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Policy Framework of Green Taxation on Motor Vehicles: A Comparative Perspective

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ABSTRACT

Green economics is structured to reward more innovative, environmentally sustainable, and low-carbon resource use while imposing taxes on the emission of pollutants that adversely impact the environment and public health. The concept of green taxation is still being tested in many nation-states. Pollution is worst in India, and the country is ranking low on several environmental performance indices. Vehicle exhausts are one of the key pollutants. In 2021, the Indian government released draft guidelines for imposing Green Tax on older motor vehicles. India submitted its first Nationally Determined Contribution Report to the United Nations Framework Convention on Climate Change in 2022. India prioritized green taxonomies, low-carbon transportation systems, and Bharat Stage-VI emission standards and offered incentives and tax breaks to encourage the production and use of higher ethanol-compatible vehicles. There is still a lack of awareness among the masses, as well as academic discussions and literature on the subject. Against this backdrop, the researchers intend to explore the legal and economic actions undertaken by the Indian Government to intercept vehicular air pollution. An effort will also be made to draw a comparative study with the fiscal policy measures and other steps taken by the Italian government to tax polluting vehicles.

Keywords: Green Taxation, Vehicular Pollution, Economic Incentives, Environmental Protection, Sustainable Development

1. Introduction

The cornerstone of a sustainable economy is the carrot-and-stick framework of offering incentives for more pioneering and environmentally conscious clean resource consumption while enforcing tax liabilities on the discharge of pollutants (Gerlagh et al., 2009; Ahmad & Satrovic, 2023). It is not a novel idea for a government to implement economic and taxing tools to counteract environmental pollution. A significant external force in the environmental economics of a nation is the legislature. India and Italy are signatories to the Paris Agreement, a pact on the diminution of climate change that lays down legally binding action strategies and a reporting structure for its member states (United Nations, 1992). The "United Nations Framework Convention on Climate Change, 1992" (hereinafter UNFCCC) promotes the willful exchange of scientific research-based lessons amongst nations and lays down rules for budgetary and technical support services for the advancement of climate-resilient communities (United Nations, 2015). As per the

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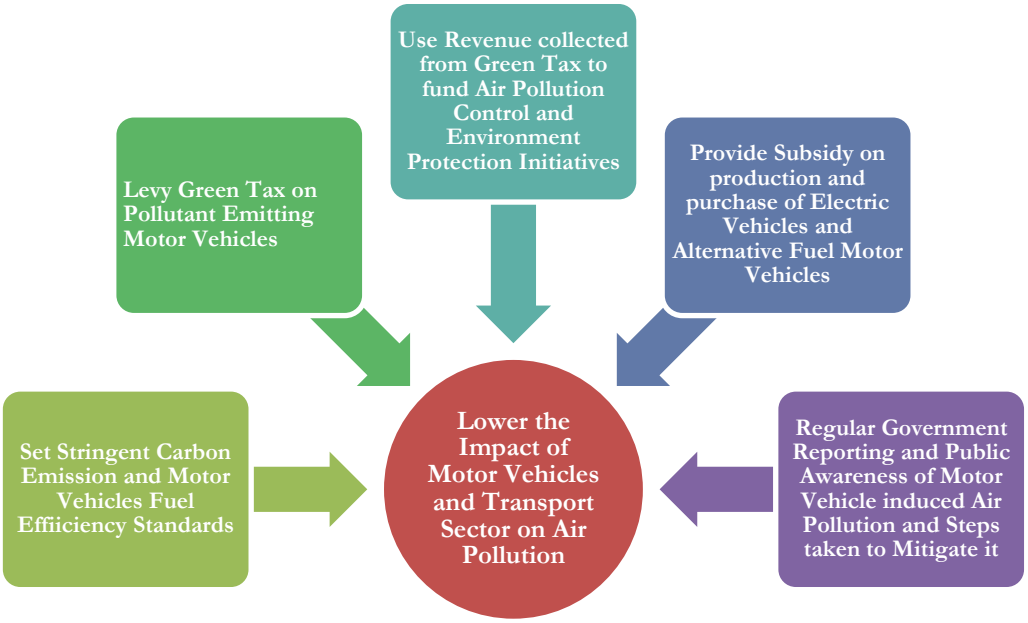
Kyoto Protocol, the parties must ensure that their aggregate emissions from Greenhouse Gas source materials do not rise over their permitted level of emissions throughout the particular phase of the program.

India has been trailing behind at 121 of the 163 countries in the 2022 Global Sustainable Development Goals Index (Sachs et al., 2022). There is significant progress made in its climate action goals. Nonetheless, the estimated yearly particulate matter intake in India for each individual remains 83 g/m3, 16.6 times the World Health Organization's recommendation (UN Environment Programme, 2022). Among the key pollutants that pollute the air in India are vehicle exhausts. Merely 5% of the overall fleet of vehicles is commercial, such as trucks, yet together they generate almost 65-70% of all vehicular emissions (Government of India, 2021). Some sustainable development goals closely related to our research study are combating climate change, sustainable transportation, strengthening urban air quality and health, and promoting well-being for all. According to India's Biennial Update Report presented to the UNFCCC in 2021, the transportation segment accounts for approximately 12.1% of the country's energy-related carbon dioxide emissions and 9.7% of the nation's overall emissions of greenhouse gases (Ministry of Environment, Forest and Climate Change, Government of India, 2021). In 2022, India provided the UNFCCC with its first Nationally Determined Contribution Report and Long-Term Low-Carbon Development Strategy, which among other things prioritized green taxonomies, low-carbon transportation systems, Bharat stage VI emission standards, and encouraged the production and usage of higher ethanol compatible automobiles by offering incentives and tax deductions (Ministry of Environment, Forest and Climate Change, 2022).

