

Understanding the EV market scenario in India through the lens of Industry experts

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Research design

Introduction & Background

Context Setting

India's EV market has been experiencing **significant growth** and has the potential to become one of the **largest EV markets globally**. Lot of changes can be observed in automotive sector due to introduction of EV. It's important to note that the EV market is **dynamic & subject** to various factors, including **government policies, technological advancements, and consumer preferences**. For staying updated its required to understand the insights from **industry experts** of this field and have an overall understanding of **EV ecosystem & market scenario in India**.

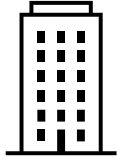
Objectives

To provide the **research findings** with the below objectives through the **IDIs** with the **Industry experts** from both **2W & 4W segments** for **Electric vehicles in India**.

- I. **EVs: Drivers & Barriers**
- II. **Impact of Government Initiatives in ecosystem.**
- III. **Expected growth of market 2W/4W**
- IV. **Opportunities & Challenges for OEMs**



Design & the Target group for the research



Bangalore Delhi/ NCR

Sample split basis the presence of the target OEMs in both 2W & 4W segments.



Virtual In-Depth interview

Few of the profiles of the TG from Automotive sector:

- Target department is Marketing, R&D, Sales, Consumer Insight.
- Designation is Senior manager level or higher.



60 min/ IDI

Virtual In-depth Interviews (IDIs) were conducted with EV experts from both 2W & 4W segments.



6 interview



EV 2-Wheeler OEMs: 3 experts



EV 4-Wheelers OEMs: 3 experts

Understanding customer expectations from EVs

Electric Vehicles scenario globally & in India

Electric Vehicle is a new buzz word globally. It is widely noticed that preference of people is shifting at a much faster pace towards Electric Vehicles across the globe. **China** leads the Electric Vehicle market and has almost **70%** of **global market sales** followed by **Europe** and the **USA** while rest of the world holds a small portion of Electric Vehicle sales. India is also inching towards the same trend, the consumer base for electric vehicles (EVs) in India is **evolving** and **expanding rapidly** with a long way to go compared to the global markets. Over the past few years, there has been a **growing interest** in EVs among Indian consumers.

In the developed countries, most of the EVs are **cars** whereas, **2W** and **3W** have the majority share among EVs in **India**.

Few reason majorly contributing to this growing interest in EVs are:



Rising fuel prices



Technology Advancement



Environmental concerns



Government initiatives



(Source: [Electrify America](#))

Awareness about EVs & its types among consumers in India

Being a niche category, there is a general awareness about EV but lacks an in depth understanding about the types of EV present. EV segment is still fascinating for a lot of people at an overall level. Among those who are aware, few of the perceived thoughts and benefits about EV are:

1. **New trending TECHNOLOGY** in Automotive.
2. **COST EFFICIENT** due to low running cost.
3. **It saves ENVIRONMENT.**

There is a prevailing perception that EV is considered as a **saving option for commute** and not associated with performance. General public lack understanding about EV and a lot of apprehensions and concern around **affordability, range,** and **battery life** exist in the minds of consumers. Consumers need to be educated about the different types of electric vehicles, their features, range, safety aspects mainly related to battery life to **boost the acceptability of EVs** in India.



2-Wheeler

In 2-wheeler space , people are aware and excited about EV mainly due to its low running cost and negligible difference in the price parity with respect to IC engine vehicles. The EV 2-W is mostly used to cover shorter commute distance. However, the awareness about types of EVs is relatively **LOW.**



4-Wheeler

Among the 4 wheelers segment, the awareness about the type of EV is considerably **MODERATE** due to the presence of Hybrid and other type of models with different powertrain being available in India & globally.

Key essential consideration factor for BEV purchase

What are **CONSUMERS** considering? Vs What should consumers consider as per the **INDUSTRY EXPERTS**?

Consumers



"The companies should provide **more battery warranty** to its customer & need free Replacement of Brake pads"



Technology Upliftment – Many young consumers are considering BEVs because of its advancement in Technology with features like **connectivity, vehicle safety & other convenience aspects**.



Driving range: Customer considers Driving range as one of the key factors while purchasing BEV.



Battery health: The **lifespan and durability** of the battery are important factors for BEV buyers.



Government incentives through subsidy: Government policies like the **FAME II scheme**, which offers **financial incentives**, are making BEVs more attractive to the users.



