

India EV industry

Introduction 2

Table 1: India population and motor vehicle market status 2

India EV industry 3

Government projects and policies 3

Table 2: India FAME II scheme detail 3

Table 3: India state governments tax incentives for EV purchasing 3

Market scale 4

Chart 1: India EV market scale, FY2016-2021 (units) 4

Table 4: India EV types and vendor status 4

Charging solutions 5

Table 5: India major EV charging solutions 5

Taiwan ICT supply chain 5

Table 6: EV sub-systems and Taiwan's ICT supply chain 5

E2W pricing 6

Chart 2: India sales share of 2-wheel vehicles running on electricity and fuel by vehicle pricing, FY2020, 2025 6

Introduction

The electric vehicle (EV) sector is a strategic focus of leading countries' industrial development efforts today. Aside from Europe, China and the US, Digitimes Research thinks India's EV industry also has great development potential.

India's huge population of 1.37 billion supports a sizeable motor vehicle market. On top of that, subsidies for EVs from both the central and state governments will drive the country's EV market to grow by leaps and bounds in the coming years. Battery swapping, power units and IoV solutions are among the strengths of Taiwan's EV component suppliers and are also what India needs. These are the critical areas where Taiwan's and India's EV supply chain can join forces.

To drive EV industry development and boost EV sales, the Indian central government has laid out the FAME II scheme (Faster Adoption and Manufacturing of Hybrid and EV) that totals nearly INR100 billion (about US\$1.4 billion) to subsidize EVs and car-charging infrastructures. Local governments are also offering a range of incentives and tax exemptions to attract EV makers to build factories and consumers to buy EVs.

Electronics systems and software are the two fundamental elements to an EV. Taiwan-based suppliers are known for their strengths in electronics components while India has a robust software sector. India's EV supply chain needs energy systems, power units and IoV solutions and will be able to find all the components it needs from Taiwan-based suppliers. As such, these areas are good starting points for Taiwan-based suppliers to penetrate into the Indian market as India makes efforts to boost domestic EV production.

According to India's Society of Manufacturers of Electric Vehicle (SMEV), EVs sold in India are largely two-wheelers and three-wheelers so battery swapping stations and chargers installed at small shops will be the most popular form of charging facilities. Furthermore, due to their low income, Indian consumers are very price sensitive and are likely to respond more enthusiastically to electric scooters priced under INR90,000.

Table 1: India population and motor vehicle market status

Item	Detail
Population	Overall population reached 1.37 billion in 2020 with 65% of the people aged below the age of 35.
Vehicles owned per every thousand people	50
Automotive market	The market's scale was around 2.71 million units in fiscal 2021, making it the fifth largest automotive market worldwide.
Motorcycle market	The market's scale was around 15.12 million units in fiscal 2021 and was the largest motorcycle market worldwide.
Key factors for developing domestic EV industry	Over 80% of India's crude oil supply is imported overseas and the government is looking to reduce such a heavy reliance.
	Central and state governments of India are offering policies and incentives to encourage domestic EV industry development.

Source: World Bank, SIAM, compiled by Digitimes Research, September 2021

India is a regional market with tremendous development potential to the EV industry for the following reasons:

With a huge population of 1.37 billion, a high demographic dividend (65% of its population are below the age of 35) and 50 registered vehicles for every thousand people, India's automotive market is poised for explosive growth.

Its EV market outlook is even more promising due to the following:

India relied on imports for about 85% of its domestic oil needs in 2020. Its government is pushing the transition to EV to reduce oil imports.

India's EV penetration (including cars and motorcycles) stood at 1% in 2020. Subsidies from the central and local governments are expected to drive EV penetration to 10% by 2025.

