



Wind energy forecasting for the Netherlands using the WRF atmosphere model

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BMT ARGOSS operates the WRF atmosphere model for regional weather forecasts and long-term historical analyses across the globe. Operational forecasts for the Netherlands are provided to an energy company to obtain power output forecasts up to 5 days ahead. The WRF model is operated at resolutions of 3 km and 9 km. Forecasts are provided 4 times per day, up to 120 hours into the future.

To estimate an accurate power output forecast based on a single weather forecast, wind speed, direction and air density are computed at specific wind farm locations, at hub height. Additionally, an uncertainty interval for the wind speed forecast is estimated based on several components: a multi-year hindcast validation study, a model forecast skill validation study, ensemble data from a global model and the spatial wind speed variability around the location of interest. Using the 4 parameters wind speed, wind speed uncertainty, wind direction and air mass, a statistical model provides power output forecasts based on a historical database of power output and modeled wind forecasts.

The presentation will focus on the methods applied for model validation and estimating the wind speed uncertainty interval for a single model forecast. Model improvements related to topography and land use data sets are also discussed.