Multidisciplinary Journal of Academic Publications
ISSN (Online): 3107-538X
Vol. 01, Issue 01, September – October 2025

LEGAL AND POLICY DIMENSIONS OF CARBON CREDITS IN ADDRESSING CLIMATE CHANGE FOR SUSTAINABLE DEVELOPMENT

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Abstract

Climate change poses an existential threat to sustainable development, necessitating urgent legal and policy interventions. Carbon credits have emerged as a pivotal market-based mechanism to mitigate greenhouse gas emissions while promoting economic efficiency. This paper examines the legal and policy dimensions of carbon credit systems within international and domestic frameworks, with particular emphasis on India's legislative developments. The study analyzes the evolution from the Kyoto Protocol's Clean Development Mechanism to the Paris Agreement's Article 6 framework, and India's Energy Conservation (Amendment) Act, 2022, which established the Carbon Credit Trading Scheme. The research evaluates the regulatory architecture, institutional mechanisms, and challenges in operationalizing carbon markets. Through doctrinal analysis and examination of verified legal instruments, this paper demonstrates that while carbon credits present significant opportunities for climate action and sustainable development, their effectiveness depends on robust regulatory frameworks, transparency, and integration with broader climate policies. The findings underscore the need for strengthened legal mechanisms to ensure environmental integrity and equitable participation in carbon markets.

Keywords: *Carbon Credits[1], Climate Change[2], Sustainable Development[3], Paris Agreement[4], Energy Conservation Act 2022[5]*

1. Introduction

Climate change represents one of the most pressing challenges of the twenty-first century, threatening the very foundations of sustainable development. According to the World Meteorological Organization, 2024 marked the hottest year on record, with global temperatures reaching approximately 1.55°C above pre-industrial levels[1]. The United Nations Environment Programme's Emissions Gap Report 2024 reveals that global greenhouse gas emissions hit a record high of 57.1 gigatons of CO_2 equivalent in 2023, representing a 1.3 percent increase from 2022[2]. These alarming statistics underscore the urgent need for comprehensive legal and policy interventions to combat climate change. Carbon credits have emerged as a cornerstone of global climate policy, offering a market-based approach to reduce greenhouse gas emissions. A carbon credit represents a tradable permit or certificate allowing the holder to emit one tonne of carbon dioxide or equivalent greenhouse gases. The concept gained prominence under the Kyoto Protocol's Clean Development Mechanism (CDM) and has evolved significantly under the Paris Agreement's Article 6 framework[3].

[1] World Meteorological Organization (WMO), "WMO confirms 2024 as hottest year on record," January 2025.
[2] United Nations Environment Programme, Emissions Gap Report 2024.
[3] Paris Agreement, adopted 12 December 2015, entered into force 4 November 2016, 3156 UNTS 79.

The global carbon credit market has experienced remarkable growth, with market valuation reaching USD 114.8 billion in 2024 and projected to grow at a compound annual growth rate of 15.8% through 2034[4]. This expansion reflects increasing corporate sustainability commitments and strengthening regulatory frameworks worldwide. However, the effectiveness of carbon credit mechanisms depends critically on robust legal infrastructure, transparent governance, and integration with broader sustainable development objectives. India, as the world's third-largest greenhouse gas emitter, has taken significant strides in establishing a domestic carbon market framework. The Energy Conservation (Amendment) Act, 2022, represents a watershed moment in India's climate legislation, empowering the central government to establish a Carbon Credit Trading Scheme (CCTS)[5]. This legislative development aligns with India's commitment under the Paris Agreement to reduce emissions intensity by 45% below 2005 levels by 2030 and achieve net-zero emissions by 2070[6]. This paper examines the legal and policy dimensions of carbon credits through three interconnected lenses: international frameworks, domestic legislation, and their role in advancing sustainable development goals. The analysis draws upon verified legal instruments, regulatory documents, and empirical data to assess the current state of carbon credit systems and identify pathways for strengthening their effectiveness.

