sdmimd
Shri Dharmasthala Manjunatheshwara Institute for Management Development, Mysuru, India
9th International Conference on
Economic Growth and Sustainable Development- Emerging Trends– November 21-22, 2024

Analyzing Economic and Industrial Impact of Carbon Trading on India and Global Sustainability

Trinadh Nookathoti
Asst. Prof.- Economics,
Central University of Karnataka
Sanapala. Arundathi Raj

Abstract

As the world faces the impacts of climate change, carbon trading has emerged as a market-based approach aimed at curbing greenhouse gas emissions. In India, a nation marked by rapid industrial growth and a critical need for economic advancement, the implementation of carbon trading systems brings both potential benefits and significant challenges. While the goal is to encourage sustainable practices, this paper contends that the existing framework may unintentionally foster reliance on international markets and ultimately lead to the commercialization of climate initiatives, which could compromise genuine sustainability.

In recent years, there has been a growing emphasis on discovering innovative solutions to tackle climate change. One such approach is carbon trading, which enables companies and individuals to buy and sell the carbon dioxide emissions they generate. While this strategy has proven effective in lowering global greenhouse gas emissions, its effects on the economic and industrial sectors in countries like India require careful examination. This paper seeks to explore the economic and industrial consequences of carbon trading in India in the context of global sustainability.

Introduction

Sustainability is defined as the capacity to fulfill current needs without jeopardizing the ability of future generations to satisfy their own. It includes environmental, social, and economic aspects, striving for a harmonious approach to resource management and development. In the realm of carbon trading, sustainability emphasizes the reduction of greenhouse gas emissions while also fostering economic growth and social fairness.

Global sustainability objectives are largely established through international agreements, such as the Paris Agreement, which seeks to limit global temperature rise and encourage sustainable development.

Key components include

1. Nationally Determined Contributions (NDCs): Countries pledge to specific emission reduction targets that reflect their capabilities and responsibilities.

ISBN code 978-93-83302-74-1

2. <u>Common but Differentiated Responsibilities</u>: Recognizes that developed nations have historically contributed more to climate change and therefore bear greater responsibility in addressing it.

3. <u>Integration of Economic and Environmental Policies</u>: Promotes the alignment of economic growth strategies with environmental sustainability.

The global quest for sustainable development has highlighted the link between protecting the environment and achieving economic growth. As significant contributors to environmental harm, businesses have become the focus of government regulations designed to reduce their emissions. The carbon emissions trading system has emerged as a tool that can help incorporate environmental costs and promote the growth of a low-carbon economy through green financial strategies.

Carbon Trading as a Tool for Sustainability

Carbon trading as a Tool for Sustainability Carbon trading is a market-based approach that enables businesses to buy and sell carbon credits, particularly through cap-and-trade systems, aimed at helping countries and companies reduce emissions in a cost-effective manner. These credits signify the permission to emit a specific amount of carbon dioxide or other greenhouse gases. Companies can either lower their own emissions or buy carbon credits from others who have successfully reduced theirs to meet their emission reduction goals. This system was created to foster environmental sustainability and decrease greenhouse gas emissions, which contribute to climate change.

India has emerged as a key player in the global carbon market. The country has made significant strides in reducing its carbon footprint and is increasingly considering carbon trading as a practical solution for lessening its environmental impact. Alongside the domestic Emissions Trading Scheme (ETS) launched in 2018, India has also partnered with other nations to engage in the global carbon credit market. This shift not only paves the way for a more sustainable future but also has economic implications for the country and its industries.

History of carbon trading in India

1. 2001: India ratified the Kyoto Protocol, paving the way for carbon trading.

2. 2005: The Indian government established the National Clean Development Mechanism (CDM) Authority.

3. 2007: India's first CDM project was registered.

4. 2010: The National Action Plan on Climate Change (NAPCC) was launched.

5. 2015: India submitted its Intended Nationally Determined Contributions (INDCs) to the UNFCCC.

6. 2016: The Paris Agreement came into effect.

7. 2017: India launched the National Carbon Market.

