“Small Format Mobility is the key to Unlock India’s EVs Expansion Potential”

Cost advantages making it even more preferred.

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1.Expanding EV
Adaption in India

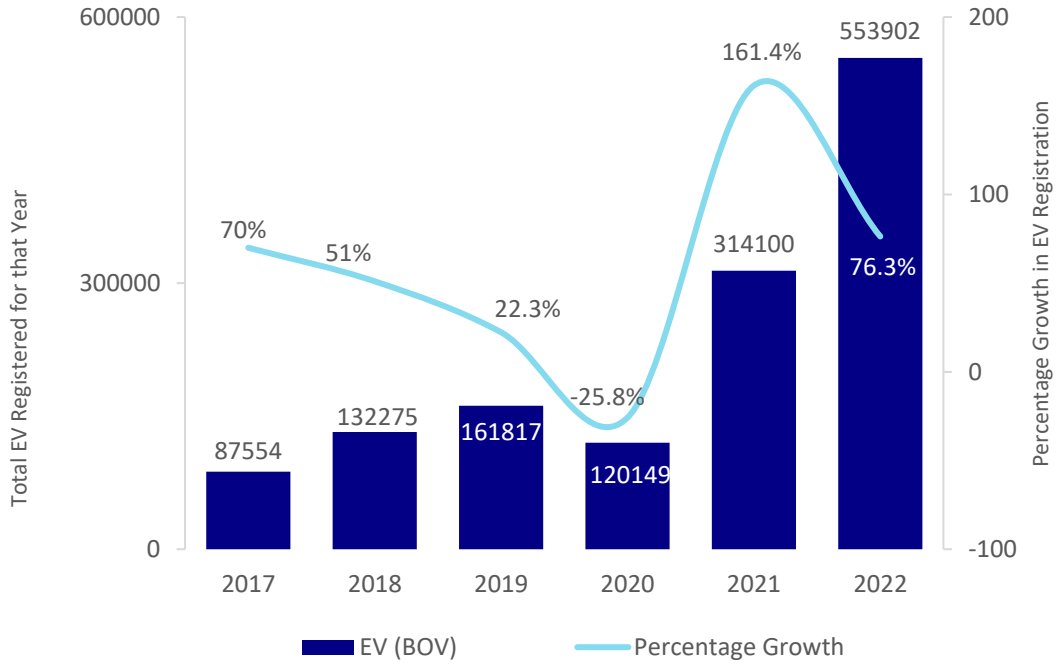
Electric vehicle landscape in India

The electric vehicle landscape is rapidly changing in India as both technology and interest evolve, and the coming years will see many more EVs take to the roads, seas, and skies. In India, electric vehicles sales has grown at a CAGR of 83% since 2018 till 2022, making the total EV count to reach a hallmark of 1.4 Million in Aug'2022.

Considering the same growth only that Indian EV sales has witnessed over the past four years, it is anticipated that the total EV count in India will hover around 9.1 Million by 2036 —providing both a glimpse of a green future and significant economic opportunity. As the central and respective state governments are giving impetus on developing the electric vehicle segment in the country, the progress is seen at concurrent levels. In India, presently 20 states have announced their EV policies for encouraging EV manufacturing, EV demand and development of supportive charging infrastructure. In this regards, Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME I & II) was launched. FAME I was launched in 2015 , while FAME II was introduced in 2019 with more embellished EV targets.

Phase-II of FAME India Scheme was notified on 8th March 2019 for a period of three years commencing from 1st April 2019, with a total budgetary support of Rs. 10,000 crore. This phase mainly focusses on supporting electrification of public & shared transportation and aims to support through subsidies - 7090 e-Buses, 5 lakh e-3 Wheelers, 55000 e-4 Wheeler Passenger Cars and 10 lakh e-2 Wheelers. Till July 2022, about 4.7 lakh electric vehicles have been supported under FAME II by the way of demand incentives.

Exhibit 1: YoY additions in Electric Vehicle (BOV) registrations in India from 2017 till 2022



Source: eninrac research & analysis, MORTH

Key initiatives taken by GOI for adoption of EVs in India

Increase in demand incentive for e-2W : The demand incentive for electric two wheelers (e-2W) has been increased to INR. 15,000/KWh from INR. 10,000/KWh with an increase in cap from 20% to 40% of the cost of vehicle from 11th June 2021, thus enabling cost of Electric two wheelers at par with that of ICE two-wheeler vehicle

Introducing production linked incentive (PLI) : The GoI on 12th May 2021 approved a Production Linked Incentive (PLI) scheme for manufacturing of Advanced Chemistry Cell (ACC) in the country in order to bring down prices of battery in the country. Drop in battery price will result in cost reduction of electric vehicles

Incentivizing EVs under PLI : Electric Vehicles are also incentivized under Production Linked Incentive (PLI) scheme for Automobile and Auto Components, which was approved on 15th September 2021 with a budgetary outlay of Rs. 25,938 crore for a period of five years

Reduction of GST on EVs: GST on electric vehicles has been reduced from 12% to 5%; GST on chargers/ charging stations for electric vehicles has been reduced from 18% to 5%

Exempting battery operated vehicles from permit requirements: Ministry of Road Transport & Highways (MoRTH) announced that battery-operated vehicles will be given green license plates and be exempted from permit requirements

Waiving road tax: MoRTH issued a notification advising states to waive road tax on EVs, which in turn will help reduce the initial cost of EVs.

