



An innovative shift from petrol to electric two-wheelers

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Abstract

In the growing world as we are moving ahead we are facing new challenges threats and opportunities in every field. In ancient time people used to travel by the carts, hand carts, by foot, and on the back of the animal but as we have moving into the future human discovered and develop the different mode of travelling like by air, road and ocean and developed the vehicles for different modes. In the ancient time we used to coal and other kind of fuels to run the engines and these fuels make the great amount of emissions and make the environment polluted and now we felt the need to update ourself. Now its time to move on electric vehicles which are based on batteries and make zero pollution.

Key words: Petrol, electric vehicles, chargers, batteries, hybrid, bikes, cost

Introduction

We are living in a world that is constantly evolving and changing as per the requirements and needs. People are more aware and cautious about the environment in which they live and concerned about their upcoming life that is for their future. The choices are getting moulded and shifting in a way that will provide a positive turn towards their future. This world is an era of innovation where everything available to us for our use is getting more innovative with more features and advantages. It will be beneficial for the environment as well as the economy. It will be pocket-friendly also.

We all know that some resources available to us are limited that their excessive consumption will lead to their end and we will not be able to use them further. So, we need to take some actions and use some alternatives so that we can preserve those resources and avail their benefit in the long term. Because those resources are really important and we do not have any other means to renew or regenerate them. Innovators and scientists are introducing various technologies and innovations that can help us preserve important resources for the future so that the upcoming generations can also benefit from the same. One of those important resources is fuel which is petrol/diesel. Petrol is a type of fossil fuel which is non-renewable and soon subjected to go extinct. With the rising demand for petrol and its crisis, the price of such has skyrocketed. They are touching the sky making it hard for people to afford it.

Two-wheelers have long served as the transportation mainstay for millions across India's sprawling urban centres and remote rural villages. With rising environmental concerns and the need to reduce reliance on fossil fuels, the electric two-wheeler sector has seen surging growth in recent years. This promises to catalyse a monumental shift toward sustainable transportation nationwide.

We use petrol to run our vehicles (cars, bikes, buses, trucks and so on). In this era, the use of these vehicles is so much and almost every other person is using them so the demand for petrol is on the very higher side which is leading to its extinction shortly. So, our great innovators came up with the idea of shifting the choices of petrol vehicles to electric ones which will not only help in the conservation of petrol but also act as a saviour of the environment. They have

introduced the electric cars and the electric two-wheelers. The choices and demands of the customers are shifting towards EVs rapidly as they are introduced to the benefits of adopting this change and making them aware of how it is beneficial in the long run. As the rising demand for petrol is making it unaffordable for people so using electric vehicles will be convenient and easily accessible as per the earnings of the individual. The two-wheelers are the need of every individual in this era, almost every individual owns one so the choice of two-wheelers to the electric two-wheelers would be a very good sign of this positive change.

The innovative shift from petrol bikes to electric two-wheelers has gained widespread recognition due to ever-increasing concerns over air pollution, rising fuel costs, and government policies that are highly investing in the EV industry. Electric two-wheelers leave zero carbon footprints which improves air quality in urban areas. They are also becoming more cost-effective as compared to petrol bikes, credited to constant developments in battery technology and economies of scale. Governments of many developed and developing nations are offering incentives such as tax credits and subsidies to encourage EV adoption. In India, adopting electric two-wheelers will have significant economic, Social, and environmental benefits which include less carbon emissions and oil imports, as well as generating employment opportunities for the youth.

The cost of electric two-wheelers is comparatively higher than the petrol-powered ones which has impacted its sales negatively for quite a long now. However, the reason behind it being expensive is because of its use of battery and other advanced and innovative technology. The initial high price of EV two-wheelers in India has witnessed to be significantly decreased. As the demand for electric bikes is increasing the prices of such are said to be decreased due to the inception of modern technologies which have reduced the prices of battery packs and lowered the cost of EV manufacturing. Several manufacturers are functioning in the EV sector which has led to the provision of competitive and affordable prices. As a result of the increasing competition and technological advancements, the cost of EV scooters in India has become comparatively cheaper making it the best time to buy an electric bike for yourself.

