

# A CRITICAL EVALUATION ON CARBON TAXATION POLICIES FOR REDUCING CARBON EMISSIONS IN CONTEXT OF VARIOUS INDUSTRIES OF INDIA

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## **Abstract**

The article has depicted an image of carbon emission rate along with carbon taxation policies in different sectors of India. The emission rate of Energy, Transport, Agriculture, "Manufacturing and construction", Technology, Fashion, and Food retail sectors have been evaluated based on the emission rate. Secondary method has been followed to gather a large context of data and developing its findings. Carbon taxation in India plays a critical role in developing sustainability and decreasing the emission rate of carbon. The major findings of the study attribute that major countries that have produced effective rates of "CO<sub>2</sub> equivalent emissions" include Ahmedabad, Chennai, Bangalore, Kolkata, Delhi and Mumbai. The energy sector is the largest contributor to carbon emissions in India. It generated about "2,442 million metric tons" carbon in 2020 with the energy sector contributing the highest. Based on the review it can be suggested that improvement in the regulation and polices associated with carbon tax model needs to be improved to decrease the emission rate of carbon in Energy, Transport, Agriculture, "Manufacturing and construction", Technology, Fashion, and Food retail sectors.

**Key words:** Carbon emissions, Carbon taxation policies, Industries, (Greenhouse gas) GhG, Climate change

## **Introduction**

The Carbon tax is a tax levied on different firms that produce carbon dioxide (CO<sub>2</sub>) by their actions. This taxation policy helps to decrease "the economy-wide practise of high-carbon fuels" as well provide effective protection for health of the environment from the harmful effects which is produces due to excessive carbon dioxide emissions. This taxation policy is levied on CO<sub>2</sub> emissions. This policy can be referred to as "Pollution Tax" in almost 27 countries worldwide involving Argentina, Canada, European Union, New Zealand, Singapore and India. It imposes a fee on distribution, production or usage of fossil fuels on the basis of the amount of carbon emitted by the combustion. "Carbon tax" relies on the principles of "polluter pay". "Global Climate Risk Index 2021" has shown that India is placed among almost 10 nations significantly impacted by extreme weather events due to climate change. With no "explicit carbon tax" in India, the primary challenge associated with "carbon pricing" relies on the advantages of the scheme being dispersed and having less concentrated costs. Being the party to "United Nations Framework Convention on Climate Change (UNFCCC)" India is aimed at decreasing "greenhouse gas (GHG) concentration". The largest polluters in India on the basis of "carbon emissions" include Energy, Transport, Agriculture, "Manufacturing and construction", Technology, Fashion, and Food retail. The development of "carbon tax policy" of India is focused on the objective of "net-zero emissions by 2070" aimed by the Prime

Minister of India. In 2010, “carbon tax” in India was based on “Rs 50 per ton of coal” imported and produced, the amount has increased to almost Rs 100 in 2014, further developed to almost Rs 200 in 2015, and presently the amount has reached to almost “Rs 400 per ton”. This tax model is levied at various stages of production and consumption that involves Consumers, Distributors, Suppliers and Producers. The aim and objective of this article are to evaluate carbon taxation policies of India in the context of several sectors and define their impact on decreasing carbon emissions.

### **Research Methodology**

“Secondary qualitative research method” has been followed in this research to gather a large amount of data related to “carbon taxation policies” in India in the context of carbon emission and various sectors. Relevant journals and articles have been collected from secondary sources such as “Google Scholar” from the year 2019 in order to provide up-to-date information related to the research topic. The collected articles and journals have been read to develop a critical interpretation of data and develop an in-depth understanding throughout this article and evaluate this research topic properly.

### **Data analysis and Interpretation**

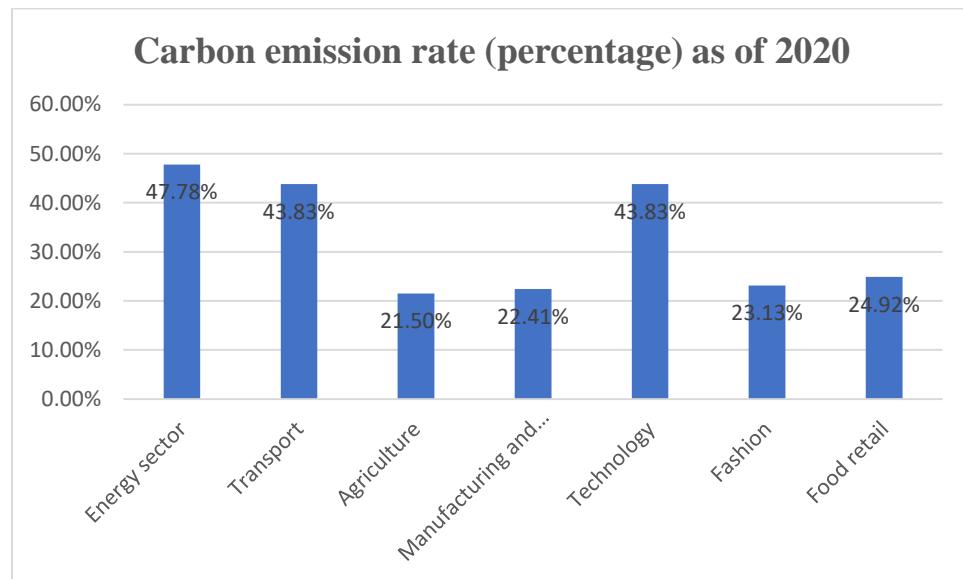
**“Carbon emission rate” in various sectors**

