Technische Universität München

Fostering Wind Energy Research at TUM

Speech given by Prof. Wolfgang A. Herrmann
on occasion of a symposium on wind energy held by GE
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Challenges concerning wind energy in Bavaria

- Solar power installations are omnipresent in Bavaria, but wind power stations are still not as prevalent as in the northern part of Germany where the land is flat and the winds more frequent and stronger.
- I am pleased to hear that the Bavarian State Government aims to foster wind energy technology and to make it an important pillar of the electrical power supply.
- In doing so we have to **cope with various challenges like the implementation and operation of wind power stations in rough terrain and changing wind conditions.**
- We need **wind power stations** that are **particularly efficient** and that **follow new control concepts.** Furthermore the wind power stations should **fit in with the overall appearance of the landscape.**

Wind energy research at TUM

- The Technische Universität München (TUM) aims to cope with these challenges by **pooling its competencies and working interdisciplinarily. More than 30 Chairs from different faculties have already conducted research in wind energy for many years.**
- **This includes, e.g.:**
  - non-destructive testing of towers and rotor blades
  - optimization of control techniques
  - optimization of aerodynamics through mathematic modeling
  - minimization of drive-train losses in power stations
  - harmonious integration of wind power stations into landscape

New Chair – Professor Bottasso

- The **new chair of wind energy** from **Professor Bottasso** will **merge and coordinate TUM's activities regarding wind energy.**
- Professor Bottasso, originally from Politecnico di Milano, was recently appointed Full Professor at TUM.

- He is an **internationally renowned expert regarding wind power stations** with **expertise in multi-body dynamics, aerodynamics and optimization of control systems, relevant in particular for establishing off-shore wind farms.**
- Professor Bottasso understands how to **address wind energy issues that are highly relevant;** his **technical solutions** have been **integrated into the industrial development of wind turbines.**

TUM Center for Wind Energy Research

- It is our goal **to sharpen our profile regarding renewable energy technologies** and to establish an **internationally renowned center for wind energy research.**
- There will be **close cooperation between the new chair and TUM.Energy**, a cross-faculty research initiative of the Munich School of Engineering (MSE).
- In addition, the Faculty of **Mechanical Engineering**, the **Faculty of Geo, Civil and Environmental Engineering** and the **Faculty of Electrical Engineering and Information Technology will collaborate closely** in order to **tackle challenges regarding the base of the wind turbine tower, new materials, energy storage, modern power electronics, and optimal embedding of renewable energy sources in the national power grid.**
- The **overall appearance of the landscape will be taken into account** as well as the **opinion of the citizens.** The latter implies the involvement of the **Munich Center for Technology in Society (MCTS).**
- TUM is already **part of various networks concerned with wind energy**
- **Examples:**
  - **Research Program "Energy Valley Bavaria"**, (the Bavarian Ministry of Science will invest 10 million euros in the next 10 years)
  - **WindForS:** Cooperation between TUM and other Southern German universities, Goal: Establishment of a wind turbine test field.

- There are also **university spin-offs** that are **dedicated to wind energy:**
  - **fos4X** develops fiber sensors for the load monitoring of rotor blades
  - **Ascending Technologies GmbH** develops small helicopters for the visual inspection of rotor blades
  - **We also plan to cooperate with GE concerning a multidisciplinary laboratory for the development of new technologies for axial compressors**

- As you can see, at **TUM wind energy research plays an important role. We pool competencies and existing collaborations in order to establish a strong and internationally renowned network of internal and external experts.**