Journal of Solar Energy Engineering

Editorial

Welcome to the 2004 special issue on wind energy. I again extend my heartfelt thanks to the authors and reviewers who have made this issue possible.

2003 was quite a good year for the wind energy industry, with approximately 8200 MW of wind installed world wide, for a cumulative installed capacity of about 40,000 MW, a 26% increase for the year. The top seven markets were Germany, the United States, Spain, India, Japan, Austria and Denmark. Of the 226 MW installed in Denmark, 166 MW were from the Nystad offshore wind farm, commissioned late in the year. This is now the largest offshore wind-power facility in the world, taking that honor from the 160 MW Danish Horns Rev offshore farm that held it for about one year. Both of these installations were constructed as demonstration projects under agreements between the Danish government and Danish utility companies to provide the opportunity to learn about the challenges of large-scale offshore installation and operation. It appears that some of the lessons learned are going to be quite expensive; the original transformers used in the Horns Rev project turbines are failing due to insufficient insulation for the marine environment and are all being replaced, and some generators have broken down and must be repaired or replaced. The problems are extensive enough that the turbine manufacturer is reportedly considering removing all the turbines so that the repair work can be done on shore.

In my editorial two years ago, I commented that it would be interesting to see what impact the entry of large companies such as Shell WindEnergy and General Electric (GE) Wind Energy would have on the wind-energy industry. Shell has invested in wind energy facilities in the U.S. and Europe and now owns about 660 MW of wind plant, of which 650 MW is commercial wind farms. They have become a player in the industry, but they are not a dominant force. GE has moved much more quickly to establish its presence in the industry. Enron Wind (which became GE Wind Energy in 2002) had worldwide sales in 2001 of approximately $500 million. In 2002, GE was ranked number five in turbine sales, but in 2003, they had worldwide sales of approximately $1.3 billion (18% of the market), second only to industry leader Vestas (with 22% of the 2003 market). Everything that I've seen and heard indicates that the GE goal is to become the industry leader in wind, just as they are in most of the areas in which they have invested. In less than two years, GE has more than doubled its wind-engineering workforce, quadrupled its research and development engineering support to the wind effort and started dozens of new wind energy technology projects. Many industry observers argue that the entry of GE Wind Energy into the industry is a primary factor behind consolidations such as the recent merger of turbine manufacturers Vestas and NEG/Micon (with a combined 32% of the 2003 market)–it is the only way that the other turbine companies can compete against the financial strength of GE. This financial strength is touted in the current GE advertisements in which they point out that they have chosen to assume the financial risk in demonstrating the new GE 3.6 MW turbine technology in Ireland's first offshore wind plant. GE will construct, build, and operate the 25 MW facility, giving their partner, Airtricity, the option to purchase the project after certification, testing and demonstration are complete.

The maturing of the wind industry is reflected in the ever-increasing attendance at the growing number of wind-related conferences and the shift of conference emphasis away from technical concerns and toward business concerns. The attendance at Global Windpower 2004 in Chicago, Illinois in March, for example, was around 3600 and the emphasis of the conference was very heavily on business aspects, including financing. FPL Energy, with a wind generating capacity of over 2700 MW (all in the U.S.), reported that they had been successful in floating the first ever wind-related investment-grade bond issue in 2003, raising some $500 million and lowering the cost of financing their wind projects. Other companies are sure to attempt to follow in their footsteps to establish bonds as an industry-wide source of lower-cost financing.

The advertisements of turbine manufacturers also seem to be changing to reflect this maturing of the industry. The ads certainly stress the normal company attributes such as increased reliability of the machines, the installed base of turbines, and company experience, but they are increasingly touting manufacturer willingness to take more of the project development risk and cost off the owner, their ability to help resolve utility interface problems and their desire to establish long-term partnerships, all attributes that I feel characterize an industry that is becoming a major player on the worldwide energy and manufacturing scene.

This natural evolution of the industry may come with an unpleasant side effect for research organizations, however. The government agencies responsible for funding basic research may decide that, as a mature industry, wind can now afford to fund its own research. This would be, of course, inconsistent with the continued government funding of research for such mature energy industries as coal and nuclear. Very strong arguments can certainly be made for continued government funding of wind research. Nonetheless, if that funding does disappear, the research organizations and the industry must re-examine the way they do business and identify other sources of funding for conducting the research that is essential for the long-term survival of the industry. The discussion paper in this issue takes a close look at how this issue has been addressed in Denmark.

I hope you find the contents of this issue interesting and informative.

In closing, I'll pass on some information on changes on the editor/publication front. As a result of the large number of wind papers that have been published in these special issues over the past few years, JSEE has added a second Associate Editor for Wind Energy–Dr. Panagiotis (Takis) Chaviaropoulos of the Greek Center for Renewable Energy Sources (CRES). Takis and I will be sharing the associate editor duties for another year or so and then I will retire (after having served the maximum allowable 6 years)

and someone else will take my place. Let me know if you happen to be interested. In a related change, JSEE has also agreed that two of the four yearly issues (the November and May issues) will now feature wind-energy related papers, with non-wind-energy papers filling out both of those issues, as space permits.

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