

Erection and Installation of a 40-m Wind Energy Data in the North East of Saudi Arabia: A case Study

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The Saudi Electricity Company (SEC) has commissioned a team from King Fahd University of Petroleum & Minerals (KFUPM) to assess the potentials of using wind energy to supply remote settlements in Saudi Arabia. The study requires the collection of wind data at various heights and under different weather conditions. This paper reports on the erection and installation of a 40-m wind mast to collect wind speed, wind direction, pressure, temperature, relative humidity and solar radiation data for one complete year at a remote location in north eastern part of Saudi Arabia.

A 40 meter tall wind mast was selected to collect wind speed data at 20, 30 and 40 meters above the ground level. The 40-m wind mast supported by 20 guy wires fixed at 5 levels, was erected on 14th September 2005 at the site of interest by KFUPM experts. The wind vanes were put at 30 and 40 meters above ground level to record the wind direction. The other meteorological sensors, such as temperature, pressure, relative humidity and global solar radiation were installed at approximately 2 meters (AGL).

The system stores ten minutes average data on the memory of the data logger while the scanning is performed every one second. The system is capable of transferring the data through e-mail on periodic bases as programmed. The data is received at Dhahran 900 km away from the site. The data received at KFUPM through e-mail was found to be complete and error free. All the sensors are working in perfect condition.

In September 2005, the wind speed values were 4.5, 5.2 and 5.5 m/s at 20, 30 and 40 meters above ground level (AGL). These values clearly indicate that the wind speed varies with height. The wind direction values WD1 And WD2 measured at 30 and 40 meters AGL showed that the wind was prevalent from the North direction during entire month.

The paper will describe the team experience in erecting the wind mast and will provide up-to-date analysis of wind data and the related meteorological items.