

Condition for establishing energy-oriented smart cities in Japan

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Abstract

In this report, we have analyzed conditions for long-term sustainable Smart cities from energy perspectives.

Evaluation index of sustainable smart cities from the viewpoint of energy require the following factors.

- 1) That EMS be prepared. This includes the investment to, and the usage of smart data. It is required to share it broadly in smart cities, not only in power companies. Functions for VPP(Virtual Power Plants) and DR(Demand Response) will also be incorporated into the smart cities.
- 2) To have self-managed lines. The merit to have self-managed lines is that they can interchange power between facilities during the ordinary time, and that they do not receive the order to restrain output from the TSO (Transmission System Operator).
- 3) The cogeneration system and heat demand are located close to the cities. Using cogeneration together with a distributed electricity system provides flexibility to the whole system.
- 4) As a result of 1), they can actively operate at JEPX (Japan Electric Power Exchange), and can participate in the real-time market. As 24-hour Back up will be reviewed in the future, participation in the wholesale market will become more important.

Other external environmental conditions are

- 5) There are factors to keep competitiveness even when the electricity price drops due to the re-operation of nuclear power plants and the large-scale introduction of renewable energy. (the smart city type to prevent damage by natural disaster)
- 6) Low price in low voltage wheeling system