

SODAR Services

by WES Engineering LLC

WES Engineering LLC is now able to offer complete wind measurement, monitoring, and analysis services to wind energy projects. This includes measuring wind using traditional pole mounted cup-anemometers and wind vanes, modeling of wind speed over the project area and predicting wind speeds and energy at each turbine location using WAsP modeling software, and now Sound Doppler Radar (SODAR) mobile wind measurement at potential turbine locations.

SODAR uses sound signals sent up into the sky and reflected back to the receiver to measure wind speeds. The unit is best operated in conjunction with on-site wind measurement equipment installed on a nearby tower. A temporary met mast can be added on the site near the SODAR if no additional cup anemometer (or similar) wind data and wind direction data is available.

SODAR Equipment- ASC Wind Explorer

The ASC Model 4000 is a leading choice for wind energy projects seeking to reduce production uncertainty by measuring wind speeds and shear in the rotor plane, the unit will measure the wind speeds up to 200m (656 feet) above ground.

Model 4000 Specifications:

Maximum Height	200 meters
Minimum Height	20 meters
Height Resolution	5 meters
Frequency	4500 Hz
Averaging and Reporting Interval	User Selectable
Wind Speed Range	0 to 35 m/s
Wind Speed Accuracy	< 0.5 m/s (WS > 2.0 m/s)
Wind Direction Accuracy	± 5 degrees (WS > 2.0 m/s)



Photo of ASC unit on trailer

Work Scope

The following tasks describe the SODAR work to be performed for Client:

- 1) Pre- installation site visit at Client's request, to inspect site/sites and verify effective use of SODAR and determine location and requirements for SODAR unit to operate during term of deployment (i.e., 4 season unit with snow melting capability, etc)
- 2) Trained staff will initially install and commission the SODAR system at the desired primary location, and verify no obstructions will prevent proper data acquisition. The system will be operated at the site as long as necessary to properly characterize the wind resource and shear characteristics of the site so that accurate annual wind speed and energy estimates can be made at hub heights of 80m and 100m. Wind data in ten minute average intervals will be transmitted daily to WES Engineering and Client via cell logger.
- 3) If requested by Client the SODAR unit can be moved to other locations at the project site where it will operate for additional time as requested by Client.
- 4) At the end of the measurement campaign, trained staff will decommission the SODAR and remove it and any other associated equipment from the site, and restore the site to pre-existing conditions to the satisfaction of the Client.

- 5) SODAR data will be compared with the data from the closest wind measurement tower with ten minute average wind speed data. The two data sets will be compared and the site cup anemometer data will be used to “calibrate” the SODAR data for wind speeds and long term averages.
- 6) The shear values from the SODAR will be used to calculate 80m and 100m hub height wind speed and energy estimates, these shear values will be much more accurate than the projected shear using the wind speed data from the cup anemometers on the site wind measurement tower.

Deliverables:

- 1) Database of ten minute average data from the SODAR, cleaned to remove any data that was affected by precipitation, snow cover, obstructions, or equipment issues.
- 2) Interim reports will be delivered monthly summarizing the data measurements to date, and any issues that may need action to improve the data collection.
- 3) A report will be created describing the results of the SODAR campaign and the measurements made. Recommendations for any future work will be made, if needed. Wind speed and energy production estimates for up to 4 turbines will be made in the report as requested by Client.

Responsibilities of Client

- 1) providing site access for WES Engineering employees or subcontractors to setup and maintain the SODAR unit
- 2) Assist with security of the SODAR unit, by informing employees and neighboring residents of the unit and to keep eye on it should there be any activity near the unit. The unit will be on a trailer and locked to a large ground screw anchor of considerable strength.
- 3) Provide monthly records of ten minute average wind speed and direction data from the “site” wind measurement tower.

Schedule and Budget

The SODAR unit can be mobilized to the site starting as early as _____, 20__.

Reports will be delivered within 2 weeks of receipt of the SODAR data AND met mast data.

Cost:

The mobilization, demobilization and calibration of the unit, **\$3,000 plus travel expenses to and from the site, billed at \$1.25 mile.**

The rental of the unit, with minimum rental period of three months (recommended time interval to get significant data to characterize site wind shear) is **\$10,000.**

TOTAL COST FOR 3 MONTH CAMPAIGN, DATA AND REPORTS \$13,000

Additional months provided at \$2,750 per month, with the requirement to notify of extended months within 30 days of execution of the initial contract. All other extensions are subject to equipment availability.