Cost savings: Cost savings from BEV due to the **rise in fuel prices** is also one of the consideration factors to opt for BEVs.

Industry Experts



"brand matters as it enhances trust factor and resale value. **Brand reputation** is an important factor as it is associated with **brand reliability, product reliability and durability** in customer's mind"



Brand: The reputation of the Brand can be an important factor for some BEV buyers.



Total cost of Ownership: BEVs offer **long-term cost savings** due to **lower fuel and maintenance costs**, these factors are considered by BEV purchasers.



Power & Health of the Battery: The **lifespan and durability** of the battery would be the important factors for BEV buyers.



Charging compatibility: The availability and accessibility of charging stations can greatly impact a buyer's decision to purchase a BEV, which makes it crucial to focus on the charging compatibility aspect.



Warranty: Though battery pack are the most expensive components of a BEV, it's important for buyers to be aware of the warranty offered by manufacturers.



After sale services: After-sales service and support are crucial factors to consider when purchasing an electric vehicle as it is relatively a new technology.

BEV Acceptability: Drivers Vs Barriers

BEV: Drivers



ECONOMIC BENEFITS: It includes **subsidy** provided by government. Tax rebate, Low running cost & Maintenance cost are some of the perceived benefits.



ENVIRONMENT & SOCIAL BENEFITS: No emission of **greenhouses gasses**, **No noise pollution**, **New technologies** give more control over our daily life. Enhanced **social status** due to its price.



PSYCHOLOGICAL BENEFITS: Considered as **Self pride**- as it is about embracing & adapting a new technology with higher price, it gives a sense of pride among family & friends.

BEV: Barriers



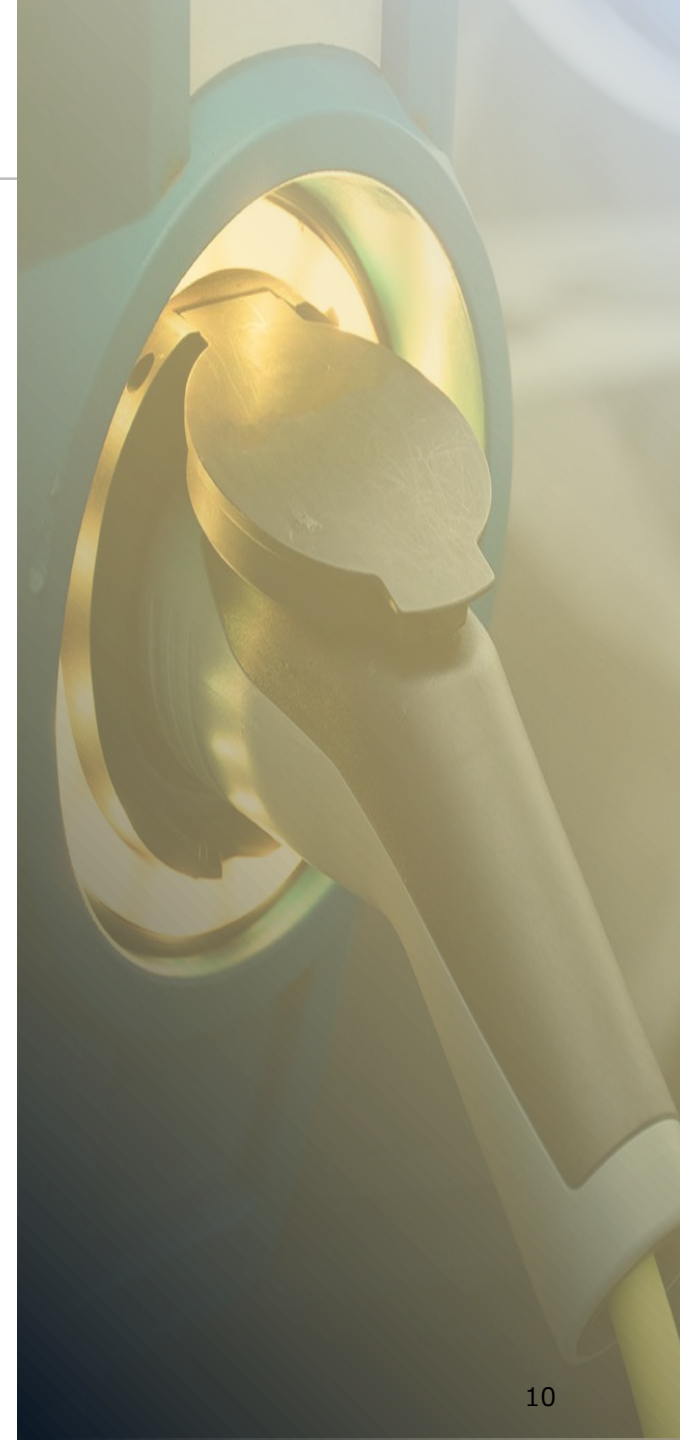
HIGHER PRICE: Huge **initial cost** is perceived to be a pain point. Both **2W & 4W** are sold at **20%** and **50%** premium respectively compared to IC Engines.



