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## Prediction of Power Output in a Large Wind Farm Using the WRF Model

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A weather research and forecasting (WRF) model, offline coupled with the Jensen's wake model in WASP, is used to predict the power output in a large wind farm located within the Changhua Coastal Industrial Park, Taiwan. The wind farm has 31 Vestas V80 wind turbines with a hub height of 67 m installed in the park area (about 8 by 8 square km). A WRF simulation can provide simulation results of wind speed, wind direction, pressure, and temperature every 30 minutes for model validation. We chose December 2015 as the main simulation scenario, because that month was mainly northeast monsoon, and the wind speed could change from 2-3 m/s to more than 25 m/s every 3 to 7 days. The WRF results are then used in Jensen's wake model in WASP to estimate the turbine power output. The simulation results show that as long as the turbine is under normal operating conditions, the predicted and actual measured power outputs have an acceptable agreement. The comparison of wind speed and wind direction is also quite consistent. The predicted temperature is lower than the measured temperature at the actual hub position. This discrepancy is mainly because the hub generator generates a lot of heat during the power generation process, which causes the air temperature near the hub to rise.