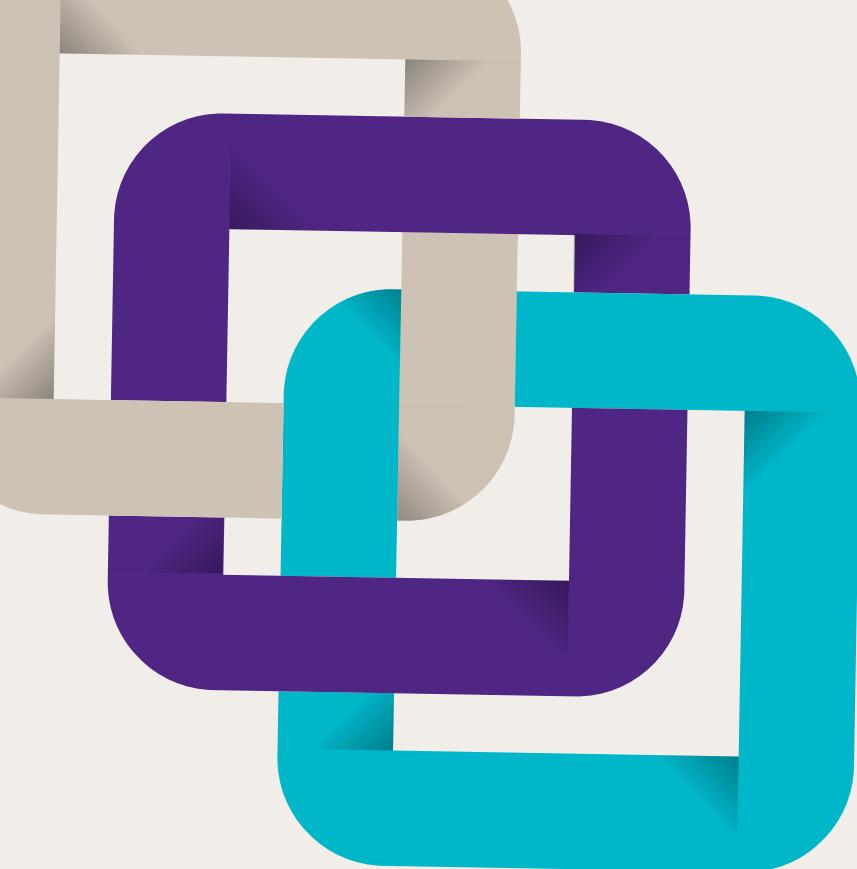


# Electric Vehicles: Is the Indian automobile sector ready?





Imagine India of 2030 with an all-electric car fleet. While government support and technological advancements can fast-track the country's automobile industry's journey towards that goal, there are still many challenges to be dealt with.

Piyush Goyal, Minister of State with independent charge for Power, Coal, New and Renewable Energy and Mines, recently said that the Government of India (GoI) is working on a policy to facilitate an all electric-car fleet by 2030. While electric vehicles (EV) have been making waves globally of late, this move reminds us of the leap from BS-IV to BS-VI by 2020 in India.

The recommendations in a draft report by the Niti Aayog are aimed at transforming India's mobility in the country with EVs by 2032.

In 2015, the government had launched Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME), a scheme that offered incentives for clean fuel technology cars with the long-term objective of boosting their sales. However, despite incentives as high as INR 140,000 on some cars, the scheme received a lukewarm response. Sales of electric and hybrid cars contributed to only a fraction of the 3 million passenger vehicles sold in India in 2016. According to the Society of Manufacturers of Electric Vehicles, EV sales in India peaked at 22,000 units for the year ended 31 March, 2016, of which only 2,000 units were four wheelers.

Reuters recently reported that the key proposals in the EV policy blueprint include:

