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Research Article

A Study on Fame India (Faster Adoption and Manufacturing of Hybrid & Electric Vehicles in India)-A Big Push towards PM'S Vision towards Sustainable Transportation & its Impact on Stock Market

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ABSTRACT

Introduction: The global climate crisis has led to an increase in the popularity of electric vehicles (EVs) worldwide. India's government, along with others, is promoting EV adoption to decrease harmful emissions, reduce dependence on oil imports, and promote renewable energy sources. In recent years, the rise in vehicle emissions has become a major concern. In response, the Central Government initiated the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME India) Scheme in 2015.

Objectives: The goal of this scheme is to decrease pollution from diesel and petrol-fueled vehicles and encourage the production of electric and hybrid vehicles. According to a Press Information Bureau report, the Indian automobile industry has made great strides in the year 2023.[1] India has set a target to double its auto industry's size to ₹15 lakh crores by 2024. Additionally, India now ranks as the world's second-largest producer of two-wheelers, sixth-largest producer of passenger vehicles, and the largest producer of tractors.

Methods: These achievements highlight the country's commitment to advancements in the automobile sector. On the flip side, also highlighted some challenges faced by the Indian automobile industry. It is crucial to address these obstacles and continue to promote sustainable and mentioned the various initiatives taken by the government to support the industry, such as the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME India) scheme, the Automotive Mission Plan 2016-26, and the National Automotive Testing and R&D Infrastructure Project (NATRiP).[2] FAME India Phase I had four focus areas - technological development, demand generation, pilot project and charging infrastructure components.

Results: The phase was available up to March 31, 2019 with budget outlay of Rs 895 Cr. From the effects of the COVID-19 pandemic to the implementation of BS-VI emission standards, as well as the constant demand for innovation and skill advancement. The scheme aims to promote the swift adoption of electric and hybrid vehicles by providing upfront incentives for their purchase and establishing crucial charging infrastructures.

Conclusions: By doing so, it not only tackles the environmental concerns surrounding pollution but also addresses the issue of fuel security and its impact on stock market.

Keywords: FAME India schem, hybrids, establish charging infrastructure, NATRiP, automobile industry, transportation.

INTRODUCTION

The world is facing a global climate crisis, with increasing levels of pollution due to the burning of fossil fuels causing significant environmental challenges. As a response, electric vehicles (EVs) are gaining popularity as a sustainable mode of transportation, and governments worldwide are promoting EV adoption to reduce harmful

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emissions and promote the use of renewable energy sources. In India, the government's initiative to promote cleaner public transport and reduce the dependency on oil imports has led to the implementation of the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME India) scheme. The FAME India scheme, launched in 2015, is a part of the National Electric Mobility Mission Plan (NEMMP) 2020, which aims to achieve 100% electric mobility in India by 2030. FAME India is one of the government's flagship programs, aiming to promote the adoption of EVs by offering incentives to manufacturers and buyers of these vehicles.[3] The scheme aims to reduce harmful emissions, save fuel, and promote the use of renewable energy sources.

Electric vehicles in India

Electric vehicles (EVs) have numerous advantages over vehicles powered by fossil fuels, including reducing carbon emissions, improving air quality, saving on fuel costs, and enhancing energy security. [4]As of July 2021, India has 13,34,385 EVs and 27,81,69,631 non-electric vehicles in operation. The Indian government is promoting EV adoption through initiatives, including the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, the National Electric Mobility Mission Plan (NEMMP), and the Green Highways Policy. Some popular EV models in India are the Tata Nexon EV, Kia EV6, Tata Tiago EV, BMW i7, Mahindra XUV400 EV, and MG Comet EV. The central government introduced the FAME-II subsidy scheme in April 2019, offering incentives in the form of an INR 100 billion spread over FY20-22, to drive EV adoption in India. The quantum of the incentive is based on the vehicle type and can be used for purchasing privately owned electric 2-wheelers, 3-wheelers, 4-wheelers, and buses.

