Special Issue on Wind Energy

This Special Issue on Wind Energy contains articles that evolved from papers presented at the ASME Wind Energy Symposium, held January 2005. The range of topics covered includes: resource assessment, aerodynamics, and structures.

In 2004, 8 GW of wind power was installed, bringing the total capacity worldwide to 50 GW. This capacity is expected to double over the next five years, with two-thirds of it being planned for Europe. The Global Wind Energy Council (GWEC), an international forum uniting the wind industry and its representative associations, was established earlier this year to promote the growth of wind energy through policy, information, and education. A five-year EU-funded project on long-term wind research and technology development is about to start, covering aerodynamics and aeroelasticity, rotor structure and materials, control systems and remote sensing, wakes and electrical integration.

JSEE has greatly expanded the coverage of wind energy research. This development has been recognized by the new JSEE subtitle "*Including Wind Energy and Building Energy Conservation*". Special thanks are due to Dr. Dale Berg for his outstanding service to the Journal as Associate Editor (AE) for Wind Energy. He will be retiring as AE at the end of 2005 after serving the maximum allowable six-year term. His successor will work closely with Dr. Chaviaropoulos to continue to develop the reputation of JSEE as a highly respected wind energy research publication.

A. Steinfeld
Editor

NREL's New Hydraulic Resonance Blade Test System, K. O'Dell, *National Renewable Energy Laboratory, 1617 Cole Blvd., Golden, Colorado; e-mail: kathleen_odell@nrel.gov.* As wind turbine blades become longer and stronger, they become more difficult to test for endurance. The test methods developed for smaller blades are not as effective for larger blades. To accommodate the larger blades, researchers at the U.S. Department of Energy National Renewable Energy Laboratory (NREL) developed a new hydraulic resonance blade test system that can be scaled up as the blades increase in length. The old method uses a hydraulic actuator to push the blade up and down for millions of cycles over a period as long as four months. The new system uses a 317- to 453-kg (700- to 1000-lb) weight housed in a stand attached to the end of the blade. The amount of weight used depends on the size of the blade. The weight is precisely controlled to oscillate up and down, which excites the blade at its natural flap frequency. The new test uses one-third the energy that the conventional method uses, and the blade oscillates at more than twice the rate. Instead of taking as long as four months to apply three million cycles to fatigue test a blade, researchers can do it in less than two months. A test duration of three million cycles is typically used to represent the 20-year lifespan of a blade. The new system, which can test blades as long as 70 m (230 ft), is the only one of its kind in the world.

NREL Conducts Field Tests on Clipper's 2.5-MW Prototype, K. O'Dell, *National Renewable Energy Laboratory, 1617 Cole Blvd., Golden, Colorado; e-mail: kathleen_odell@nrel.gov.* Clipper Windpower Technology, Inc. worked in partnership with the U.S. Department of Energy (DOE) Wind Energy Program to develop this new 2.5-MW turbine design that incorporates a number of advanced elements. This new design, designated the Clipper C-93 Liberty turbine, uses a highly innovative multiple-drive path gearbox feeding four advanced permanent magnet generators. The design also incorporates a 93-m diameter rotor at a hub height of 75 m, advanced blades with truncated root section airfoils, and advanced controls. Researchers from the DOE National Renewable Energy Laboratory (NREL) are working with Clipper to field-test the prototype on a test site near Medicine Bow, Wyoming, where average wind speeds are 8.5 m/s at 61 m above the ground.

