



## Carbon Credits in India: Hopes and Challenges

*This editorial is based on “[Are carbon credits for people, planet or consultants?](#)” which was published in The Hindu Business Line on 14/08/2025. The article examines the complexities of carbon credit markets, focusing on their role in offsetting emissions and the challenges of ensuring genuine environmental benefits.*

**For Prelims:** [Carbon Credits \(CCs\)](#), [Kyoto Protocol \(1997\)](#), [Paris Agreement \(2015\)](#), [Greenhouse Gas \(GHG\) Emissions](#), [Carbon Border Adjustment Mechanism](#), [Nationally Determined Contributions \(NDCs\)](#), [Energy Conservation \(Amendment\) Act, 2022](#), [Carbon Credit Trading Scheme](#), [Bureau of Energy Efficiency \(BEE\)](#), [Perform, Achieve, and Trade scheme](#)

**For Mains:** [Key Concerns Regarding Carbon Credits](#), [Functioning of the Carbon Market in India](#).

[Carbon credits \(CCs\)](#) represent a complex intersection of **environmental responsibility and economic strategy**. While they offer a **pathway to offset emissions** and promote sustainability, their implementation is fraught with challenges. From inflated claims to uneven benefits for communities, the journey of CCs reveals a balance between **hope, hypocrisy, and opportunity** in the fight against [climate change](#). As India navigates its path toward net-zero, the future of carbon credits must evolve into a tool for both [environmental justice](#) and **market integrity**.

