

STUDY OF POLLUTION FREE TRANSPORT AND THE BARRIERS AND PROBLEMS FOR ADOPTION

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Abstract

India, today has the largest automotive industry in the world, resulting in a massive growth in the number of vehicles, notably two-wheelers and cars. India now accounts for a significant portion of global vehicle sales. This exponential increase has two major consequences: energy security and pollution, both of which are critical. Delhi has been rated the most polluted city in the world, as well as the Indian city with the most vehicles. As a consequence, zero-emission cars are in high demand in order to minimise pollution levels. Electric vehicles, which are both energy efficient and pollution-free, are one of the most desirable answers to this problem, but their adoption in Delhi is almost non-existent. Even the government spends a lot, albeit it hasn't reached its full capacity yet. The Indian government has tried a variety of initiatives to promote electric vehicles, but they have been ineffective. As a consequence, the goal of this research is to look at the enablers, bottlenecks, and solutions for electric car adoption in Delhi in order to solve energy security and pollution-related health problems.

Keywords: Pollution, electric vehicles

INTRODUCTION

India has risen to new heights in the car industry and continues to do so at a rapid pace. India's automobile industry is one of the largest in the world, with annual output of 23.96 million automobiles in FY 2015-16. It also accounts for around 7% of the country's Gross Domestic Product (GDP). The rise of the Indian automobile industry has been notable since its start. The number of vehicles, particularly two-wheelers and automobiles, has increased dramatically.

Cars have also become a prestige symbol in India, in addition to being a need. People may own two or three vehicles, depending on their financial level. People tend to acquire second or third homes when their income levels grow. When per capita income rises by one percent, the percentage of people who own an automobile rises by 1.7 percent. It has been discovered that car ownership levels in the United States, Japan, and Europe are above 450 cars per 1,000 people, whereas car ownership in India is 13 cars per 1,000 people and the number of cars is currently around 15 million, indicating that India may follow in the footsteps of the United States, Japan, and Europe.

In terms of automobile ownership in Delhi, there are around 157 cars per 1,000 inhabitants. According to several estimates, by 2025, India's vehicle population would have increased to roughly 35 cars per 1,000 people. This might result in roughly 45-60 million automobiles on Indian roadways, with over 300 cars per 1,000 people in certain places. This might result in a significant increase in the overall number of automobiles in Delhi, which could rise from 2 million in 2011 to almost 10 million by 2025, or around 380 cars per 1,000 people. The exponential growth in the number of automobiles will have grave implications for energy security and air pollution.

There are two key consequences of this exponential growth: energy security and pollution health, both of which are crucial. In terms of energy security and pollution-health in India, Delhi is one of the most afflicted cities. A metropolis with a population of almost 20 million people has nearly 10 million automobiles. According to the 2017-2018 economic study, every second individual in Delhi possesses a car, resulting in 556 automobiles per thousand 2 persons. In Delhi, more than one crore vehicles, or 1,05,67,7129, have been registered as of May 2017, with autos accounting for a substantial portion of the total. Until May 25, 2017, the total number of registered automobiles in Delhi was 31,72,842.

First Implication-Energy Security:

To satisfy the country's enormous energy needs, we rely significantly on imported crude oil and petroleum products. The data on oil demand and supply reveals a significant disparity that is widening over time. The transportation industry consumes 55 percent of all available petroleum products, the most of any sector. Petroleum products account for 98 percent of the fuel used in the transportation industry, with electricity accounting for the remaining 2%. The transport industry uses 99.6% of petrol and 70% of diesel, according to MOPNG data from 2014. Road transport is a significant user of crude oil and petroleum products in the transportation industry.

Road transport consumes more than 90% of all energy, with road passenger travel accounting for 65 percent and road freight transport accounting for 35 percent. Cars used 34.33 percent 3 of petrol and 13.15 percent 3 of diesel in road travel. As the globe grapples with the issue of oil

shortage, there is an urgent need for energy-efficient road transport vehicles, particularly in countries like India, where oil imports are excessive. The number of automobiles in India is highest in Delhi, resulting in a high need for oil.

Second Implication-Pollution & Health:

Road transport is one of the most significant causes of pollution (Source: System of Air Quality and Weather Forecasting and Research). This is mostly due to a growth in the number of cars on the road, but other sources of pollution exist as well. Chemical pollutants such as CO, CO₂, and SO₂ are released into the atmosphere when fossil fuels such as oil and petroleum products are burned. These are very hazardous to one's health. Chemical pollution is a leading cause of ailments such as heart disease, lung disease, brain disease, and cancer.

