

Reduce Costs and Downtime and Maximize Energy Production with Predictive Maintenance

Ovation™ Green Wind Turbine Condition Monitoring Solution



EMERSON™

Undetected Component Wear and Thermal-Related Issues Can Escalate to Become Major Issues

Safely extending wind turbine operating life enables wind farm owners and operators to extract the most value out of their assets.

Wear and tear on critical drivetrain components such as gearboxes, generator bearings and main bearings shortens the expected useful turbine life. This can be accelerated by several factors including exposure to harsh conditions and extremely high and varying torque loads.

Even though these components are designed to withstand severe environments and operating conditions, as turbines age they will experience a sharp increase in maintenance costs and their operational life will likely fall short of expectations.

If left undetected, misalignment, imbalance, looseness, cracks, or other mechanical wear problems can quickly escalate and eventually cause significant equipment damage, machine failure, or even an unplanned outage. Expensive repairs and extended downtime translates into lost generation and lost profit.

With innovative software and automation solutions, we see a future where renewable and reliable power is realized at scale, helping the power industry, as a collective, drive innovation that makes the world healthier, safer, smarter and more sustainable.



Ovation™ Green Wind Turbine Condition Monitoring

Protect your investment by predicting the unpredictable

Forecasting upcoming wind turbine maintenance can be challenging if the automation systems lack condition monitoring or restrict access to detailed data needed for maintenance planning.

Emerson's Ovation Green software and automation technologies for renewable energy includes comprehensive wind solutions that leverage our decades of deep industry expertise.

Ovation Green condition monitoring with vibration analysis is a key component of our portfolio of software and solutions for wind energy.

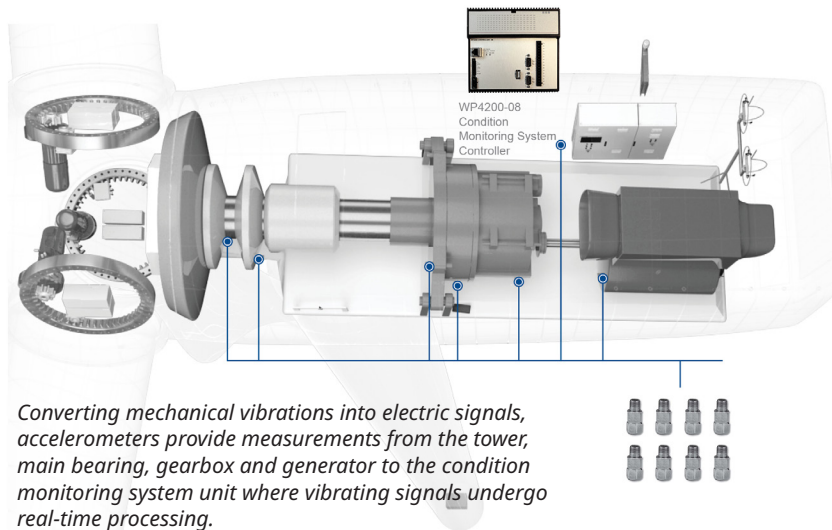
Specifically designed for wind turbines, our condition monitoring software uses real-time data to quickly pinpoint the root cause of an issue before it escalates — enabling faster, more informed decisions.

Each solution is tailored to meet unique individual turbine needs and is adaptable for implementation across a fleet of wind assets.

Results -

- Enables predictive maintenance for optimized service scheduling
- Reduces unplanned outage risk and cost
- Increases turbine availability
- Enhances turbine performance





Key Benefits:

- Powerful software and robust hardware
- Advanced diagnostics using kinematic equipment data and sophisticated monitoring algorithms
- Tight integration with Ovation Green asset management and SCADA software
- High level of signal quality
- Certified (standalone and integrated versions)
- Optional integration with third-party control systems
- Ability to use existing or Emerson-supplied vibration sensors
- Flexible setup and extension with auxiliary sensors

The Value of Predictive Maintenance

Turn data into actionable intelligence

Vibration analysis, the cornerstone of an Ovation Green condition monitoring solution, enables quick identification of a component experiencing misalignment, imbalance, looseness or other mechanical wear problems.