Sale of electricity as "service": Ministry of Power, India has allowed sale of electricity as 'service' for charging of electric vehicles. This would provide a huge incentive to attract investments into charging infrastructure

Reduction in the interest paid on loan of EVs: In the Union Budget of 2019-20, the Ministry of Finance, India announced provision of additional income tax deduction of INR 1.5 lakh on the interest paid on loans taken to purchase electric vehicles

Ease in grant of driving license : The Ministry of Road Transport & Highways, India has notified certain specifications for the grant of license to age group of 16-18 years to drive gearless E scooters/ Bikes upto 4.0 KW

Providing EV charging stations in private & commercial buildings : Ministry of Housing and Urban Affairs, India has made amendment in the Urban and Regional Development Plans Formulation and Implementation (URDPFI) guidelines to provide for electric vehicle charging stations in private and commercial buildings

Small format mobility – ideal for India's EV expansion vision

Covid'19 has presented the globe with an unprecedented economic, humanitarian & healthcare challenge. India was no different, a serious setback was witnessed by country's industrial segment, with automotive being among the hardest hit sector. In 2018, India's auto industry experienced a sharp decline in the sales of commercial vehicles after the regulatory change in the axle load norms. Credit availability fell, demand slowed (especially in infrastructure and mining), and discretionary spending dropped, all of which contributed to a decline in auto sales. In early 2020, just as the industry was expected to recover, the pandemic added to the pain of already plummeting sector. Covid'19 further increased – cash flow tightening , supply chain disruptions, delays in raw material sourcing and decreased – consumer demand , imports, labor availability. Although many challenges were faced by the auto segment , but the covid'19 accelerated some beneficial trends as well. For example, demand of electric two wheelers & three wheelers increased because of the growth of various use cases, such as last-mile delivery, ride hailing, and rentals.

Some of the most exciting developments that relates to the growth of electric vehicles in India is the – small format mobility, which includes electric (e) 2 W & 3W. Looking into the growth trajectory of EVs in India of past five years , it is pertinent to note that the same has increased at a CAGR of approximately 29% from 2018 till Aug 2022, courtesy e-2W & 3W. For e-2Ws much of the demand is witnessed by low to medium income group people, fleet aggregators that deals in – last mile deliveries, bike taxis etc. such as Zepto, Blink it, Zomato,Swiggy, Ola, Uber etc. For the e-3Ws, a lot of demand is observed for the e-rickshaws from the riders due to its affordability. Also, with the increase in ecommerce options, e-bulk order home deliveries etc. - many such service providers have also started adopting e-3W good carriers for meeting door to door deliveries of bulk items.

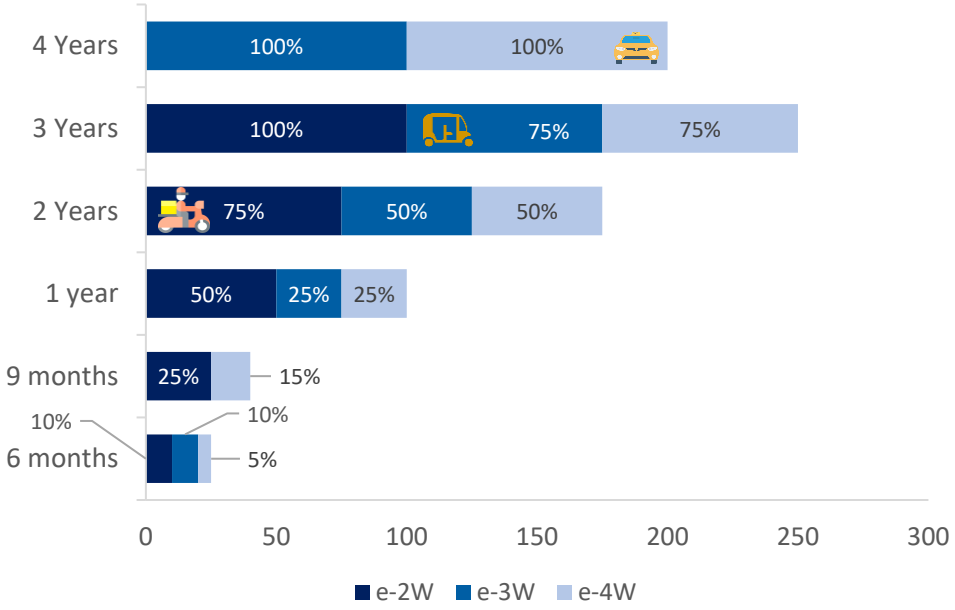
Within the small format segment, several enablers are already encouraging the growth For instance, small format EVs achieve faster parity with traditional internal combustion engine (ICE) vehicles, as their total cost of ownership (TCO) is lower, given their lower fuel and maintenance costs. They are also less dependent on charging infrastructure, since their power requirements are lower, and they are more likely to come in models that allow battery swapping. Both features may alleviate concerns about vehicle range. Some of the key developments that could help the small-format e mobility market in India are as follows –

Incentives from India's central and state governments to encourage EVs: The Faster Adoption and Manufacturing of Hybrid and EV (FAME) program, which was first implemented in 2015 and updated in 2019, provides consumers and domestic companies with various incentives. For instance, in phase two of FAME, the government announced an outlay of USD 1.4 billion till 2022. In addition to subsidizing EV purchases and essential infrastructure development, the funding will provide local manufacturers with incentives to produce EVs

Dedicated policies by respective state governments to involve EVs in the commercial fleet: In July 2022, the government of Delhi announced the draft aggregator fleet scheme. One of the key feature of this scheme was setting targets to have more electric vehicles in the fleet managed by the aggregators such as -Ola, Uber, Meru Cabs, Zomato, Swiggy and even other services operational in the National Capital Territory of Delhi. The entire fleet should comprise electric vehicles by April 1, 2030.

