

Vol: 03, Pg:04-13, Yr:2022

Innovate – Renovate – Electric

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Abstract:

With around 40 crore consumers in need of sustainable mobility by 2030, India is the fifth - largest automotive market and has the possibility of becoming one of the top three in the coming years. Nevertheless, in light of the Paris Agreement's aims, a growth in the number of automobile users will not result in a rise in traditional fuel usage. In order to accomplish India's Net Zero Emissions objective of 2070, a transit transformation is required. This will result in more "availability," as well as improved transport links. Many of these "faster mileage" will very certainly be electric vehicles. Electric automobiles are the new frontier, according to a growing consensus among auto experts and the broader population. However, India, among other

things, has a long approach in terms of battery manufacturing and charging facilities. This review throughs the light on how non-renewable and renewable sources takes part in Co2 emission and how the world in comparison to India is moving towards electrical vehicles.

Introduction:

An automobile that operates on electrically is known as an electric vehicle (EV). EVs are cars that are propelled entirely or partially by electricity. Electric automobiles have low running costs because they have simpler structure to maintain, and they are also extremely environmentally beneficial because they require nearly no carbon fuel (petrol or diesel). In all over world Norway are the leads the electrification.

Indeed, even though the energy comes from fossil fuels (coal), electric vehicles are cleaner- One justification used by people who want to hold on to the certainty of the internal combustion engine [1] is that we do need to decarbonize the power grid first, else automobiles will be no cleaner than if they used gasoline. Many critics dispute whether electrical automobiles are truly "greener" after emissions from manufacturing and producing power are included in. A recent study reveals that, apart from the immediate advantages in local air quality from not having dangerous tailpipe pollution streaming into the environment, EVs contribute to combat climate change in all except the most coal-dependent countries. According to a recent study conducted by institutions in the United Kingdom and the Netherlands, renewable automobiles emit less toxins. Regardless of the fact that electricity is fossil fuel - based, electric vehicles reduce total carbon emissions as shown in a recent survey conducted by institutions [2]

India vs the World

In 95 percent of the globe, operating a battery powered automobile is environmentally friendly than riding a normal petrol engine under prevailing situation, according to the report.

Countries like Poland, where fuel power generation still dominates the electrical system, are important differentiators. In countries with a heavily decarbonized system, electric vehicles offer up to 70% fewer lifespan emission than gasoline vehicles including such Sweden and France, which already have massive volumes of renewable and nuclear electricity production, while emanations in the UK, which is speedily going to phase out coal but it still has a good percentage of gas-fired electricity production, are about 30% lower.

Using On-Site Renewables to Charge

EV charging may be combined including on renewable energy production, most typically through the co-location of EVs with on-site renewable power installations and, in some situations, batteries, with or without controlled charging. San Diego Gas & Electric, in collaboration with the City of San Diego and other stakeholders, began a pilot scheme at the San Diego Zoo in 2012, installing 10 solar photovoltaic (PV) canopies. Consumers have access to five charging infrastructure, and the solar energy can be stored in a battery system while idle. Similarly, Google uses solar energy provided by its own PV systems to support a fraction of the 750 charging stations intended for its staff. [3]

Norway, in reality, tops the globe in electrification: 60 percent of new automobiles purchased in Norway are electric vehicles, opposed to only 2% in the United States. What could the rest of the world learn from Norway and how did they achieve it?

In 2021, there will be more electric automobiles in Norway than non-electric cars. Not only automobiles, bus bicycles as well as trams are also operated with the help of electricity. The role of government strategy is crucial. The rate of the transformation is intimately linked to government policies and buyer incentives. In Norway, the key to accelerating EV adoption is making them affordable. To keep the cost of electric vehicles low, Norway slashed taxes and even waived road tolls as an added incentive.

The alternative idea was to levy higher fees on conventional automobiles, thus imposing a polluting levy. This includes a 25% VAT charge, a near to 20% carbon tax, plus lower sums for weight tax, NOX tax, and a car scrapping fee in Norway. Generally, lowering air quality and greenhouse gas (GHG) production comes at a cost, as Bill Gates' "premium" notion suggests. However, as mass manufacturing proceeds, the cost of electric vehicles will decline, and they will

eventually be cheaper than gasoline - powered vehicles. In Norway, electric vehicles are inexpensive. The Nissan Leaf, a simple small car, is Norway's best-selling vehicle. [4].

