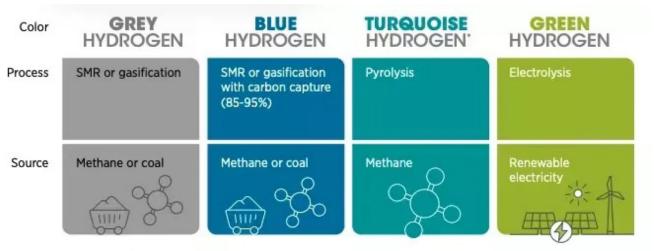
- Green hydrogen has emerged as a crucial pathway to decarbonize its industrial sectors, as India aims for net-zero emissions by 2070.
- However, the **economics of green hydrogen production** presents significant challenges, particularly in terms of **financing**.

## **About the Green Hydrogen**

- It is produced using renewable energy sources through a process called electrolysis, where water is split
  into hydrogen and oxygen using electricity generated from renewable sources such as solar, wind, or
  hydropower.
- It does not emit greenhouse gases, making it a sustainable and environmentally friendly alternative.
- India has set an ambitious target of producing 5 million metric tonnes (MMT) of green hydrogen annually by 2030.

# Why Green Hydrogen?

• Traditional hydrogen production methods, such as **grey hydrogen** (produced from fossil fuels) and **blue hydrogen** (produced from fossil fuels with carbon capture), still contribute to greenhouse gas emissions.



Note: SMR = steam methane reforming.

- The push for green hydrogen is driven by the need to reduce carbon emissions and combat climate change.
- Green hydrogen offers a zero-emission alternative, aligning with global climate goals.

#### **Concerns Related To Green Hydrogen**

- **High Production Costs:** The **levelized cost of electricity (LCOE) and electrolyzer costs** are major factors driving up the overall production costs.
  - In emerging markets like India, the high cost of capital further exacerbates the financial viability of green hydrogen projects.
- Disparity in Production Costs: A substantial disparity between green hydrogen production costs (\$5.30-\$6.70 per kg) and traditional grey/blue hydrogen production costs (\$1.9-\$2.4 per kg).
  - It makes it challenging to drive domestic offtake and attract private investment.
  - It creates a classic market deadlock: green hydrogen costs can only decrease with scaled production, but scaling requires viable economics.
- **Global Investment Barriers:** By May 2024, **only 27.6% of the 1,572** announced large-scale clean hydrogen projects valued at \$370 billion had reached final investment decisions.

<sup>\*</sup> Turquoise hydrogen is an emerging decarbonisation option.



- This disparity between plans and financial commitments indicates that the market's structural barriers extend beyond technological readiness.
- **Technological Readiness:** The adoption rates and risk factors associated with futuristic technologies pose challenges for financing and scaling up production.
  - Investors and financial institutions are often hesitant to fund projects that have not been tested at scale.

# **Key Initiatives Related To Green Hydrogen in India**

- National Green Hydrogen Mission: It aims to make India a leader in green hydrogen production by focusing
  on reducing the cost of green hydrogen production, creating demand, and establishing a certification
  framework for green hydrogen and its derivatives.
- **Financial Incentives and Pilot Projects:** The mission includes financial incentives for manufacturing electrolysers and producing green hydrogen.
  - Pilot projects are also being funded to explore low carbon steel production, mobility solutions, and shipping applications.
  - These initiatives are expected to drive innovation and reduce production costs.
- Green Hydrogen Hubs: India plans to develop green hydrogen hubs to support large-scale production and utilization.
  - These hubs will be equipped with the necessary infrastructure and will be strategically located to maximize efficiency and reduce costs.

# **Mechanism Associated To Overcome High Costs**

- Blended Finance Models: Combining public and private capital can help lower risks and make investments in green hydrogen more attractive. Government-backed financial instruments or concessional loans can reduce borrowing costs, lowering the weighted average cost of capital (WACC).
  - Collaborations between the government and private sectors can help mitigate risks and ensure the
    financing of green hydrogen projects. Governments can provide financial support through incentives,
    subsidies, or tax breaks to attract private investors.
- Green Bonds and Climate Financing: Issuing green bonds to raise capital for renewable energy projects can provide long-term funding at lower costs. These bonds can appeal to investors with an interest in sustainable investments.
- Carbon Credits and Offtake Agreements: Green hydrogen projects could leverage carbon credits or longterm offtake agreements to secure steady revenue streams, which would increase investor confidence and help finance production scale-up.
- Strategic Industrial Clusters: Creating localized industrial clusters linked to renewable energy sources can create self-sustaining hydrogen corridors in India, attracting investment and fostering integrated ecosystems.

## **Conclusion and Way Forward**

- The U.K.'s Low Carbon Hydrogen Standard Certification provides a model for building market confidence.
   Similarly, strategic hydrogen hubs in the U.S., Japan, and Australia reflect a shift from traditional industrial development approaches.
  - **India** needs to adopt similar approaches to overcome structural barriers and promote the growth of its green hydrogen sector.
- By leveraging innovative and effective financing mechanisms and policy frameworks, India can overcome the financing challenges and establish itself as a leader in the green hydrogen sector.

Source: TH

#### **Mains Practice Question**

Discuss the key financial challenges associated with green hydrogen projects and analyze the potential financing mechanisms that could accelerate their deployment.