



## EXPERER SERVICES TO WIND ENERGY PROJECTS

Weather conditions strongly affect wind power production and therefore weather and climatological conditions at wind farms should be carefully analyzed before making any investment decisions and building the wind turbines at the project area.



### Wind measurements

Wind measurements and analysis greatly influence the financial side of wind power projects and the investment decisions. The Finnish Meteorological Institute (FMI) can provide wind measurements at the selected project area. These measurements will be carried out with modern technology combined with long-term expertise. The measurement systems used can be mast or remote sensing technology (SoDAR, LiDAR). FMI operates the national weather station network and in wind energy projects we will also utilize that know-how.

### Wind measurements includes

- » Design of measurement site and system
- » Meteorological and technical review of site
- » Instruments with installation
- » Commissioning of measurement system
- » Quality control and sustenance
- » Measurement exchange and analysis

### FMI Services

- » Wind measurements (mast, LiDAR, SoDAR)
- » Measurement analysis
- » Detailed wind potential analysis based on Wind Atlas 2009
- » Wind index/ Representativeness of measurement period
- » Icing forecasts
- » Marine services (sea level, waves, sea ice)
- » Short term wind and wind power production forecasts

### Wind index

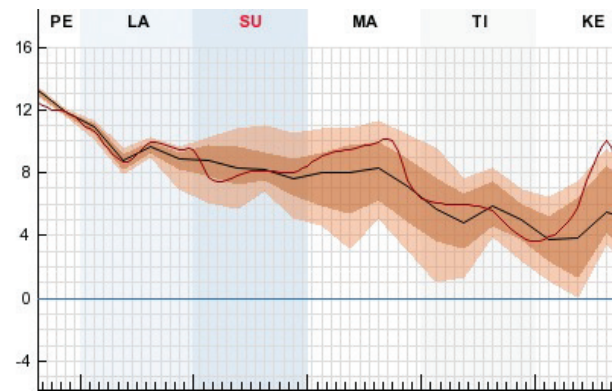
Wind conditions vary throughout years and therefore the conditions during the measurement period should be compared to the long term wind conditions. The Finnish Meteorological Institute calculates wind indexes if estimate of the representativeness of the measurement period or post-analysis of wind power production is needed. These wind indexes are based on wind measured at weather stations and re-analysis of data combining past observations and atmospheric modeling.

### Wind potential analysis

The wind potential analysis for the project area can be performed before or after the wind measurements at the site. If performed before the measurements, the wind potential analysis is based on the Finnish Wind Atlas 2009, and if performed after, the analysis is based on the measurements. The distribution of wind power production at the wind farm and the wake effects are identified using computer models.

### Short-term weather forecasts

Finnish Meteorological Institute produces customized weather forecasts for energy companies. Weather forecast is important input information when planning wind farm operation, in wind farm operation itself and when giving estimates on wind power production to stock exchange.



An example on temperature ensemble forecast (0-10 days)

### Finnish Meteorological Institute

Finnish Meteorological Institute is service and research agency. The institute provides weather, marine and climate services for ensuring public safety and to different sectors for decision-making. Finnish Meteorological Institute develops active observation methods and numerical models to produce more exact information to the public and stakeholders and also services which meets customer needs. Service development and research related to wind energy are implemented in co-operation with customer and internationally.

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Wind speed distribution at the project area and planned wind turbines with wake effect. >>>

