www.envsciarch.com

ENVIRONMENTAL SCIENCE ARCHIVES
ISSN: 2583-5092
Volume IV Issue 2, 2025

REVIEW OPEN ACCESS

Carbon Taxation in India: A Policy Feasibility Study

Aviyush Sodhi and Swati M Biswas*
Atma Ram Sanatan Dharma College, University of Delhi, Delhi, India
*Correspondence for materials should be addressed to SMB (email: smajumdar@arsd.du.ac.in)

Received: 2025/08/29
Accepted: 2025/09/29
Published: 2025/10/05

Abstract
Climate change is a pressing challenge facing 21st-century policymakers, with India facing severe consequences due to its geographical diversity. Rising emissions, coupled with increasing economic inequality, make it crucial to identify policy instruments that can both reduce pollution and support sustainable growth. One such instrument is the carbon tax, which has been implemented in several countries to curb emissions while raising government revenue. The paper examines the case study of Canada and the EU, to analyse the effectiveness of carbon tax. Drawing on these lessons, this study suggests a phased strategy for enacting a carbon tax in India and highlights potential economic barriers like inflation, industry resistance, and enforcement problems. This study suggests an initial tax rate of $10 per tonne of CO_2 emissions for India. The study also notes that the rate should be viewed as a baseline for phased implementation, open to future adjustments based on performance. In order to guarantee that the tax is both practical and politically feasible, it highlights the necessity of revenue redistribution, public awareness initiatives, and specific exemptions for industries that are particularly vulnerable. By tailoring global lessons to India's unique economic and political context, this paper bridges an important gap in the literature. Hence, a well-structured carbon tax could be a major contributor to India's progress to a net-zero future.

Keywords: Carbon tax; Climate change mitigation; Climate finance; Environmental policy; India's emission control; Sustainable taxation

Introduction

India is especially susceptible to experiencing the ill-effects of climate change due to its vast size and complex geography. Also, according to Barbier and Hochard (2018) poor people are very vulnerable to climate change and this fact cannot be ignored. Given India's vulnerability to climate change, policymakers must consider effective strategies to reduce emissions. One such approach is the implementation of a carbon tax. This paper will provide insights into the potential for a carbon tax to reduce emissions in India while keeping in mind economic growth, strategies for phased implementation to reduce or avoid inflationary pressures and industrial resistance and revenue allocation methods to ensure public and business acceptance (reinvesting tax revenue in green energy or lowering other taxes).

Methods

This research study is based on a comparative policy analysis approach examining how carbon taxes have been implemented in different countries and how those lessons can be applied to India. The study relies on secondary data sources which include studies on carbon tax policies from peer-reviewed journals, including case studies from Canada and the European Union, data on India's Carbon emissions (total emissions and emissions by sector) and data on existing carbon tax rates from countries like Sweden, Canada, Germany, and Switzerland.

By analysing these case studies, the research identifies key lessons applicable to the Indian context. Canada and the EU were also one of the first places to implement a carbon tax with Canada implementing one in 2008 and the EU implementing one as early as 1990 (Finland) and 1991 (Sweden). A comparative framework for assessing how comparable policies may perform in India is provided by both the regions, which offer insightful information on policy formulation, enforcement methods, and economic results. The extreme disparity in political and economic systems, however, is a major drawback of these case studies. India's economy and policy differences contrast with

Canada's high per capita income and decentralised administration. Although these examples provide valuable insights, they are not directly applicable to India and necessitate policy modifications.

Discussion

What is a carbon tax?

According to Zhang et al. (2016), carbon tax is a tax levied on carbon dioxide for the purpose of combating global climate change. A carbon tax is a type of Pigouvian tax, which is designed to correct negative externalities (costs levied on society that are not reflected in market prices). Since carbon emissions contribute to climate change, this tax ensures that polluters bear the financial cost of their environmental impact.

