

FACT SHEET

# WIND ENERGY SERVICES

Including engineering, failure analysis and technology to safeguard your assets

**Our wind energy expertise improves product quality and reliability, secures operational efficiencies, and protects infrastructure.**



### Our Services for Wind Power

Intertek supports wind power industry owners, manufacturers, developers, and operators with critical services including asset management, forensics and root cause analysis, engineering, product and system certification, structural analysis and inspection, field inspection and labeling, independent verification, and monitoring.

Through our industry-leading responsiveness and turnaround times, we bring improved reliability and safety to our clients, with reduced failure-related downtimes.

### Industry Challenge

Much of the wind generating fleet is less than a decade old, and therefore the impact of equipment age on reliability and performance has not manifested in a significant way.

**The Center for Evaluation of Clean Energy Technology (CECET) is an Intertek company dedicated to the advancement of clean energy technology, launched in partnership with the New York State Energy Research and Development Authority (NYSERDA).**



However, as this large fleet of wind assets age, it is expected that the units will degrade in terms of reliability and performance.

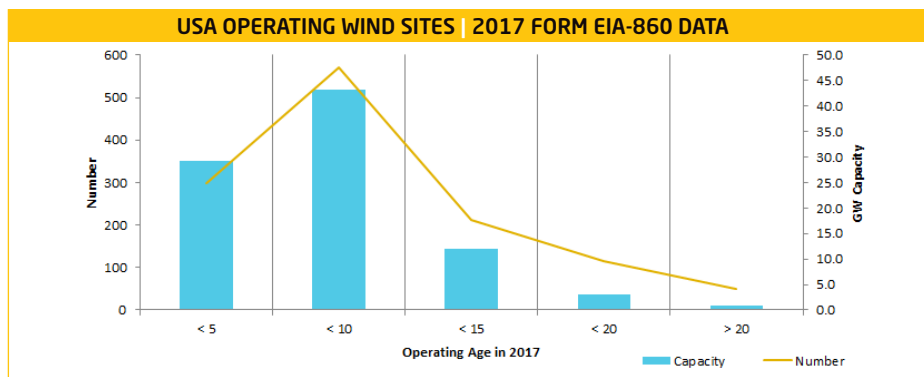
Some studies have estimated that wind turbines like other rotating equipment tend to lose 1.6+/-0.2% of their output per years.

Our experience as well as literature research confirms that most operators suffer from a lack of detailed failure and reliability data on wind turbine generators.

From a design perspective, the International Electrotechnical Commission (IEC) 61400 standard estimates the life of a wind turbine to be a minimum of 20 years.

In conclusion, the main challenges of performing reliability studies as well as having a long-term operation and maintenance (O&M) plan are:

- Sample size of failure data
- Complexity of components
- Wind and site-specific variability
- Inconsistent operating practices & operator training
- Technology advancements
- Condition monitoring and predictive maintenance
- Warranty and service contracts





## Assurance, Testing, Inspection & Certification Services

- Asset Integrity Management
- Benchmarking Services – Performance & Reliability
- Condition Assessment & Monitoring
- Data Analytics & Monitoring (including sensor installations)
- Dimensional Control and Surveying
- Engineering: Mechanical, Structural and Electrical
- Electrical Testing and Failure Analysis
- Economic Evaluation: CAPEX and OPEX, including Financial Modelling
- Environmental Consulting
- Failure Analysis and Forensic Engineering
- Geotechnical Engineering
- Inspection Services (Rope Access and Drones)
- Materials Testing and Inspection
- Performance Testing
- Product Certification
- Remaining Useful Life Evaluations
- Vendor Surveillance
- Vibration Analysis

## Key Partners and Customers

- Aristeo Construction
- Babcock & Brown
- Black & Veatch
- Blattner Energy
- BP Alternate Energy
- Celsia
- Calpine Power
- Catamount
- Clipper Windpower
- Constellation Energy
- Duke Energy Renewables
- Iberdrola Renewables
- Invenergy Wind Jacobs Engineering
- Mortenson Construction
- NRG Energy
- Oscar J. Boldt Company
- Pacificorp Energy
- Padoma Wind Power
- Patrick Energy Services
- Powers Engineering
- Shell Wind Energy
- WAPA
- Waukesha County Technical College
- We Energies

## Partial List of Projects and Publications

- “Reliability, Availability, Maintainability (RAM) for Wind Turbines”, N. Kumar et al., Proceedings of the ASME 2017 Power and Energy Conference
- “Asset Integrity Management for Wind Turbines”, N. Kumar, D. Rogers, P. Besuner, WindTech International
- “Generator Reliability Improvement Program”, T. Burnett et al., Intertek Technical Paper 50
- Conference Presentation at “All Energy”, Glasgow, 10-11 May 2017
- Evaluation of Wind Energy Converter Failures at Guanacaste Wind Farm, Intertek Report 10160
- Fire Damage Assessment Report for Wind Turbine Tower, Intertek Report 8954
- Evaluation of a Small Wind Turbine to IEC 61400-2, Intertek Project 7297
- Wind Turbine Regulatory Research Project for Vietnam, Intertek Project 7157
- Metallurgical Evaluation of Wind Turbine Blade Hub Bolts, Intertek Project 7625
- Small Wind Turbine Bolting Calculation Review
- Wind Turbine Design Evaluations (*several*)
- Wind Turbine Certifications (*several*)

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### FOR MORE INFORMATION

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