FAME II Incentives - - Investment rollout plan (FY20 to FY22)						
	2 Wheelers	**E - - rickshaws**	**Electric 4W**	**Strong hybrid 4W**	**E-buses**	**Charging Infrastructure**
Number of Vehicles	10,00,000	5,00,000	35,000	20,000	7,090	2,700 charging
Incentive per vehicle (INR)	20,000	50,000	1,50,000	13,000	50,00,000	-
Total Incentives(INR Cr)	2,000	2,500	525	26	3,545	1,000
Demand Incentives	10,000 per KWh, Maximum cap on incentives of 20% of total cost of vehicles				20,000 per KWh Maximum cap on incentives of 40% of total cost of vehicles	
source: Department of Heavy Industries						

PM's vision towards Sustainable Transportation:

In India, air pollution has become a significant concern in recent years. The Government of India is committed to addressing these environmental challenges and has set an ambitious target of reaching 175 GW of renewable energy by 2022. The Prime Minister Narendra Modi has set a vision for India to achieve 100% electric mobility by 2030. He believes that electric mobility is the need of the hour, not just for environmental reasons but also to reduce India's dependence on foreign oil. The FAME India scheme was launched to provide a big push towards achieving this vision.[5]

The central government’s FAME policy and the Delhi government’s EV policy offer monetary incentives to customers which help reduce the purchase price of EVs and bridge the price differential between EVs and ICE

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vehicles. A number of state governments, on the other hand, have primarily focused on supply-side incentives to attract investment in the EV sector in their respective states to help generate employment opportunities.

Government policies

	POLICY/INITIATIVE
2005	JnNURM
	Bharat Stage II nation wide
2006	National Urban Transport Policy
2008	National Action Plan for Climate Change
2010	MNRE incentive scheme. Alternate Fuels for Surface Transportation program
	BS 4
	National Green Tribunal
2011	National Council for Electric Mobility. National Board for Electric Mobility
2012	MNRE Incentive scheme ends
2013	National Electric Mobility Mission Plan
2014	Lima COP
	National Urban Transport Policy updated
2015	National Air Quality Index announced
	FAME-1 (Faster Adoption and Manufacturing of Electric and Hybrid Vehicles)
	Paris Climate Accord COP 21
	Smart City Mission Plan
	AMRUT
	Auto Fuel policy update
2016	Green Urban Mobility Initiative
	Bharat Stage IV
2017	Transit Oriented Development policy
	FAME-1 extended
2019	FAME-2
2020	Go Electric campaign
	Scrappage Policy
	Euro VI

source: compiled from MoF, MoRTH, MoHIPE, DST, MoHUA, MoP

1. Reiterating its commitment to the Paris Agreement the government of India plans to make a major shift to electric vehicles by 2030.

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2. National Electric Mobility Mission Plan, 2020 (NEMMP) was introduced by the government of India in 2012 to increase national fuel security through the promotion of hybrid and electric vehicles to 30-percent EV penetration in India by 2030.
3. Faster Adoption and Manufacturing of Hybrid and Electric vehicles (FAME) which provides incentives for purchasing electric vehicles. Phase I of the scheme was from 2015 to 2019 and Phase II began in 2019, and was planned for completion in 2022.
4. Go Electric campaign in early 2021 to encourage the adoption of electric mobility vehicles and electric cooking appliances and to ensure energy security.
5. In 2019 the Delhi government approved 1,000 low-floor AC electric buses to be used in the union territory's public-transport system.
6. Tamil Nadu chief minister Edappadi K. Palaniswami introduced Mauto Electric Mobility's electric auto rickshaws, reportedly India's first retrofitted electric autos, in 2019. The Dubai-based KMC Group and Mauto Electric Mobility will convert petrol-powered auto rickshaws into electric vehicles with an investment of ₹100 crore and create 5,000 jobs.
7. Karnataka approved the Electric Vehicle and Energy Storage Policy 2017, which aims to attract investment of ₹310 billion and create about 55,000 jobs.
8. The Maharashtra government is focusing on increasing EV use in the state by proposing an EV road-tax exemption and a 15-percent subsidy for the first 10,000 EVs registered in the state.
9. In 2018, the Uttarakhand government introduced a scheme to promote the manufacture and use of EVs.
10. The Gujarat government is committed to reducing its carbon footprint by 600,000 tons per year by decreasing pollution from the burning of fossil fuels. EV purchasers are eligible for subsidies of up to ₹20,000 for two-wheelers, ₹50,000 for three-wheelers, and ₹150,000 for four-wheelers Ministry of Power along with Ministry of Road Transport and Highways, Ministry of Heavy Industries and NITI Aayog has launched a nationwide “Go Electric” Campaign on 19.02.2021 to educate the general public on the benefits of electric vehicles.
11. Action plans for 9 major cities have been prepared by Bureau of Energy Efficiency (BEE) for installation of Public Charging Stations. As per the initial estimates, a total of 46,397 Public Charging Stations (PCS) are being targeted in these cities by 2030.
12. All the central Ministries and state Governments have been requested to join the Government of India’s initiative on transformative mobility and to convert their fleet of official vehicles from present Petrol/Diesel Vehicles with Electric Vehicles.
13. Ministry of Housing and Urban Affairs has issued amendments in Model Building By-Laws and Urban and Regional Development Plans, Formulation and Implementation Guidelines regarding Charging Infrastructure for Electric Vehicles.