Need for a carbon tax in India

India's total carbon emissions in 2023 stood at 2,955 $MtCO_2e$ ($MtCO_2e$ = Million tonnes of Carbon Dioxide equivalent) and have been rising at an average annual rate of approximately 7.7% over the two-year period of 2021-23 (World Bank, 2025). Fig. 1 illustrates the steady rise in the total CO_2 emissions in India, with the only exception being the COVID-19 lockdown period, when industrial and transport activities were temporarily halted. Along with this, Fig. 2, shows CO_2 emission by source. While the power sector and manufacturing are the major sources for CO_2 emissions, it is seen that agriculture contributes a lot less than the prevalent notion in the media.

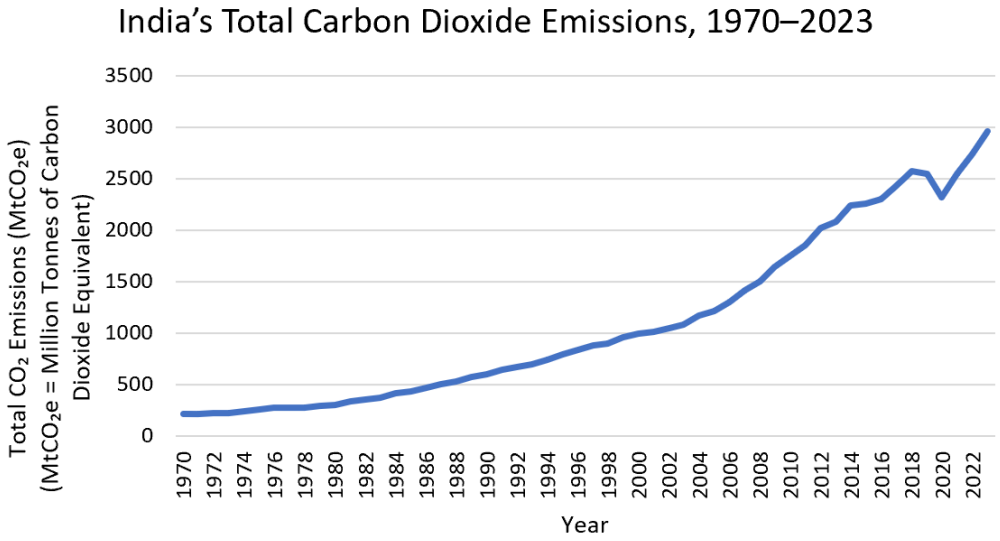

Fig. 1. India's Total Carbon Dioxide Emissions, 1970–2023 (Source: World Bank, 2025)

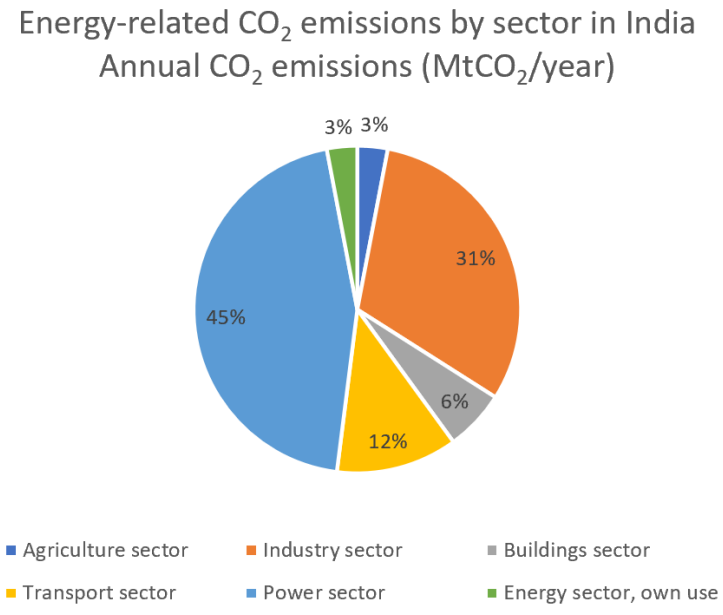

Fig. 2. Energy-Related CO_2 Emissions by Sector (Source: Climate Transparency, 2022)

