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ELECTRIC VEHICLES: MOVE TOWARDS A BETTER TRANSPORTATION

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ABSTRACT:
In India, majority of the oil demand comes from the transport sector. The sector accounts for over 40% of the total oil consumption with around 90% of the demand arising from the road transport. By 2020, 330 mt(million tons) of carbon emissions are expected to arise from the transportation sector, 90% of which may be from road transport alone.
The premier think tank of GoI, NITI Aayog (National Institution for Transforming India), reports that India can save 64% of anticipated passenger road-based and mobility-related energy demand and 37% of carbon emissions by 2030 if it pursues electric mobility in future. This would probably result in an annual reduction of 156 MToE in diesel and petrol consumption for 2030, saving INR3.9 lakhcrores (or ~US$60 billion (at US$52/bbl of crude)). The cumulative savings for the tenure 2017- 2030 is expected to reach 876 MToE of savings for petrol and diesel, which totals to INR22 lakhcr ores (or ~US$330 billion), and 1 gigaton for carbon-dioxide emissions.

Keyword:fossil oil, emission of carbon, environment, FAME II, Battry electric vehicle(BEVs), Hybrid electric vehicle (HEVs).

INTRODUCTION:

Pollution of the environment is currently a global concern. Toxic emission from internal combustion engines is one of the primary air pollutants. In order to mitigate the effects of fossil fuel emission and address environmental concerns (ECs), electric vehicles (EVs) are being promoted aggressively all over the world. Various governments are encouraging people to switch to EVs by incentivizing the transition. Previous studies indicate that the high cost of the electric car, non-availability of charging infrastructure, time and range anxiety act as impediments to consumer adoption. The Government of India has given a call for 'only Electric Vehicles' on Road by 2030. This article is contemporary and examines the different factors that affect a consumer's adoption of an EV. The respondents of the study are existing car owners in India. The data were analysed using Structured Equation Modelling (SEM). Attitude (ATT) emerged as a strong mediator, influencing the adoption of electric cars.
Future-is-green-2020-may-see-re-birth-of-electric-vehicles-say-experts

The year 2019 was a mix of ups and downs for the electric vehicle (EV) sales in the country. The coming year is expected to be better, with the entry of more electric cars and Chinese entities' entry, bringing down the average cost.
The second phase of the Rs 10,000-crore scheme of the central government, termed Faster Adoption and Manufacturing for Hybrid and Electric vehicles (FAME II), offers higher incentives to higher powered products. It excludes lead acid battery-powered two-wheelers and mandates that e-scooters should have 80 km per charge and a minimum top speed of 40 kmph, with at least 50 per cent localisation in manufacturing. This has left a large share of two-wheelers out of the incentive, says CRISIL Research.

ELECTRIC MOBILITY - A POTENTIAL SOLUTION FOR INDIA:

Recently, Union minister PrakashJavadekar told Parliament about 285,000 buyers of electric/hybrid vehicles had been supported by a subsidy of Rs 360 crore under FAME.

Sohinder Gill, director-general, Society of Manufacturers of Electric Vehicles (SMEV).said, "The year 2019 was full of turmoil for the EV industry. Sudden policy shock by the government in March 2019 led to a decline in sales of electric two-wheelers under FAME II. It has made companies becoming less dependent on government subsidies."

The number of electric two-wheelers sold under FAME in the first six months of this financial year (April to September) saw a 94 per cent decline to around 3,000 units, from 48,671 units in the same period last year. The number sold without FAME incentive in the period went up to around 49,000 units, 2019, from around 10,000 during the same period last year, said SMEV.

Low-speed lithium battery vehicles without the FAME incentive cost around Rs 55,000. The high-speed electric two-wheeler costs around Rs 80,000 after the incentive applied, said sources.
The number of electric cars within the FAME scheme of under Rs 15 lakh cap sold during April to September almost halved to 340. They do not include the numbers of Hyundai's Kona, launched in July, according to the Society. Reports say only around 1,500 electric cars for personal use have been sold so far during the financial year.Some of the positive developments were entry of leading players into the EV business, state governments announcing policies and customers becoming more aware of the benefits of such vehicles.

After much anticipation, the Department of Heavy Industries (DHI) under the Ministry of Heavy Industries and Public Enterprises launched the second phase of the FAME program in March. The aim of the program is to ramp up the manufacturing and adoption of EVs as well as the charging infrastructure ecosystem in India. FAME II complements existing pollution reduction strategies, including those implemented under the National Clean Air Program.

FAME II increases the financial investment for EVs and mobility to □10,000 crore ($1.4 billion)—more than a 10-fold increase from □895 crores ($129 million) under the past FAME I scheme. Also, 86% of the funds are set aside to be distributed as an upfront incentive to reduce the vehicle cost.

CATEGORIES OF VEHICLES:
Three categories of vehicles are eligible for FAME II incentives: public transportation fleets; registered commercial vehicles for buses, four-wheelers and three-wheelers; and privately-owned two-wheelers. Interestingly, FAME II excludes policies for privately-owned four-wheelers (cars). FAME II also includes a localization requirement to source 50% of the vehicle parts in India. The requirement may delay the introduction of new vehicles in the Indian market as vehicle manufacturers currently import most of the vehicle parts.
Road Electric Vehicles (EVs) include a large range of vehicles from electric two - wheelers, three - wheelers (rickshaws), cars and electric buses.

In addition, plug - in electric vehicles can be classified into two types: battery electric vehicles (BEVs), and plug - in hybrid electric vehicles (PHEVs). BEVs have an electric motor in place of combustion engine and use electricity from the grid stored in batteries. Plug - in hybrid electric vehicles (PHEV) use batteries to power an electric motor and liquid fuel such as gasoline or diesel to power an internal combustion engine or other propulsion source.EVs can go beyond the above mentioned technology based classification, and can be classified on the basis of their attributes such as charging time, driving range, and the maximum load it can carry. Of these attributes, the two most important characteristics of an electric vehicle of concern to the consumer are:
Driving range (i.e. the maximum distance an EV can run when fully charged)

Charging time of batteries (i.e. the time required to fully charging the battery) and Charging time depends on the input power characteristics (i.e. input voltage and current), battery type and battery capacity.

The following four types of batteries are commonly used today in EVs: Lead Acid

Nickel Cadmium (NiCd)

Nickel Metal Hydride (NiMH)

Lithium - ion (Li- ion) - Lithium - ion batteries have higher specific energy relative to the other battery types. In the future, technology innovations with Li - ion and other battery technologies are expected to result in batteries with much higher specific energy and lower costs.

CONCLUSION/POLICY IMPLICATIONS:

Electric mobility is expected to be a city-led development wherein various city-level stakeholders will collaborate to reduce risks (such as land availability) through viable and sustainable business models. An ideal city-level implementation plan shall be based on a phase-wise approach of procurement factoring in techno-commercial considerations specific to the city.

Implementation plan needs to factor in the following critical areas:

1. Route planning and electric load analysis at feeder level for identifying strategic locations.
2. Assessment of transport infrastructure.
3. Viability analysis to structure pilots and explore options for PPP models.

Accordingly, there is a need to develop a detailed DPR and a detailed implementation plan factoring in phase-wise adoption targets, CAPEX requirements and infrastructure augmentation assessments for both transport and power.

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