



Weather For Vage – Improving The Value Of Variable and Uncertain Power Generation In Energy System

Juha Kilpinen, Karoliina Hämäläinen, Janne Kauhanen, and Sami Niemelä
Finnish Meteorological Institute, Meteorological Research, Helsinki, Finland

FMI is participating in VaGe project (funded by Academy of Finland) with the lead of VTT (Finland). The purpose is to improve operational decision making in the power systems when considering the variability and uncertainty of wind, photovoltaic (PV), water inflow, heat and electricity demand, their correlations and possible sources of flexibility. The whole energy system will be modelled and impact of weather variations will be estimated on the unpredictable and predictable part of the system. The modelling covers the area of Nord Pool Spot (Nordic countries, Eastern Baltic countries and UK).

Energy consumption is largely depending on weather and its variations. Renewable energy, mainly solar power, wind power and hydro-power affect nowadays almost 30 % on production side in Finland and more in other Nordic countries.

FMI will verify raw ENS (ECMWF) forecast data and statistically calibrated ENS forecasts for the particular test period and MetCoOP MEPS forecasts for experimenting. So far we know that all raw ensembles are under dispersive and calibration therefore compulsory. The verification and calibration tools are jointly developed within Aladin-Hirlam co-operation during the past few years. The verification tool has most relevant verification scores and graphics supporting probabilistic forecast verification. Non-Gaussian Regression (NGR) is used in present calibration version and the calibration area is Northern Europe. At the moment temperature and wind speed forecast are calibrated. Work is going on with 100 m level winds and calibration of precipitation amount will start in near future. For 100 meter wind calibration a set of LIDAR observations is used. For other meteorological parameters traditional observations are used.

So far the calibration has increased the probabilistic skill and accuracy of the forecasts on average but locally they are not always perfect. Some calibration methods are, however, still immature and need to be developed further to capture the local details of error better.