8. 2020: India's cabinet approved the submission of its Nationally Determined Contributions (NDCs) to the UNFCCC.

9. Carbon Credit and Trading Scheme: Notified in June 2023, this framework outlines emission reduction targets for four key industries: iron and steel, cement, petrochemicals, and pulp and paper. These sectors will face compliance targets for 2024-2025, with trading commencing in 2025-2026 [1].

ISBN code 978-93-83302-74-1

India's Carbon Trading Sectors

1. Renewable Energy (50%)
2. Energy Efficiency (30%)
3. Industry (15%)
4. Forestry (5%)

Top Carbon Trading Companies in India

1. Tata Steel
2. Reliance Industries
3. ITC Limited
4. Suzlon Energy
5. Welspun Energy

India Stands 3rd In Carbon Trading After Usa And China.

Here are some case studies regarding carbon trading by industries in india :

Case Study 1: Tata Steel's Carbon Credit Project

- Project: Energy efficiency improvements in steel production
- Location: Jamshedpur, Jharkhand
- Carbon credits generated: 1.5 million
- Revenue generated: $15 million

Case Study 2: ITC Limited's Wind Power Project

- Project: 46.5 MW wind power generation
- Location: Andhra Pradesh
- Carbon credits generated: 750,000
- Revenue generated: $7.5 million

Case Study 3: Delhi Metro's Energy Efficiency Project

- Project: Energy-efficient lighting and HVAC systems
- Location: Delhi
- Carbon credits generated: 500,000
- Revenue generated: $5 million

Case Study 4: Gujarat Industries Power Company's Wind Power Project

ISBN code 978-93-83302-74-1

- Project: 75 MW wind power generation
- Location: Gujarat
- Carbon credits generated: 1.2 million
- Revenue generated: $12 million

Case Study 5: Infosys' Renewable Energy Project

- Project: 12 MW solar power generation
- Location: Karnataka
- Carbon credits generated: 200,000
- Revenue generated: $2 million

