

DOCKETED	
Docket Number:	22-EVI-06
Project Title:	Vehicle-Grid Integration
TN #:	257247
Document Title:	Eneridge and TBU Comments on CEC Network Roaming Workshop
Description:	N/A
Filer:	System
Organization:	Damon Kim
Submitter Role:	Public
Submission Date:	6/21/2024 11:03:36 AM
Docketed Date:	6/21/2024

*Comment Received From: Damon Kim
Submitted On: 6/21/2024
Docket Number: 22-EVI-06*

**Damon Kim - Eneridge and TBU Comments on CEC Network
Roaming Workshop**

Additional submitted attachment is included below.

June 21, 2024

California Energy Commission
715 P Street
Sacramento, CA 95814

Re: Docket No. 22-EVI-06 – Comments In Responses to CEC Network Roaming Workshop

Eneridge Inc. and TBU Inc. appreciates the opportunity to submit comments on the California Energy Commission’s (CEC) ongoing efforts to enhance the electric vehicle (EV) charging experience in the state. As a dedicated advocate for sustainable transportation and improved EV infrastructure, I commend the CEC’s commitment to addressing the critical issues of EV charging interoperability and accessibility.

Ensuring a robust and user-friendly EV charging network is vital for accelerating the adoption of electric vehicles and meeting California’s ambitious energy, decarbonization, and air quality goals. This document provides my perspective on the current EV charging interoperability landscape, underscores the importance of a collaborative approach among industry stakeholders, and suggests actionable recommendations to further the CEC’s vision for a more accessible and efficient EV charging ecosystem.

About Eneridge Inc.

Eneridge has provided turnkey EV charging station solutions in California since 2018. Our mission is to reduce the carbon footprint of transportation by offering comprehensive services, including equipment provision, installation, incentive processing, as well as our network platform and mobile app. We have a team of experts with extensive experience in EV charging stations, and we collaborate with local and state agencies, utility companies, and EV charger manufacturers. As the sole partner of TBU Inc., we are also dedicated to developing a hub to improve the interoperability of EV charging stations.

About TBU Inc.

- Headquarters:
 - Asia: Seochodae-ro 78 gil 26, Seocho-Gu, Seoul, South Korea
 - North America: 3600 Wilshire Blvd., Suite 1410, Los Angeles, CA 90010
- The date of company incorporation: December 30th, 2020
- Business area: EV charging

Comment

1. Roaming Network in Korea

I. Background

- There are more than 500 companies and entities that are involved in the business of EV charging, mostly being charge point operators (CPO) or charging station operators (CSO) in South Korea. In this regard, South Korean EV users must carry around multiple payment methods for each CSO.

- Therefore, South Korean government branch, Ministry of Environment (MoE) has established a central roaming network and a central CSO data center that collects data ranging from the location, type of charging port, output charge, real-time availability and so on. CSOs that operate public charging stations funded by government subsidy are mandated to update their chargers' information to the central server (Figure 1).

II. The Korean Ministry of Environment (MoE) operates the central roaming network platform (hub) in Korea

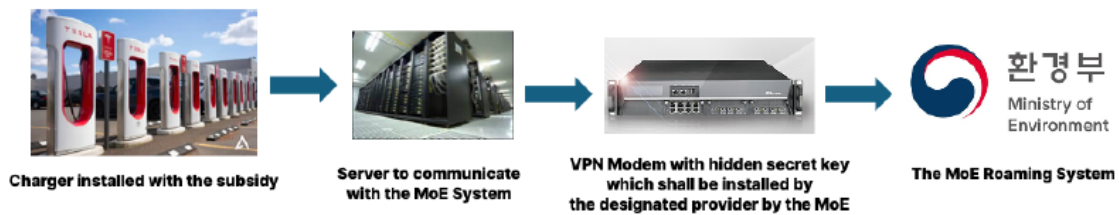


Figure 1. MoE's central server system for reporting CSOs' charging station status

