
AKE 11: Erneuerbare Energie 5 - Windenergie, Systeme

Time: Tuesday 14:00–15:00

Location: DO24 Reuter Saal

Invited Talk AKE 11.1 Tue 14:00 DO24 Reuter Saal
Small is beautiful but big is better: the tale of wind energy technology development — ●PO WEN CHENG — Institute of Aircraft Design, University of Stuttgart, Stuttgart, Germany

The development of wind turbine technology has a long history. Different development paths have been chosen by the design engineers of the first hours with different outcome. In this talk the historical development of the wind turbine in the seventies and eighties will be illustrated briefly and used as a starting point to explain how the historical developments have determined heavily the current state of the art of wind turbine technology. Furthermore, the future technology development trends as well as the scientific and technical challenges that lie ahead of wind energy, onshore as well as offshore will be presented and discussed.

Invited Talk AKE 11.2 Tue 14:30 DO24 Reuter Saal
Design of a fully renewable European energy system – challenges for the physics of complex systems — ●MARTIN GREINER — Department of Engineering, Aarhus University, Denmark

Today's overall macro energy system based on conventional resources will transform into a future system dominantly relying on fluctuating renewable resources. At the moment it is not really clear what will be the best transitional pathway between the current and the future energy system. In this respect it makes sense to think backwards, which means in a first step to get a good functional understanding of fully renewable energy systems and then in a second step bridge from there to today's energy system. Based on state-of-the-art high-resolution meteorological and electrical load data, spatio-temporal modelling, and the physics of complex networks, fundamental properties of a fully renewable pan-European power system are determined. Amongst such characteristics are the optimal mix of wind and solar power generation, the optimal combination of storage and balancing, the optimal extension of the transmission network, as well as the optimal ramp down of conventional power generation during the transitional phase. These results indicate that the pathways into future energy systems will be driven by an optimal systemic combination of technologies, and that economy and markets have to follow technology.