India's per capita carbon emissions were only about 2.05 metric tonnes, much lower than the global average of approximately 4.7 metric tonnes (World Bank, 2025). But the total carbon emissions make India the 3rd largest emitter which is a great cause of concern. India faces rising sea levels, extreme heatwaves, erratic monsoons, and crop failures and this directly threatens livelihoods, food security, and health, especially for the poor. Hence the cost of inaction is much greater for India than any other developed country. Also, the longer it waits the more costly it will be to adapt to climate change and implementing a carbon tax now allows for phased, gradual reforms that can reduce emissions without major economic shocks. A carbon tax won't just incentivise cleaner energy and technology but also has the ability to reduce oil import bills, cut urban pollution, and create jobs in the renewable energy sector.

Taking the example of the national capital it is observed that Delhi's Air Quality Index (AQI) has reached dangerously high levels, peaking at 795 (AQI.in, 2024), far exceeding the 'severe' category threshold of 400.

Case Studies

Canada

Canada is among the most emissions-intensive countries in the world, with per capita emissions in 2010 of 20.3 kg of CO_2eq per year. In June 2007, Quebec implemented the first carbon tax in Canada. Harrison (2013) finds that the carbon tax of British Columbia was North America's first revenue-neutral carbon tax reform. It started at 10 CAD per tonne of CO_2 and increased by 5 CAD annually until it reached 30 CAD per tonne of CO_2 in 2012. This allowed both the consumers as well as the producers to get comfortable with the tax which would not have been the case if it was straightaway initiated at the cost of 30 CAD. This policy was strategically designed to align with growing public concerns over climate change, increasing its acceptability. This ensured that the public would be supportive of this policy which hence incentivised the government to take charge. Also, the tax revenue was fully recycled to give corporate and income tax cuts, which also made the tax more favourable with both the public as well as the businesses. The tax recycling, i.e. using the tax revenue from the carbon tax to reduce the rates of other taxes like income tax and corporate tax, helped increase the support towards a carbon tax. In fact, businesses that invest in research and development for green energy or adopt greener production methods could even end up paying lower taxes in the long run. However, initial support declined due to concerns over rising fuel costs, leading to the emergence of the 'Axe the Tax' campaign. Despite this, public approval rebounded within five years, with support nearly doubling as studies confirmed the tax effectively reduced emissions without significant economic harm.

The European Union

The EU is the third largest emitter of CO_2. The EU is responsible for around 6% of global CO_2 emissions (European Parliament). According to Brink et al. (2016) in April 2013 the pricing of greenhouse gas emission allowances under the European Union Emissions Trading System (EU ETS) was €2.75 per tonne of carbon dioxide (CO_2) equivalent and the current (Spring 2016) price is around €5. This is much lower than what the policy makers expected and they are now demanding to raise the cap so as to drive up the prices. This would ensure that the full benefit of the carbon tax can be taken. The study concluded that a minimum price would ensure the robustness of the tax. But at the same time a variable tax for the power sector would be a good option because it provides a relatively even distribution of compliance costs over member states, and has little impact on the exposed sectors of the EU economy. Hájek et al. (2019) selected five EU member countries, namely Sweden, Finland, Denmark, Ireland and Slovenia, where the carbon tax has been in place for a long time. The study concluded that the carbon tax charged to energy industries has been very environmentally effective. Rising tax rates have indeed led to reduction in emissions. While the EU Emissions Trading System (EU ETS) sets an overall emissions cap, individual member states have implemented carbon taxes to further strengthen climate policies. Research shows that longer-term carbon taxes, such as those in Sweden and Finland, have consistently led to emissions reductions. Also, the carbon tax is not only a good environment policy but is also a part of a coherent and flexible taxation system.

These particular regions were taken because they were the first ones to have enacted a carbon tax policy and hence have been able to gather considerable amount of data for the policy. It is also noted that the carbon tax policy, even in these regions, did not have smooth implementation. The "Axe the Tax" campaign in Canada shows this challenge. Canada like India has a federal form of structure where both central and provincial governments play roles in environmental regulation which makes it a useful comparative framework. On the other hand, the EU has experience dealing

with varied economic sectors and tailoring carbon prices accordingly which is also helpful for India's diverse industrial base.

