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Integrated Wind Power Planning Tool

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This poster presents the current state of the public service obligation (PSO) funded project PSO 10464, with the working title "Integrated Wind Power Planning Tool". The project commenced October 1, 2011, and the goal is to integrate a numerical weather prediction (NWP) model with purely statistical tools in order to assess wind power fluctuations, with focus on long term power system planning for future wind farms as well as short term forecasting for existing wind farms. Currently, wind power fluctuation models are either purely
statistical or integrated with NWP models of limited resolution. With regard to the latter, one such simulation tool has been developed at the Wind Energy Division, Risø DTU, intended for long term power system planning. As part of the PSO project the inferior NWP model used at present will be replaced by the state-of-the-art Weather Research & Forecasting (WRF) model. Furthermore, the integrated simulation tool will be improved so it can handle simultaneously
10-50 times more turbines than the present $\sim$ 300, as well as additional atmospheric parameters will be included in the model. The WRF data will also be input for a statistical short term prediction model to be developed in collaboration with ENFOR A/S; a danish company that specialises in forecasting and optimisation for the energy sector. This integrated prediction model will allow for the description of the expected variability in wind power production in
the coming hours to days, accounting for its spatio-temporal dependencies, and depending on the prevailing weather conditions de

ned by the WRF output.
The output from the integrated prediction tool constitute scenario forecasts for the coming period, which can then be fed into any type of system model or decision making problem to be solved. The high resolution of the WRF results loaded into the integrated prediction model will ensure a high accuracy data basis is available for use in the decision making process of the Danish transmission system operator, and the need for high accuracy predictions will only increase
over the next decade as Denmark approaches the goal of 50% wind power based electricity in 2020, from the current 20%.