

# AEEE Members comments on Draft Battery Swapping Policy

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## About AEEE

Alliance for an Energy Efficient Economy (AEEE) is one of the leading organizations in India that works on creating awareness about energy efficiency as a resource. The organization intends to enable Energy Transition by working across industry, government and research/civil society organization. The organization is committed to achieving India's energy transition for a climate-resilient and energy secure future and meeting India's commitments to India's Nationally Determined Contributions and UN Sustainable Development Goals 2030.

AEEE believes that electric mobility will play a key role in India's energy transition for a climate-resilient and energy secure future. The Power Utility and Electric Mobility (PU&EM) vertical at AEEE has developed frameworks to identify suitable locations to deploy charging facilities for electric two-wheelers, electric three-wheelers and electric buses and has studied the need for public charging infrastructure to support the commercial electrification of car fleets in India. Some of the recent and ongoing work at the PU&EM vertical includes research on catalysing the market transformation of electric two- and three-wheelers.

## Background and highlights of the policy

The Honourable Finance Minister announced in her Budget Speech 2022-23 that the Govt will be introducing a Battery Swapping policy and interoperability standards to improve efficiency in the EV Ecosystem. NITI Aayog released the draft Battery Swapping Policy on 20<sup>th</sup> April 2022. The policy has been formulated through inter-ministerial discussions and extensive stakeholder discussions. It is valid from the date of its public notification till 31st March 2025.

The draft policy states that battery swapping de-links charging and battery usage and keeps the vehicle in operational mode with negligible downtime. It is time, space, and cost-efficient. This Policy supports the adoption of battery-swapping primarily for light electric power train vehicles (LEV) of category L and E-Rickshaw/E-Cart.

The draft Battery Swapping Policy specifies the technical and operational requirements for ensuring interoperability between EVs and batteries. The policy is business model agnostic as battery swapping is an emerging market in India. The policy also specifies fiscal support required to level the playing field across business models. It also addresses important inputs to battery charging stations such as electricity tariff, land rates, GST, etc. The draft policy also attempts to address concerns regarding battery reuse and recycling.

This policy is a positive step in addressing the challenges in scaling up battery swapping and facilitating of 'Battery as a Service' business. Alliance for an Energy Efficient Economy (AEEE) and its member organisations who are active players in the EV ecosystem in India would like to congratulate NITI Aayog for bringing out this timely policy. On behalf of its members, AEEE would like to submit the following comments on the policy.

## Comments and Suggestive Recommendations

### Primary Recommendations

#### 1. Technical and operational requirements - Interoperability, standards and testing, UIN

One of the important aspects that are critical for the uptake of Battery Swapping is interoperability. One of the key objectives, as specified in the draft policy, is to set the basics right to enable interoperability without dampening the innovation. The policy tries to address this by specifying requirements in terms of standardisation, unique tracking number, smart BMS systems etc. **However, more needs to be done so that this critical aspect of the policy does not remain open-ended.** For instance, some guidance needs to be provided for the critical components such as battery dimension, connectors, voltage, communication, etc. to ensure a good start for an open ecosystem.

**Also, technical standards of interoperability for different vehicle segments must be defined to advance battery swapping.** These standards to be developed by BIS can bring more clarity in the future.

The draft policy in section 5.1 states that *'Additional specifications or standards for batteries eligible under this Policy shall be applied from time to time, based on relevant policies and schemes in practice.'* However, the nascent industry cannot be subjected to changes in standards frequently as it is important to ensure that the industry is provided with the necessary clarity for a viable business uptake. **This clause should be removed or a timeline should be specified when the new standards should apply.**

The draft policy in section 5.3 mentions that *"Vehicle OEMs shall be required to get ARAI approval for their vehicles to accept interoperable swappable batteries."* This leads to many questions including the following which require clarity -

- Does this mean that there will be two tests for the vehicles with batteries and without batteries?
- What is the standard against which these testing will be done? Will a standard battery pack be specified for vehicles to support testing?
- Will the existing standards (AIS3,39,40,42) be revised?
- As the ARAI test brings out the range of the batteries, how will the range be specified for the vehicles without batteries?

**Also, the regulatory standards under ARAI and additional tests for vehicles with swappable batteries have to be clearly defined.** For example, additional fire safety, SOC level checks, connectors pins design, vibration checks, etc.