While the paper looks at these case studies to act as a roadmap for India's own policy the limitations must also be addressed. Canada and the EU are developed economies while India is still developing with their per capita incomes much higher than those of India. Direct policy transfers may be challenging because of Canada's much smaller and less complicated population and economy compared to India's. The European Union is not a single country, but rather a political and economic union of 27 nations. Direct comparisons with India's centralised carbon policy decisions are made more difficult by this. The EU's robust regulatory and oversight framework is crucial to its tax's implementation success, and it might be difficult to duplicate in India's several states.

Functioning of a carbon tax in the Indian context

From the above case studies, many learnings including importance of public acceptance, phased introduction and the crucial part of recycling the tax revenue, can be taken and implemented in the case of India. In India, a carbon tax would apply to all major CO_2 emitters, including industries, transportation, and power generation. Factory emissions data can be tracked through mandatory reporting systems, while private vehicle owners could be taxed based on either annual pollution checks or a fuel-based tax. The tax should be introduced in phases, which would first include the tax on factories followed by the tax on private transport. It should also be kept in mind to ensure that the tax rates are steadily increased as in the case of Canada so as to ensure the comfort of the stakeholders. Also, the tax rates can be variable for different industries especially for the ones which are vulnerable (cement, aluminium, and textile industries). Since India is still trying to get more industries to set up here, it should try to keep the tax rates on the lower end. This would ensure that we take accountability for the pollution while also trying to keep the economy growing. From Fig. 3 it is observed that there are taxes as high as $167.17 per tonne of CO_2 emitted (Uruguay) and as low as $0.77 per tonne of CO_2 emitted (Ukraine). The mean and median rates are $55.22 and $48.37 per tonne of CO_2 emitted respectively. So, India can position itself comfortably at the initial rate of around $10 (~₹853.87) per tonne of CO_2 emitted and then increase it annually with changes being made as more data regarding acceptance and default rates starts pouring in.

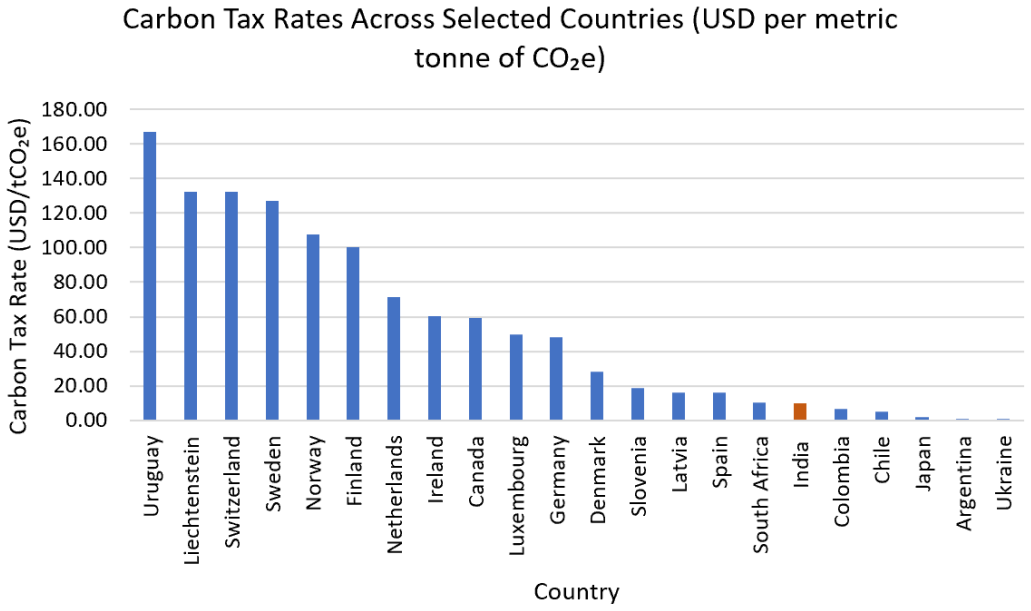

Fig. 3 Carbon Tax Rates Across Selected Countries (USD per metric tonne of CO_2e) (Source: World Bank, Carbon Pricing Dashboard, 2025)