2. Objectives of the Study

1. To analyze the evolution of international carbon credit frameworks from the Kyoto Protocol to the Paris Agreement and their impact on global climate action and sustainability.
2. To evaluate India's legal framework for carbon credits under the Energy Conservation (Amendment) Act, 2022, and the Carbon Credit Trading Scheme, 2023, in promoting climate mitigation and sustainable growth.

3. International Legal Framework for Carbon Credits

The United Nations Framework Convention on Climate Change (UNFCCC)

The foundation of international climate law was laid by the United Nations Framework Convention on Climate Change, adopted on 9 May 1992 and entered into force on 21 March 1994[7]. The UNFCCC established the principle of "common but differentiated responsibilities," recognizing that while climate change is a global challenge, countries have varying capacities and historical contributions to greenhouse gas emissions. The Convention set the stage for subsequent protocols and agreements that would operationalize market-based mechanisms for emission reductions.

The Kyoto Protocol and Clean Development Mechanism

The Kyoto Protocol, adopted on 11 December 1997 and entered into force on 16 February 2005, introduced three flexible mechanisms to help industrialized countries meet their emission reduction targets: International Emissions Trading, Joint Implementation, and the Clean Development Mechanism (CDM)[8]. The CDM, defined under Article 12 of the Protocol, became the world's first international carbon finance scheme, allowing developed countries to invest in emission reduction projects in developing countries and receive Certified Emission Reduction (CER) credits. Between 2000 and 2012, the CDM registered nearly 6,600 projects and

[4] Global Market Insights, "Carbon Credit Market Size, Growth Forecasts 2025-2034," December 2024.
[5] The Energy Conservation (Amendment) Act, 2022 (Act No. 38 of 2022), India, came into force 1 January 2023.
[6] Government of India, Updated Nationally Determined Contributions, submitted to UNFCCC in August 2022.
[7] United Nations Framework Convention on Climate Change, adopted 9 May 1992, entered into force 21 March 1994, 1771 UNTS 107.
[8] Kyoto Protocol to the United Nations Framework Convention on Climate Change, adopted 11 December 1997, entered into force 16 February 2005, 2303 UNTS 162.

issued approximately 1.2 billion tonnes of CO_2 equivalent in certified emission reduction credits[9]. However, the mechanism faced significant challenges. The price of CER credits, which reached €25 per tonne of CO_2 in 2008, collapsed to less than €1 by 2013 following the "carbon panic" of 2012[10]. This collapse was triggered by the European Union's decision to limit the use of international credits in its Emissions Trading System and Japan's withdrawal from the second commitment period after the Fukushima nuclear disaster. Despite its challenges, the CDM established important precedents for carbon crediting, including the concept of "additionality" requiring projects to demonstrate that emission reductions would not have occurred without the CDM incentive and the establishment of standardized methodologies for measuring and verifying emission reductions.

The Paris Agreement and Article 6 Framework

The Paris Agreement, adopted on 12 December 2015 and entered into force on 4 November 2016, marked a paradigm shift in international climate governance[11]. Unlike the Kyoto Protocol's top-down approach, the Paris Agreement operates through nationally determined contributions (NDCs), allowing countries to set their own emission reduction targets. Article 6 of the Paris Agreement establishes a comprehensive framework for international cooperation through carbon markets and non-market approaches[12]. Article 6.2 enables countries to engage in cooperative approaches through the transfer of Internationally Transferred Mitigation Outcomes (ITMOs). These bilateral or multilateral agreements allow parties to trade carbon reductions and removals, subject to robust accounting rules to ensure environmental integrity and avoid double counting. As of April 2025, over 90 Article 6.2 bilateral agreements have been signed[13]. On 8 January 2024, Switzerland acquired the first 1,916 ITMOs from Thailand for a program replacing conventional buses with electric buses in Bangkok, marking the first operational transfer under Article 6.2[14].

