IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

CARBON TAX IN INDIA: OBJECTIVES, IMPACT AND POLICY PERSPECTIVES

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Abstract

Climate change is an urgent global issue, and carbon taxation is becoming a central instrument to contain greenhouse gas emissions while promoting sustainable economic development. Sweden, Canada, and the European Union have all implemented carbon tax systems, but India has particular challenges with its coal-based economy, industrial competitiveness concerns, and affordability. This research evaluates the viability of carbon taxation in India through consideration of economic impacts, policy obstacles, and best international practices. The research finds that a carbon tax phased into operation, together with revenue reinvestment in renewables and linking with India's Carbon Credit Trading System (CCTS), can facilitate the country achieving its climate ambition under the Paris Agreement while being economically stable. The study is keen on asserting that well-designed carbon taxation accompanied by subsidies on green technology will propel the fair transition toward India's low-carbon economy.

Keywords: Carbon Tax, Greenhouse Gas Emissions, Climate Change, Clean Energy, Carbon Pricing, Economic Growth, Renewable Energy, India's Carbon Policy, Emissions Reduction, Carbon Credit Trading.

Introduction

Climate change constitutes an existential risk for world economies, societies, and ecosystems with an increase in global temperatures, intensified weather events, and pollution, affecting billions across the globe. Amongst those policy measures for climate change reduction, carbon tax has become one of the more efficient ways of cutting down GHG emissions through putting a carbon price tag on carbon-consuming behaviour. By deterring the use of fossil fuels and encouraging cleaner energy sources, carbon taxes provide economic incentives to companies and citizens to go green.

With its status as the world's third-largest carbon emitter, India is under tremendous pressure to reconcile its fast-paced economic growth with aggressive climate targets. While India has implemented indirect carbon pricing instruments like the Coal Cess (2010), the Perform, Achieve, and Trade (PAT) Scheme, and Renewable Energy Certificates (RECs), a direct carbon tax is still a controversial policy option. Fears about its effect on industrial competitiveness, the affordability of energy, and economic growth have slowed its introduction.

In the face of these hurdles, lessons from foreign experiences in Sweden, Canada, and New Zealand are particularly instructive on how to effectively design carbon tax policy. All three countries have successfully implemented carbon taxes by adopting staged implementation, recycling revenue into renewable energy, and safeguarding strategies for vulnerable industries and households. India can strategically shift towards a cleaner, more sustainable economy by implementing a carbon tax while protecting industrial competitiveness.

This report examines the feasibility, economic consequences, and policy implications of carbon taxation in India. Based on a detailed review of global best practices, sectoral issues, and stakeholder views, this research seeks to create a formal framework for carbon taxation that responds to India's economic and environmental priorities. A properly calibrated carbon tax, harmonized with the nation's Carbon Credit Trading System (CCTS) and other

sustainability programs, can be a potent tool in attaining long-term climate objectives while ensuring economic resilience and competitiveness on the world stage.

Literature Review

Schneider, H. (2024)."Common but Differentiated Responsibilities in the Paris Agreement."

Schneider (2024) analyzes the mechanism of Common but Differentiated Responsibilities (CBDR) under the Paris Agreement and how nations craft climate policies relative to their economic and technological capabilities. The study alludes to challenges of equity among global climate policy, especially for emerging economies such as India, whose growth has to be weighed against environmental sustainability. Schneider also elaborates on the challenges of the flexibility of the CBDR principle, observing that whereas it enables specific national policies, it also makes it difficult to compare commitments and can result in self-serving action by countries. The research also examines the capability of CBDR to constrain as well as to increase ambition depending on its operation within mechanisms such as the Global Stocktake.

Ernst & Young LLP (2018). "Discussion Paper on Carbon Tax Structure for India."
Ernst & Young LLP (2018) analyzes the feasibility of introducing a carbon tax in India and describes how excise taxes on fuel serve as an implicit carbon pricing mechanism. The report suggests a calibrated carbon tax regime aligned with the Goods and Services Tax (GST) to enhance revenue collection and speed up the transition to clean energy without disproportionately impacting industrial competitiveness. Moreover, the research indicates that a carbon tax can be key to India's emission reduction goal, recommending an effective and fair tax rate. In addition, it highlights the need for clear communication and phased implementation to win public and industry support for the carbon tax policy.

