

Wind Energy Solutions

ACCURATE DATA FOR BETTER DECISIONS

Efficiency, Accuracy, Reliability



Renewable Energy

RENEWABLE ENERGY

Wind energy solutions to address climate change

Climate change is one of the most pressing issues our world currently faces. Without action, there is potential for environmental devastation and other impacts yet to be determined.

In the energy domain, there is a need for renewable resources to provide clean energy and fight climate change and pollution. Renewables, such as wind energy, are an environmentally friendly alternative to traditional sources that emit pollutants and contribute to climate change.

Ensuring the energy output is accurately estimated is fundamental to understanding the wind farm's sustainability and performance. There are several challenges we must address to ensure these sites will be able to operate at their highest potential. Common challenges include choosing the right site location, oversight of operations and maintenance costs, and verifying site performance.

Challenges: resolving these can be the difference between success and failure



⚠ Site assessment

When constructing or operating a wind farm, wind assessment measurements help to determine if a site has the necessary wind resources for efficient energy production. The amount and availability of natural resources is vital to the performance of a wind power site.

⚠ Operation and maintenance (O&M) costs

Sensor durability and versatility can greatly impact operation and maintenance costs. When collecting wind energy measurements, it's important to have rugged sensors that can survive strong winds, powerful storms, and harsh conditions. Without a system that can withstand these types of environments, data can be inaccurate or lost to power outages, resulting in more maintenance costs.



⚠ Verifying and assuring site performance

The reliability of data is key to assuring site performance. Data needs to be collected and stored in a secure and effective way. The information also needs to be clear, accurate, and timely. If a system can't supply reliable data, it's an efficiency disadvantage.



WIND ASSESSMENT SOLUTIONS

Optimized, data-driven decisions for wind energy

Solution | Site Assessment Data ▶

Wind measurements are a key component for site assessment, management, and power. Assessment can determine where wind turbine farms are constructed based on the projected efficiency of a site's available resources. Assessment can also provide data for research or to analyze the collection of renewable wind energy post-construction. For site assessment, our systems are capable of monitoring different wind measurements, including wind speed, wind direction, and air density with real-time or interval data.



◀ Solution | Data-Driven O&M Decisions

Reliability and versatility are key when it comes to selecting a cost- and energy-efficient wind assessment system that is right for your application. Our wind assessment systems provide clear, reliable data and even allow unattended measurement and control decisions based on time or conditional events. Our data loggers store data locally and make it available to a SCADA system through different communication methods to guide appropriate site and measurement decisions.

Solution | Verifying and Assuring Site Performance ▶

The ability of data loggers to perform advanced control functions and provide reliable information is a great asset to site performance. Our systems are equipped with wide operating temperature ranges and weatherproof enclosures to ensure reliable operation and accurate data collection, even in adverse conditions. These data loggers can also make and record measurements, control electrical devices, and have different channel types that enable nearly all sensors to be measured on a single unit for efficient operation.



THE PROOF

Delivering insight: global expertise

Campbell Scientific has been providing measurement solutions since 1974. During that time, our solutions have delivered the information that helped scientists gather data to better understand climate change and other human-made environmental impacts; and supported countless organizations, institutions, and national agencies to provide more efficient and effective wind energy services to their community.

Our instrumentation hardware is known to be the best in the business. Our software services provide an unrivaled level of insight. Our project delivery expertise combines them both to deliver unique end-to-end solutions.



USA | Wagoner Wind Energy Project

Finding an efficient site to house a wind farm prior to development is key to the success of the farm's energy output. Developers scouting a potential location in the Midwestern U.S. were looking for a system tower to measure wind speed, wind direction, temperature, and pressure at multiple heights. These elements ensure that assessment data is continuous and consistent to determine the best site. If developers don't have access to measurements at multiple heights, they risk data inaccuracy or could lose data if one sensor drops out.

For this assessment, the developers selected Campbell Scientific, partnered with Wagoner Wind, to provide a Wind Resource Assessment (WRA) package. The partnership capitalized on the strengths of each company to supply in-situ measurements in an ongoing project assessment. Campbell Scientific was used for instrumentation, data loggers, and a communications package while Wagoner Wind was used for their tower, installation, and field services. The instrumentation package consisted of six Class 1 anemometers, two wind vanes, one air temperature/relative humidity sensor, one air temperature sensor, and one pressure sensor.

Wind farms located off the grid benefit from having remote communication capabilities to observe measurement collection while not physically on-site. The CR1000X was the data logger of choice with a Campbell Scientific CELL210 for cellular communications, programmed to send data files once per day via email. The measurement system is powered by a small solar panel and battery for continuous operation.

After determining the measurement package, Wagoner Wind applied their extensive knowledge in tower selection, instrumentation mounting, and complete system installation to provide the necessary hardware for deployment.

The combination of monitoring equipment resulted in a complete WRA solution with wind speed measurements at three heights, wind direction at two heights, and air temperature and pressure at two heights. With this system, the developers were equipped with the tools to secure reliable data and assess their desired wind resource site.



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