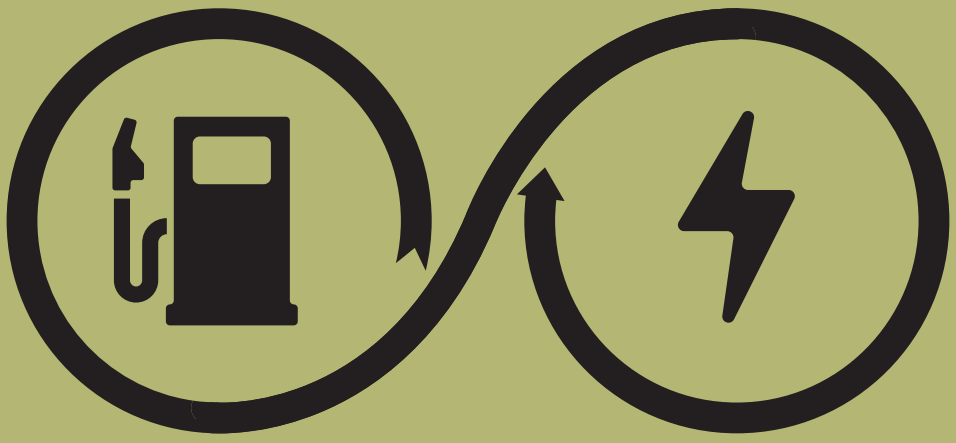

Summary for Stakeholders

ICE to EV

CHALLENGES, OPPORTUNITIES, AND THE ROADMAP FOR JUST TRANSITION IN INDIA'S AUTOMOBILE SECTOR

iFOREST
INTERNATIONAL FORUM FOR ENVIRONMENT, SUSTAINABILITY & TECHNOLOGY

Summary for Stakeholders

India's automobile sector is poised for significant expansion in the near future, driven by the electric vehicle (EV) revolution. This shift promises to usher in a wave of new opportunities and growth avenues. However, it could also pose challenges for businesses, the workforce, and the environment. To mitigate these potential downsides, a sustainable and just transition of the automobile sector is essential. This approach should be underpinned by technological advancements and innovation, with a focus on safeguarding workers' well-being and job security. Moreover, it is crucial to encourage sustainable mobility choices that are affordable and accessible and reduce the environmental footprint of EVs throughout their lifecycle.

A. Growth Trajectory

A modeling study was undertaken to forecast the growth of electric two-wheelers (2Ws), three-wheelers (3Ws), passenger cars, and commercial vehicles (CVs), under two scenarios, viz., a Current Policy Scenario (CPS), and an Aspirational Policy Scenario (APS). The projections are made for two timeframes-2030-31 and 2036-37.

1. The EV penetration in India can reach 29-38% in 2030-31 and 47-67% in 2036-37, under different policy scenarios.

Vehicle manufacturing in India is projected to rise from 25.9 million units in 2022-23 to 54.5 million units by 2030-31, and further to 77 million units by 2036-37. Consequently, India's total vehicle production is expected to double by 2030-31 and triple by 2036-37 in comparison to present levels.

EV production is poised for an even more rapid acceleration. With an anticipated annual growth rate of 38-42% from 2022 to 2030 and 15-16% from 2030 to 2036, EV production is expected to range between 15.9 to 20.8 million units by 2030-31, scaling up to 36 to 51.4 million units by 2036-37. This remarkable increase will elevate EV penetration to between 29-38% by 2030-31 and 47-67% by 2036-37.

2. EV penetration will be highest in three-wheeler and two-wheeler segments.

EVs will dominate the three-wheeler (3W) segment, with their market share projected to increase to 90% by 2030-31 and approach nearly 100% by 2036-37. For the two-wheeler (2W) segment, adoption rates are forecasted to range from 30-40% by 2030-31 and between 50-70% by 2036-37. On the other hand, the penetration of EVs in the passenger car segment is predicted to be more gradual. Starting from a base of 1.2% in 2022-23, the share of EVs in this segment is expected to rise to 15-20% by 2030-31, and further to 25-50% by 2036-37, depending on various scenarios.