Mercer-Blackman et al. (2023). "Are Carbon Taxes Good for South Asia?" World Bank Policy
Mercer-Blackman et al. (2023) employ the Climate Policy Assessment Tool (CPAT) to consider the impacts of levying a $25 per ton CO_2-equivalent carbon tax in South Asia. Their results suggest that such a tax would generate monetized welfare co-benefits, efficiency costs netted out, of 1.4% of GDP by 2030. Moreover, the tax is estimated to raise revenues equal to 1.3% of GDP, which, if invested in public infrastructure and green projects, could marginally increase economic growth rates. The research also shows that such a strategy can ensure a more balanced income distribution, as confirmed by a decrease in the Gini coefficient. Such findings emphasize the effectiveness of a properly designed carbon tax as a twin-purpose tool in supporting both environmental sustainability and regional economic development

Congressional Research Service (2023). "India: Climate Change Issues."
The Congressional Research Service (CRS) has studied India's climate change targets and carbon pricing regimes. India has used indirect carbon pricing via fuel taxes but does not have explicit carbon taxation, as their report states. The CRS implies that the introduction of explicit carbon taxes would enable India to achieve its long-term economic and environmental goals.

Global CCS Institute (2023). "India's Carbon Credit Trading Scheme & CCUS Report.".

The Global CCS Institute (2023) analyzes India's development in creating its carbon credit market and policy strategy for Carbon Capture, Utilization, and Storage (CCUS). The report emphasizes that although CCUS is yet to be included fully in India's emissions trading schemes, it has been considered as a crucial removal activity under Article 6.2 of the Paris Agreement. The research suggests implementing a hybrid system of combining carbon taxation with emissions trading schemes for policy stability and long-term emissions decline. This method can be used to incentivize private investment in low-carbon technologies such as CCUS. The research places significant importance on the use of market-based instruments as a means to develop an overarching and sustainable climate policy framework to enable India to reach its net-zero targets.

United Nations DESA (2024). "The Interaction of Carbon Taxation with Other National Measures."

The United Nations Department of Economic and Social Affairs (UN DESA) has assessed the interaction between carbon taxation and other policy tools, highlighting the necessity of combining carbon taxes with emissions trading schemes and other policy tools to reduce economic distortions, especially in developing countries such as India. This integrated strategy has the goal of increasing the efficiency of carbon pricing instruments by making sure that policies work complementarily, not competing against one another, to advance both environmental and economic goals.

Muthu, E. S. (2024). "Carbon Tax as a Climate Solution." Journal of Environmental Law & Policy.
Muthu (2024) analyzes carbon taxation as a possibility for an Indian climate policy solution with special focus placed on the different administrative, economic, and political issues that may appear during its enforcement. Owing to these impediments, the study argues, however, that a well-designed carbon tax can help drive India towards a considerable leap forward for its 2070 net-zero pledge. It contends that such a tax would encourage investments in clean energy, promote technological innovation, and lead to a more sustainable industrial environment. In order to avoid causing minimal disturbance to economic activity, the study suggests a gradual implementation of the tax. Such a gradual rollout would provide industries with time to adjust, while allowing the government to develop institutional capacity and popular support, ultimately positioning carbon taxation as a central tool in India's climate policy.

Roelfsema et al. (2020). "Taking Stock of National Climate Policies." Nature Communications.

Roelfsema et al. (2020) examine the impact of national climate policies in helping countries meet the goals of the Paris Agreement and stress the imperative for more intense policy integration. The research recognizes that there are substantial gaps between what is currently being done by national efforts and what is needed to meet climate action levels, especially in the case of emerging economies. Integration of carbon taxation with renewable energy policy to have synergistic impacts is one major recommendation. The study asserts that carbon taxes, properly designed, can be an additive policy instrument to speed the transition to low-carbon technologies by internalizing environmental costs and reallocating market incentives. The combination of fiscal instruments such as carbon taxes with direct support for renewables allows countries to improve the policy coherence and overall impact of their climate policies.

Pradhan & Ghosh (2012). "The Impact of Carbon Taxes on Growth, Emissions, and Welfare in India."
Pradhan and Ghosh (2012) use a Computable General Equilibrium (CGE) model to measure the macroeconomic effects of imposing a carbon tax in India. Their findings indicate that even though carbon taxation is found to very effectively curtail carbon emissions, it can cause a marginal decrease in GDP growth, especially in the short run. The analysis stresses the environmental-economic trade-offs and demands a balanced policy response. In order to reduce negative economic effects, the authors suggest a gradual and properly calibrated approach towards implementation. The strategy would enable industries and consumers to adapt over time to ensure that carbon taxation enhances India's climate goals without compromising economic growth and competitiveness in key sectors of the economy.