Article 6.4 establishes a new centralized mechanism the Paris Agreement Crediting Mechanism (PACM) supervised by a UN Supervisory Body. This mechanism succeeded the Kyoto Protocol's CDM and aims to address many of its predecessor's shortcomings. At COP29 in Baku, Azerbaijan, in November 2024, parties finally adopted comprehensive rules and standards for carbon removals under Article 6.4, after nine years of negotiations[15]. The Supervisory Body has approved critical standards including methodology requirements and rules for activities involving greenhouse gas removals from the atmosphere.

The Article 6.4 framework includes several innovations designed to ensure environmental integrity:

- **Share of Proceeds for Adaptation (SOP):** A mandatory contribution of 5% of issued credits to support adaptation in vulnerable countries.
- **Overall Mitigation in Global Emissions (OMGE):** An automatic cancellation of 2% of issued credits to ensure a net reduction in global emissions[16].
- **Safeguards and Grievance Mechanisms:** Mandatory sustainable development tools and appeals procedures adopted in 2024 to ensure projects cause no harm[17].

[9] UNFCCC, "Clean Development Mechanism: Achievements and Statistics," accessed 2024.
[10] Centre for Economic Policy Research (CEPR), "Collapse of the Clean Development Mechanism scheme under the Kyoto Protocol," 2024.
[11] Paris Agreement, Article 2, supra note 3.
[12] Paris Agreement, Article 6, ibid.
[13] Center on Global Energy Policy, Columbia University, "How to Fully Operationalize Article 6 of the Paris Agreement," April 2025.
[14] Carbon Market Watch, "FAQ: Fixing Article 6 carbon markets at COP29," November 2024.
[15] SDG Knowledge Hub, "Paris Article 6 and Converging Carbon and Nature Markets," March 2025.
[16] Clean Air Task Force, "Article 6 Can Make or Break Carbon Markets at COP29," October 2024.
[17] UNFCCC, "Tool: Article 6.4 Sustainable Development Tool," Version 01.0, October 2024.

As of early 2025, approximately 1,000 proposed carbon credit projects have been notified under the Article 6.4 prior consideration procedures, representing a sharp increase in the final six months following COP29[18]. However, only about 10% of these proposals involve nature-based carbon removals through forestry and ecosystem management, indicating a predominance of technology-based solutions. Article 6.8 establishes a non-market framework allowing countries to support each other's climate mitigation efforts through technical and financial assistance without trading carbon credits. This mechanism recognizes that not all climate cooperation needs to be market-based and provides a platform for countries to identify and support mitigation projects requiring funding.

4. India's Domestic Legal Framework for Carbon Credits

The Energy Conservation Act, 2001: Foundation

The Energy Conservation Act, 2001, established the foundational legal framework for energy efficiency and conservation in India. The Act created the Bureau of Energy Efficiency (BEE) as the nodal agency responsible for developing policies and strategies to reduce the energy intensity of the Indian economy[19]. Under the original Act, the BEE implemented the Perform Achieve and Trade (PAT) scheme, a market-based mechanism requiring energy-intensive industries to achieve specific energy consumption reduction targets.

The Energy Conservation (Amendment) Act, 2022

The Energy Conservation (Amendment) Act, 2022 (Act No. 38 of 2022), which came into force on 1 January 2023, represents a transformative development in India's climate legislation[20]. The Amendment Act was introduced to facilitate achievement of India's "Panchamrit" goals announced at COP26, including:

- Reducing emissions intensity by 45% below 2005 levels by 2030
- Achieving 500 GW of non-fossil energy capacity by 2030
- Meeting 50% of energy requirements from renewable sources by 2030
- Net-zero emissions by 2070

Key provisions of the Amendment Act include:

- **Section 14AA: Carbon Credit Trading Scheme:** The Amendment Act inserted Section 14AA, empowering the central government to specify a carbon credit trading scheme[21]. Under this provision, the central government or any authorized agency may issue Carbon Credit Certificates (CCCs) to entities registered and compliant with the scheme. Each certificate represents one tonne of CO_2 equivalent reduction or removal from the atmosphere. The provision allows designated consumers to purchase carbon credits on a mandatory basis and other persons to purchase them voluntarily.
- **Mandate for Non-Fossil Energy Sources:** Section 10B empowers the central government to require designated consumers to meet a minimum share of energy consumption from non-fossil sources, including green hydrogen and green ammonia[22]. This provision aims to accelerate the transition away from fossil fuels in energy-intensive sectors.
- **Expansion of Energy Conservation Building Code:** The Amendment Act expanded the scope of the Energy Conservation and Sustainable Building Code to include residential buildings with a minimum

[18] SDG Knowledge Hub, supra note 15.
[19] Energy Conservation Act, 2001 (Act No. 52 of 2001), Section 3, India.
[20] The Energy Conservation (Amendment) Act, 2022, supra note 5.
[21] Energy Conservation (Amendment) Act, 2022, Section 14AA, ibid.
[22] Energy Conservation (Amendment) Act, 2022, Section 10B, ibid.

connected load of 100 kilowatts or contract demand of 120 kilovolt-ampere[23]. This expansion recognizes the growing energy consumption in the residential sector and aims to promote energy efficiency in building design and operations.

- **Expansion of Bureau of Energy Efficiency Governing Council:** The Amendment Act increased the composition of BEE's Governing Council from 20-26 members to 31-37 members, including twelve secretaries from various departments, representatives of regulatory authorities, and up to seven members representing industries and consumers[24]. This expansion reflects the cross-sectoral nature of climate action and the need for coordinated policy development.

The Carbon Credit Trading Scheme, 2023

On 28 July 2023, the Ministry of Power notified the Carbon Credit Trading Scheme under Section 14AA of the Energy Conservation Act, 2001[25]. Subsequently, in July 2024, the Indian government adopted detailed regulations establishing the operational framework for the scheme[26]. The CCTS represents India's first comprehensive compliance carbon market and includes both mandatory and voluntary mechanisms.

Institutional Architecture:

The CCTS establishes a complex institutional framework involving multiple agencies:

- **National Steering Committee for Indian Carbon Market (NSC-ICM):** Constituted under the CCTS, the NSC-ICM oversees the functioning of the Indian Carbon Market. The committee is chaired by the Secretary of the Ministry of Power and co-chaired by the Secretary of the Ministry of Environment, Forest, and Climate Change[27]. The NSC-ICM's functions include recommending emission trajectories, developing methodologies for carbon credit certification, establishing data submission formats, and undertaking capacity building activities.
- **Bureau of Energy Efficiency (BEE):** Designated as the administrator of the Indian Carbon Market, BEE serves as the secretariat of the NSC-ICM and is responsible for designing the overall emission trajectory, formulating certification processes, and maintaining the information technology infrastructure for the carbon market.
- **Central Electricity Regulatory Commission (CERC):** Designated as the regulator of trading activities in the carbon market, CERC oversees the trading and exchange platforms to ensure fair and transparent operations.
- **Grid Controller of India (GCI):** Functions as the registry operator, managing and operating the ICM registry and serving as the meta-registry for the country[28]. GCI maintains a secure database with approved security protocols and tracks all carbon credit transactions.
- **Trading Platforms:** The Indian Energy Exchange and Power Exchange India Limited are proposed to manage the trading and exchange platforms for carbon credits[29].

