

Paris Session 2022



Eliminating overload in distribution systems by utilizing DER

SC C6

PS 2 and Question 4

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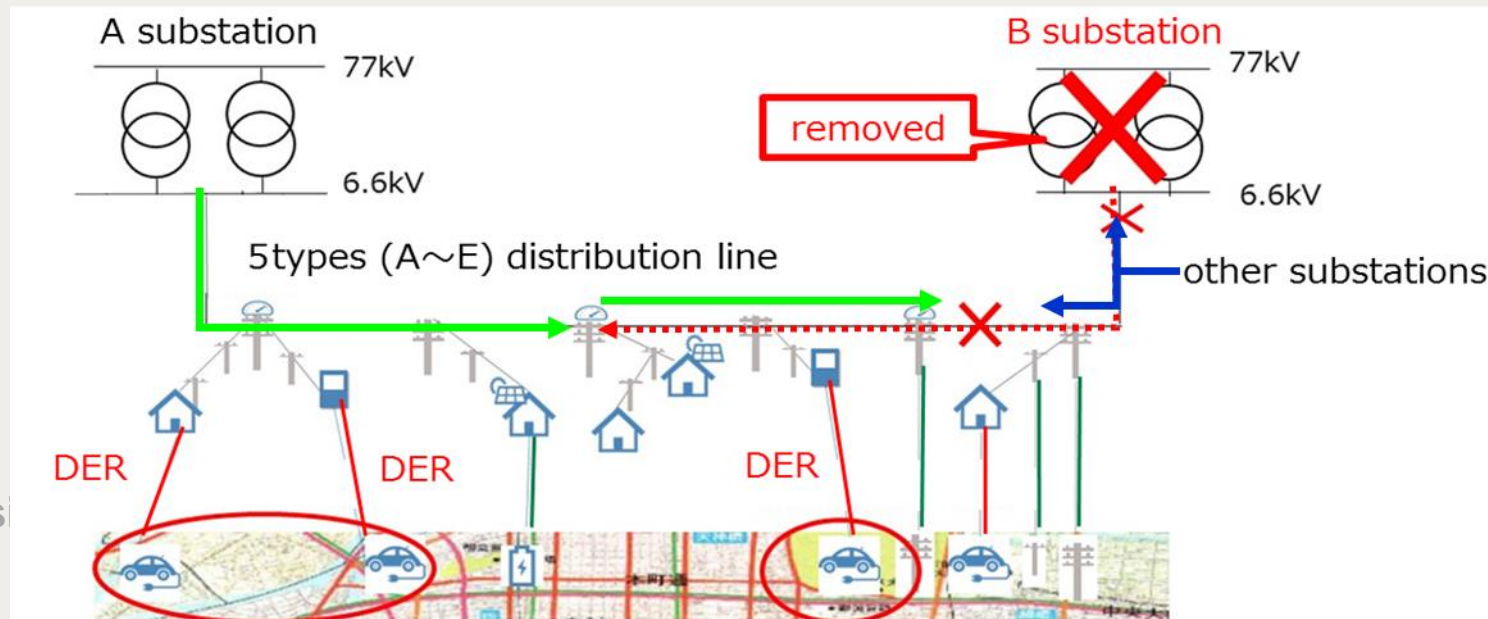
Group Discussion Meeting

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Outline of simulation

- Since electricity demand is expected to decline in Japan, DSOs need to control the cost of reinforcement for distribution facilities.
- In the distribution system, the DER flexibility is expected to control the cost of facility reinforcement of distribution system.
- In this paper, we simulated if it can be avoided facility reinforcement of distribution system by utilizing EVs when B substation was removed.