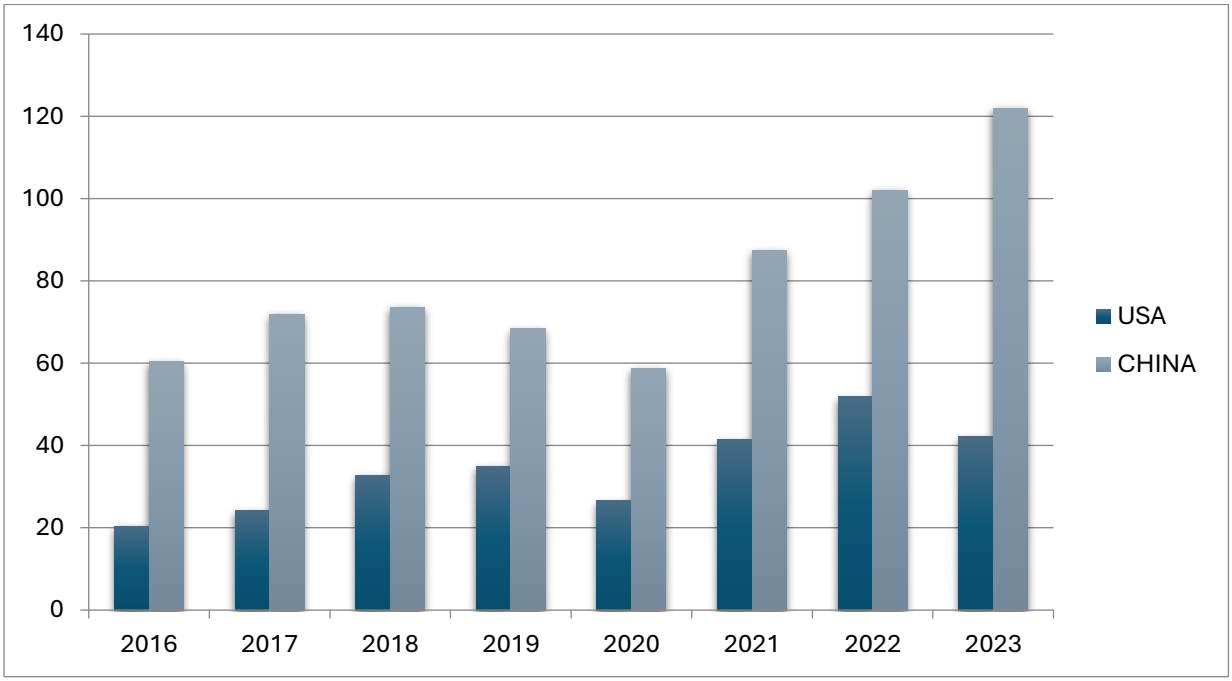
Economic Analysis of Carbon Trading

The economic impact of carbon trading in India presents a dual perspective. On one side, it can encourage greater investment in clean energy and other sustainable technologies. For example, as companies are motivated to lower their carbon emissions, they might channel funds into renewable energy sources like solar, wind, and hydropower, or seek ways to enhance energy efficiency within their operations. This transition towards cleaner energy and efficient technologies could boost the growth of India's renewable energy sector, generating jobs and fostering economic development along the way.

Conversely, carbon trading also has negative economic effects, especially for small and medium-sized enterprises (SMEs) and industries with high carbon emissions. The expenses tied to achieving carbon reduction goals might result in higher prices for goods and services, diminished competitiveness, and possible job losses. Additionally, some experts suggest that the carbon pricing system could be vulnerable to market manipulation and price fluctuations, potentially jeopardizing the long-term stability of the carbon market.

In the long run, as we continue to sell carbon limits, India risks becoming dependent on the industrial sectors of other countries rather than maintaining its independence, which could lead to economic weakness and instability. Over time, India's reliance on foreign nations for goods and services related to carbon trading may grow significantly, resulting in lost economic opportunities and diminished sovereignty. The financial burden of meeting carbon reduction targets could also strain India's resources. We have been selling approximately 8 billion carbon credits each year, generating over $400 million from these transactions. While the carbon trading market has provided India with a substantial revenue stream, particularly through carbon credits, it has also made the country more reliant on others for purchasing these credits. As the market evolves, it does bring income to the country, but much of it is offset by the costs of imports from abroad. In 2019, India's imports from China and the USA amounted to around $600 billion. These expenses undermine the potential economic advantages of the carbon trading market for Indian industries. The Indian government needs to carefully evaluate policies that focus on reducing carbon emissions while enhancing the country's self-sufficiency.