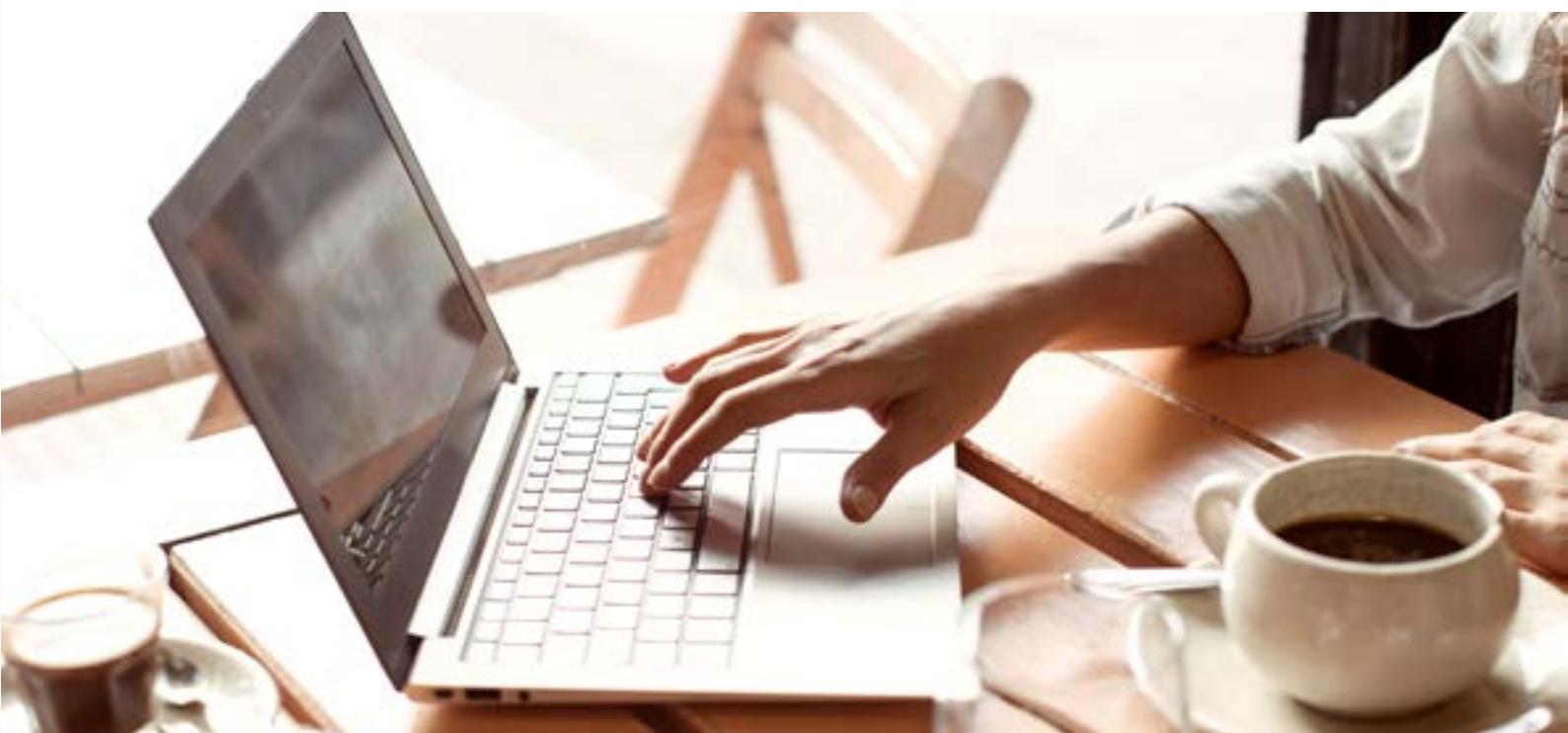
- Limiting registration of conventional vehicles through public lotteries and preferential registration for electric vehicles.
- Bulk procurement of electric vehicles and building standardised and swappable batteries to bring down the cost as well as having favourable tariff structures for charging vehicles.

- Prioritise battery and charging infrastructure development by setting up a 250 megawatt per hour battery plant by 2018 with an aim to reach one gigawatt of production by 2020.
- Setting up battery swapping stations and common manufacturing facilities for EV components.
- Increasing subsidies on EV batteries to bring cost parity with conventional models by 2025.
- Incentivising use of EVs by lowering taxes, interest rates on loans, electricity tariffs for fleet operators and duties on manufacturing such cars.

This shows that GoI is committed to nurturing EVs. Goyal said the government can initially handhold the electric vehicles industry for 2-3 years to help it stabilise. The proposed plan also contemplates selling vehicles without an upfront payment. EMIs can be paid by the users over a period of time from the savings made on fuel. The idea behind this is to make the programme entirely self-financed without much intervention from the government.

In an attempt to bring down the cost of EVs, the government is also exploring a strategy to task a company with buying EVs in bulk and then leasing them to taxi aggregators.

The first step towards the EV initiative was announced by the Minister of Road Transport and Highways and Shipping, Nitin Gadkari, who launched India's first electric taxi project in Nagpur in May 2017. Mahindra and Mahindra has been roped in to provide 200 taxis for the pilot project.



## Global industry scenario

The automobile sector has a significant role in the government's plan to raise the share of manufacturing in India's GDP from 15 per cent now to 25 per cent by 2022. A major thrust will be needed from the government to sell 6 million EVs by 2020 as the first step to attain the larger vision of EVs for all by 2030.

India's electric vehicles industry is nascent with just 0.1 per cent global market share. In comparison, China is a world leader with over 50 per cent global annual market share. China is spending largely on subsidising local companies, pushing them at the forefront of electric mobility technologies. Some of the other measures announced by China includes research funding and rules framed to discourage vehicles running on fossil-fuels. China is also making it mandatory for car makers to manufacture a certain percentage of EVs annually.

