E-mobility plug and play: Considerations for e-vehicle battery swapping

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Battery swapping or battery- as- a-service (BAAS) model could emerge as a cost-effective solution for EV usage. Instead of charging EVs, vehicle owners can swap the discharged battery with a fully-charged battery at swapping stations. At an operational level, BAAS model will involve multiple stakeholders including manufacturers (EV and battery), BAAS operators, supplementary service providers such as software service providers and the EV owners.

Consumers, industries and governments are shifting focus towards emission-free mobility. Presently, there are various types of electric vehicles (EVs) available in the market including hybrids, plug-ins, battery EVs etc. In India, the EV market is estimated to reach $150 billion by 2030.

To promote the EV industry in India, Finance Minister Nirmala Sitharaman announced in the Budget 2022 speech that a battery-swapping policy will be introduced, and interoperability standards will be formulated to enable this policy. The finance minister also proposed zero-emission zones where only EVs will be allowed. Although in the past, the government had introduced policy initiatives for the promotion of EVs such as the FAME Scheme, this recent announcement is the first step in furtherance of battery swapping in India.

Battery swapping or battery- as- a-service (BAAS) model could emerge as a cost-effective solution for EV usage. Instead of charging EVs, vehicle owners can swap the discharged battery with a fully-charged battery at swapping stations. At an operational level, BAAS model will involve multiple stakeholders including manufacturers (EV and battery), BAAS operators, supplementary service providers such as software service providers and the EV owners.

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While BAAS is an attractive cost-effective alternative to setting up public charging infrastructure, this model could face hurdles in India.

INTEROPARIBILITY OF BATTERIES

For battery swapping models to work on a large scale, it is essential to standardise EV batteries to ensure it is interoperable i.e. compatible with EVs largely belonging to the same segment. While there hasn’t been any global consensus on EV battery interoperability, governments are attempting to standardize BAAS at the national level. For instance, in 2021, China introduced the

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Currently, Indian law does not prescribe a uniform standard for EV batteries. In 2021, NITI Aayog advanced a policy paper, which proposed the formulation of EV charging standards. However, there was no guidance on standards for the interoperability of batteries. Battery interoperability standards may be developed in India to include:

• Technical standards such as size and dimensions, composition, format, voltage, etc.;

• Performance test specifications;

• Authorization and regulatory approvals;

• Guidance for EV and battery manufacturers.

REGULATORY RELAXATION

In 2018, the Ministry of Power issued a clarification that charging of batteries of electric vehicles through a charging station does not require any license under the provisions of Electricity Act, 2003. Recently, in January 2022, the ministry issued revised guidelines on EV charging infrastructure permitting setting up of public charging stations and battery swapping stations without the requirement of a licence provided they meet the technical, safety and performance standards. The tariff of electricity supply to these stations will be a single part tariff and will not exceed the average cost of supply till March 2025.

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USER MINDSET

In the BAAS ecosystem, the EV owner does not purchase the battery along with the EV, instead leases batteries as a separate component. Typically, a lease agreement will have to be executed between the EV owner and BAAS operator to facilitate this model. The agreement may include terms with respect to cost per use, conditions with respect to the handling of batteries, warranties and indemnities in the event of malfunction, security deposit, and termination.

While this lease model appears to be effective on paper, it is possible that consumers may not be very welcoming of this model. Vehicle owners today feel secure knowing that they are fully in control of their vehicle and its components. Changing this mindset to encourage people to lease an essential component of their vehicle could take time as consumers may be vary of a leased battery’s quality standards, how it may impact their vehicle’s performance, safety concerns, etc. BAAS providers therefore will need to ensure top-quality services are provided to build trust.

The Consumer Protection Act, 2019 divides responsibility between the manufacturer, seller and service provider. The entity which is directly responsible for causing the damage is liable to the consumer. In the context of BAAS, the manufacturer is responsible for any manufacturing defects in the battery. Similarly, any alterations to the battery, independent warranties, failure to exercise reasonable care in installation of the batteries etc. could be attributed to the BAAS operator. Separately, the EV manufacturer could also be liable for any manufacturing defects with respect to the EVs excluding the battery. Therefore, each party in this ecosystem could be liable to the extent of their role and representations.

INTELLECTUAL PROPERTY

The interoperability standards are likely to be formulated on existing EV battery technologies. These may be patent-protected inventions that could lead to the emergence of more standard-essential patents in the EV batteries and charging space. Although in the recent past, some EV manufacturers such as Toyota and Tesla have announced royalty-free access to EV-related patents, most manufacturers remain apprehensive about technology licensing to maintain exclusivity in the market. Refusals to license patents covering standards in a fair, reasonable, and non-discriminatory manner may lead to litigations.

DATA- RELATED CONSIDERATIONS

In order to facilitate BAAS and provide information on location, battery inventory details, etc., the integration of technology such as IoT, telematics, M2M, etc. becomes essential. In order to provide personalized and instantaneous services, mass-scale collection of data such as such as GPS location, energy consumption-mapping, frequency of availing services, etc. would be required. Thus, all stakeholders in the ecosystem must have clear terms regarding ownership and sharing of customer data.

Further, in 2021 there were guidelines introduced for the usage of geospatial data and maps. The said guidelines largely deregulate the geospatial data sector but place certain restrictions on foreign entities as well as foreign owned and controlled Indian entities. Hence, service providers relying on such data will need to ensure compliance with the said guidelines.

Also, the data privacy regime in India is set for a watershed change in the background of the proposed Data Protection Bill, 2021 which seeks to regulate the collection, processing, storage and transfers of personal data and non-personal data. If this law is enacted in its current form, it could significantly impact the mobility sector including BAAS operations.

WAY FORWARD

The proposed policy on battery swapping is a bid to strive for a thriving EV market in India. While this new announcement creates a bundle of opportunities for all players in the EV market, it may take time for BAAS operators to build a brand in India With issues such as implementation costs

take time for BAAS operators to build a brand in India. With issues such as implementation costs, standardisation and lack of consumer trust, growth of BAAS in India will need to overcome varied challenges. While the breadth of the proposed policy and the extent of its applicability is still unknown, we hope that it will address nuances as discussed above. However, unlike the conventional EV charging models, BAAS demands a higher level of standardization but more importantly there needs to be user acceptance for its success.

-Authors Varsha Rajesh, Aparna Gaur and Huzefa Tavawalla are associated with Nishith Desai Associates. Views expressed are personal

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