3. The EV market will be dominated by two-wheelers.

By 2030-31, more than 80% of all EVs produced in India will be 2Ws. On the other hand, the proportion of passenger cars within the total EV production is expected to rise from 7.7% in 2030-31 to 10% by 2036-37.

B. Impact on Businesses

The transformation from internal combustion engine (ICE) vehicles to EVs will have impacts across the value chain – from the original equipment manufacturers (OEMs) and auto component manufacturers (ACMs) to the service sector. This disruption will drive significant changes in the business models. The impact assessments on businesses rely on primary surveys of enterprises in major auto clusters, alongside assessments of government and industry data.

1. Depending on vehicle type, 45-84% of parts of an ICE vehicle will become obsolete due to EV transition.

The fundamental difference between an ICE vehicle and an EV is in the powertrain – a group of components that generate power and deliver it to the wheels. About 90-100% of parts of the powertrain of an ICE vehicle will become obsolete due to the transition to EVs, depending on the vehicle type.

The non-powertrain parts of ICE vehicles will also be moderately impacted. The obsolescence of parts in an ICE 2W will be 28%, 3W will be 37%, and in cars will be 12%. Besides, there are many similarities in non-powertrain components, and thus, these components of an ICE vehicle can be repurposed for an EV.

Overall, 45-84% of parts of an ICE vehicle will become obsolete. The obsolescence in the case of an ICE 3W will be as high as 84%, whereas it will be 45% in the case of passenger cars.

2. The powertrain supplier industry will be transformed by the shift to EVs.

Depending on vehicle type, the powertrain of EVs has 85-90% fewer parts compared to their ICE counterparts. Thus, there will be a significant impact on the business of ACMs as they will have to supply fewer parts. There will also be impacts on the spare parts and aftermarket activities resulting from the diminished number of wearable parts in the EV powertrain compared to an ICE powertrain.

3. Reducing the cost of batteries is key to reducing the total cost of ownership (TCO) of EVs.

The powertrain cost for an electric 3W is now lower than that of its ICE counterpart. This is the reason for the increased market share of electric 3Ws in India. On the other hand, for passenger cars, the powertrain of an EV is roughly 20% more expensive, primarily due to the higher cost of batteries. If the cost of the battery is set aside, the powertrain of an EV car costs less than half compared to that of an ICE car. Therefore, the reduction in battery and electronics costs is crucial for decreasing the TCO of electric cars.

4. One-third of the ACMs will be highly impacted by the transition with concentrated impacts on certain states.

An analysis of 729 members of the Automotive Component Manufacturers Association of India (ACMA) shows that about 34% of them will be highly impacted by the transition. Around 60% of these highly impacted ACMs are concentrated in the states of Haryana, Maharashtra, and Tamil Nadu. These enterprises primarily produce parts and components for powertrain sub-assemblies in ICE vehicles, including areas like 'engine-fuel-exhaust', 'transmission', and 'driveline'.

5. The transition impact on automobile clusters will be varied, and so will be the transition strategies.

A detailed study of three major automobile clusters in India—the Gurugram cluster in Haryana, the Pune cluster in Maharashtra, and the Hosur cluster in Tamil Nadu—indicates that the shift towards EVs will affect each cluster in unique ways. In the Gurugram cluster, for instance, over 40% of businesses will experience high to moderate impacts from the EV transition, with most of these being large and medium-sized enterprises. In contrast, in the Hosur and Pune clusters, about 20-25% of enterprises are expected to be affected, predominantly those that are small and micro in scale. As a result, the strategy for transitioning to EVs will need to be tailored for each cluster, considering their specific profiles and the scale of businesses within them.

6. ACMs have started transitioning to EV-related components, but mostly in the same segment.

From the primary survey of about 100 enterprises in each cluster, it was observed that 27% of enterprises in Gurugram, 21% in Hosur, and 45% in Pune are currently supplying EV parts to OEMs. However, most

enterprises are making logical transition. They are expanding their business by supplying parts of the same sub-assembly for EVs. Only a small percentage were found to be transitioning/diversifying their business portfolio for manufacturing EV parts based on new opportunities in the EV ecosystem. This means that the ACMs involved in the ICE powertrain are not diversifying into EVs.