Objective of Study

1. To assess the Feasibility and Impact of Carbon Taxation in India
2. To compare India’s Carbon Taxation Approach with Global Models
3. To develop Policy Recommendations for an Effective Carbon Tax System
4. To analyze the Challenges and Barriers to Implementing a Carbon Tax in India

Research Methodology

This study employs a mixed-methods approach, integrating both quantitative and qualitative analyses to assess the feasibility, impact, and challenges of implementing a carbon tax in India. The methodology includes:

1. **Secondary Data Analysis**

- Reviews policy reports from OECD, the Paris Agreement, and the World Bank to examine India’s carbon pricing mechanisms.
- Analyses existing implicit carbon pricing frameworks, such as the Coal Cess, Perform Achieve Trade (PAT) Scheme, and Renewable Energy Certificates (REC), to evaluate their effectiveness in reducing emissions.

2. **Comparative Case Studies**

- Evaluates carbon tax models from Sweden, the EU, British Columbia, and South Africa to understand best practices.
- Studies tax rates, sectoral exemptions, and revenue reinvestment strategies to identify lessons applicable to India’s economic and environmental landscape.

Comparative Case Studies: Global Carbon Tax Models and Insights for India

- The **European Union's Emissions Trading System (EU ETS)** operates on a cap-and-trade mechanism, covering power, industry, and aviation sectors. Its phased implementation has successfully reduced emissions while allowing companies to trade allowances, offering a flexible approach to carbon pricing. For India, the EU ETS highlights the importance of a **gradual phase-in strategy and strong enforcement mechanisms**, ensuring industries can adapt while meeting emissions targets.
- Sweden's carbon tax, introduced in 1991, is one of the highest in the world, currently at approximately **$126 per ton of CO_2**. Despite this high tax rate, Sweden has continued economic growth while achieving significant emission reductions, particularly in the heating sector. The key lesson for India from Sweden's model is that **a strong price signal can drive substantial emission reductions, but targeted exemptions for key industries may be necessary** to maintain economic stability. Furthermore, Sweden reinvests part of the tax revenue into renewable energy projects, reinforcing the idea that **carbon tax revenues should be strategically used for green energy transition**.
- British Columbia, Canada, implemented a **revenue-neutral carbon tax** in 2008, starting at **CAD 10 per ton of CO_2**, with gradual increases. The tax applies broadly to nearly all fossil fuel consumption, and all revenue is returned to citizens through **income tax reductions**. This model has successfully lowered per capita emissions while maintaining public acceptance. India can adopt a similar approach, as **returning carbon tax revenue to households or businesses can enhance political and public support**, making the transition smoother.

- South Africa introduced an explicit carbon tax in **2019 at $8 per ton CO_2**, balancing economic competitiveness with environmental goals. The country has **gradually increased tax rates** while providing **exemptions for certain industries** to minimize economic disruptions. India can learn from this phased approach, as **introducing a carbon tax in stages can prevent economic shocks and allow businesses to adapt**. Additionally, South Africa reinvests a portion of its tax revenue into clean energy subsidies, emphasizing the need for **transparent fund utilization**.

- Chile, which implemented a **$5 per ton CO_2 tax in 2017**, presents an example of a less effective carbon pricing strategy. The low tax rate and weak enforcement mechanisms have **failed to create strong incentives for emissions reduction**, resulting in continued reliance on fossil fuels. India should ensure that **carbon pricing is high enough to influence industry behavior** and that enforcement mechanisms are **strictly implemented to prevent non-compliance**.

- British Columbia's revenue-neutral carbon tax, introduced in 2008 at **CAD 10 per ton of CO_2**, has gradually increased to **CAD 65 per ton** by 2023. The tax was designed to be **revenue-neutral**, meaning all collected revenue was returned to the public through **income tax cuts and rebates**. This approach successfully reduced per capita fuel consumption by **15% in five years** while maintaining **economic growth on par with the rest of Canada**. However, some studies indicate that **low-income and rural populations were disproportionately affected**, despite the rebate system. For India, this highlights the importance of **redistributing carbon tax revenues** through **targeted subsidies or tax reductions** to prevent adverse socio-economic impacts.

