Centralised power control of wind farm with doubly fed induction generators

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At the moment, the control ability of wind farms is a prime research concern for the grid integration of large wind farms, due to their required active role in the power system. This paper describes the on-going work of a research project, whose overall objective is to analyse and assess the possibilities for control of different wind farm concepts. The scope of this paper is the control of a wind farm made up exclusively of doubly fed induction generators. The paper addresses the design and implementation issues of such a controller and focuses on the ability of the wind farm control strategy to regulate the wind farm power production to the reference power ordered by the system operators. The presented wind farm control has a hierarchical structure with both a central control level and a local control level. The central wind farm control level controls the power production of the whole farm by sending out reference power signals to each individual wind turbine, while the local wind turbine control level ensures that the reference power signal send by the central control level is reached. The performance of the control strategy is assessed and discussed by means of simulations illustrated both at the wind farm level and at each individual wind turbine level. (c) 2005 Elsevier Ltd. All rights reserved.