

BATTERY SWAPPING POLICY

1. INTRODUCTION

India has committed to achieving net-zero emissions by 2070 at the 26th Conference of the Parties (COP26) in November 2021. This will require clear pathways to decarbonize high greenhouse gas (GHG) intensive sectors such as transport and energy.

To decarbonize transport, the transition to clean mobility, led by electric vehicles (EVs), is paramount. Several supporting initiatives have been implemented, such as the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME) I and II, and the Production Linked Incentive (PLI) scheme for the National Programme on Advanced Chemistry Cell (ACC) Battery Storage (NPACC) to boost indigenous battery manufacturing capacity. State governments are also developing complementary policies to promote EV adoption.

India is on the cusp of an e-mobility revolution led by the two-wheeler (2W) and three-wheeler (3W) vehicle segments. 2Ws account for 70-80% of all private vehicles, and 3Ws play a critical role for public transit, freight transport and last mile connectivity in cities. While the upfront costs of EVs are typically higher than internal combustion engine (ICE) counterparts, operation and maintenance costs over their lifetime tend to be lower. Electric 2Ws (e-2Ws) and 3Ws (e-3Ws) are already cost competitive relative to ICE equivalents for fleet-based models, and therefore offer maximum potential for EV penetration.

EVs are traditionally purchased with “fixed” batteries which can only be charged using the power supply while housed within the EV. Like fueling stations for ICE vehicles, adequate, affordable, accessible, and reliable charging networks are a pre-requisite for mass EV adoption. Efforts are underway in India to boost the availability of charging infrastructure¹. Charging still takes significantly longer than refueling an ICE.

Battery swapping is an alternative which involves exchanging discharged batteries for charged ones and provides flexibility to charge them separately. This de-links charging and battery usage and keeps the vehicle in operational mode with negligible downtime. Battery swapping is generally used for smaller vehicles such as 2Ws and 3Ws with smaller batteries that are easier to swap, compared to 4 wheelers

and e-buses, although solutions are emerging for the latter segments as well. Battery swapping offers three key advantages relative to charging: it is time, space, and cost efficient, provided each swappable battery is actively used.

- With existing technologies for e-2Ws and e-3Ws, regular charging takes at least 3 to 4 hours, adding to inconvenience and creating range anxiety. The resulting vehicle downtime is particularly significant for freight and shared mobility vehicles. Whereas, battery swapping is done in minutes, as the batteries are pre-charged in swapping stations.
- Charging stations require more space, since vehicles need to be parked next to the chargers during the charging process. Battery swapping stations can stack multiple batteries on top of each other, and require limited parking, which would address space constraints in urban areas.
- While battery swapping involves a greater number of batteries than conventional batteries, each swappable battery can be smaller in capacity (kWh), since range anxiety is a smaller concern.

Battery swapping falls under the broader umbrella of Battery as a Service (BaaS) business models which involve users purchasing an EV without the battery, which significantly lowers upfront costs, and paying a regular subscription fee (daily, weekly, monthly, etc.) to service providers for battery services throughout the vehicle lifetime. BaaS is applicable for both fixed and removeable batteries and is the channel to implement swapping solutions.

Battery swapping is still nascent in India but gaining ground especially for commercial and fleet operations. There are currently a limited number of battery swapping service providers that have been engaging with original equipment manufacturers (OEMs), individual/commercial users, and other relevant stakeholders, to develop ecosystems of swapping services with compatible components (batteries, vehicles, chargers, etc.) within each ecosystem. During Budget 2022-2023, the national government announced plans to introduce a Battery Swapping Policy and interoperability standards, with the intent of building and improving the efficiency of the battery swapping ecosystem, thereby driving EV adoption.

2. VISION AND OBJECTIVES

The overall vision is to catalyze the large-scale adoption of EVs by improving efficient and effective use of scarce resources (*viz.* public funds, land, and raw materials for advanced cell batteries) for the delivery of customer centric services.

This Policy would support the vision by promoting the adoption of battery swapping technology implemented via BaaS business models which will ensure lower upfront costs, minimal downtime, and lower space requirements. The Policy addresses key technical, regulatory, institutional, and financing challenges that will help develop battery swapping ecosystems to unlock the large-scale adoption of battery swapping in India.