The European Green Deal provides the foundation for the European Union's objective of attaining climate neutrality by 2050, with the endeavor to attain negative emission levels after that, as set forth in Article 2 (1) of the European Climate Law (European Commission, n.d.). Road traffic was the leading producer of nitrogen oxides in the European Union in 2020, making up 37% of greenhouse gas (European Union, 2022). Air pollution leads to significant environment-related medical illnesses in Europe that disrupt a healthy life span and favorable working conditions (European Union, 2023). The exposure levels in air quality are substantially high in Italy, 3.2 times the World Health Organization recommendations (Deprez, 2022). Italy, a founding member-state of the European Union, was placed 25 of the 163 countries in the 2022 Global Sustainable Development Goals Index. However, the report noted that considerable challenges to achieving its climate action goals remained (Italy SDG Index and Dashboard, 2022). Italy submitted its Eighth National Communication to UNFCCC in 2022. Road transport was stated as a significant component of carbon dioxide equivalent emissions in the transportation sector, responsible for 23.4% of the country's overall emissions in 2020. The sector's emissions of greenhouse gases dropped by 16.3% during 1990 and 2020. However, the economic crisis and COVID-19 were the main reasons for lowered motor vehicles on the roads (Ministry of Environment and Energy Security, 2022).

Motor vehicles and the transport sector emit pollutants that make a significant contribution to greenhouse gas emissions and result in air pollution and adverse impacts on health. Green taxes are a significant tool in the hands of the government to mitigate the adverse effects of carbon dioxide and other pollutants emitted by motor vehicles. The

revenue so generated can be employed towards environment preservation measures. Still there is a lack of regular government reporting of steps taken to mitigate motor vehicle induced air pollution and utilization of the collected green tax from motor vehicles. Several governments also provide subsidies as a powerful economic instrument to promote the



usage of electric vehicles and alternative fuels. Road transport is one of the important areas that contribute towards pollution. Certain measures that can be taken to lower the impact of motor vehicles and transport sector on air pollution include:

Though India and Italy differ in many aspects like area, population, road infrastructure, etc, it would be interesting to look at a comparative analysis of India and Italy with respect to the percentage share of the road transport sector's contribution to GHG and Co2 emissions in both countries. The contributions are much higher in Italy, nonetheless, still a significant proportion in India (Figure 1).

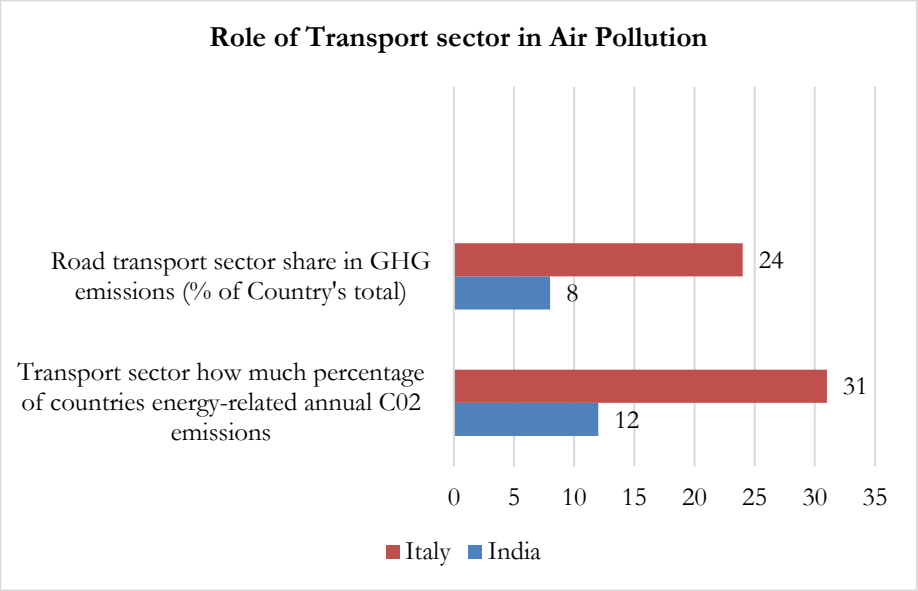


Figure 1. Share of Road Transport in Overall Green House Gas and Carbon Dioxide Emissions of India and Italy (Source: developed by the authors, based on (Shrivastava, 2022) (Climate Transparency, 2022))

Research Design

The research conducted by the authors is a theory-focused comparative study whereby the impact of green taxation laws and government subsidy initiatives that mitigate the adverse effects of carbon emissions from motor vehicles in India and Italy are examined. The primary sources are the legislation and economic incentive policies pertaining to motor vehicle pollution and clean fuel promotion that have been implemented by the respective governments across the two economies over the years. In addition to the discussions and comparative study on the existing laws and policies in India and Italy, our study further contains a quantitative comparison conducted using secondary empirical data available for both countries. Secondary empirical data is collected from governmental, international organizations, and independent research agencies.

The study is divided into six parts. The first part is the theoretical framework of green taxation and international climate action obligations of India and Italy. The second part is a detailed assessment of India's environmental tax structure conducted using a comparison table of the state-by-state environment tax laws that pertain to motor vehicles. The variables being compared include the age and class of the vehicle, the amount of environmental tax levied, and the stated objective and intended usage of such tax. The third part is the eco-tax and other fiscal policy measures and parameters concerning polluting motor vehicles implemented by the European Union and the Italian Government. The fourth part is a comparative analysis of both countries' motor vehicle green taxation legislative and policy frameworks. And comparative data analysis on indicators including population, motorization rate, ambient air pollution attributable deaths, transport sector energy-related annual C02 emissions, revenue from environmentally related taxes, and electricity and biofuels vehicle share, among others. The

fifth part includes limitations of the study. And the final part is the conclusion and suggestions, the contribution to the existing literature, and the scope of future studies.