Integrated vibration and wind turbine operational data obtained through accurate load and performance analysis are used to predetermine critical vibration levels between a frequency range of 0.1 -10000 Hz and a vibration range of 0.001 - 25G.

Real-time vibration measurements are recorded using strategically placed precision sensors that monitor the wind tower and drivetrain components such as the gearbox, generator and main bearings.

The measurements are processed using flexible and individually configured measurement task scheduling based on time and frequency domain requirements.

Applying a predictive maintenance strategy using a state-of-the-art Ovation Green condition monitoring solution helps to reduce equipment run-to-failure situations resulting in:

- Fewer unplanned outages
- Optimized wind turbine performance
- Increased energy output
- Improved revenue generation

Notifications

Ovation Green condition monitoring software provides either a warning or alarm notification to indicate the severity of vibrations that exceed individually set and fine-tuned wind turbine levels.

Warning or alarm notifications are displayed on the site's SCADA software (either Ovation Green SCADA or existing third-party system) and can be pushed to the responsible service or site manager.

Certifications

Demonstrating Emerson's commitment to quality, our wind condition monitoring system is certified according to the DNV-SE-0439:2021-09 Certification of Condition Monitoring. The certificate includes both the standalone and the integrated condition monitoring solution.

Emerson also holds a certificate for our Quality Management System according to ISO 9001:2015.



Versatile Implementation Options

Ovation Green condition monitoring solutions are adaptable and tailored to meet the unique needs of individual turbines or across a fleet of wind assets. For wind farms comprised of multi-OEM turbines and turbine types, our vendor-independent condition monitoring software embraces open standards and protocols for connectivity to a wide range of devices. Implementing a unified solution streamlines operations, increases availability, boosts annual energy production and reduces costs.

INTEGRATED

A combined solution of wind turbine and condition monitoring control embedded in an Emerson controller.

- Wind turbine control
- Condition monitoring system software
- Condition monitoring system control platform
- Power panel
- Sensors and cables
- Accessories



STANDALONE

A standalone condition monitoring hardware solution that can be integrated into any wind turbine controller.

- Condition monitoring system software
- Condition monitoring system control platform
- Cabinet
- Sensors and cables
- Accessories



Condition monitoring and SCADA - Better together

Emerson's Ovation Green asset management and SCADA software, available for all wind turbine platforms, is a natural extension of our condition monitoring solution for a tightly integrated and comprehensive view of wind turbine health. An intuitive interface provides critical information to your organization's vibration analyst on the turbine state, as well as production, availability, alarms, weather conditions and more. Don't have a vibration analyst on staff? As an option, Emerson's certified vibration experts can provide 24/7/365 fleet monitoring services.



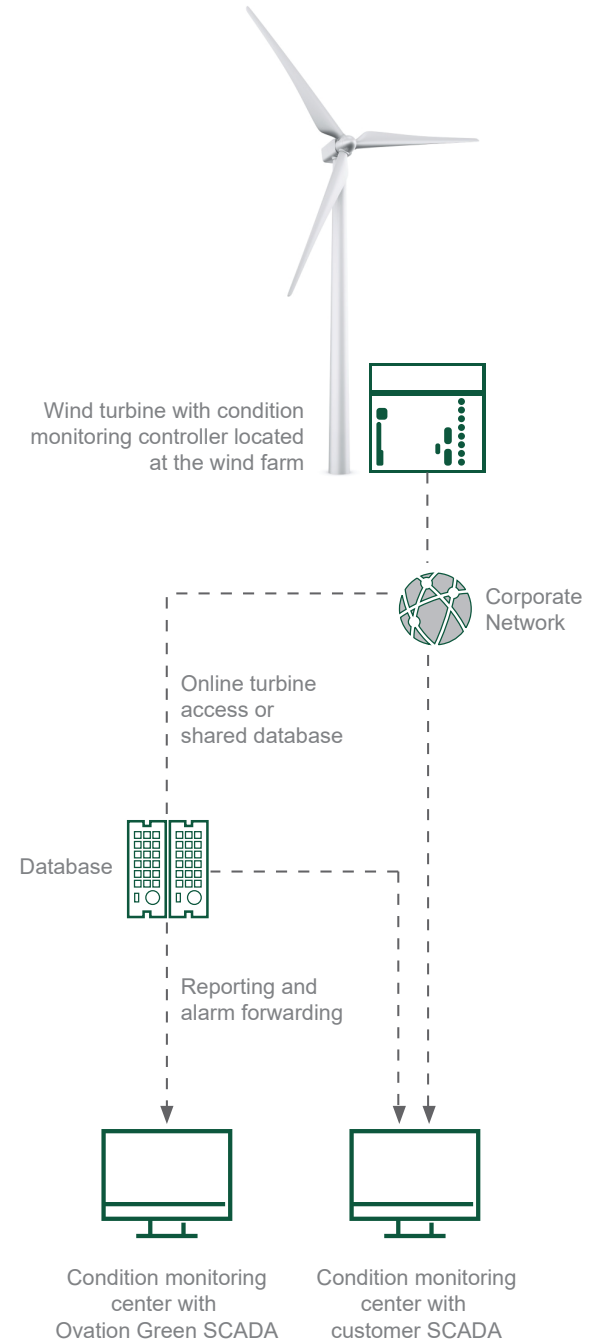
Condition Monitoring Surveillance Center

