Power Systems Engineering Research Center

PSERC Public Tele-Seminar Series

Impact of Increased DFIG Wind Penetration on Power Systems and Markets

Small Signal and Transient Stability: February 2
Vijay Vittal, Arizona State Univ.

Frequency Response and Stability: February 9
Jim McCalley, Iowa State Univ.

Voltage Response and Stability: February 16
V. Ajjarapu, Iowa State Univ.

Market Mechanisms: February 23
Uday V. Shanbhag, Univ. of Illinois at Urbana-Champaign

2:00-3:00 p.m. Eastern Time (11:00-12:00 p.m. Pacific)

Description: This tele-seminar series gives the results from a PSERC project (Executive Summary | Full Report) that examined the impact of increased penetration of doubly-fed induction generator (DFIG) wind generation on power system dynamic performance and hence reliability. DFIG wind turbines use controls that effectively isolate the inertia from the grid. In addition, large wind farms are typically connected to the grid at lower voltage levels resulting in higher fault currents. As a result, the increase in penetration of wind generation may affect a power system's transient stability, overall frequency response, regulation, voltage response, fault ride-through capability, and load-following capability. The impact of increased wind penetration was analyzed under two scenarios: a) Increased wind penetration with concomitant displacement of aged conventional generation, and b) Increased wind penetration without any decrease in existing conventional generation. Analyses identified the conditions under which increased wind penetration could result in violation of reliability criteria. Other selected critical system impact issues were studied, such as on low-voltage ride through and dynamic reactive compensation as per the requirements of FERC standards, and on the effects of increased wind penetration on frequency stability. Solutions of identified problems were explored.

The power system reliability impacts of wind power were studied along with the effects on market mechanisms, such as day-ahead reserves. The project focused on markets characterized by i) energy, reserves and capacity bidding, and ii) market settlement. Technical solutions to problems meeting reliability standards were examined along with the effects of the solutions on market mechanisms.

Participation by Webcast: You can participate in PSERC tele-seminars via webcast. Before the tele-seminar, click here and then on the date of the tele-seminar when the program status is "Live." Note that the web page at that URL does not automatically refresh. The archived audio-slide production of the tele-seminar will be available for webstreaming after the tele-seminar. Slides will be posted on the PSERC website.

Registration for Webcast Participation: None required. There is no charge for participating!

Webcast Technical Issues:
To confirm that you will be able to view the webcast, click here and try viewing one of the archived webinars. If you have difficulty viewing the webinar, review the Mediasite Playback Checklist. Follow the checklist of configure your browser if your network uses a proxy server. You may need to install Silverlight 3 to view the webinar. During the webinar, if the audio-slide production stops, try refreshing your page to see if the connection can be restored. Note that IE-6 does not function fully with the webcast platform. The use of a more recent version of IE is recommended.

Assistance: If you need assistance before or during the webinar, please contact Theresa Herr, PSERC's administrative specialist, at 480-965-1643 or Theresa.Herr@asu.edu.

Professional Development Hour Certification: PDH certification is available for PSERC members (only). Send an email requesting PDH certification to Theresa.Herr@asu.edu with the subject "PDH" after the seminar. *Include the name and title of each participant.*

PSERC's Tele-Seminar Coordinator
Shmuel Oren, University of California at Berkeley
Email: oren@ieor.berkeley.edu

Shmuel welcomes feedback on the tele-seminars and suggestions for future ones.

Related PSERC tele-seminars:

Integrating Wind Power Efficiently into Electricity Markets Poses New Regulatory Challenges. (10-01, Jan. 19, 2010)

Analyzing the System Costs of Wind Variability (09-10, Oct. 6, 2009)

Demand Response via Real-Time Pricing to Increase Use of Operational Wind Energy Generators (08-07; May 6, 2008)