Positive aspects of shifting to EVs

- The cost of petrol is touching the sky which is making it unaffordable for the people and making it inaccessible so they are not able to use the petrol vehicles. Hence the electric vehicle will be accessible for them.
- The excessive use of petrol will lead to its extinction and it will not be able for the future use then.
- The petrol vehicles emit poisonous gases which pollute the air and various diseases arise out of them.
- EVs have a much higher energy efficiency when compared to traditional internal combustion engines. They require less energy to cover the same distance, thus resulting in lower running expenses.
- The cost of charging an electric two-wheeler is typically a fraction of the cost of refuelling a conventional petrol-powered vehicle.
- Purchasing an electric two-wheeler becomes even more pocket-friendly with the availability of governmental subsidies.

Electric and hybrid vehicles can have significant emissions benefits over conventional vehicles. All-electric vehicles produce zero tailpipe emissions, and PHEVs produce no tailpipe emissions when operating in all-electric mode. HEV emissions benefits vary by vehicle model and type of hybrid power system.

EVs will eventually have a positive impact on the economy of the country. Switching to an electric two-wheeler offers a range of benefits, including financial savings and environmental sustainability. The low running costs, reduced noise pollution, low emissions and low maintenance requirements make electric two-wheelers an attractive option if you are looking to reduce your transportation expenses and minimise your carbon footprint. Electric two-wheelers hold the potential to slash emissions, clear smoggy skies above India's cities, decrease dependence on imported oil, and pioneer a future of clean, green commuting. This will be driven by major technological leaps rapidly elevating electric Two-wheelers' capabilities and performance.

Government subsidies and low-interest EV Bike Loans from financiers like HDFC Bank make it a pocket-friendly option over conventional petrol-powered two-wheelers. You can claim an electric vehicle tax exemption by claiming a deduction of loan interest from your income.

With the advancement of changing infrastructure and improvements in battery technology, the feasibility and convenience of owning electric two-wheelers are increasing. By embracing electric mobility, you can contribute to a cleaner and more sustainable future while enjoying the personal benefits of electric vehicles. Buy your EV bike now using HDFC Bank EV Bike Loans.

In India, the future of electric two-wheelers is bright. Long been an integral part of India's mobility ecosystem, accounting for more than 70 percent of all vehicles.

With favourable government policies, renowned manufacturing prowess, and enormous market potential, India is strategically positioned to emerge as a global hub for electric two-wheeler innovation and adoption. The country has the opportunity not just to embrace electric two-wheelers, but potentially lead the industry into the future. The increased use of electric two-wheelers will support India's alignment with global climate policies, central- and

state-government initiatives (such as FAME [Faster Adoption and Manufacturing of Electric Vehicles]), and city access regulations aimed at reducing air pollution and improving traffic conditions. However, concerns about vehicle safety, battery life, and lack of charging infrastructure could present challenges in achieving full market penetration sooner.

When purchasing their next two-wheeler, Indian consumers are thinking most about vehicle brand, safety, and sustainability. Consumers continue to trust incumbents; however, they're also willing to embrace newcomer EV companies. This is evident from the fact that today, approximately more than 50 percent of the electric-two-wheeler market is dominated by new attackers. This is in significant contrast to the internal combustion engine two-wheeler market, where incumbents continued to dominate more than 90 percent of the market over the past several decades.

There's no doubt that Indian consumers' interest in electric two-wheelers is rising. This interest comes with clear and shifting preferences regarding features, ownership options, and evolving purchase journeys. Manufacturers of electric two-wheelers will want to keep these shifting expectations and preferences in mind to capitalize on the market dynamics resulting from electrification in the years to come.

There are some negative impacts as well of adopting EVs

Uncontrolled charging of EVs with high penetration levels is expected to introduce unwanted negative impacts and effects on the power system. The possible negative impacts are the impact increase of peak demand, voltage deviation from the acceptable limits, phase unbalance due to the single-phase chargers, harmonics injection, overloading of the power system equipment, and increase in power system power losses. A large number of studies have investigated these impacts because the estimation of EV charging impacts is based on several conditions and has many uncertainties that must be considered and modelled properly in the study to accurately estimate the impact of EV charging on the power systems, the main key variables are:

- EV battery charger
- Time
- Location
- Battery Capacity
- Battery Soc
- Penetration Level
- Distribution System Status

EV battery charger: Depending on the charging infrastructure and the EV model single phase or three phase chargers may be used for charging. Moreover, there are many power ratings for EV chargers operating at different voltage levels. So, the fast chargers are expected to increase the peak demand in a larger value compared with slow chargers. Power quality problems may arise due to EVs charging. Because power electronic devices are used in EV chargers, so high EVs integration can affect the power network's power quality. Harmonics injected by EV chargers into the power grid will lead to negative effects on electric power system components which are designed to be supplied by pure sinusoidal waveform and increase system losses. Few studies found that EV chargers had a non-significant effect on harmonic distortion.