LACK OF CHARGING & SWAPPING INFRASTRUCTURE: With roughly **6 lakh** EVs running on road the charging station in India are only up to **2000**. This is perceived as a major concern.



RANGE ANXIETY & TESTING MEASURES: It is perceived that BEVs cannot be used for **long ride** due to limited range per single charge. There are concerns over **proper measures** or regulatory framework for **testing battery** before installation.



Suitability factor of EVs in Indian market: Awareness → Acceptability



Awareness

In India, for EV in 2-Wheeler segment, the awareness is limited to **Battery Electric Vehicle (BEVs)**

"Consumers are generally aware of only BEVs and not the other types"

Acceptability

BEVs are well accepted but people are concerned about the **range** and **cost** of the EV 2 Wheelers.

"EV is used as an option for commuting 50 km in and around the city"



Awareness

Among 4-Wheeler segment, consumers have awareness about **Battery Electric Vehicle (BEVs)** and **HEV (Hybrid Electric vehicle)**

"There is a huge gap between the customer awareness about EV and their purchase journey. EV is a Trendy term for customers as of now. BEV is used Globally but now there is a shift to HEV"

Acceptability

In 4-Wheeler segment, people are accepting EV but due to **range issue** and **lack of EV charging Infrastructure, Hybrid** is still considered as the **suitable option** for today.

"In hybrid the user need not worry about charging the vehicle while experiencing a better range or mileage"

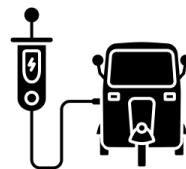
It is believed that **BEV is the future** and lot of work has already started on its **research & development**. The dominance of BEV can be seen soon in below categories.



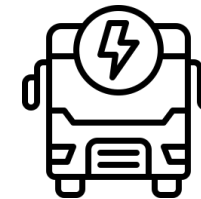
Electric Cars



Electric 2-W



Electric 3-W



Electric Bus



Electric Commercial Vehicles

Why should the consumers prefer BEVs over ICE vehicles?



Electric Vehicles



ICE Vehicles



| | | |
|----------------------------|------------------------------|-------------------------------|
| Energy Efficiency required | <i>Low (Battery)</i> | <i>High (Fuel)</i> |
| Emission | <i>No tailpipe emissions</i> | <i>Emits greenhouse gases</i> |
| Running Cost | <i>Low</i> | <i>High</i> |
| Noise Pollution | <i>No</i> | <i>Yes</i> |
| Maintenance Cost | <i>Low</i> | <i>High</i> |
| Motor/Engine Efficiency | <i>80%</i> | <i>30%</i> |

Most Desirable features in BEV Segment



Connected Features: EV can be easily operated from Phone, Alexa and other electrical gadgets by enabling the push notification on battery discharge, Geo tagging and other technologically advance features.

“Connected features on a smartphone or similar devices can offer entertainment and delight to individual users. However, these features are particularly advantageous for commercial users, especially those operating EVs with connectivity and telematics capabilities. Such users can utilize these features to schedule trips efficiently, optimize routes, maintain service logs, and manage fuel data records, among other benefits.”



SOTA (Software over the Air): OEMs should use SOTA, to understand analytics of the vehicle usage, performance & condition.



AI, Machine Learning & Automated after sales: The integration of AI, Machine Learning, and automation in after-sales services for electric vehicles is enhancing convenience, efficiency, and vehicle longevity. By harnessing these technologies, the EV industry is moving toward a more sustainable and customer-centric future.



Vehicle-to-Vehicle (V2V) communication: V2V communication enables vehicles to exchange information with each other using wireless communication technology. This information includes data about the vehicle's speed, location, and direction, road and traffic conditions ahead.





