India's carbon markets: Transitioning from ambition to action

Deep Shah

The journey to achieving India's ambitious emissions goal by 2070 is fraught with financial challenges. India needs over $10 trillion to achieve its climate goals, whilst current capital sources can only meet $6.6 trillion of that—far short of the actual need. This gap between ambition and finance underscores the urgency for innovative mechanisms such as the carbon market.

Carbon markets are systems designed to reduce emissions by enabling entities to buy and sell carbon credits. Each credit represents a reduction or removal of one metric ton of CO_2 or its equivalent from the atmosphere. Fundamentally, carbon markets are instruments to reduce emissions in the most cost-effective manner. They provide financial incentives for industries to reduce their carbon footprint by 1) attaching a monetary value to carbon emissions, and 2) enable their trading, thereby leading to innovation in low-carbon technologies and energy efficiency measures. There are two broad types of carbon marketplaces: compliance (cap-and-trade schemes operated under regulatory frameworks), and voluntary (companies and individuals to buy credits, often as part of corporate sustainability goals).

ICF conducted a round table discussion on India's carbon markets. Invited experts included representatives from the government, market stakeholders, experts from EU and China carbon market, participating industries from compliance and voluntary markets, and think tanks. The discussions included the most recent updates on India's carbon markets, followed by a detailed discussion on the key challenges, approaches to address them, and learnings from EU and China carbon markets.

Current landscape of carbon markets in India

India has been an early adopter of carbon markets, although its participation has evolved significantly over the past two decades.

Historically, India has been a seller-side heavy participant in the global voluntary markets.

During the Kyoto Protocol era, the Clean Development Mechanism (CDM) allowed Indian projects to generate carbon credits sold to developed countries. Over time, voluntary standards like the Gold Standard (GS) and Verra (VCS) also gained prominence alongside CDM, improving the quality and credibility of these credits. Seventy-two Indian projects received credits through CDM in 2011, which was down to 31 projects in 2021. Comparatively, 39 projects received credits through GS/VCS in 2011, which increased to 62 projects in 2021.

The 2015 Paris Agreement introduced Article 6, emphasizing cooperative approaches and a robust international trading framework.

Article 6.2 allows countries to trade credits, or International Transferred Mitigation Outcomes (ITMOs) through multilateral or bilateral agreements to achieve their domestic Nationally Determined Contributions (NDCs). Article 6.4 is another UN-supervised system, expected to create a new global framework for carbon credit transactions across 14 sectors, like the CDM under the Kyoto Protocol.

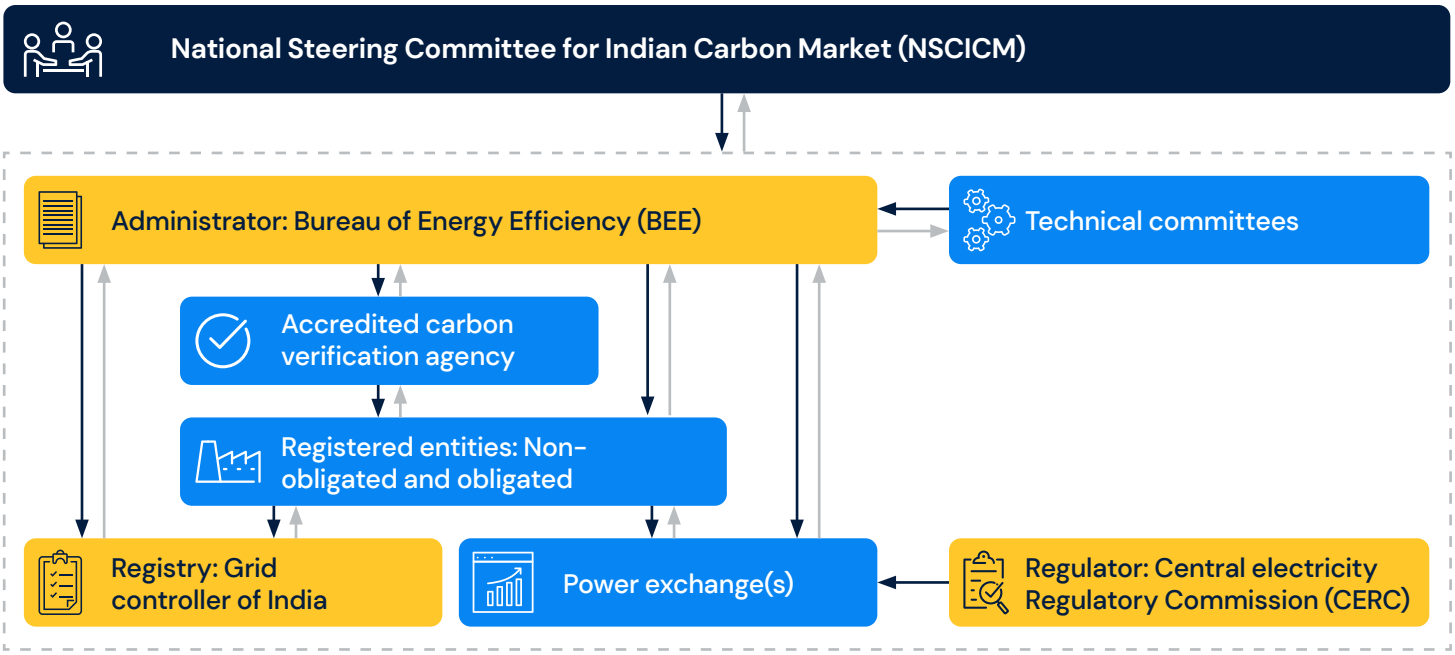
India announced the 2023 Carbon Credit Trading Scheme (CCTS), aimed at improving the economy through trading of carbon credit certificates (CCCs) in the Indian Carbon Market (ICM).