Time: The time of connecting the EVs for charging is not certain so it is unknown how many EVs may be charging at the same time and the probability that the EV charging time interferes with the peak demand time of the distribution networks. Some studies assume the charging start time of EVs, and other studies make surveys in a geographical area or a city to know the home arrival time of vehicles and model it as a probability distribution.

Location: The place at which an EV charge is random and unique. EV owners may charge at home, a friend's home, a street charger, or a charging station. It may be different from one distribution network to another where are the charging locations and what are the EV charger types (i.e., private or commercial chargers).

Battery Capacity: There is a wide range of EV battery capacity. PHEV usually contains a small battery capacity while BEV contains a higher battery capacity. EVs with high battery capacity will draw a larger amount of energy from the power grid.

Battery SOC: The battery SoC at the plug-in instant is stochastic. Many studies assume the SoC and others consider it as a probability distribution.

Penetration level: EVs still have a very small market share which will increase quickly for a few countries like Norway and slowly for many other countries. Therefore, many studies considered different EV penetration levels ranging from 10% to 100%.

Distribution system status: There are many differences between distribution systems in terms of structure, equipment loading condition before connecting EVs, voltage level (i.e., medium voltage or low voltage), voltage profile, daily load profile of loads, etc.

Repair and maintenance: Repair of an e-bike can be a point of concern as very few spare part dealers and repair centres are available for this new mode of transport. However, since the popularity of e-bikes is rising, the number of repairs will also increase and will become easily accessible.

Lack of infrastructure: In many developed countries, electric two-wheelers are mainstream. Charging stations are available at every few kilometres distance. Now people can stop and charge their electric vehicles at charging stations. But India has very less or nearly no such type of infrastructure for such services so taking an electric vehicle for a long ride might become challenging.

High production costs: E-bikes cost more in comparison to normal vehicles, this is due to the high production costs. Also, there are only a few producers of electric two vehicles. Though the government is taking measures to reduce the costs of EVs, currently an EV is priced higher than normal vehicles.

So, the various studies are being conducted to assess the impacts of EV charging on the power system. And most of them focus on the distribution network at which EVs get charged. Various studies have been performed for the assessment of EV charging's impact on the peak demand and load profile of distribution systems. Many distribution

networks in different countries and with different topologies and characteristics were chosen to conduct these studies. It was found that EV rapid charging at peak hours will result in a significant rise in peak demand and equipment limits were exceeded even with very small penetration levels. However, by the use of slow charging at off-peak hours, the distribution network could integrate up to 50% penetration level without violating equipment limits.

Electric vehicles can be of 8 types

1. Plug-in Electric Vehicle
2. On- and Off-road Electric Vehicles
3. Space Rover Vehicles
4. Seaborne Electric Vehicles
5. Airborne Electric Vehicles
6. Electrically Powered Spacecraft
7. Range-extended electric vehicle
8. Railborne Electric Vehicles

Electric vehicles in India—government schemes and initiatives for promotion of electric vehicles

1. In February 2019, the Union Cabinet cleared a Rs 10,000-crore programme under the FAME-II scheme. This scheme came into force on April 1, 2019. The main objective of the scheme is to encourage faster adoption of electric and hybrid vehicles by offering upfront incentives on the purchase of electric vehicles and also by establishing necessary charging infrastructure for EVs.
2. In 2017, Transport Minister Nitin Gadkari made a statement showing India's intent to move to 100 percent electric cars by 2030. However, the automobile industry raised concerns over the execution of such a plan. The Government subsequently diluted the plan from 100 percent to 30 percent.
3. In 2013, India unveiled the 'National Electric Mobility Mission Plan (NEMMP) 2020' to make a major shift to electric vehicles and to address the issues of national energy security, vehicular pollution, and growth of domestic manufacturing capabilities. The scheme was to offer subsidies and create supporting infrastructure for e-vehicles.

Conclusion

The entire economy of the country is supporting the use of electric vehicles as they are eco-friendly and cost-friendly as well. They are helping reduce environmental pollution and promote a healthy life. Some of the challenges are there which the developing country like India will overcome soon with time. If it has some of the disadvantages but it still holds more advantages shifting to the electric two-wheelers would be a very good and effective decision altogether. Before purchasing any two-wheeler, one should go through its benefits and disadvantages and do a little research so that a good decision can be made. The usage and advantages vary from person to person depending on their motive of use and purchasing capacity.

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