2. Policy Framework in India

The extent and the origins of environmental pollution vary considerably among Indian States. The Hon'ble Supreme Court of India recognized the right to live in a pollution-free environment as an element of the fundamental right to life underlying Article 21 of the Constitution of India (*M.C. Mehta v. Union of India* 1986). A cost-effective and sustainable economic approach to reducing carbon emissions and their implications on the environment is the carbon tax on fossil fuels, often known as the greenhouse gas emission tax (Mondal et al., 2016; Yunzhao, 2022). Although driving a motor vehicle as an act is not hazardous or inherently dangerous, vehicle owners, among other polluters, must compensate for the harm they caused because it adds up to pollution and public health risks over time. Hybrid policies merge two or more methods or instruments to regulate the ecosystem. It is imperative to have formal regulations like environmental taxes, saleable emission permits, mandatory environmental standards in place, and incentives to the manufacturing sector for renewable technology enhancements. The Ministry of Law and Justice incorporated subsection (4) to section 59 of the Motor Vehicle Act of 1988, which asserts that the Central Government could establish regulations outlining how to recycle motor vehicles and their components after they have outlived their useful lives while taking into consideration community safety, environmental conservation, and the legislation's objectives (Ministry of Law and Justice (Legislative Department), 2019). It granted the power to the central and state governments to enact policies that would preserve and improve the environment, stimulate energy saving, and raise the standard of living. The Indian government's Ministry of Road Transport and Highways released draft guidelines for imposing a Green Tax on older vehicles in India (Government of India, 2021). Eight States and Union Territories including Karnataka, Goa, Daman and Diu, Telangana, Andhra Pradesh, Maharashtra, Uttar Pradesh, and Jharkhand have previously implemented green taxes on aged motor vehicles in India. The National Capital Territory of Delhi has not implemented any such green tax on older motor vehicles. The following Table 1 summarizes the green tax legislation already in effect in a few of the Indian states and union territories.

Table 1: Motor Vehicle Green Taxes in India

Name of the State Law and Introduction of the Green Tax on Motor Vehicles	**Provision**		**Objective and Time of Levy of Green Tax**
	Age and Class of Vehicle	**Amount of Green Tax**	
The *"Karnataka Motor Vehicles Taxation Act"*, 1957 Introduced	Section 3B		For carrying out different air-pollution control initiatives.
	Non-transport-vehicle older than 15 years	₹250-500	Once going to renew the vehicle-registration-certificate.

in 2002	Transport-vehicle older than 7 years	₹ 200 /- per annum	When such a fitness-certificate is renewed.
The *"Goa, Daman and Diu Motor Vehicles Tax Act"*, 1974 Introduced in 2004	Section 3-A		For carrying out different air-pollution control initiatives.
	15-year-old Non-transport two wheelers vehicle	₹ 250	Once going to renew the vehicle-registration-certificate.
	15-year-old Non-transport-vehicle other than two-wheelers	₹ 500	
	15-year-old Transport-Motorcycle	₹ 200/- per annum	When such a fitness-certificate is renewed.
	15-year-old Transport-Auto-Rickshaws	₹ 300/- per annum	
	15-year-old Transport-Motor-Cab and Maxi-Cab	₹ 400/- per annum	
	15-year-old Transport-Light-Commercial-Vehicle	₹ 500/- per annum	
	15-year-old Transport-Medium-Commercial-Vehicle	₹ 600/- per annum	
	15-year-old Transport-Heavy-Motor-Vehicles	₹ 1000/- per annum	
The *"Telangana Motor Vehicles Taxation Act"*, 1963 Introduced in 2006	Section 3-B		To put into action different preventative air-pollution mechanisms. The mode, categorizations, and proportions of utilization are to be specified afterward.
	7-year-old Transport-Vehicle	₹ 200/- per annum	Commencing with the date of registration of the vehicle.
	15-year-old Non-transport Motorcycles	₹ 250/- for 5 years	Vehicles powered by Liquefied Petroleum Gas, Compressed Natural Gas, battery, or solar power are exempt from the Levy.
	15-year-old Non-transport Vehicle other than Motorcycles	₹ 500/- for 5 years	
The *"Andhra Pradesh Motor Vehicles Taxation Act"*, 1987 Introduced	Section 3-B		To put into action different preventative air-pollution mechanisms. The mode, categorizations, and proportions of utilization

