PRIMUS RESEARCH

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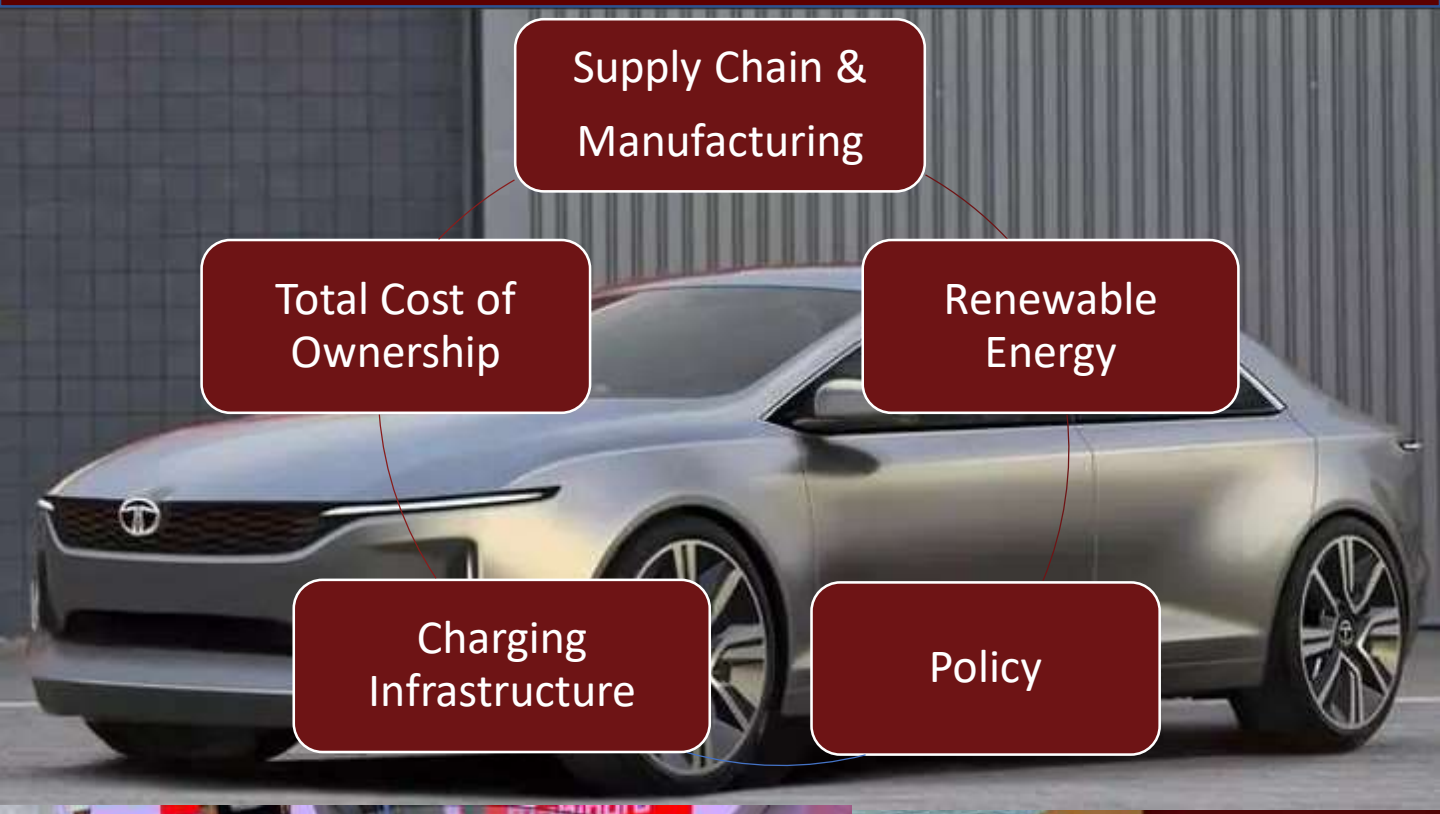
Status of 5 Key Factors for Electrification of Automobiles