This $10 rate has been reached at through various sources. Parry (2019) by IMF suggested a $35 carbon tax rate for India. The introductory carbon tax rate for many countries lies between $2-$10. Metcalf (2019) says that British Columbia (BC) introduced carbon tax in 2008 at a rate of around $10 per tonne. On the other hand, Asian countries had a lower introductory rate. Japan introduced a carbon tax in 2012 at the rate of US $2.7 (JPY 289) per tonne of CO_2 equivalent. MacDonald and Parry (2024) finds that Singapore started a carbon tax on January 1, 2019 at the rate of US$4 (S$5) per tonne. Columbia too started its carbon tax in 2017 at the rate of US $5.7 per tonne (IETA (International Emissions Trading Association), 2023). Thus, seeing that the introductory rate majorly falls in the $2-$10 bracket and that IMF suggests a higher $35 rate this paper hence suggests

the upper boundary of the introductory rate bracket adopted by various countries and hence coming to the rate of $10 per tonne. While the proposed $10 rate is consistent with international trends and provides a pragmatic starting point, it is important to note that India's economic, industrial, and administrative landscape may influence the actual effectiveness of this rate. Therefore, this figure should be viewed as a baseline for phased implementation, open to future adjustments based on performance, equity, and emission outcomes.

To put the $10 per tonne of CO_2 emitted tax into perspective, this paper takes the example of change in price of a ream (500) of A4 paper, since paper is a commodity which is used by all demographics and the paper producing process also leads to considerable carbon emissions. According to Sun et al. (2018) producing one tonne of paper results in about 950 kg carbon dioxide (CO_2) equivalent (CO_2-eq) GHG emissions on average. One ream (500 sheets) of A4 paper weighs approximately 2.3 kg.

CO_2e emissions per ream:

$$\frac{2.3}{1000} \times 0.95 = 0.002185\ tCO_2e \quad (1)$$

Tax Impact at $10/t$CO_2e$

$$0.002185 \times \$10 = \$0.02185 \quad (2)$$

This translates to approximately 2.2 cents or ₹1.88. A $10 carbon tax per tonne would increase the cost of a ream of A4 paper by just 2.2 cents (~₹1.88). This small price nudge could steer manufacturers and consumers toward more sustainable alternatives without a significant cost burden. Hence, this tax will help to introduce the carbon tax to the public as well as the businesses without much backlash due to the low rates. The tax will become more effective as tax rates are revised and increased in a phased manner.

Also, it cannot be forgotten how important public contribution and acceptance is for the success of a carbon tax. So, more awareness to the public on how it's good for the environment and how it'll actually help them by reducing other taxes in the future would lead to a warmer acceptance of the tax. At the same time India must also ensure to use the proceeds of these taxes to reduce the corporate and income taxes in order to keep the stakeholders happy. The carbon tax should not merely serve as a revenue-generating tool for the government but should be transparently utilised to benefit both citizens and the environment. Effective reinvestment in sustainable infrastructure, tax reductions, and public health initiatives will ensure long-term acceptance and success.

Challenges in introducing a carbon tax in India

Since this tax would add an additional financial burden without immediate corporate tax relief, industries may respond by passing down the costs to consumers. In a price-sensitive market like India, even small increases in production costs could lead to reduced demand, negatively impacting economic growth. Furthermore, unchecked price hikes could contribute to inflation, making consumer goods more expensive and leading to public dissatisfaction. Businesses may also argue against the tax stating that it reduces competitiveness and there could be public agitation against increased fuel prices as has been seen by the farmer's protest over fuel costs. Another major challenge is ensuring accurate measurement and reporting of emissions. Since the tax system relies on emission tracking, any loopholes or inaccuracies in reporting could undermine its effectiveness. The implementation and enforcement of this tax would also be a particular problem especially in the informal sector. Marron and Toder (2014) suggest that a carbon tax should be imposed at points in the supply chain where carbon content is easily measurable, such as coal mines for coal or refineries for petroleum. This approach simplifies enforcement while minimising the administrative burden. Additionally, minor adjustments can be made to protect small energy-intensive industries and those vulnerable to international competition (textile manufacturing, aluminium production, and fertiliser industries).