- New Zealand initially implemented a **carbon tax in 2005**, but later replaced it with an **Emissions Trading System (ETS) in 2008** to provide greater flexibility for industries. The **NZ ETS covers multiple sectors, including forestry, energy, and transport**, with a gradually tightening emissions cap. While the system helped reduce emissions in **forestry and energy-intensive industries**, the **initially low carbon prices and lack of strict enforcement reduced its effectiveness**. India's **Perform Achieve Trade (PAT) scheme and Renewable Energy Certificates (REC) program** function similarly but suffer from **oversupply issues and weak enforcement**. Strengthening these existing mechanisms before implementing a direct carbon tax would create a **smoother transition to an effective carbon pricing model**.

- Singapore introduced a **carbon tax in 2019**, becoming the first Southeast Asian country to implement explicit carbon pricing. The initial tax rate was **S$5 per ton of CO_2**, set to increase to **S$25 in 2024 and up to S$80 by 2030**. Unlike cap-and-trade systems, Singapore's tax **applies to large emitters without providing free allowances**, ensuring that all major polluters contribute. While businesses initially had concerns about **rising operational costs**, the **predictable tax roadmap and reinvestment in green technologies** helped smooth the

transition. India can learn from this approach by **introducing a low initial carbon tax and gradually increasing rates**, allowing industries to adapt while ensuring long-term emission reductions.

- From these global case studies, India can derive several important lessons. **First, a sectoral focus on energy-intensive industries** such as **coal, steel, cement, and power generation** is crucial to achieving meaningful emission reductions, as seen in the **EU ETS and New Zealand ETS**, which prioritize high-emission sectors before expanding coverage.
- **Second, gradual implementation of a carbon tax or emissions trading system (ETS)** can prevent economic instability. **Singapore and South Africa** have successfully introduced phased carbon tax increases, allowing industries time to adjust while ensuring long-term emission reductions.
- **Third, revenue recycling**, such as reinvesting funds in **renewable energy projects, energy efficiency programs, and direct rebates for consumers**, can increase public acceptance. **British Columbia's revenue-neutral carbon tax** demonstrated that redistributing tax revenues to households and businesses **reduces opposition and improves compliance**.
- **Fourth, strong compliance measures** are essential to ensure the effectiveness of carbon pricing mechanisms. **Chile's carbon tax failed** due to weak enforcement, while **Sweden's high and strictly implemented tax ($126 per ton CO_2)** successfully reduced emissions. **India must ensure strict monitoring, penalties for non-compliance, and transparent enforcement**.
- **Lastly, India would benefit from a hybrid approach, combining explicit carbon taxation with an enhanced emissions trading framework**, to strike a balance between economic growth and environmental sustainability. **New Zealand's ETS and the EU cap-and-trade system** provide a flexible model that **India can integrate with its existing PAT & REC programs**, ensuring a **smooth transition towards a low-carbon economy**.

Assessing the potential impact of carbon taxation in India requires a comprehensive analysis of various economic indicators and data from global repositories.

Carbon Tax Rate Scenarios and Economic Impact Projections

- **Carbon Tax Rate Scenarios:** Implementing a carbon tax in India involves determining appropriate tax rates. Studies suggest that a tax of **$35 per ton of CO_2** could be effective.
- **Economic Impact Projections:** A carbon tax would increase production costs for industries, potentially leading to higher consumer prices. However, the revenue generated could be used to fund climate mitigation measures, such as renewable energy projects and energy efficiency programs, which may offset some economic drawbacks.

Sector-Wise Elasticity of Emissions Reduction Due to Taxation

- Elasticity Estimates: Research indicates that a €10 increase in carbon pricing can lead to a 3.7% reduction in CO_2 emissions from fossil fuels in the long term. The effectiveness varies by sector, with the electricity and heat sector showing significant responsiveness to carbon pricing

GDP Growth vs. Carbon Emissions Correlation

- Economic Growth and Emissions: Implementing a carbon tax can have mixed effects on GDP growth. While it may impose additional costs on industries, the revenue generated can be reinvested in the economy, potentially leading to new job creation and technological advancements. The net effect on GDP would depend on the balance between these factors.

Inflation and Consumer Price Index (CPI) Variations Due to Taxation

- Inflationary Effects: A global carbon tax of $100 per ton of CO_2e is projected to cause an inflation increase of 4.08% in the Producer Price Index (PPI) and 3.53% in the Consumer Price Index (CPI). For India, the specific impact would depend on the tax rate implemented and the structure of the economy.
- **Trade Flow Impacts – Carbon Tax on Exports and Imports**

Trade Considerations: The European Union's proposed Carbon Border Adjustment Mechanism (CBAM) aims to levy taxes on carbon-intensive imports, which could affect India's exports, particularly in sectors like steel and aluminium. India has expressed concerns that such measures are unfair and could hinder its economic development.

