



EUCI Presents a Web Conference on:

WIND VARIABILITY AND BALANCING AREAS

July 9, 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

Because of the variability of wind speed, wind power fluctuates on all time scales (regulation, load following, scheduling, and unit-commitment). What makes this problem more severe is the inaccuracy in existing wind forecasting. Therefore, the prediction of the wind power output is much less accurate than that for conventional generation.

Since all generator outputs must match the total system load plus losses at all times, there is a need for the wind systems to exert more control on its output and to dedicate dispatchable generators to counteract additional variability. The agencies responsible for balancing generation to load are called balancing areas (authority).

The course covers the impact of wind variability and uncertainty on power system operation, control, and planning. It describes the concept of the balancing areas and the control actions that can be taken at the wind farm to address the problem.

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 variability of wind energy and the poor forecasting of wind speed are two major challenges for wind integration into utility systems. Participants will review and discuss the following:

- Variability of wind power output
- Uncertainty of wind energy
- The impact of wind energy variability on utility systems (operation, control, scheduling and planning)
- The concept of balancing areas (authorities)
- Reserve requirement calculations
- Effect of wind farms on Area Control Error (ACE)
- New problems for the balancing equipment
- Wind farms vs. Wind garden models
- National and international regulations and compliances

AGENDA

- Energy balance of power grid
- Stability of a power system
- How does wind variability affect the energy balance?
- How wind uncertainties affect operation and planning
- Stochastic analysis for load and wind variability
- Balancing authorities
- Calculations of the balancing requirements
- Area Control Error (ACE) for operation and planning
- Challenges of balancing resources
- National and International standards
- Remedies

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 June 5, 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 June 5, 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 Variability and Balancing Areas, July 9, 2009,
Single Site Connection: US \$345

Early Bird on or Before July 8, 2009: US \$295

- Additional Connection: US \$245,

Early Bird on or Before July 8, 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.

- Sign me up for "Energize Weekly"**

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.