Supplement your operations with expert support from trusted advisors

Emerson's condition monitoring surveillance center offers customers remote 24/7 surveillance of their wind turbines and wind farms. Standard services included with each condition monitoring solution include kinematic data preparation, initial system configuration, condition monitoring data collection and processing during the learning phase (typically 3 months).

Our condition monitoring and Level III certified vibration experts provide professional monitoring, analysis and consulting services through three different service-level packages.

● - Included ○ - Optional	Service Level 1	Service Level 2	Service Level 3
24/7 condition monitoring data acquisition (vibration and turbine operation data)	●	●	●
Condition monitoring, data analysis, fault detection, of turbine drive train; 24/7 vibration monitoring and alerts	●	●	●
Immediate alarm notification with registered technical notes, detailed alarm and trends analysis	●	●	●
Storage of all condition monitoring-related data in a secured database	●	●	●
Close collaboration with site teams	●	●	●
Secure web access to turbine condition monitoring data and wind farm diagnostics		●	●
Annual detailed wind turbine condition monitoring report		●	●
Quarterly detailed wind turbine condition monitoring report			●
Customized individual services (data acquisition setup , maintenance interval definition, in-depth fault examination, component tracking under special operating modes)			●
Documentation management and revision tracking			●
Optional on-site condition monitoring system commissioning	○	○	○
Optional training	○	○	○
Optional extended status reports			○
Optional extended analysis			○



Get Started Today!

Let Emerson help you reduce unplanned maintenance due to failing components with a customized Ovation Green condition monitoring strategy. Key baseline vibration level and frequency values, determined using industry standards and operating wind turbine data, are continuously monitored for changes in turbine load and performance conditions.

Early vibration detection, amplified by embedded advanced diagnostics and spectral analysis enabled by sophisticated algorithms, allows proactive and planned maintenance of the affected equipment which substantially reduces time and costs.

Consider Ovation Green when evaluating a condition monitoring solution for your wind operations:

- Full access to wind turbine condition monitoring data
- Accurate monitoring via strategically placed precision sensors
- Synchronous vibration data sampling for all connected sensors
- Real-time vibration signal processing based on accelerometer inputs
- Advanced algorithms for signal processing and data analysis
- Maintenance-free design without fans and replaceable batteries
- Easy integration with turbine control and SCADA systems as well as turbine and farm networks
- Secure data flow, storage, and multi-user access
- Self-diagnostic capabilities with status indication
- Scalable software and hardware architecture
- Flexible configuration and installation options
- Scheduled or event-based data acquisition
- Web access to online and offline data



For more information visit
www.Emerson.com/Ovation-Green



PWS_010852 [2]

The Emerson logo is a trademark and service mark of Emerson Electric Co. © 2023 Emerson. All rights reserved.