The key **objectives** of this policy are to:

1. Promote swapping of batteries with Advanced Chemistry Cell (ACC) batteries to decouple battery costs from the upfront costs of purchasing EVs, thereby driving EV adoption.
2. Offer flexibility to EV users by promoting the development of battery swapping as an alternative to charging facilities.
3. Establish principles behind technical standards that would enable the interoperability of components within a battery swapping ecosystem, without hindering market-led innovation
4. Leverage policy and regulatory levers to de-risk the battery swapping ecosystem, to unlock access to competitive financing.
5. Encourage partnerships among battery providers, battery OEMs and other relevant partners such insurance/financing, thereby encouraging the formation of ecosystems capable of delivering integrated services to end users.
6. Promote better lifecycle management of batteries, including maximizing the use of batteries during their usable lifetime, and end of life battery recycling.

3. DEFINITIONS

The definitions here shall be considered only in the context of this Policy

Battery as a Service (BaaS) decouples the EV and its battery by enabling the use of the battery as a service, without ownership of the battery. BaaS can be applicable for fixed and swappable batteries.

Battery-swapping shall mean a method to cater to the charging requirements of battery-powered EVs that entails replacing discharged batteries or partially charged batteries of EVs by charged batteries which can be conveniently carried out manually and/or with mechanical intervention.

Battery swapping ecosystem shall mean a compatible set of battery swapping components, viz. EVs, swappable batteries and charging facilities which satisfy the technical and operational requirements stipulated in Section 5 of this Policy.

Fixed battery shall mean a battery that remains associated with a particular EV as long as it is used for mobility purpose.

Swappable battery shall mean an ACC battery used in a battery-powered EV which can be conveniently detached and interchanged with another battery and subsequently, electrically recharged outside the EV for the purpose of replacing a discharged battery of a battery-powered EV.

Battery Charging Station (BCS) shall mean a station where the discharged or partially discharged electric batteries for EVs are electrically recharged. In case the swappable batteries are electrically recharged at a facility not set up for the purpose of battery charging, like a *kirana store*, commercial or private property or any other such place, the host facility will not be regarded as a BCS.

Battery Swapping Station (BSS) shall mean a station where any EV can get its discharged battery or partially charged battery replaced by a charged battery.

A BCS and a BSS can be co-located or integrated at the same site or located separately at different locations.

Public BSS shall mean a BSS where any EV, privately or commercially owned, can get its discharged or partially charged battery replaced by a charged swappable battery.

Public BCS shall mean a BCS where only the swappable batteries that are dispensed at one or more Public BSS(s) are electrically recharged.

Captive BSS shall mean a BSS exclusively for the EVs owned or under the control of the owner of the BSS, and is not accessible to other EVs with swappable and compatible batteries.

Captive BCS shall mean a BCS exclusively for the swappable batteries of the EVs owned or under the control of the owner of the BCS, and is not made available for charging other swappable and compatible batteries.

Battery Provider refers to any entity which owns EV batteries and provides them based on BaaS models to electric vehicle owners.

4. POLICY OVERVIEW

The **scope** of this policy is as follows:

- This Policy stipulates the minimum **technical and operational requirements** that battery swapping ecosystems would need to fulfil, to enable effective, efficient, reliable, safe, and customer-friendly implementation of battery-swapping infrastructure.
- This Policy highlights the possible ways in which various national and sub-national government agencies and Public Sector Enterprises (PSEs) may provide **direct and indirect financial support** to Battery Providers (for the cost of batteries) and EV users (for the upfront cost of purchasing EVs), with the aim of driving EV adoption by lowering the costs of EVs for users, relative to ICE vehicles.
- This Policy emphasizes enabling innovation in adoption of possible **business models**, and de-risking the investment in required infrastructure to encourage private sector participation and attract **affordable financing**.

- This Policy underlines the importance of **re-use** of end-of-first-life swappable batteries and **recycling** of end-of-life batteries.
- This Policy also lays the groundwork to create unique battery codes for ACC batteries falling under this Policy.
- Finally, this Policy lays down an **institutional framework** to facilitate on-ground implementation of the required battery-swapping infrastructure and to realize the stated policy objectives.

This Policy is targeted at supporting the adoption of battery-swapping primarily for battery swapping systems destined to be used for light electric power train vehicles (LEV) of category L, and E-Rickshaw/E-Cart. However, this does not preclude the Government from extending its coverage to other EV segments in the future.

