

15. Need to Rethink the Policy on Eco-Friendly Nature of Electric Vehicles

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Abstract

In recent years, the number of electric vehicles on Maharashtra's and India's highways has rapidly increased. It helps to minimize global warming and climate change by reducing pollution. However, this is only possible if the energy used to power these vehicles originate from renewable sources like solar, wind, geothermal, or water. Otherwise, there is a chance that these things will persist on paper, causing greater environmental damage. So, owing to the unavailability of significant benefits, governments should reconsider their e-vehicle policies.

Keywords: Electric vehicles, battery, fossil fuels, global warming, climate change.

Introduction

Many cities in Maharashtra have a large number of electric vehicles on the road. Two-wheelers and four-wheelers with green number plates are not uncommon on the roadways [1]. In the current circumstances, there are two reasons to use electric vehicles. One is the massive hike in petrol and diesel prices, in such situations, electric vehicles are cost-effective [2]. Their maintenance is also not remarkable. The second reason is that these vehicles are labelled as "eco-friendly". These vehicles are used by a large number of people who are worried about the environment. At the same time, another significant aspect of these vehicles is that their use will contribute to the reduction of global warming [3]. These electric vehicles, unlike traditional vehicles, will not emit carbon dioxide. As a result, these will be truly "green vehicles," allowing us to avoid the problem of global warming and climate change [1, 4].

The rationale for moving towards electric vehicles is very straightforward and clear, including factors such as controlling rising air pollution and energy security challenges [5]. Although there are still many hurdles in the way of the widespread adoption of electric vehicles,

government support at various levels will be required to encourage this major shift in the transport sector. In recent times, the issue has been raised at the central and state government levels. The policies are being formulated to promote these vehicles [6]. It also shows the future direction of India's automotive industry. Presently, there are two issues while using these vehicles, these vehicles are not able to run long distances on a single charge, and there are not enough 'charging stations' to charge them instantly.

However, are these vehicles eco-friendly as they are being promoted as 'green'? Also, is it true that their use will solve the problem of climate change? In this study, an attempt is made to answer these questions.

Material and Methods

We analysed the environmental impact of electric vehicles using the most relevant scholarly articles from 2013 up to the present. We also examined the data of the Ministry of Power and Central electricity authority of India [7, 8]. According to the Ministry of Power, India the percentage share of each energy source in generating electricity in India as of September 30, 2021, is displayed in **Figure-1**. According to the Central electricity authority, India, the monthly share of each energy source in the power generation for the year 2020 is as shown in **Table-1** and **Table-2** shows the trend in electricity consumption during 2011-12 to 2020-21, depending on the need and availability of electricity in India.

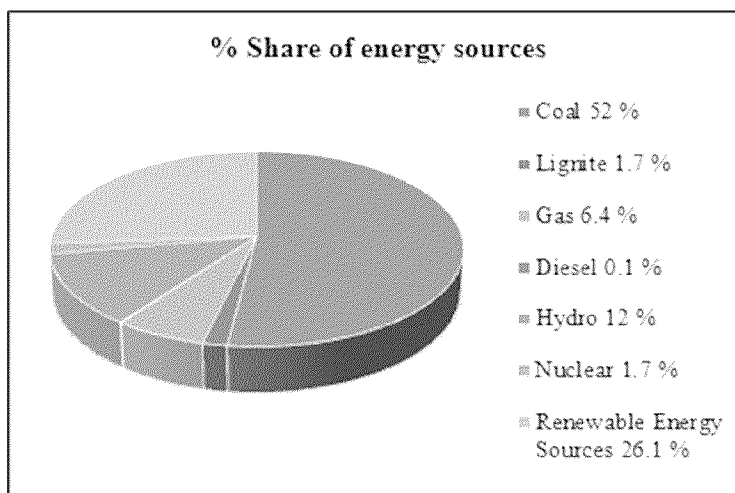


Figure-1: Percentage share of different energy sources for the electricity generation in India as on September 30, 2021 (Source: Ministry of Power, India)

Table-1: Fuel wise percentage share for the electricity generation in India during Jan-2020 to Dec-2020. (Source: Central Electricity Authority, India)

Month	Fossil Fuel			Non-Fossil Fuel		
	Coal	Gas & Oil	Total	Renewable Energy Sources	Nuclear	Total
January	76	4.4	80.4	16.9	2.7	19.6
February	74.6	5.5	80.1	17.1	2.8	19.9
March	66.3	8	74.3	21.7	4	25.7
April	64.6	6.7	71.3	25.1	3.6	28.7
May	63.4	6.2	69.6	27.1	3.3	30.4
June	62.4	5.9	68.3	28.9	2.8	31.7
July	65.2	5.8	71	26.9	2.1	29
August	59.5	5.4	64.9	32.3	2.8	35.1
September	64.1	5.8	69.9	27.1	3	30.1
October	72.6	6.6	79.2	17.7	3.1	20.8
November	72.8	4.9	77.7	18.6	3.7	22.3
December	75.9	3.8	79.7	17.1	3.2	20.3

Table-2: The power supply position in India during 2011-12 to 2020-21.

