

Connection between Dispersed Power Sources and Utility Distribution

Systems: TEPCO's Technical Challenges

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Abstract

Society's heightened consciousness of energy saving and environmental protection in general, including its commitment to reducing CO2 emissions, has generated a higher demand for clean dispersed power sources such as those using renewable energy, e.g., solar and wind power. The amount of such power sources connected to utility distribution systems is increasing year by year. New types of dispersed power sources, e.g., micro gas turbine and fuel cell, have also been developed, which suggests that the opportunities for connecting dispersed power sources to utility power systems will further increase.

However, uncontrolled or non-regulated connections to these power sources may compromise the supply reliability, quality of utility power, and even public safety. To promote the spread of dispersed power sources and maintain the reliability and quality of utility distribution systems in Japan, the Ministry of Economy and Industry published Technical Requirements for System Interconnection, a guideline designed to facilitate the standardization of technologies for source-to-system interconnection, with the ultimate objection of protecting the systems and maintaining the quality of power. Tokyo Electric Power Company (TEPCO) is making efforts to develop various devices and systems, including an independent operation detecting system and new voltage regulator. These new systems may facilitate harmonious and safer connection to dispersed power sources, which in turn may contribute to the spread of dispersed power sources in a sound manner.

This report introduces the presently available technologies to enable connection between dispersed power sources and the typical distribution systems of Japanese utilities, and the Technical Requirements for System Interconnection, a guideline published by the Ministry of Economy, Trade and Industry of Japan. TEPCO's R&D efforts towards the sound development and spread of dispersed power sources are also described.