



EUCI Presents a Course on:

INTRODUCTION TO BULK POWER SYSTEMS

PHYSICS, ECONOMICS, AND REGULATORY POLICY

March 25-26, 2010 • Hyatt Regency Crystal City • Arlington, VA

"Outstanding program and very high quality presentation."

Director, ERCOT

"Great course. Very educational, very helpful. Good depth and breadth...."

Economist, FERC

"Extremely understandable, great teacher."

Energy Analyst, NREL



Electric Utility Consultants, Inc. (EUCI) is recognized by the North American Electric Reliability Corporation

as a continuing education provider who adheres to NERC Continuing Education Program Criteria. NERC ID: EUCI_109824

This course has been approved for 15 NERC CEs

March 25-26, 2010

OVERVIEW

The Introduction to Bulk Power Systems: Physics, Economics, and Regulatory Policy course is designed to provide an overview of electric power systems. Basic electrical principles will be briefly reviewed and used to explain how bulk power systems operate. The two unique characteristics of electric power systems (storage and flow control) will be discussed along with their consequences. The interrelation of physics, economics, and regulatory policy contexts will be discussed throughout the seminar.

The seminar will cover:

- The basics of direct and alternating current
- Real and reactive power
- Capacity and energy
- Transmission and generation
- Industry structure: balancing areas, regions, and interconnections
- Reliability events and ancillary services
- Power system planning, operations, and tools
- NERC reliability rules
- FERC oversight

This seminar is not designed to make the participant an expert in any single power system area, but to provide an understanding of the important aspects of each context and how they fit together to make the entire system work reliably and economically.

WHO SHOULD ATTEND

This seminar should be useful to anyone involved with the electric power industry that needs a deeper understanding of how and why it works as it does.

This can include:

- Traders
- Regulators
- Economists
- Advocates
- Attorneys
- Engineers and technical professionals that are new to the power industry or who could use an update

ABOUT THE INSTRUCTOR

Brendan Kirby is an electric power systems consultant who recently retired from the Oak Ridge National Laboratory's Power Systems Research Program. He has 35 years of electric utility experience and has been working on restructuring and ancillary services since 1994 and spot retail power markets since 1985.

Brendan's interests include electric industry restructuring, bulk system reliability, wind power integration, ancillary services, demand side response, renewable resources, distributed resources, energy storage, and advanced analysis techniques. He has published over 140 papers, articles, and reports. He has a patent for responsive loads providing real-power regulation. He serves on the NERC Standards Committee. He has participated in the NERC/FERC reliability readiness reviews of balancing authorities and reliability coordinators, performed field investigations for the US/Canada Investigation Team for the 2003 Blackout, and has appeared as an expert witness in FERC and state litigation. He has conducted research projects concerning restructuring for the NRC, DOE, NREL, EEI, AWEA, UWIG, numerous utilities, state regulators, and EPRI. Publications and a full resume are available at www.consultkirby.com.

Brendan is a licensed Professional Engineer with a MS in Electrical Engineering (Power Option) from Carnegie-Mellon University and a BS in Electrical Engineering from Lehigh University.

March 25-26, 2010

PROGRAM AGENDA

THURSDAY, MARCH 25, 2010

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

- 1) **Basic Concepts...**
 - A) Power and Energy
 - B) DC and AC Power
 - C) Real and Reactive Power
 - D) Power System Components
- 2) **... Applied to Power Systems**
 - A) Electric Power's Unique Characteristics
 - B) Reliability and Economics are Inseparable
 - C) Types of Reliability Events
 - D) Distribution vs. Transmission Reliability
 - E) Transmission Line Characteristics
 - F) Building New Transmission – The World May be Changing
- 3) **Generator Characteristics – Loads and Storage**
 - A) Capital and Operating Costs
 - B) Response Capabilities
- 4) **Power System Economics**
 - A) Regulated vs. Restructured
 - B) Economic Dispatch
 - C) Energy Markets
 - D) Capital Cost and Capacity Markets
 - E) Direct and Opportunity Costs
 - F) Renewable Portfolio Standards, etc.

FRIDAY, MARCH 26, 2010

8:00 – 8:30 a.m. Registration and Continental Breakfast

8:30 a.m. – 4:00 p.m. Course Timing

12:00 – 1:00 p.m. Group Luncheon

- 5) **Power Systems Operations – Meeting Load and Maintaining Reliability**
 - A) Industry Structure – Old and New
 - B) Ancillary Services
 - C) System Operator Functions and Tools
 - D) Sufficient Capacity? – Power System Planning
 - E) Contingency Constrained Unit Commitment and Economic Dispatch
- 6) **Reliability in a Restructured Power System: Ancillary Services and Markets**
 - A) Physical Needs For Reliability
 - B) How Markets Value and Obtain Ancillary Services
 - C) Supplying/Selling Energy and Multiple Ancillary Services
 - D) Co-Optimizing Energy and Ancillary Services
- 7) **Reliability Standards and Market Rules**
 - A) NERC and Regional Standards
 - B) FERC's Role and Rules
- 8) **Conclusions and Summary**

NERC CREDITS



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NERC ID: EUCL109824

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PROCEEDINGS

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

COURSE LOCATION

A room block has been reserved at the Hyatt Regency Crystal City, 2799 Jefferson Davis Highway, Arlington, VA 22202, for the nights of March 22 - 25, 2010. Room rates are US \$199, plus applicable tax. Call 703-418-1234 for reservations and mention the EUCI course to get the group rate. Make your reservations prior to March 1, 2010. There are a limited number of rooms available at the group rate. **Please make your reservations early.**

REGISTRATION INFORMATION

REMEMBER, EVERY 4TH REGISTRANT IS FREE

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

Register 3, Send 4th Free!!

Any organization wishing to send multiple attendees to these conferences may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.

All cancellations received on or before February 26, 2010 will be subject to a US \$195 processing fee. Written cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI conference or publication. This credit will be good for six months. In case of conference cancellation, Electric Utility Consultants' liability is limited to refund of the conference registration fee only. For more information regarding administrative policies such as complaints and refunds, please contact our offices at (201) 871-0474.

EUCI reserves the right to alter this program without prior notice.

MAIL DIRECTLY TO:

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Falls Church, VA 22042

FAX TO: (253) 663-7224
PHONE: (201) 871-0474

PLEASE REGISTER THE FOLLOWING

- Introduction to Bulk Power Systems: Physics, Economics, and Regulatory Policy, March 25-26, 2010, US \$1495
Early Bird on or Before March 12, 2010, US \$1295

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