

CONTROL STRATEGIES FOR MICROGRIDS BLACK START AND ISLANDED OPERATION

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ABSTRACT

Dissemination of small size dispersed microgeneration connected to Low Voltage (LV) distribution systems is expected to become an effective mean to face the continuous demand growth in power needs. Under normal operation conditions, the LV distribution system is considered as interconnected with the upstream medium voltage network. However, if a severe disturbance occurs in the medium voltage side, a general blackout can take place. The potentialities of distributed generation can be truly realized if islanded operation is allowed and bottom-up black start functionalities are implemented. In this paper are presented the control strategies to be used in such a system to deal with islanded operation and to exploit the local generation resources as a way to help in power system restoration in case of an emergency situation. A sequence of actions for a black start procedure is identified and it is expected to be an advantage for power system operation in terms of reliability as a result from the presence of a very large amount of dispersed generation. The feasibility of the new concepts – islanded operation of small LV distribution systems and LV black start functionalities, up to now only developed for conventional power systems – are tested through simulations, being the results described and discussed in this paper.