Initiatives under FAME-II

• Department of heavy industries (DHI) sanctioned the purchase of 5,595 e-buses in 64 cities under FAME II, providing a total subsidy of INR35.45 billion in August 2019.[5]

• In Phase 1 of FAME-II, the tender process has been completed for 3,135 e-buses across 30+ cities.

- TCO for SRTUs: Intra-city segment is expected to achieve TCO parity by 2028 for AC buses and 2030 for non-AC buses. However, for private intra-city segments, it is expected beyond 2030

EV Stocks in India

- 2-wheeler electric vehicles companies in India

There are several 2-wheeler manufacturers in India that are providing electric vehicles. Some well-known names are Hero Electric, Okinawa, Ampere, Ather, PUREV, Ola, TVS, Revolt, Benling, Bajaj and many more.

- 4-wheeler electric vehicles companies in India

There are several 4-wheeler manufacturers in India that are providing electric vehicles. Tata Motors, Mahindra Electric, Hyundai, and Ultraviolette Automotive are well-known names and more.

- EV battery stocks in India

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Some of the electric vehicle battery stocks in India are Exide Industries, Amara Raja Batteries, Tata Chemicals, Hero MotoCorp, Maruti Suzuki, Himadri Speciality Chemical Ltd, etc.

- EV charging station stocks in India

Some EV charging stocks in India are TATA Power Company Ltd, Power Grid Corporation of India Ltd, Indian Oil Corporation Ltd (IOCL), etc.

Reasons behind this push by the government

India is the third largest carbon emitter in the world. So, the Indian government is under tremendous pressure to reduce its carbon emissions. The world is creating new policies to counter climate change. It is now India's turn to act fast. Shifting to EV will give the government the much-needed relief globally. India's fuel bill in 2021 is a whopping $24.7 billion.[6] Electrification of vehicles has been recognised as a key part of meeting global climate change targets and a key aspect of sustainable transport. Here, an integrative and bird's-eye view of scholarly research on Electric Vehicles (EV) is provided with a focus on an objective and quantitative determination of research trends. The analyses suggest that areas of EV research linked to (i) charging infrastructure, (ii) EV adoption, (iii) thermal management systems and (iv) routing problem have been the distinct trending topics in recent years.[7] A big chunk of our foreign reserves is being spent on fuel. Adopting and promoting EVs will help us conserve our foreign reserves.

List of EV Promotion Company

Stock Name	Category	Market cap (Rs. in cr.)	Closed Price (Rs.)	1Y Return (%)
Olectra Greentech Ltd	Auto parts and EV software	10,621.66	1,268.75	141.65
TATA Motors	Auto manufacturer	2,47,327.15	681.70	61.89
Exide Industries Ltd	Battery manufacturing	23,965.75	285.60	56.49
Mahindra & Mahindra	Auto manufacturer	1,85,854.57	1,559.75	28.03
Power Grid Corporation of India Ltd	EV charging stations	1,94,661.64	208.95	27.19
Hero MotoCorp Ltd	Auto manufacturer	66,889.24	3,376.50	26.11
Motherson Sumi Systems Ltd	Auto parts and EV software	26,814.02	60.40	4.23
Amara Raja Batteries Ltd	Battery manufacturing	10,944.81	655.05	3.87

Source: *The data is from 21st November 2023 and the ev companies are sorted according to their 1-yr return*

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Impact of FAME India Scheme on the Stock Market/Share Price of EVs:

The FAME India scheme has had a positive impact on the stock market and share price of EVs. In India, EV manufacturers such as Tata Motors, Mahindra & Mahindra, and Hero Electric have seen an increase in their stock prices due to the implementation of the scheme. This increase can be attributed to the growing demand for EVs, the incentives offered by the government through the FAME India scheme, and investor confidence in the future potential of the EV industry.

