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**UNION BUDGET 2026-27 & CARBON  
CAPTURE UTILISATION AND  
STORAGE (CCUS) TECHNOLOGIES**

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## UNION BUDGET 2026-27 & CARBON CAPTURE UTILISATION AND STORAGE (CCUS) TECHNOLOGIES

### Context

- Recently, the **Union Budget 2026-27** proposed an outlay of **Rs 20,000 crore** over the next **five years** in **Carbon Capture Utilisation and Storage (CCUS)** technologies.
- It is aligned with India's long-term goal of achieving **net-zero emissions by 2070**, even as industrial activity and energy demand continue to grow in the near term.

### What Are CCUS Technologies?

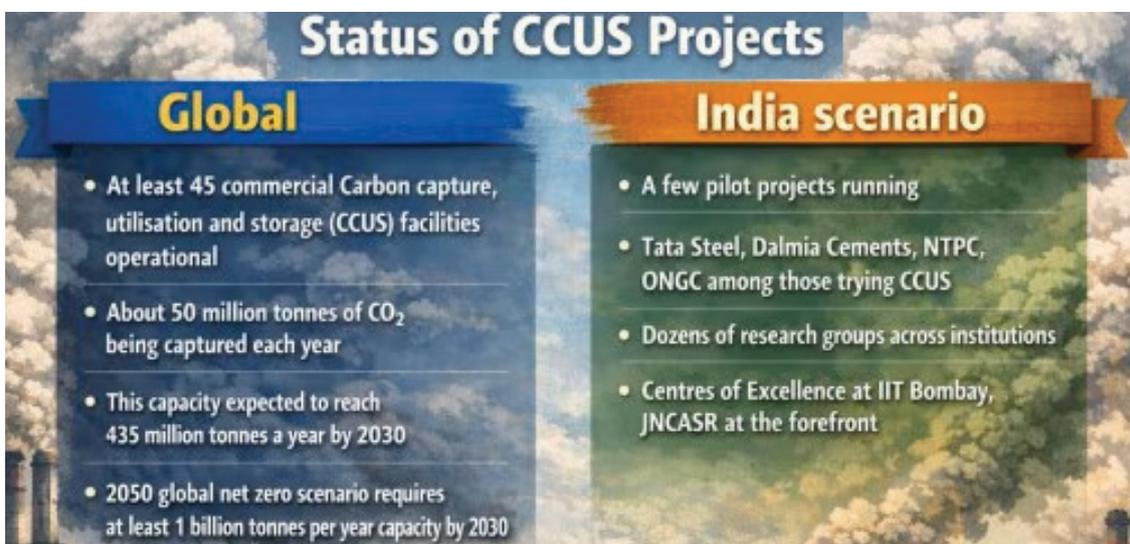
- **Carbon Capture, Utilisation and Storage (CCUS)** refers to a group of technologies that prevent carbon dioxide (CO<sub>2</sub>) emissions from entering the atmosphere.
  - ♦ **Capture:** CO<sub>2</sub> released during industrial processes is separated and collected.
  - ♦ **Utilisation:** The captured CO<sub>2</sub> can be converted into useful products such as chemicals or fuels.
  - ♦ **Storage:** Alternatively, it can be stored safely for long periods in geological formations deep underground.

### Why CCUS Matters for Climate Goals?

- Although CCUS technologies have existed for decades, their **global deployment has been limited** due to **high costs, safety concerns and scaling challenges**.
- At present, only about **50 million tonnes of CO<sub>2</sub>** are captured annually worldwide, less than **0.5%** of the nearly **40 billion tonnes** emitted each year.
  - ♦ The **global net-zero targets are unachievable without large-scale CCUS deployment**, especially as many countries struggle to sharply cut emissions from heavy industry.

### India's Growing Focus on CCUS

- Emissions are expected to rise in the **short to medium term** due to infrastructure development and industrial expansion.
- India has intensified efforts to develop **indigenous CCUS solutions**, since announcing its **net-zero 2070 pledge** at the **Glasgow Climate Summit (2021)**.
- Key developments include:
  - ♦ **Pilot and demonstration projects** in steel, cement and chemical industries;
  - ♦ **Mapping of potential large-scale capture and storage sites**;
  - ♦ Establishment of **Centres of Excellence**, such as those at IIT Bombay and the Jawaharlal Nehru Centre for Advanced Scientific Research;
  - ♦ A **CCUS R&D roadmap for 2030**, released by the **Department of Science and Technology (DST)**, identifying technological, financial and policy gaps;



### Why Is the Budget Allocation Crucial?

- A major hurdle for CCUS has been the lack of funding for **field-scale testing and deployment**. While many technologies have proven effective in laboratories, scaling them up to real-world conditions involves high risks and costs.
- The **₹20,000 crore allocation** is aimed at bridging this gap by improving the **technology readiness levels** of promising solutions.
- The meaningful impact requires technologies capable of capturing or storing **100–500 tonnes of CO<sub>2</sub> per day**.
  - ◆ Multiple CCUS technologies to achieve commercial deployment in India within the next five years.

### Economic and Industrial Benefits

- CCUS is especially important for industries like **steel and cement**, where emissions arise from fuel combustion and **core production processes themselves**.
  - ◆ In such cases, **switching to renewable electricity** alone **cannot eliminate CO<sub>2</sub> emissions**.
- The budget targets CCUS deployment in power generation, steel, cement, refineries, and chemical industries.
  - ◆ These sectors are among the **largest contributors to India's emissions**.

### Boosting Global Competitiveness

- Indian exporters are increasingly exposed to **carbon-related trade barriers**, such as the EU's **Carbon Border Adjustment Mechanism (CBAM)**.
  - ◆ Indian products can remain competitive in key international markets, by lowering their carbon footprint through CCUS.

### Looking Ahead

- India could see **commercial deployment of CCUS technologies within the next five years** with targeted funding, clearer policy direction, and growing industrial interest.
  - ◆ The push promises technological leadership, industrial resilience, and long-term economic gains, beyond climate mitigation.
- **India's ₹20,000 crore** on CCUS signals that **achieving net-zero** will require renewable energy, and **heavy investments in technologies** that deal directly with carbon emissions where they are hardest to eliminate.

Source: IE

### Daily Mains Practice Question

- [Q] Examine the significance of the recent policy push for Carbon Capture Utilisation and Storage (CCUS) technologies in India. Discuss how it can support India's net-zero commitment and enhance the global competitiveness of Indian industries.