However, that's not the case in the United States, where Tesla models have sold a total of 71,000 units (data from first half of 2020). During the same time period, the Chevy Bolt sold 8,000 units while the Nissan Leaf sold 3,000. Around a third of the total cost provided by the consumers are for the batteries which plays the most effective role in the expenditure [5].

The use of renewable energy is critical.

For a country's vehicle and vehicle transportation networks to be decarbonized, two parts are necessary. To begin, the electric drivetrains must be built. Nissan produces the Leaf, Chevy produces the Bolt, and Tesla produces the Model 3, and GM plans to produce 30 different electric vehicles by 2025.

The second is the availability of renewable energy. The secret to Norway's success is hydropower electricity generated by 1500 plants spread around the country. Many of them are low-impact designs known as run-of-river plants, which do not necessitate dam construction. In Norway,

hydropower generates 96% of all electricity.

Norway also boasts some of the world's lowest power rates and excellent infrastructure for harnessing and transmitting it to end users. Norway's 2020 power cost was 16.4 cents per kWh in USD for homes and about half for enterprises, comparing to an EU household average of 25.8 cents. The nationwide average was 13 cents, while Texas had an average of 11 cents. Hydropower renewables contribute 67 percent of total energy usage in Norway due to their low cost. Oil is the second-largest contributor, accounting for 24% of the total. Norway produces a lot of natural gas and oil, and most of it is shipped, with just a little amount utilised in the nation for automobiles. [6]

Benefits of Electrical Vehicle in India:

1. Low-cost maintenance

The protection costs is perhaps the most essential factor for purchasing an electric vehicle. If one decides to purchase a vehicle with an ICE (internal combustion engine). Because it has more mechanical and functional components, hence, one may run into more intricate and protective issues and it also has a cheaper

storage cost due to its basic design and simplicity of usage.

2. Electric vehicles make no sound of their own.

Another benefit of electric vehicles over conventional vehicles is tranquillity and there is no disturbance. The motor's operation is so silent that you can even read a book inside.

3. Increase in the Cost of Fuel

Are you concerned about the price of gasoline alternating? You won't have to worry about daily variations in gas and diesel costs if you purchase a new automobile. You no more need to be concerned about the administration fluctuating fuel prices depending on international market rates.

4. Charging at Home is Simple

During rush hour, you've probably seen the queues that grow at gas stations during rush hour. If you stop to refuel on your way to work, you could be delayed. An electric vehicle has a major advantage in this case since all you have to do is plug it in. Going home will require you 4-5 hours, following which you will be able to move.

5. It's simple to drive

All-electric vehicles, have no gears. Yes, electric cars are enticing since the shifting process aren't under our control. The tempo can be changed with little more than a series of buttons or pedals to increase or reduce the pace. If you believe that an automated gasoline automobile gives the same degree of comfort, then we have more benefits than purchasing an electric vehicle.

6. Friendly to the environment

It is absolutely excellent for the environment if you want to purchase an electric vehicle. The ground has been cut off, it has been healed, and now we must make decisions with the environment in mind. You may lower your carbon footprint since there are no emissions at all.

7. Extra Capacity and a Much more Comfortable Cabin

Even though the front row may give us with more storage capacity because there is no gear lever, because there is no gear lever, if you pick an electric car, you will have greater legroom. Passengers are seated in the centre of the row, on the flat floor, and are thoroughly enjoying the journey. The number of storage possibilities has also been increased. Due to the lack of an engine, there may

be beneath the hood storage in the front. Batteries take up very little area as contrasted to electric motors.

8. Government Subsidies

The advantages of purchasing an electric vehicle extend beyond the vehicle itself. The Delhi Government now encourages consumers to purchase an electric vehicle since electric vehicles are the way to go these days. The Delhi government just announced a new electric car policy that would provide you with additional advantages. Up to Rs.150,000 can be won.

