



Guest Editorial

A Message From the Special Issue Editor

Welcome to the 2006 special edition devoted to wind energy.

As is traditional for the November special issue, many of the papers herein were recruited from the January 2006 ASME Wind Energy Symposium in the United States. These papers and the others in this issue deal with a variety of subjects that are common in wind turbine engineering and research: aerodynamics, advanced control systems, field testing and modeling, atmospheric physics, reliability, and composite structural design. In brief, one could say that these papers deal with uncertainties in wind turbine operation and how to deal with these uncertainties effectively. Perhaps this is a simplified description of wind energy research in general. But, we do know that lowering these uncertainties and creating better models of the physical processes that dominate wind turbine dynamics will be essential to the long term success of our industry.

One of the best ways to improve the understanding of the physical processes of turbine operation is to validate models with experimental data, as seen throughout this issue. For example, some of the aerodynamics papers use data from the NREL/NASA Ames wind tunnel test of 2000, which has been an invaluable resource for model validation. In the future, we hope to see similar papers that will use data from an upcoming European experiment (MEXICO) that is scheduled for the end of this year. These two important data sets should help produce important breakthroughs in aerodynamics research, which is currently one of the larger areas of uncertainty in turbine modeling.

Outside of research, the wind energy industry continues to grow at a record pace. Worldwide penetration is expected to grow by 14 GW this year. In the United States, the recently proposed Ad-

vanced Energy Initiative states that, "areas with good wind resources have the potential to supply up to 20% of the electricity consumption..." This is good news for manufacturers who should continue to experience increasing demand in the near future. Not only is the installed capacity of wind energy continuing to grow, but the sizes of turbines themselves are getting larger. This is particularly true in Europe, where land usage is an important constraint and interest in offshore wind farms is increasing. Moving offshore and increasing the size of turbines will only amplify the need for more reliable aerodynamic and atmospheric models, control systems, and advanced materials in order to keep costs of these new installations in check. We hope this special issue contributes to this progression.

I would like to thank the former associate editor, Dale Berg, my co-associate editor, Takis Chaviaropoulos, and also the authors and reviewers for working concurrently with me to complete the review process for this issue. Takis Chaviaropoulos will be finishing his three-year term in December, after which he will be passing his duties to Spyros Voutsinas at the National Technical University of Athens. This new assignment will preserve the tradition of having one European and one North American associate editor who can more easily draw high quality papers from their respective geographic regions.

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