Future of Carbon Trading in India

This editorial is based on "Designing a carbon market" which was published in The Financial Express on 12/03/2025. The article brings into the picture India's Carbon Credit Trading Scheme (CCTS), set to launch in mid-2026, replacing the Perform, Achieve, and Trade scheme by shifting from energy efficiency to greenhouse gas-based emissions trading.

For Prelims: Carbon Credit Trading Scheme, Perform, Achieve, and Trade scheme, Carbon Border Adjustment Mechanism, Green Climate Fund, Nationally Determined Contributions, EU ETS (Emissions Trading System, Renewable Energy Certificates (REC) market, CCTS and its Regulatory and institutional frameworks.

For Mains: Key Advantages of the Carbon Market for India, Roadblocks in the Effective Functioning of the Carbon Market in India.

India's upcoming **Carbon Credit Trading Scheme** **(CCTS**), set to launch **mid-2026**, represents a significant shift in the **nation's climate policy framework.** Replacing the existing **Perform, Achieve, and Trade scheme**, this emissions trading system will transition from energy efficiency metrics to greenhouse gas equivalents, initially targeting major industrial sectors that account for **16% of India's emissions**.

What is the Carbon Market and Carbon Credit Trading Scheme (CCTS)?

- **Carbon Market and its Component:** According to the UNEP, Carbon markets are carbon pricing mechanisms enabling governments and non-state actors to trade greenhouse gas emission credits.
    - The Indian Carbon Market framework has two key mechanisms:
        - **Compliance Mechanism** – Addresses emissions from energy use and industrial sectors, ensuring mandatory reductions. Example: Power plants meeting renewable energy obligations.
        - **Offset Mechanism** – Incentivizes voluntary actions by entities not covered under the compliance mechanism to reduce GHG emissions. Example: IT companies investing in afforestation projects.
- **The CCTS:** To meet the country's ambitious climate goals, a robust National Framework for the Indian Carbon Market (ICM) is being developed through a reliable national carbon credit electronic platform.
    - **Regulatory Framework:** The **Energy Conservation (Amendment) Act, 2022** empowers the Central Government to specify a **Carbon Trading Scheme**. This amendment also allows a designated agency to issue **carbon credit certificates**, each representing **one ton of CO_2 equivalent (tCO_2e) reduction or removal** from the atmosphere.
        - Under this act, the **Central Government has notified the Carbon Credit**

Trading Scheme.

- **Institutional Framework:** The **Central Government** has established the **National Steering Committee for the Indian Carbon Market (NSCICM)** under the **Carbon Credit Trading Scheme (CCTS)** to oversee the functioning of the **Indian Carbon Market (ICM)**. Key institutional roles include:
  - **National Steering Committee (NSCICM)** – Chaired by the Secretary, Ministry of Power, with the Secretary, Ministry of Environment, Forest, and Climate Change as Co-Chair.
  - **Bureau of Energy Efficiency (BEE)** – Acts as the **administrator** of the ICM.
  - **Grid Controller of India (GCI)** – Serves as the **registry operator**, managing and operating the ICM registry.
  - **Central Electricity Regulatory Commission (CERC)** – Functions as the **regulator** for trading activities under the ICM.

What are the Key Advantages of the Carbon Market for India?