9. Electric vehicles are future-proof.

Electric cars are the only solution we can look forward to in future, given our current growth path! Fossil fuels might run out at the same time, and it would be unjust to utilise them all while we are still living. We are steadily transitioning away from fossil fuels and toward renewable energy, which is unquestionably the way of the future. We have solar and wind energy that is sustainable and does not pollute the environment! Electric vehicles are the future, so get used to them today.

10. In India, there are tax advantages to purchasing an electric vehicle.

Interest on acquisition loans is withheld under Section 80EEB. The government provided incentives for the adoption of electric vehicles in the 2019 coalition budget. Will be compensated in accordance with the plan. From August 2020 to 2021, a new section 80EEB permits interest to be subtracted from loans for the adoption of electric cars. [7]

11. Criteria for Eligibility

Consumers are exempt from the reductions in this area of the qualifying requirements. Other taxpayers are not eligible for this deduction. As a result, whether you're a HUF, AOP, partnership, company, or another kind of taxable, may not be eligible for benefits.

14. The amount of deduction:

You can deduct interest up to Rs 1,50,000 under Article 80EEB. An electric automobile can be owned by a single taxpayer for personal or commercial usage. This deduction simplifies the process of receiving interest charged on a car loan for the people who own an electric automobile for personal usage. Individuals can also demand withholding tax up to Rs 1,50,000 for business usage under the terms of Article 80EEB. Interest costs of more than Rs 1,50,000 are deductible as a business expense. The car must be licensed in the

owner's or trade company's name in order to be claimed as a business cost. Individual taxpayers should keep in mind that they must get documentation of interest paid when completing their tax returns. [8]

15. The conditions are :

To buy an electric automobile, a loan must always be arranged from a finance company or a non-bank financial organisation, and it must be granted between April 1, 2019, and March 31, 2023.

Disadvantages:

1. Range Restrictions

Electric cars have a limited range, majority of which is 100 kilo-meters and cannot travel beyond it. Although the work is under progress to increase the range. Backup batteries is required if someone wishes to embark on a lengthy journey.

2. Stations for Charging

There are extremely few electric vehicle charging facilities in India. Power stations may be found in major Indian cities such as Delhi, Mumbai, Bangalore, and Hyderabad. To alleviate the paucity of charging stations, tens of thousands of charging stations should be installed around the country.

Electric Vehicles and India's Origins, as well as their Expanding Scope:

The Paris Agreement's global climate goal of reducing carbon emissions in order to reduce rising temperatures is increasing demand for electric vehicles (EVs). Electric vehicles (EVs) are already defining the global e-mobility revolution due to their rapid uptake. EV sales are estimated to reach 2.1 million by 2020, accounting for nearly two out of every hundred autos produced today. In 2020, the worldwide EV fleet will number 8.0 million, representing for 1% of global vehicle stock and 2.6 percent of global auto sales. Falling battery costs and increased performance efficiency are also driving global demand for electric vehicles. [9]

1. India requires an electric vehicle revolution.

It is impossible to continue on the current route of introducing ever more automobiles that run on expensive conventional petroleum, clogging already congested cities with infrastructure bottlenecks and high concentrations of pollutants. Electric mobility is a viable worldwide solution for decarbonizing the transportation sector.

2. Support for Electric Vehicles in India:

India is one of just a few nations to embrace the worldwide EV30@30 initiative, which aims for at least 30% new electric vehicle sales by 2030. At the COP26 in Glasgow, India advocated for five aspects to combat climate change, dubbed "Panchamrit." At the Glasgow summit, India proposed a number of suggestions, including renewable power meeting 50% of India's energy demands by 2030, lowering carbon emissions by 1 billion tonnes by 2030, and attaining net zero by 2070. [10]

Their several measures taken by the Indian Government :-

1. The newly improved FAME II (Faster Adoption and Manufacturing of Electric Vehicles) initiative.
2. There are two types of suppliers is a Production-Linked Incentive (PLI) plan for Advanced Chemistry Cell (ACC).
3. For makers of electric cars, the recently announced PLI programme for Auto and Automotive Components. [11]