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Primus Partners India
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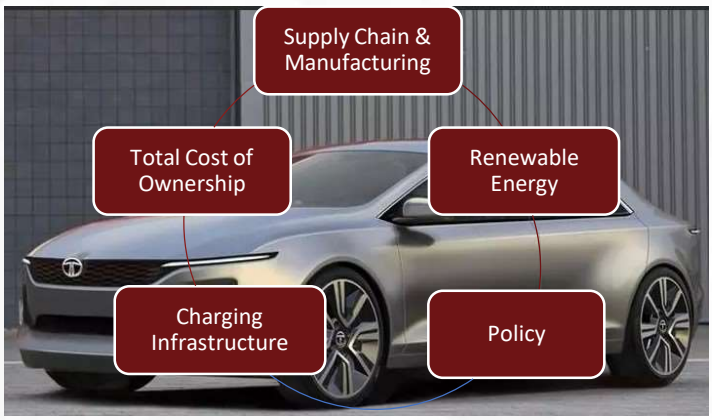
Electrifying India's $222 billion Automotive Industry

5 Factors are coming together

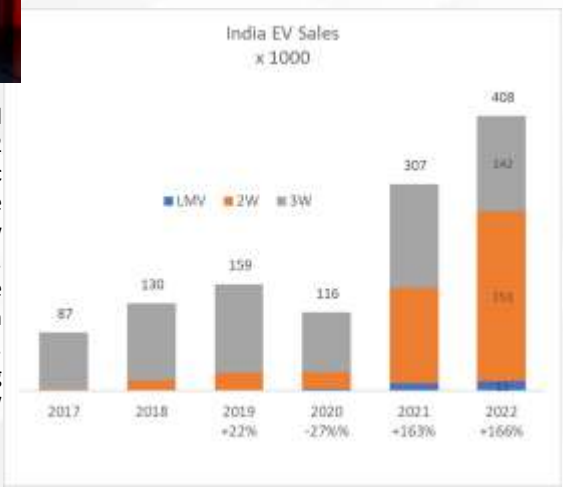


Electric Vehicles (EVs) have shown exponential growth in the past 5 years and will soon reach an inflection point where 5 factors that affect the success of electrification will come together:

- The **Supply chain and manufacturing** capacities are being built on a massive scale. Very soon these capacities will come online
- **Total Cost of Ownership** is getting favourable for EVs. This will tilt the buying decision overwhelmingly towards EVs.
- **Charging infrastructure** is still in its infancy. A lot of investment, both private and Government aided is coming to this sector
- EV's carbon footprint drastically reduces with **renewable energy**. Renewable energy is rapidly increasing, led by Solar power.
- **Policy** framework for the adoption of EVs is favourable and is getting better.

1. Supply Chain and Manufacturing

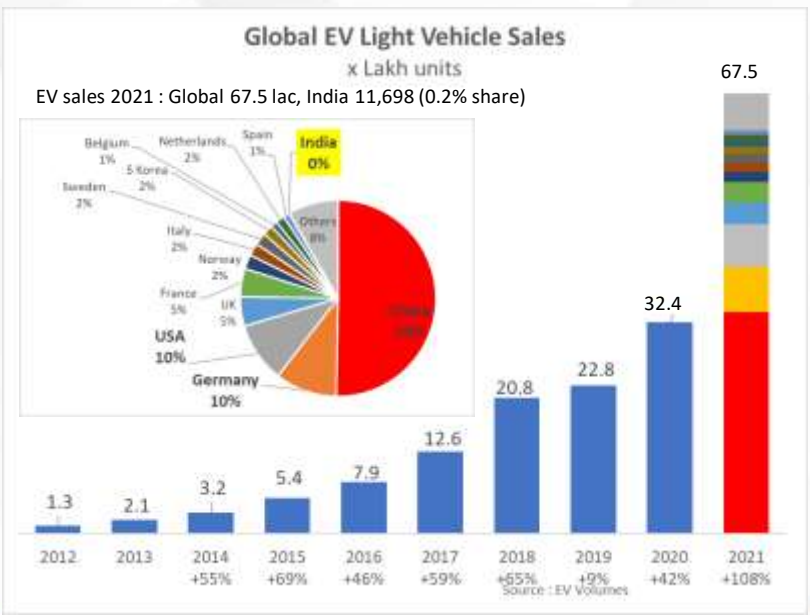
Over 3 lac EVs were sold in India in 2021. In 2022 H1, already over 2 lac have been sold. A large part of the success now has been in 3-wheelers. Most of these were made in relatively low-tech manufacturing facilities. The story is fast changing with 2W as well as 4W sales growth.

