

The Wind Energy Department

Erik Lundtang Petersen,
Head of Department

Our work primarily revolves around the nature of the atmosphere and how it affects life on Earth. One particular aspect of the atmosphere keeps us busy: The wind and the energy that may be extracted from it.

The Wind Energy Department seeks to meet the needs for scientifically based knowledge, methods and procedures from government, academia, and the wind turbine industry.

Our research and development activities range from boundary layer meteorology, fluid dynamics and the mechanic as well as the dynamic quality of structures, to power and control engineering, and wind turbine loading and safety. The Department's activities also include research into atmospheric physics and environmental issues related to the atmosphere.

Our assistance to the wind turbine manufacturers serves to pave the way for technological development and thus further the exploitation of wind energy worldwide. The means to this end are research, innovation, education, testing and consultancy services as well as development of procedures for operation and maintenance.

Major activities such as wind energy mapping, technology development, consultancy on wind energy projects and capacity building are all performed on a commercial basis. Other commercial activities are software development, measurement systems development and accredited testing of wind turbines.

Many of our projects involve international collaboration, and we take part in the solution of problems that are encountered worldwide in the application of wind energy, for example grid connection and integration. The Department also houses the administration of the Danish Certification Scheme for Wind Turbines, and we participate in the development of standards, both national and international.

The Department is organized in programmes according to the main scientific and technical activities, and employs a total of about 100 people, most of which are scientists.

Meteorology

Søren E. Larsen, acting Head
soeren.larsen@risoe.dk
Phone +45 4677 5012

The Meteorology Programme is aimed at basic research in the fields of boundary layer meteorology, assessment of wind resources for power generation and of wind loads on turbines and various other structures. Our day-to-day work ranges from the development of models and software, field measurements and both in-house and externally commissioned assessment studies. We also study environmental problems related to the transport of airborne pollutants and the turbulent exchange of matter during the interaction between the atmosphere and terrestrial or marine surfaces.

Aeroelastic Design

Flemming Rasmussen, Head
flemming.rasmussen@risoe.dk
Phone +45 4677 5048

The key issues for this programme are the research, development and application of aeroelastic programs, computational fluid dynamics (CFD) code and software design tools for aerofoils and wind turbine blades. The programs are used for establishing design load bases for wind turbines, in furthering the development of the three-bladed wind turbine concept, and for the development of new wind turbine concepts. Furthermore, this programme undertakes wind tunnel measurements of aerofoil section flows.

Wind Turbines

Peter Hjuler Jensen, Head
peter.hjuler@risoe.dk
Phone +45 4677 5037

The purpose of this programme is to develop new as well as improve current methods for wind turbine loading and safety design, and in addition to develop new design methods and to identify new technical and economic applications. Two key elements are experimental verification, and technical and economic analysis of the utilization of wind energy in grids and in hybrid energy systems. This research supports our consultancy activities in wind energy projects for Danish and international authorities, industry, banks and investors. It also supports our participation in the development of international standards.

Wind Energy Department
Risø National Laboratory
Technical University of
Denmark (DTU)
PO box 49, VEA-118
4000 Roskilde
Denmark

Phone +45 4677 5000
Fax +45 4677 5970
vea@risoe.dk
www.risoe.dk/vea

Visiting address
Frederiksborgvej 399
Roskilde • Denmark

We carry out pre-research for the development of new standards, and we are involved in the formulation of both national and international standardization. The programme also includes the secretariat for the Danish Certification Scheme for Wind Turbines.

Wind Energy Systems

Jens Carsten Hansen, Head
carsten.hansen@risoe.dk
Phone +45 4677 5074

An important aspiration of this programme is to lower the cost of energy derived from the wind by optimizing the wind turbine together with the grid interface and the operation of power systems. Our work includes such aspects as system integration, control concepts for wind turbines, electrical components, grid connection and large-scale wind energy penetration, hybrid power supply systems and energy storage in relation to renewable energy sources.

Risø Wind Consult is another activity of this programme, aimed at utilizing the knowledge and state-of-the-art tools available at Risø in providing consultancy and technical advice for international projects concerning the development and application of wind power technology.

Test and Measurements

Poul Hummelshøj, Head
poul.hummelshoej@risoe.dk
Phone +45 4677 5081

The research of this programme is aimed at the development of instrumentation and new methods for experimental determination of wind turbine characteristics, including test methods for the wind turbine industry. This group also represents our departmental expertise in organizing and conducting field meteorological measurements, and in providing instruments as well as data systems and data management for the Wind Energy Department and outside clients.

The Test and Measurement Programme also operates a test station for large wind turbines at Høvsøre on Jutland's west coast. This area has excellent conditions, with high wind speeds and flat terrain. We can therefore verify both performance and the wind turbine design bases for all operating conditions relevant to large wind turbines. The test station operates five test beds for wind turbines.

Wind Energy Educational Programme

Søren E. Larsen, Head
soeren.larsen@risoe.dk
Phone tel. +45 4677 5012

The educational activities of the Wind Energy Department aim to support PhD, Master and Bachelor degrees within areas of relevance for wind power production, so that:

- The wind energy industry may continue to have qualified personnel available within the necessary areas of expertise.
- The research activities within the programmes of the department are supported by Bachelor, Master and PhD student projects.

The Department presently participates in several national and international academies and networks, involving the exchange of, and schools for, PhD students and young researchers, who may give lectures. These contacts are also important for summer schools, student and post doc exchanges, and of course financial support.

Current and recent student projects at the Wind Energy Department may be seen on our web at <http://www.risoe.dk/vea/>

WAsP

Are you a certified WAsP user – or still dreaming? If you want to know more about the Wind Atlas Analysis and Application Program, please visit www.wasp.dk. For ordering, please contact us at wasp@risoe.dk or telephone +45 4677 5097, fax number +45 4677 5970.

The Wind Energy Department collaborates with partners and customers in more than 100 countries and territories around the world.