Data analysis:

Sales of electric and hybrid passenger vehicles in India increased by 20% to 1.56 lakh units in FY20, thanks to the government's FAME India scheme, according to a report by the Society of Indian Automobile Manufacturers (SIAM). The two-year extension of the scheme announced in April 2019 with a budget of INR 10,000 crore ($1.3 billion) has boosted demand and positively affected the stock market. Tata Motors' stock price rose by 12% in the first week of September 2021 following the announcement of its latest EV, the Tigor EV. Mahindra & Mahindra has also seen stock price growth thanks to its investments in EV technology, with INR 600 crore ($80 million) invested since 2015. The FAME India scheme has also contributed to the growth of the green bond market, with Indian Renewable Energy Development Agency (IREDA) issuing India's first-ever green bond in 2018, raising INR 2,000 crore ($265 million) to support various renewable energy projects, including the development of EVs.[8] It also provides suitable insights to further the development of EVs in the domestic and global market. Variation in share price of electric vehicles for last 10 years are as follows:

VARIATION IN SHARE PRICE OF ELECTRIC VEHICLES FOR LAST 10 YEARS

COMPANY NAME	Dec-14	Dec-15	Dec-16	Dec-17	Dec-18	Dec-19	Dec-20	Dec-21	Dec-22	Dec-23
Olectra Greentech Ltd.	9.7	1.45	26.15	198.9	252.4	166	111.95	602.05	503.3	1326.03
Tata Motors Ltd	369.55	526.05	400.85	515.65	425.9	246.45	142.1	206.8	384.15	425.9
Exide Industries Ltd	168.1	140.1	195.4	226.55	260.9	208.15	155.3	173.8	175.7	284.4
Mahindra & Mahindra Ltd.	636.7	666.6	675.15	730.65	751.95	564.15	623.9	870.25	911.8	1140.45
Hero MotoCorp Ltd	1131.67	2753.65	2895.67	3260	3735.65	2876.4	2492.8	2776.65	2772.95	3666.6
Power Grid Corp. of India Ltd	84.15	78.75	88.45	100.85	120.8	117.6	111.65	110.55	139.7	207.6
Motherson Sumi Wiring India Ltd	0	0	0	0	0	0	0	0	58.45	63.8
Amara Raja Energy & Mobility Ltd.	600.75	823.67	866.8	772.9	778.1	725.95	772.9	665.95	559	632.65

Source: trading view.com

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Olectra Greentech Ltd. is a holding company, which engages in the manufacturing of composite polymer insulators and electrical buses. It operates through the Insulator Division and E-Bus Division segments. The company was founded in 1992 and is headquartered in Hyderabad, India.

Tata Motors Ltd. is an automobile manufacturer with a portfolio that includes a range of cars, utility vehicles, trucks, buses, and defense vehicles. The company was founded on September 1, 1945 and is headquartered in Mumbai, India.

Exide Industries Ltd. engages in the manufacture of storage batteries. It operates through the Storage Batteries and Allied Products segment. The company was founded in 1946 and is headquartered in Kolkata, India.

Mahindra & Mahindra Ltd. is a holding company, which engages in the manufacturing of automotive vehicles. The company was founded on October 2, 1945 and is headquartered in Mumbai, India.

Hero MotoCorp Ltd. engages in the manufacture of two wheeler. The company was on January 19, 1984 and is headquartered in New Delhi, India. In 2011, Honda group sold its 26% stake in the company to the Munjals (promoters) and ended the JV. Post the termination of JV, the name of the company was changed to Hero Motocorp.

Power Grid Corp. of India Ltd. is a holding company, which engages in the power transmission business. The company was founded on October 23, 1989 and is headquartered in Gurgaon, India.

Motherson Sumi Wiring India Ltd. engages in the manufacture and sale of wire harnesses, components, and wires to automotive original equipment manufacturers. The company was founded on July 2, 2020 and is headquartered in Mumbai, India.

Amara Raja Energy & Mobility Ltd. engages in the manufacture, marketing, and trading of lead-acid storage batteries. The company was on February 13, 1985 and is headquartered in Hyderabad, India. Company is almost debt free. Company has been maintaining a healthy dividend payout of 19.7%.

CHALLENGES FACED BY THE FAME INDIA SCHEME

The FAME India scheme has positively impacted the EV industry in India, but it has also come across certain challenges. One of the significant challenges is the lack of charging infrastructure in the country. Although the government has announced plans to build a network of charging stations across the nation, progress has been slow. The absence of adequate charging infrastructure. The study shows that the major barriers to adopting EVs are their higher purchase price and less availability of charging stations. The topmost effective mitigation strategies to overcome EVs barriers are government policies, support, and strategic planning.[9] Rising temperatures across the world is posing a serious challenge to the longevity of earth's natural cycle. Use of private and conventional cars is growing year by year as standard of living continues to increase and affordability remaining no more of an issue for a significant proportion of the population. However, there has been a growing voice from segments of the society for a behavioural shift towards more sustainable modes of transport like usage of electric vehicles (EVs), mobility sharing and rental services and public transportation powered by electricity. One of the biggest importers of foreign crude oil, India, is reeling under immense pressure to reduce its carbon dioxide emissions and thereby contributing to environment protection. In India, the statistics or stock of EVs continues to remain poor when compared to its counterparts like China.