Small format mobility – ideal for India's EV expansion vision

Exhibit 2: Target to achieve new EV fleet by 2026 from the launch of the scheme



Source: Government of Delhi

Lower battery pack prices: According to industry estimates, the price of a battery pack in India could fall to USD 110 to USD 120 by 2030, making EVs much more affordable. A combination of scale, technology, and market maturity will drive this decline

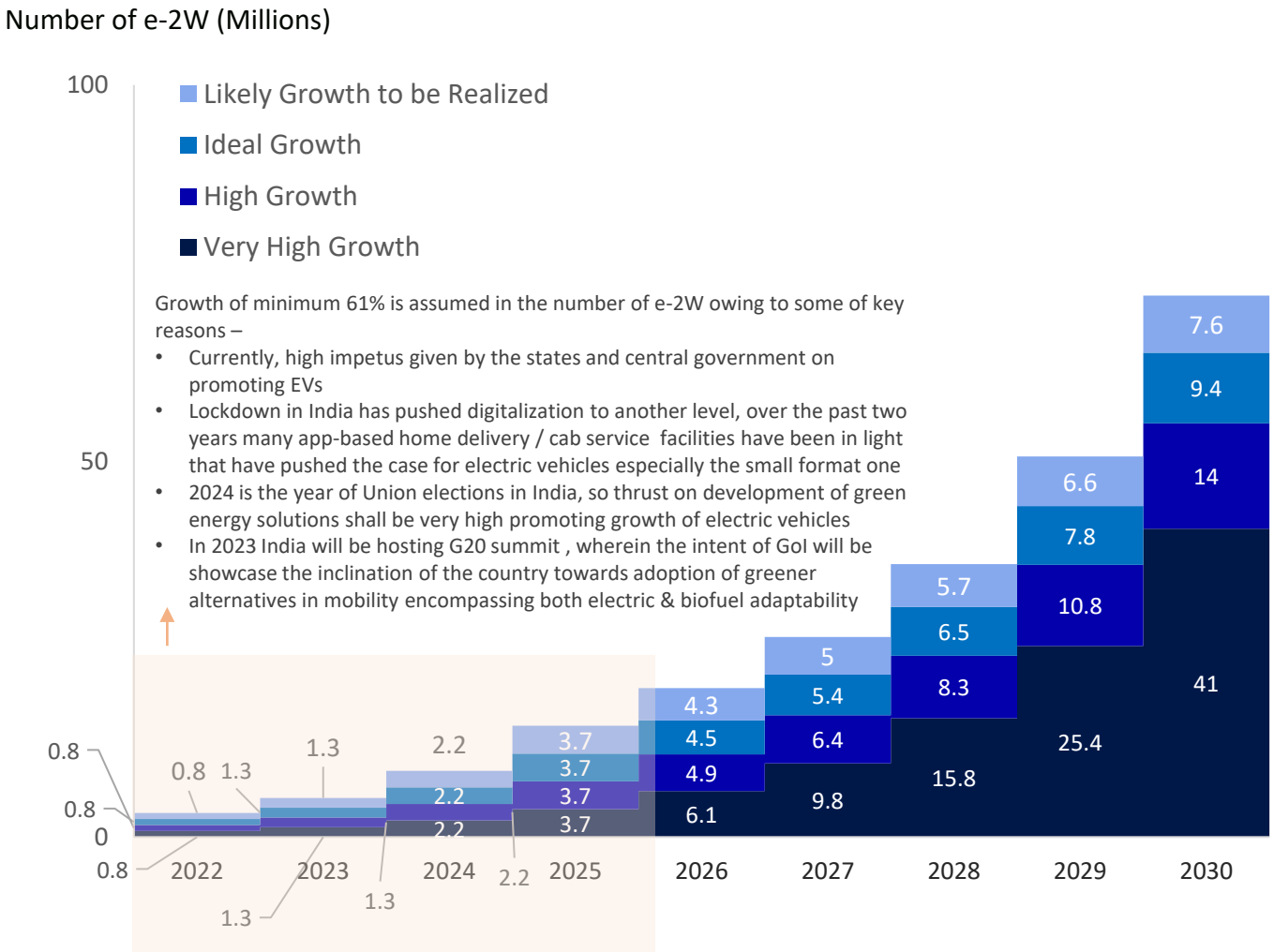
Increased consumer readiness: Across use cases, more consumers must be willing to opt for EVs over ICE vehicles. As per industry insights, one major roadblock is the perceived safety of EVs. This was the top concern after TCO and the availability of charging infrastructure. As more EVs hit the road, and as consumers become more familiar with them, their comfort level may increase

Eninrac analysis suggest that demand for small-format e-mobility options could rise substantially over the next decade. For 2W e-vehicles, sales could reach upto 41 Million by 2030 in the most optimistic scenario (i.e., very high growth scenario) , while the bare minimum growth shall lead the number of EVs around 7-8 Million. Exhibit 3 presents four growth scenarios for e-2W in India till 2030.

