Paris Session 2022

Calculation of EV charging/discharging potentials

SC C6

PS 3 and Question 2

Kenji KINOSHITA ,JAPAN

Kansai Transmission and Distribution

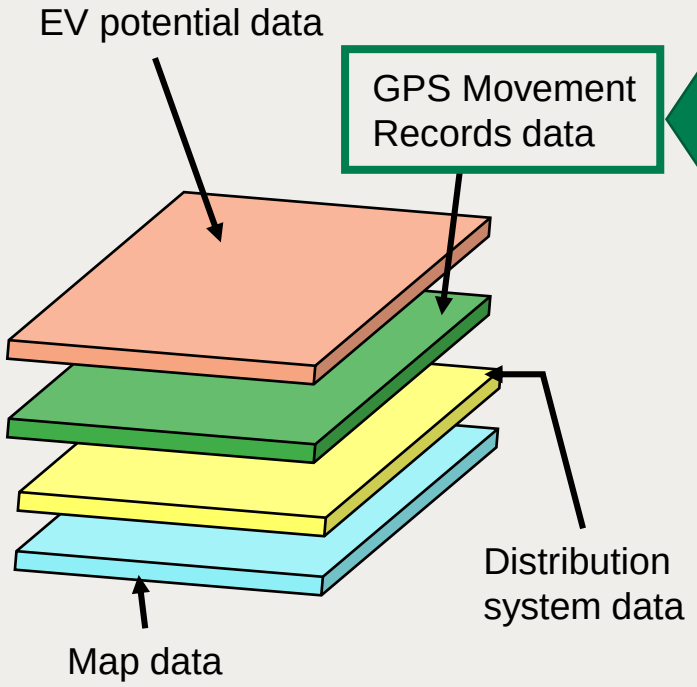
Osaka University
Mobility System
Joint Research Chair

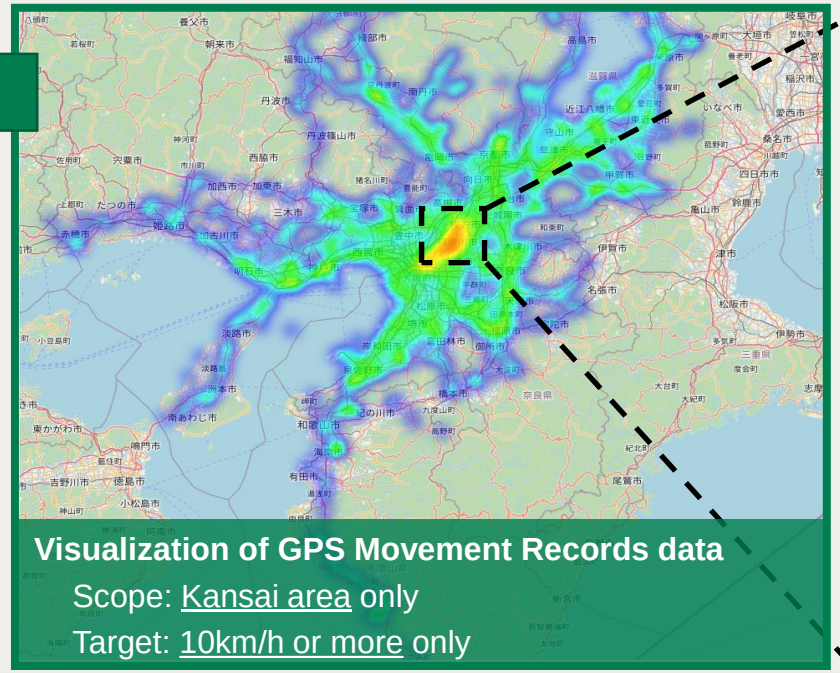
Background

- In Japan, electricity demand is expected to decline, therefore, it is necessary to construct system facilities at a lower cost.
- In the distribution system, the DER flexibility is expected to be utilized in the facility construction.

Purpose

- Of the DERs, EV has uncertainty due to user usage, and it is important to evaluate their potential.
- EV charging/discharging potential was calculated from GPS Movement Records data.

