

WIND RESOURCE ASSESSMENT

Wind resource assessment is the most crucial phase in the development of a wind power project. It aims at the definition of the wind characteristics over a candidate wind farm site and is accomplished by means of theoretical modeling of the wind field or wind potential measurements, especially in complex terrain where the uncertainty of a wind atlas is increased.

The Laboratory for Wind Turbine Testing (LWTT) of CRES performs wind potential measurements using a stand-alone station capable of recording wind speed and direction, as well as supplementary meteorological parameters (atmospheric pressure, temperature, humidity). A digital data acquisition system having a sampling rate of 1 Hz is used to collect measurements and store pre-processed data in both a buffer and a flash card. The data loggers used are manufactured by Symmetron (model Stylitis-40). Day-to-day follow up of the system status and frequent data downloading and re-programming is obtained through wireless transmission (data logger extension + GSM modem + battery). The duration of each data set is usually fixed at 10 minutes. For each interval, standard statistical analysis of the collected magnitudes is performed deriving averages, standard deviation values, max and min values. The measurement campaign duration is usually one year. Shorter measurement campaigns combined with Measure-Correlate-Predict methods applied against long-term reference stations operated by CRES (in Greece) are also offered. Detailed wind structure and micro-siting studies employing up to 60 m masts and/or fast response sonic anemometers and mobile masts and techno-economical studies may be carried out.

Monthly reports are issued. A variety of comprehensive graphs and tables is provided by the in-house developed WindRose© software, an Excel-VisualBasic application providing overall statistics, diurnal and monthly wind patterns, windrose diagrams per month for mean and maximum wind speeds, Weibull scale and shape parameters in total and sectorwise, turbulence dependence on wind speed and direction, AEP of selected wind turbine types, capacity factors, power density, calm frequency of occurrence etc. The test report also provides a thorough site description and an uncertainty estimation.

LWTT has performed wind regime measurements under contracts (owners and operators of wind farms, local government authorities, investors) all over Greece, and also in Italy, Turkey and Cyprus. LWTT also operates a permanent wind monitoring network in Greece. For wind potential feasibility studies in Greece, the data from a network of 100 stations deployed by CRES can be ordered.

LWTT is accredited by the DAP (Deutsches Akkreditierungssystem Pruefwesen) according to **DIN-EN ISO/IEC 17025:2000**. The accreditation scope includes wind resource measurement.

