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Japan aims to achieve carbon neutrality by 2050, and the 6th Strategic Energy Plan aims to achieve renewable energy (renewable energy) ratio of 36 to 38% by 2030, and t he importance of expanding the introduction of renewable energy is increasing. The 6th Strategic Energy Plan calls for "overcoming grid constraints" toward making renewable energy the primary power source, and there are high expectations for its realization through research and development.

However, there is concern that the inertial force of the network may decrease as the installation of renewable energy expands. Usually, the frequency drops when the power supply to the network is lost due to the failure of generators or transmission lines. It may lead to the machine stops, resulting in an outage in a wide area. In a single failure such as the stoppage of one generator, the generator governor-free (primary control power) works in about 10 seconds to increase the power generation, thereby stopping the frequency drop. The generator connected to the network is a synchronous generator with the inertia that autonomously mitigates frequency changes. However, as the use of renewable energy progresses, inverter power sources, which are asynchronous generators, will increase, and the use of synchronous generators such as thermal power plants will decrease, resulting in a decrease in system inertia.

Research and development are being carried out in various countries to give the inverter a pseudo-inertia function. Inverters with pseudo-inertia monitor frequency and voltage and output active and reactive power in response to significant changes in these, simulating the behavior of inertia and mitigating frequency changes to stabilize the power system, improving the stability of the power system.

Overseas, applying a pseudo-inertia function to large-capacity inverters in extra-high voltage networks is considered. In Japan, on the other hand, the number of interconnected medium-voltage inverters is relatively large, so the target is medium-voltage inverters with an islanding detection function (active method). Therefore, balancing an islanding state detection function and a pseudo-inertial force is necessary. We plan to develop and verify the effectiveness of the current control method (GFL : Grid Following) and voltage control method (GFM : Grid Forming) through demonstrations in the future.