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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 title "Integrated Wind Power Planning Tool". The goal is to integrate a mesoscale 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. Using the state-of-the-art mesoscale NWP model *Weather Research & Forecasting model* (WRF) the forecast error is sought quantified in dependence of the time scale involved. This task constitutes a preparative study for later implementation of features accounting for NWP forecast errors in the DTU Wind Energy maintained *Corwind* code — a long term wind power planning tool. Within the framework of PSO 10464 research related to operational short term wind power prediction will be carried out, including a comparison of forecast quality at different mesoscale NWP model resolutions and development of a statistical wind power prediction tool taking input from WRF. The short term prediction part of the project is carried out in collaboration with ENFOR A/S; a Danish company that specialises in forecasting and optimisation for the energy sector.
The 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 defined by the WRF output. The output from the integrated short term prediction tool constitutes 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. 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 2025 from the current 20%.