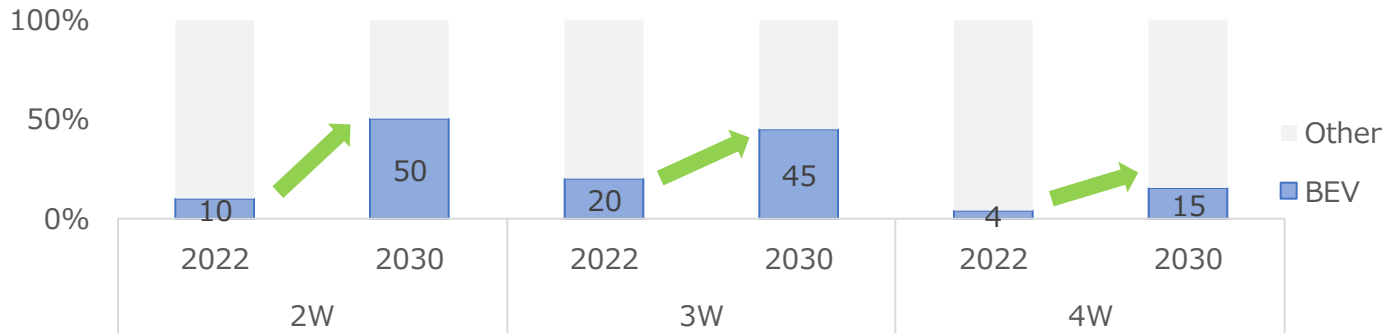
BEV Segment in India:

Current scenario and Future trends

Electric vehicles in India: Current scenario Vs Future trend

- The demand for battery electric vehicles (BEVs) is likely to **grow significantly** in the coming years, particularly in the three-wheeler and two-wheeler segments. **Rising fuel costs** and a growing awareness of the **environmental impact of gasoline vehicles** are driving this trend.
- As for the production capacity, **BEV Manufacturers** continues to **increase** the same, as it is likely that the sales will also continue to grow. In fact, it is believed that at least **30%** of the current production capacity of EV manufacturers in India will be utilized soon.
- Overall, the BEV market in India is poised for **significant growth**, and manufacturers that can provide **high-quality, affordable, and technologically advanced** EVs are likely to see **strong demand** from both **commercial** and **consumer markets**.

Trend forecast of market share for BEVs in 2030



Rising fuel prices

| | | |
|------------------------------|-----------------------------------|------------------------|
| Range for Daily Commute | Low Running Cost | Low Running Cost |
| Government Subsidy | Government Subsidy | Environmental concerns |
| Battery Guarantee & Warranty | High usage & Low Maintenance Cost | Technological appeal |

Key reasons for Upward trend





BEV Manufacturers (OEMs): Challenges in manufacturing EVs & Support from the government

Key challenges for the OEMs manufacturing BEVs in India

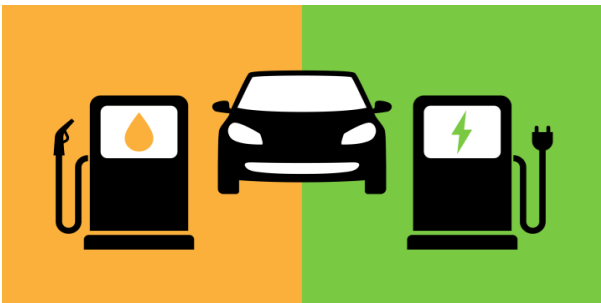


Regulatory Framework

- Many markets around the world, including India, have implemented stricter emission standards and regulations to reduce greenhouse gas emissions and combat climate change. Failure to meet these standards can result in significant financial penalties for OEMs. As a result, OEMs are under pressure to introduce new and more efficient vehicles to the market quickly.
- There is no safety guidelines and regulations for electric vehicle batteries.

Customers' Perception & Adaptability

- BEV business risk is high as consumers have certain barrier for BEV adoption due to its high initial acquisition cost, lack of charging infrastructure and battery safety concerns, making the customers slightly reluctant to embrace this new technology.
- Therefore, the demand for BEV persists but the conversion rate to purchase still stands very low.