It includes a domestic compliance market and voluntary market and is expected to be implemented starting in 2026. The compliance mechanism requires obligated entities to meet specific targets, with those exceeding targets earning Carbon Credit Certificates (CCCs) and those failing to meet targets needing to surrender banked CCCs or purchase additional ones. The offset mechanism allows non-obligated entities to register their projects for issuance of CCCs upon fulfilment of the eligibility requirements.

CCTS: Institutional framework

The National Steering Committee for Indian Carbon Market (NSCICM) oversees the ICM framework and is responsible for policy and strategic direction. It comprises of representatives from relevant government ministries and agencies, representative of state government and industry experts (See Figure 1).

Figure 1. Institutional Structure for CCTS, 2023



Administrator – Bureau of Energy Efficiency (BEE): As the administrator, BEE manages all tasks related to sector identification, emission target setting, credit issuance, stability mechanisms, developing detailed procedures, accreditation of verification agencies, developing IT infrastructure, database management, capacity building, and other assigned functions. BEE has already identified nine sectors for the compliance mechanism and 10 sectors for offset mechanism as below. Initially, they will both act as separate markets with no interlinkage.

- **Compliance mechanism:** Aluminium, chlor alkali, cement, fertiliser, iron and steel, pulp and paper, petrochemical, petroleum refinery, and textile. (Targets for four sectors have already been approved and four more are close to being approved.)
- **Offset mechanism:** Energy, industries, agriculture, waste handling, forestry, transport, fugitive emissions, construction, solvent use, and CCUS (carbon capture, utilization, and storage of CO_2 and other removals).

BEE is also in the process of finalizing and approving the targets for compliance sectors and is also conducting capacity building sessions with the industry stakeholders.

Regulator – Central Electricity Regulatory Commission (CERC): CERC is responsible for setting regulations related to carbon trading, safeguarding the interest of market participants, regulating trading frequency, and overall market oversight. CERC has published the Draft Regulations for CCTS, showing its commitment to support the India Carbon Market. They have also received comments from 30+ stakeholders, which generally call for a larger role for the regulatory and seek more clarity on operational aspects, including segmentation of voluntary and compliance markets, price discovery mechanisms, re-trading allowances, and enabling bilateral trade alongside power exchanges. The draft regulations serve as a broad skeleton. As the market evolves, CERC will refine and expand these regulations.

Registry – Grid Controller of India Limited: The registry is responsible for entity registration, data management, IT platform development support, and other functions as directed by the Administrator. Currently, Grid Controller is assisting BEE in developing the platform, expected to be completed by mid-2025. The registry is also ensuring that the rules required under Article 6.2 and Article 6.4 are incorporated into the CCTS system. With experience as the registry for the Renewable Energy Certificate (REC) mechanism (developing in-house technology solutions) and the PAT Scheme (providing operational support to BEE), Grid Controller brings valuable expertise shaping the development of CCTS.

Addressing the key challenges of CCTS

Challenge #1: Setting targets that generate demand whilst also encouraging participation. Target setting requires delicate balance. Targets must be strict enough to create demand but flexible enough to encourage low emissions. Identifying this sweet spot is the key challenge. Historically, under the Perform, Achieve, and Trade (PAT) scheme, targets were set for specific energy consumption. While there is no established baseline based on historical data, what we do know is that most industries were successful in meeting the targets assigned under PAT.

1

Long-term ambition: The CCTS scheme aims for 15%–25% lower emissions by 2030, varying by industry based on feasibility. This long-term approach helps industries align with the government's decision-making timeline.