## What are Carbon Credits and the Carbon Market?

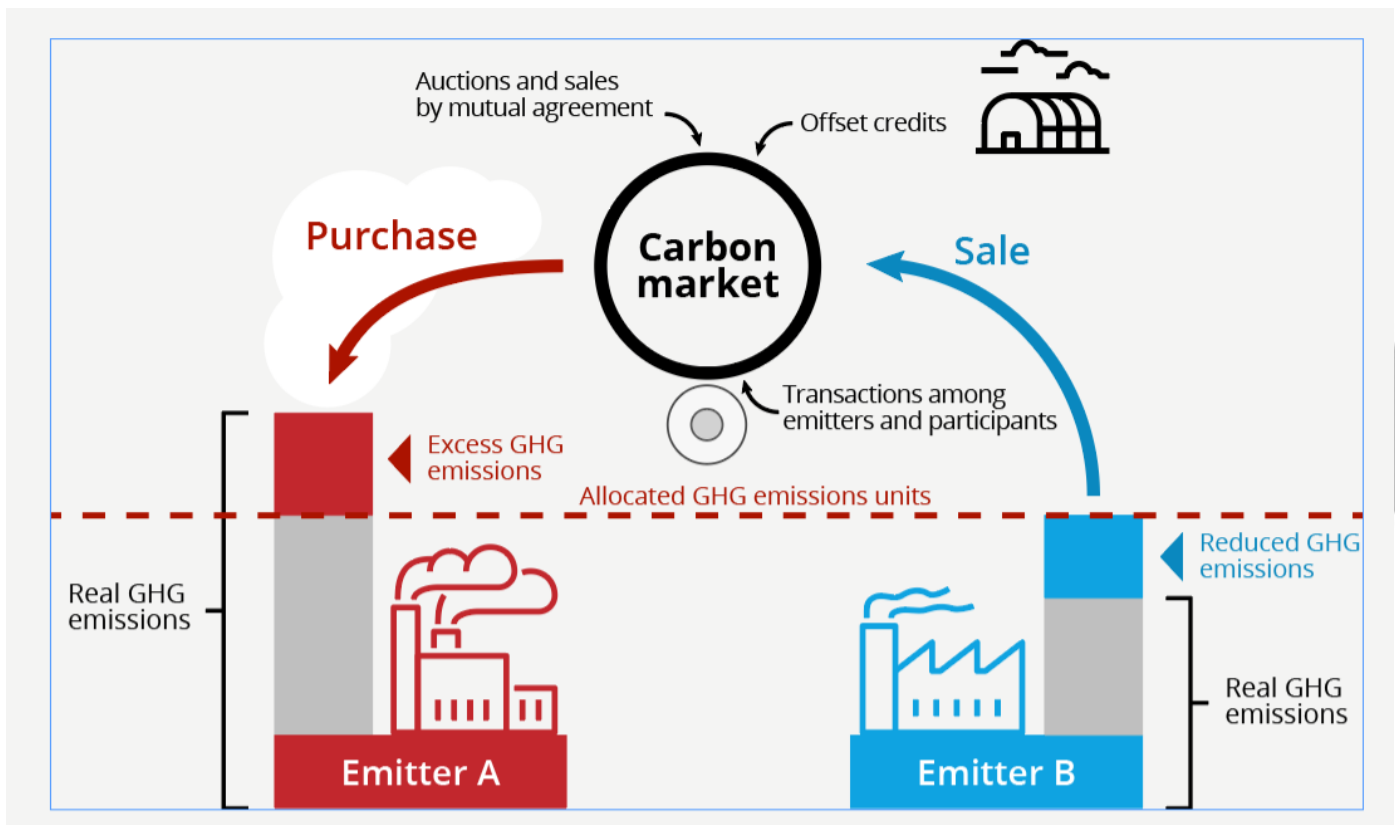
### Carbon Credits

- **About:** Carbon credits, or carbon offsets, refer to carbon emissions reductions or removals, measured in tonnes of **carbon dioxide equivalent (tCO<sub>2</sub>e)**.
  - The concept of carbon credit, introduced in the Kyoto Protocol, 1997 and reinforced by the [Paris Agreement, 2015](#), aims to reduce [greenhouse gas \(GHG\)](#) emissions through carbon trading.
    - Each carbon credit permits the emission of one tonne of CO<sub>2</sub> or its equivalent.
  - These credits are generated by projects that **absorb or reduce carbon emissions** and are certified by international bodies like the **Verified Carbon Standard (VCS)** and the Gold Standard.

### Carbon Markets

- **Carbon Markets:** Under the **Paris Agreement, Article 6** allows countries to collaborate by transferring carbon credits from emission-reducing projects to help meet climate goals, aiming to create reliable systems for trading carbon credits and ensuring transparency in emissions reductions.

- **Types of Carbon Markets:** The mandatory carbon markets, valued at **\$800 billion**, are expected to **reach \$1.88 trillion by 2030**, while the voluntary carbon markets, currently at \$3 billion, are projected to grow to \$24 billion by the same year.
  - **Mandatory Carbon Markets: Kyoto Protocol (1997)** laid the foundation for mandatory carbon markets, where companies are **legally required to limit their greenhouse gas (GHG) emissions**.
    - Companies are allowed to operate under a '**cap-and-trade**' system, where a cap is set on emissions, and entities can purchase carbon credits (CCs) to offset their emissions within the cap.
  - **Voluntary Carbon Markets:** Evolved later, driven by socially conscious action, offering opportunities for companies or individuals to voluntarily offset their emissions.
    - This is often done as part of [corporate social responsibility \(CSR\)](#) initiatives or to gain a market advantage by showcasing environmental responsibility.



## What are India's Initiatives Related to Carbon Credits?

- **Perform, Achieve and Trade (PAT) scheme:** It is a regulatory scheme to reduce energy consumption in **energy-intensive industries**, using a market-based mechanism to enhance cost effectiveness.
- **Renewable Energy Certificates (REC):** This mechanism is a **market based instrument** to promote renewable energy and facilitate compliance of renewable purchase obligations (RPO).
- **Green Credit Programme:** It is an innovative market-based mechanism designed to **incentivize voluntary environmental actions** across diverse sectors, by various stakeholders like individuals, communities, private sector industries, and companies.
- **Energy Conservation (Amendment) Act, 2022:** It empowers the Central Government to implement a **Carbon Trading Scheme** and issue carbon credit certificates. One CC represents **one tonne of CO<sub>2</sub>** equivalent reduced, avoided, or removed from the atmosphere.
- **Carbon Credit Trading Scheme (CCTS):** The CCTS is a market-based mechanism introduced to regulate and trade carbon credits under the Indian Carbon Market (ICM).
  - The CCTS aims to decarbonize the Indian economy by pricing [greenhouse gas \(GHG\) emissions](#) and facilitating carbon trading.
  - CCTS replaces PAT, shifting the focus from energy intensity to reducing GHG emission

intensity, monitoring emissions per tonne of GHG equivalent.

- It issues **Carbon Credit Certificates (CCC)**, each representing a one-tonne CO<sub>2</sub> equivalent (tCO<sub>2</sub>e) reduction.
- Managed by multiple government bodies, including the **Bureau of Energy Efficiency (BEE)** and the National Steering Committee for Indian Carbon Market (NSCICM).
- **Nationally Determined Contributions (NDCs)**: India updated its **NDCs** in 2023 to include the establishment of a **domestic carbon market**.
- **Monitoring and Verification**: The **Bureau of Energy Efficiency (BEE)** and the National Steering Committee for Indian Carbon Market (NSCICM) are responsible for ensuring the **integrity of the carbon credits** through rigorous monitoring, reporting, and verification processes.