C. Impact on workforce

The shift from ICE vehicles to EVs will have implications for a large proportion of the workforce currently engaged in the manufacturing of ICE vehicles, as well as those engaged in the value chain such as servicing and repairs. The digital transformation in the automobile industry will also require a new set of skills from manufacturing to servicing. Therefore, a key consideration for the EV transition will be to ensure a planned transition of the existing workforce engaged in the ICE vehicle ecosystem to the EV ecosystem. Simultaneously, there will be a need for the development of a new workforce.

The impact assessment on the workforce was done based on primary surveys of about 300 ACMs and a total of 1,184 workers in the three auto clusters. Further, a comprehensive analysis of all job roles in the automobile ecosystem was done considering various secondary data sources, including the National Qualification Register and National Classification of Occupations (NCO) codes.

1. Job roles in the automobile sector are dominated by manufacturing and servicing.

The analysis of job roles shows that there are at least 564 job roles in the entire automobile sector. About 54% of them are related to manufacturing, followed by servicing and repairing accounting for an additional 16%. Research and development (R&D) and dealerships are the two other key segments accounting for 13.3% and 10.5% respectively. Overall, 70% of all the job roles are in manufacturing and service/repair.

2. Most job roles are at the NSQF levels 4 and 5.

Around two-thirds of the auto sector job roles fall between the National Skills Qualification Framework (NSQF) levels 4 and 5. These two levels generally represent jobs such as operators/technicians and managers. People working at NSQF 4 and 5 are skilled and have at least a higher secondary level education, but most are graduates, including those with technical degrees from polytechnics and Industrial Training Institutes (ITIs).

3. Contractual workers dominate the ACM segment.

The assessment of enterprises and workers in the three auto clusters shows that the largest share of workers in the ACMs are contractual workers. Besides, there is a significant proportion of informal workers. Overall, contractual and informal workers constitute nearly two-thirds (66%) of the workers in ACMs. The informality is higher in micro and small enterprises.

4. The impact of the EV transition will be significant on the workforce affecting 31% of the job roles in the ICE ecosystem.

About 31% of the job roles in the ICE ecosystem will be affected – 14% will become obsolete and 17% will require reskilling. Maximum job roles will be affected in ICE vehicle manufacturing. Out of the total job roles in this segment, 21.4% would become obsolete. This includes jobs like fuel injection technicians, clutch system specialists, and exhaust system inspectors, among others. Further 12.3% of jobs in the segment will require major reskilling interventions, in sub-assemblies such as transmission and driveline, among others.

5. The overall impact of the transition on the number of job roles will be positive.

Sixty-six job roles (14% of the job roles related to ICE vehicles) will become obsolete due to the shift to EVs. On the other hand, 92 new job roles (18% of the EV job roles) will be created due to EVs. Overall, the number of job roles in the EV ecosystem is about 5% higher than in the ICE vehicle ecosystem. However, the new job roles are qualitatively different than the existing job roles, as they require high skills and education levels.

Even for job roles that will not become obsolete, new skill sets will be required to retain workers in those roles. Therefore, skilling and reskilling of the workforce will be one of the most important interventions for the EV transition.

6. The job factor in EV cars is lower than ICE cars.

A detailed assessment of the number of jobs per passenger car (job factor) shows that at the OEM level, the job factor in an ICE car is about 20% higher than in an EV car.

At the ACM level, the job factor in the powertrain of an ICE car is about 10% higher than that in the powertrain of an EV. The job factor in the powertrain of EVs is likely to reduce further due to the economy of scale and automation. At the ACM level, the job factor in the non-powertrain of an ICE and an EV car is the same. However, the job factor in the non-powertrain of EVs is projected to reduce due to economy of scale and automation.

Overall, the number of jobs in manufacturing an ICE car is about 10% higher than in an EV car.

7. While the number of jobs supported by EVs are slightly lower than ICE vehicles, there will be a net increase in jobs in the automobile sector due to penetration of EVs.

