



Industrie Service

**Choose certainty.
Add value.**

Wind energy is becoming increasingly important. Despite many other innovative technologies all parties agree on one point: The power of wind must be used. But how to stay profitable? And how to ensure good

quality? The experience TÜV SÜD has gained in the area of wind energy over many years and our up-to-date know-how assist you in planning, constructing and operating safe and reliable wind turbines.

Wind Cert Services

More reliability. Long-term profitability.

TÜV SÜD Industrie Service GmbH

TÜV®



TÜV SÜD Wind Energy Certification Body – Your Expert Partner

TÜV SÜD is a leading provider of services related to technical safety and efficiency both in Germany and worldwide. From planning wind farms to designing wind turbines, TÜV SÜD offers comprehensive, customised consultancy and service.

German state authorities have authorised TÜV SÜD for wind energy certification as an officially approved body for wind turbines. TÜV SÜD is also accredited to international standards.

As a **Wind Energy Certification Body** we carry out certifications, approvals and inspections in the field of wind power and participate in the preparation of standards and regulations. Our engineers are engaged in all aspects of approval, design review and calculation (stress

analyses, dynamics, life cycle assessment) and in the review, testing, approval and certification of all types of wind turbines. We have successfully supported numerous wind energy projects, performed wind measurements and evaluated many wind park sites.

German type approval according to DIBt

In Germany official type approval of towers and foundations may only be carried out by Notified Bodies approved in accordance with legal regulations. As an accredited certification body, TÜV SÜD is authorised to prepare such type approvals for turbines. Evaluation of the structural elements includes strength and service life assessment for key components.

TÜV SÜD. Choose certainty. Add value.



Select from these TÜV SÜD Services:

■ **Type Certification**

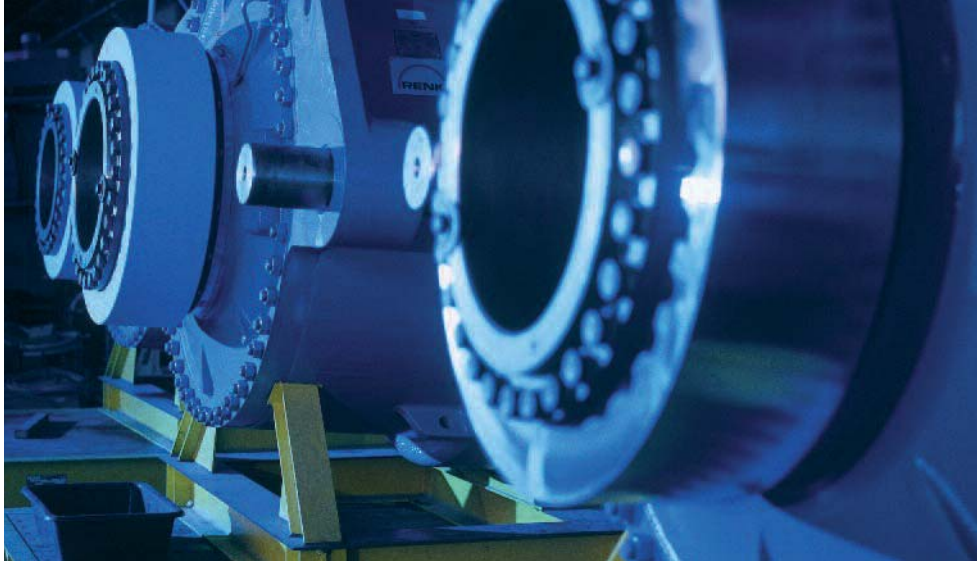
To ensure your wind energy system functions reliably.

■ **Site Assessment**

To ensure you make full use of the potential offered by your site.

■ **Wind Farm Certification**

To ensure long-term profitability of your project.



Type Certification – Ensure Quality

In a technical review, the overall plans of the wind turbine are assessed to verify their compliance with the applicable requirements and relevant national or international standards. Approval covers all aspects of the plant: testing and evaluating safety, planning, design and construction.

► **Certification and approval of the design**

- Verification of fatigue and extreme loads
- Assessment of safety and control system
- Safety configuration and operational assumptions
- Design assessment by detailed parallel computation:
 - rotor blades and machinery components
 - tower and foundations
 - electrical components and control system
- Review of operating and maintenance instructions

► **Product certification and manufacturing inspections**

- Inspection and approval of materials and components
- Review of material and quality assurance records
- Production supervision for blades, machinery components, tower and foundation

► **Type testing**

- Functional and safety tests
- Inspection of commissioning
- Acoustic noise measurements
- Type test conformity statement



Site Assessment – Ensure a Solid Foundation

TÜV SÜD provides consultancy and assessment throughout all stages of wind farm development. Our experts have worldwide experience and offer assistance in all types of wind speed and energy forecasting and in choosing the WEC type best suited to your site.