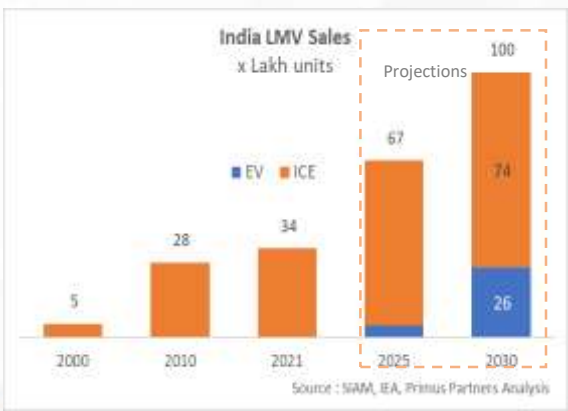


Globally, EV Light Motor Vehicle (LMV i.e. Cars/SUVs) sales in 2021 doubled to 67.5 lac units over 2020. China, Germany & US contributed over 70% of the sales. In many countries including China & Germany over 10% new cars sold were EVs. While the 2021 numbers for India were low, it is not far behind.

Capacities are being built globally and will aid explosive growth that will continue for the next decade. In India, capacities to make EVs are being built by Tata, Mahindra, Ola, Ather, Hero, Hyundai, MG, Ashok Leyland, Olectra, Bajaj, TVS, JBM etc. and substantial capacities will come online in the next 3-4 years. In fact, the announced EV capacities are more than that of Internal Combustion Engine vehicles (ICE) present today. India seems to be on track to create capacity to produce over 4.5 lac LMV by 2025 and over 26 lac LMV by 2030. PLI schemes announced in 2021 did help accelerate the capacity built up.

Building capacities takes time. Many parts, especially batteries and semiconductors have global value supply chains. New technologies are being developed at a rapid pace, and hurrying up may lead to wrong choices.





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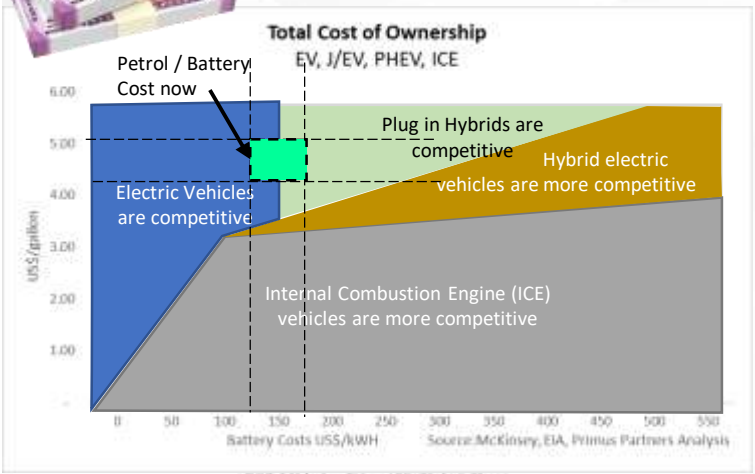
2. Total Cost of Ownership



TCO is favourable in many countries & use cases as of today, albeit with a dose of policy support

Source Nickel Institute

The commercial viability, and hence the demand for EVs fundamentally depends on the Total Cost of Ownership (TCO) vis-a -is ICE vehicles. The TCO includes all costs of owning and running the vehicle: purchase price, cost of capital, fuel, maintenance, tire wear, insurance, resale price etc.