Like e-mobility, demand for shared mobility is expected to increase in the next decade, largely driven by three use cases. For 2W vehicles, last-mile delivery for food, grocery, and e-commerce is the major demand driver. Other popular 2W use cases include ride hailing and self. driving rentals, with YoY growth of 40 to 50 percent and 100 percent, respectively, through 2025. For 3W vehicles, passenger mobility will be the greatest demand driver, with expected YoY growth of 40 to 50 percent, followed by goods delivery, with YoY growth of 14 to 16 percent.

Small format mobility – ideal for India's EV expansion vision

Exhibit 3: Scenario wise Anticipated Growth (Numbers in Million) of e-2W in India till 2030



Source: eninrac research & analysis, Channel Checks

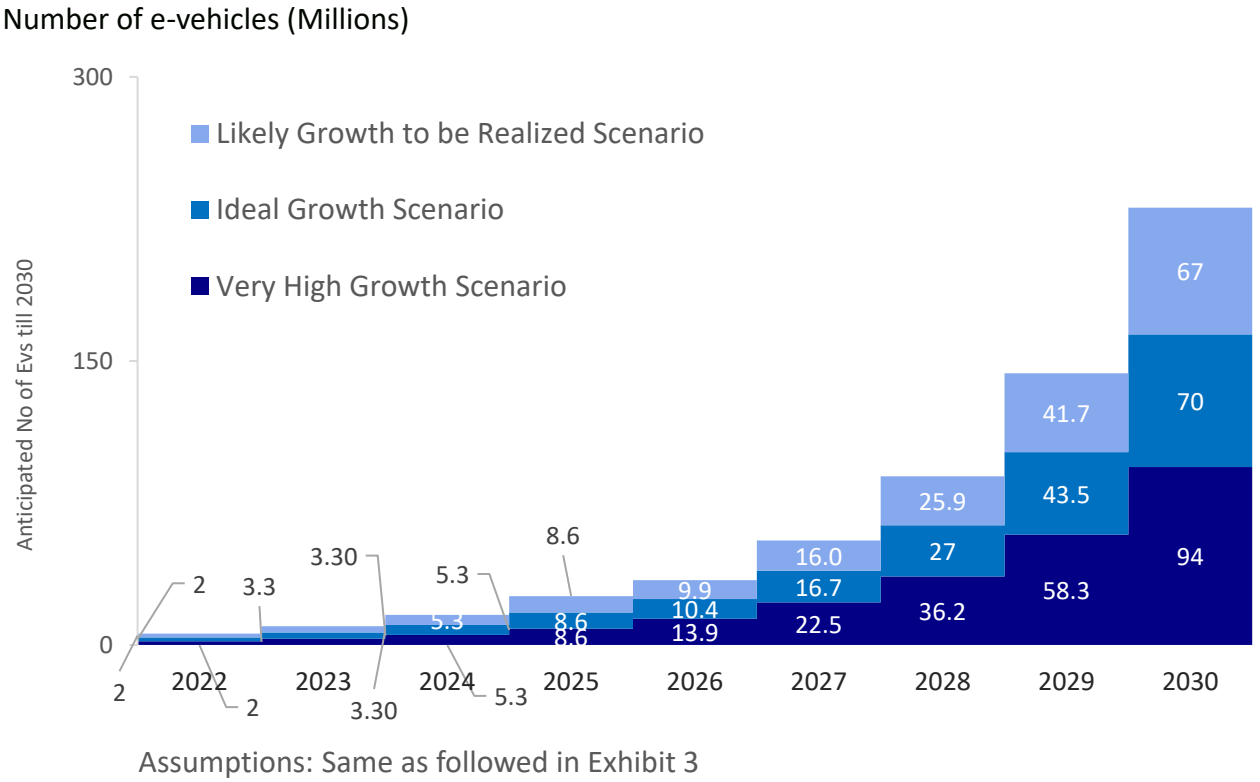
"Anticipated number of EVs that can be realized in India till 2030 shall hover between 50-60 Million with An average growth of 39%. This can be possible with growth in the supportive charging infra, grid facilitation, increase in user index value, reduction in battery prices, continued policy support from central & state government etc. " – Eninrac Research

Assumptions :

i. The anticipated numbers are for the calendar year(i.e., from Jan-Dec)
ii. Analysis is done on the current share of e-2W in total EVs. Currently e-2W constitute 32% of total EVs in India
iii. The yoy growth assumed from 2022 to 2025 is 61%*
iv. *indicates growth witnessed from 2021 to 2022
v. Very high growth scenario (VHGS) signify 61% yoy growth in the e-2W from 2025 to 2030
vi. High growth scenario (HGS) signify 30% (half of the growth from VHGS) yoy growth in the e-2W from 2025 to 2030
vii. Ideal growth scenario (IGS) signifies 20% (one-third of the growth from VHGS) yoy growth in the e-2W from 2025 to 2030
viii. Likely to be realized growth (LRG) signifies 15% (one-fourth of the growth from VHGS) yoy growth in the e-2W from 2025 to 2030