India EV industry

Government projects and policies

Table 2: India FAME II scheme detail

Item	Detail
Scheme budget	INR100 billion (about US\$1.4 billion). Around INR86 billion will be used to subsidize EVs and INR\$10 billion car-charging infrastructures.
Time period	The program was originally planned for the period April 2019 through March 2022 and has been extended till March 31, 2024 (announced in June 2021).
Subsidizing target	The program will support the purchase of one million two-wheelers, 500,000 three-wheelers, 55,000 four-wheelers and 7,000 electric buses.
	The support for two-wheelers will include those for personal use while the support for the other EV types will focus on commercial and public transportation vehicles.
Subsidies	Subsidies are offered at INR10,000 per KWh based on the battery size and type (only for lithium-ion batteries, not lead-acid batteries).
	Starting June 2021, subsidies for two-wheelers are increased from INR10,000 per KWh to INR15,000 per KWh. The maximum subsidy cap is also increased to 40% from 20%.

**Note: FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) is a program aimed to drive hybrid and electric vehicle adoption and manufacturing.*

Source: The India government, compiled by Digitimes Research, September 2021

To drive EV industry development and boost EV sales, the Indian government has laid out the FAME II scheme.

The Indian government announced NEMMP-2020 (National Electric Mobility Mission Plan 2020) in 2013, followed by FAME in 2015. Both are aimed at promoting EV industry developments.

India is currently rolling out FAME II, effective April 1, 2019 through March 31, 2024.

A total budget of INR100 billion to subsidize EVs and car-charging infrastructures

Government subsidies to promote the use of EVs and guide private sector investments

Table 3: India state governments tax incentives for EV purchasing

Tax incentive	Offered states
Complete VAT exemption	Rajasthan
EVAT reduced to 5.5% from 14.5%	Punjab
VAT reduced to 5% from 12.5%	Maharashtra, Delhi and Haryana
VAT reduced to 4% from 12.5%	Tamil Nadu
VAT reduced to 0% from 12.5%	Madhya Pradesh, Chandigarh, Chattisgarh and Karnataka

Source: SMEV, compiled by Digitimes Research, September 2021

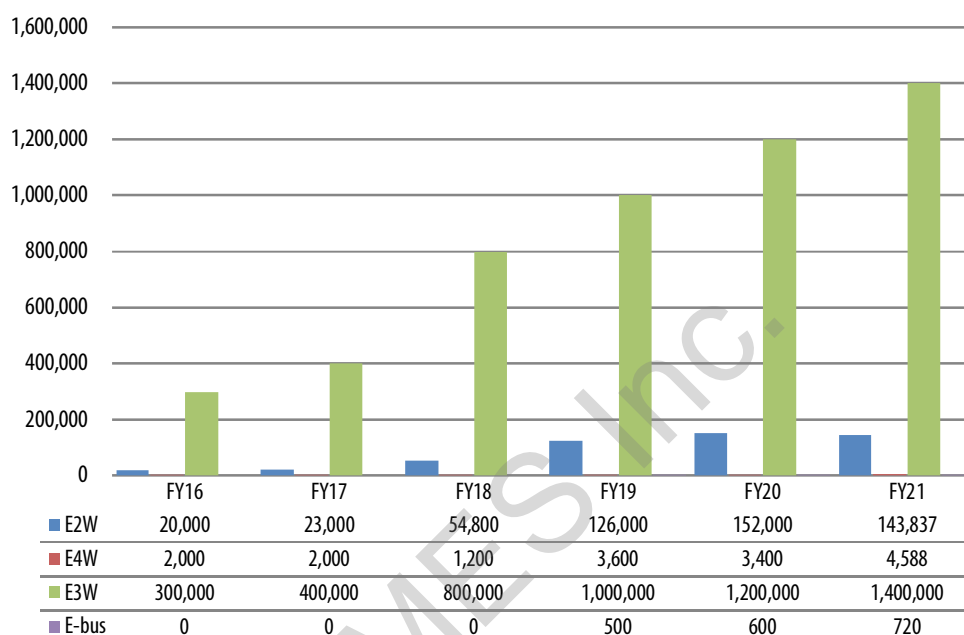
According to SMEV director general Sohinder Gill, both the central and local governments have proposed a wide range of incentives to attract EV makers to build factories in India.