<b>Sector</b>	<b>Carbon emission rate (percentage) as of 2020</b>
“Energy sector”	47.78%
“Transport”	43.83%
“Agriculture”	21.50%
“Manufacturing and construction”	22.41%
“Technology”	43.83%
“Fashion”	23.13%
“Food retail”	24.92%

**Table 1: Carbon emission in various sectors**

(Source: ourworldindata.org, 2023)

The above table has defined the rate of “carbon emission” and shows that the sector of energy has a highest contributor towards the emission of carbon in India (ourworldindata.org, 2023). The industries of Energy, Food retail, fashion, technology, agriculture and transport have been included as these sectors have a significant contribution to the emission of carbon. For instance, food waste and loss exacerbate the crisis of climate change with “greenhouse gas (GHG) footprint” and the sector of fashion is responsible for almost 10% of “global carbon emissions” and almost “20% of wastewater”.



**Figure 1: “Carbon emission” in various sectors**

(Source: ourworldindata.org, 2023)

The above graph has defined the contribution in the segment of “carbon content of fossil fuels”. The energy sector had the highest emission rate of around 47.78% and the transport sector contributed around 43.83% (ourworldindata.org, 2023). Increased rate in “carbon tax policies” in India has developed sustainability in different sectors and decreased the rate of carbon emission.

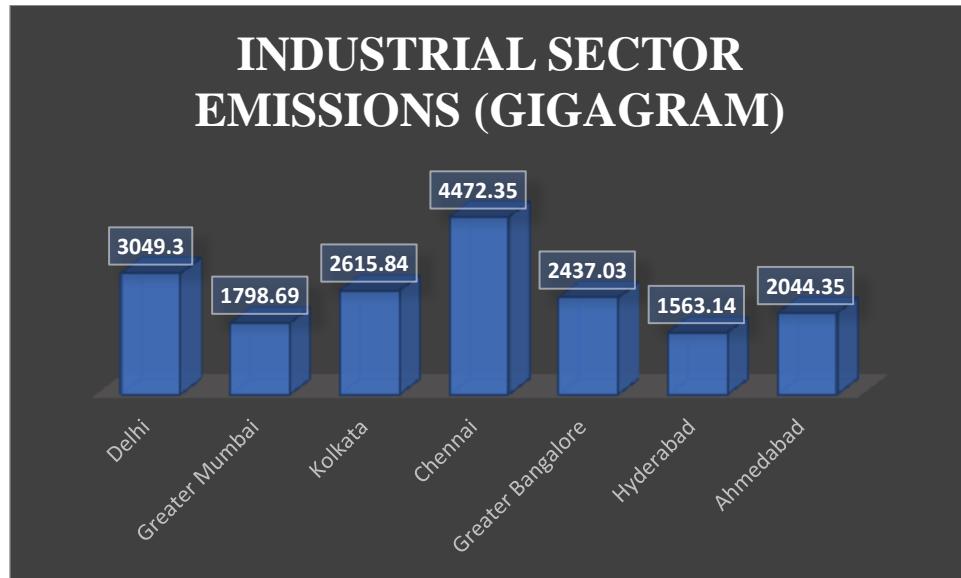
#### “CO2 (carbon dioxide) equivalent emissions” from Indian industrial sectors in Major Cities in India

Cities	Industrial sector emissions (Gigagram)
“Delhi”	“3049.3”
“Greater Mumbai”	“1798.69”
“Kolkata”	“2615.84”
“Chennai”	“4472.35”
“Greater Bangalore”	“2437.03”
“Hyderabad”	“1563.14”
“Ahmedabad”	“2044.35”

**Table 2: “CO2 equivalent emissions” in different cities of India**

(Source: wgbis.ces.iisc.ernet.in, 2023)

The above table has depicted the rate of “CO<sub>2</sub> equivalent emissions” in the major countries in India. It showed that the major cities that produced effective rates of “CO<sub>2</sub> equivalent emissions” included Ahmedabad, Chennai, Bangalore, Kolkata, Delhi and Mumbai. The rate of “Industrial sector emissions (Gigagram)” in Delhi was almost 3049.3, Mumbai was almost 1798.69 and Kolkata was almost 2615.84 (wgbis.ces.iisc.ernet.in, 2023).