This Policy will be valid from the date of its public notification till 31st March 2025, and will be reviewed and extended thereafter, as may be decided by the Ministry of Power.

5. TECHNICAL & OPERATIONAL REQUIREMENTS

BaaS models, particularly for battery swapping services, will need to ensure interoperability between EVs and batteries for the successful mainstreaming of battery swapping as an alternative. The Policy aims to create a framework for greater interoperability while safeguarding the innovation potential for the EV battery ecosystem. Interoperability may be defined for the charging and discharging processes of EV batteries. For EV battery discharging, interoperability is defined as the compatibility of fixed or swappable EV batteries with different EV models. For EV battery charging, interoperability is the compatibility of fixed or swappable EV batteries with the Electric Vehicle Supply Equipment (EVSE) provide in different BCS.

Given the nascency of battery swapping, interoperability between EV batteries and other components (EVs, EVSE) within a battery swapping ecosystem is adequate for eligibility under the Policy, as long as all components within the ecosystem adhere to the technical and performance standards defined for BaaS and battery swapping services.

Additionally, for eligibility purposes, any such ecosystem should also be open to other industry players to participate, provided they develop compatible components which also meet the same set of technical, safety and performance requirements.

Technical and performance standards help in ensuring compatibility, safety, security of assets and cost-effectiveness of BaaS models. At the same time, battery technology heterogeneity and scope for innovation must be maintained for the evolution of more advanced and efficient solutions. Standards will be adopted or approved by the appropriate agencies to enable the safe operation of certified battery packs in different vehicles and for compatibility of BCS and BSS with different battery types.

5.1. General Requirements

- The Policy will only support batteries using “Advanced Chemistry Cells” (ACC), with performance that is equivalent or superior to EV batteries supported under the FAME-II scheme. 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.
- Battery providers must demonstrate end-to-end compatibility between batteries and other components of the swapping ecosystem, all of which must be certified under appropriate processes defined or referred to under Section 5.2. of this Policy.
- For efficient battery monitoring, data analysis, and safety, batteries covered under this policy are required to be BMS-enabled. The manufacturer shall ensure that appropriate BMS is in place to protect the battery from conditions such as thermal runaway.
- To ensure battery safety and security of assets, swappable batteries will be equipped with advanced features like IoT-based battery monitoring systems, remote monitoring & immobilization capabilities, and other required control features.
- Additional standards and specifications for batteries regarding battery pack dimensions, charging connectors, etc. will be notified over time with adequate notice to, and consultation with, industry stakeholders, to support a phased transition to interoperability between ecosystems.

5.2. Battery and Swapping Station Unique Identification Number (UIN)

- To implement unique traceability across the battery lifecycle, a Unique Identification Number (UIN) shall be assigned at the manufacturing stage for tracking and monitoring EV batteries. Various tracking and tracing solutions are used in different industry sectors, and an appropriate system may be applied for EV batteries which is tamper-proof and allows centralized monitoring. The standard or generic methodology and the detailed definition of the UIN system for EV batteries will be developed by the relevant authorities.
- Required technical data of the battery will be mapped by the OEMs with UIN of battery pack at the manufacturing stage. Battery swapping operator must store the usage history and required performance data of battery with UIN during EV application, and data must be maintained to facilitate the traceability of EV batteries during the entire lifecycle.
- Similarly, a UIN number will be assigned to each Battery Swapping Station.

5.3. Testing & Certification for Battery Swapping Components

Standards approved or defined by BIS shall be implemented for the electric vehicle, battery safety requirements, Degrees of Protection (IP-code) of electrical equipment against foreign objects, technical specification of cables and connectors, and traction battery safety requirements.

- Batteries shall be tested and certified as per AIS 156 (2020) and AIS 038 Rev 2 (2020) standards for safety of traction battery packs, as well as additional tests that may be prescribed for swappable batteries which are subject to multiple coupling/ decoupling processes at the connectors.
- To ensure a high level of protection at the electrical interface, a robust/rigorous testing protocol shall be adopted to avoid any dielectric breakdown, arc phenomenon, or any unwanted temperature rise at the electrical interface. BMS of the battery must be self-certified and open for testing to check its compatibility with various systems, and capability to meet safety requirements.

- Compatible electric vehicles shall be tested as per relevant regulatory standards. For EVs with swappable battery functionality, vehicle OEMs shall be required to get ARAI approval for their vehicles to accept interoperable swappable batteries.