Small format mobility – ideal for India's EV expansion vision

Exhibit 4: Anticipated growth in the electric vehicles in India till 2030



Assumptions: Same as followed in Exhibit 3

Source: eninrac research & analysis & Channel Checks

Exhibit 5: Number of use case will drive growth in shared mobility for small-format vehicles

	Use case	Kms travelled per day	Growth rate (2030)
	E-commerce/ small format	90-100	17-20
	Food delivery	120-130	17-20
	Grocery delivery	70-80	27-35
	Self-drive rentals	30-40	100
	Ride hailing	70-80	40-50
	Goods mobility	110-120	15-17
	Passenger mobility	120-130	35-45

Source: eninrac research & analysis, Mckinsey & Channel Checks

2.Making EVs
Profitable

Cost advantages of small format electric mobility

Covid’19 has presented the globe with an unprecedented economic, humanitarian & healthcare challenge. India was no different, a serious setback was witnessed by country’s industrial segment, with automotive being among the hardest hit sector. In 2018, India’s auto industry experienced a sharp decline in the sales of commercial vehicles after the regulatory change in the axle load norms. Credit availability fell, demand slowed (especially in infrastructure and mining), and discretionary spending dropped, all of which contributed to a decline in auto sales. In early 2020, just as the industry was expected to recover, the pandemic added to the pain of already plummeting sector. Covid’19 further increased – cash flow tightening , supply chain disruptions, delays in raw material sourcing and decreased – consumer demand , imports, labor availability. Although many challenges were faced by the auto segment , but the covid’19 accelerated some beneficial trends as well. For example, demand of electric two wheelers & three wheelers increased because of the growth of various use cases, such as last-mile delivery, ride hailing, and rentals.

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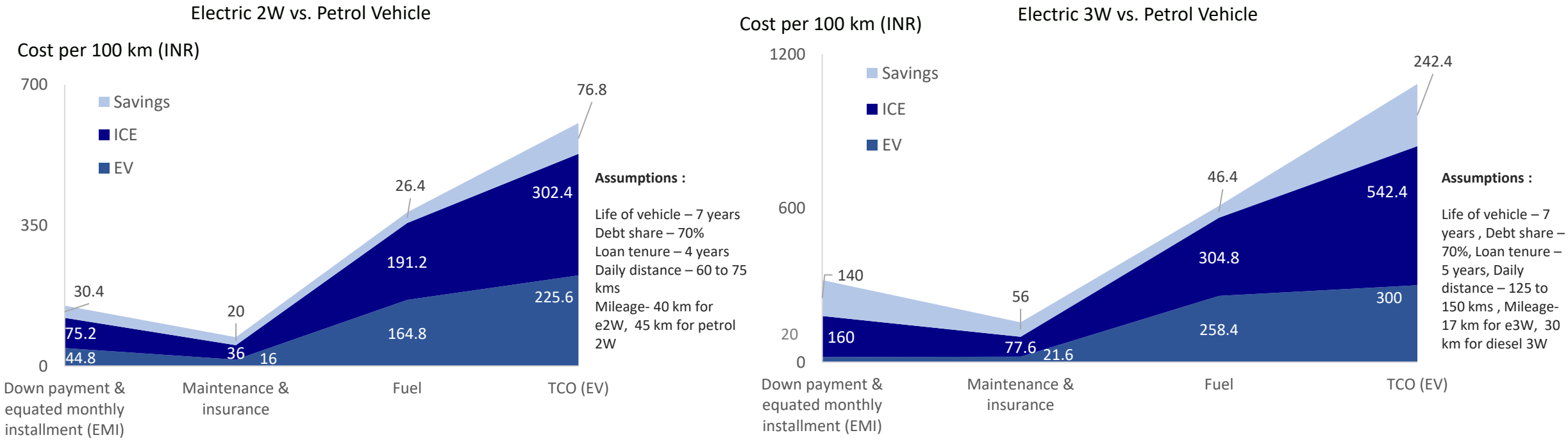
If we compare an electric bike with a petrol bike’s cost, an electric bike take 2-5 unit’s electricity to fully charged and the cost of electricity is INR 4-8 per unit (it shall vary as per the living area). If we talk about petrol bikes, then their average is 40 to 50 km per liter and its cost will be around INR 90 to 110 . The cost of electric bike is around INR 5000 for 50,000 km, that is; 1km=10-15 paisa and a petrol bike costs around INR 1 Lakh for 50,000 km that is; 1 km = INR.2

Cost advantages of small format electric mobility

Exhibit 6: Cost advantages of small format electric mobility over conventional vehicles