The automobile sector is the third largest employer in the manufacturing sector accounting for 9.6% of employment. The transition to EVs will further boost employment in the sector due to new job roles and the demand of the workforce to produce more EVs.

iFOREST undertook a comprehensive modeling of jobs for the passenger car segment. The number of jobs was estimated for both the Current Policy Scenario (CPS) and Aspirational Policy Scenario (APS) till 2036-37. The CPS and APS scenarios were compared with a scenario in which it was assumed that only ICE cars were produced (ICE Scenario).

The results show that the total number of jobs in passenger car manufacturing is projected to grow from 1.7 million in 2023-24 to 2.6 million in 2030-31 and 3.3-3.7 million in 2036-37. So, there is no job loss per se due to the transition from ICE vehicles to EVs.

However, the number of jobs created in the CPS and APS scenarios is lower than those in the ICE scenario. In 2036-37, 8–17% fewer jobs would be created than in the ICE scenario. Thus, the number of jobs supported by EVs is relatively lesser than ICE.

D. Ensuring a Sustainable, Just, and Inclusive Future of the Automobile Sector

India needs to seize the opportunities of the momentous EV transformation, backed by technology and innovation, while ensuring workers' resilience and security, supporting sustainable choices by citizens that are affordable and accessible, and reducing the lifecycle impact of EVs to realise a sustainable and just transition of the automobile sector.

1. Just transition of the automobile section hinges on four key pillars that can aid the progress toward a sustainable, just, and inclusive automobile future.

The just transition vision of the automobile sector should be based on four pillars which are outcome-oriented and designed to guide the development of practical and holistic policies, plans, and investments.

Pillar 1-Technology and skilling: Will promote the simultaneous advancement of technology and the development of human resources to ensure the availability of skilled personnel to fully leverage technological capabilities and evolving demands. At the same time, technology needs to be designed and implemented in a manner so that job displacements are reduced and the prospects for new jobs and employability are enhanced.

Pillar 2- Vibrant green manufacturing: Will support the green growth agenda and is positioned to make India a hub of green automobile manufacturing.

Pillar 3- Sustainable mobility choices: Transition from automobile as a product to mobility as a Service (MaaS) will promote sustainable urban mobility, reduce congestion and pollution, and support a diversification of income opportunities around clean mobility.

Pillar 4- Green energy and material circularity: Will reduce the life cycle impact of EVs, from energy and material use, to end-of-life material management.

2. A comprehensive Just Transition Policy Framework for the Automobile Sector will be required to support a holistic transformation.

While there are policies, plans, and schemes developed by the Central and State Governments to increase the adoption of EVs, support infrastructure development, boost domestic manufacturing, and generate revenue and employment, however, to support a sustainable, just, and inclusive transition of the automobile sector, a more integrated policy framework is required.

The Government needs to develop a comprehensive Just Transition Policy Framework aligned with India's vision of strengthening opportunities for green growth and, boosting green jobs, fostering environmental stewardship, and building a clean mobility future.

3. A comprehensive e-Mobility Policy should be developed specifying targets.

The central Government needs to develop a national e-Mobility Policy to promote EV deployment while supporting an inclusive transition. The policy should define targets and plans for EVs that are long-term, consistent, and coherent across ministries.

4. Supporting R&D investments will be essential to make India an innovation hub.

R&D investments will be crucial for India to leverage its expertise in engineering and innovation to become a global leader in the development and adoption of cutting-edge automotive technologies. Also, standardisation of EV technology, especially for battery and charging parts and components, is important to drive down the costs of the vehicle as well as of the charging infrastructure. The Government should notify standards that align with the global best practices to drive down costs and enable EV adoption.

5. Green manufacturing in the auto sector will be crucial for achieving India's target of reducing the emission intensity of the GDP by 2030 and boosting green growth.

The Government needs to boost green manufacturing practices for both OEMs and ACMs by developing guidelines, providing fiscal and non-fiscal incentives, and technological support.

For example, incentives can be offered to the OEMs to adopt green manufacturing practices, such as utilising renewable energy (RE), investing in energy-efficient equipment, implementing green procurement measures, material reuse, etc.

For ACMs, providing fiscal incentives and technical assistance will be crucial given the predominance of MSMEs in this segment. The government can offer grants, subsidies, and tax incentives to MSMEs for adopting green manufacturing technologies and practices. It will also be important to ensure access of these enterprises to credit and risk capital to support investments in green manufacturing.