- **Boosts Industrial Competitiveness and Green Innovation:** A well-designed **Carbon Credit Trading Scheme (CCTS)** incentivizes industries to adopt **clean technologies** and improve **energy efficiency**, reducing long-term operational costs.
  - Companies investing in **low-carbon processes** gain a **competitive edge** in global markets, especially in sectors like steel, cement, and chemicals.
  - India's push for **Green Hydrogen Mission** aligns with this shift, helping industries transition to sustainable models.
  - During the year **2022-23**, the above units under PAT have saved **25.77 Million Ton of Oil Equivalent (MTOE).**
    - **Tata Steel** has pledged **net-zero emissions** **by 2045**, investing in carbon capture, propelling green innovation.
- **Facilitates Compliance with Global Carbon Border Regulations:** With the EU implementing the **Carbon Border Adjustment Mechanism** **(CBAM)** from 2026, Indian exporters—especially in iron, steel, and aluminium—will face higher tariffs unless emissions are controlled.
  - A robust domestic carbon market can **prepare Indian industries for compliance**, reducing financial losses and ensuring continued access to key markets.
  - Indian firms must integrate carbon pricing to **remain competitive in global trade**.
  - The EU's **CBAM** will impose a **CO_2 tax** on imports from carbon-intensive industries.
    - In 2022, 27% of India's exports of iron, steel and aluminum products worth **$8.2 billion went to the EU, sectors directly affected by CBAM (Commerce Ministry, 2024).**
- **Strengthens India's Position in Climate Diplomacy:** As India aims for **Net Zero by 2070**, an effective carbon market enhances its **credibility in climate negotiations** and attracts climate finance from global investors.
  - Participation in **carbon trading aligns India with international best practices**, can help secure funding from mechanisms like the **Green Climate Fund** **(GCF)** and align with **World Bank Engagement Roadmap for Carbon Markets**
  - This also improves India's diplomatic leverage in COP summits. India committed to reducing **emissions intensity by 45% by 2030** under its updated **Nationally Determined Contributions** **(NDCs).**
- **Generates Revenue and Economic Growth:** A functional **carbon trading market** creates a **new revenue stream** for both industries and the government.
  - Companies that cut emissions below their targets can **sell surplus carbon credits**, promoting circular revenue generation.
  - The government can also **auction carbon credits**, generating funds for green infrastructure and R&D in sustainable technologies.
  - For instance, the **EU ETS (Emissions Trading System)** generated **€43,6 billion in 2023 in revenues** in 2023, reinvested in clean energy projects (IEA, 2024).
  - India's **Renewable Energy Certificates (REC) market** saw a **65% surge in trading volume** in 2023, indicating rising investor interest (IEX, 2023).

- **Encourages Renewable Energy Adoption and Decarbonization:** By making carbon-intensive energy sources **financially unviable**, a carbon market pushes industries to **shift towards renewables** like **solar, wind, and green hydrogen**.
    - This aligns with India's **Energy Transition Roadmap** and accelerates its commitment to achieving **500 GW of non-fossil fuel capacity by 2030**.
    - In 2023, **India added 9.7 GW of solar PV capacity,** ranking fifth globally for new installations and cumulative capacity. The government's **Green Hydrogen Mission)** aims to produce **5 million metric tonnes** of hydrogen annually by 2030.
- **Attracts Foreign Investment and Green Finance:** A transparent and well-regulated **carbon market** makes India an attractive destination for **foreign investors** looking to fund low-carbon projects.
    - Institutional investors, **sovereign wealth funds**, and multinational corporations prefer economies with **stable carbon pricing mechanisms** for long-term sustainability-linked investments.
    - This also facilitates India's access to **green bonds and ESG (Environmental, Social, and Governance) funds**, which are rapidly growing in global markets.
    - In 2023-24, the government has issued sovereign green bonds worth Rs 200 billion in four tranches of Rs 50 billion
        - In 2023, the **World Bank's Board of Executive Directors** approved **$1.5 billion** in financing to accelerate India's development of low-carbon energy.

What are the Roadblocks in the Effective Functioning of the Carbon Market in India?

