

//Target

Economic

- reduction of production and maintenance costs
- improvement of drivetrain performance
- extension of the lifetime of renewable energy systems

Technological

- reduction of scrap
- reworking of expensive large scale workpieces on shop floor
- FEA based prediction of performance

Global

- knowledge transfer and service for other fields e.g. ship and aerospace industry
- international harmonization of trade
- competitiveness of EU renewable energy industry

Fundamental

- transfer to national and international standardisation committees (ISO, DIN, VDI, BSI)
- best practice guides for industry

For further information on the project, please visit:

<http://www.ptb.de/emrp/drivetrain.html> →

Coordinator and contact person:

Dr.-Ing. Karin Kniel
Physikalisch-Technische Bundesanstalt
e-mail: karin.kniel@ptb.de

//Partner



The European joint research project "DriveTrain":

Traceable measurement of drivetrain components for renewable energy systems



EMRP
European Metrology Research Programme
■ Programme of EURAMET

The EMRP is jointly funded by the EMRP participating countries within EURAMET and the European Union



//Background

Today, electrical energy is mainly generated by fossil resources such as coal, oil, natural gas, and nuclear fuel. These energy resources will be exhausted during the next generations and their immense usage leads to environmental pollution, e.g. carbon dioxide emissions, nuclear waste or chemical soil contamination from fracking.

To overcome these challenges and guarantee sustainable energy for the future renewable energy resources are essential. Wind energy systems (WES) are regarded as one of the most promising technologies for the generation of renewable energy.

State of the Art

- doubling number of installed WES each 3-4 years
- maximum power provided per WES is 7 MW, 20 MW is even yet predicted
- 30% failures caused by mechanical problems
- lifetime of most WES < 20 years

Future

EU roadmap 2025:

- 25% of current electricity consumption shall be renewable energy
- reduction of carbon dioxide by 20%

//Motivation

The efficiency of WES mainly depends on the quality of its components. In this context, the reliability of drivetrains plays an essential role.

Consequences of WEA-Failures

- limited availability
- downtimes of several days or even weeks
- high operation costs
- complex and dangerous repairs, especially with offshore installations

Reliable quality assurance of large drivetrain components is of particular importance. Suitable measurement standards and calibration strategies to ensure a certain sufficient quality at the end of the manufacturing process are, however, currently not available. Within the scope of the "DriveTrain" project fundamentals for improving metrology for large components will be established.

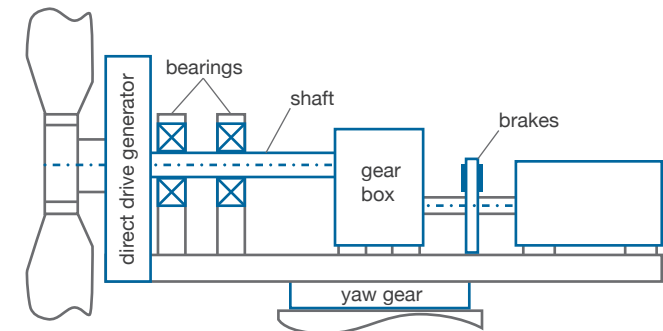
14 partners, including 5 national metrology institutes from across Europe, form the consortium of this project. Furthermore, the project is accompanied and supported by numerous industrial companies and scientific institutions.



//Tasks

Allocation of candidate solutions for measuring and characterising 2D and 3D size, form, waviness and surface roughness, establishing functional characterisation parameters

Study of shafts up to 3 m in length and \varnothing 1 m, large bearings and internal and external gears up to \varnothing 3 m, and brakes up to \varnothing 1 m



Development of measurement standards and calibration procedures in order to establish traceability for large drivetrain components

Quantification of the key additional sources of uncertainty that influence industrial measurement capability

Expansion of the virtual measuring process including modeling of the significant uncertainty contributors temperature and deflection

Verification of the developed measurement strategies and use of standards in industry as well as critical analysis of performance