NEECA's EV Charging Infrastructure & BSS Web Portal

Overview

To promote sustainable mobility and energy efficiency in Pakistan, the National Energy Efficiency and Conservation Authority (NEECA), under the Ministry of Energy (Power Division), is developing a comprehensive digital ecosystem comprising a **mobile application** and a **web portal**. The **EV Charging & Battery Swapping Mobile Application** is designed for EV users and operators, enabling convenient access to charging and battery swapping services, real-time booking, payments, and energy conservation features. Complementing this, the **EVCI & BSS Registration Web Portal** serves regulatory stakeholders such as DISCOs, Land Authorities, EVCI Investors and NEECA administrators, streamlining registration, compliance, and approval processes for investors and operators. Together, these platforms create an integrated system that ensures transparency, efficiency, and data-driven decision-making to support the nationwide adoption of electric vehicles and the effective use of energy resources.

Terms of Reference (TOR)

Integration and Operationalization of NEECA's EVCI&BS Registration Portal with Stakeholder Departments (DISCOs and Land Authorities**)**

1. Background

The National Energy Efficiency and Conservation Authority (NEECA), under the Ministry of Energy (Power Division), has developed the EVCI&BS Registration Portal to streamline and digitize the registration of Electric Vehicle Charging Infrastructure (EVCI) and Battery Swapping Stations (BS) across Pakistan.

The EVCI &BSS Registration Portal is distinct from the mobile application developed for end-users (EV drivers). The portal is dedicated exclusively to managing investor/operator applications and facilitating coordination among regulatory stakeholders such as DISCOs and Land Authorities.

The registration and approval process involves multiple stakeholders—particularly Electricity Distribution Companies (DISCOs) and Land Development Authorities—who are critical for verifying land approvals and issuing load feasibility or power connections. This TOR outlines the integration mechanism and required portal enhancements for seamless collaboration, faster decision-making, and transparent service delivery.

2. Purpose

To establish a coordinated digital mechanism between NEECA, EVCI investors/operators, and relevant stakeholder departments (DISCOs and Land Authorities) through shared access to the portal, efficient data exchange, and collaborative processing of EVCS/BS applications in their respective jurisdictions.

The portal will exclusively serve administrative and regulatory purposes and will not be used for end-user (EV consumer) interactions. All consumer-facing functionalities (e.g., charging station search, booking, payments) will be delivered via the NEECA mobile application.

3. Objectives

- Ensure jurisdiction-based access to applications by stakeholder departments.
- Enable automated alerts to relevant departments upon application submission.
- Streamline documentation, review, and feedback processes.
- Improve accountability, traceability, and processing timelines for EVCS registrations.

4. Scope of Integration and Features

4.1 Portal User Roles and Access

The portal shall be used only by:

- EVCI/BSS investors or operators submitting applications for registration and regulatory approvals
- EVCI/BSS investors or operators can track their application status.
- Electricity Distribution Companies (DISCOs) for reviewing and approving load feasibility
- Land Development Authorities for verifying land-use compliance

4.1.2 EVCI & BSS Operator Registration & Management

Charging Station Registration: Charging station operators will register through the app, providing details such as:

- Charging Type: AC, DC, or any hybrid system
- Connector Type: Type 1, Type 2, CHAdeMO, CCS, or any specific connectors supported
- Charging Speed: Fast, Rapid, Slow – This information will help users select stations based on their preference

Availability Status: Operators can update the real-time status of each charging point (e.g., available, in-use, under maintenance)

Geo-location Mapping: GPS integration will map all charging stations and battery swapping points in Pakistan. This data will be continuously updated to reflect the real-time status of stations

Wait Time Configuration: Charging station operators can configure default wait times or add custom parameters for maximum wait time before user gets alert for the next available slot.

Further refer to the details of the registration is mentioned in mobile application section.

4.2 Application Visibility Based on Jurisdiction

- Stakeholder users (DISCOs and Land Authorities) will have access only to applications within their designated geographic or administrative boundaries (e.g., district, tehsil, circle).
- Jurisdiction mapping will be linked to area tags selected by the applicant during submission.