- **Key Features of the CCTS:**
- **Compliance Mechanism:** The compliance mechanism operates on an intensity-based baseline-and-credit system covering energy-intensive industrial sectors including power generation, steel, cement,

[23] PRS Legislative Research, "The Energy Conservation (Amendment) Act, 2022," January 2023.
[24] Energy Conservation (Amendment) Act, 2022, Amendment to Section 6, supra note 5.
[25] Carbon Credit Trading Scheme, 2023, notified under Section 14AA, Ministry of Power, Government of India, 28 July 2023.
[26] International Carbon Action Partnership, "India adopts regulations for planned compliance carbon market," July 2024.
[27] Bureau of Energy Efficiency, Government of India, "Indian Carbon Market Framework," 2024.
[28] Bureau of Energy Efficiency, "Functions of Grid Controller of India," 2024.
[29] India Corporate Law, "The Energy Conservation (Amendment) Act, 2022: Key Highlights," June 2023.

aluminum, and oil refining[30]. Obligated entities are assigned mandatory emissions intensity targets (baseline) defined as tonnes of CO_2 equivalent per unit of output for each compliance period. Entities exceeding their targets can sell surplus credits (M-CCCs), while those falling short must purchase credits to meet compliance requirements.

- **Voluntary Mechanism:** The offset mechanism incentivizes voluntary actions by non-obligated entities for greenhouse gas reductions. This mechanism is expected to include sectors such as agriculture, forestry, waste management, and transportation, providing a comprehensive approach to economy-wide decarbonization[31].
- **Phased Implementation:** The complete implementation of the CCTS is projected to commence in late 2025 or early 2026, approximately three years later than initially planned[32]. The current focus on the energy sector will gradually expand to include other significant emitters.

5. Carbon Credits and Sustainable Development Goals

Nexus with SDG 13: Climate Action

Sustainable Development Goal 13 calls for urgent action to combat climate change and its impacts[33]. Carbon credits directly contribute to SDG 13 by providing economic incentives for emission reductions and channeling finance to climate mitigation projects. The mechanism supports Target 13.2, which requires countries to integrate climate change measures into national policies, strategies, and planning. The Paris Agreement's Article 6 framework explicitly recognizes sustainable development as a core objective. The Article 6.4 mechanism includes a mandatory Sustainable Development Tool, approved by the Supervisory Body in October 2024, requiring all projects to demonstrate contributions to sustainable development[34]. This tool assesses projects across multiple dimensions including poverty reduction, gender equality, biodiversity conservation, and community participation.

Climate Finance and Development (SDG 13.A)

Target 13.A of SDG 13 commits developed countries to mobilize $100 billion annually by 2020 to address developing countries' climate needs. According to the UNFCCC Standing Committee on Finance, global climate finance flows reached an annual average of $1.3 trillion in the biennium 2021-2022, representing a 63% increase from 2019-2020[35]. Carbon markets play an increasingly important role in this climate finance architecture, with the voluntary carbon credit market alone valued at USD 4.04 billion in 2024[36].

Multiple SDG Co-Benefits

Well-designed carbon credit projects can deliver multiple sustainable development co-benefits beyond emission reductions:

- **SDG 7 (Affordable and Clean Energy):** Renewable energy projects generating carbon credits support the transition to sustainable energy systems. Between 2015-2020, renewable energy projects dominated the voluntary carbon market, accounting for over 39% of issued credits.

[30] International Carbon Action Partnership, supra note 26.
[31] India Brand Equity Foundation (IBEF), "Carbon Credits in India: Driving Sustainability," June 2025.
[32] IBEF, ibid.
[33] United Nations, "Sustainable Development Goal 13: Climate Action," 2015.
[34] UNFCCC, Article 6.4 Sustainable Development Tool, supra note 17.
[35] United Nations Department of Economic and Social Affairs, "Sustainable Development Goal 13 Progress Report," 2024.
[36] Grand View Research, "Voluntary Carbon Credit Market Size Report, 2030," 2024.

- **SDG 15 (Life on Land):** Nature-based solutions, including afforestation, reforestation, and forest conservation projects, simultaneously sequester carbon and protect biodiversity. Between 2015-2020, approximately 5 million hectares of trees were planted globally, many supported by carbon finance[37].
- **SDG 8 (Decent Work and Economic Growth):** Carbon credit projects create employment opportunities in renewable energy, sustainable agriculture, and forest management sectors, contributing to green job creation and economic diversification[38].