Local governments, especially in Southern India, offer incentives such as land, capital and labor subsidies, in an effort to boost domestic EV production.

Local governments implement different levels of Value Added Tax (VAT) reductions. Among them, Madhya Pradesh, Chandigarh, Chattisgarh and Karnataka cut their state VAT from 12.5% to 0%.

Market scale

Chart 1: India EV market scale, FY2016-2021 (units)



Source: SMEV, compiled by Digitimes Research, September 2021

India's automotive market is dominated by two- and three-wheelers so 90% of EVs sold in India are electric two-wheelers and three-wheelers.

According to SMEV, about 144,000 electric two-wheelers (E2W) and more than one million electric three-wheelers (E3W) were sold in FY2021 in India.

The market for electric four-wheelers (E4W) in India is grim due to the country's low per capita income, which was recorded at US\$2,080 in 2020.

Only 4,588 E4Ws were sold in FY2021 in India, far below the sales of E2Ws and E3Ws.

Electric buses come with much higher price tags and their promotion will have to rely on government efforts and subsidies. A total of 720 electric buses were sold in FY2021 in India.

Table 4: India EV types and vendor status

EV types		Vendor status
E2W	E-scooter	20 manufacturers including major brands Hero Electric, Ampere, Lohia and Ather
	E-motorcycle	7 to 8 manufacturers making E2Ws with higher spec than e-scooters Indian brands include Ultraviolette Automotive and Tork Motors; global brands include Yamaha and Honda
E3W	E-auto rickshaw	Major brands include Mahindra Treo, Greaves Cotton, Bajaj and Kinetic Group 20KWh batteries; vehicle registration is mandatory
	E-rickshaw	Rapid market growth with a slew of competitors Large automakers including Mahindra, Lohia Auto and Kinetic Group are expanding into this segment 8KWh batteries; vehicle registration is mandatory in some states
E4W	E-car	Tata Motors and Mahindra are selling E4Ws, which however still have a low penetration in the passenger car market
	E-bus	Major electric bus makers include Tata Motors, Ashok Leyland, JBM, Volvo and Deccan Auto The electric bus market is dictated by state-owned corporations

Source: Vendors, compiled by Digitimes Research, September 2021

Among India's leading manufacturers of various types of EVs, those producing E2Ws and E3Ws make up the largest group, including well-known brands and market newcomers.

India's traditional automaker Mahindra not only has added an E4W product line but also has expanded into the enormous E3W market.

Charging solutions

Table 5: India major EV charging solutions

	Charging station	Battery swapping station	Charging point
Vehicle applied	E2W and E4W	E2W and E3W	E2W
Facility detail	Charging infrastructures are mainly deployed by the government. AC charging stations are especially costly to build.	Battery swapping has tremendous market potential in India as it provides a time-saving alternative to EV charging.	Chargers installed at roadside shops have low deployment costs and long service hours.
Solution suppliers	Delta, ABB, Siemens, Raychem and Exicom	Sun Mobility, Lithion Power and OLA Electric	Hero Electric and Ather

Source: Companies, compiled by Digitimes Research, September 2021

There are three ways to charge EVs in India: charging stations, battery swapping stations and chargers installed at small shops or charging points.

Charging stations are mainly built by the government. Charging station solution providers that have expanded into India include ABB, Delta Electronics, Siemens, Raychem and Exicom.

Battery swapping is a more convenient solution to the Indian EV market with a dominance of E2Ws and E3Ws. Leading battery swapping service operators in India include Sun Mobility, Lithion Power and OLA Electric.

Having chargers installed at roadside shops (for example, ice cream and cigarette stands) is a low-cost alternative.

EV drivers can eliminate range anxiety as they can go to the nearest charging point when the battery runs low.