4.3 Role-Based Access Control

- Users will be assigned specific roles:
    - DISCOs: Review power availability, approve load, provide technical comments, upload NOCs, or raise objections.
    - Land Authorities: Verify land-use compliance, upload NOCs, or raise objections.
- Users cannot modify applicant data, but can request clarifications through the portal.

4.4 Real-Time Alerts and Notifications

- Email and SMS alerts will be sent automatically to the relevant stakeholder department upon submission of an application in their area.

- SMS / Email to user about the missing documents on the provisional approval state. And add timer to email reminder.
- Alerts will include key application details (applicant name, location, type, ID).

4.5 Review, Comment & Approval Interface

- Stakeholders can upload approvals/NOCs, provide comments, or raise document requests.

- Status will be tracked per stakeholder input (e.g., Approved, Under Review, Returned).

- Relevant authorities can/ maybe (if required) comment of their process on the application that comes under their jurisdiction.

4.6 Unified Dashboard and Performance Tracking

- Department-specific dashboards will allow users to view:
    - Application statuses (Pending, Approved, Returned)
    - Timelines per application
    - Total applications per month/region

4.7 Communication & Clarification Module

- A built-in comment/chat section will allow stakeholders to directly engage applicants regarding missing information or required revisions.
- All interactions will be logged.

4.8 Escalation and Reminder Mechanism

- Automated reminders will be sent if a stakeholder does not act within a defined period (e.g., 7 working days).
- Escalations can be configured to notify higher authorities or nodal officers.

4.9 Activity Logs and Audit Trail

- The system will maintain a complete log of stakeholder activities for each application.
- Used for audits, transparency, and dispute resolution.

5. Technical Enhancements and Portal Accessibility Features

To ensure operational efficiency and inclusivity, the following features and activities will be implemented:

5.1 Stakeholder Onboarding and Training

- Conduct regular orientation and hands-on training for DISCOs and Land Authority users.
- Provide video tutorials, manuals, and a dedicated helpdesk.

5.2 Feedback and Grievance Module

- Enable users to submit feedback or complaints regarding delays or unresolved issues.
- Grievances will be routed to NEECA focal persons.

5.3 Data Migration from existing system

- Migrating the data from existing database, which hold the data of the all the applications for EVCI&BSS. It is required to migrate existing data into the new portal without any data loss.

5.4 Administrative & Data Analytics Features

Admin Portal (NEECA):

- Station Registration Monitoring: Track and approve the registration of new charging stations and BSS operators
- Compliance Reports: Ensure all charging stations and operators meet regulatory and operational standards
- Data Analytics:
    - Generate insights on EV adoption rates, energy consumption patterns, and seasonal demand fluctuations.
    - Provide detailed reports on energy savings, demand forecasting, and infrastructure performance
- Integrate data from national energy platforms or third-party APIs to analyze energy consumption trends on a national scale.
- Allow authorized users to export filtered datasets for internal reporting and analysis.

- Build visual analytics dashboards for NEECA and stakeholders.

6. Responsibilities of Stakeholders

NEECA

- Administer portal and manage user roles.
- Conduct training and provide helpdesk support
- Ensure data security and continuous platform improvement.

DISCOs

- Assign focal persons for portal use.
- Assess power availability and feasibility.
- Upload load approval or rejection letters in defined timeframe.

Land Authorities

- Assess land ownership and zoning compliance.
- Upload land-use NOCs or objections.
- Coordinate with applicants via the portal if clarifications are needed.

7. Data Security and Confidentiality

- All user activity will be role-based and monitored through access logs.
- Data protection guidelines will be enforced in line with NEECA's internal policy.

NEECA's EV Charging & Battery Swapping Mobile App

Brief Functional Requirements & Features

NEECA is developing a mobile application focused on EV Charging Infrastructure (EVCI) & Battery Swapping System (BSS), along with energy efficiency awareness features. The app will streamline EVCI & BSS operator registration, EV user access to charging facilities, and data-driven insights for better energy management.