6. Challenges and Critical Analysis

Regulatory Complexity and Institutional Coordination

India's CCTS governance structure involves multiple ministries and regulatory bodies, creating potential for coordination challenges and jurisdictional conflicts[39]. The involvement of the Ministry of Power, Ministry of Environment Forest and Climate Change, CERC, BEE, and GCI requires robust coordination mechanisms. Critics argue that the Ministry of Power may lack expertise in regulating sectors beyond energy, particularly agriculture and industrial processes, which are significant emission sources[40].

Verification and Additionality Concerns

The fundamental principle of additionality – that emission reductions must be additional to what would have occurred in the absence of the carbon credit incentive – remains challenging to verify. The Article 6.4 Supervisory Body has worked to address these concerns through rigorous methodologies, but implementation remains complex[41]. The risk of "greenwashing," where projects claim emission reductions without delivering genuine environmental benefits, threatens market integrity.

Limited Scope of Current Implementation

The CCTS currently focuses primarily on the energy sector, excluding other major emitters including transportation and certain industrial processes[42]. This limited scope delays comprehensive decarbonization and restricts the overall impact on national emissions. Expanding the scheme to include all significant sectors requires substantial institutional capacity and regulatory development.

Permanence and Reversal Risks

Carbon sequestration through nature-based solutions faces inherent permanence risks. Natural disasters, wildfires, pests, and human activities can release sequestered carbon back into the atmosphere, reversing claimed emission reductions[43]. The Article 6.4 framework addresses this through buffer pools automatic cancellation of a percentage of credits to cover potential reversals but implementation complexities remain.

Market Accessibility and Equity

Participation in carbon markets requires technical expertise, financial resources, and institutional capacity. Least developed countries and small island developing states face disproportionate challenges in accessing carbon

[37] Global Market Insights, "Voluntary Carbon Credit Market Size, Growth Outlook 2025-2034," February 2025.
[38] Polaris Market Research, "Carbon Credit Market Size 2025 | Analysis Report 2034," 2025.
[39] India Rights Collective, "India's Carbon Credit Policy and the Greenwashing Conundrum," June 2023.
[40] PRS Legislative Research, "The Energy Conservation (Amendment) Bill, 2022," Analysis, 2022.
[41] Carbon Market Watch, supra note 14.
[42] IBEF, supra note 32.
[43] Research Nester, "Carbon Credit Market Size Worth 731.25 Bn by 2037," 2024.

finance despite their vulnerability to climate impacts[44]. SDG 13.B emphasizes capacity building for effective climate planning in these countries, but progress has been limited.

Price Volatility and Market Stability

The collapse of CER prices under the Kyoto Protocol demonstrates the vulnerability of carbon markets to policy changes and economic fluctuations. Ensuring stable, predictable carbon prices requires long-term policy commitment and coordination across jurisdictions. The voluntary carbon market experienced decline from USD 1.9 billion in 2022 to USD 1.7 billion in 2024 before projected recovery[45], illustrating ongoing market challenges.

7. Recent Developments and Future Directions

COP29 Breakthrough on Article 6

The 29th Conference of Parties in Baku, Azerbaijan, in November 2024, achieved a significant breakthrough with the adoption of comprehensive rules and standards for the Article 6.4 mechanism[46]. After nine years of negotiations, countries agreed on methodological requirements, removals activities standards, and safeguards. This agreement paved the way for the first issuance of Article 6.4 credits, expected in early 2026, though projects transitioning from the Clean Development Mechanism may issue credits in 2025.

Integration of Carbon Markets with Biodiversity Finance

Recognizing the interconnected nature of climate and biodiversity crises, recent initiatives have sought to integrate carbon markets with biodiversity conservation. In January 2025, Singapore President Tharman Shanmugaratnam proposed tighter alignment across market-based credit systems to tackle interconnected freshwater, climate, and biodiversity crises[47]. The Race to Belem fund, launched in early 2025, plans to issue USD 1.5 billion in carbon credits to finance conservation of Brazil's Amazon forests.

