

Area: 8.

EV SOLAR STATION, A KEY INFRASTRUCTURE FOR ABSORBING SURPLASS ENERGY GENERATION OF PV ON THE CAR-ROOF

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Solar power by PV installed on automobiles has the great ability to reduce green-house gas emission. One of the problems is the PV will not generate the clean energy when the car-battery is full. The EV solar station will be useful as the collecting point of the surplus electricity from PV and distributing the clean electricity to EVs (Figure 1). There were several high efficiency CPV stations in the parking place that can be the model cases of the EV solar stations (Figure 2). Monte Carlo simulations were conducted and the size of the panel in the EV station will be reasonable (Figure 3). By accepting the PV cars for charging to the station, the frequency of demanding the grid energy will be substantially decreased (Figure 4). It is important merit because the customers will care if the electricity that is charged to their cars comes really from the renewable energies. Additionally, EV stations may be used to the emergency power source system to natural disasters. The required number of the system for supplying energy to the local evacuation centers is reasonable even in the cold area (high energy demand in the disasters, see Figure 4).



Figure 1: Illustration of the EV solar station that absorbs surplus energy from the PV on the car-roof.

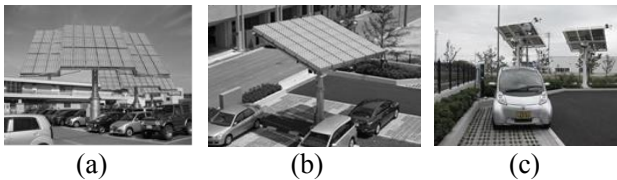


Figure 2: CPV system installations in a parking place in three ranges of the size.

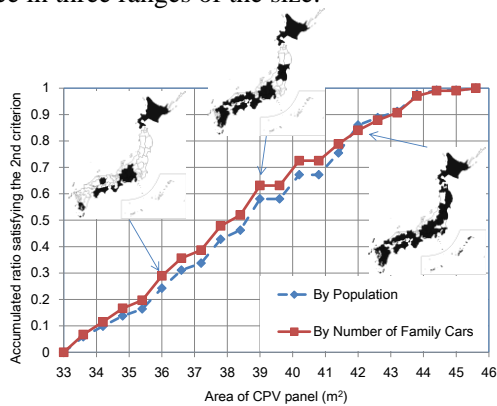


Figure 3: Panel area vs. Accumulated ratio satisfying one of the criteria. The embedded map shows the area that passed that criterion. Capacity: max. 5 cars (full-charge) a day.

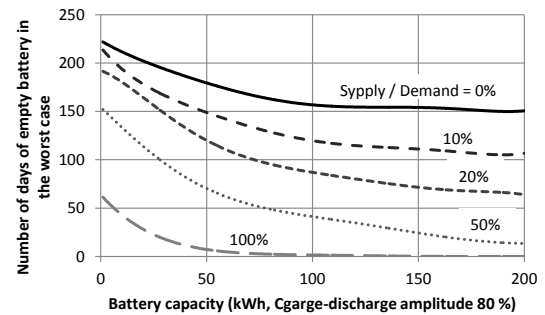


Figure 4: Number of the days of the empty battery as the function of the ratio of re-visit to the station to release surplus energy generated by the PV.

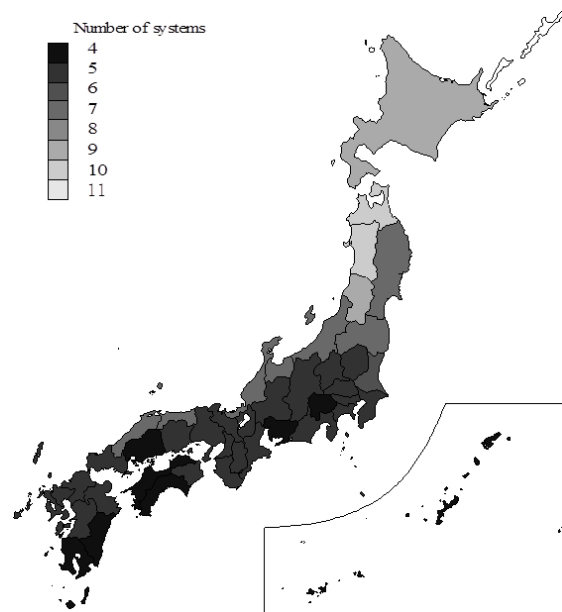


Figure 4: Required number of the system used for the emergency energy source for local evacuation centers.