

AppNotes:

Wind profiling using SODAR for wind power assessment



Motivation

In order to reach optimal heights of wind turbines for power generation, it was necessary to find alternatives for wind profiling besides anemometer towers.



Higher towers mean a considerable increase in the cost of equipment, civil works, structures and permits. Besides, towers are fixed structures and additional costs are produced if want to be removed or changed in location.

Even though using remote techniques like SODAR or LIDAR was quite new in the sector at that time, they had some advantages that made worthwhile to give them a try:

- fast to deploy in the field
- easy to change in location
- less environmental impacting
- higher volume of air is taken for measurement compared to an anemometer, that could be also affected by the tower itself.

SODAR had been used for many years for air pollutant dispersion and for airport management.

Objective

The main objective of this project was to confirm SODAR could be a solid tool for win power resource evaluation.

Check if this tool is valid for determining the wind profile for the first 200m meters of the planetary boundary layer with enough precision and representativity in order to be useful for wind power assessment.

Explore the weakness and advantages of this technique in relation with classical anemometer tower.

Case Study Summary

Services:



Location:

Products Used:

SODAR

Measured Parameters:

Wind Profile



Methodology

A REMTECH PA0 (remtech.com) phased array SODAR was first tested at laboratory. This meant hardware, software and communications checks. These included the integration with a GPRS SAGEM router as gateway. For that time, this kind of routers were not very common in field experiments.

Two approaches were developed for this project:

- Housing and powering solution based on solar power. These SODARS were first design for AC continuous powering and were considerably power demanding.
- Datalogging and sensor system for ancillary information such as temperature, precipitation and currents, in order to learn as much as possible about the consuming patterns.

SODAR was installed in a location characterized by extreme temperatures, with freezing temperatures during winter and temperatures above 30°C in summer. It was installed at a reasonable distance of a 80 m anemometer tower.

Data was received through internet to a central server, processed and sent to our client. This survey lasted for some years and preventive and corrective maintenance was done by our personnel. The client was very involved in all the processes.

“Nowadays our client has SODAR measurement as a standard tool for wind profiling”



Results

Nowadays our client has SODAR measurement as a standard service and is a powerful actor in this kind of measurement. The SODAR used in this project can be considered portable and useful for field deployment which makes this instrument suitable for:

- Preliminary wind power assessment
- Extrapolation of results obtain by towers.
- Completing and verify assessments done using towers.
- Assess wind power resources at locations where tower cannot be installed due to technical, environmental, economical or legal constrains
- Wind profiling up to 200 m and more

Thanks to our excellent trajectory with projects like this and good procedures, professional competences and environmental commitment, interMET has accreditation on ISO 14001:2004 for the activity: “Design, installation and management of meteorological and environmental networks”.



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