in 2010			are to be specified afterward.
	7-year-old Transport-vehicles	₹ 200/- per annum	Vehicles powered by Liquefied Petroleum Gas, Compressed Natural Gas, battery, or solar power are exempt from the Levy. Commencing with the date of registration of the vehicle.
	15-year-old Non-transport-Motorcycles	₹ 250/- for 5 years	
	15-year-old Non-transport-vehicles other than motorcycles	₹ 500/- for 5 years	
The *"Maharashtra Motor Vehicles Tax Act"*, 1958 Introduced in 2010	Section 3A and Section 11 (4)		The revenues of the environment tax will be devoted to nine defined expenditures, as to construction and growth of vehicle inspection facilities, the institution and advancement of a system of pollution-checking establishments, the formation and progression of air quality test centers, the promotion of clean-fuel for vehicles, the endorsement of automobiles powered by solar-energy or hybrid-technology, the boosting of the system of public transportation, the training of public transportation operators, and the betterment of the public transportation system, to improve knowledge of environmental protection, to create advanced vehicle verification stations to deliver or renew fitness-certificates, and to conduct scientific studies to recommend multiple techniques and pathways to cut emissions and enhance the natural environment.
	Two-wheeler-non-transport-vehicles that are older than 15 years	₹ 2000/- lump sum for every five years	
	Old petrol-drive-non-transport-vehicles other than two-wheeler which are older than 15 years	₹ 3000/- lump sum for every five years	
	15-year-old diesel-driven non-transport vehicles other than two-wheelers	₹ 3500/- lump sum for every five years	
	8-year-old auto-rickshaw transport vehicles not running on CNG or LPG	₹ 750/- lump sum for every five years	
	8-year-old fared meter taxis and Jeep-type motor cab transport vehicles not running on CNG or LPG	₹ 1250/- lump sum for every five years	
	8-year-old tourist-taxi-transport-vehicles not running on CNG or LPG	₹ 2500/- lump sum for every five years	
	8-year-old light-good-transport-vehicles not running on CNG or LPG	₹ 2500/- lump sum for every five years	
	15-year-old auto-rickshaw transport vehicles running on CNG or LPG	₹ 750/- lump sum for every five years	
	15-year-old fared meter taxis and Jeep-type motor cab transport vehicles running on CNG or LPG	₹ 1250/- lump sum for every five years	

	15-year-old tourist-taxi-transport-vehicles running on CNG or LPG And 15-year-old light goods transport vehicles running on CNG or LPG	₹ 2500/- lump sum for every five years	The age of the vehicle will be computed from the day of its first registration.
	8-year-old Medium, Heavy, and Articulated goods transport vehicles weighing above 7500 kg	10% of annual-tax	
	8-year-old Contract carriage buses and first schedule clause A-VII transport-vehicles, 8-year-old private-service-transport-vehicles, 8-year-old tourist-bus-transport-vehicles, and 8-year-old camper van, stage carriage, ambulance, and fire brigade.	2.5% of annual-tax	
The *"Uttar Pradesh Motor Vehicles Taxation Act"*, 1997 Introduced in 2014	Section 2 (d-1) and Section 4 (1)		To reduce environmental degradation and allocate tax resources towards environmental preservation.
	Motor-vehicle other than a transport-vehicle	10%	
The *"Jharkhand Motor Vehicles Taxation Act"*, 2001 Introduced in 2018	Section 5 (5)		It was decided in 2020 that the tax would be levied for an additional five years.
	12- year-old transport vehicles and 15-year-old personalized-vehicles	10%	

One can digitally pay the above motor vehicle taxes on the Indian government's *"Vahan Citizen Services"* website. State department's official records outlining the amount and utilization of the revenue received from green taxes, unfortunately, were not published. Very few state governments have maintained the revenue it has garnered from a 'Green Tax' in a special fund to be deployed for pollution control (Mandal et al., 2013). Noticeably, the lower tax rate in these states is not serving as a deterrent when the maximum green tax permitted in state motor vehicle taxation legislation schedules is much higher. Only the Maharashtra government has a relatively higher tax rate and offers a comprehensive list of actions it would adopt to mitigate environmental degradation in the state. A number of states like Karnataka, Goa, Maharashtra, Uttar Pradesh, and Jharkhand did not specify the vehicles exempted from the green taxes. The central government's proposed guidelines advised states to set up cutting-edge on-road emission monitoring equipment for thorough vehicle filtering using a portion of the generated green tax. There is hardly any amendment in the above laws to gradually increase the green taxes over time in a time-bound and

phased manner. There is no framework for interstate deliberations on taxing measures to reduce air pollution, and state laws differ considerably from one another.

2.1. Analysis of the Capital City of Delhi

The extent of pollution is at its worst in the NCT of Delhi and India is ranking low on several environmental performance indices, with the NCT of Delhi and the neighboring NCR ranking among the worst (DNA Web Team, 2022; Wolf et al., 2022, The World Air Quality Index project, 2023). This is caused by a wide range of variables in Delhi, including industries, construction sites, silica dust, stubble burning, and motor vehicle exhausts (Chatterji, 2020; Central Pollution Control Board, 2019). In comparison to all other union territories in India, Delhi has the greatest number of registered vehicles, and it is only trailing behind states which have far larger territories (Aramane et al., 2021). In the Ministry of Earth Sciences report, vehicles accounted for 41% of the capital's pollutants (Environment Pollution (Prevention and Control) Authority for NCR, 2018). The National Green Tribunal took note of the growing air pollution in the NCT of Delhi, which is primarily the outcome of vehicular pollution (*Vardhaman Kaushik v. Union of India and Ors*. 2016). The progression of Delhi's green taxation policy is not keeping up with the exigencies of a cleaner ecosystem, environmental sustainability, and international and domestic benchmarks (Bhatia & Gupta, 2020; Surayya, 2012). In compliance with the Hon'ble Supreme Court of India's direction in *M.C. Mehta v. Union of India and Ors.*, the "Environment Pollution (Prevention and Control) Authority" for Delhi has published several reports and action plans on the Environment Compensation Charge revenues that were collected from commercial goods trucks entering the Delhi border (Environment Pollution (Prevention and Control) Authority for NCR, 2020). The underutilization of the green funds raised from the Environment Compensation Charge was asserted in the media (Singh, 2022). Other measures to be enforced across the capital included the application of Bharat Stage VI fuel and emission standards, the issuance of an environmental pollution charge of 1% on the registration of diesel vehicles with 2,000 ccs and above, and the imposition of fines against noticeably carbon-intensive vehicles (Environment Pollution (Prevention and Control) Authority for NCR, 2017).