As the number of personal automobiles grows, so does the amount of traffic pollution in cities. The World Health Organization has established a criterion for determining PM₁₀ concentration, and it has been observed that cities with significant automobile ownership have broken this limit. Delhi has been named the world's most polluted city. Despite the use of CNG and the Metro, the pollution level is far higher than the legal limit. As a result, there is an urgent demand for zero-emission automobiles to reduce pollution levels.

The Road Ahead:

India's oil imports are growing at a quicker rate every year. It increased by 27.89% to US\$ 9.29 billion in October 2017. The consumption climbed to 212.7 million tonnes in 2016. Its consumption is growing

at an annual rate of 8.3%, compared to a worldwide rate of 1.5 percent, making it the world's third-largest oil consumer.

India's oil consumption is expected to expand to 458 million tonnes of oil equivalent by 2040, with a CAGR of 3.6 percent (MTOE). The demand for petroleum products is also expected to increase to 244,960 MT by 2021-22, up from 186,209 MT in 2016.

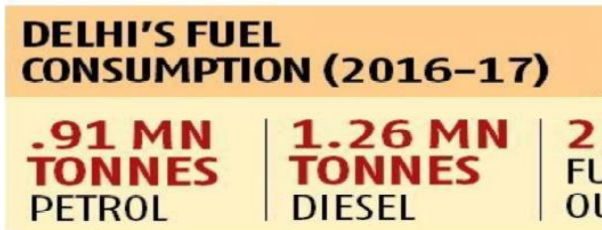


Figure 1: Fuel consumption in Delhi

Delhi's fuel consumption

In the year 2016-17 the quantity of oil consumed in Delhi was .91 million tonnes of petrol and 1.26 million tonnes of diesel. In Delhi 200,000 litres of petrol and diesel are being sold daily by approximate 2,600 fuel retail outlets.

Pollution & Health:

The presence of unwanted particles in the environment is referred as pollution. It is the outcome of human action. Substances which pollute air, water or land are called pollutants. Environment is badly affected by the Pollution. When pollution crosses the safety limits it harmfully affects humans, plants and all other living beings.

Chemical Pollution: Chemical pollution refers to compounds found in the environment that are hazardous to human health. When fossil fuels such as coal, oil, and natural gas are used, they contaminate the environment because they discharge chemical pollutants into the air. ICE cars

run on oil, and when we burn the oil, chemical gases are released into the atmosphere, which are referred to as Green House Gases. Carbon dioxide is one of these types, since it absorbs infrared light and traps heat. Sulphur dioxide is produced into the atmosphere when coal is burned, contributing to acid rain, a process in which pollutants mix with water vapour and fall to the ground.

Transport Pollution: Use of ICE vehicles is the main reason of transport pollution. Gases like CO₂, SO₂ and CO are released in the environment due to burning of fuel which drives ICE vehicles.

The amount of pollution is also dependent upon

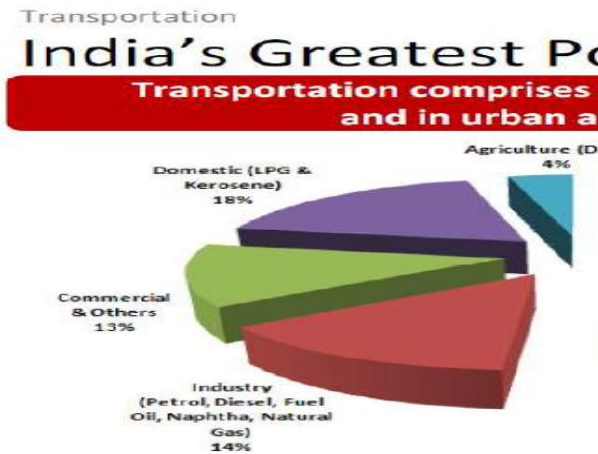
- 1- The level of urbanization
- 2- Number of vehicles

It is impossible to exist in a city without access to transportation. As the population of cities grows, so does the number of automobiles. Cities with a higher population saw greater pollution as a result of the increased number of automobiles. According to the International Energy Agency, fossil fuel-based transportation is the world's second-largest generator of CO₂. Between 2006 and 2030, global energy use is estimated to increase by 53%, with the transportation sector accounting for over 3/4 of the predicted increase in oil demand.

Pollution in the world:

Air pollution levels remain dangerously high in many parts of the globe, and contaminated air is inhaled by 9 out of 10 people on the planet. According to the WHO, 7 million people die each year as a result of their exposure to contaminated

air. In 2016, 3.8 million people died as a result of residential air pollution from polluting fuels, while 4.2 million people died as a result of ambient air pollution alone. More than 90% of air pollution-related fatalities occur in low- and middle-income countries, mostly in Asia and Africa.