(Source: Central Electricity Authority, India)

Year	Requirement	Availability	Remarks	
	(MU)	(MU)	(MU)	(%)
2011-12	9,37,199	8,57,886	-79,313	-8.5
2012-13	9,95,557	9,08,652	-86,905	-8.7
2013-14	10,02,257	9,59,829	-42,428	-4.2
2014-15	10,68,923	10,30,785	-38,138	-3.6
2015-16	11,14,408	10,90,850	-23,558	-2.1
2016-17	11,42,929	11,35,334	-7,595	-0.7
2017-18	12,13,326	12,04,697	-8,629	-0.7
2018-19	12,74,595	12,67,526	-7,070	-0.6
2019-20	12,91,010	12,84,444	-6,566	-0.5
2020-21	12,75,534	12,70,663	-4,871	-0.4

[MU = Million Unit; (-) = Deficits]

Results and Discussion

One of the most important aspects of electric vehicles that are usually ignored is the energy required to charge them, as well as the emissions associated with the generation of that energy. Electric vehicles have batteries like other charging devices such as mobiles, laptops, etc. However, there is a fundamental difference in energy consumption between the conventional

vehicles running on fuels such as petrol, diesel, natural gas, and electric vehicles. Both types of vehicles store energy in one form or another. In conventional vehicles, it is stored as fuel like petrol, diesel or gas while in electric vehicles it is stored in the battery. However, a vehicle cannot run without converting this stored energy into kinetic energy. To convert fuel energy into kinetic energy, conventional vehicles burn fuel. At that point, carbon dioxide or other gases are released. These are the greenhouse gases that cause global warming. Smoke and other pollutants are also emitted if the fuel is not fully ignited. On the other hand, combustion is not present in electric vehicles. Instead, the stored energy is converted into kinetic energy by electrochemical means. As a result, it does not emit greenhouse gases, fumes and other pollutants.

If the electricity required for electric vehicles is generated by clean methods (e.g. solar, wind, geothermal, hydropower), then these vehicles can be called completely 'green'. However, the purpose is not achieved by burning fossil fuels such as coal, mineral oil or natural gas instead of the clean energy required for these vehicles. Reducing carbon emissions is needed to prevent global warming. For this purpose, it is necessary to ensure that electricity is generated in a clean manner. Otherwise, if fossil fuels are being burned during power generation and electric vehicles are being charged on such electricity, the expected results will not be achieved. In such a scenario, vehicles do not emit carbon dioxide, but it is emitted wherever electricity is generated. These vehicles may look 'green' because they are out of sight, but in reality, they are not.

The power generation statistics of India (**Figure 1**) show that we are still dependent on fossil fuels for electricity on large scale. According to the Central Electricity Authority of the Central Government of India, the installed capacity ratio of fossil fuels and other clean fuels in the country is around 60:40. This suggests that renewable energy can contribute to around 40% of total energy production. But what actually happens? The figures from the same authority for power generation during 2020 (**Table 1**) look a little different. Fossil fuels accounted for 74% of the country's total energy production in the last year. In different months, it varied between 64.9 and 80.4 percent. This implies that we are still producing most of our energy from fossil fuels. If the batteries of electric vehicles are charged with the same electricity, how can carbon dioxide emissions be reduced just by using these vehicles? This is the major issue we have. As a result, these vehicles will not become eco-friendly immediately, and their use will not result in the 'green' effects we anticipated. Apart from that, India was facing deficits in power supply for the last ten years. The statistics in **Table 2** show that we are unable to meet the electricity demand.

The electricity demand is continuously growing. As a result, clean energy resources for the generation of electricity to charge electric vehicles are needed.

Electric vehicles are not genuinely eco-friendly unless the energy used to charge them comes from clean sources such as solar, wind, geothermal, or water. If we insist that all of the electricity needed to charge these vehicles originate from clean sources, they will be truly green. On the other hand, to charge electric vehicles batteries containing materials such as lithium, nickel, cobalt, and graphite are required. These elements are extremely rare on earth, and extracting them requires a significant amount of energy. In addition, the extraction process produces a large number of pollutants. In order to extract these elements, large amount of acids are used in the extraction process and the disposal of these harmful acids is not always done properly, which also causes damage to the environment.

Conclusion

The present study raises the question of whether it is necessary to rethink the policies on electric vehicles to make them truly green. Electric vehicles have a bright future now because they serve to reduce our dependency on fossil fuels. There are two main challenges while using electric vehicles i.e., battery and charging facility. Electric vehicles will be the future of the transportation sector, but the availability of next-generation high-capacity batteries is important. In addition, using renewable energy sources to generate electricity is crucial to overcoming environmental challenges like global warming.

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