



EUCI presents a course on:

FUNDAMENTALS OF ELECTRICITY TRANSMISSION

March 12-13, 2012 • Hyatt at Fisherman's Wharf • San Francisco, CA

TESTIMONIALS FROM PAST ATTENDEES

"Great introductory course for the non-engineer energy professional. You will be amazed and engaged, all the time."

– *Contract Manager, Siemens*

"The program offered a good balance of the basic fundamentals of electricity transmission. It provided sufficient introductory material on each relevant topic to allow individuals of diverse backgrounds to follow all sections. The presentation materials are also an excellent resource to take away."

– *Director - Regulatory Review,
Missouri Public Service Commission*

"Basics for the developer, planner, and regulator."

– *Commissioner,
Nevada Public Utilities Commission*

"Fantastic! A true value for anyone interested in transmission."

– *Sales Manager, Nordex USA*



EUCI is authorized by IACET to offer 1.0 CEU for this program.

OVERVIEW

New electricity transmission, transmission expansion, and transmission upgrades are being proposed in every region of the United States and Canada. Electricity transmission – and the need for more of it – is the key to many of North America’s energy goals, including increased reliability and security, the integration of more renewable energy, more competitive markets, and the construction and implementation of a smart grid. In addition, new transmission market mechanisms are being applied in many U.S. regions.

This course is designed to provide a practical overview of electricity transmission and the transmission system for non-engineers or those who are new to the industry. The course will also cover how new transmission is designed and planned and how the transmission system is regulated. Important topics such as markets and new technologies will also be discussed.

LEARNING OUTCOMES

Attendees to this course will learn to:

- Define and describe the major concepts of electricity transmission
- Explain considerations that affect transmission planning and design
- Analyze the importance of transmission reliability and the factors that can affect it
- Examine the organizations that regulate the electric transmission industry
- Identify the main drivers for new transmission and discuss the many challenges of transmission expansion
- Examine the structure of major transmission markets in the U.S. and comprehend how the market system operates
- Discuss smart technologies that will make the transmission system more efficient and reliable

WHO SHOULD ATTEND

- Engineering staff new to transmission
- Executives, attorneys, accountants, managers, and other professionals from investor-owned utilities; federal, state, and municipal utilities; and electric cooperatives
- Renewable-energy product developers
- Regulatory agency staff
- Consultants, attorneys, and engineering firms that work within the electricity-transmission sector

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 its 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 sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

Instructional Methods

The instructors will use PowerPoint presentations and classroom exercises for this course.

FUNDAMENTALS OF ELECTRICITY TRANSMISSION

March 12-13, 2012

PROGRAM AGENDA

MONDAY, MARCH 12, 2012

8:00 – 8:30 a.m. Registration and Continental Breakfast
8:30 a.m. – 5:00 p.m. Course Timing
12:00 – 1:00 p.m. Group Luncheon

Overview

- What is transmission?
- Transmission system components
- System protection
- Remedial action
- Voltage control
- Reactive power
- Unscheduled flow
- Transmission losses

Reliability

- Network design effects on reliability
- Path definition, constraints, and flowgates
- Causes and impacts of an outage
- The role of balancing authorities

NERC

- Mandatory standards and applicability
- Regional entities
- Impact to industry

Design and Planning

- Overhead
- Underground
- AC transmission
- DC transmission

Smart Transmission Grids

- Synchrophasors
- Superconductors
- FACTS devices

TUESDAY, MARCH 13, 2012

8:00 – 8:30 a.m. Continental Breakfast
8:30 a.m. – 12:00 p.m. Course Timing

FERC Orders 888, 890, and 1000

Markets

- ISOs/RTOs
- Congestion management: LMPs, FTRs, and TLRs
- Major players in transmission markets

New Transmission/Transmission Expansion

- Making the case for new transmission
- Who is building new transmission? Utilities, merchant companies, etc.
- Renewable integration issues
 - Gen-tie vs. transmission
- Clean energy and climate change issues
- Evaluating alternatives to transmission expansion
- Cost recovery
- Challenges to transmission expansion

INSTRUCTORS

Raj Rana, Past Director – RTO Policy and NERC Compliance, American Electrical Power

While serving as the director of RTO policy and NERC compliance at American Electrical Power, Mr. Rana was responsible for coordination of energy, transmission, market structure, finance, and governance related RTO policy issues among the AEP business units, development of corporate positions/policies, and advocacy of such positions at regulatory agencies, at stakeholder forums in PJM, SPP, and ERCOT RTOs. He was also responsible for the development and coordination of strategic direction of AEP's reliability compliance program among all business units as well as coordination and facilitation of compliance plans, policies, and procedures within the company to ensure timely and successful compliance of NERC and regional reliability standards.

Previously, Mr. Rana worked in AEP's system-planning department in various positions. His experience at AEP includes planning and operation of the bulk transmission network, generation interconnections, tariff and regulatory/legislative issues, system integration, asset management, and mergers and acquisitions as well as planning and engineering studies for international transmission and generation projects.