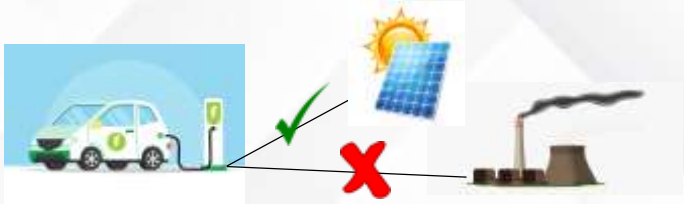
Two key TCO determinants are cost of battery and price of fuel. A large part of EV cost is in its battery. In fact the rest of the car is much simpler and cheaper to produce compared to ICE. The battery costs have been falling consistently over past few years and have reached $130-$175/kWH range at the pack level. The current oil price is hovering ~$100/barrel, ~Rs 100/L Petrol in India, ~$ 4.5-5/gallon in US. As seen on the graph on your left, both these factors make the EVs competitive against ICE today.

Further policy support in terms of capital subsidy, subsidy for buying EVs, lower taxes, tax deductions, subsidy for charging stations and charging etc. are helping the TCO for EVs across the globe and in many use cases.

Commercial use cases e.g. buses, taxis, 3W etc. have a stronger TCO advantage as well as emission reduction case for EVs.

The large scale adoption of EVs will start when the TCO is favourable, with minimal policy support. This point is not far away in future.

3. Renewable Energy



EVs typically do not produce emissions while they run. Hence they will be quite effective in reducing the pollution in densely populated and high traffic locations.

However, if the electricity is produced using thermal power, it is just a shift of the location of pollution from the car's tailpipe to the thermal power plant's chimney. The life cycle carbon foot-print of EVs is much lower when it uses renewably sourced electricity. For true benefits to come in from EVs, the electricity should be renewably sourced.

India has made significant investments and plans for renewable electricity, especially solar. This will result in a grid that is dominated by renewable power. As of today, majority of the electricity produced is using thermal power.

Shifting to EVs will also greatly reduce oil consumption and its import dependence.

Electrifying India's $222 billion Automotive Industry

4. Charging Infrastructure

India	2021	2030
Charging Stations	2,636	4,00,000
EV Sales	11,701	26,38,000

The battery charging infrastructure is still in its infancy. There is still a problem of chicken and egg – there are not enough vehicles for charging, and there are not enough chargers for vehicles. India would need over 4 lac chargers by 2030 to support the EV fleet.

Both Government and Private sectors are investing in creating charging infrastructure. 25 state nodal agencies have been identified to implement the same. The sector is also attracting private capital with players like Tata Power, Magenta Power, Fortum, TecSo, Tvesas, Ather energy, Sun mobility etc. investing in charging stations and battery swapping.

Infrastructure is being developed both for setting up charging stations as well as strengthening of grid to take care of the increased electricity requirement.

5. Policy

India has a favourable policy regime for electric vehicles. It has a slew of policies and incentives that help:

- Ease of setting up manufacturing units
- Reducing the price of Evs through subsidy and production linked incentives
- Facilitating enablers like charging infrastructure
- Government procurement of vehicles providing necessary impetus to manufacture
- Lower taxation and registration taxes in many locations etc.

India is going the 'middle way'. There are governments like China that have done far more in policy interventions to promote EVs. Our policy interventions are similar in intensity to key countries like US, Germany & UK albeit through different policy measures.

