POWER SYSTEM AND STABILITY ISSUES IN THE SOUTH KOREA

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Transmission & Substation Facilities

Transmission voltages in South Korea are 345kV on major networks and 154kV or 66kV in local systems. Most 66kV lines are now either being removed or replaced by higher voltage lines. 765kV facilities is now being constructed, to be operated from 2002, to transmit large power stably between large power generation plants and customer area due to the rapid power demand increases in the metropolitan area. The power system on Jeju island is now connected to the mainland via a 100km-long submarine transmission system of High Voltage Direct Current cables. Power transmission networks and substations are monitored and controlled by SCADA systems. It have been emphasized T&D facility improvement and control automation, which includes installing more indoor and unmanned substations to enhance power supply reliability. As of 1999, the total length of transmission lines was 25,337C-km and the total capacity of substation facilities was expanded to 120,257MVA.

Stability Issues

Large-scale power plants have been constructed in southern area of Korea and the metropolitan area in central parts of Korea consumes nearly 42% of total generation, so that multiple routes of connection network have been established to supply the metropolitan area and relatively large power should flow northward. The size of the transmission was increased, so that some buses must be operated in separation and the reliability of the system has been taken into consideration in the stage of the planning to improve the system reliability. And the northward power flow should be restricted for the supply security of metropolitan area. This constraint should be investigated under various operating conditions. Transient stability of the system should be examined under the severe cases such as 3 phase fault and the simultaneous trip of major two transmission line. Some simulations show that major transmission line’s fault can cause the system unstable.