► **Analysis of wind potential – project creation**

Awareness of the wind potential for all scales, from a potential study of regions to micro-siting for a specific site, is a critical parameter for project success and the first step towards a healthy project. Paired with our expert knowledge, our expertise in acquiring and analysing climate data with respect to wind speed statistics identifies possible wind farm sites at first glance.

- Reports for all scales (country, region, site) in appropriate resolutions
- Annual mean wind speed at various heights
- Energy yield prediction for various hub heights and/or WEC types
- Report with detailed information and high-quality maps

► **Wind measurements – project acquisition**

A wind measurement campaign consisting of one or more wind measurements paves the way for an extended database which is a 'must' for all advanced and sophisticated expert reports. The data is based on our experience in the supervision and monitoring of over 100 types of wind measurements worldwide. TÜV SÜD supervises and controls qualified wind measurements and keeps you updated at all times.

- Professional installation, maintenance and dismantling of wind measurement equipment as well as preparation and supervision of the entire measurement process at heights between 10 m and 125 m
- "First Class" sensors and high-quality equipment
- Supervision of expert opinion with monthly updates/reviews
- Collection of a broad base of expert approved data



► **Wind expert reports – project qualification**

Using the data gathered from qualified wind measurements, TÜV SÜD provides 'bankable' wind expert reports. A quasi three-dimensional rendered model is used to forecast the mean annual wind energy production and wind speed for the planned project configuration.

- Calculation of mean wind speeds and energy yields for a variety of configurations
- Expert approved comparable data from a worldwide network of meteorological stations
- Independent bankable expert report with a solid project rating
- Expert notes and recommendations for further optimisation issues

We also address issues concerning the optimisation of wind farm layouts to maximise mean annual energy production by recalculating or extrapolating annual mean wind speeds to hub heights of different WECs.

► **Turbulence and extreme winds – project safety**

Does your intended wind farm turn out to be in an exposed position or in an area with heavily varying wind gusts? TÜV SÜD offers detailed calculations on turbulence and extreme wind statistics, taking into account current standards and guidelines. These data can also be used by our colleagues to determine stress and load levels.

- Determination of the wind zone with respect to DIBt and IEC
- Statistical review of base and annual mean wind speeds
- Calculation of extreme wind occurrences



Wind Farm Certification – Ensure Certainty

TÜV SÜD helps you to protect your investment by providing independent monitoring and evaluation of your wind farm project. As your expert partner, TÜV SÜD provides a full range of services from greenfield planning, due diligence and evaluation of installations to final commissioning – from a single source. The certification of your wind farm will be documented by a project certificat according to IEC WT01.

- ▶ **Foundation design evaluation**
- ▶ **Transport control**
- ▶ **Manufacturer control**
- ▶ **Errection Monitoring**
- ▶ **Site assessment – soil conditions**
- ▶ **Due Diligence**
- ▶ **Initial test**
- ▶ **Regular wind farm inspections**



Industrie Service



www.tuev-sued.de/windenergy

TÜV SÜD Industrie Service GmbH is a member company of TÜV SÜD AG and offers engineering, testing and inspection services worldwide. As third-party expert organisation with longstanding experience we can advise you on all issues related to the safety, reliability and cost-effectiveness of your systems and installations.

International Accreditation

The TÜV SÜD Wind Energy Certification Body is accredited by "DAR" as a certification body for wind energy in accordance with the EN 45011 standards and issues European and internationally accepted certifications for wind turbines.

TÜV SÜD works to the following standards: EC 61400 "Wind Turbine Generator Systems"; NVN 11400 "Wind Turbines"; IEC WT01 "Conformity Testing and Certification of Wind Turbines"; GL Guideline for the Certification of Wind Turbines; DS 471 "Loads and Safety of Wind Turbine Constructions"; DIBT-Rules "Wind Turbines" AGMA "Gearboxes for WTG-systems"

Type Certification / Wind Farm Certification

Alexander Trunz

Tel.: +49 (0)89 5791 – 2198

Fax: +49 (089) 5791 – 2022

alexander.trunz@tuev-sued.de

Site Assessment / Wind Farm Certification

Peter Herbert Meier

Tel.: +49 (0)941 460212 – 0

Fax: +49 (0)941 460212 – 29

peter-h.meier@tuev-sued.de

TÜV SÜD Industrie Service GmbH

Wind Energy Certification

Westendstr. 199

80686 Munich/Germany

Tel.: +49 (0)89 5791 – 0

Fax: +49 (0)89 5791 – 2022

windenergy@tuev-sued.de