1. **EVCI & BSS Operator Registration & Management**

   Charging Station Registration: Charging station operators will register through the app, providing details such as:

   - Charging Type: AC, DC, or any hybrid system
   - Connector Type: Type 1, Type 2, CHAdeMO, CCS, or any specific connectors supported
   - Charging Speed: Fast, Rapid, Slow – This information will help users select stations based on their preference

   Availability Status: Operators can update the real-time status of each charging point (e.g., available, in-use, under maintenance)

   Geo-location Mapping: GPS integration will map all charging stations and battery swapping points in Pakistan. This data will be continuously updated to reflect the real-time status of stations

   Wait Time Configuration: Charging station operators can configure default wait times or add custom parameters for maximum wait time before a user gets an alert for the next available slot

   Energy Analytics Dashboard will display real-time and historical data, which may include:

   - Total energy consumption
   - Charging duration per vehicle
   - Peak hours for charging activity
   - Forecast of demand for future periods (daily, weekly, monthly)

   Each operator will have a dedicated dashboard to:

   - View upcoming bookings and reservations.
   - Access registered vehicle details for scheduled charging.
   - Accept or decline slot requests based on station capacity.
   - Monitor overall station performance in real-time.

1.2 EVCI Investor Registration & Application Tracking

Investors/Operators can register their EVCI or BSS setup via the mobile app by submitting:

- Business details, Proposed site location, Charging type and connector specifications, load requirements

Upon submission, the unique Application ID is generated for tracking.

"My Applications" dashboard will be available to view real-time status updates such as:

- Under Review, Approved, Returned for Clarification or Rejected

Each status will be accompanied by timestamps and department remarks for transparency.
Push notifications and SMS/Email alerts will inform applicants of any status change or required action. The process will enable efficient communication between NEECA, DISCOs, Land Authorities, and private investors. Moreover, it will help promotes transparency and timely resolution for all registered applications

2. Consumer Features & EV Charging Booking

Charging Station Search:

- Users can filter charging stations based on location, speed (Fast, Rapid, Slow), connector types, and pricing
- Real-time availability will be shown, so users can choose stations with no waiting time

Route Planning:

- Users can input their destination, and the app will suggest optimal charging stops along the route. The suggestion will consider:
- Battery levels and charging needs
- Availability of stations along the route
- Estimated charging times and station downtime.
- Charging stop preferences (e.g., nearby restaurants or amenities).

Pre-booking Options:

- Users can reserve a charging slot at a preferred time and location.
- Be cancelable within a defined grace period (e.g., 15 minutes)
- Alert users of upcoming reservations and penalties for no-show or late cancellation

Live Status Updates: Users can monitor real-time updates

- Slot availability (free/occupied)
- Estimated waiting time (e.g., 5 min, 20 min)
- Station downtime or any maintenance alerts

Charging Cost Transparency:

- Display detailed price breakdowns for each station
- Per minute, per kWh, or time-based pricing models

- Cost differences between stations (e.g., premium pricing during peak hours)
- Discounts or promotions available for EV users

3. **EV Charging & Payment Management**

User Profile & Registration:

- Users will register their EV details such as model, registration number, battery type, and preferred connector type
- The app will customize recommendations based on the user's vehicle specifications

Payment Integration:

- Initially, payments will be processed directly with EVCI operator, but in future, the app may provision for in-app payments with digital wallets or payment providers

Charging History:

- The system will log all past charging sessions, allowing users to: track energy usage, monitor costs, and view charging session history (including times, locations, costs, etc.)

4. **Battery Swapping System (BSS) Features**
   - Battery Swapping Station Locator: users can view the nearest battery swapping stations on a map and check real-time availability
   - Reservation System: users can reserve a fully charged battery in advance to ensure no wait times upon arrival
   - Compatibility Information: based on the user's registered EV model, the app will suggest compatible batteries and ensure that users receive the correct type for their vehicle