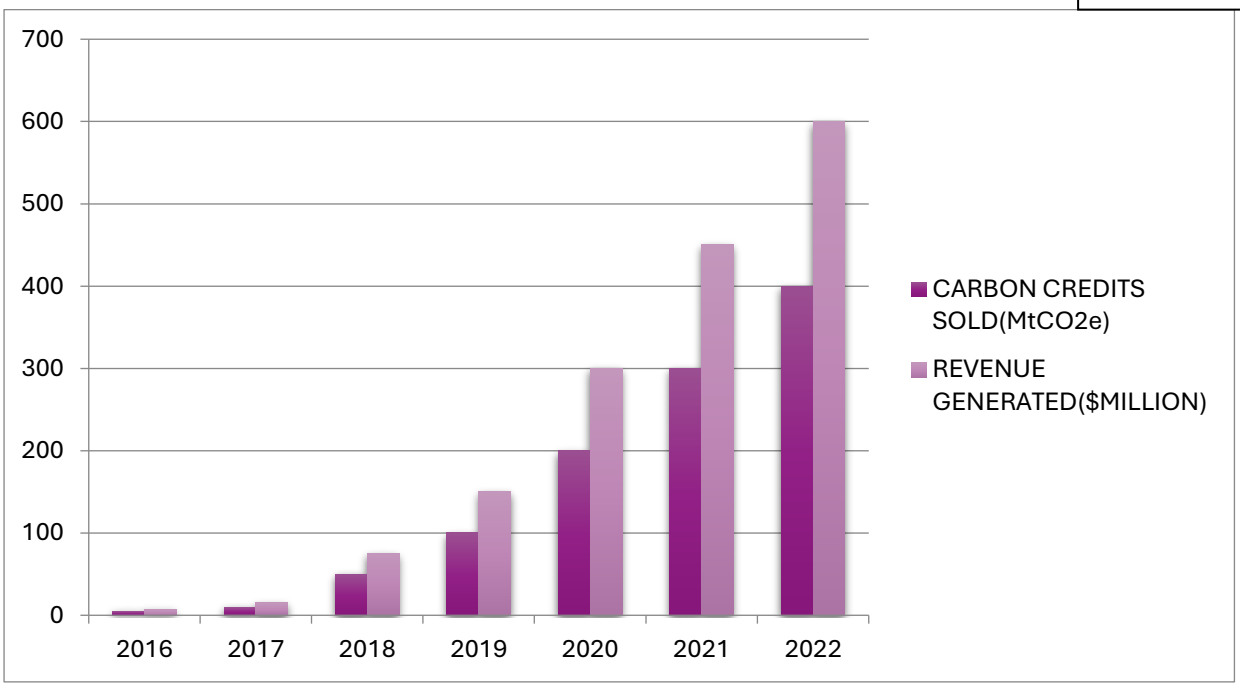
ISBN code 978-93-83302-74-1



GRAPH 1: Imports Of India From Usa And China

X-axis: years

Y-axis: billion dollars



ISBN code 978-93-83302-74-1

Graph 2: Carbon Credits Sold And Revenue Generated

X-axis : years

Y-axis : million tons carbon dioxide equivalent / million dollars

Table 1: Carbon Credits Sold and Revenue Generated

YEAR	Carbon Credits Generated (MtCO2e)	Revenue ($ million)
2016	5	7.5
2017	10	15
2018	50	75
2019	100	150
2020	200	300
2021	300	450
2022	400	600

Growth Rate Calculation

Compound Annual Growth Rate (CAGR)

Carbon Credits: 64.5% (2016-2022)

Revenue: 64.1% (2016-2022)

TABLE 2 : Year-over-Year (YoY) Growth Rate

YEAR	CARBON CREDITS (YoY GROWTH)	REVENUE (YoY GROWTH)
2017	100%	100%
2018	400%	400%
2019	100%	100%
2020	100%	100%
2021	50%	50%
2022	33.3%	33.3%

ISBN code 978-93-83302-74-1

Year-over-Year (YoY) Growth Rate = ((Current Year Value - Previous Year Value) / Previous Year Value) × 100

Compound Annual Growth Rate (CAGR) = ((End Value / Beginning Value)^(1 / Number of Years)) - 1

Average Annual Growth Rate (AAGR)= (Sum of (Yearly Growth Rates)) / Number of Years

The data above clearly states the dependency on imports from USA and CHINA . Despite the benefits of carbon trading, India has become increasingly dependent on imports, especially from China and the United States. Major imports from these countries can be analyzed as follows:

Top 5 Imports from China

Electronics: India imports a significant amount of electronic goods and components, critical for its burgeoning tech sector.

Machinery: Industrial machinery necessary for manufacturing processes, where India seeks to boost production capabilities.

Chemical Products: Several chemical products essential for pharmaceuticals and agriculture are sourced from China.

Solar Photovoltaic Cells: As India invests in renewable energy, it relies heavily on imports of solar panels from China to meet its energy targets.

Toys and Sporting Goods: These consumer goods represent a significant share of the import basket, reflecting India's huge domestic demand.

Top 5 Imports from the United States

Crude Oil: A major portion of India's energy needs is met through imports of crude oil, from which the U.S. is a significant supplier.

Aerospace and Defense Equipment: India's expanding defense sector relies on U.S. suppliers for advanced military hardware.

Pharmaceuticals: The U.S. is a key source of both raw materials and finished pharmaceutical products, critical for India's healthcare sector.

Technology and Software: High-tech products and software services form a crucial part of the import portfolio, driving India's IT sector.