5.4. Battery charging and swapping infrastructure

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.

The Electric Vehicle Supply Equipment (EVSE) used at the swapping station must be tested and approved by the National Accreditation Board for Testing and Calibration Laboratories (NABL) or agency appointed by the central nodal agency for battery swapping.

For safety during operation of the charging infrastructure, the operator must follow the guidelines and protocols of DISCOMS/CEA (Central Electricity Authority).

5.5. Data Sharing & Communication

Communication

To ensure stability and security of data, standards for the communication infrastructure (protocols, technology) must be adopted. Standards for communication between battery & vehicle controller, battery & charger, battery & energy operator server will be defined or approved by BIS. To encourage “back-end” interoperability in the battery swapping ecosystem, an open standard communication protocol such as OCPP may be adopted, which must allow switching of networks.

Data Sharing

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.

The information to be tracked by battery providers on an ongoing basis will be defined and the assigned nodal government authorities may access it at any time.

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.

Information to support ease of consumer access and use of battery swapping services, on availability, battery type, compatibility, and performance for batteries at all BSS, must be made openly available in a standard format by battery providers.

6. BUSINESS MODELS

It is noted that there are different business models under the umbrella of BaaS which are currently being employed by Battery Providers. The models mainly differ in the extent to which different roles in the battery swapping ecosystem are integrated or kept separate. At one end, Battery Providers work with battery OEMs to develop smart, swappable batteries, provide them to the end user, and also operate charging facilities or BCS/BSS. Each of these roles can also be separated, whereby the batteries manufactured by an OEM are purchased by a Battery Provider, which then partners with relevant entities (such as retail/kirana stores) that deliver customer facing facilities such as BCSs/BSSs.

As battery swapping is still nascent in India, it is recognized that further business models will emerge as the market matures. The Policy is therefore business model agnostic and seeks to even the playing field for different models.

Hence this Policy recommends the following measures to support the development of such business models:

- Encourage collaboration among stakeholders to form battery swapping ecosystems that are sustainable, scalable and leverage the strengths of each party.
 - Rather than mandating a rigid set of technical and operational requirements to foster interoperability, this Policy will allow for multiple distinct interoperable solutions to arise

from the market. Battery swapping ecosystems would be considered under this Policy so long as they fulfil technical (particularly safety) and operational requirements in Section 5. This would encourage market-led innovation in terms of products and services.

- In addition, this Policy requires ecosystems to be “open” to allow participation from other market players in order to be considered for support under the Policy. This may be facilitated by requiring approved battery swapping ecosystems to publish relevant technical and operational characteristics that would allow other players to develop compatible solutions. This would avoid the formation of closed loops which would limit flexibility and choice for EV users.
- The Battery Provider is expected to play a key role in managing these partnerships to ensure key requirements related to safety, and performance are met. The Battery Provider would also be the potential point of contact representing the ecosystem for any coordination with external stakeholders including EV users, and government agencies.
- Provide flexibility to end users (personal and business) to have different arrangements with Battery Providers with the option of switching operators in the future. For added flexibility, this Policy 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.
- Support enabling technologies, which promote standardization, interoperability, safety and improve communication among stakeholders (including EV users where applicable). This would include providing access to real-time data on battery statistics like charge levels and range, discovery of nearest swapping stations as well as seamless options to book and pay for the services through multiple modes.

With the strengthening of the ecosystem supported by the de-risking measures, it is also expected that other third-party entities will identify new market opportunities in offering value added services such as insurance, financing etc. These entities are expected to partner with battery providers, OEMs, and end customers to provide product warranty, minimal maintenance costs assured buyback policy as well as

affordable financing options. This would assure EV users that subscribe to BaaS models leading to large scale adoption.

Central and state nodal agencies will be appointed to facilitate coordination among stakeholders, grievance redressal, dispute resolutions, and to ensure compliance with the policy, regulations, standards, and guidelines.

7. FISCAL SUPPORT

To support the adoption of BaaS models and EVs with swappable batteries, this Policy seeks to level the playing field across business models involving the sale of EVs with fixed or swappable batteries.

It is proposed 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. 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. It is also proposed that a seamless mechanism for the disbursement of subsidies shall be worked out by the concerned ministry or department.

