

## Wind Measuring

The wind is subject to strong temporal and local fluctuations. Therefore very fundamental meaning if possible reliable Wind measuring is to be determined to the wind energy potential.



At locations with very complex terrain the results of a computer simulation are frequently faulted, so that these by an at least one year's Wind measuring and comparative views should be included to measuring data of many years.

Wind Measuring are offered of the WINDCOM as Service.

For this at the location measuring masts are established with the desired and/or necessary height and equipped with anemometer and Data Logger.

For the measurement of the wind velocity to MEASNET calibrated cup anemometers are used.

The recording of the wind direction is takes place by means of potentiometer Wind Vane.

The measured values should be stored out 10-min average values on a Data logger.

The energy yield is charged to the system specific performance characteristic with help on the basis of

the 10 min mean average values of the wind speed at the potential location.

The performance of a wind power plant increases approximation wise cubically the wind speed. A measuring error of 5% at the wind speed leads approx. 15% to a fault at the energy yield. It points, how important an exact Wind speed measuring is.

### Anemometer

The anemometers should be calibrated before the beginning of the wind measuring. Institutes certified according to DKD (German calibration service) or MEASNET.

### The wind direction

Wind direction is usually measured on a height.

### Temperature sensor and air pressure sensor (optional)

The flow energy of the wind is proportional to the air density. This is calculated from the temperature and the air pressure. For the improvement in the yield forecast the air temperature and the barometric pressure are therefore often recording.



### **Data Logger**

In the data logger includes all measuring signals. The current measured values are stored. As a time row.

### **GSM-Modem (optional)**

The data loggers' attached GSM modem makes the long-distance data transmission possible over the mobile telephone network. As a distant terminal a PC is necessarily. With a telephone modem.

### **Shelter Box**

For the protection from weather, theft and vandalism the data logger is in a lockable Shelter box.

### **Meteorological measurements**

In connection with questions of the air-pollution control it is around the respective climate conditions to grasp required, also the physical condition of the atmosphere exactly to be able determine.

To this it requires the measuring of a variety of meteorological parameters

### **Wind (Wind direction and Wind speed)**

Only the horizontal wind is generally measured since the vertical component of the ground wind at an undisturbed flow low is. Because of the ground friction the wind speed increases primarily strongly in the undermost layers of air with the height. Vegetation, buildings udgl. have great influence on the wind speed and the wind direction. The choice of location therefore is of special significance at the wind measuring. As a rule, the representation of the wind is made by the detail of the wind speed (strength of the wind) and wind direction.

### **Airtemperature**

The air temperature is, defined as a measurement of an adequately radiation protected thermometer which is in the thermal balance with the surrounding air.

### **Atmospheric humidity**

The water contained in steam form in the air (atmosphere) is understood by atmospheric humidity at the ruling conditions (air pressure and air temperature) in meteorology. The detail is carried out as relative atmospheric humidity (ratio of steam pressure to repletion steam pressure at the given air temperature) in per cent

### **Air pressure**

The air pressure is the pressure, which the air of the atmosphere exerts due to the gravitation on its document or one of their air layers



It decreases like the density with the height and sways according to the movement events in the atmosphere.

### **Rain Gauge**

Liquid or solid condensation products made of the atmosphere which reach the earth's surface are described as a precipitation; e.g. these are rain, snow, hail, soft hail, dew, hoarfrost, hoarfrost and weeping fog. One must distinguish...between the pure measuring of the precipitation height in collecting basins and collecting a chemical Analyse. from precipitation to an end ...

### **Global radiation**

The global radiation is the radiation striking from the upper half-space on a horizontal area in the wavelength range of the sun spectrum of 0.3 to 3  $\mu$  m of (sum of the direct solar and diffuse sky radiation). Your recording is carried out with so-called Starpyranometers, which belong to the group of the "black white Pyranometer" and measure the intensity of radiation not immediately but on the detour about a temperature difference produced by it.

At electrical Pyranometern this difference is, changed by thermocouples into a proportional voltage with help through what the complicated measuring of a radiation current is explained by a simple voltage measurement.