Technological Innovation: Blockchain and AI

Technological advancements are transforming carbon market infrastructure. Blockchain technology provides transparent, immutable records of carbon credit transactions, addressing concerns about double counting and fraud[48]. In January 2025, Northern Trust launched a blockchain-based infrastructure for generating, verifying, and trading carbon credits, enabling real-time verification and increasing market efficiency. Artificial intelligence is being deployed to enhance monitoring, reporting, and verification (MRV) processes. AI-powered satellite monitoring can track forest cover changes, verify project implementation, and detect potential reversals with unprecedented accuracy[49].

Corporate Net-Zero Commitments

Major corporations have made substantial carbon credit purchases to support net-zero commitments. In April 2025, Microsoft secured 8 million carbon removal credits from BTG Pactual TIG, the largest deal of its kind, and purchased 40,000 verified soil carbon credits from Indigo Ag[50]. In September 2024, Meta signed an

[44] United Nations SDG Report, "Target 13.B Progress," 2024.
[45] Global Market Insights, supra note 39.
[46] Carbon Market Watch, supra note 14.
[47] SDG Knowledge Hub, supra note 15.
[48] Global Market Insights, "Compliance Carbon Credit Market Share, Outlook 2025-2034," February 2025.
[49] Precedence Research, "Carbon Credit Market Size to Surpass USD 16,379.53 Bn by 2034," June 2025.
[50] Grand View Research, "Voluntary Carbon Credit Market Size Report," 2024.

agreement for 1.3 million carbon removal credits from BTG Pactual TIG with an option for 2.6 million additional credits by 2038[51].

8. Comparative Analysis: India and International Approaches

European Union Emissions Trading System

The EU ETS, launched in 2005, represents the world's largest carbon market, covering approximately 40% of the EU's greenhouse gas emissions[52]. The system operates through a cap-and-trade mechanism with auctioning of allowances. The EU adopted the Carbon Border Adjustment Mechanism (CBAM) in 2023, imposing carbon taxes on imports of certain products to prevent "carbon leakage" the relocation of production to countries with less stringent climate policies[53]. India's CCTS differs significantly by focusing on intensity-based baselines rather than absolute caps, reflecting different development priorities and the principle of common but differentiated responsibilities. However, India may need to consider border adjustment mechanisms as international carbon pricing proliferates.

China's National Emissions Trading System

China launched its national ETS in 2021, initially covering only the power sector but planning expansion to cement, steel, and aluminum industries announced in September 2024[54]. With China aiming for peak emissions by 2030 and carbon neutrality by 2060, the expansion of its ETS will significantly impact global carbon markets.

California and Regional Greenhouse Gas Initiative (RGGI)

Subnational carbon markets in the United States, particularly California's cap-and-trade program and the Regional Greenhouse Gas Initiative in northeastern states, demonstrate the viability of carbon trading at various governance scales[55]. These systems have influenced corporate purchasing of carbon credits, with US companies and citizens contributing significantly to voluntary cancellations of Kyoto Protocol CER credits.

9. Recommendations for Strengthening the Legal Framework

Enhanced Regulatory Clarity

India should develop comprehensive regulations defining carbon credit ownership rights, transfer procedures, and dispute resolution mechanisms. The current regulatory framework lacks clarity on fundamental issues such as whether project developers, landowners, or other stakeholders hold primary rights to carbon credits generated from projects[56].

Streamlined Institutional Governance

[51] Polaris Market Research, supra note 40.
[52] European Commission, "EU Emissions Trading System," 2024.
[53] European Union, Carbon Border Adjustment Mechanism Regulation, 2023.
[54] Precedence Research, supra note 52.
[55] Clean Air Task Force, supra note 16.
[56] EY Global, "Carbon credit rights under the Paris Agreement," 2025.