Further, the policy in section 5.4 states that *"To ensure safe and cost-effective infrastructure for charging and swapping of EV batteries, standards for BCS and BSS will be developed or approved by BIS/ Ministry of Power (MoP) or other competent authorities."* It is great that the policy has specified the role of BIS and MoP in the areas to develop standards in a few areas. The development of standards, including the development of communication protocols and standards between battery, EV and chargers, will be critical in facilitating swapping. **There is a need to specify all the standards that need to be developed as well as the concerned authority and timeline for the development of these standards.**

The draft policy in section 5.2 states that a Unique Identification Number (UIN) will be assigned to the battery and Battery Swapping Station. Allotting a UIN to the battery is a very welcome move which will help in tracing the battery. The policy also mentions that a UIN will be assigned to battery swapping stations, but does not elaborate on its workings. **There is a need to provide additional information on the interaction between the UIN of the battery and the swapping station. Further, the policy can elaborate on whether technologies such as IoT or blockchain will be used to trace the battery and swapping stations.**

## **2. Fiscal support and tariff structure**

Under fiscal support (section 7), the draft policy proposes that *"demand-side incentives offered under existing or new schemes for EV purchase can be made available to EVs with*

*swappable batteries eligible under this policy.*” EVs are subsidized to reduce their price of which the batteries constitute a sizeable amount. So, in the case of battery swapping, the subsidy can be diverted to Battery Providers which can be passed on to users through a lease/ business model. While fiscal support is necessary to support the uptake of the battery swapping, **there needs to be a careful examination of its implications with the current scheme for incentives, which is contradictory as it is dependent on battery capacity.** Further, as subsidy is to be provided to battery manufacturers, the mechanism for the same also needs to be worked out. Another question is whether the subsidy under FAME II to owners of EVs without batteries or with swappable batteries be reduced since batteries contribute to 60-70% of the EV. If yes, a cost-benefit analysis on whether an EV without batteries or with swappable batteries is a beneficial proposition for consumers needs to be worked out.

Regarding section 7 which states that *“The size of the incentive could be determined based on the kWh rating of the battery and compatible EV. An appropriate multiplier may be applied to the subsidy allocated to Battery Providers to account for the float battery requirements for battery swapping stations in different battery swapping ecosystems.”* This raises a lot of questions that need to be clarified. When an EV does not have a battery pre-fixed, how would the rating of the battery be determined for the subsidy? Doesn't it complicate things as it is possible for an EV can have different battery sizes and the battery provider could opt for the highest rating even if it is not needed? If so, it also implies that Battery Provider has to keep a different form factor of battery? This can make the business model unattractive as the Battery Provider has to keep various batteries which would increase CAPEX and reduce the utilization. **There needs to be more clarity regarding the size of the incentive and the determination of the multiplier.**

There is a specific part in section 7 which states that *“The size of the incentive could be determined based on the kWh rating of the battery and compatible EV”*. However, this is a very important point left vague and open-ended. What will be the compatible EV specifications and who will determine that? For example, a two-wheeler can have 1 swappable battery pack, 2 packs for an e-rickshaw, and 3 for an e-auto or so on. The same swapping service provider might be providing service to different types of vehicles. The multiplier is dependent on the operational patterns of the fleet the swapping station is catering to. **These details need to be worked out in the battery swapping policy itself.**

**It is also important to consider incentives for battery swapping operators.** The setting up of a battery-swapping station may involve higher costs so policy could include clear guidelines for incentives to service providers.

In section 7.4, the policy states that *“As per the current Goods and Services Tax (GST) regime, the tax rates on Lithium-ion batteries and Electric Vehicle Supply Equipment (EVSE) are 18% and 5% respectively.”* This has been a long-standing request from the EV industry. However, the policy has recommended the GST reduction but left the decision to the GST council for consideration. **The GST reduction must be made applicable instead of being a recommendation. Also, it should be specified whether the revision recommended by the policy is only applicable for swappable batteries or it includes fixed pre-fitted**

**batteries in EVs as well.** The differential in GST taxation of EVs & batteries is not clarified in the policy which may cause more delay in scaling up of battery swapping stations.