- **Lack of Stringent Emission Reduction Targets:** India's carbon credit system primarily focuses on **reducing emissions intensity**, not absolute emissions, leading to **excess supply of credits and low trading prices**.
    - Weak targets, as seen in the **Perform, Achieve, and Trade (PAT) scheme**, have resulted in **minimal financial incentives** for industries to adopt green technology.
    - Only **51% of the total ESCerts** mandated to be purchased in the **Perform, Achieve and Trade program's** cycle II were actually purchased.
    - The price of an ESCert fell from **Rs 1,200 to Rs 200** in 2022. The divergence between the sellers and buyers of ESCerts, however, varied across sectors**, far below the cost required to drive clean tech adoption.**
- **Inadequate Compliance and Enforcement Mechanism:** Despite existing carbon pricing mechanisms, **non-compliance remains high due to weak penalties and enforcement gaps**.
    - Many companies do not purchase mandatory carbon credits, and **penalties for non-compliance are either not levied or too low to be a deterrent**.
    - Without **strict regulatory oversight**, industries will continue to **evade obligations**, undermining the credibility of the carbon market.
- **Limited Sectoral Coverage and Exclusion of Key Polluters:** The initial phase of India's **Carbon Credit Trading Scheme (CCTS)** excludes major polluting sectors like **thermal power plants**, which contribute **significantly to India's GHG emissions**.
    - Additionally, key transport and agriculture sectors—significant emission contributors—are **not yet part of the trading framework**, leading to **limited market impact**.
        - A partial approach weakens the **market depth and price discovery**.
    - The **EU's Emissions Trading System (ETS)** covers **45% of its total emissions**, while India's scheme **currently lags behind.**
- **Lack of Reliable Carbon Measurement and Verification Systems:**For an efficient carbon market, emissions must be **accurately measured, verified, and transparently reported**.
    - However, India lacks **a robust monitoring framework**, leading to concerns about **double counting of carbon credits, over-reporting of emission reductions, and fraud**.
    - Without strong third-party verification, **investor confidence and global credibility remain weak**.
    - Some sectors, **such as agriculture and land use,** have complex emission pathways and

multiple sources.
        - Gathering data on emissions from these sectors requires extensive research, monitoring, and the integration of remote sensing technologies.
- **Absence of a Well-Defined Secondary Market for Carbon Credits:** A liquid and efficient secondary market is **crucial for price discovery and encouraging participation from industries and investors.**
    - However, India's carbon market lacks a structured mechanism for the resale of carbon credits, leading to low market activity and volatility in credit prices.
        - The **absence of institutional investors and speculative trading** further limits the scalability and attractiveness of the market.
- **Insufficient Integration with Global Carbon Markets:** India's carbon market is largely domestic and not yet aligned with international carbon trading mechanisms, **such as the EU Emissions Trading System (EU ETS) or voluntary carbon markets**.
    - This restricts the participation of global investors and industries in India's carbon credit system.
    - **Without harmonization with global standards, Indian carbon credits risk being undervalued**, limiting the financial incentives for companies to engage in emissions reduction actively.

What Measures can India Adopt to Deploy an Effective and Efficient Carbon Market?

- **Strengthening Emission Reduction Targets with a Dynamic Carbon Price Floor:** India must **set ambitious yet realistic emission reduction targets** to ensure a robust carbon market.
    - A **carbon price floor** should be introduced to prevent the oversupply of credits and maintain economic incentives for industries to cut emissions.
    - The government should also establish a **progressive reduction trajectory**, ensuring industries transition to cleaner alternatives over time.
        - A **dynamic pricing mechanism**, linked to global carbon markets, can help stabilize credit values and prevent market crashes.
- **Expanding Sectoral Coverage to Maximize Market Depth:** The carbon market should **gradually expand beyond industrial sectors** to include **power generation, transport, and agriculture**, which are major emission contributors.
    - A phased approach can ensure **seamless integration** of these sectors while minimizing disruptions.
    - Power plants should be brought under the **Carbon Credit Trading Scheme (CCTS)** to align with global best practices.
        - The government can also incentivize **low-carbon farming practices** by integrating carbon markets with the **National Mission for Sustainable Agriculture (NMSA)**.
- **Integrating Carbon Market with Renewable Energy Certificate (REC) Trading:** A **unified trading platform** combining **Carbon Credits, Renewable Energy Certificates (RECs), and Green Hydrogen Certificates** can enhance market efficiency.
    - This will encourage industries to invest in **renewable energy projects** while fulfilling their carbon reduction obligations.
    - The **International Solar Alliance (ISA) and India's Green Hydrogen Mission** can play a critical role in expanding the renewable credit market.
        - A **cross-sectoral credit system** will prevent duplication and create a more holistic decarbonization strategy.
- **Strengthening Carbon Monitoring, Reporting, and Verification (MRV) Framework:** A **transparent and tamper-proof MRV system** is essential to prevent fraudulent carbon credit claims.
    - **Blockchain-based registries** and **AI-driven carbon auditing tools** can be deployed to track emissions accurately.
    - Third-party verification agencies must be **accredited and regulated** to enhance accountability.
        - The **Bureau of Energy Efficiency (BEE)** should collaborate with **global carbon**

