



EUCI Presents a Web Conference on:

WIND ENERGY REACTIVE POWER AND VOLTAGE CONTROL

August 4, 2009



2:30 – 4:30 PM Eastern Time



EUCI is authorized by IACET to offer up to 0.2 CEUs for this program.

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OVERVIEW

Wind farms can cause voltage fluctuations at the interface transformers. This is due to the large number of wind turbines using a squirrel cage induction generator (SCIG) that demands a significant amount of reactive power from the utility system. The reactive power consumed by these induction generators is dependent on the speed of its shaft. Since the voltage is dependent on the reactive power consumed by all wind turbines in the farm, the fluctuations in speed lead to fluctuations in voltage at the GSU interface transformer, particularly for weak trunk lines.

The course identifies the sources of voltage fluctuations, clarifies FERC and European regulations, analyzes the system, and provides a solution to the voltage fluctuations.

INTENDED AUDIENCES

- Utility engineers
- Wind energy field engineers
- Wind energy manufacturing engineers
- System operators
- Maintenance engineers
- Wind power producers
- Consultants and researchers in wind energy

LEARNING OUTCOMES

The reactive power variations from wind farms cause voltage fluctuations, transmission congestions and poor regulation. Participants will review and discuss the following:

- One of the most important wind energy integration problems
- The sources of the problem
- The impact on utility grids and nearby loads
- The National and international regulations and compliances
- The solution methods

AGENDA

- Explanation of reactive power fluctuations
- Causes of reactive power fluctuations in wind farms
- Effect of reactive power fluctuations on voltage fluctuations
- Dependency of voltage fluctuations on the strength of tie lines (trunk lines)
- Modeling of fluctuations
- Regulations of voltage and reactive power fluctuations
- Remedies
 - Fixed VAR compensations
 - Adaptive VAR compensation
 - Doubly-fed systems
 - Type 4 synchronous systems

IACET



EUCI has been approved as an

Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102. In obtaining this approval, EUCI has demonstrated that it complies with the ANSI/IACET Standards which are widely recognized as standards of good practice internationally.

As a result of their Authorized Provider membership status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standards.

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Requirements for Successful Completion of Program

Participants must be logged in to the web conference for its entirety to receive continuing education credit.

Instructional Methods

Web based PowerPoint presentation and on-line interactive question/answer session.

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INSTRUCTOR



Mohamed A. El-Sharkawi is a Fellow of IEEE. He received his Ph.D. in Electrical Power Engineering from the University of British Columbia in 1980. In 1980 he joined the University of Washington as a faculty member where he is presently a Professor of Electrical Engineering specializing in Power Systems. He also served as the Associate Chair and the Chairman of Graduate Studies and Research.

Professor El-Sharkawi is the founder and co-founder of several conferences in power systems and is the founding chairman of numerous IEEE task forces, working groups and subcommittees in the Power Engineering Society including the working group on renewable energy machines and systems. He organized and chaired numerous panels and special sessions in IEEE-PES and other professional organizations. He organized and taught several international tutorials on power systems, energy management systems, renewable energy, electric safety, load forecasting, vulnerability assessment, VAR management, and power systems operations.

Professor El-Sharkawi is a member of the editorial boards and is the associate editor of several journals. He served as editor/co-editor of several IEEE tutorial books and published over 200 papers and book chapters in his research areas. He authored two textbooks on *Fundamentals of Electric Drives* and *Electric Energy: An Introduction*. He also authored and co-authored 5 research books in the area of intelligent systems and power systems. He holds 5 licensed patents in the area of renewable energy VAR management, and minimum arc sequential circuit breaker switching.

LOGGING IN TO THE WEB CONFERENCE

After registration, each registrant will receive a confirmation of payment or an invoice, depending on method of payment. Each registrant will also receive an e-mail with appropriate login information and more information regarding the event 24 hours prior to the start of the event. To log on, you will need a Windows PC with a broadband connection and audio system.

WHAT IS A SINGLE SITE CONNECTION?

A site connection allows a single connection to the web conference. That connection is open to any number of users in a collaborative setting. Because there are no travel expenses and only a single registration fee is required, each additional participant lowers the cost per participant significantly.

By purchasing a site connection, you can invite as many people as you would like to view and participate in the session from a single location. Set up the session in a conference room and project the presentation and chat on a large screen. You also have rights to distribute copies of the presentation materials to everyone involved. Please note that audio is received via the computer sound system and must be broadcast to your group.

If for any reason a relevant stakeholder cannot co-locate for the session, we encourage you to include that person by purchasing an additional connection at the reduced fee of \$195 per session. This will ensure that every member of a team receives the same relevant, timely information in the most efficient way.

If you have any technical or purchasing questions, please contact us at (201) 871-0474.

Start Time: 2:30 PM Eastern Time

United States Regional Start Times:

11:30 AM Pacific :: 12:30 PM Mountain :: 1:30 PM Central :: 2:30 PM Eastern

Use the time zone converter at (<http://www.timezoneconverter.com/cgi-bin/tzc.tzc>) to find your correct start time.

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REGISTRATION INFORMATION

Mail or fax this form along with payment. You will receive a confirmation and/or invoice within 48 hours. Make checks payable to "PMA".

MAIL DIRECTLY TO:

The Power Marketing Association (PMA)
P.O. Box 2303
Falls Church, VA 22042

ONLINE:

www.pmaconference.com

PHONE:

(201) 871-0474

FAX TO:

(253) 663-7224

REFUND / CANCELLATION POLICY

All cancellations received prior to July 3, 2009 will be subject to a \$50 processing fee per web conference per registrant. Written cancellations received after this date will create a partial credit of the tuition good toward any other EUCI conference, publication or web conference. This credit will be valid for six months. No refunds will be given after July 3, 2009 in any case. In case of conference cancellation, EUCIs' liability is limited to refund of the conference registration fee only.

PLEASE REGISTER THE FOLLOWING

Wind Energy Reactive Power and Voltage Control, August 4, 2009,
Single Site Connection: US \$345
Early Bird on or Before August 3, 2009: US \$295

Additional Connection: US \$245,
Early Bird on or Before August 3, 2009: US \$195 each
Number of additional connections: _____

ENERGIZE WEEKLY

When you sign up for "Energize Weekly" you will receive a new conference presentation each week via email on a relevant industry topic. The presentations are selected from a massive library of over 1000 current presentations that EUCI has gathered during its 22 years organizing conferences.

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How did you hear about this event?
(Direct email, Colleague, Speaker(s), etc.)

Name _____ Title _____

E-Mail _____

Company _____ Telephone _____

Address _____ City _____ State _____ Zip _____

PAYMENT METHOD Please make checks payable to "PMA"

Please charge my credit card: Visa MC AMEX Security Code _____

Visa and MC cards have a 3 digit code on the signature panel on the back of the card, following the account number. American Express cards have a 4 digit code on the front of the card, above the card number.

Name on Card _____ Signature _____

Account Number _____ Exp. Date _____

Billing Address _____ Billing Zip Code _____

Or enclosed is a check for \$ _____ to cover _____ persons.