2

Sectoral approach: Whilst targets are notified at the unit level, the calculation is conducted to achieve lower emissions at the sectoral level. The sectoral targets are then broken down to the unit level.

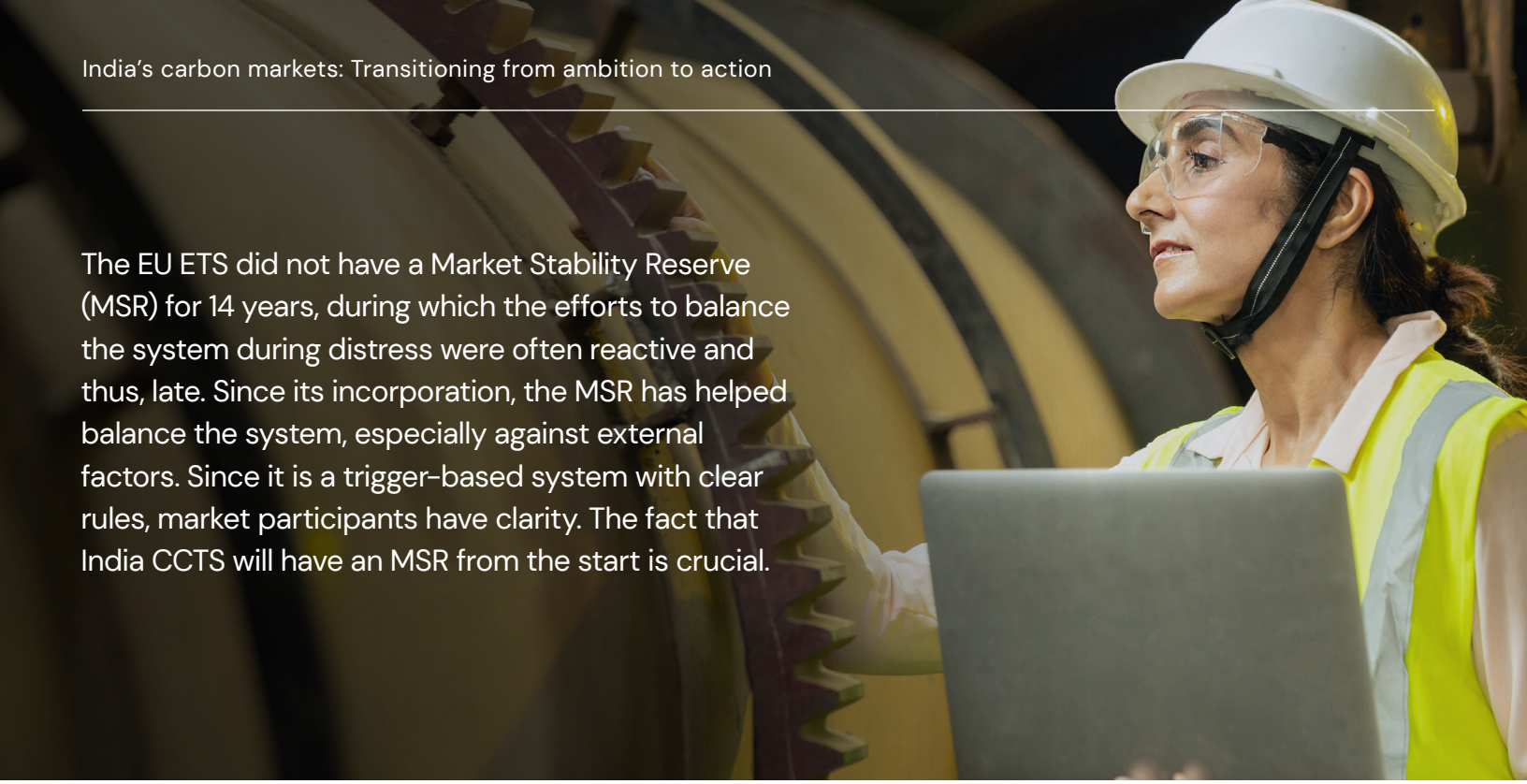
3

Phased implementation: Although targets are projected until 2030, they will be notified in three-year cycles, with the first cycle extending to 2027. This allows for flexibility and adjustments based on evolving ground realities.

4

Cost considerations: Current baseline estimates indicate industries will need to invest $20–$30 on average per ton. Targets for each sector have been assigned based on the cost of reductions for that sector.

The allocation process of European Union Emission Trading Scheme (EU ETS) is closest to the target setting process adopted for India. At the start of ETS, they too didn't have a baseline and ended up over-allocating, which crashed the system. Over time, the entities put better data monitoring, reporting, and verification (MRV) systems in place, which offered better data, allowing improved allocation in subsequent phases. India's approach of 3-year target notification cycles will be an important mechanism, allowing more balance in the system based on ground realities.