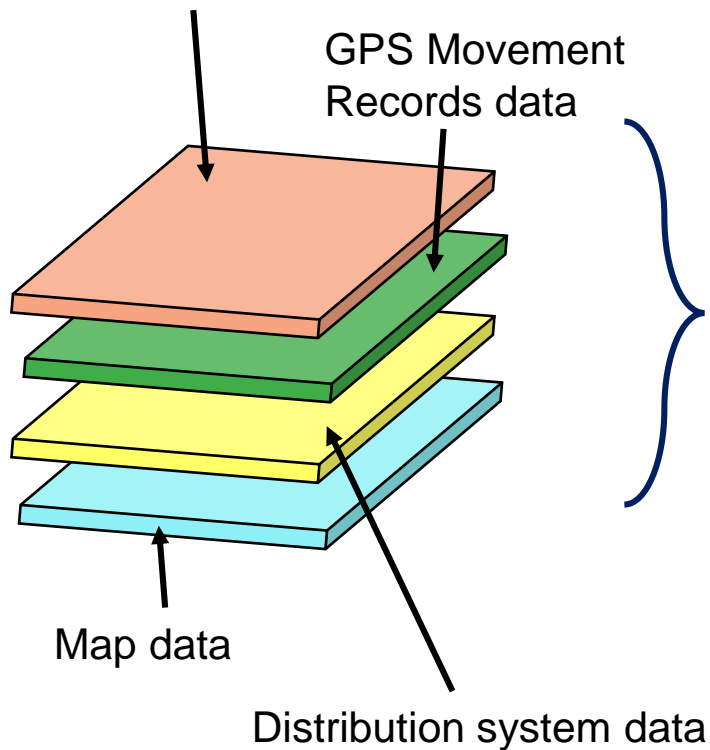


Group Discuss

Simulation condition

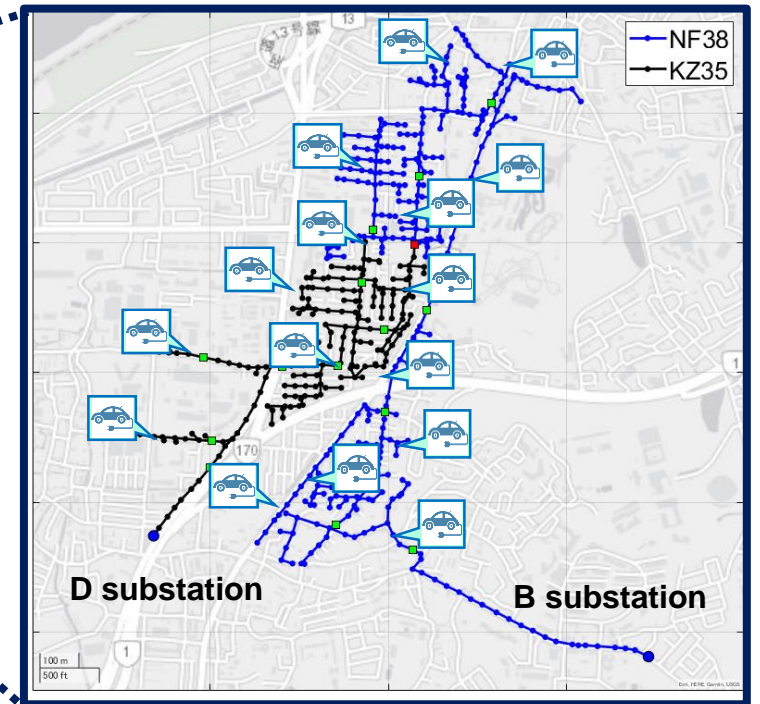
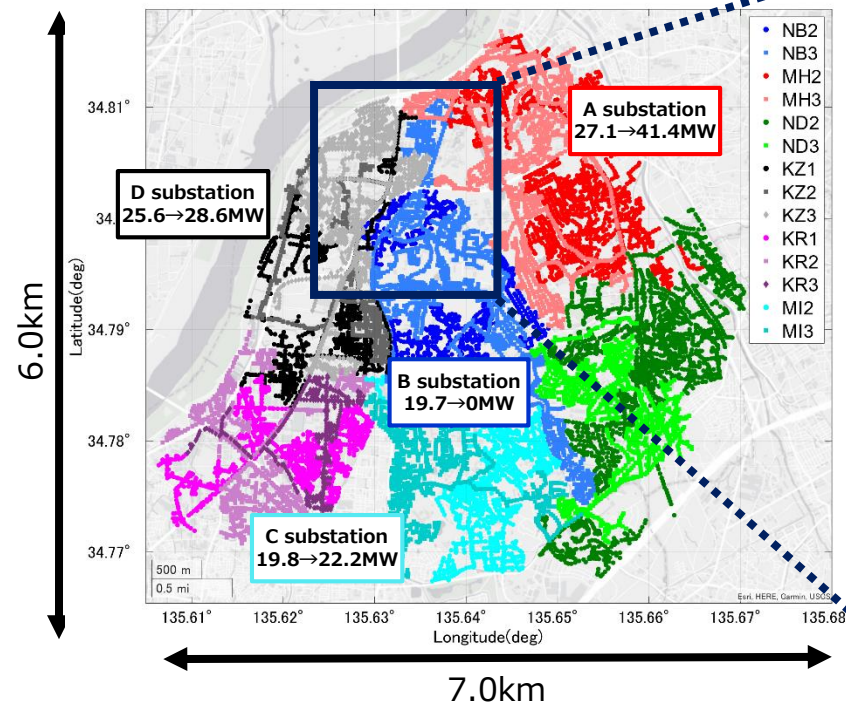
- We created the distribution system map located charging/discharging potentials to the data of the poles' locations.
- We simulated 3 cases per EV penetration rate (15%, 30%, 45%) .