5. **Notifications, Alerts & User Engagement**
   - Push notifications for:
     - Charging Slot Reminders: Alerts users when their reserved time slot is approaching
     - New Station Alerts: Notifications about newly opened charging stations or BSS points
     - Promotional Offers: Alerts on government incentives, discounts, or partner offers related to EVs
     - User-Generated Content: Users can share content on the app, such as success stories, energy-saving tips, or even EV-related artwork
     - Energy Conservation Quotes: Daily or weekly push notifications with inspiring quotes on sustainability and energy conservation
6. **Ratings, Reviews & Feedback Mechanism**
   - Users can rate charging stations and BSS points based on their experience (e.g., service quality, cleanliness, staff helpfulness, etc.)
   - Only registered users who have used the station's services will be allowed to provide feedback, ensuring credibility

- Incentives: Introduce a rewards system that encourages users to engage in energy-efficient behavior. For example, users could earn points for charging during off-peak hours or using clean energy sources. These points can be redeemed for discounts, rewards, or eco-friendly products

7. Future Suggestions for Improvement:

- Enhanced Route Planning: If a user's preferred charging station becomes unavailable due to unforeseen circumstances, the app should automatically suggest alternative routes or charging stops
- GIS-Based Jurisdiction Mapping Integrate a GIS backend to automate jurisdiction tagging of applications, facilitating more accurate and efficient routing of applications
- Dynamic Pricing Awareness: The app should reflect pricing fluctuations based on demand (e.g., peak hours or seasonal pricing) and alert users to any changes before they commit to a booking
- Idle Time Tracking & Penalties: Introduce a feature that tracks how long a vehicle remains plugged in after charging is completed. Users will receive notifications if they exceed the recommended time, with potential penalties for overstaying (e.g., fines, warnings)
- AI-based Smart Recommendations: Use machine learning algorithms to analyze historical data (e.g., past trips, usage patterns, and charging times) and recommend optimal charging times and locations to users.

Preferred Technology Stack

- Frontend (Mobile App) – Flutter or React Native
- Backend (API & Business Logic) – Node.js or Laravel
- Database – MySQL or PostgreSQL or Mongo DB

Proposal Evaluation Criteria & Scoring System

All submitted proposals will be evaluated by a designated evaluation committee based on a weighted scoring system. The objective is to ensure a transparent, merit-based selection of the most suitable vendor who demonstrates both technical expertise and value for money. The technical evaluation's total score will be 70 points, distributed across the following evaluation criteria, and minimum passing marks are 50 points.

Evaluation Criteria	Description	Total Marks
Firm's Relevant Experience	- Experience in developing mobile applications for government/energy/EV-related projects (5 marks) - Experience in integrating GIS and real-time data processing, and payment processing (5 marks) - Portfolio of at least 3 mobile projects (5 marks)	15 marks
Technical Solution & Approach	- Understanding of mobile application requirements and compliance with preferred technology stack (5 marks) - Detailed technical proposal outlining app architecture, security protocols (secure user authentication & encryption mechanisms), scalability, and API integrations (10 marks) - Use of AI/ML for recommendations & analytics and user-friendly and intuitive app interface (5 marks)	20 marks
Team Composition & Expertise	- Dedicated project manager/lead with at least 5 years of relevant experience (3 marks) Technical Expertise (12 marks), availability of • Qualified UI/UX designers experienced in designing web and mobile app interfaces. • Frontend or full-stack developers with proven experience in web and mobile app development • Mobile app developers proficient in Flutter, React Native, or equivalent cross-platform frameworks. • Availability of backend developers with demonstrated expertise in database design, development, and management • Quality Assurance (QA) professionals to ensure comprehensive testing & validation of deliverables	15 marks
Project Management & Timeline	- Realistic and detailed project implementation plan with clear milestones (5 marks) - Agile development methodology & risk mitigation strategy (5 marks)	10 marks

Compliance fulfilment with RFP Requirements	Degree to which the proposal/presentation meets the functional and technical specifications outlined in this document	5 marks
Value-Added Features & Innovations	Any additional suggestions, features, or technological innovations that enhance the app beyond baseline expectations and aaccessibility features for inclusivity (e.g., support for visually impaired users)	5 marks

Whereas Financial Evaluation will be of 30%. Only technically qualified firm will go to next round of financial evaluation. The passing marks of technical evaluation is 50 or above.