Heavy Machinery: Equipment used in construction and infrastructure development often comes from the U.S., supporting India's rapid urbanization.

This dependency is especially evident in sectors like solar and wind energy, where advanced technologies are frequently imported from countries such as Germany, the United States, and China. This reliance on imports poses significant risks to India's energy security and can impede long-term economic independence.

ISBN code 978-93-83302-74-1

The financial resources generated through carbon trading could, in theory, be utilized to lessen import dependency by investing in domestic industries, fostering technological advancements, and boosting energy self-sufficiency. However, the situation reveals a paradox: as demand for high-quality goods and services rises, India finds itself increasingly dependent on imports.

Economic Implications

Trade Deficits: The rising imports contribute to trade deficits, which can threaten the country's economic stability.

Domestic Manufacturing: Dependence on foreign products can hinder local manufacturing efforts, resulting in job losses and diminished domestic production capabilities.

Sustainable Development Paradox: While carbon trading may offer benefits, the growing carbon footprints from imported goods could undermine the environmental gains achieved through emission trading schemes.

Commercialisation Of Carbon Trading

Carbon trading turns the challenge of reducing emissions into a business opportunity rather than a genuine environmental necessity. This shift raises ethical concerns about whether the pursuit of profit can overshadow the essential goal of combating climate change. It may also encourage greenwashing, where organizations claim to be environmentally friendly without making meaningful changes to their operations.

The goal of reducing emissions should not be driven by profit in carbon trading. If the focus shifts too heavily toward financial gain, it undermines the effectiveness of climate policies. Moreover, it poses risks to social and environmental justice, particularly in India, where marginalized communities often suffer the most from environmental degradation.

Long Term Sustainability

Sustainable development requires a comprehensive approach that balances economic growth with environmental stewardship. The key question is whether carbon trading supports or detracts from true sustainability practices. Long-term policy integrity must take precedence over immediate economic benefits.

Conclusion

Carbon trading represents a forward-thinking approach to tackling climate change in India. However, it is crucial to evaluate its effectiveness from an economic and industrial perspective. Relying on carbon credits from imports could expose local economies to vulnerabilities, undermining the goal of sustainable development. The commercialization of climate initiatives risks transforming the fundamental aim of environmental stewardship into a profit-driven enterprise. Moving forward, India should aim to establish a carbon trading framework that encourages local investments in sustainable technologies while genuinely committing to climate stewardship, balancing economic growth with environmental considerations.

ISBN code 978-93-83302-74-1

Recommendations

Domestic Markets Legacy: Develop a strong domestic carbon credit market that incentivizes local emission reduction projects.

Technology Transfer: Enhance the ability of small and medium enterprises (SMEs) to achieve their targets independently by facilitating technology transfer and capacity building.

Policy Adjustment: Carbon trading policies should be refined to ensure they support sustainable development goals, emphasizing long-term environmental integrity over short-term economic benefits.

Public Awareness: Boost public awareness and engagement in climate action to foster collective responsibility and innovation in sustainable practices.

Sources

Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India

Central Electricity Regulatory Commission (CERC)

Indian Energy Exchange (IEX)

National Stock Exchange of India (NSE)

https://www.grandviewresearch.com/horizon/outlook/carbon-credit-market/india#:~:text=The%20India%20carbon%20credit%20market%20generated%20a%20revenue,expected%20to%20reach%20USD%2049%2C448.6%20million%20by%202030

.Articles

“Carbon Trading in India: An Overview” by The Energy and Resources Institute (TERI)

“India’s National Carbon Market: A Review” by the Centre for Policy Research

“Carbon Pricing in India: A Study” by the Indian Institute of Management (IIM)

.**Websites**

National Clean Development Mechanism Authority – cdma.nic.in

United Nations Framework Convention on Climate Change (UNFCCC) – unfccc.int

International Emissions Trading Association (IETA) – ieta.org

The World Bank – Carbon Pricing Dashboard – worldbank.org/en/topic/carbonpricing

ISBN code 978-93-83302-74-1