Title: Wind Correlation

Speaker: Henry Louie, Seattle University

Location: More 230, UW campus


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Abstract

The integration of wind plants into a power system becomes more manageable if the wind plants are dispersed over a geographically diverse area because the uncertainty and variability in their aggregate power output decreases. This paper derives the theoretical basis for this effect and analyzes how practical considerations such as the tendency of wind plants to cluster in areas with desirable wind resources and access to long-distance transmission influence the realized geographic diversity. Statistical analyses are performed on data covering a two-year period from the Bonneville Power Administration (BPA) and the Electric Reliability Council of Texas (ERCOT) systems. The results show a limited year-to-year change in the uncertainty and variability of the aggregate wind plant power output, despite 65 to 70 percent increases in capacity in each system over the period examined. Consideration of a hypothetical interconnection of the two systems shows that investments in long-distance transmission will result in perceptible decreases in uncertainty and variability, but the decrease is limited by the inherent correlation between the systems.

Henry Louie received the B.S.E.E. degree from Kettering University in 2002, the M.S. degree from the University of Illinois at Urbana-Champaign in 2004 and a Ph.D. in Electrical Engineering from the University of Washington in 2008. From 2007-2008 he worked for 3TIER Environmental Forecast Group, Inc. He is now an Assistant Professor in the Department of Electrical and Computer Engineering at Seattle University. His research interests include renewable energy forecasting, power system optimization and electricity markets. He is the Chair of the IEEE PES Seattle Chapter and is a member of the IEEE PES Long Range Planning Committee.