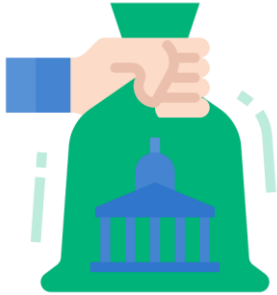
EV Charging Infrastructure

- Lack of charging stations is a concern, mainly for the 4W segment. It becomes important for the customers to better plan their travel routes as per the availability of the charging points in advance.

EV Business case & Profitability

- There is a low purchase conversion of BEV's among customers even though the consideration is up to 50% to 60%.
- It's been one challenge for OEMs to satisfy the technological needs of consumer when it comes to BEVs with the higher range on full charge expectations being one of them.

Support from Government to boost the BEV adoption in India



The **government** is promoting the **adoption of BEVs** through various **incentives** and **policies**, which will further boost the **demand** for **electric vehicles**. The government is spreading awareness to **increase the penetration** of BEVs. There is **direct support** to OEMs from government on the **manufacturing of BEV's** by providing some rebate on the import tax and with the incentives to encourage and support the testing and manufacturing of BEVs.

Direct & Indirect Support from the government to the OEM manufacturing BEVs

- **FAME India Scheme (Phase II):** The Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME) India scheme aims to promote the adoption of electric vehicles by providing incentives to manufacturers and buyers.
 - **Incentives for BEV Manufacturers:** The Indian government was offering various incentives for manufacturers of electric vehicles and their components. These incentives include financial assistance for setting up manufacturing facilities, research and development activities, and the creation of charging infrastructure.
 - **Reduced GST:** The Goods and Services Tax (GST) on BEVs was reduced to 5% from the earlier 12% to make BEVs more affordable for consumers and to incentivize their adoption.
 - **Customs Duty Exemptions:** The government is considering to provide customs duty exemptions for certain BEV components and parts to encourage local manufacturing and reduce costs.
- **Research and Development Support:** The government is promoting research and development activities related to BEVs through various grants, subsidies, and funding programs aimed at encouraging innovation and improving the technology associated with BEVs.
- **Infrastructure Development:** The government is working on improving charging infrastructure across the country by extending support to OEMs and other stakeholders involved in setting up charging stations.
- **Electric Mobility Vision:** India had set ambitious targets for the adoption of electric vehicles, aiming for a significant portion of the vehicle fleet to be electric by a certain year. This vision was expected to drive OEMs to focus on BEV manufacturing.



BEV Charging Infrastructure & Preferences

BEV Charging Infrastructure in India

In India, as on today, the **charging infrastructure** is perceived to be **not sufficient**, however the government is taking a lot of **initiatives to promote** this so that required charging infrastructure can be built by collaborating and supporting all the stakeholders in setting up the charging stations through a few of the below mention initiatives.

- **National Electric Mobility Program (NEMP):** This is the initiative to set up **charging infrastructure, standardize charging protocols**, and promote the use of **renewable energy** for charging stations.
- **Green Energy Corridors:** These corridors aim to **integrate renewable energy** generation with EV charging to promote **clean and sustainable mobility**.
- **Incentives for Charging Infrastructure Providers:** The government offers various incentives such as **tax benefits, subsidies, and low-cost loans** to facilitate the establishment of charging stations.



Types of Chargers in 2Ws & 4Ws in India

Universal charging slot is perceived to be a need to build good ecosystem for EVs, it is not practically possible for each EV brand to build its own ecosystem. EV user have multiple options but majority of **4-Wheeler** owners are dependent on **Home base fixed chargers** while majority of **2-Wheeler** owners are dependent on portable chargers.





Public chargers are mostly **fast chargers** and occasionally used by 4-wheeler owners (Private Car), but majorly used by fleet owner. Among the 2W segment, there are chargers available like Charzers, Ather, Fortum, Zeon, etc. however, the usage of outside home charging in 2W is very limited due to the limited usage as the 2-W are more often charged at home.

2 Wheelers

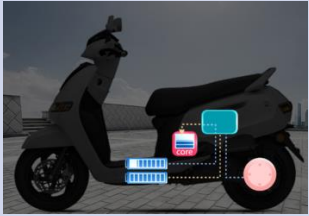


If case of **2-Wheelers**, as of now all brand has its **own charger type** and the standardization norm is not prevalent. In this case using universal charger is like a far-fetched dream as it is not just the connector type, but the wattage and capability of charging system is also different. To standardize this, the government needs to take initiative and come up with some specified norm which every company is bound to follow. Ather is an exception to this as its charger offers compatibility with any 2W and 4W BEVs.

