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Wind power predictability: comparative study of forecasts with MM5 and WRF for Portuguese transmission system operator

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By February 2007, wind power installed capacity in Portugal was 1747 MW with 700 MW (13 parks) being telemeasured and 3273 MW already licensed. This growth follows the tendency throughout Europe, and many efforts have been made to produce good quality forecasts for wind power integration in the electric system. However, in many cases, different methodologies and definitions applied to wind power forecast, and their different uses, do not allow a quantitative comparison of the performance of each method.

To better understand the problem, we present a comparative study of wind power forecasts for Portugal from the point of view of system operator, based on two meteorological mesoscale models (MM5 and WRF), statistical models and persistence correction. All simulations have the same initial and boundary conditions whenever possible, interpolations and wind power curves are also the same, so the results are quantitatively comparable.

We compare forecasts for telemeasured parks in Portugal, for the first quadrimester of 2007, and in three temporal bases: (1) weekly production, for maintenance strategy; (2) daily, for load dispatching strategy, and (3) intra-daily, for dispatching decisions. For weekly forecasts, MM5 and MM5-MOS (model output statistics) 7-days forecasts will be compared. For daily forecasts, comparison between MM5, MM5-MOS and WRF, for 00Z and 12Z simulations, will be presented. For intra-daily forecasts, MM5 most recently available forecast (made at 00, 06, 12 and 18Z) will be compared and combined with data available from telemeasured parks.