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Large scale integration of micro-generation to low voltage grids (MICROGRIDS)

Results in Brief

Analysis of the dynamic behaviour of a MicroGrid

Introducing a new type of power system, the MicroGrid, the MICROGRIDS project investigated its stability for different types and locations of disturbances.



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The MicroGrid power system comprises a set of interconnected, small, modular generation sources to low voltage distribution systems. The system may either be connected to the main power network or operate autonomously just like the power systems of physical islands.

The key concept behind this is to increase the potential of using renewable energy and micro sources (fuel-cells and micro-turbines) as well as improve reliability of the power supply

system. Moreover, the new system is expected to result into great reductions of annual losses and energy cost reduction for the end-user.

One of the project results involved the study of the main issues, such as stability regarding the operation of MicroGrids in two cases. In the first case the MicroGrid is in interconnected mode with a main medium voltage network, while in the second in emergency (islanded) mode under fault conditions.

The study results may significantly contribute to the exploration and development of control strategies and emergency functions for the system. Thereby, in case of failures in the medium voltage main system, the distribution network may break down in isolated "islands", each of which is self-sufficient in energy supply.

With aid of the developed MatLab/Simulink platform several simulations have been conducted for the two cases. In addition to these, consideration was taken for two types of fault locations, a fault on the main medium voltage network and a fault inside the MicroGrid network.

Analysis of the dynamic behaviour of the MicroGrid system involved assessment of the impact of load types under varied fault elimination times and fault resistance values. Moreover, the stability of the MicroGrid with the potentiality of load-shedding was also compared against the case without load-shedding possibilities. For further information click at: <http://microgrids.power.ece.ntua.gr/micro/micro2000/index.php>

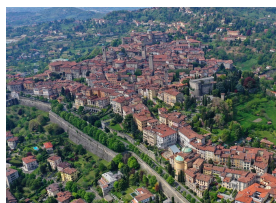


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MICROGRIDS

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