3. Fiscal Policy Measures Concerning Polluting Motor Vehicles Taken by the European Union and the Italian Government

European nations have a variety of laws governing transportation-related taxes and levies, the proceeds of which account for a sizable portion of all environmental earnings (Nagy, 2013). The Member States are responsible for ensuring that, at the time of purchase, a label on fuel efficiency and CO2 emissions in line with the specifications of the 1999 Directive is enclosed or demonstrated in a conspicuous manner adjacent to every new passenger type of car (Directive 1999/94/EC, 2000). In order to mitigate, avert, or minimize adverse impacts on human well-being and nature, European Union Members have the mandate to ascertain their ambient air quality (Directive 2008/50/EC, 2008). They must also assure that the general populace has access to this data. As reported in the European Union Climate Action Progress Report 2022, the ratio of battery electric cars

has risen exponentially, and average emission levels from new automobiles have dropped significantly from 130.3 g CO2/km under the Worldwide Harmonized Light Vehicles Test procedure in 2020 to 114.7 g CO2/km in 2021 (European Commission, 2023). To offer objective scientific assistance on European Union policies and climate deliverables, the "European Scientific Advisory Board on Climate Change" was constituted in 2022 (European Environment Agency, 2023). In addition to building the necessary infrastructure, the emphasis has been on establishing an eco-friendly alternative clean fuels framework and reliance on electric vehicles (Directive 2014/94/EU, 2014; Ala et al., 2020). To guarantee the long-term viability of an ecological transportation industry framework across the European Union, close association with both local and regional agencies, adjoining member countries, and manufacturers is deemed crucial.

Italy ratified the Kyoto Protocol in 2002 and the Paris Agreement in 2016. The promotion of sustainable development, in a way that is consistent with the global programs and missions put forward by international bodies and by the European Union, constitutes one of the primary goals undertaken by the Italian Agency for Development Cooperation (Organization for Economic Cooperation & Development, 2021). Environmental taxation remains among the best strategies for recouping the external costs associated with the battle against pollution (oral & Sayin, 2015). In Italy, the motor vehicle tax amount is determined by the exhaust carbon emissions documented on the certificate of registration, the Euro directive the automotive adheres to, and multiplying the corresponding value along each kilowatt of engine power. Italy has a 22% Value-added tax. Vehicle Registration Tax depends upon that vehicle's engine power; it would be Euro 150 for the initial 53 kilowatts and Euro 3.51 for each additional kilowatt. The local authorities ascertain the surcharge, which can vary from zero to thirty percent. Depending on the engine's cylinder capacity and air pollutants, a yearly ownership tax between Euro 2.58 to Euro 4.95 per kilowatt is imposed. Local rates could differ from the national median. For every kilowatt of engine power above 185, surtax on the usage of automobiles for the transport of individuals or commodities is imposed at a value of Euro 20.00. An eco-tax is paid by those who purchase and document a new M1 vehicle in Italy, a vehicle intended and built for passenger transportation, with less than 9 seats when including the driver's seat, along with anybody who records an M1 vehicle previously enrolled in another Region (OECD iLibrary, 2022). The eco-tax is determined by the number of grams of carbon dioxide emitted per kilometer surpassing the criterion of 160 CO2 g/km. It is 1100 euros for emissions between 161 and 175 g/km, 1600 euros between 176 and 200 g/km, 2000 euros between 201 and 250 g/km, and 2500 euros above 250 g/km (Zachariadis et al., 2020). Special-purpose vehicles, like those utilized by individuals who have disabilities, remain exempt. Additionally, Electric vehicles powered by batteries, that essentially emit under 20 g CO2/km, enjoy Euro 4,000 subsidy, even as plug-in hybrid vehicles that generally emit within 20 and 60 g CO2/km get a Euro 1500 subsidy (OECD iLibrary, 2022). Automobiles of historical and collectible value are entitled to a 50% motor vehicle tax rebate. Across many jurisdictions, electrical, liquid petroleum gas, and compressed natural gas vehicles are entitled to a 100% ownership tax-free status for five years following their initial registration and a 75% exemption thereafter (OECD iLibrary, 2022). Following the initial COVID-19 lockdown, nitrogen dioxide yearly elevated levels were brought down by up to 25% in urban centers, which included Italy. Rome and certain other cities have

introduced *"Zona Traffico Limitato"*, which restricts the operation of vehicles with particular emission levels in notified regions to clamp down on traffic (Zhogoleva & Vinogradov, 2020). In a bid to boost state revenue, a Superbollo tax was levied on all new cars bought commencing through 2012. Vehicle owners were bound to pay an added Superbollo tax if their car's engine power surpassed a certain limit. The tax was initially set at ten euros per kilowatt of engine power over 225 kilowatts in 2011 and twenty euros per kilowatt of engine power over 185 kilowatts in the following year. Studies have held that the implementation of a vehicle tax could decrease greenhouse gas emissions if potential buyers abstain from selecting automobiles with greater engine power (Bergantino et al., 2019).

4. Comparative Analysis

Both India, a federal democratic republic, and Italy, a democratic republic, are suffering from deteriorating ambient air quality and rising vehicular pollution. At present, India and Italy have a population of around 1,425,776,000 and 60,199,484 inhabitants, respectively (Worlddata.info). The population though continuously fluctuating is on the rise in the two economies. Italy is a developed country and India is a developing one but the latter is a much larger economy and the steps taken now to control carbon and other pollutant emissions from motor vehicles and making a shift to electric vehicles early on can help achieve India's zero-emission goals in the future (Kamboj et al., 2022). The European Union and Italy are already pioneers in decreasing the emission of vehicle exhaust pollutants through eco-tax and eco-bonus legislation. WHO data (2019) talks about ambient air pollution resulting in deaths (World Health Organization, 2022). The numbers are severe with India having 882638 deaths in a total population of 138.31 Crores and Italy having 32738 deaths in a total population of 5.97 Crores. Looking at the ratio of deaths to total population the difference between the two countries is not much. The figure 2 shows Italy being less than 10% higher.