standards like Verra and Gold Standard to align India's framework with international norms.

- **Enhancing Private Sector Participation through Carbon Trading Incentives:** A well-functioning carbon market requires **active private sector participation**, which can be boosted through **tax incentives, concessional loans, and priority lending** for companies investing in clean technologies.
    - The government should encourage **carbon offset projects** in industries like **steel, cement, and transport** by linking them with **Corporate Social Responsibility (CSR) obligations**.
    - A clear **carbon pricing roadmap** will provide businesses with **policy certainty**, encouraging long-term investments.
- **Creating a National Carbon Trading Exchange for Market Stability:** A **centralized carbon trading exchange**, similar to **the EU's Emissions Trading System (ETS)**, should be established to ensure **liquidity, price stability, and transparency**.
    - This exchange can integrate with **existing electricity markets and commodity exchanges** to provide a **seamless trading experience**.
    - Leveraging **India's expertise in digital finance** (like UPI and ONDC), a digital-first carbon market platform can improve accessibility and participation.
- **Aligning Carbon Market with Global Trade Regulations:** With the EU's **Carbon Border Adjustment Mechanism (CBAM)** and similar policies in the US, India must **align its carbon pricing system with global standards** to ensure trade competitiveness.
    - A **bilateral carbon credit recognition mechanism** can be established with major trading partners.
    - Additionally, Indian exporters should be supported through **CBAM-readiness funds**, helping them transition to low-carbon production processes without suffering economic disadvantages.
- **Promoting Carbon Credit Awareness and Capacity Building:** A **well-informed industry and workforce** are essential for the carbon market to function effectively.
    - **Capacity-building programs** should be launched for industries, MSMEs, and policymakers to understand **carbon trading mechanisms**.
    - Business schools and research institutions should be encouraged to develop **specialized courses on carbon finance and carbon market operations**.

Conclusion:

India's Carbon Credit Trading Scheme (CCTS) holds immense potential to **drive emissions reductions, enhance industrial competitiveness, and align with global carbon markets.** Strengthening regulatory mechanisms, **expanding market participation, and integrating with international carbon trading systems will be crucial for its success.** A well-functioning carbon market can position India as a global leader in climate action while fostering sustainable economic growth.

Drishti Mains Question:

India's carbon market is a key instrument in achieving its net-zero targets while promoting sustainable industrial growth. Examine the potential and challenges of India's carbon market in ensuring an effective transition to a low-carbon economy.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Consider the following statements (2023)

Statement-I: Carbon markets are likely to be one of the most widespread tools in the fight against climate change.

Statement—II: Carbon markets transfer resources from the private sector to the State.

Which one of the following is correct in respect of the above statements?

(a) Both Statement—I and Statement—II are correct and Statement—II is the correct explanation for Statement—I

(b) Both Statement—I and Statement—II are correct and Statement—II is not the correct explanation for Statement—

(c) Statement—I is correct but Statement—II is incorrect

(d) Statement—I is incorrect but Statement—II is correct

Ans: B

Q. The concept of carbon credit originated from which one of the following? (2009)

(a) Earth Summit, Rio de Janeiro

(b) Kyoto Protocol

(c) Montreal Protocol

(d) G-8 Summit, Heiligendamm

Ans: B