The policy also mentions in section 7.2 that *“the revised consolidated Guidelines and Standards for Charging Infrastructure for Electric Vehicles issued on 14th January 2022, or their revisions made from time to time will be applicable to Public and Captive BCSs provided they are energized by exclusive electricity connections (not used for other purposes).”* This is a good action point. **It is also important to specify that smart meters or other relevant metering arrangements (such as net metering) may be considered to make this a future-proof arrangement.** Battery charging stations are in effect distributed energy storage systems and they can offer grid support.

Also, the policy document in section 7.2 mentions that *“In addition, the Policy advocates bringing BCSs under existing or future Time-of-Day (ToD) tariff regimes as stipulated by the appropriate Commission so that the swappable batteries can be charged during the off-peak periods when the electricity tariffs are low.”* This is also a very good move. However, there is a need for clarity on its implementation. **It should be more prudent to specify that BCS should receive supply under EV charging tariff, with the time of use rate.**

**Electricity connections in battery charging stations should have either a net-metering arrangement or time restrictions.** This is beneficial from the DISCOMs perspective, considering the power crisis scenario.

### 3. Battery Health Management

Section 5.5 mentions that *“To provide improved information on battery health and performance, and to enable more flexibility to consumers through peer-to-peer roaming networks, data sharing agreements among major battery providers will be encouraged.”* However, the policy document needs to specify the battery health and performance-related indicators which should be collected and monitored. **The draft policy may introduce a compulsory physical check of the battery before a battery is swapped,** as frequent battery swapping may lead to the wear and tear of battery junctions and terminals which may subsequently cause a fire hazard. Also, accountability should be discussed in detail in case of any malfunctioning, damage, or fire incidents.

The policy has introduced a Unique Identification Number (UIN) mechanism with the internet of things (IoT) - based battery monitoring systems and remote immobilization capabilities to implement traceability across the battery lifecycle. **All the battery-related information i.e., Physical health, total battery life cycles (maximum life cycles) and utilized cycles, etc. should be traceable, tamper-proof, and available in the public domain. Moreover, a certain criterion concerning the State of Health (SoH) of a battery can be defined to ensure that the user will get a battery of similar SoH.** This will increase the confidence among users and may lead to an increase in adoption.

### 4. Battery swapping ecosystem

According to section 7.1 of the draft policy, *“Battery Provider will also be responsible for channeling monetary compensation to the EV owners within a stipulated time, if necessary.”* The onus is on the Battery Provider to ensure good service to the consumer

and adding the responsibility of providing monetary compensation may put an additional burden on the Battery provider both in terms of cost and effort. Instead, it is EV sellers who should be POC as they would have better control over Battery providers. Section 7.1 on grievance redressal and compensation, it is mentioned that *“In case complaints are registered by EV owners, the Battery Provider may be asked by the Appropriate Authority to return the demand incentive given to it under the applicable scheme.”* **The policy needs to specify the appropriate authority. Moreover, the policy should include the appellate authority with clarity on its role, and responsibilities.**

As indicated in the policy section 7, *“The scheme may specify a minimum contract duration for the contracts to be signed between the EV users and Battery Providers (or relevant ecosystem entity) to ensure that Battery Providers continue to provide battery swapping services after qualifying for any subsidies.”* The policy may create an inherent problem for EV users. It will tie an EV user to one particular Battery Provider which does not offer flexibility to EV users. If the battery provider services are not satisfactory, the EV user will need to suffer. Thus, this may affect the user preference in adopting EVs. **The EV ecosystem should provide flexibility to end-users (personal and business) to have different arrangements with Battery Providers with the option of switching operators in the future.** However, its implementation can face practical challenges. **An institutional arrangement with the organizations like BEE can be provided where the user can apply for „portability”. Also, users may be provided flexibility in the contract of use, either they can opt for a pay-per-swap or pay-as-you-go model.**

Section 9.4 in the policy document states that *“each BSS should serve at least two EV OEMs.”* This demands a lot of networking from the battery swapping stations which is not possible by an individual or small entity. So essentially this can lead to business being usurped by larger players. Such recommendations in the initial stage should not be considered.