Advantages of a carbon tax for India

The carbon tax in India would have its obvious benefits which prominently includes lower air pollution. The country has been fighting to breathe clean air and this tax would give a much-needed relief. Also, the various diseases being caused by the worsening air quality like Asthma, lung cancer etc. would also slow their spread. Jonsson et al. (2020) finds that in Sweden, where a carbon tax has been in place since 1991, carbon emissions have fallen by nearly 27% while the economy has grown, proving that such policies can work without hampering growth. According to Wacket et al. (2024)

Germany has successfully reinvested carbon tax revenue into renewable energy projects, increasing the share of renewables in electricity generation. The carbon tax, if imposed correctly, will incentivise industries to look into greener modes of production. Companies would have a direct financial reason to invest in cleaner technologies, accelerating India's shift toward sustainable industries.

India currently has a coal cess (cess or tax on coal) which was introduced in 2010 and has now been subsumed under the GST Compensation Cess. According to Ghosh (2016), a higher level of the coal cess could have significant impact on the energy mix and emission levels. It also has a cap-and-trade scheme called PAT (Perform Achieve and Trade) which is an initiative under the National Mission on Enhanced Energy Efficiency (NMEEE) to improve the energy efficiency of the high energy intensive industrial units through target setting and tradable energy saving certificates. Oak and Bansal (2022) find that PAT scheme has been successful in reducing energy intensity in the cement and fertilizer sectors and that it has also contributed to the national target of reduction in emission intensity by mitigating carbon dioxide emissions. Thus, a carbon tax is just a natural progression of India's existing climate commitments, especially under its updated Nationally Determined Contributions (NDCs) under the Paris Agreement.

Results

This paper explored how a carbon tax could help India reduce pollution while generating government revenue. International case studies demonstrate that a well-designed carbon tax can be both environmentally and economically beneficial. India must design its carbon tax carefully which includes starting with industries, ensuring gradual rate increases, and using the revenue transparently. Without public acceptance and economic safeguards, the policy may face backlash. As India moves towards a net-zero goal, adopting a carbon tax is not just an economic decision but a necessity for future sustainability. Future research should explore the potential impact of different carbon tax rates on various sectors of the Indian economy. Additionally, pilot programs in select industries could help policymakers fine-tune tax structures before full-scale implementation.

References

AQI.in (2024) Delhi AQI hits 795: Highest record as most polluted city in history (2021–2024). Available at: https://www.aqi.in/blog/en-in/delhi-aqi-becomes-the-most-polluted-ever-in-history/ (accessed 10 March 2025).

Barbier EB and Hochard JP (2018) The impacts of climate change on the poor in disadvantaged regions. Review of Environmental Economics and Policy 12(1): 26–47. DOI: 10.1093/reep/rex023.

Brink C, Vollebergh HRJ and Werf EVD (2016) Carbon pricing in the EU: Evaluation of different EU ETS reform options. Energy Policy 97: 603–617. DOI: 10.1016/j.enpol.2016.07.023.

Climate Transparency (2022) Climate Transparency Report: Comparing G20 Climate Action. Available at: https://www.climate-transparency.org/wp-content/uploads/2022/10/CT2022-India-Web.pdf (accessed 10 March 2025).

Das-Gupta A, Lahiri R and Mookherjee D (1995) Income tax compliance in India: An empirical analysis. World Development 23(12). DOI: 10.1016/0305-750X(95)00098-W.

Dash SK, Jenamani RK, Kalsi SR, et al. (2007) Some evidence of climate change in twentieth-century India. Climatic Change 85(3): 299–321. DOI: 10.1007/s10584-007-9305-9.

European Parliament (2024) Climate change in Europe: facts and figures. Available at: https://www.europarl.europa.eu/topics/en/article/20180703STO07123/climate-change-in-europe-facts-and-figures (accessed 10 March 2025).

