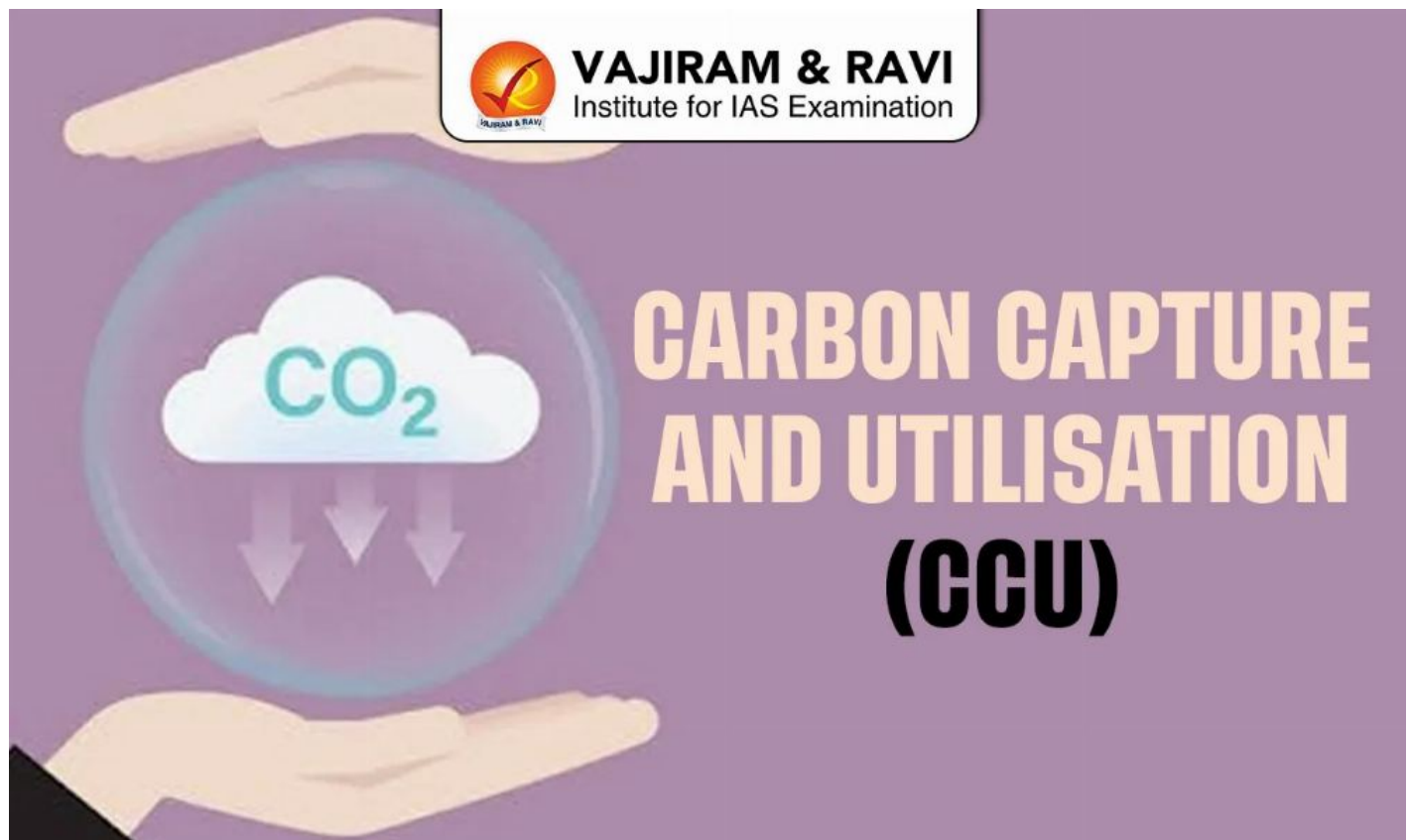


Carbon Capture and Utilisation (CCU): India's Low-Carbon Industrial Strategy

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Carbon Capture and Utilisation (CCU) Latest News

- **Carbon Capture and Utilisation (CCU)** involves technologies that capture carbon dioxide from industrial emissions or directly from the air and convert it into useful products such as fuels, chemicals, construction materials, or polymers.
- Unlike **carbon capture and storage (CCS)**, which stores CO₂ underground permanently, CCU reuses the captured carbon within the economy, turning emissions into productive inputs instead of waste.

Why India Needs Carbon Capture and Utilisation (CCU)

- India is the world's **third-largest CO₂ emitter**, with major emissions coming from power generation, cement, steel, and chemical industries.
- While renewable energy can curb future emissions, several industrial sectors remain hard to decarbonise due to their carbon-intensive processes.

- Carbon Capture and Utilisation (CCU) provides a solution by reducing emissions from these “hard-to-abate” sectors while creating new industrial value chains.
- It also supports India’s net-zero target for 2070 and promotes a circular, low-carbon economy.

India’s Progress on Carbon Capture and Utilisation (CCU)

- **Policy and Research Support** – India has begun advancing CCU through research funding by the Department of Science and Technology, which has developed a dedicated R&D roadmap.
- The Ministry of Petroleum and Natural Gas has also released a draft 2030 CCUS roadmap identifying potential projects.

Industry-Led Pilot Projects

- Ambuja Cements (Adani Group), in collaboration with IIT Bombay and Swedish partners, is piloting technology to convert captured CO₂ into fuels and materials.
- JK Cement is developing a CCU testbed to use captured CO₂ in products like lightweight concrete blocks and olefins.
- Organic Recycling Systems Limited (ORSL) is leading **India’s first pilot-scale Bio-CCU platform**, converting CO₂ from biogas streams into bioalcohols and specialty chemicals.

Global Efforts to Advance Carbon Capture and Utilisation (CCU)

- **European Union: Linking CCU to Circular Economy** – The EU’s Bioeconomy Strategy and Circular Economy Action Plan promote CCU as a tool to convert CO₂ into fuels, chemicals, and materials, supporting sustainability and circularity goals.
- **United States: Incentives and Funding Support** – The US encourages CCU through tax credits and public funding, particularly for projects producing CO₂-derived fuels and chemicals, helping scale industrial applications.
- **United Arab Emirates: Integrating CCU with Green Hydrogen** – The UAE’s Al Reyadah project and proposed CO₂-to-chemicals hubs combine CCU with green hydrogen, aiming to decarbonise heavy industry while creating new value chains.
- **China** – China is rapidly scaling CCUS projects, particularly in coal-based power and chemical industries. It is investing in pilot projects that convert captured CO₂ into fuels and building materials.

Risks and Challenges in Scaling CCU in India

- **Cost Competitiveness** – Capturing, purifying, and converting CO₂ is energy-intensive and expensive. Without policy incentives or carbon pricing, CCU-derived products may struggle to compete with cheaper fossil-based alternatives.
- **Infrastructure Gaps** – Effective CCU deployment requires co-located industrial clusters, CO₂ transport systems, and integration with downstream industries. Such infrastructure remains unevenly developed across India.

- **Regulatory and Market Uncertainty** – The lack of clear standards, certification systems, and stable market signals creates uncertainty for investors and limits demand for CO₂-based products.

Way Forward

- Although India has developed policy roadmaps for CCU, successful implementation, supportive regulations, and financial incentives will be crucial to achieving long-term climate and industrial goals.

Source: TH | CEEW

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