- Cost of EV: The cost of an EV is two to three times the cost of ICE vehicle. Secondly after elapse of certain years the battery requires a change which costs around 3-4 lakhs for a car.
- EV Battery Insurance:50% of the cost of EV is battery and none of the insurance companies cover 100% of the battery.
- Lack of charging stations: As per Bureau of Energy Efficiency (BEE) data, 5254 Public Charging Stations (PCS) are currently operational in the country.
- Lack of Standardisation of EV charging ports: As far as cars are concerned there is standardization of charging port(CCS-2).

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- Not suitable for all parts of the country: An EV vehicle has ideal performance in the temperature range of 15 to 40 degrees.
- Increase in the demand of electricity: At present most of the charging stations are using diesel generators to generate electricity which is polluting the environment more than an ICE vehicle.
- Extraction of Lithium and Disposal of Batteries: The EV car batteries are made up of Nickel, Cobalt and graphite which are extracted through mining. The mining of these minerals itself is a highly polluting process.; their disposal is a challenge. If during disposal these batteries leak they give toxic gases which is very harmful for the environment.

Another challenge is the high cost of EVs. While incentives offered by the government can help reduce the overall cost of EVs, they are often still more expensive than equivalent gasoline or diesel vehicles. The lack of affordability could limit the adoption of EVs, especially among lower-income groups.

FINDING

Market trends: The overall stock market trends can impact the stock price of individual companies. If the market is rising, it can bring up the stock price of most companies and vice versa.

Company financial performance: A company's financial performance is a key factor in determining its stock price. Factors such as revenue growth, earnings growth, profitability, balance sheet strength, and cash flow can all impact the stock price of a company.

Industry trends: The performance of an industry or sector can have an impact on individual company stock prices. If an industry is growing rapidly, it can boost the stock price of companies in that sector.

Interest rates: Interest rates can impact the stock market by affecting the borrowing and spending habits of consumers and businesses. Higher interest rates can lead to lower consumer and business spending, leading to lower stock prices.

Geopolitical events: Political events such as elections, wars, and diplomatic relations can impact the global economy, which can in turn impact the stock markets. Political instability can lead to lower stock prices.

Investor sentiment: Investor sentiment, or the general attitude and emotions of investors towards the market, can have a significant impact on the stock prices of companies. If investors are optimistic about a company's future prospects, it can boost the stock price even if the financial performance of the company isn't strong**.**

CONCLUSION

The FAME India scheme has had a significant impact on India's EV industry, promoting the adoption of cleaner modes of transport and reducing the country's dependence on foreign oil. The scheme has also positively affected the stock market and share price of EV manufacturers in India. With the government's continued efforts to promote electric mobility and the growing demand for EVs in India, the future of the EV industry looks promising in India. he Indian government's policy promoting the adoption and manufacturing of hybrid and electric vehicles has positively impacted the stock prices of some companies operating in this sector.[9] The policy has led to an increased demand for electric vehicle components such as batteries, charging infrastructure, and related technologies, resulting in increased stock prices of companies working in these areas.

Moreover, the electric vehicle market in India is also attracting significant investments from both domestic and foreign investors, further boosting the stock prices of companies operating in this space. Some of the Indian companies that may benefit from this policy are Tata Motors, Mahindra & Mahindra, Ashok Leyland, Exide Industries, and Amara Raja Batteries, among others. That being said, it's important to remember that the stock market is complex, and stock prices are influenced by a variety of factors beyond government policies such as financial performance, industry trends, and broader macroeconomic factors. Investors should conduct careful analysis of market trends and a company's fundamentals before making investment decisions. Mahindra & Mahindra: Mahindra & Mahindra's electric vehicle business has been one of the main beneficiaries of the government's focus on hybrid and electric vehicles. The company launched its electric vehicle line-up in India in 2011 and has since launched several battery-operated vehicles, hybrids, and electric sedans. With the

implementation of the FAME scheme, Mahindra is among the companies that stand to benefit from government support to promote electric mobility. Additionally, Mahindra also has an interest in battery manufacturing and electric vehicle charging infrastructure. However, there are various challenges that need to be addressed to ensure the long-term success of the FAME India scheme. Investments in charging infrastructure, collaborations with the private sector, and further incentives to promote affordability are some of the measures that could help address these concerns. Overall, the FAME India scheme has laid the foundation for a sustainable and cleaner future for India's transportation sector.

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