Participation in the power grid frequency control by offshore wind farm connected to the beach with HVDC line

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Abstract In this thesis, the influence of wind energy on the power system, especially on frequency stability is analyzed. In this regard, Wind turbines with permanent magnet generators are used and connected with HVDC lines to AC power system. The main purpose is controlling the frequency due to load changes. Therefore, a new control system is used to control the frequency of the power system in the presence of wind generations. In this thesis, unlike the other studies that the controlling system is implemented on the converters of the grid and the generator, the control system is investigated on wind turbine using VSC controller. This controller adjusts the momentary active and reactive power with changes of load and wind speed. Simulation results show that the controller has remarkable ability to control frequency during load changes and wind speed and is more flexible. So, the advantage is high performance of the controller and the disadvantage is the high cost of using permanent magnet synchronous generator. Key Words: Wind turbine, HVDC Lines, Frequency Control, Power System, Load and Wind Speed Variations

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