- **Job Market Shifts and Employment Effects by Sector**

Employment Impacts: The introduction of a carbon tax is expected to reduce demand for emissions-intensive energy sources, potentially leading to job losses in sectors like coal mining and oil extraction. Conversely, it could stimulate job creation in renewable energy sectors and industries focused on energy efficiency.

Table Source:

The carbon pricing data is sourced from the *World Bank's Carbon Pricing Dashboard* (2024). Available at: https://carbonpricingdashboard.worldbank.org/compliance/price

Data Source: Data used in this analysis is drawn from the World Bank's Carbon Pricing Dashboard, in the section designated for pricing. The dashboard provides rich data on carbon pricing instruments, including carbon taxes and Emissions Trading Systems (ETS) implemented across jurisdictions globally. The data includes the main carbon price rates (in US$/tCO$_2$e) in effect for each jurisdiction, which is the price on April 1st or the latest available data prior to this date annually.

Descriptive Analysis for the above data source

Variance	SD	quartile 1	quartile 2	quartile 3	quartile 4	Interquartile range	Mean Absolute Deviation
578.3604	22.51798	6.03	18.08	46.5	58.94	40.47	27.5833

Interpretation: The data exhibits significant variability, indicated by a high standard deviation (22.52). The median (18.08) suggests a central tendency lower than the implied mean, pointing towards a right-skewed distribution. The middle 50% of the data, defined by the interquartile range (40.47), spans a considerable range, from 6.03 to 46.5. This, along with a large Mean Absolute Deviation (27.58), further emphasizes the data's dispersion and potential outliers.

Table Source:

The historical carbon pricing data in the above table is sourced from the *World Bank's Carbon Pricing Dashboard* (2024). Available at: https://carbonpricingdashboard.worldbank.org/compliance/price

Data Source: World Bank's Carbon Pricing Dashboard dataset includes carbon prices (US$/tCO$_2$e) and country-level adoption of ETS. The present analysis considers the correlation between the adoption of ETS and carbon prices to determine whether the countries with ETS adoption have a trend towards higher carbon prices

Correlation Analysis for the above data

	EU ETS	*Canada federal OBPS*	*Finland carbon tax*	*South Africa carbon tax*	*Shanghai pilot ETS*
EU ETS	1.00				
Canada federal OBPS	0.86	1.00			
Finland carbon tax	0.65	0.62	1.00		
South Africa carbon tax	0.84	0.91	0.70	1.00	
Shanghai pilot ETS	0.74	0.76	0.89	0.78	1.00

Interpretation: This correlation analysis reveals significant interdependencies among various carbon pricing mechanisms globally. The EU ETS, a mature and influential market, exhibits strong positive correlations with Canada's OBPS (0.8630) and South Africa's carbon tax (0.8367), suggesting shared drivers like global economic trends or similar regulatory pressures. These strong correlations indicate that fluctuations in the EU ETS are likely mirrored in these systems, highlighting the interconnectedness of carbon markets.

Canada's OBPS further underscores this connectivity, showing the highest correlation with South Africa's tax (0.9081), implying closely aligned market dynamics or policy responses between these two regions. The moderately strong correlations with Shanghai's ETS (0.7550) and the EU ETS point to a broader pattern of global carbon price convergence.

Finland's carbon tax, while showing moderate correlations with EU ETS and Canada's OBPS, displays a very strong correlation with Shanghai's ETS (0.8912). This unique relationship suggests that specific economic or policy factors may be driving the alignment between Finland and Shanghai, potentially reflecting shared priorities in industrial decarbonization or technology adoption.

Shanghai's ETS, as a pilot program, shows varied correlations, indicating its sensitivity to distinct regional influences. Its strong correlation with Finland's tax highlights that, despite geographical distance and system differences, certain carbon markets move in tandem.

Overall, the data points to a growing convergence in carbon pricing trends, with strong and moderately strong correlations observed across diverse systems. This convergence suggests that global carbon markets are becoming increasingly intertwined, influenced by shared economic forces, policy objectives, and environmental concerns. The high correlations imply that policy decisions and market fluctuations in one region can have ripple effects on others, underscoring the importance of international cooperation in addressing climate change.