- Korea's central roaming network operates in a hub based roaming manner, MoE's server acting as a hub for CSOs and EMSPs to interoperate their charging stations (Figure 2). Moreover, CSOs and EMSPs can easily manage roaming contracts through MoE's central roaming platform.
- Although MoE acts a central hub for CSOs and EMSPs to manage roaming

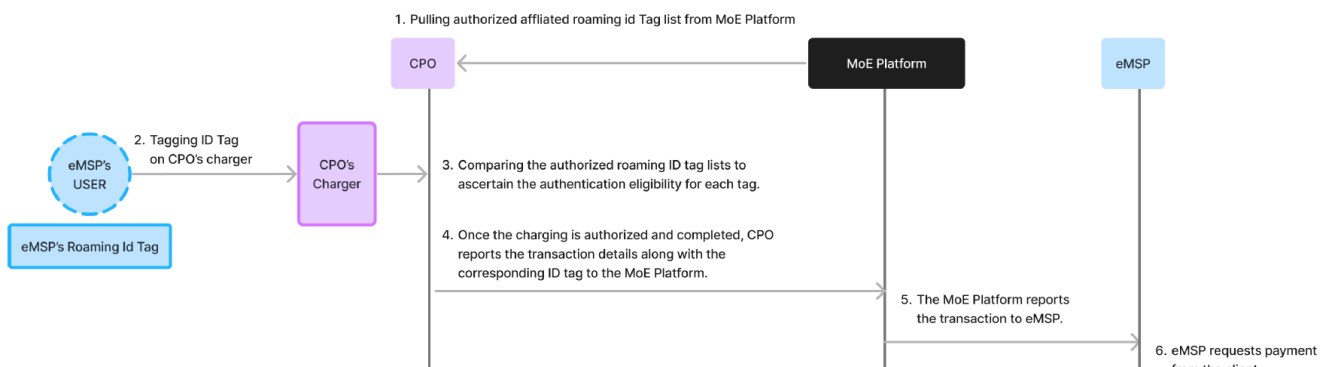


Figure 2. Structure of the central roaming network in Korea

contracts and central server for roaming transactions, CSOs or EMSPs must communicate with each other (just like peer to peer roaming) when it comes to balancing accounts for transactions made every month, as MoE does not act as a clearing house.