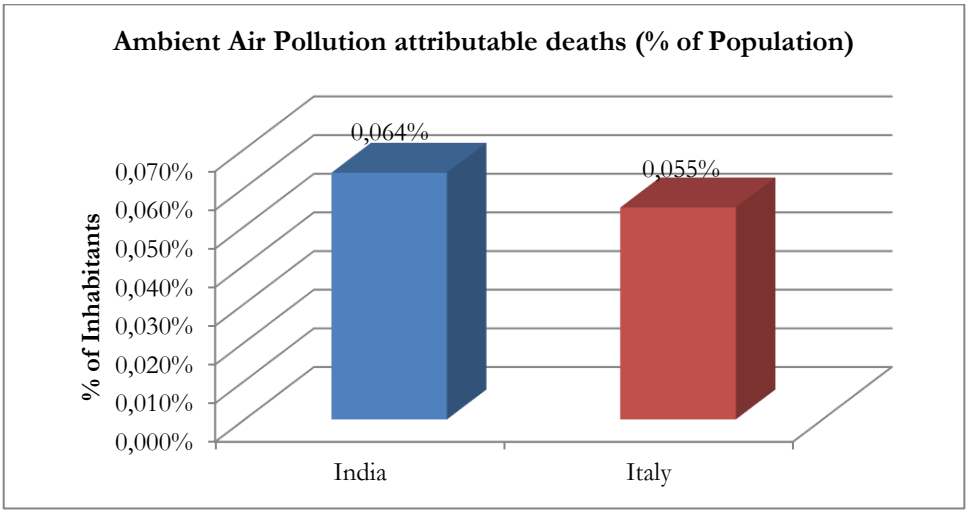


Figure 2. Ambient Air Pollution attributable deaths in India and Italy as per World Health Organization (Source: developed by the authors, based on (World Health Organization, 2022))

At this point, it would be beneficial to compare the Motorization Rate and Co2 emission per 1000 inhabitants of the two countries. Figure 3 shows that Italy is way ahead in its roadways structure, motorization rate, and Co2 emissions as per available 2019 data. However, when a comparison is done in light of revenue from environmentally related taxes and electricity and biofuels vehicle share in the two countries the percentage is higher in Italy showing higher revenues and greater share of environment-friendly alternative fuelled vehicles in the economy.

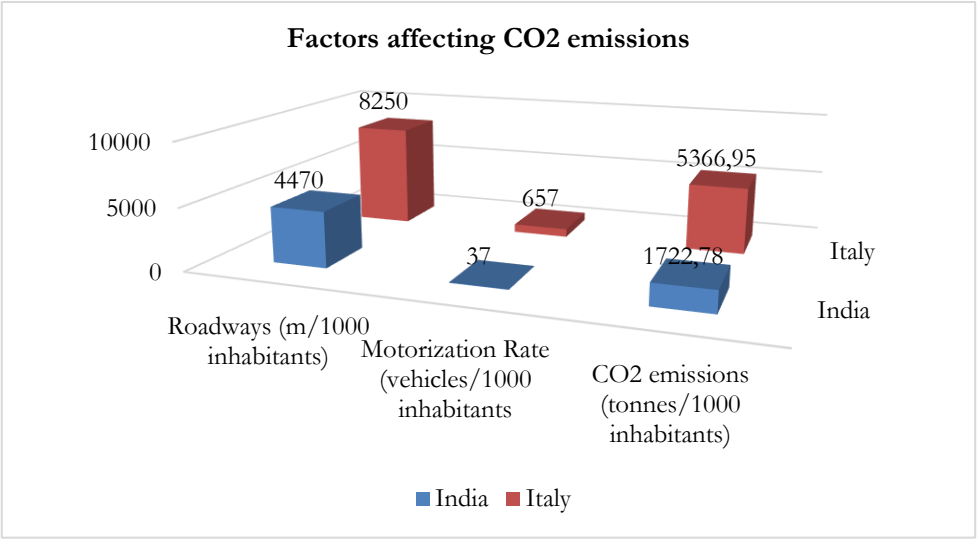


Figure 3. Roadways, Motorization Rate and Co2 emissions in India and Italy per 1000 inhabitants (Source: developed by the authors, based on (Worlddata.info) (Shrivastava, 2022) (Climate Transparency, 2022))