Source: eninrac research & analysis, Mckinsey, Industry Interactions

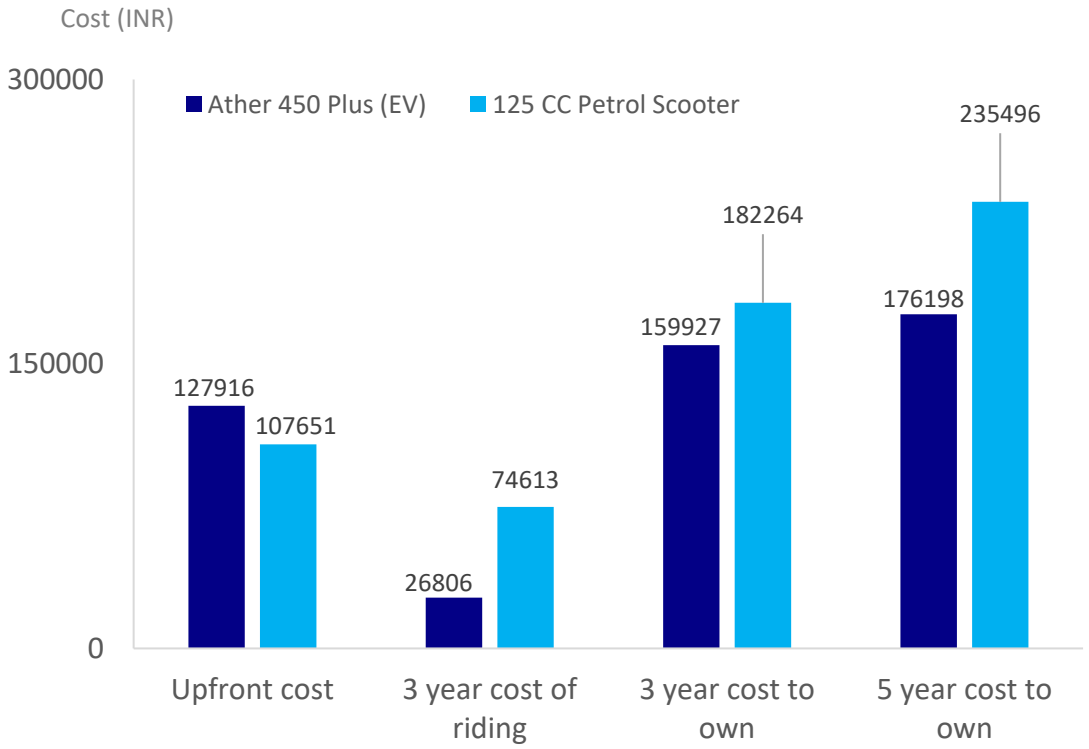
Speaking about the maintenance cost linked with the petrol scooter, lets understand the cost outlay for a period of 3 years

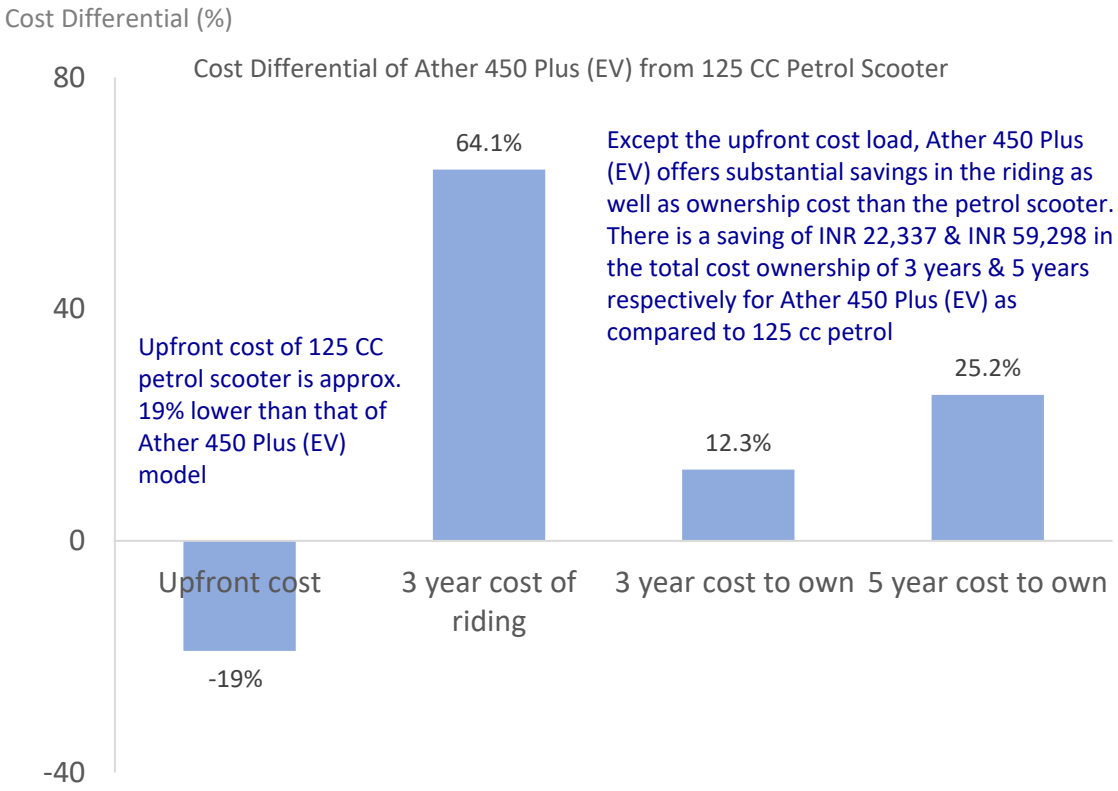
- Petrol scooters contain a lot of moving parts and an oil-filled engine. Most petrol scooters have annual maintenance expenditures of INR 6000, equating to INR 18,000 over a three-year period
- Keep in mind that petrol scooters have a lot of parts, including an engine, transmission, gearbox, converters, filters, and engine parts. These can malfunction, necessitating replacement or repairs. Let's assume that part repair/replacement costs total Rs 6,000 over the course of three years. So, during a three-year period, the total maintenance cost for a petrol scooter could be INR 24,000