2. Our experiences in Roaming Network operation

I Elecvery platform introduction

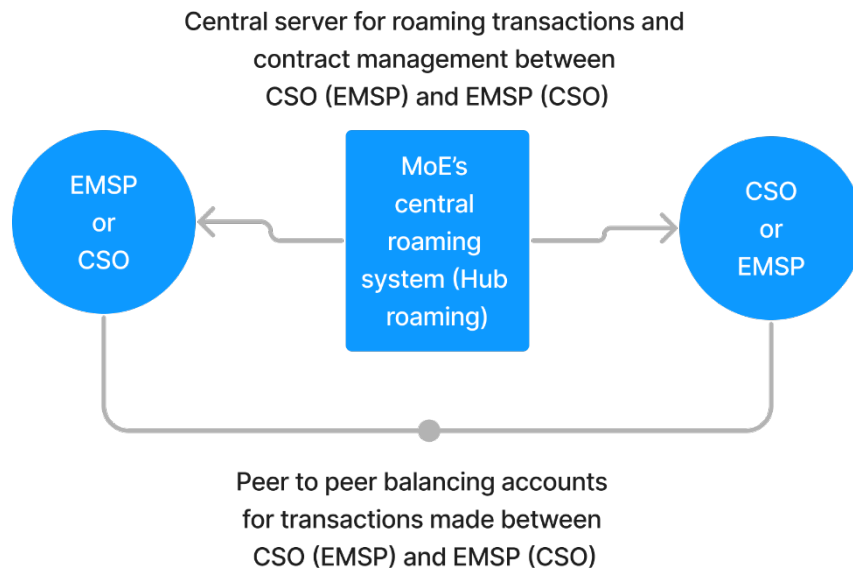


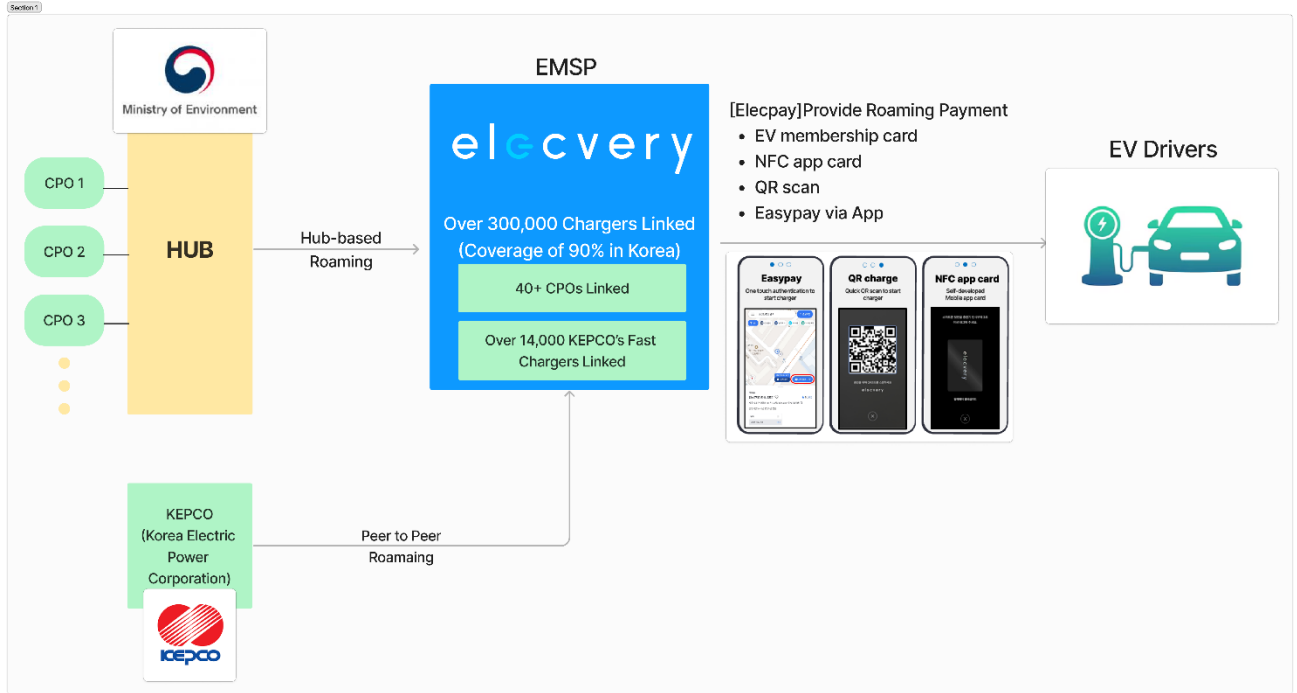
Figure 3. South Korea's roaming network accommodating both hub-based roaming and peer to peer roaming

- Elecvery is a mobile app platform offering reliable EV charging station data and real-time charger availability to help users locate suitable chargers for their vehicles. Our advanced EV charging station data has positioned us as the exclusive data provider for Naver, the largest map platform in Korea. We also offer a range of advanced features, including AI-based route planning, connectivity services for Tesla, Hyundai, Kia, and Genesis vehicles, as well as mobile EV charging services.

II Key Platform Figures

- 8 out of 10 EV drivers in Korea use elecvery to search and pay for EV charging
- Monthly Active User (MAU): Over 150,000 active users (total of 600,000 registered EVs in Korea as of June 2024)

Roaming payment growth rate: Growing by 35% each month since January



2023

Figure 4. Overview of elecvery's roaming service

- III** Elecvery is one of the largest roaming service providers in Korea

 - i. Elecvery is connected to roaming networks with over 40 CPOs in Korea through the MoE roaming system
 - ii. Covers over 300,000 chargers, representing over 90% of the total installed chargers in Korea.
 - iii. An additional 14,000 chargers are linked via Peer-to-Peer roaming with KEPCO (Korea Electric Power Cooperation)

- IV** Servicing our own payment system 'elecpay' supporting various payment methods

 - i. elecpay membership card: Pre-issued RFID-based card type payment
 - ii. NFC App Card: Cardless authentication similar to Apple Pay, by tagging one's smartphone
 - iii. easypay: One-click direct authentication of chargers via the elecvery app
 - iv. QR scan: Simple scan of QR stickers on EV chargers for quick authentication
 - v. Autocharge: Immediate authentication when the charger connector is connected, based on the vehicle's MAC ID.