A metropolis with a population of almost 20 million people has nearly 10 million automobiles. According to the 2017-18 economic survey, Delhi has 556 motor cars per 1,000 residents, with every second person having a vehicle. Until May 2017, the total number of registered vehicles in Delhi has surpassed one crore (1, 05, 67, 7129), with autos accounting for a considerable portion of the total. Until 2017, the total number of registered automobiles in Delhi was 31, 72,842. To satisfy our country's various energy needs, we rely significantly on imported crude oil and petroleum products. According to the statistics, there is a significant imbalance between oil demand and supply, which is widening year by year. The transportation sector is the greatest user of petroleum products, accounting for 55 percent of total consumption, with petroleum products accounting for 98 percent of transportation fuel and electricity accounting for the remaining 2%.

Within the transportation industry, one of the largest users of crude oil and petroleum products is road transport. Road transport uses over 90% of energy, with road passenger travel accounting for around 65 percent and road freight transport accounting for about 35 percent. Cars used 34.33 percent of Petrol and 13.15 percent of Diesel in road transport. As the globe grapples with the issue of oil shortage, there is an urgent need for energy-efficient road transport vehicles, particularly in countries like India, where oil imports are excessive. The number of automobiles in India is highest in Delhi, resulting in a high need for oil.

One of the most significant sources of pollution is road transport. It is mostly due to a growth in the number of automobiles on the road, but there are other causes of pollution as well. Heavy commercial vehicles (HCVs), commercial and privately owned four-wheeler segments have emerged as one of the top polluting sources in Delhi, according to the study's results. As the number of personal automobiles grows, so does the amount of traffic pollution in cities. PM10 concentrations in cities with high automobile ownership levels were found to be higher than the World Health Organization's limits. Delhi has been named the world's most polluted city. As a result, the electric car, which is both energy efficient and pollutant-free, has the potential to provide advantages for both energy security and the local environment. As a result, Delhi stands to gain a lot by changing its ICE vehicles to E-cars as soon as possible. According to a research done in 2006 on a sample of 500 respondents, 95.6 percent of individuals feel that Delhi should be less dirty, and 93 percent believe that electric vehicles would help to

decrease pollution. As a result, the facilitators, constraints, and measurements for automobile adoption in Delhi have been given in this research.

Promotional activities and automotive awareness, such as Swatch Bharat and LED bulbs, should be prioritised. The government should concentrate on raising public awareness. In institutions, malls, workplaces, and public areas, there should be extensive advertising, test drives, awareness camps, and awareness talks. To encourage R&D, there should be supply side incentives in addition to demand side incentives. In billing, there is a need for simplicity of conducting business. The introduction of a fee bate on ICE cars is important since it will result in a price increase to collect the funds, and the funds collected should be utilised to support the E-car.

For Car, Company & industry:

According to the replies of e-car customers, the car's serviceability is extremely bad. As a new technology, the serviceability should be as excellent as possible to please the customer, but the firm is not focused on it, and the customer is experiencing many troubles. As most ICE automobiles are now equipped with safety measures, safety elements such as air bags and a sturdy body are now essential.

To make it more appealing, the attention should also be on design and aesthetics. Customers also want a high resale value, thus a secondary market must be established to improve the car's resale price. Customers were complaining about expensive replacement parts in the poll, thus the corporation should lower the price of replacement parts. There is no profitable

model from the standpoint of the industry. As a result, policies should be enacted in favour of manufacturers as well. According to the data, 42 percent of respondents find it highly desirable, 29 percent find it desirable, 25 percent find it neutral, 6 percent find it undesirable and only 3 percent find it highly undesirable. Thus, there is a need to develop and promote technology that can convert an ICE car into an E-car without compromising safety and performance at a reasonable price.

Conclusion

According to government sources, the rationale for this is that the number of private electric vehicles on the roads is much too little, thus the government has opted to offer financial incentives to taxi aggregators instead. Because even a subsidised e made sense from a consumer standpoint, this government move will essentially eliminate the sale of private e cars. This government policy seems to be exceedingly impractical, particularly in the case of Delhi, where the total number of registered automobiles till 2019 is estimated to be about 500,000. Rather than implementing the policy consistently throughout the nation, it should be tailored to varied geographical and environmental contexts, particularly in areas where automobile sales and pollution are high. India stands to benefit greatly from broad use of e-mobility. Manufacturing of e-vehicles and their related components is predicted to boost the percentage of manufacturing in India's GDP to 25% by 2022 under the Make in India initiative. On the economic front, widespread adoption of electric cars is expected to save \$60 billion in oil imports by 2030, now, imports account for 82 percent of

India's oil requirement. Electricity as a fuel might drop to as low as Rs 1.1/km, saving an electric car owner up to Rs 20,000 for every 5,000 kilometres driven. Finally, electrification will aid in the reduction of automotive emissions, which are a major contributor to air pollution and generate an annual GDP loss of around 3%, according to studies.

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