"The per kilometer cost of electric bike costs around 10-15 paisa , while that of a petrol bike costs around INR 2" – Zypp Electric

Cost advantages of small format electric mobility

Exhibit 7: Total cost ownership comparison of Ather electric scooter with 125CC petrol scooter





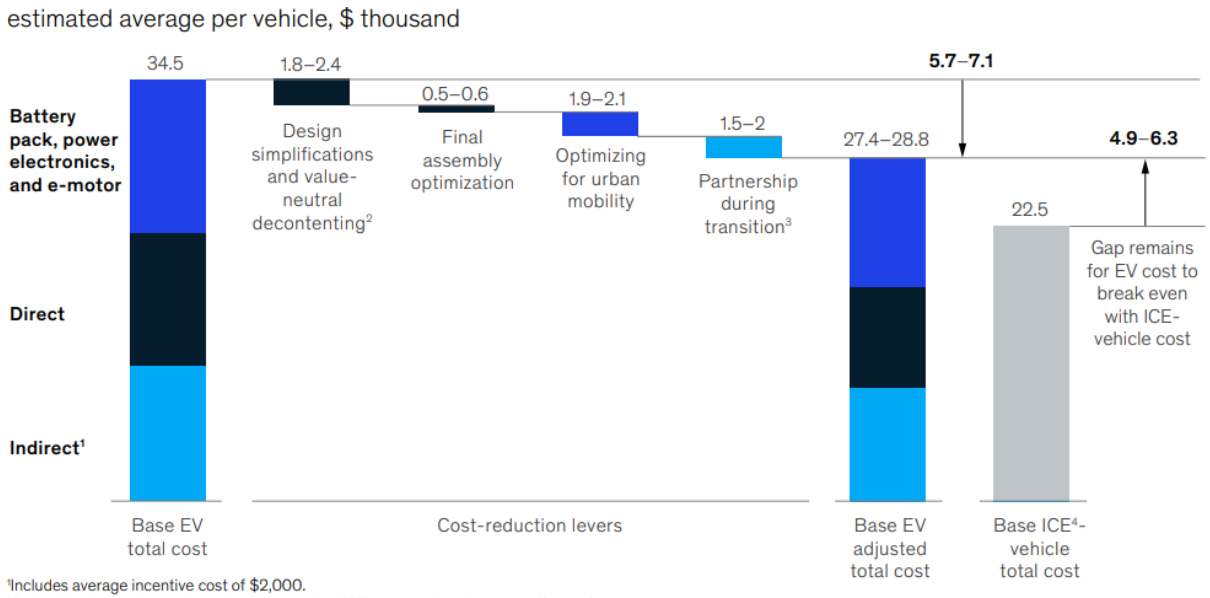
Source: eninrac research & analysis, Ather Energy, Industry Interactions

Making EVs profitable

Optimizing electric vehicle designs for the market: OEMs can reduce their EV costs by nearly 20% by pursuing strategic de contenting paired with a dedicated EV platform. This could be accomplished leveraging new freedom in design unlocked by using electric rather than ICE subsystems and applying leading strategies in low-cost ICE design and from cutting-edge EV-focused OEMs.

Exhibit 8: Cost reduction levers could bring down electric vehicle costs considerable

Base electric-vehicle (EV) total cost, with cost-reduction levers



[1]Includes average incentive cost of $2,000.
[2]Reduction in non–internal-combustion-engine (ICE) content that does not affect safety.
[3]Assumes combined average annual production of ~150,000 units.
[4]Internal combustion engine.

Source: McKinsey, Industry Interactions

Design simplifications: OEMs can take lessons from leading e-vehicle concepts, for which our proprietary teardown study revealed that cockpit, electronics, and body simplifications netted up to $600 in reduced costs, without removing core feature content tied to value generation for the OEM. Eliminating extra displays, buttons, switches, wiring, modules, and additional structural components, as well as reducing the overall design complexity, drove major savings. As per industry interactions, companies can extract component savings of 20 to 30 percent with these design approaches, including by adjusting material specifications and negotiating with suppliers with the shared objective of EV profitability

Optimizing urban mobility: For many customer segments, today's EVs offer either too little driving range, such as smaller EVs with ranges of fewer than 160 kms, or too much, such as luxury EVs with ranges of approximately 482 kms, when compared to actual driving patterns. The average vehicle kms traveled (VKT) for an urban population is around 30-35 kms per day in India, and it increases to around 40-50 kms per day when accounting for demographic groups that drive more. Assuming today's battery efficiency in kilowatt-hours (kWh) per mile, a potential sweet spot for urban customers is approximately 25 kWh of energy. However, if we account for consumer preference to use the same vehicle for suburban and occasional rural travel, the optimal battery capacity increases to approximately 40 kWh, equating to ~250 kilometers, based on average VKT in rural areas. A reduction in battery capacity to 40 kWh, from 50 kWh, would save $1,900 to $2,100 today, while the range would still enable most consumers, especially those in urban environments, to complete trips without any sacrifice to their daily routines.