The EU ETS did not have a Market Stability Reserve (MSR) for 14 years, during which the efforts to balance the system during distress were often reactive and thus, late. Since its incorporation, the MSR has helped balance the system, especially against external factors. Since it is a trigger-based system with clear rules, market participants have clarity. The fact that India CCTS will have an MSR from the start is crucial.

Challenge #2: There needs to be a stricter enforcement mechanism to ensure the success of this scheme. The learnings from Renewable Energy Certificates (RECs) show that more stringent enforcement systems can be set in place by the state regulators (Energy Development Agencies). Accordingly, the enforcement for the CCTS will be with the Environment Protection Act and will be handled by the State Pollution Control Boards, expected to have a stronger influence over the participating entities. Further, an additional environmental compensation will be given to entities that don't buy certificates upon not achieving the targets.

Challenge #3: Sustainable price discovery and stability remain a major challenge. Carbon market prices have fluctuated wildly, with instances of halving or doubling within a year, undermining market confidence. India's experience with RECs and Energy Saving Certificates (ESCerts) shows the risks, as both faced price collapses due to weak demand and oversupply. To help stabilize the prices, the CCTS will be supported by a Market Stability Reserve (MSR). The MSR fund is not designed for daily use but will come into play in certain conditions as required to help bring more stability into the market.

Challenge #4: Capacity building at all levels—across industries, auditors, accreditation agencies and the government—is a must for the growth of carbon markets. For instance, there were about 7,000 energy auditors in 2010, which increased to 20,000 auditors by 2020. It is clear from the China and EU experiences to not wait for all the details to finalize before starting training programs. Another challenge is that the current batch of energy auditors are trained in energy, but not in emissions. The government is already planning in that direction. For instance, existing energy auditors and agencies will have to first undergo specific ISO trainings to build capacity on the carbon side. A separate, but connected challenge is communication and raising awareness of the end consumers.

Challenge #5: Need for robust systems for Measurement, Reporting and Verification (MRV) Systems: Carbon markets continue to face integrity problems such as double counting, inconsistent additionality definitions, lack of transparency, and inadequate oversight. The CCTS administrator body plans to meet the demand by developing digital MRV systems and is further exploring how AI can be used to identify mismatches and red flags in the data submissions. The digital and AI-driven systems will enable the sectoral specialists to verify the bulk data submissions in a timely fashion.

Next steps and way forward

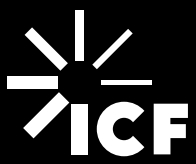
The Indian government has taken several proactive steps to strengthen its carbon market, as highlighted in the ICF roundtable discussion. The CCTS provides a structured framework with compliance and voluntary mechanisms, while a MSR will help maintain price stability. Target-setting follows a phased approach, ensuring both ambition and feasibility, and enforcement measures under the Environment Protection Act will enhance credibility. Capacity-building efforts are expanding, with emissions-focused training and AI-driven digital MRV systems improving transparency and efficiency. These initiatives collectively position India for a robust and credible carbon market.

It is also vital to create a strong value proposition for diverse stakeholders. Large corporations—especially in energy intensive sectors transitioning from the PAT Scheme to CCTS in 2026—require clear regulations, balanced targets, and sustained engagement. Expanding a competitive domestic offset market will drive participation and growth. MSMEs, facing scale and technical constraints, can benefit from aggregation models that lower costs and improve access. Carbon markets can also expand beyond energy-related projects to sectors with social and cultural co-benefits. Sub-national governments can leverage these markets to fund renewable energy, waste management, and electric mobility. Simplified participation, pre-financed models, and capacity-building programs will further align sustainability goals with financial stability.

Building on these advancements, additional steps such as aligning domestic mechanisms with global best practices will enable seamless participation in international trading, which can enhance market confidence and long-term sustainability. Targeted interventions—such as fungibility across markets, price safeguards, targeted incentives to boost demand, robust standards and transparent processes—can strengthen market resilience.

It is also important to assess how the carbon market framework interacts with other national carbon-accounting policies to avoid overlaps and ensure fair, scientific, and consistent carbon accounting. This may call for targeted skill-building, open dialogue, and clear communication strategies to foster shared understanding and build confidence. Furthermore, capacity-building programs are critical for accurate data, credible certification, and investor confidence. Close collaboration between the public and private sectors, initial handholding, and the development of knowledge products will ensure meaningful policies that translate into actionable outcomes.

India's carbon market is not just an economic tool—it is a foundation for a future where climate goals and economic growth converge. The question is not whether India can lead, but how soon this vision can become reality.



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