## **5. Safety aspects related to charging**

The draft policy in section 6 states that it *“does not prevent Battery Providers from allowing EV users to detach swappable batteries from EVs to charge elsewhere (at home for instance), with appropriate measures to ensure safety and performance.”* **In the case that swappable batteries are being charged at home, battery manufacturers need to specify clear guidelines to ensure safety. For example, batteries not to be charged in a closed room, monitoring of battery temperature during charging, etc.**

Section 5.4 points out that *“For safety during operation of the charging infrastructure, the operator must follow the guidelines and protocols of DISCOMS/CEA (Central Electricity Authority).”* Safety standards must be uniform throughout the country. However, it may be difficult to achieve homogeneity in safety during operations as DISCOMs are local entities. **There is a need for a more defined mechanism to devise fail-proof safety protocols and standardization everywhere.**

## Secondary Recommendations

### 1. Battery end-of-life and resale value

In addition, section 8 of the policy states that *“To address the concerns related to battery life and resale value, BIS or other relevant organizations shall develop regulations for the minimum battery performance and durability requirements.”* **This is a highly necessary aspect, along with an authorized monitoring agency at the state level.**

Section 8 also states that *“To promote the re-use of swap batteries after their End-of-Life (EOL) in automotive/EV application, energy operators or battery swapping operators will be encouraged to develop a ‘power bank’ using EOL swap batteries to store and use renewable energy for EV charging or other applications.”* This aspect may be further clubbed with the renewable energy scheme of MNRE to incentivize re-use and avoid waste.

### 2. Clarifications related to the definition of BCS, BSS, and Battery Provider

Section 3 of the policy has defined various terms like BCS, BSS, and Battery Provider. However, the definition could be more precise to make it clearer and unambiguous. **The definition of a Battery Charging Station (BCS) needs to be revamped. The definition should encourage an open ecosystem rather than saying that a facility can be created at the Kirana store and private property for use by others as well which will make the EV ecosystem more inclusive.**

The Battery Swapping Station (BSS) definition mentions ‘any EV’. It is understood from the preamble that the intent of the policy is for 2Ws/3Ws. This should be clearer, as it mentions any EV whether it covers four-wheelers, buses, etc. as well. If so, then BSS would be equipped with the mechanical swapping system (Swapping Robot). In that case, it is prudent to define EV. It is also important to note that the current policy is silent on 4Ws; though 4Ws and e-buses are covered under FAME II.

The mentioned definition of battery provider may create confusion in implementation. As per the policy, Battery Provider, BCS, and BSS could be owned by different entities. However, this arrangement may lead to confusion during the accountability of entities in case of malfunctioning and battery-related incidents (Battery fire, explosion etc.).

Further, policy should include the definition/specification of important concepts such as charge-discharge rate and battery pack.

### 3. Challenges related to Data sharing and communication

The policy supports an open ecosystem facilitated by the publication of *relevant technical and operational characteristics*. This is a very admirable step and it highlights the importance of information exchange. **More details would be needed here. For instance, who will take leadership in information exchange and publication, what data should be published and who will ensure this data is accessible to all.**



Further, section 5.5 of the policy states that “*For the classification of collected data under the broad categories of proprietary, restricted-access, private and open-data, a non-restrictive detailed guideline will be developed for adherence by all industry players.*” **The policy needs to clarify certain elements of the data collection process.** For instance, the following questions need to be addressed - Who will be the authority to monitor this data and their classification? Will data include details on the physical health of the battery and the remaining lifetime? Who will address consumer grievances? Technical data could be confidential for some organizations. The policy should define the data types for which sharing is mandatory. **The policy can also clearly identify the nature of each data type that is being generated through the battery swapping ecosystem.**

#### **4. State-level actions required for the registration of vehicles without batteries and uptake of battery swapping**

In section 9.3 the policy mentions that “*As per the MoRTH circular RT-11036/72/2017, vehicles without batteries can be registered based on the Type approval certificate issued by an accredited Testing Agency, without the need to specify the make/ type or any other details of the battery.*” However, registration itself might be difficult without state policy. Support from state RTO is a must for successful implementation.

Section 9.3 also mentions that “*Transport Departments of states and UTs are advised to establish procedures to streamline the registration of vehicles with swappable batteries at RTOs.*” Additional information in the draft policy is needed to have implementation procedures across states and UTs for more concrete action at the sub-national level.

#### **5. Rollout of the battery swapping stations**

Section 9.1 specifies the rollout of battery swapping stations focusing on Tier I cities. Electric two-wheelers and three-wheelers are more prevalent in Tier II and Tier III cities which should be targeted in the first phases to advance the current clauses of the policy. The battery swapping policy can be utilised as an opportunity to increase EV adoption in the countryside as well as in Tier II and Tier III cities. The policy needs to address this aspect of geographic spread.

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