- V** Technological advantage

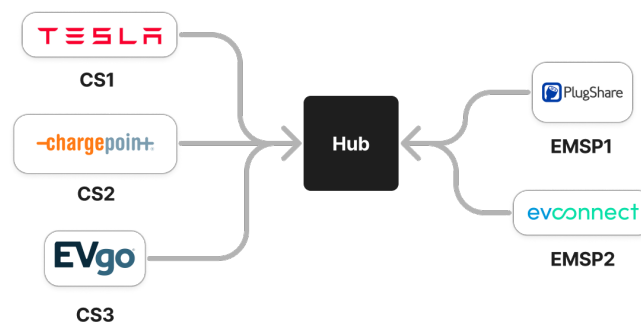
 - i. Experience in Large-Scale Roaming Systems: We possess the technical capability to construct a roaming system that not only includes a peer-to-peer roaming system but also supports a hub-based topology. This system

manages over 300,000 charge points and more than 100,000 authentication tokens for eMSPs in South Korea.

- ii. **Advanced Authorization Methods:** We have developed our own technology for mobile authentication of chargers, which includes app-based mobile authentication and NFC-based phone tagging. Additionally, we have the capability to develop charging authorization systems and charging services for auto charge based on authentication through PLC communication between the vehicle and the connector.
- iii. **Global Real-Time Monitoring and AI-Based Prediction:** we operate a large-scale platform that provides real-time information for 1.4 million charging stations worldwide. The system monitors charging stations globally in real time and offers AI-based prediction services to forecast operational efficiency and availability of the chargers. This capability can be utilized to optimize the efficiency of each charger when constructing a roaming system.

3. Suggestions for CEC's roaming network system

I Proposed Topology



A Centralized Hub-based Roaming system topology would be suitable for mediating the charger status and roaming session data among CSs and EMSPs. Considering the cases of South Korea's MoE and Hubject, the centralized system would support integrated roaming connectivity through communication with a single server without new communications between different servers among various operators.

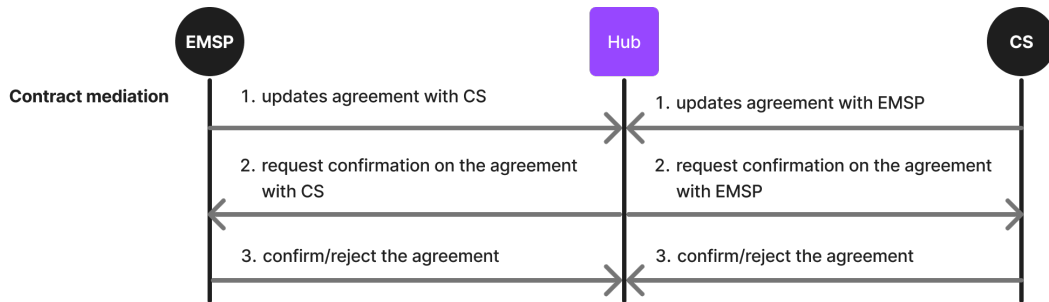
II Expected Benefits

- i. **Simplified access and integration:** new participants can connect to the hub instead of making separate agreements with each network. In addition, standardized protocols (like OCPI) can easily adopted by ensuring compatibility across networks and reducing technical barriers.
- iv. **Consistent User Experience:** the standardization ensures consistent payment, access, and service experiences, no matter which charging station is used.
- v. **Reduced Negotiation Costs:** connecting to a hub eliminates the need for