India's Transition from Fossil Fuel Subsidies to Carbon Taxation

India has historically subsidized fossil fuels like petrol, diesel, and kerosene to keep energy prices low. However, in 2010, the government introduced the Coal Cess, marking a shift toward carbon taxation. Initially set at ₹50 per ton, it increased to ₹400 per ton by 2016, generating ₹84,400 crore (~$12.5 billion) for clean energy projects. However, with the introduction of GST in 2017, the funds were redirected, reducing its effectiveness.

Since 2014, India has also increased excise duties on petrol and diesel, effectively imposing an implicit carbon tax estimated at $60 per ton of CO_2 for petrol and $42 for diesel which contributed to an 11 million-ton CO_2 reduction in one year. While India lacks an explicit carbon tax, its existing fiscal policies have incorporated elements of carbon pricing.

To further formalize carbon pricing, India plans to launch its Carbon Credit Trading Scheme (CCTS) by 2026. It will target 11 high-emission sectors (steel, cement, power, fertilizers, etc.), starting with a carbon price of ~$10 per ton. As the system matures, pricing is expected to increase to align with global benchmarks, similar to the EU Emissions Trading System (ETS) (~$70–$80 per ton) and Singapore's planned $50–$80 per ton by 2030. The goal is to create a structured carbon market, encouraging industries to invest in cleaner technologies, reduce emissions, and maintain economic competitiveness.

A carbon tax will have different effects across industries. In power generation, it would push for renewable energy adoption but may initially raise electricity costs. High-carbon industries like steel and cement may face increased production costs, requiring incentives for cleaner production. Oil and gas companies would be encouraged to shift towards cleaner fuels, while the automobile industry would accelerate its transition to electric vehicles (EVs). However, sectors like agriculture and MSMEs, which operate on thin profit margins, may struggle with higher costs, requiring targeted subsidies.

A scenario-based approach was used to model different carbon tax rates and their economic impact. A low carbon tax ($10 per ton CO_2) would have minimal industry impact, negligible GDP reduction (~0.1%), and generate $8–10 billion annually. A moderate carbon tax ($35 per ton CO_2) would balance economic feasibility with emissions reduction, causing a 0.4% GDP reduction, but creating over 1 million new green jobs, generating $30–40 billion in revenue, and cutting emissions by 15%. A high carbon tax ($75 per ton CO_2) would result in a 1.2% GDP

contraction in the short term, but drive long-term green technology adoption, generating $80 billion+ in revenue and reducing emissions by 30%.

Macroeconomic effects include GDP growth decoupling from emissions, as a $35 per ton tax would shift economic expansion towards cleaner energy sources. Inflationary effects would see CPI rising by ~1.5–2%, mainly affecting energy and transport, but targeted subsidies and EV incentives could offset price increases. Trade competitiveness would also be impacted, as the EU's Carbon Border Adjustment Mechanism (CBAM) will impose tariffs on carbon-intensive imports, affecting steel, aluminum, and cement exports. A domestic carbon tax would help Indian industries remain competitive in global markets.

The job market would see shifts, with coal and fossil fuel industries losing ~700,000 jobs, while the renewable energy, EV, and green tech sectors could create over 2 million new jobs. Reskilling programs would be needed to ensure a smooth workforce transition.

A phased carbon tax approach (starting at $10 and rising to $35 per ton CO_2) would allow a smoother transition while supporting economic growth and emissions reduction. 40% of the tax revenue should be allocated to renewable energy, and 30% should be used for consumer subsidies to prevent inflation shocks. Strengthening carbon pricing mechanisms would also prepare India for global trade regulations and establish it as a leader in sustainable development. A well-structured carbon tax can be both an environmental tool and an economic opportunity—driving clean technology, job creation, and energy security.

Barriers to Implementing a Carbon Tax in India

The levying of a carbon tax in India involves a system of interconnected challenges. Most glaring is the tension between fostering economic development and achieving environmental sustainability, fueled by fears of increased cost of production dampening the increase in GDP and diminishing manufacturing competitiveness. In addition to this, a major challenge relates to social justice, with increases in fuel prices having the potential to disproportionately favor poor households and exacerbating energy poverty. Political and administrative inefficiencies reflected in the controversial Coal Cess are also essential concerns in the arena of effective governance and optimizing the disbursement of resulting revenue generated. The possibility of a regressive impact on the small and medium-sized enterprises (MSME), with the potential to lead to financial stress and job loss, further complicates the challenge. Overlapping such challenges is also the powerful fossil fuel lobby against change. Then, too, the possibility of inflationary pressures emanating from high fuel and production costs is a serious economic challenge. The lack of widespread public and political acceptance, often based on fear of a carbon tax raising costs further, is another constraint. Finally, the threat of impending international tariff barriers, exemplified by the EU's mooted Carbon Border Adjustment Mechanism, calls for convergence of global carbon-pricing regimes to which India must adjust, potentially impacting export competitiveness.