**Figure 2:** “CO<sub>2</sub> equivalent emissions” in major cities

(Source: wgbis.ces.iisc.ernet.in, 2023)

The above graph has evaluated equivalent emissions associated with CO<sub>2</sub> in the major pollutant cities in India. It has shown that Chennai has the highest rate of emissions in the segment of industrial sector. “CO<sub>2</sub> equivalent emissions” in Chennai is almost 4472.35.

#### Global “greenhouse gas emission (GHG) sources” by sector for 2022

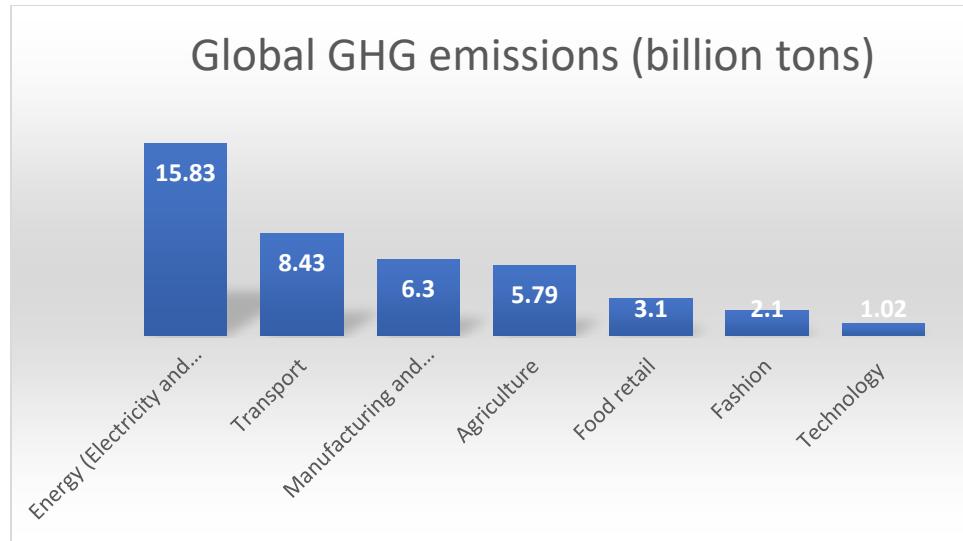
Sector	Global GHG emissions
“Energy (Electricity and Heating)”	“15.83 billion tons”
“Transport”	“8.43 billion tons”
“Manufacturing and construction”	“6.3 billion tons”
“Agriculture”	“5.79 billion tons”
“Food retail”	“3.1 billion tons”
“Fashion”	“2.1 billion tons”
“Technology”	“1.02 billion tons”

**Table 3:** Global “greenhouse gas emission (GHG) sources” in 2022

(Source: eponline.com, 2022)

The above table has defined the GhG emission rate globally by sectors. In the segment of GhG, energy sector has the highest emission rate of about “15.83 billion tons” and transport sector emission rate of about “8.43

billion tons” in 2022. Energy, transportation and construction industries or manufacturing has developed top three positions and the “combined output” consists of “30.56 billion tonnes of GHG annually”. In the segment of global platform, the “GHG emission rate” of food retail sector was almost “3.1 billion tons” in 2022. Along with this, the sector of fashion has emitted almost “2.1 billion tons” and technology industry has emitted almost “1.02 billion tons” of GHG gases in 2022 (eponline.com, 2022).



**Figure 3: Global “greenhouse gas emission (GHG) sources”**

(Source: eponline.com, 2022)

The above figure has defined the sources of GhG emission rate globally based on top seven sectors. The transport sector had the emission rate of almost “8.43 billion tons. Along with this, the industry of energy consists of highest emission rate to almost “15.83 billion tons” globally.

