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Track: WIND RESOURCE Topic: WIN01 Forecasting

TOWARDS IMPROVED WIND POWER FORECASTING TECHNOLOGY WITH FOCUS ON EXTREMES. THE SAFEWIND PROJECT.

Due to the variable nature of the wind resource, the large-scale integration of wind power causes several difficulties in the operation of a power system. Short term forecasts of wind generation from a few hours to a few days ahead are necessary for the optimal integration of wind generation into power systems. However, existing forecasting approaches focus on the "usual" operating conditions rather than on extreme events.

This paper presents the methodology and mid-term results of the European project SafeWind (FP7). The project aims at improving predictability with focus on extremes at various temporal and spatial scales going from a few minutes to a few days and from the level of wind turbine to the European scale respectively. A strong synergy with research in meteorology is developed.

Although current forecasting technology mainly encompasses deterministic models for the power output, the project develops the concept of complementary tools that can be used jointly to traditional forecasts to assess wind predictability at various temporal and spatial scales. The project develops:

• new forecasting methods for wind generation focusing on uncertainty and challenging situations/extremes;

• models for "alarming": providing information for the level of predictability in the (very) short-term. They use near-real time online observations for alerts on potential extreme prediction errors and for immediate updates of short-term (0-6h) wind power predictions on regional and local scale;

• models for "warning": providing information for the level of predictability in the medium-term (next day(s)). Such tools, based on ensemble weather forecasts and weather pattern identification, can be used to moderate risks in decision making procedures related to market participation, reserves estimation etc.

At early stages of wind energy, the focus was in resource assessment where the aim is to optimise decisions where to install new wind farms. Nowadays, with the development of large-scale wind farms (i.e. offshore) and also with the development of electricity markets, wind predictability may become an issue at the phase of site selection and design of a new wind farm. The project investigates the new concept of "resource assessment versus predictability". The predictability of a site, and especially the issue of extremes, can be considered as a design parameter when taking decisions for the installation of a new wind farm.

Finally, we analyse how new measurement technologies like Lidars can be beneficial for better evaluation of external conditions, resource assessment and forecasting.