## What are Opportunities and Challenges Associated with Development of Carbon Market in India?

- **Opportunities**
  - **Global Climate Commitment**: India's development of a carbon market aligns with its **Paris Agreement goals**, aiming for a **45% reduction in GHG emissions** by 2030 (from 2005 level) and achieving net-zero emissions by 2070.
  - **EU CBAM Influence**: The European Union's **Carbon Border Adjustment Mechanism (CBAM)** has pushed India to develop a national carbon market, ensuring its **exports remain competitive** by meeting international carbon standards, especially in high-emission sectors like steel and cement.
  - **Advancing Cleaner Technologies**: The carbon market **incentivizes cleaner technologies** by setting **sector-specific emission** intensity targets, encouraging industries to adopt **low-carbon solutions**, and positioning India to lead in sustainable practices and attract **green investments**.
  - **Economic Growth through Carbon Credits**: India's carbon market creates new financial opportunities, allowing industries to earn and sell carbon credits, with an **estimated value of \$1.2 billion**, supporting **decarbonization** efforts and promoting investments in **renewable energy**.
- **Challenges**:
  - **Limited Scope and Exclusion of Major Emitters**: Key sectors like **steel** and thermal power, which contribute significantly to emissions, are excluded from the CCTS, undermining its effectiveness in tackling overall CO<sub>2</sub> emissions.
  - **Weak Emission Reduction Targets**: The emission reduction targets for some sectors, such as cement (3.4% reduction over two years), are seen as **insufficient to meet long-term climate goals**, potentially delaying necessary decarbonisation efforts.
  - **Challenges for MSMEs**: **MSMEs** face high compliance costs, **inadequate financial support**, and a lack of technical capacity, making participation in the carbon market difficult and exclusionary.
  - **Complexity of MRV Systems and Market Volatility**: India's carbon market struggles with outdated **measuring, reporting, and verification (MRV) systems**, impairing accurate emission tracking and eroding investor confidence.
    - Coupled with **inconsistent price signals** and market volatility, driven by fluctuating emission targets and financial speculations, these challenges hinder long-term investments in emission reduction technologies.
  - **Weak Oversight**: India's voluntary carbon market, **valued at \$500 million**, suffers from minimal oversight, with nearly 90% of its value being lost in the supply chain.

## What are the Concerns Regarding Carbon Credits?

- **CC Trade and Complexity**: Carbon credit (CC) trade simplifies Earth's ecosystems into numbers. In India, **forestry projects use satellite data** to predict **deforestation**, and agriculture projects estimate soil carbon. But these predictions have big errors. A 2024 *Nature* article showed that many carbon projects overestimate results.
- **Additionality in Carbon Markets**: Additionality means carbon offset projects should reduce emissions that wouldn't happen otherwise (like wind farms replacing coal).
  - However, a 2024 report found that millions of carbon credits are questionable, meaning

many projects don't actually cut emissions, leading to [greenwashing](#).

- **Community Benefits from Projects:** India is a major supplier of carbon offset projects, like afforestation. But many projects don't benefit local communities. A World Rural Forum (2023) study showed only **0.3% of climate funds reach them**.
  - Furthermore, a 2025 *Nature* report found that half of India's forestry projects failed due to issues with community rights.
- **Permanence and Climate Risks:** Carbon credits aren't permanent if forests are burned or farming practices stop. For example, [Cyclone Tauktae](#) in 2021 destroyed Gujarat's forests, releasing carbon and wiping out the credits. Buffer systems hold 20%, but they often fail during major climate disasters.
- **Inequitable Access:** Developing countries may encounter obstacles in accessing the necessary resources or technology to engage in carbon credit generation, restricting their ability to benefit from the market and **reinforcing global climate inequalities**.

## What Steps are Required to Address Carbon Credit Concerns?

- **Reframe Carbon Credits as an Environmental Responsibility:** Carbon credits should be viewed as a **duty to the planet rather than a tradable commodity**. When industries like coal plants purchase these credits, it can delay their **transition to renewable energy**, reducing the long-term effectiveness of such projects.
- **Enhance Transparency and Accountability:** Strengthening monitoring, reporting, and verification (MRV) systems is crucial to ensure the credibility of carbon credit projects. **Real-time tracking and third-party verification** can help expose inflated baselines and improve market transparency.
- **Support Fair Negotiation Platforms for Communities:** Start-ups like C-GEM are creating platforms that help **communities negotiate better** terms in carbon credit markets, ensuring fairer agreements and that the benefits reach those directly involved.
- **Prioritize High-Impact Projects:** Focus on carbon credit projects that demonstrate clear and significant emissions reductions, such as **HFC-23 abatement**. Avoid projects with poor success rates or low-impact potential, which could undermine the integrity of the carbon credit system.
- **Align with Global Standards and Strengthen Regulation:** Align carbon credit systems with international standards such as those outlined in the Paris Agreement. The upcoming CCTS provides an opportunity to **introduce stricter regulations**, ensuring accountability and more robust market practices.

## Conclusion

While carbon credits offer an innovative way to address climate change, they are **fraught with complexities and contradictions**. The system often falls short in ensuring real, lasting environmental benefits, with issues such as overestimates, greenwashing, and a lack of community involvement. For carbon credits to be truly effective, they must **evolve from mere offsets to instruments** that drive meaningful change, promoting both environmental sustainability and social justice.

### **Drishti Mains Question**

In light of India's commitment to achieving net-zero emissions by 2070, critically analyze the potential benefits and challenges of carbon credit systems in India.

## 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)**

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