Mr. Rana has participated in and made significant contributions to a variety of organizations, including IEEE, EPRI, ECAR, NERC, and NAESB. He was a member of the EEI Transmission Policy Task Force and chaired the NAESB Standards Review Subcommittee. He was a member of the NERC Standards Committee (SC) and chaired the SC Communication and Planning Subcommittee. Presently, Mr. Rana is member of the NERC ballot body. He also chaired the PJM Transmission Owners Agreement - Administrative Committee and was an elected member of the PJM Finance Committee.

Mr. Rana holds a bachelor's degree in electrical engineering from M. S. University (India), a master's degree in electrical engineering from West Virginia University, and an MBA from University of Dayton. Mr. Rana also completed the AEP Management Development Program at the Fisher Business College of the Ohio State University. He is a senior member of IEEE and holds the Ohio State PE license.

Ed Weber, Senior Transmission Planning Advisor, HDR Engineering Inc.

Ed Weber is a senior electrical engineer with 30 years of experience in power system analysis and planning throughout the upper Midwest. He has extensive experience in power system reliability and modeling, power flow and stability analysis, and transmission tariff process and generator interconnections. He has served on several national and regional work groups associated with the Mid-Continent Area Power Pool, Midwest Reliability Organization, the North American Reliability Corp, and the Western Electric Coordinating Council.

Ed's experience includes more than 20 years of management of large power facility projects requiring coordination of project planning, design, and environmental activities; coordination of consultant activities; coordination of regulatory and contractual activities; interfacing with the developers and transmission owners and operators; and preparation of reports.

During his 30-year career at Western Area Power Administration (WAPA), he supervised a diverse staff of professional engineers and was responsible for all facets of power system planning and operational support. Ed directed the initial NERC standards and compliance program for WAPA, upper Great Plains region, as well as coordinating the tariff revisions necessary to comply with FERC Order 890 – Large Generator Interconnection. Since coming to HDR Engineering, Ed has worked on several large renewable-energy projects along with numerous planning studies.

James Buker, Design Engineer, HDR Engineering Inc.

Mr. Buker is currently a design engineer with five years of experience with HDR and received his bachelor's degree in mechanical engineering from Montana State University. He has worked on a variety of different transmission-line projects ranging from 115kV to 500kV throughout the western United States. He has worked on every aspect of the design process, including structure-strength analysis, foundation design, conductor sag and tension, material, thermal-line ratings, and survey.

Erik J.A. Swenson, Partner, Fulbright & Jaworski LLP

Erik Swenson joined the Washington, D.C., office of the international law firm Fulbright & Jaworski LLP in 2008 as a partner. His two-decades-plus of experience in energy law contributes to the firm's expanding energy practice. Erik works closely with his clients in transactional and regulatory matters, including guiding energy project development, managing acquisitions, negotiating and documenting energy related transactions, securing energy-related authorizations and certifications, and representing clients in a variety of administrative proceedings.

PROCEEDINGS

The proceedings of the course will be published, and one copy will be distributed to each registrant at the course.

EVENT LOCATION

A room block has been reserved at Hyatt at Fisherman's Wharf, 555 North Point Street, San Francisco, CA 94133, for the nights of March 11-14, 2012. Room rates are \$180, plus applicable tax. Call 415-563-1234 for reservations, and mention the EUCI course to get the group rate. The cutoff date to receive the group rate is February 19, 2012, but as there are a limited number of rooms available at this rate, sometimes the room block will close sooner. **Please make your reservations early.**

REGISTRATION INFORMATION

REMEMBER: EVERY FOURTH REGISTRANT IS FREE

For instant registration, call (201) 871-0474 or fax the registration form to (253) 663-7224.

Register Three; Send Fourth Free!

Any organization wishing to send multiple attendees to this course may send one FREE for every three delegates registered. Please note that all registrations must be made at the same time to qualify.

All cancellations received on or before February 10, 2012, will be subject to a \$195 processing fee. Written cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event or publication. This credit will be good for six months. In case of event cancellation, Electric Utility Consultants' liability is limited to refund of the event registration fee only. For more information regarding administrative policies such as complaints and refunds, please contact our offices at (201) 871-0474.

FIVE EASY WAYS TO REGISTER

One: CALL
(201) 871-0474

Two: FAX
(253) 663-7224

Three: E-MAIL
register@pmaconference.com

Four: MAIL
PMA
P.O. Box 2303
Falls Church, VA 22042

Five: WEB SITE
www.pmaconference.com

PLEASE REGISTER THE FOLLOWING

- Fundamentals of Electricity Transmission
March 12-13, 2012: US \$1395
Early bird on or before March 2, 2012: US \$1195

ENERGIZE WEEKLY

EUCI's *Energize Weekly* e-mail newsletter compiles and reports on the latest news and trends in the energy industry. Newsletter recipients also receive a different, complimentary conference presentation every week on a relevant industry topic. The presentations are selected from a massive library of more than 1,000 current presentations that EUCI has gathered during its 25 years organizing conferences.

- Sign me up for *Energize Weekly*.**

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.) _____

Name _____ Job Title _____

Name Preferred for Badge _____ E-mail _____

Company _____ Telephone _____

Address _____ City _____ State _____ Zip _____

Check here if you have any dietary or accessibility needs. We will contact you for more details.

PAYMENT METHOD Please make checks payable to "PMA"

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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 _____

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OR Enclosed is a check for \$ _____ to cover _____ registrations.