4 Wheelers

In case of 4-wheeler brands, mostly the usage is from some listed connector, most of the brands are supporting type 2 charger and some brands have designed their sockets in such a way that they can charge from multiple type of connectors.

| AC Chargers (Slow Charger/Home charging) | | DC Chargers (Fast Charger) | | | |
|---|--|---|---|--|--|
| Type 1/J11772 | Type2/Mennekes | GB/T Level | CHAdEMO | CCS1 | CCS2 |
|  |   |   |  |   |   |

BEV Battery types prevalent in 2 Wheelers

| | | Merits | Demerits |
|---------------------------|--|--|---|
| In-built or fixed battery |  | <ul style="list-style-type: none"> ➤ Can be charged at home which is very cheap and convenient. ➤ Less possibility of damage of battery as its fixed properly, no chance of wear & tear. ➤ Linear power delivery & consistency is higher. | <ul style="list-style-type: none"> ➤ Need power points for charging in the parking space. ➤ Issue in case of flats/apartments for those who don't have fixed parking location. ➤ Need 4-5 hours for charging. (Longer duration) |
| Detachable Battery |  | <ul style="list-style-type: none"> ➤ Can park the vehicle anywhere and take the battery at the convenient place for charging with 3-pin socket. ➤ This is a good option for those who live at a places where electricity can't be made available at parking lot or parking place is not fixed. ➤ Only battery can be carried back home in case anyone runs out of charge. | <ul style="list-style-type: none"> ➤ Battery weight is heavy to carry ➤ Possibility of damage while detaching and charging. High chances of wear & tear. ➤ Need 4-5 hours for charging. (Longer duration) ➤ Chances of injury while detaching/carrying the battery. |
| Swappable battery |  | <ul style="list-style-type: none"> ➤ Quick process, no waiting time. ➤ Good for vehicle in commercial use. ➤ No need to worry about battery range. | <ul style="list-style-type: none"> ➤ One has to take subscription and pay monthly/yearly subscription amount. ➤ Need to pay every time you swap the battery no matter how much charge is left. ➤ Condition of the battery swapped may not be as good as the owned one. |

"Most convenient option for consumers, less chances of damage to the pins of the battery as it is fixed and need not be removed, no wear and tear"

"With detachable battery no one likes to carry the battery of 10 or 12 kg in their hands and go to a charging point, put it in charge, then take a 10 or 12 kg battery again back and put it in their scooter and then drive"

"Swappable option is good when one's vehicle is in moving state, it is costly but good for people who are using it for commercial purpose and don't have time to charge it"

