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

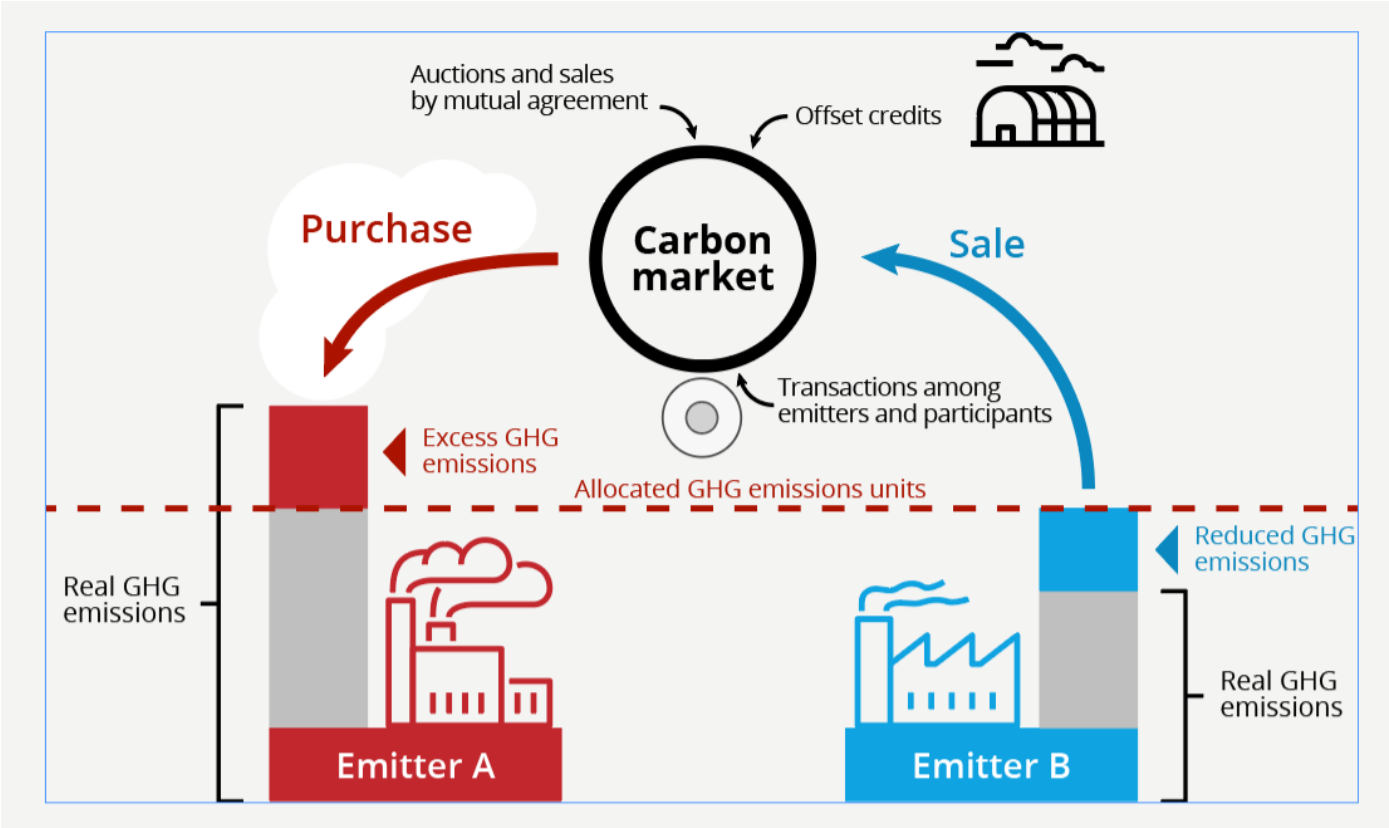
- **About:** Carbon credits, or carbon offsets, refer to carbon emissions reductions or removals, measured in tonnes of **carbon dioxide equivalent (tCO2e).**
    - The concept of carbon credit, introduced in the Kyoto Protocol, 1997 and reinforced by the **Paris Agreement, 2015,** aims to reduce **greenhouse gas (GHG)** emissions through carbon trading.
        - Each carbon credit permits the emission of one tonne of CO_2 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_2** 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 CO2 equivalent (tCO2e) 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 CO2 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)