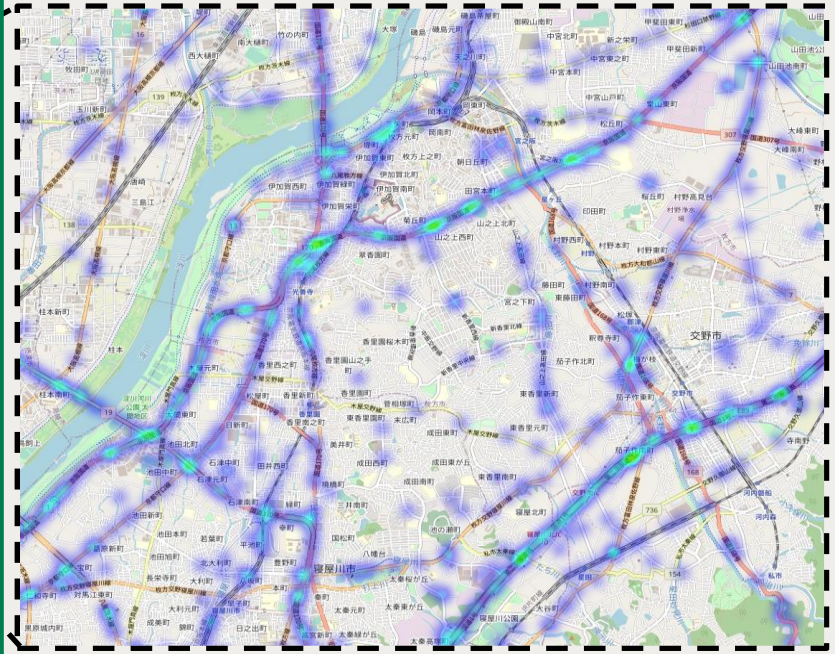




Visualization of GPS Movement Records data

Scope: Kansai area only

Target: 10km/h or more only

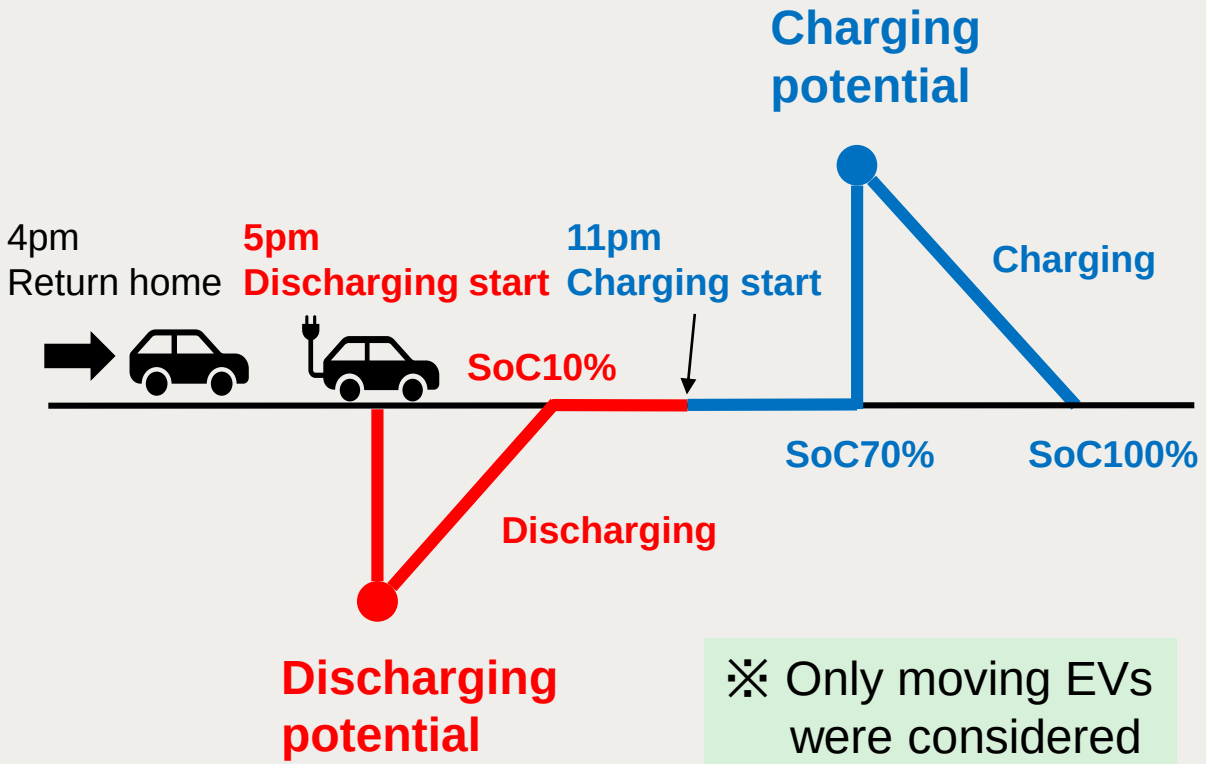


Simulation conditions

Potential calculation was based on driving distance, driving route, and the following conditions.

Spec	Battery capacity: 62kWh Charging/discharging rating: 6.0kW SoC required at departure: 70% Electricity consumption rate: 5.0km/kWh
Discharging Potential	Time: 5pm - 11pm Lower limit: SoC 10%
Charge Potential	Time: After 11pm Start value: SoC 70%

“Image” of EV charging/discharging potential



※ Only moving EVs were considered

Results

- The potential was mainly influenced by the time of EVs return home.
  Therefore, the charging/discharging performance was found to depend on the EV's SoC.
- Many EVs were discharged, which increased the load at the timing of the charge start.
- The simulation method needs to be improved in order to calculate more reliable potentials.

Charging/discharging potential and EV charging load (average for all EVs)