Policy Recommendations for Carbon Taxation in India

Implementing a Phased Carbon Tax Approach

To ease the economic strains and facilitate the transition to cleaner energy sources, India needs to introduce a carbon tax in phases. This involves a gradual increase of the tax rate over time, giving industries a chance to transition and implement green technologies. The first phase, from 2025 to 2027, will be a pilot and testing phase targeting high-emitting sectors like power generation, steel, and cement, with the tax levied at a rate of $10 per ton of CO_2. The next phase, from 2028 to 2032, will aim to expand the tax imposition to the transport, commercial, and industrial sectors, with the tax rate stepped up to a range of $25–35 per ton of CO_2. Finally, from 2033, the rate of taxation will gradually align with international best practices by institutions like the European Union and Canada, moving toward a range of $50–75 per ton of CO_2. Phased introduction is essential to avoid economic shocks to industries and consumers, provide industries sufficient time to transition to clean technology, and position India strongly with regard to forthcoming global trade norms, including the EU's Carbon Border Adjustment Mechanism and future carbon tariffs.

Revenue Utilization Strategy

To ease the economic strains and facilitate the transition to cleaner energy sources, India needs to introduce a carbon tax in phases. This involves a gradual increase of the tax rate over time and, therefore, gives industries a chance to transition and implement green technologies. The first phase, from 2025 to 2027, will be a pilot and testing phase targeting high-emitting sectors like power generation, steel, and cement, with the tax levied at a rate of $10 per ton of CO_2. The next phase, from 2028 to 2032, will aim to expand the tax imposition to the transport,

commercial, and industrial sectors, with the tax rate stepped up to a range of $25–35 per ton of CO_2. Finally, from 2033, the rate of taxation will gradually align with international best practices by institutions like the European Union and Canada, moving toward a range of $50–75 per ton of CO_2. Phased introduction is essential to avoid economic shocks to industries and consumers, provide industries sufficient time to transition to clean technology, and place India in a strong position with regard to forthcoming global trade norms, including the EU's Carbon Border Adjustment Mechanism and future carbon tariffs.

Carbon Taxation in High-Emission Sectors

In order to successfully implement carbon taxation in India, there needs to be a sectoral approach with customized tax reforms and supporting policies. In the power generation industry, a carbon tax on coal-fired power must be offset by renewable energy programs and battery storage to facilitate a transition towards cleaner alternatives. For the steel and cement industries, a carbon tax on energy-intensive production processes must be offset against green steel incentives and the utilization of alternative, sustainable material. A higher refinery and fuel production tax, with incentives for biofuels, green hydrogen, and energy efficiency programs, is needed for the oil and gas industry. In the transport industry, a diesel and petrol vehicle tax must be imposed along with EV subsidies and public transport infrastructure upgradation. Because of the unique challenges of the agriculture sector and MSMEs, a lower carbon tax needs to be imposed to avoid economic distress, while offering low-cost clean energy alternatives and greater access to associated technologies.

Measures to Prevent Inflation & Economic Burden

In an effort to offset the likely inflationary impact of charging a carbon tax and prevent undue economic burden, a planned strategy must be adopted. Gradually increasing tax rates over a specific span of time can effectively prevent abrupt rises in the price of goods and services. Additionally, reserving around 30% of the revenue generated for consumer rebates and custom relief programs can help ease consumer burden. Granting tax rebates on investments in energy-saving technology to small businesses will also ease financial burdens and encourage green practices. Protecting the interests of poor households must be ensured through targeted interventions, such as direct cash transfers or subsidies on electricity bills, to be financed out of the carbon tax proceeds. Additionally, a planned phasing out of fuel subsidies is essential while keeping basic services affordable to ensure maintaining social equity during the transition period.