To formalize and operationalize the possible subsidy scheme, an appropriate ongoing scheme may be revised, or a new scheme may be launched. The scheme may detail the procedures for application to avail the subsidy and subsequent disbursement, including the following:

- Battery Providers shall receive the subsidy, provided the battery swapping ecosystem that they represent satisfies the technical and operational requirements under Section 5 of this Policy.
- The scheme will clarify the modality of the subsidies in a way that balances benefits to recipients with ease of implementation. Subsidies may be linked to the UIN of EVs and batteries to ensure that there is no double-dipping.

- 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 scheme may also set eligibility criteria based on performance for EVs and swappable batteries (aligned with requirements under FAME II) to ensure only high-quality EVs and swappable batteries get the incentives.

Sub-national government agencies may provide additional capital subsidies to promote battery-swapping.

7.1. Grievance redressal and compensation

As the recipient of the subsidy on behalf of a battery swapping ecosystem, Battery Providers shall be designated as the Point of Contact with EV owners and shall be responsible, in coordination with other ecosystem players, for registering, handling, coordinating, and addressing any type of complaint, be technical/ under-performance related, contractual, etc., from EV users regarding EVs, swappable batteries, charging facilities, and/ or the contracts/ subscriptions. On behalf of the ecosystem, the Battery Provider will also be responsible for channeling monetary compensation to the EV owners within a stipulated time, if necessary. The Battery Provider may not necessarily bear the cost of such compensation depending on the particulars of the case, and may recover these costs from other ecosystem players, for instance the EV manufacturer, should there be a technical fault in its EV(s).

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.

7.2. Tariff for supply of electricity to Public Battery Charging Stations

The Policy understands that energy bill from electricity consumption for charging swappable batteries is a major operating expenditure to run a BCS. This Policy reiterates that the provisions mentioned in Section 7 of 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).

Charging of swappable batteries at other places like kinara stores, commercial or private properties and other such facilities using existing electricity connections will attract tariffs set by the appropriate Commissions for those consumer types.

In addition, this 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 may also help the serving DISCOMs flatten their respective power demand curves and better manage the load emanating from battery charging at BCSs. To participate in a ToD tariff regime, a BCS should have a dedicated electricity connection.

7.3. Provision of land at promotional rates for Public Battery Swapping Stations

The Ministry of Power recognizes that access to affordable land is necessary to scale up rollout of public charging infrastructure for EVs. To this end, in the revised consolidated Guidelines and Standards for Charging Infrastructure for Electric Vehicles issued on 14th January 2022, it has urged Government/ Public entities to provide land parcels available with them for the purpose of establishing public charging infrastructure, on a revenue sharing basis. This Policy emphasizes that the applicable provisions of Section 9 of the Guidelines, or their amendments made from time to time will be applicable to Public BCSs.

7.4. Applicable rates of Goods and Services Tax

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. The GST Council, the decision-making body on GST provisions, may consider reducing the differential across the two tax rates. The Council will take an appropriate decision in this regard at a suitable time.

8. BATTERY RE-USE AND RECYCLING ECOSYSTEM

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.

For safety, reusability, and sustainability of the business models in second-life application of the used EV batteries, BIS shall develop standards for the re-use and re-purposing of the End-of-First-Life batteries from EV applications.

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.

To ensure proper EOL recycling of EV batteries, a definition of battery ownership and liability shall be developed by BIS or MOEF. Improper disposal of EV batteries in landfills or scrap will not be allowed. Battery Management Rules shall be released separately to cover the end-of-life handling of the batteries in detail and fix the Extended Producer Responsibility (EPR). Details of tracking of collection and re-processing of used EV batteries are already available in Draft Battery Waste Management Rules (2020).

9. IMPLEMENTATION OF BATTERY SWAPPING SERVICES

Rollout of battery swapping networks will require state and local government coordination and support. States and/or local authorities should ensure that battery swapping is offered a level playing field with plug-in charging for public (and captive) BCS and BSS, as required.

9.1. Rollout of battery swapping

The target vehicle segments for battery swapping are e-2Ws and e-3Ws, which are heavily concentrated in urban areas. The rollout of battery swapping stations will therefore be phased in the following manner:

- **Phase 1 (Years 1-2):** All metropolitan cities with a population greater than 4 million (as per Census 2011) will be prioritized for development of battery swapping networks under the first phase.