Making EVs profitable

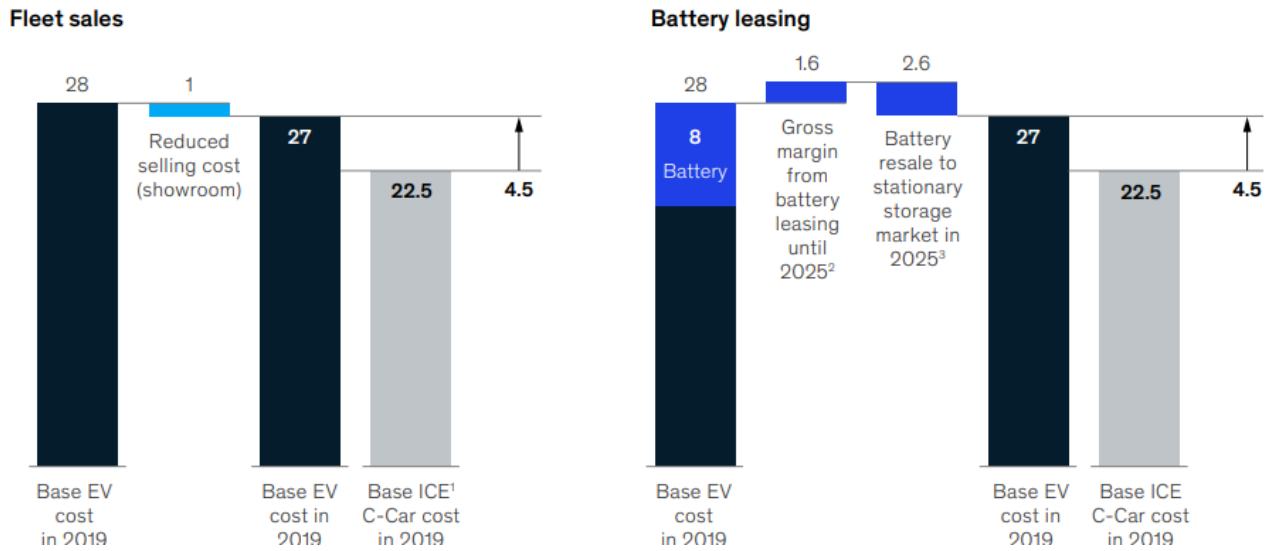
Final assembling optimization: As per industry insights, EV design also suggests that a purpose-built EV platform is simpler to assemble and could deliver up to $600 in savings per vehicle in lower fixed-cost allocation. That savings come from having fewer components to assemble in an optimized EV platform and requiring less capital in EV-only plants versus complex plants that combine ICE-vehicle and EV lines

Partnership during transition: During the next five to seven years, as the industry transitions toward electrification but struggles with profitability, automakers should more strongly consider partnering and collaborating with competitors. At a time when OEMs face the possibility of retooling numerous models and platforms for electrification, collaborating with other OEMs can reduce the fixed-cost burden of R&D, tooling, and plants. Benefits will be especially high if OEMs can share EV platforms and plants, which can still enable multiple model variants. These alliances will also be most beneficial when they enable higher-volume procurement of the same battery cells and power electronics to take advantage of scale that is otherwise elusive when going it alone. In fact, some automakers have already announced a range of different global partnerships focused on reducing the cost of designing and producing EVs.

Exploring new business models: Automakers that take a bolder approach to closing the profitability gap can also experiment with a range of new business models for niche segments. For example, ideas include targeted direct sales to fleets and battery leasing. Economically, it makes sense to target fleet customers with EV models, given that these fleets typically fall into a high-mileage category in which the total cost of ownership (TCO) of EVs is beneficial—and they prioritize TCO higher than other buying factors. Direct selling to these customers can reduce selling costs. OEMs could offer to lease batteries separately from the vehicle and resell older batteries to the stationary storage market for secondary use. Battery leasing has a potential to attract consumers who shy away from purchasing an EV due to uncertainty in performance and degrading capacity of batteries today

Exhibit 9: New business models , such as fleet sales and battery leasing , could improve profitability

Base electric-vehicle (EV) total cost with new business models for improved profitability, price per vehicle, $ thousand



1.Internal combustion engine.
2.Assumes 5-year leasing period; assumes 30% gross margin on depreciated value of battery pack
3.Assumes 70% original capacity; assumes resale to remanufacturer at ~$65 per kilowatt-hour in 2025 (assume no margin by OEM on resale of battery pack; remanufacturer could potentially derive margin from repurposing battery pack

Source: McKinsey, Industry Interactions

3. About Eninrac Consulting

eninrac is a leading provider of research, analytics and advisory services for your business nestled under different industry with unique insights to stakeholders across the globe. eninrac blends extensive knowledge of all aspects of your business industry to provide unmatched analytical insights, innovative strategies, and measurable value creation. We add value with pace, certainty and strategic agility and strive to exceed client expectations by delivering consistent results. We help our clients in unlocking potential and empowering organizations to achieve business objectives and goal effectively. We at eninrac put clients at the centre of our business and transform their risks into high rewarding opportunities through our innovative solutions.

The life of a man consists not in seeing visions and in dreaming dreams, but in active charity and in willing service

- Henry Wadsworth Longfellow

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