

WINDGEMINI DIGITAL TWIN

DNV's online digital twin is the most advanced and comprehensive wind operations analytics solution, giving you 24/7 access to data driven insights to reduce costs, extend life and maximize production



OUR SERVICES

Blade 1 68%

Blade 2 68%

Hub 52%

Blade 3 14%

Tower base
77%
Component life

Site comparison

Gearbox
Temperature alerts

- ✓ 24/7 easy access
- ✓ Reliable
- ✓ Independent
- ✓ Affordable

Developed by DNV's wind energy experts, WindGEMINI is a wind turbine digital twin which puts you firmly in control of your wind farm operations. WindGEMINI gives you access in an efficient and cost-effective way to advanced wind turbine condition and performance analytics, enabling you to make informed decisions and prioritize limited resources.

Using a range of innovative algorithms and physics-based simulation models, WindGEMINI translates the information held within the vast amounts of SCADA data generated by your turbines into actionable insights that are accessible 24/7 through our Veracity portal.

The practical metrics generated by WindGEMINI provide key information to improve performance, optimize servicing and inspections, plan repairs or replacements and minimize downtime and lost revenue. Our dashboards and interfaces inform your financial modelling and strategic decision-making processes with a realistic indication of the condition of your assets - so that you can make better and faster decisions.

DNV is the world's largest provider of independent renewable energy advice. WindGEMINI builds on the combined experience of our Turbine Engineering department, who have over 30 years of experience in the design of wind turbines, having contributed to the design and analysis of hundreds of wind turbine models, and of our Asset Operations & Management department, who have analysed over 50 GW of onshore and offshore operating wind plant worldwide.

WindGEMINI is the most extensive analytics solution available in the wind industry and currently includes six modules:

1. Drivetrain integrity monitor
2. Structural integrity monitor
3. Power curve performance watchdog
4. Pattern of production analysis
5. Energy production analysis
6. Turbine life estimator

Drivetrain integrity monitor

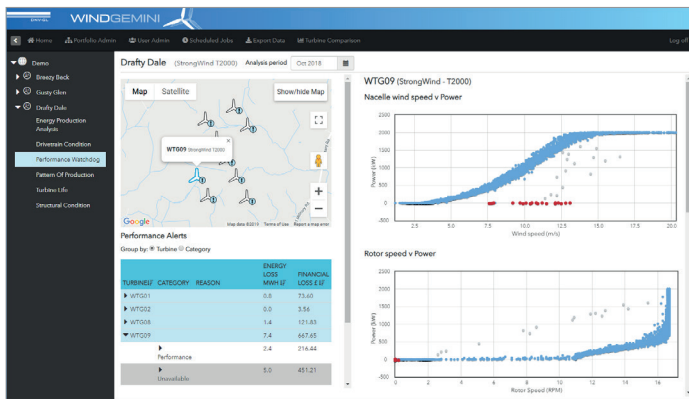
A machine learning algorithm analyses turbine temperatures to identify patterns indicative of incipient failure modes and raise alerts that can be used by owners and operators to avoid failures, optimize servicing and inspections, and reduce downtime.

Structural integrity monitor

Our frequency analysis algorithms process higher frequency data from standard turbine interfaces to help detection of structural issues, such as rotor imbalance and foundation degradation, which can be mitigated to reduce operating costs, increase energy capture and extend turbine life.

Power curve performance watchdog

DNV's artificial intelligence algorithms analyse SCADA data to identify power curve performance issues, incorrect turbine control settings, and sub-optimal operation so that these can be rectified to increase top line revenue.



Pattern of production analysis

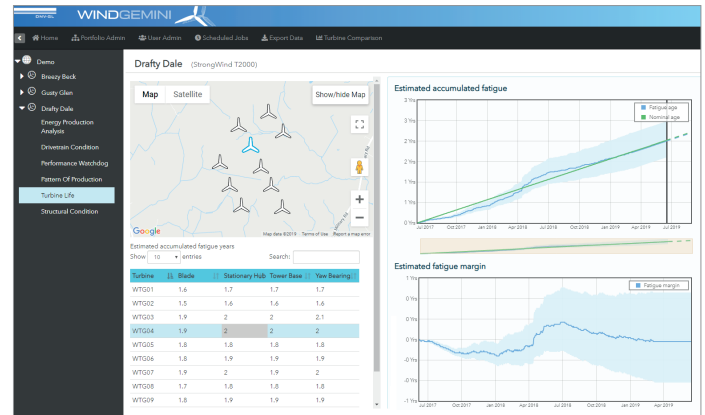
Through monitoring, the relative variation in production between turbines and over time, it is possible to identify performance outliers and degradation in turbine performance, so that these can be corrected. Our Pattern of production analysis can also be used to validate performance upgrades.

Energy production analysis

This module combines the analysis of wind farm SCADA data with the mesoscale reanalysis data to estimate the contribution of windiness, turbine availability and performance to any difference between actual production and operating budgets. Where sufficient data are available, the algorithm uses the long-term mesoscale data to generate long-term annual energy yields.

Turbine life estimator

This module leverages DNV's physics based simulation models to calculate fatigue accumulation at the main structural components. This provides an estimate of the remaining life of a turbine which can be used to identify opportunities to extend life and prioritize inspections and maintenance. The life calculations are based on DNV's aeroelastic modelling software, **Bladed**, the industry standard solution for the design and certification of wind turbines.



CONTACT US TO LEARN MORE

Request a demo today by emailing: windgemini@dnv.com

For more information, please visit www.windgemini.com or contact:

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