- **Phase 2 (Years 2-3):** All major cities such as state capitals, UT headquarters and cities with population greater than 5 lakhs (as per Census 2011) will be covered under the second phase, given the importance of the 2W and 3W vehicle segments in growing cities.

Any central and state government agencies involved in implementation of battery swapping networks may consider this prioritization when providing additional policy support and/or subsidy allocations for battery swapping networks.

9.2. Nodal agencies for rollout of battery swapping stations

The Bureau of Energy Efficiency (BEE), the Central Nodal Agency responsible for the rollout of EV public charging infrastructure, will be responsible for the implementation of battery swapping networks across the country.

States and union territories (UTs) are responsible for the implementation and governance of the battery swapping ecosystem. Appointed state nodal agencies (SNAs) for EV public charging infrastructure will facilitate the rollout of battery swapping. SNAs will be supported by the following state agencies:

- Transport Departments and State Transport Authorities are responsible for easing registration processes for vehicles sold without batteries or for vehicles with battery swapping functionality.
- Municipal corporations are responsible for planning, zoning permissions and land allocation for battery swapping stations.
- Energy Departments and electricity distribution companies (DISCOMs) are responsible for supply of power to battery swapping stations, and for any policy support vis-à-vis power connections.
- State Electricity Regulatory Commissions are responsible for concessional power tariffs, open access, and other regulatory incentives or support for battery swapping services.

9.3. Registration of vehicles with swappable batteries

Vehicles with swappable batteries will be sold without a battery, providing the benefit of lower purchase costs to potential EV owners.

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. Any vehicle with a swappable battery should be registered without reference to the battery details, to ensure the validity of the vehicle registration when using any certified battery.

Transport Departments of states and UTs are advised to establish procedures to streamline the registration of vehicles with swappable batteries at RTOs.

9.4. Planning and provision of battery swapping networks

Battery charging and swapping stations are required to be in accordance with the requirements specified for public charging infrastructure, in Section 3 of the January 2022 amendment of the revised “Charging infrastructure for electric vehicles – Guidelines and Standards” released by MoP.

- Any individual or entity is free to set up a battery swapping station at any location, provided that the specified technical, safety and performance standards are adhered to.
- Certified battery agnostic swapping stations must be used for setting up swapping services and may accommodate one or more types of certified battery packs.
- All BSS should serve at least one vehicle segment (e-2W, e-3W, LCV, etc.), and each BSS should serve at least two EV OEMs.
- Location of BCS and BSS should be planned for optimum accessibility and utilization, provided that the planning is in line with all defined standards of safety and security.

9.5. Land allocation for battery swapping services

Battery swapping stations require less space than public charging stations for a given number of vehicles served, due to a quicker turnaround time per vehicle.

Battery swapping services enabled through BSS should be available at a variety of locations, based on ease of access and utility for EV users. This includes but is not limited to retail fuel outlets, public parking areas, *kirana shops* and general stores, malls, and any other locations where public charging stations may be made available.

In general, space requirement for battery swapping services includes the footprint of the BSS (or the BCS and BSS in case of co-located but separate units) and parking and queueing space for one-tenth of the serving capacity of the BSS. In cases where the BCS requires additional electrical infrastructure such as a dedicated distribution transformer, space requirements for the same need to be accounted for.

States or local authorities may provide concessional land parcels for battery swapping services, in line with concessions provided for public charging services.

9.6. Power supply connections for battery charging stations

BCS may vary significantly in capacity, from 1-2 batteries to hundreds of batteries, as per the requirements of the battery swapping network provider.

States should ensure that public BCS (and captive BCS, where applicable) are eligible for EV power connections, with the concessional tariff. Any additional support that is provided for power supply connections for public charging stations may also be extended to BCS, as applicable.

States or local authorities may mandate that power supply connections should be approved in an expedited manner for BCS. Battery providers should be able to self-certify their installations for safety as per guidelines provided by the distribution utility.

9.7. Single window portal

A single window portal should be set up to facilitate submission of all required documents by battery swapping providers, issue trade licenses for battery swapping businesses, approve allocation of public

land for installation of battery swapping stations and to grant electricity supply connections for battery charging centres/ stations.

This may be set up by the SNA, municipal authorities or by an alternative public agency nominated by the state government.

States or local authorities may mandate that the required licenses and approvals should be expedited and provided within 5 days of application, through the single window in digital format.

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