



## **Comparison of wind power forecast using wind speeds at different height levels**

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The success of wind energy is determined by reliable wind power forecasts. These are needed for the efficient grid management in regions of large installed wind power. Only this can lead wind energy production to an economic success in a deregulated electricity market. Wind power forecasting is based on wind forecasts derived from Numerical Weather Prediction (NWP). They either focus on statistical methods or consider physical parameters as atmospheric stability, roughness and orography or they combine these two approaches.

The newly developed model 'Hugin' is used to calculate wind power for Germany, with special focus on the area of North-West-Germany which has a rather flat topography. As part of the new approach artificial power curves are used to transfer wind speeds to wind power.

For our study we used forecast data of the European Centre of Medium-Range Weather Forecasts (ECMWF) for the year 2004. There are several possibilities to adapt the predicted wind speed to hub height. The simplest approach is to take the widely used 10 m wind speed and calculate it with the logarithmic wind profil to hub height. In a second step the influence of the thermal stratification on the vertical wind profil is taken into account. The latest approach is to use directly upper level wind speeds as computed by the numerical weather model.

The power predictions with the three different procedures are compared with measured wind power generation. It will be shown if it is necessary and worthwhile to use physical parameterization or to integrate data of high level wind forecasts into the wind power prediction.