Trade Protection & Global Competitiveness

In order to protect its trade interests and stay competitive globally, India needs to position its carbon pricing on a level with global levels, especially in the context of impending trade barriers such as the EU's Carbon Border Adjustment Mechanism (CBAM). This encompasses bringing the carbon tax in line with global standards, with an aim of a range of $35-$50 per ton of CO_2 by 2030. Creating its own Carbon Border Adjustment Mechanism is also required in order to avoid carbon leakage and ensure a level playing field. Providing tax relief and incentives to exporters who shift to green production processes will also enhance their competitiveness even more. This strategy helps Indian exports remain competitive in carbon-regulated markets such as the EU, US, and Canada, while at the same time encouraging industries to shift to low-carbon production processes.

Integration with India's Carbon Credit Trading System (CCTS)

In order to develop a strong and flexible system for emissions reduction, India can integrate its planned Carbon Credit Trading System (CCTS), to be implemented in 2026, with the carbon tax. This integration would produce a hybrid model of carbon pricing that combines the strengths of fixed-price and market-based systems. The carbon tax as a fixed-price system would provide predictability and generate revenue, while the carbon credit trading system would provide flexibility by enabling companies to sell excess emission. Such a hybrid system provides industries with an option to pay the tax or cut emissions through credit trading, thus encouraging investments in carbon capture and clean technologies. In addition, the flexible pricing mechanism embedded in the carbon credit market ensures stability, producing a balanced and effective system for emissions reduction.

Job Creation & Workforce Transition Support

As India makes the shift towards a low-carbon economy, it is important to tackle the emerging challenge of employment loss in traditional sectors like coal and fossil fuel by creating new employment opportunities in green industries. A holistic reskilling workforce strategy is imperative to make this shift happen. While the fossil fuel and coal industries have been estimated to lose around 700,000 jobs, the renewable energy sector covering solar, wind, and hydro power is estimated to create around 1.5 million new jobs. Similarly, the electric vehicle and

battery sector will generate 500,000 jobs, and the energy efficiency and green technology sector is likely to provide another 800,000 jobs. This shift needs targeted investments in education and training to enable the workforce to acquire skills in these new green industries.

Policy Roadmap for Carbon Taxation in India

- Phase-wise tax implementation ensures a smooth transition without economic disruption.
- 40% of revenue invested in renewable energy accelerates clean power adoption.
- Sector-specific tax structures & incentives ensure fair burden-sharing.
- Trade competitiveness strategy prevents export losses due to EU CBAM & international carbon tariffs.
- Workforce reskilling & job creation ensure employment security in the green economy.
- Integration with carbon trading (CCTS 2026) provides flexibility & efficiency in emissions reduction.

By implementing these policy recommendations, India can achieve its net-zero 2070 targets, ensure economic stability, and position itself as a leader in global climate action.

Conclusion

The descriptive analysis provides statistical evidence of the inconsistencies in taxation, supporting your study's need for better-structured policies.
By linking high variance and skewness to feasibility challenges, global comparisons, and implementation barriers, the analysis strengthens your argument for structured and predictable carbon taxation in India.

The correlation analysis strengthens your argument that India should learn from successful global models while addressing its unique economic and industrial landscape.
India must develop a tax framework that aligns with international carbon pricing trends, while also ensuring local feasibility and economic stability.
The interconnectedness of global carbon markets suggests that India's carbon tax policy will not function in isolation-international cooperation is essential.

Implementation of a carbon tax in India is both plausible and impactful but must be achieved with a phased gradual approach to ensure economic stability and industrial flexibility. The study identifies tax rate differences seen in alternative models in the world and their implications for various industries and recommends a one-size-fits-all policy is not the best. A comparison of India's indirect carbon pricing mechanisms, e.g., coal cess, with organized global systems, e.g., the EU ETS, Canada's OBPS, and Finland's carbon tax, reveals high interdependencies among global carbon pricing systems. This indicates the necessity of India aligning its policies with prevailing global best practices while keeping in mind its unique economic and energy context. For the design of an effective carbon tax regime, the study proposes a hybrid approach that combines direct taxation with market-based methods, thus ensuring flexibility and sustainability. Much, however, remains to be achieved, including plugging regulatory loopholes, overcoming opposition from industries, and India's excessive dependence on coal, which can prove to be an impediment to smooth implementation. Phased implementation, reinvestment of carbon tax funds in sustainable energy programs, and proactive stakeholder engagement will be crucial in overcoming these challenges. Finally, this study contends that an effective carbon tax regime in India must balance economic growth, industrial competitiveness, and environmental responsibility with harmony with global climate obligations.

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