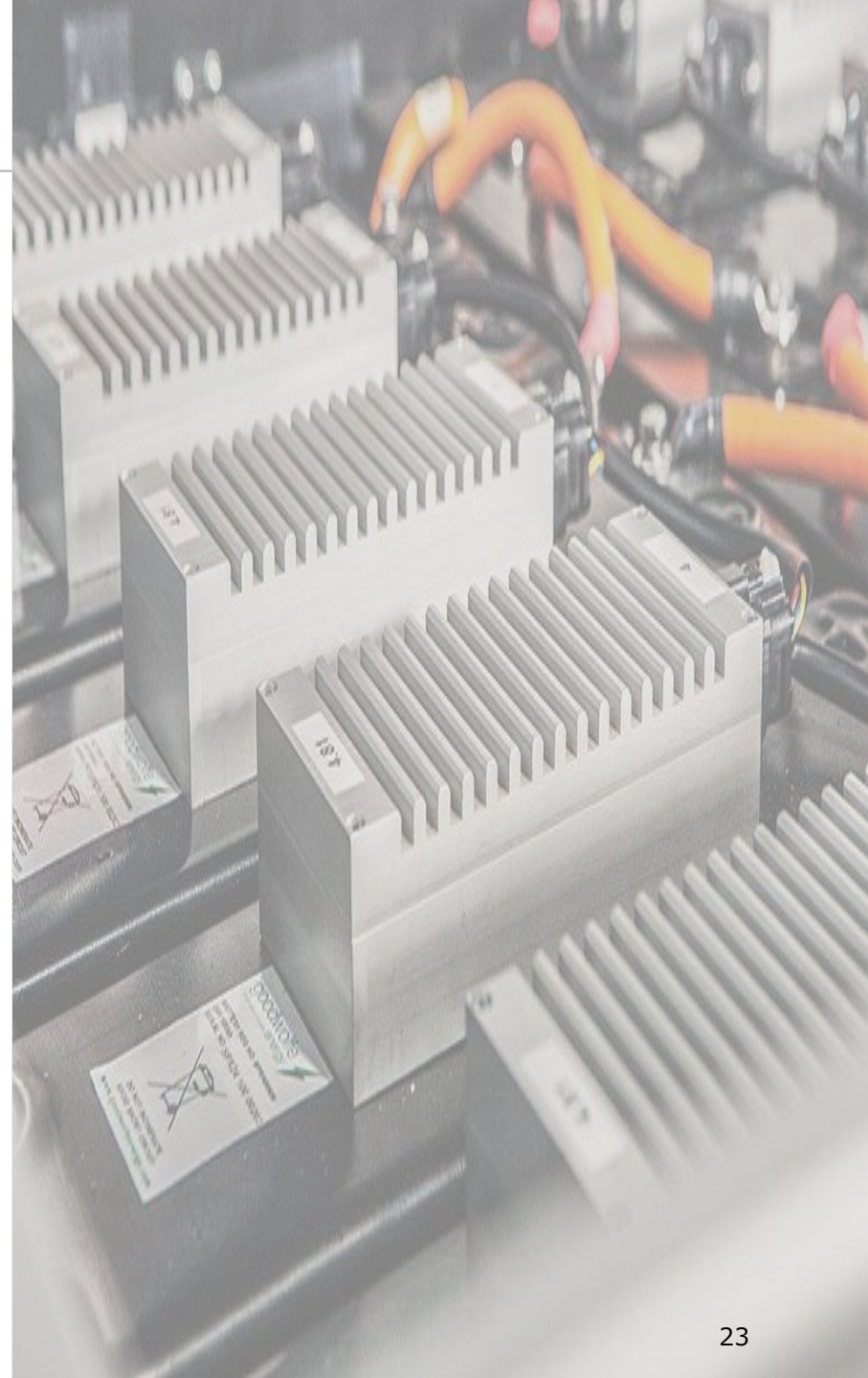
"Swappable option is perceived to be good however the major concern is about the condition and the health of the battery received in exchange during the swap may not be reliable or consistent in offering good performance, will always have this fear at the back of their minds during every swap"

Most OEM Preferred battery type for BEVs in 4Ws

As per the experts, Lithium-ion Battery have gained popularity over the years, and this is the most preferred choice of batteries in EV for 4-wheeler segment for the OEMs.

- **Lithium-ion batteries** are widely used in electric vehicles due to their **high energy density**, which means they can store a lot of energy in a relatively **small and lightweight package**. They also have a **high power-to-weight ratio**, making them ideal for use in electric vehicles.
- Li-ion batteries are also known for their **thermal stability**, which means they can perform well even at **high temperatures**. This is important in electric vehicles, where the batteries can get hot during use or charging.
- Furthermore, Li-ion batteries have a **good recycling factor**, which means the materials used in the battery can be **reused or repurposed, reducing waste and environmental impact**.
- Overall, Li-ion batteries are a popular choice for electric vehicles due to their **high energy efficiency, power-to-weight ratio, thermal stability, and recyclability**.

“Lithium batteries are preferred choice for the OEMs as the energy density is higher, more energy can be stored in a small package, this eventually helps in offering great performance by keeping the overall weight lesser”



Way forward to drive the adaptability of BEVs in India



Infrastructure Development: Establishing a robust charging infrastructure network across cities, highways, and rural areas is crucial.




Incentives and Policies: Governments should continue offering attractive incentives such as tax breaks, subsidies, and reduced registration fees for BEVs.



Local Manufacturing and Supply Chain: Encouraging local production of BEV components and batteries will reduce dependency on imports, lower costs, and create job opportunities.




Affordable BEV Options: Manufacturers should focus on developing affordable BEV models with good specifications, competitive pricing without compromising on the reliability.



Research and Innovation: Continued investment in research and development will lead to technological advancements, improved battery efficiency, longer ranges, and faster charging times.



Battery Recycling and Disposal: Developing a sustainable system for battery recycling and disposal is crucial to minimize environmental impact.



Skills Development and Training: Training programs for technicians, engineers, and service personnel are essential to meet the demands of the evolving BEV technology landscape.





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