

Govt bets on carbon capture to go green

Experts say this technology will help India meet its emissions goals, report Subhayan Chakraborty and Shreya Jai



IMAGING: AJAY MOHANTY

The government has for the first time declared energy transition as a policy goal in the Budget. To this end, the Ministry of Petroleum and Natural Gas (MoPNG) has received a ₹35,000-crore grant in the 2023-24 Budget, which is expected to be used to deploy alternative technologies like carbon capture, utilisation and storage (CCUS).

Another fossil fuel department, the ministry of coal, is also drawing up a dedicated plan for using CCUS as an effective measure for carbon capture and reducing emissions. The Centre plans to unveil a comprehensive national policy on CCUS soon.

Increasing global scrutiny of India's emissions reductions policy and the need to effectively cut the country's carbon footprint have combined to make a tried-and-tested solution attractive once more.

India is the third-largest producer of carbon emissions after China and the US. According to government data, the country emits close to 2.65 giga tonnes of CO₂ annually, which was about 7 per cent of the world's total CO₂ emissions in 2019. In comparison, China and the US are responsible for 28 per cent and 15 per cent, respectively, of global emissions.

But the country has acknowledged that CCUS will be crucial to meet at least two of its key climate action targets under its latest nationally determined contributions to the United Nations. India has committed to reduce the carbon intensity of its GDP by 45 per cent by 2030 (from 2005 levels). It was 30 per cent earlier. It has also added a new target of creating an additional carbon sink for about 2.5-3 billion tonnes of CO₂ through additional forest and tree cover by 2030.

The CCUS value chain consists of CO₂ capture, processing, transport and disposition, or conversion of CO₂ to value-added products.

Big plans

According to the MoPNG, India's energy sector contributes 68.7 per cent of greenhouse gas emissions, followed by agriculture (19.6 per cent), industrial processes (6 per cent), land-use change (3.8 per cent) and forestry (1.9 per cent). A task force under the ministry brought out the draft '2030 Roadmap for CCUS' in 2022, which aims to develop and scale up CCUS techniques.

While there is a large number of working models for CCUS, it primarily involves the capture of CO₂ from large sources such as power generation or industrial facilities that use either fossil fuels or biomass for fuel. As a result, the government has identified oilfields belonging to state-owned oil marketing companies like Indian Oil Corporation (IOCL) for prospective CCUS projects.

It plans to transport CO₂ captured from

IOCL's refineries in Koyali in Gujarat and Digboi in Assam through pipelines to ONGC's Gandhar oil field in Gujarat and Oil India's Naharkatiya oil field in Assam, respectively, for enhanced oil recovery and sequestration.

Despite global pressure, India has not indicated any expiry date for coal, but the ministry of coal and the national miner, Coal India (CIL), are actively planning CCUS projects. The former coal secretary, A K Jain, had said a national plan for CCUS would be successful if carbon was captured at the pithead

(coal mine-end). The ministry has planned coal gasification projects to meet a target of 100 million tonnes (MT) of coal gasification capacity in the country by 2030.

Business Standard has learnt that five state-owned enterprises will set up manufacturing units — CIL, manufacturing major BHEL, GAIL, IOCL, and Neyveli Lignite Corporation (NLC). The coal ministry has proposed a production-linked incentive scheme for this.

Atanu Mukherjee, president and CEO of US-based Dastur Energy, believes that despite concerns over

coal, it also fits into the carbon capture story. "One of the ways to make coal clean is through coal gasification, which also produces CO₂ in a concentrated form. This can be easily captured and stored, or utilised. Coal will continue to be a primary source of energy in electricity generation. Carbon can also be captured from the flue gas created in the process."

Senior executives at NTPC, India's largest power generator, say that the company intends to capture waste flue gas carbon dioxide in a big way and utilise the captured CO₂ as resource material to develop a value-added product chain for CCU materials in India. Developing fuel-grade methanol by utilising flue gas CO₂, along with green hydrogen, is one of the major steps to achieve the target of generating green power, they say. NTPC is also in discussions with various technology suppliers, while its R&D arm, NTPC Energy Technology Research Alliance, is building its own tech as well.

In August 2022, NTPC commenced a CCUS pilot at its Vindhyachal thermal power station. The company said that this plant was designed to capture 20 tonnes of CO₂ every day from flue gas. Moreover, it will soon set up a hydrogen manufacturing unit at this location. Along with the captured carbon, 20 tonnes of methanol is to be manufactured as well.

Global focus

One area of concern in the use of CCUS is cost, but industry players believe this is so only in the early days. "There is an inherent cost in CCUS, but there is also a significant opportunity in accessing low-cost funds that are available internationally," says Mukherjee.

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