3. Associated Challenges Battery Manufacturing:

India's aggregate requirement for batteries is expected to reach around 900-1100 GWh by 2020-30, according to estimates. However, the lack of a battery industrial capacity in India is causing worry, since it would force India to rely only on imports to fulfil expanding demand. India bought more than \$1 billion worth of lithium-ion cells in 2021, according to official statistics, despite the fact that electric cars and power storage are still in their early stages in the power industry. [12]

Consumer Issues: India was estimated to have just 650 charging stations in 2018, compared to over 5 million charging stations in surrounding countries. It is impractical for customers to travel lengthy distances leading to a shortage of charging facilities. Furthermore, a complete charge of a car at the owner's house using a personal light-duty slow charger might take at least 10 hours. Furthermore, the cost of a basic electric automobile is significantly greater than that of the cost of the vehicle that runs on conventional gasoline.

Policy Challenges: As, EV production is an investment company that needs a protracted plan to break even and profit, government policy uncertainty in this area discourages investment. When it comes to

creating key components for the electric car sector, such as batteries, electronics, and controllers, India lags behind in terms of technology. EV's require more upkeep. costs and need a higher degree of expertise. India lacks designated programmes in this field. Unavailability of Materials for Domestic.,

Manufacturing: The battery is by far the most crucial component of an electric vehicle. India has no recognized lithium or cobalt deposits, both of which are necessary for battery manufacture. Importing lithium-ion batteries from other nations is a barrier to being entirely self-sufficient in the battery manufacturing business.

Way Forward Electric Vehicles: EVs will help to improve the nation's overall power system security, since the country produces over 80% of its crude oil needs, which total over \$100 billion. Electric vehicle is also expected to stimulate employment growth in the region's EV manufacturing industry. Through a range of grid services and support, EVs are expected to bolster the system and help accommodate higher renewable energy penetration while assuring stable and resilient grid stability.

Manufacturing and Storage of Batteries Possibilities: With current technology

advancements, battery storage presents a significant opportunity to assist the country in achieving long-term development, particularly in light of government initiatives to promote e-mobility and renewable energy (450 GW energy capacity target by 2030) [13]. As per capita income has increased, consumer electronics such as mobile phones, UPS, laptops, power banks, and other goods that require specialised chemical cells have witnessed a significant increase. As a conclusion, one of the most attractive economic opportunities of the twenty-first century is better battery manufacture.

EV Charging Infrastructure: An EV charging infrastructure may be built up at private households, public utilities such as fuel and CNG pumps, and commercial enterprises such as malls, train stations, and bus depots, using energy from the local grid. The Ministry of Power has stipulated that at least one charge controller be positioned in a 3 km grid and every 25 km on both sides of the highways. In new and existing buildings, the Ministry of Housing and Urban Affairs has enforced allocating 20% of parking spot for EV charging stations under the Model Building Bye-laws, 2016 (MBBL) [14]. The MBBL will need state governments to make appropriate

adjustments to their individual building bye-laws in order to take impact.

R&D in electric vehicles:

The Indian market requires support for indigenous innovations that are critical and economically beneficial to India. It provides logical to use local colleges and traditional industry centres since investment in regional research and development is required to drive costs down. To raise the usage of electric vehicles India can get a helping hand from countries like USA.

Conclusion :- Electric vehicles are on their way. Are We Prepared?

Several cities, governments, and businesses have set objectives to switch their vehicles to electric vehicles and power them with renewable energy sources. Amazon recently revealed intentions to buy 100,000 electric vans as part of their promise to become carbon independent by 2040, while cities like Cambridge and Portland have committed to 100% biofuel community transit by 2035 and 2050, respectively [15]. With a significant number of electric vehicles projected to be on the road in the next years, it's vital that both companies and consumers continue to pursue for new ways to charge EVs using

renewable energy sources to obtain optimum decarbonization. EV charging might potentially be a useful source of fluctuating power demand, allowing the system to take use of more fluctuating solar and wind energy. New utility and third-party services are beginning to appear, allowing customers to choose sustainable energy to suit their charging needs, although they are not available everywhere. Customers should be able to align charging to when renewable energy solutions are available, and consumers must be able to save money when they bring grid advantages to the table.

Acknowledgement

Authors are grateful to University of Engineering & Management, Kolkata.

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