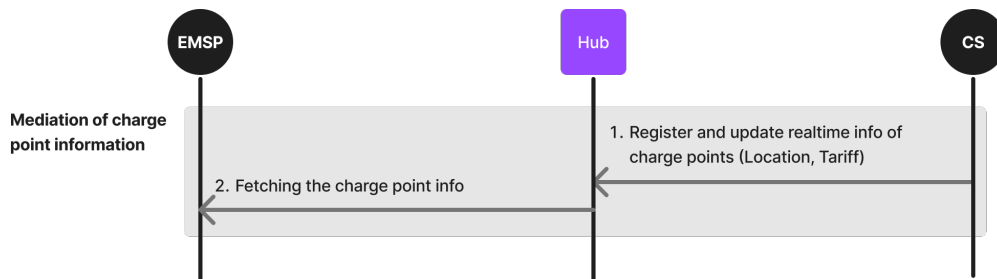
multiple individual agreements, saving time and money and speeding up infrastructure deployment.

III Functional Requirements for the Roaming System

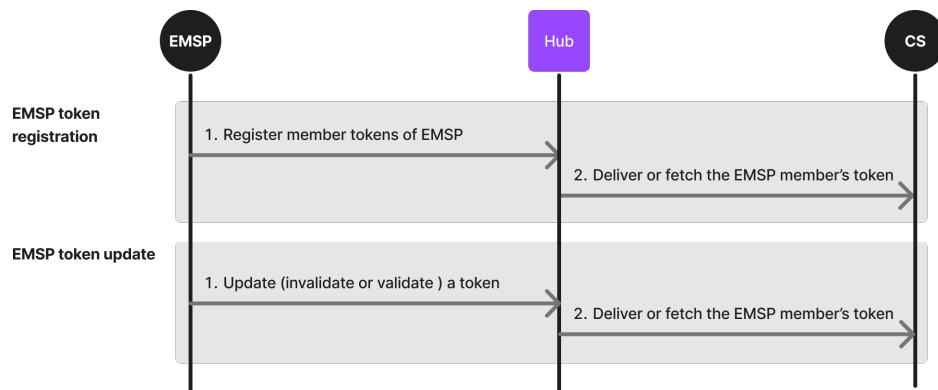
- i. **Contract Mediation:** it assures that all parties are aligned, and agreements are properly executed without the need for direct, bilateral negotiations.



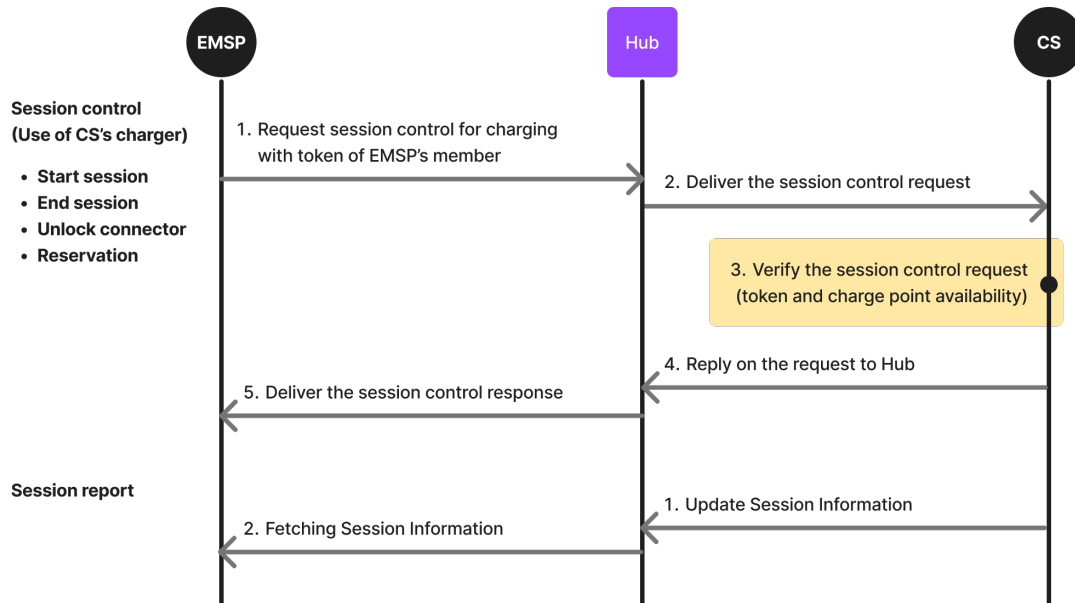
- ii. **Mediation of Charge Point Information:** the system shall ensure that accurate and up-to-date information about charge points is consistently available to all parties, enhancing the efficiency and reliability of the charging network.



