



## Power Performance Testing

To make sure your investments are protected, and wind turbine generator (WTG) performance is optimised for real-life site conditions, Wood offers flexible, best-practice measurement solutions throughout a project's lifecycle.

### Proper preparation leads to accountability

We support wind farm operators, investors and WTG manufacturers with IEC-compliant measurement campaigns to provide confidence in the performance of new and operational wind farms. Wood's Power Performance Testing (PPT) methods are accredited, tested and validated over the last ten years, with extensive international experience in aiding the operation of wind farms across Europe, North America and Asia.

Our customised PPT services properly quantify WTG performance, showing how the actual power curve compares to that warranted by the WTG manufacturer. PPT gives real leverage to ensure that the WTG manufacturer corrects any sources of underperformance.

Power curve measurements offer a benchmark from which assets can be optimised for real-world site conditions during the operational lifetime of the wind farm.

### We support you before site development begins. Simple steps to get ready for optimisation

Right from the start, we provide the technical and contractual expertise you need to extract maximum value from power curve warranty negotiations.

A terrain and obstacle assessment determines if the site is simple or complex, to give you a clear roadmap to WTG performance assessment.

Our assessment determines if and how complex forestry should be considered as part of orography, based on a proprietary state-of-the-art methodology developed in line with latest IEC Standard.

### We work alongside you

Your development plans and budgets are paramount. We consider them every step of the way to give you practical and cost-efficient solutions for performance assessment.

Power performance measurement plan:

- We equip you with a plan for measuring the power curve of the WTG using traditional meteorological (met) mast methodologies or, where suitable, novel lidar techniques.
- We select the most representative WTGs to be tested.
- We calculate the non-disturbed sectors and overlap them with most predominant and energetic sectors.

Our teams have a history of tackling even the harshest environments to specify, design, test, install and decommission fit-for-purpose wind measurement campaigns with met masts and remote sensing devices.

We securely collect, monitor and process your asset data, ready for analysis.

In complex terrain the site calibration process prepares the ground for power curve measurement.

Where allowed in the warranty provisions, our numerical site calibration solutions using computational fluid dynamics (CFD) make measuring the power curve cost-effective, even at smaller wind farms.

## Competence and Rigour

Wood (Renewables) fulfils all the requirements needed to perform PPT recognised by WTG manufacturers, developers and lenders.

Wood is accredited by UKAS according to ISO/IEC 17025:2017 to conduct power performance tests following the IEC 61400-12-1 Standard and IEA Wind Task 32 guidance.

We are a permanent member of the Measuring Network of Wind Energy Institutes (MEASNET) for Power Performance Services, and a recognised Renewable Energy Testing Lab for Power Performance within the IECRE system.

Wood personnel were involved in the writing of the new edition of IEC Standard 61400-12-1 and are active members of PCWG, MEASNET PPT expert group, IEA Wind Task 32, BSI L/6/2 committee, TC88 and IECRE SG 551.

## Global leadership

Wood is a global leader in the delivery of project, engineering and technical services to the energy and industrial markets.

**160+ Year history**

**\$10 bn+ Revenue**

**60+ Countries**

**200+ Offices**

**40,000 Employees**

## Get in touch

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## During the warranted operational period, and beyond. Quantify to improve

A rigorous, IEC-compliant analysis, right first time, is the launchpad for getting the most from your WTGs. Performance quantification through the only recognised method and benchmarking for optimisation of wind farm performance.

Our analysis and reporting service covers:

- Power curve measurement and performance assessment.
- Rigorous evaluation of measurement uncertainty.
- Comparison between warranted and measured power curves and annual energy production (AEP).

With an IEC-compliant hub height met mast in place, you have a valuable asset for continuous wind farm performance monitoring for years to come. We support you through data monitoring and assessment, maintenance and quality assurance.

## Getting results

### Quantification

A compliant PPT program requires an incremental investment, however, in our experience, indisputable and IEC-compliant PPT results are the only way to enable effective collaboration between the asset manager and the WTG manufacturer / O&M operator to capture and close any performance gaps and to monitor performance during the operational lifetime of a project.

### Optimisation

Our Optimiser service has been used in over 50 projects rated in excess of 3 GW and has seen an average AEP gain of 4% through constructive expert-led discussions between WTG manufacturers and site developers following analysis of operational data. This service includes forestry optimisation, noise management and life extension.