EV potential data



*Color difference : Distribution substation difference

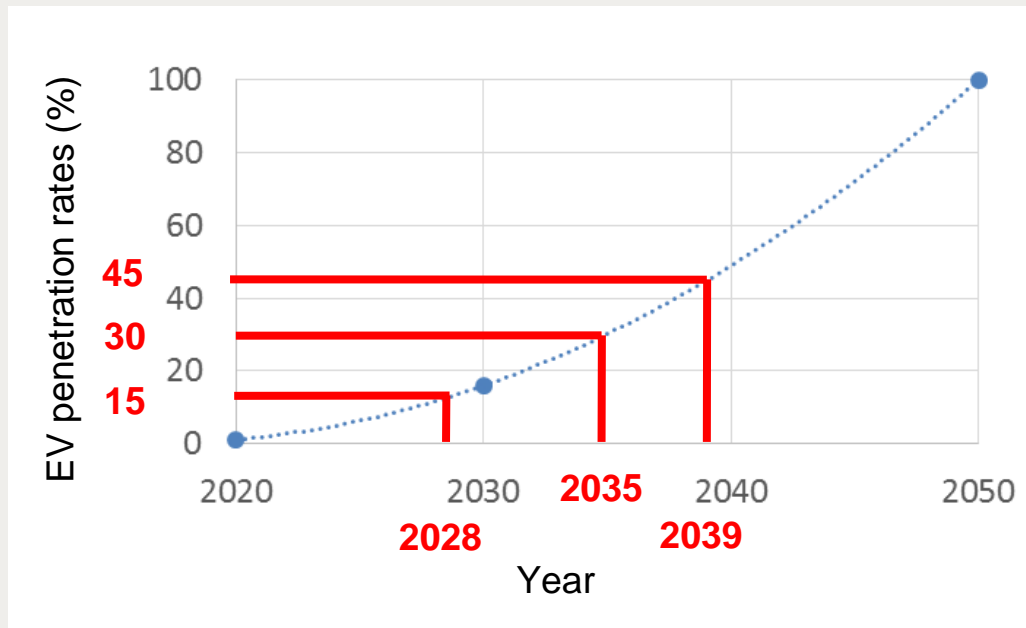
*Color Shades : Transformer difference



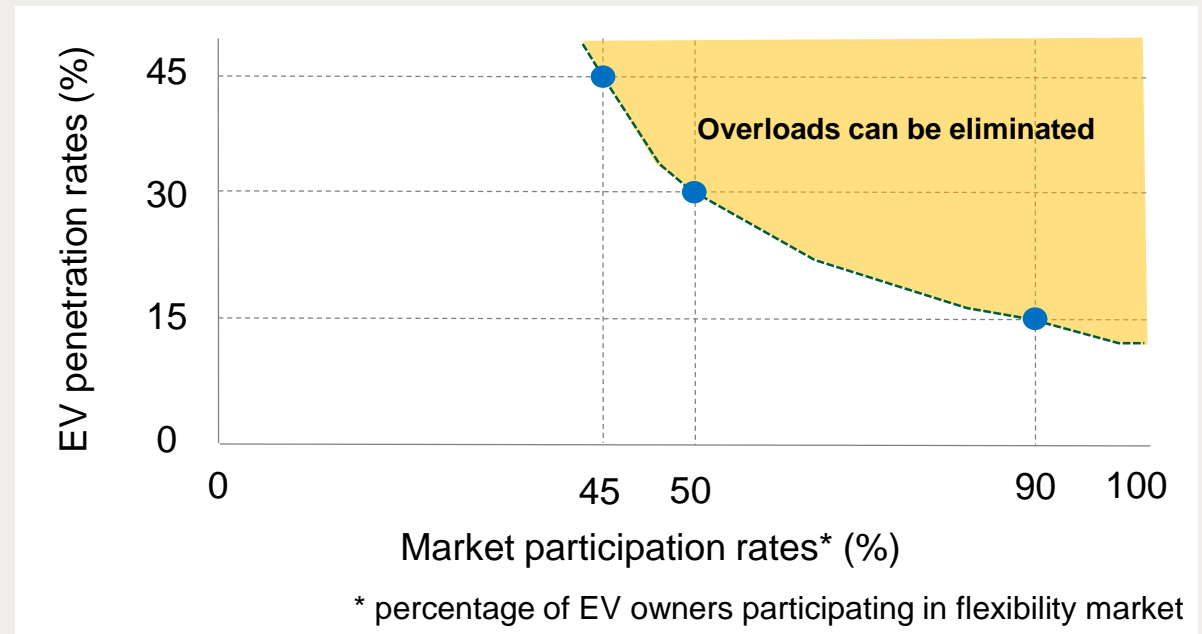
EV penetration rate (15%, 30%, 45%) .

Simulation Results

- The results of this simulation show that, at low EV penetration and market participation rates, the overload of the distribution lines can't be eliminated by utilizing DERs when B substation is removed.
- In order to simulate under more realistic conditions in the future, we will also consider other data (ex. EVs that are neither running nor charging, household Storage Batteries).



Assumed EV penetration rates



Amount of EV required to eliminate overloads in E distribution line