Overall, promoting industry benchmarking and reporting on environmental performance metrics, can help to champion best practices and improve industry performance.

6. A comprehensive workforce transition policy will be required to support the existing workforce impacted by the transition and prepare a future-ready workforce.

Transition of the existing workforce to the new EV ecosystem, and increasing employability of the future workforce lies at the core of ensuring a just transition of the automobile sector. The most important intervention in this regard will be reskilling and skilling the workforce to retain jobs and create a future-ready workforce.

To develop and invest in effective skilling programmes, coordination between the government, industry, skilling agencies, educational and training institutions, and other concerned entities will be necessary.

To facilitate a coordinated approach, a Skills Taskforce can be developed at the state level, consisting of members of OEMs, ACMs, skill councils, training institutes, and research institutions, to generate data on workforce profile, including their education and skills levels, to assess education and skill gaps to enable the design of training, academic and vocational programmes.

7. Mandating the development of a Workforce Transition Plan by OEMs will be required for strengthening enterprise-level action.

Mandating the development of a Workforce Transition Plan by the OEMs can be an effective policy instrument for workforce transition at the enterprise level, and complement government policies and transition measures. The plan for workforce transition should be output-oriented, outlining key performance indicators (KPIs) for monitoring its implementation.

8. A Right to Repair and Servicing Policy needs to be instituted to reduce the vulnerability of workers engaged in servicing and repairing.

Servicing and repairing jobs are a crucial part of the automobile ecosystem. This segment also includes a large number of informal workers. To reduce the vulnerability of workers in the servicing and repairing segment a 'Right to Repair and Servicing' policy can be effective. The policy should enable EV manufacturers to involve local service centers in repair and servicing and retain employment.

9. A dedicated transition fund is necessary to provide targeted support to the MSMEs.

The manufacturing segment of the automobile sector is dominated by MSMEs who have limited resources, technology, and the capability to adapt to the evolving needs of the EV sector, diversify their businesses, and provide reskilling support for workers. To support the MSMEs in a targeted manner, the Central Government may establish a dedicated transition fund for the MSMEs, including their workforce.

Towards this, the Government can issue necessary notification(s) and guidelines under the MSME Act, 2006. Aligned with the objective of the Act and the requirements of an EV transition, the fund can used for skilling and reskilling the workforce, providing grants, low-interest loans, or subsidies to enterprises for upgrading their manufacturing processes and adopting new technologies, and supporting the reorientation of enterprises and diversifying their customer base, among others.

10. Transition of the auto sector should be overall aligned with plans to diversify and strengthen regional industrial ecosystems and support demand for green jobs.

The transition from ICE to EV, should not be limited to a mere sectoral approach, it should be harnessed as an opportunity to support broad-based green economic growth and green jobs. The policies for the transition of the auto sector should be aligned with the industrial and economic policies of the state(s) and should aim to diversify and strengthen regional industrial ecosystems, support broader demands of green job creation, and maintain economic and social cohesion. For this, regional impact assessments of the ICE to EV transition can be undertaken to develop cohesive investment plans.

11. Supportive policies are required to shift the idea from vehicle ownership to Mobility as a Service (MaaS).

As the EV transition accelerates, it should be balanced by considerations of the sustainability of our urban spaces, and support a shift in the idea of mobility. The uptake of MaaS could bring about considerable environmental and societal benefits, such as lowering individual carbon footprint, reducing congestion, and boosting service sector employment opportunities in the clean mobility ecosystem.

12. Transition to EVs should consider a lifecycle approach, and should not be restricted as a tailpipe solution.

Achieving environmental sustainability in the EV transition requires a holistic approach that considers the entire lifecycle of EVs and addresses energy and material use at every stage. Using renewable-based energy will be important to minimise the carbon footprint of EVs. Similarly, sustainable mining practices for extracting raw materials for battery manufacturing, recycling of batteries, and research into alternative battery chemistries with fewer rare or toxic materials will be essential for reducing material extraction and use, and overall environmental impacts.

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