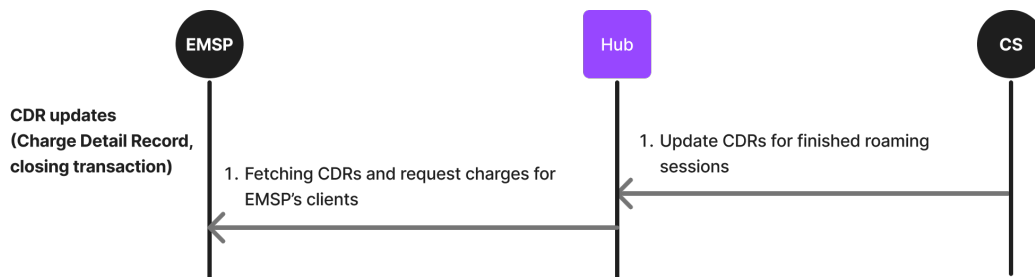
- iii. **EMSP Token Management:** this process involves the registration of unique tokens associated with EMSP users and the continuous updating of these tokens to CSs.



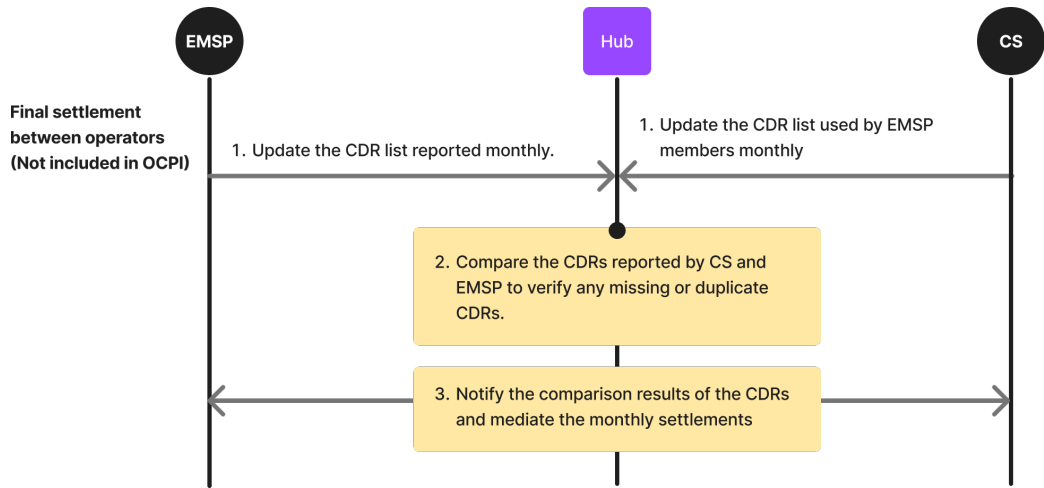
- iv. Session Control and Report: the hub shall secure managing and control charging sessions initiated by EMSP members using a CS's charger.



- v. CDR (Charge detail records) Updates: the system shall guarantee accurate and timely updates of Charge Detail Records (CDRs) for the completion of charging sessions and facilitate the accurate billing of EMSP clients.



- vi. Cash In/Out-flow Settlement Management among EMSPs and CSs (not standardized in OCPI): this feature ensures the accurate settlement of charging costs and fees between operators at specified intervals (e.g., monthly). Although OCPI does not describe the role of final settlement mediation, it is an essential function for reconciling charging costs and fees between operators.



Damon Kim
 Director of Business Development
 Eneridge Inc.
 10044 Pioneer Blvd.
 Santa Fe Springs, CA 90670
 Damon.kim@eneridge.com