FAME I & II

Policy for Faster Adoption and Manufacturing of Electric Vehicles, Phase I and II

PLI

Policy for Production Linked Incentives for

- Automobiles (with large focus on EVs)
- Advanced Cell Chemistry Battery Manufacturing

National Policies & Initiatives

- National Council for Electric Mobility NCEM
- National Automotive Board
- FAME India
- PLI
- Technology Platform for Electric Mobility (TPEM)
- E-mobility 2030
- Central Motor Vehicles Rules, 1989
- Model Building Bye-Laws (MBBL) 2016
- Urban Regional Development Plans Formulation and Implementation (URDPFI) Guidelines 2014
- National Electric Mobility Mission Plan 2020
- National Board for Electric Mobility (NBEM)
- National Mission on Transformative Mobility and Battery Storage
- Bundling of EV bus procurement by EESL

State Policies & Initiatives

- State level EV policies
- Setup of State level nodal agencies
- State level incentives for setting up manufacturing
- State level incentives for EV sales
- State level incentives and initiatives for charging infrastructure
- State/city level initiatives for electrification of public transport including bus, 3W and taxis

Finding Right Pace for Electrification

Finding the right Pace

Too Slow	Too Fast
• Environment suffers • Other countries gain competitive advantage • Oil cost and foreign dependence	• Wrong technology choice • Not all factors are in place • Higher subsidy cost • Chance of wrong investment

As we have seen, the factors for EV adoption are shaping up nicely, and the inflection point is around the corner, we are 'not there yet'. There is no doubting that EVs are the future of mobility.

Going too fast has its downside too as can be seen from China experience. While the strong policy push has resulted in China reaching targeted numbers and developing manufacturing, not all is well there. It has led to a large number of companies entering the industry. Many of these are bad investments and some reports say that 90% will close down. There are substantial quality issues including spontaneous fire incidents in China, (which we are seeing now in India) the life and residual values of EVs are low.

Policy interventions have proven to be successful across the world in accelerating EV adoption. India is doing well in promoting EVs, and very soon the results will start to be substantial. Speeding things faster than the system and factors allow will lead to expensive mistakes. It should keep up with the policy interventions, without going overboard.

Expert Take

Mr. Nishant Arya
Vice Chairman, JBM Group

JBM Electric Buses
JBM is a leader in electric bus segment

At JBM, Technology, Innovative Business Model and People (TIP) are the three key pillars on which we have established the foundations of our business.

We have developed a "Well to Wheel" concept that not only drives business across our various verticals on one hand but also propels our initiatives towards sustainability and green manufacturing. JBM's multiple businesses like Renewable Energy, EV Charging Infrastructure and Electric Vehicles have strategically synergized towards creating a seamless solution from generation to consumption of clean energy. Moreover, now in many of our plants we are using solar power for captive energy requirements. As part of our business sustainability, we define sustainability in different ways of energy conservation, people skill enhancement, societal development that leads to scalability for us.

Electric Vehicles are growing as a segment in India. People, now, are more focused on their health, safety and environment. As responsible corporate citizens, our focus is towards the propagation of green technologies such as electric vehicles. Various government schemes, such as the PMP, the Phased Manufacturing Program will stand beneficial to promote localization by way of collaboration between the various EVs and EV ecosystem players, thereby, reducing the dependence on imports.

Contributors

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About Primus Partners

Primus Partners has been set up to partner with clients in 'navigating' India, by experts with decades of experience in doing so for large global firms. Set up on the principle of 'Idea Realization', it brings to bear 'experience in action'. 'Idea Realization'— a unique approach to examine futuristic ideas required for the growth of an organization or a sector or geography, from the perspective of assured on ground implementability.

Our core strength comes from our founding partners, who are goal-oriented, with extensive hands-on experience and subject-matter expertise, which is well recognized in the industry. Our core founders form a diverse cohort of leaders from both genders with experience across industries (Public Sector, Healthcare, Transport, Education, etc), and with varied specialization (engineers, lawyers, tax professionals, management, etc).

PASSION
for providing solutions to help clients achieve their goals

RESPECT
For all and alternate viewpoints

INTEGRITY
of thoughts and actions

MASTERY
of our chosen subject to drive innovative and insightful solutions

US
Representing the Primus collective, where each individual matters

STEWARDSHIP
for building a better tomorrow

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