For short trips, it may take only 15 to 20 minutes for the driver to get the EV charged and go home or wherever they want to.

Such charging points can be in service for long hours from 7am to 11pm.

Taiwan ICT supply chain

Table 6: EV sub-systems and Taiwan's ICT supply chain

System	Sub-systems						
Energy systems	Advanced battery materials	Battery management systems	Thermal control systems	Battery swapping networks	Charging infrastructures	Fast charging	Smart charging
Power units	High-efficiency and high-power motors			Advanced motor controllers		Electronics components for vehicle control	
IoV	IoV devices			IoV platform back-end IT equipment and software		IoV platform front-end software	

*Note: Those written in red are Taiwan-based suppliers' strengths and are areas where India would like to seek partnerships with Taiwan-based suppliers.

Source: SMEV, compiled by Digitimes Research, September 2021

Electronics systems and software are the two fundamental elements to an EV. Taiwan-based suppliers are known for their strengths in electronics components while India has a robust software sector.

By engaging in collaborations, Taiwan and India can complement each other and together drive India's EV industry upgrade.

India's EV supply chain needs energy systems, power units and IoV solutions.

Energy systems include battery management, battery swapping and smart charging solutions.

Battery swapping has tremendous market potential in India so the country is eager to bring in Gogoro and Kymco's technologies.

Power units encompass high-power motors and high-efficiency motor controllers.

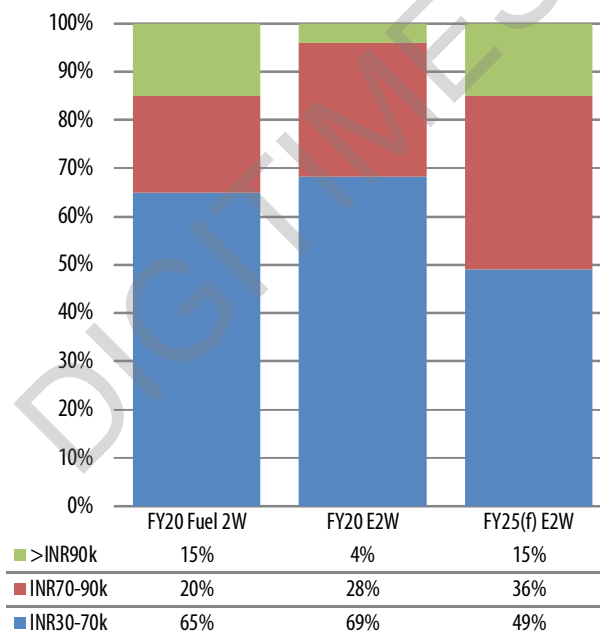
Taiwan-based suppliers in this area include Delta Electronics, Fukuta, Teco and Chroma.

In terms of IoV solutions, India's price sensitive consumers will not be willing to pay for subscriptions so the low-cost Narrowband Internet of Things (NB-IoT) technology will be suitable for India.

Taiwan-based suppliers including Sercomm and Gemteks are experienced in NB-IoT technologies.

E2W pricing

Chart 2: India sales share of 2-wheel vehicles running on electricity and fuel by vehicle pricing, FY2020, 2025



Source: Hero Electric, compiled by Digitimes Research, September 2021

Due to the country's low per capita income, which was recorded at US\$2,080 in 2020, Indian consumers are very price sensitive when they make EV purchases.

For example, more than 90% of E2Ws purchased in FY2020 cost no more than INR90,000. The average purchase price was even lower than that for gasoline-fueled scooters.

According to Indian EV manufacturer Hero Electric, 85% of E2Ws on the market in India will come with a price tag below INR90,000 by 2025.

In other words, most consumers will respond to EVs in the same price range as gasoline-fueled vehicles. The high-end segment will not see rapid growth for the next five years.

Taiwan-based suppliers foraying into India will have to highlight their cost advantages and provide the EV components that are suited to the local market needs.