Japan to Set up Green Hydrogen Production Centre in UP

Why in News?

In a significant step towards advancing **Uttar Pradesh's renewable energy initiatives**, a delegation from the state government recently visited Japan to **forge strategic partnerships** aimed at boosting **green hydrogen production** and energy innovation.

Key Points

- **Green Hydrogen Centre of Excellence**: Japanese entrepreneurs have agreed to **establish a Centre of Excellence** for green hydrogen in Uttar Pradesh, marking a pivotal development in the state's renewable energy landscape.
    - This collaboration will serve as a **catalyst for cutting-edge research,** innovation, and the adoption of sustainable energy solutions.
- **Focus on Zero-Emission Transport**: During the visit, the UP delegation explored several breakthrough technologies, including the **next-generation hydrogen fuel cell vehicle**, Toyota Mirai.
    - This vehicle runs on a combination of **hydrogen and oxygen,** emitting only water as a byproduct, aligning with Uttar Pradesh's vision for a **zero-emission transport policy.**
- **Learning from Japan's Expertise**: The UP delegation visited **several advanced facilities** in Japan's Yamanashi Prefecture, including the NESRAD Green Hydrogen Plant and the Suntory Hakushu Distillery, which houses a power-to-gas technology plant and Hydrogen Research Centre.
    - These visits offered valuable insights into **international best practices** in hydrogen production and clean energy technologies.
- **Implications for Uttar Pradesh:**
    - **Renewable Energy Expansion:** Uttar Pradesh's collaboration with global leaders in green hydrogen will boost its renewable energy capacity, including solar, hydro, and **biomass.**
    - **Green Hydrogen Technological Advancements:** The adoption of advanced Japanese hydrogen fuel cell technology will drive cleaner, sustainable transport, reduce **greenhouse gas emissions**, and contribute to the state's clean energy goals by diversifying renewable power generation methods.
    - **Economic Growth & Innovation:** The Centre of Excellence will position Uttar Pradesh as a **renewable energy hub,** attracting investments, **fostering innovation,** and creating new business opportunities and jobs.

Installed Capacity of Renewable Power of Uttar Pradesh

Type	MW (as on 30-06-2025)
Hydro (Large + Small)	551
Solar	3427

Hydrogen

- **Hydrogen is the most abundant element in the universe,** but on **Earth, it makes up only**

0.14% of the Earth's crust by mass, ranking as the **10th most abundant element.**

- The type of hydrogen depends on the process of its formation:
    - **Green hydrogen** is produced by **electrolysis of water using renewable energy** (like Solar, Wind) and has a lower carbon footprint.
        - Electricity splits water into hydrogen and oxygen.
        - **By Products: Water, Water Vapor.**
    - **Brown hydrogen is produced using coal,** where the emissions are released to the air.
    - **Grey hydrogen** is produced **from natural gas,** where the associated emissions are released to the air.
    - **Blue hydrogen** is produced from natural gas, where the **emissions are captured using carbon capture and storage.**