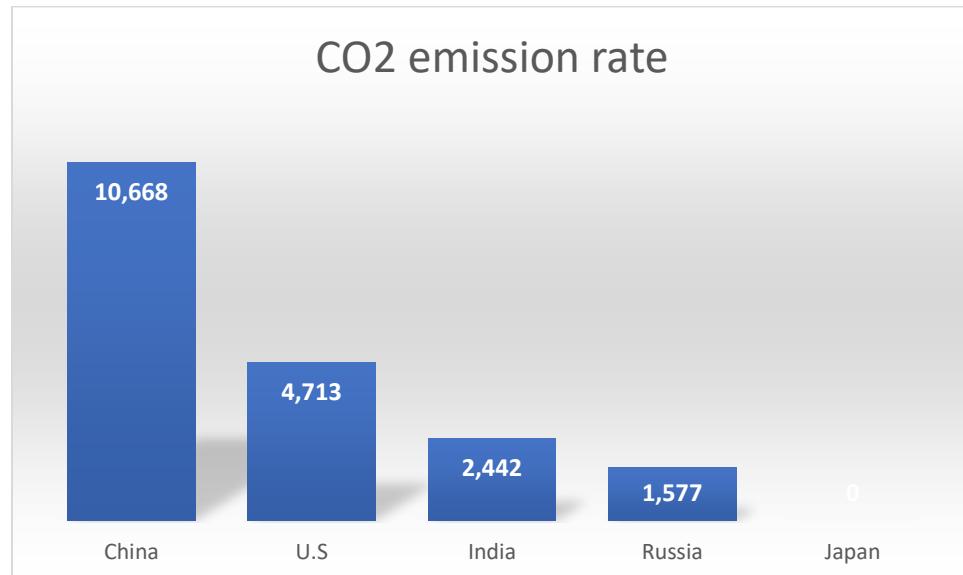
**Top countries based on “CO2 Emission rate”**

Country Name	CO2 Emission rate
China	10,668 million metric tons
U. S	4,713 million metric tons
India	2,442 million metric tons
Russia	1,577 million metric tons
Japan	1,577 million metric tons

**Table 4: Top countries on “CO2 Emission rate”**

(Source: worldometers.info, 2023)

The table above has evaluated the emission rates of CO2 in the top five countries worldwide. Based on the CO2 emission rate, India is ranked third, generated about “2,442 million metric tons” in 2020. It has shown that China is in the top position in based on the emission of CO2. The emission rate of emission rate of carbon dioxide in Japan was almost “1,577 million metric tons”.



**Table 4: Top countries on “CO2 emission rates”**

(Source: worldometers.info, 2023)

The above graph has shown top five nations based on the factor of “CO2 emission rate”. China can be marked as “largest emitter of carbon dioxide gas” and in 2020 it has emitted almost “10,668 million metric tons”. On the other hand, US has emitted almost “4,713 million metric tons” and the emitted rate of India was almost “2,442 million metric tons” in 2020.

### Discussion

The findings have shown the emission rate of CO2 based on different sectors of India. As stated by Bhat & Mishra (2020), in the modern era, climate change has become global concern and could have a subversive impact on the planet. The rate of “carbon dioxide emissions or CO2 emissions” can be referred as emissions from fossil fuel burning and cement manufacturing. The sources of CO2 emission include “natural- gas processing”, “industrial processes” and “fuel combustion activities”. The emission rate can be calculated by multiplying the factors associated with emission by the operation’s “maximum capacity” in “production per hour units”, “material consumption per hour” and units in which the emission factor is contained. A “carbon tax's” purpose relies on decreasing carbon emissions and delivering a “price signal” to every emitter encouraging them to avoid carbon-intensive consumption and production (Beiser-McGrath & Bernauer, 2019).

“Carbon tax in India can be marked as “Pigouvian tax” which is focused on decreasing the emission of carbon and building a healthy environment. Fujimori *et al.* (2020), increased population rate and competition in the global market has developed the emission rate of carbon in different sectors of India. The country is in the third position based on the emission rate of carbon. It has generated almost “2,442 million metric tons” in 2020 where the sector of energy had the highest contribution (Kotlikoff *et al.* 2021).

“Economic Survey 2014-15” has defined that the green measures developed by India, including significantly higher taxation in the segment of petroleum products and revitalizing the sector of renewable energy sector. India has reduced subsidies and developed taxes on “fossil fuels (petrol and diesel)” driving a subsidy system of carbon into “carbon taxation”, putting an significant price on the basis of emissions (Azad & Chakraborty, 2020). The regulations such as “Environment Protection Act, 1986”, “National Green Tribunal Act, 2010” and “National Environment Policy, 2006” have developed sustainability.

## Conclusion

Thus, it can be concluded that “carbon tax” plays a critical role in the development of sustainability in environment and decreasing the rate of carbon emission. Increased percentage of “carbon taxation” has assisted in decreasing the emission rate of GHGs. The government of India has set prices on the basis of “per ton on carbon”, “tax on electricity” and “Tax on Natural Oil and Gas”.

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