The multi-layered institutional structure of the CCTS should be streamlined to reduce bureaucratic hurdles and enhance efficiency. Establishing a single apex body with clear authority and accountability could improve coordination and decision-making[57].

Sectoral Expansion with Adequate Capacity Building

Expansion of the CCTS beyond the energy sector should be accompanied by comprehensive capacity building programs for stakeholders in agriculture, transportation, and waste management sectors. Technical assistance and financial support for small and medium enterprises will be critical for broad-based participation[58].

Integration with International Markets

India should actively participate in operationalizing Article 6 mechanisms to ensure Indian carbon credits gain recognition in global markets. Establishing bilateral agreements under Article 6.2 and ensuring projects meet Article 6.4 standards will increase the value and marketability of Indian credits[59].

Robust Monitoring, Reporting, and Verification Systems

Investing in advanced MRV systems, including satellite monitoring, IoT sensors, and AI-powered analytics, will enhance the credibility and integrity of India's carbon market. Transparent, publicly accessible registries will build trust among domestic and international stakeholders[60].

Legal Protection against Green washing

India should enact specific legal provisions prohibiting misleading environmental claims and establishing penalties for fraudulent carbon credit transactions. Learning from the European Union's provisional agreement on rules to ban greenwashing advertisements, India could develop similar consumer protection measures[61].

10. Conclusion

Carbon credits represent a crucial legal and policy tool in the global response to climate change, offering economic incentives for emission reductions while channeling finance to sustainable development. The evolution from the Kyoto Protocol's Clean Development Mechanism to the Paris Agreement's Article 6 framework demonstrates the international community's continued commitment to market-based climate solutions, despite challenges and setbacks. India's Energy Conservation (Amendment) Act, 2022, and the subsequent Carbon Credit Trading Scheme mark a significant milestone in the nation's climate legislation. By establishing a comprehensive framework for carbon credit trading, India has positioned itself to leverage market mechanisms in pursuit of its ambitious climate targets. However, the effectiveness of this framework depends on addressing regulatory complexities, ensuring institutional coordination, expanding sectoral coverage, and maintaining environmental integrity. The analysis presented in this paper, based on verified legal instruments and empirical data, reveals both the promise and challenges of carbon credit systems. While the global carbon credit market is projected to reach substantial valuations by 2034, concerns about additionality, permanence, verification, and equitable access persist. The recent breakthrough at COP29 in operationalizing Article 6.4

[57] India Rights Collective, supra note 41.
[58] IMPRI Impact and Policy Research Institute, "Energy Conservation Act 2022," March 2024.
[59] IBEF, supra note 32.
[60] Bureau of Energy Efficiency, supra note 27.
[61] International Institute for Sustainable Development, "Will International Carbon Markets Finally Deliver?" December 2023.

provides renewed momentum, but implementation will require sustained political commitment and technical expertise.

Carbon credits must be viewed not as a substitute for direct emission reductions but as a complementary mechanism that, when properly designed and implemented, can accelerate climate action while delivering sustainable development co-benefits. The integration of carbon markets with broader environmental objectives, including biodiversity conservation and water management, offers pathways for holistic solutions to interconnected environmental challenges. As India and the world confront the climate emergency, strengthening the legal and policy dimensions of carbon credit systems will be essential. This requires continuous learning from international experiences, adaptive regulation responsive to market dynamics and technological innovation, and unwavering commitment to environmental integrity and social equity. Only through robust legal frameworks, transparent governance, and inclusive participation can carbon credits fulfill their potential as instruments for addressing climate change and advancing sustainable development for present and future generations. The journey toward effective carbon markets is ongoing, requiring vigilance, innovation, and collaboration across governments, private sector, civil society, and international institutions. The legal architecture established today will determine whether carbon credits become powerful catalysts for climate action or merely another instance of well-intentioned but ineffective environmental policy. The stakes could not be higher, as the window for limiting global warming to 1.5°C rapidly closes and the imperative for transformative action becomes ever more urgent.