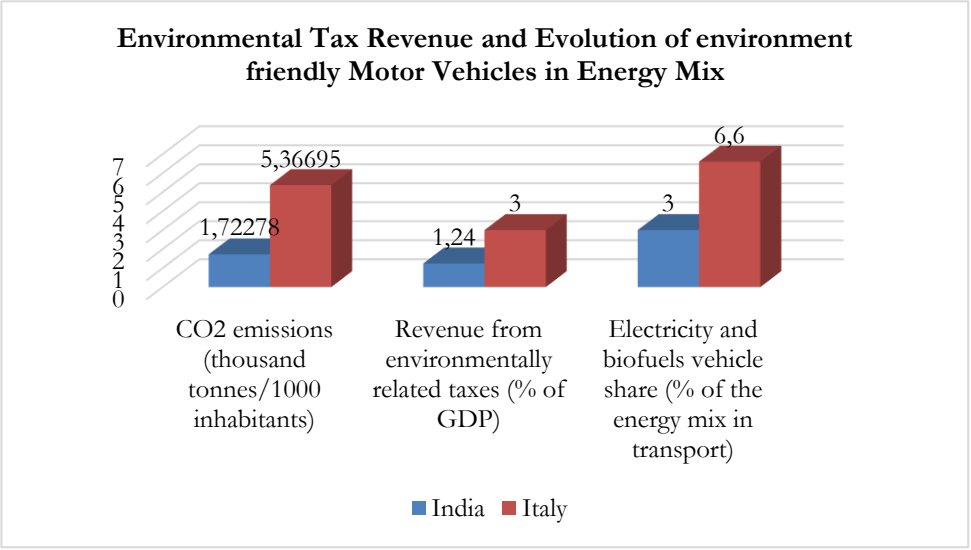


Figure 4. Co2 Emissions, Revenue from environment related taxes, and share of electricity and biofuels vehicles in transport energy mix of India and Italy
(Source: developed by the authors, based on (Worlddata.info) (Green Fiscal Policy Network, 2021) (Shrivastava, 2022) (Climate Transparency, 2022))

In its UNFCCC report, India discusses implementing measures for lowering vehicular pollution which has been in place in the member states of the European Union for more than a decade. Both nations adhere to Bharat Stage VI and Euro 6 emission standards, with the latter advancing to Euro 7. Imposing a Green tax on the operation of outdated vehicles is meant to deter excessive use of such vehicles by holding the individual who owns the vehicle accountable for the financial cost of contributing to pollution. Ensuring that emitters bear their fair share of the cost of pollution is in compliance with the "polluter must pay" principle in above jurisdictions. It advances public welfare as measures to mitigate air pollution are often undertaken with the help of revenue generated from the green taxes. The quantum of taxation in Italy is directly governed by the extent of carbon dioxide emissions. The environmental tax provisions in the above jurisdictions are designed primarily to framework and watch over climate goals, accompanied by the revenue intent. Italy makes a significant contribution to the Green Climate Fund, the Asian Development Fund, and UNDP grants, among other initiatives.

At present, a green taxation law on vehicles is still missing in the NCT of Delhi. Delhi did devise a green program that encompassed fund allocation for pollution control and several measures were taken including the promotion of CNG and electric vehicles, mandatory pollution checks, and phasing-out old vehicles policy to lower air pollution. The odd-even scheme was also implemented whereby vehicles ending with odd or even number plates were restricted on Delhi roads on alternative days to control traffic smog (Kumar et al., 2017). A substantial amount was collected as fine from those not adhering to the scheme and this stirred several people to do carpooling and use public transport, instead. The price of petrol and diesel is greater than that of CNG-powered and alternative fuels in Delhi. The renewal of pollution certificates is mandatory. The government has put forth numerous efforts, yet the air quality continues to deteriorate. High-impact measures

for fruitful outcomes are long overdue. Any mention of green tax or eco-tax is still missing from the Delhi Motor Vehicles Taxation Act, 1962.

The research study highlights that the Maharashtra model of green taxation from India might be the most effective deterrent. It has higher tax rates, more classes of vehicles covered, and objectives stated for utilizing the green funds received. Exemption to vehicles power-driven by LPG, CNG, battery, solar power, or any other clean fuel should also be introduced in all Indian states. India lacks guiding principles, reporting structure, and directives for its states, as seen in Italy, where the European Union issues periodic regulations.

5. Limitations of the Study

There are certainly other variables besides motor vehicle emissions that contribute to the environmental degradation in the above jurisdictions. There was a language barrier in accessing certain research work, statistical data, and Italian legislation, due to it being available in only the native language. Therefore, reliance was placed on secondary sources citing and interpreting the above data and legal provisions in the English language. State departments in India did not publish statistical data outlining the amount of green taxes collected from motor vehicles and how the funds generated were utilized. As a result, the scope of the study was confined to a theoretical assessment of existing Indian laws and regulatory measures. Added to that, the research analysis of data depended solely on secondary empirical sources and resources for the quantitative information for different indicators were gathered over different periods in time. However, authors did make a conscious effort to make sure that the data used for a particular indicator for Italy and India was collected from an identical source and time period.

6. Conclusion and Suggestions: the way forward

Without carefully examining the past, one cannot truly forecast the future. The right to an unpolluted environment is extensively documented in India and Italy. Nonetheless, the review of existing literature highlighted that there are not many comprehensive and analytical studies published by the government or academic journals that examine the green taxation laws applicable to motor vehicles in respective jurisdictions, especially India. European Union published certain reports but the same is on broad environmental tax and carbon emission targets and not on the impact of motor vehicle eco-tax and subsidies in Italy. The international organizations and independent research agency studies were also on broad perspectives and statistical data had to be collected from different sources as not one source did specific motor vehicle emission and green taxation similar study in India and Italy. There is no information on the collection and utilization of Motor Vehicle Green Tax on the official websites of the Indian state governments or in the annual reports of the Ministry of Road Transport and Highways. European Union and Italy also merely has broad environmental tax revenues related data, instead of the specific motor vehicle eco-tax data. The necessity to track down and appraise the expansion of green taxation and other market-based instruments employed by states to combat vehicular pollution in India, in the present research study, was more than ever

with the introduction of the 2021 older motor vehicle green tax draft guidelines and ongoing Faster Adoption and Manufacturing of Electric Vehicles in India scheme. India has a larger territory and a higher population, yet some urban areas, like the National Capital Territory of Delhi, have a higher concentration of motor vehicles and air pollution than others. Meanwhile, Italy, despite having far more motor vehicles per 1,000 inhabitants, has been on a journey to control its motor vehicle carbon emissions as can be seen in previous chapters.