Some of the global automotive players like Tesla Inc. and Toyota Motor Corp. have shown interest in the Indian EV market. Nissan also plans to bring its best-selling electric vehicle Leaf to India. Suzuki Motor Corp. announced that it would form a joint venture with Denso Corp. and Toshiba Corp. to produce lithium-ion batteries for EVs in India with an initial capital expenditure of USD 184 million. Large Indian corporates like BHEL, PGCIL and Vedanta Group have shown interest in making EVs, setting up charging stations and developing storage solutions respectively.

However, Maruti Suzuki's CEO Kenichi Ayukawa has questioned the government's ambitious EV plans suggesting it will be very difficult for the industry to shift on such a large scale just over a decade. Further, there are difficulties in expanding sales of EVs as existing cost is very high.

Except for Mahindra and Mahindra Ltd, which has an electric portfolio, the focus of Indian auto companies so far has been migration from internal combustion engines to smart hybrids. EVs appear to be a distant possibility.

## Dealing with challenges

Batteries, the largest component in an EV, accounts for nearly 50 per cent of the total cost of an electric vehicle. Prices of lithium-ion batteries used by most EVs have dropped 73 per cent over the last six years, according to Bloomberg. Though the cost of electric battery has declined recently, it still remains on the higher side. However, its operating cost per kilometer driven is lower.

India does not have any lithium deposits. While this does present a challenge to setting up a viable battery manufacturing plant in India, it also means that companies must look for other options to power such vehicles. R&D labs across the world are working in this direction. For example, Stanford University came up with an aluminium battery that could reduce charging time for a car to a few minutes. Developments in Graphene-based batteries/supercapacitors which can be 50-100 times the power density of lithium battery and 5-10 times its energy density is expected to extend range and life while reducing time to charge.

In a scenario when India has limited lithium deposits, professor Ashok Jhunjhunwala of the Indian Institute of Technology, Madras extended his support to the government and private sector companies in acquiring lithium fields across Chile, China, Argentina, Australia and Bolivia. Also, choice of technology in terms of energy storage devices like batteries, capacitors and supercapacitors needs to be evaluated. Significant research is being conducted to identify alternatives to lithium ion. With all its advantages, Graphene is also being developed as an alternative.

Another challenge is electricity generation for batteries. How additional capacity can be created for electric generation? The plan should consider renewable options over fossil-based options, ensuring the dream of an all-electric passenger vehicles fleet is realised with minimal carbon footprint.

## Opportunities: Moving towards sustainable growth

India's energy import bill is expected to double from around USD 150 billion to USD 300 billion by 2030. The shift to EVs will also help reduce India's energy imports where it looks to the cut oil import bill to half by 2030 and reduce emissions as a part of its commitment to the Paris climate treaty. The growth in sale of EVs will lead to more demand for power, especially renewable energy. This will help tackle intermittency issues of renewable power and reduce reliance on imported oil.

Shifting to EVs will also check pollution as India is the biggest emitter of greenhouse gases after the US and China. As part of its Intended Nationally Determined Contribution (INDC) to the United Nations Framework Convention on Climate Change, India plans to reduce its carbon footprint by 33-35 per cent from its 2005 levels by 2030.

A report by the Niti Aayog suggests that adoption of electric vehicles and shared vehicles could save a whopping USD 60 billion in fuel costs. This would also aid in cutting down as much as 1 giga ton of carbon emissions by 2030.

## Conclusion

Although challenges seemingly outweigh the opportunities, the government has started taking initiatives on building infrastructure for EVs such as constructing charging stations and reducing the cost of batteries by facilitating technology transfer between the public and private sector. The Union Budget for FY 2017-18 has allocated INR 795 crore for developing EVs.

The EV market is growing worldwide fuelled by stricter environmental measures, technology improvements and cost reduction in energy storage. India has in its hands a lifetime opportunity to make a remarkable contribution towards a sustainable future. With over 3 million passenger cars sold in the previous fiscal, the Indian passenger car segment is expected to scale new heights in the near term.

It will be interesting to see how the well-funded investors and technological leaders in the business create options for customers and how the entrepreneurs rise to the challenge.

However, the big question still remains: What policy measures will be in place to phase out the fossil fuel-based vehicles (including passenger buses and commercial vehicles) - which are the largest contributors to the pollutants - gradually and what measures will be taken to help the industry transition from fossil dependent energy to green energy? Meanwhile, hybrids could be a practical option to bring down a few million tonnes of toxicity in the air in a phased manner.

EV is a great opportunity for the industry, academia and the regulatory authorities to collaborate for a sustainable future. The best thing is that we have only scratched the surface and there's more to come in future.



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