Ghosh J (2016) Analysis of India's coal cess using an economywide framework. Green Growth Knowledge Platform (GGKP), Fourth Annual Conference on Transforming Development Through Inclusive Green Growth, 6-7 September 2016, Jeju International Convention Center, Republic of Korea

Hájek M, Zimmermannová J, Helman K et al. (2019) Analysis of carbon tax efficiency in energy industries of selected EU countries. Energy Policy 134. DOI: 10.1016/j.enpol.2019.110955.

Harrison K (2013) The political economy of British Columbia's carbon tax. OECD Environment Working Papers 63. DOI: 10.1787/5k3z04gkkhkg-en.

International Emissions Trading Association (IETA) (2023) Colombia carbon tax at a glance. Available at: https://ieta.b-cdn.net/wp-content/uploads/2024/02/Colombia-business-brief_Jan-23.pdf (accessed 28 June 2025).

Jonsson S, Ydstedt A and Asen E (2020) Looking back on 30 years of carbon taxes in Sweden Tax Foundation Europe. Available at: https://taxfoundation.org/research/all/eu/sweden-carbon-tax-revenue-greenhouse-gas-emissions/ (accessed 10 March 2025).

MacDonald M and Parry IWH (2024) Policy options for climate mitigation: Emissions trading schemes in Asia-Pacific. IMF Working Papers 2024(155): 32. DOI: 10.5089/9798400282030.001.

Marron DB and Toder EJ (2014) Tax policy issues in designing a carbon tax. The American Economic Review 104(5): 563–568. DOI: 10.1257/aer.104.5.563.

Metcalf G (2019) Carbon taxes: What can we learn from international experience? Econofact. Available at: https://econofact.org/carbon-taxes-what-can-we-learn-from-international-experience (accessed 3 May 2025).

Oak H and Bansal S (2022) Enhancing energy efficiency of Indian industries: Effectiveness of PAT scheme. Energy Economics 113. DOI: 10.1016/j.eneco.2022.106220.

Parry I (2019) What is carbon taxation? Finance & Development Magazine. Available at: https://www.imf.org/en/Publications/fandd/issues/2019/06/what-is-carbon-taxation-basics (accessed 10 March 2025).

Sun M, Wang Y, Shi L and Klemeš JJ (2018) Uncovering energy use, carbon emissions and environmental burdens of pulp and paper industry: A systematic review and meta-analysis. Renewable and Sustainable Energy Reviews 92. DOI: 10.1016/j.rser.2018.04.036.

Wacket M, Eckert V and Merriman J (2024) How Germany aims to get to net zero without breaking the bank. Reuters. Available at: https://www.reuters.com/sustainability/climate-energy/how-germany-aims-get-net-zero-without-breaking-bank-2024-07-18/ (accessed 18 July 2024).

World Bank (2025) World development indicators. Available at: https://datacatalog.worldbank.org/search/dataset/0037712 (accessed 10 March 2025).

World Bank Group (2024) Carbon pricing dashboard. Available at: https://carbonpricingdashboard.worldbank.org/ (accessed 10 March 2025).

Zhang K, Wang Q, Liang Q-M and Chen H (2016) A bibliometric analysis of research on carbon tax from 1989 to 2014. Renewable and Sustainable Energy Reviews 58: 297–310. DOI: 10.1016/j.rser.2015.12.089.

Author Contributions
AS and SMB conceived the concept, wrote and approved the manuscript.

Acknowledgements
Authors would like to express their sincere gratitude to Ms. Vidushi Shankar and Mr. Aryan Kapoor for their invaluable recommendations and strategic guidance during the initial planning and analysis of this research. Their insightful feedback on the case studies and proposed policy strategies significantly enhanced the quality of this paper. The authors would like to thank all data providers for the data used in this study.

Funding
Not applicable.

Availability of data and materials
Not applicable.

Competing interest
The authors declare no competing interests.

Ethics approval
Not applicable.

Citation: Sodhi A and Biswas SM (2025) Carbon Taxation in India: A Policy Feasibility Study. Environmental Science Archives 4(2): 720-727.