There is a scope for future nationwide and inter-states and inter-nations empirical longitudinal comparative impact studies that assess the cumulative impact of green tax regulations and other fiscal and environmental policy initiatives to achieve net-zero emission goals and test them in varying sectors including motor vehicles and transport. Our study underlined the need for a government and international organizations-led research initiative and annual statistical data. Inquiry is required to identify the correlation between green taxation laws and the subsequent benefits reaped by society. Future comparative studies must be done by a committee of scientific, legal, financial, and environmental experts. The findings and recommended measures of which should be made public to affect change and periodically pushed among the populace through the media. There have been researches that addressed the trade-off that occur between the numerous benefits of clean technology and the barriers that nations without developed economies may encounter when implementing green taxation (environment tax) it being an impediment on the growth of the economy (OECD, 2012). Environmental externalities are to be priced and corresponding environmental costs internalized through the implementation of green taxation regulations. Lack of stringent laws along with inadequate provision for implementation, compliance, monitoring infrastructure and reporting structures for generated tax revenues have been the barriers to green tax adoption especially in developing countries. Other challenges involve establishing an adaptable green taxation structure for a diverse and ever-growing economy like India, in which states have the authority to enact motor vehicle taxation laws; determining an equitable tax base and motor vehicle, internal combustion engine, and emission-wise tax rates; inadequate government assistance in offering market subsidies and incentive programmes to encourage consumers to purchase alternative fuels and electronic vehicles which though have greater upfront cost are advantageous to individual and society in longer run and financial support to manufacturers to conduct research into making alternative fuel motor vehicles more affordable; and failure of governments to use revenues derived from green taxes in an accountable and structured manner to lower taxes in other sectors, building community infrastructure, and combat the adverse effects of environmental pollution (RK News, 2023; Moller et al., 2019). Further empirical studies can be conducted by researchers to study the influence of barriers and challenges mentioned above in varying countries and sectors that implement green taxation policies.

Indian government is progressing in their Green Tax (environment tax) measures with Eight States and Union Territories implementing it in its Motor Vehicles Taxation Acts and passing of 2021 National Draft Green Tax on Older Motor Vehicles Guidelines. Only limited States and Union Territories in India lay down purposes for which Green Tax collected from Motor Vehicles can be utilized. The existing state legislation in India must be amended to meet the proposed 2021 guidelines' criterion of 10 to 25% green taxes

on older motor vehicles. The future of India's green economy and motor-vehicle tax regime to cut emissions and ensure a healthy environment may lie in a national legal regime. For now, states should further identify and publicize the intended purposes for which the revenue accumulated from green taxes will be utilized. The European Union and Italy have set a precedent by taking carbon dioxide emission and engine power levels into account while levying green taxes on motor vehicles. It is arbitrary for Indian states to tax and discards older motor vehicles based on their age alone rather than their fitness and emission level. New policies are required to assess all parameters while holding a vehicle accountable for air pollution. In addition, remotely sensed or automated assessment stations must be employed to detect unfit gross polluters before vehicle re-certification. States like Telangana have already begun to exempt the initial batch of electric vehicles from paying road tax and registration fees and are providing retrofit incentives. Differential green tax rates must be passed in the NCT of Delhi based on how much pollutants a vehicle emits. Older and diesel-powered automobiles have already been the first targets. A notable development is the *"Commission for Air Quality Management in National Capital Region and Adjoining Regions Act"* which was passed in 2021.

Italy can implement a further region-specific eco-tax, a more thorough vehicle categorization system, and additional range of vehicles exempt from the eco-tax, as is the case in selected Indian states. A periodical adjustment in their fiscal policy measures related to vehicle pollution must also be done to meet their climate action goals. According to previous studies, media could be a powerful instrument for developing community awareness towards sustainable practices including taking public transportation in Italy (Ferrucci & Petersen, 2018). Government budget allocation on clean fuel innovation and green technology must rise in both economies. Vehicular emissions requirements should be easy to comprehend and uncomplicated for automakers and vehicle owners to adhere to. Automakers must be granted adequate leeway in modernizing their vehicles with time to oversee the shift to zero-emission automobiles in a cost-effective way that preserves the industry's competitive edge and establishes the foundation for future technological advances. Only when environmentally sustainable alternatives are affordable and readily available should policies limiting vehicular carbon emissions be enforced. The retrofitting of older motor vehicles with modern engines and emission control equipment must be authorized to a certain extent under the oversight of public authorities in both nations. The extent of permitted air pollutant emissions must not become redundant. And new limitations must be imposed as and when required. Green taxes must be gradually increased over time with periodic amendments implemented progressively. It is crucial to bear in mind that this is a marathon, not a sprint. And indeed, a lengthy one. The endeavors must sustain for generations to come. The allocation of green funds collected from green taxes levied should be transparent in both economies. The government must grant economic incentives to automakers to advance in green technology. Air quality control initiatives, allotment of vehicle pollution check certificates, and marketing initiatives promoting electric vehicles must run side by side. The sales of electric vehicles are predicted (Iea, 2023) to rise globally and both India and Italy have elaborate electric vehicle promotion policies in place. Italy and certain States and Union Territories in India including Delhi provide subsidies for Electric Vehicles (Iea, 2021).

We are both victims and polluters. The situation won't get better until we do. The governments should enact legislation requiring the disclosure of pollution-related data on the respective motor vehicles and the websites of the enterprises that manufactured them as recommended by the European Union. The general population can be made aware of air pollution concerns at petrol pumps, red lights, and auto dealerships. In Delhi, certain campaigns, such as turning off the engine when the traffic light turns red, are already in effect. *'Sehat kelie hanikarak hai or Hazardous for Health'* should be used as a warning sign for deteriorating air quality. One must be conscious of the long-term bargain they are making with their health, environment, and life.

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