INTRODUCTION TO REGIONAL WHOLESALE ELECTRICITY MARKETS - RTOs AND ISOs

August 24-25, 2017
Sheraton Seattle Hotel
Seattle, WA
OVERVIEW

This course is designed to introduce basics of wholesale electricity markets operating in the U.S., Canada and Mexico. The purpose is enhancing attendees’ understanding of types of wholesale electricity markets and the platforms that offer such markets. The focus will be on the functions of RTOs/ISOs and their role in providing platforms for real-time and day-ahead energy markets, ancillary service markets and in some cases capacity markets. Participants will also gain a high-level understanding of current issues affecting electricity markets and will receive detailed explanation of how the electricity markets operate.

Major topics covered in this course include:

1. Basics of Electric Power Systems
   - Fundamentals of electricity, definitions and measuring units
   - Generation, transmission, distribution, and loads
   - Types of generation resources including intermittent resources, costs, and capabilities
   - Load duration curves, system load factors, load growth and customer classes
   - Ancillary services
   - Power system losses
   - Power system load flow simulation

2. Regulatory oversight – Role of FERC and State regulatory agencies

3. Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs)
   - RTOs/ISOs in U.S. and Canada
   - Regulatory structure of RTOs/ISOs
   - RTO functions and characteristics
   - Advantages and disadvantages of RTO participation
   - Role of FERC, state regulatory agencies, and market monitor

4. Regional Wholesale Electricity Markets Fundamentals – Part 1
   - Wholesale electricity prices trend and volatility
   - Locational marginal price (LMP) and its components
   - Review of supply and demand relationship, spot versus bilateral electricity markets
   - Economic merit order selection and unit commitment including responsibilities and obligations
   - Security constrained economic dispatch and scheduling
   - Two settlement system: Day ahead and real-time settlement
   - Cost of transmission congestion
   - Financial transmission rights (FTRs) for hedging against transmission congestion
   - Wholesale demand response
   - Capacity market
   - Ancillary services market
   - Virtual trading
   - Comparison of energy, capacity, and ancillary service markets offered by RTOs/ISOs in the U.S.
   - LMP simulation

5. Regional Wholesale Electricity Markets Fundamentals – Part 2
   - Forward pricing curve
   - Generator bidding strategies and constraints
     - Variable cost and its components, marginal cost, incremental cost
     - Cost-based vs. market-based rate
   - Scarcity pricing and load pockets
   - Energy price forecasting overview
   - Brief overview of risk management
   - RTO/ISO financial settlement
LEARNING OUTCOMES

- Describe major components of a power system and types of wholesale electricity markets
- Describe platforms for real-time and forward wholesale electricity markets
- Explain locational marginal price (LMP) and its components
- Describe, at high level, types of risks inherent in the wholesale energy markets and financial tools to manage such risks.
- Describe the role of generators, transmission, and load in a power system
- Define and provide examples of ancillary services
- State the role of FERC and state regulatory agencies
- Describe ISO/RTO functions
- Describe role of transmission in the regional wholesale electricity markets
- Explain bilateral and real-time energy markets
- Discuss RTO/ISO financial settlement and credit issues

“Beneficial introduction to markets. Gives good insight into interactions and strategies to be a participant.”
ATC/AIC Specialist, TVA

“Speaker very knowledge of subject and able to address all questions asked. Encouraged class participation.”
MAP

“Great class! Opened my eyes to the deep details of the market place.”
Managing Partner, Apis Energy Group
PROGRAM AGENDA

THURSDAY, AUGUST 24, 2017

7:30 – 8:00 am   Registration and Continental Breakfast

8:00 – 10:30 am   Power System Basics, Types of Generation Resources and Loads, and Regulatory Oversight
• Fundamentals of electricity, definitions, and units
• Overview of source to socket components - Generation, transmission, distribution, and loads
• Power flow demonstration
• Types of generation resources, heat rate, capacity factor, and installation costs
• Load characteristics - Load duration curves, load factor, and customer classes
• Demand response
• Power system losses
• Regulatory oversight – Role of FERC, State regulatory agencies, and market monitor
• Review questions

10:30 – 10:45 am  Morning Break

10:45 am – 12:00 pm   Types of Energy Markets, Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs)
• Wholesale electricity prices and volatility
• Review of supply and demand relationship
• Types of electricity markets – Real-time (spot) versus bilateral markets
• RTOs/ISOs in U.S. and Canada
• RTO functions and characteristics
• RTO drivers
• Advantages and disadvantages of RTO/ISO participation
• Regulatory framework and role of FERC and state regulatory agencies
• RTO stakeholders
• Review questions

12:00 – 1:00 pm   Group Luncheon

1:00 – 3:00 pm   Locational Marginal Pricing (LMP)
• LMP concept
• Components of LMP and examples
• Nodal, Hub, and Zonal LMP
• LMP demonstration, review questions, and class exercise

3:00 – 3:15 pm   Afternoon Break

3:15 – 5:00 pm   RTO/ISO Wholesale Electricity Markets
• Economic merit order and unit commitment
• Security constrained economic dispatch
• Cost of transmission congestion and losses
• Financial transmission rights (FTRs) for transmission congestion hedging
• Day-ahead and real-time market, scheduling, and dispatch
• Capacity market
• Ancillary services – Whose responsibilities?
• Ancillary services market
• Comparison of markets offered by RTOs/ISOs in the U.S.
• Review questions
PROGRAM AGENDA

FRIDAY, AUGUST 25, 2017

7:30 – 8:00 am  Continental Breakfast

8:00 – 8:15 am  Review of Previous Day; Opportunities for Questions and Discussion on Previous Day’s Material

8:15 – 10:00 am  Regional Wholesale Electricity Market Basics - Continued
• Overview of generator/load offer/bidding considerations, bid and offer curves, three-part bid
• Generator capacity dispatch range, variable cost components, start-up cost, no load cost, ramp rate concepts
• Overview of RTO/ISO financial settlement
• Review questions

10:00 – 10:15 am  Morning Break

10:15 – 11:45 am  Risk Management and Credit Requirements
• Potential risks
• Overview of risk hedging tools for real-time and bilateral markets: FTRs, virtual trading, options, futures, and SWAPs
• Credit requirements
• Review questions

INSTRUCTOR

Raj Rana, PE, MBA, CEM, PMP
President, Rana Energy Consulting

While serving as the director of RTO Policy and NERC Compliance at American Electrical Power, Raj 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 power system 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, mergers and acquisitions, as well as planning and engineering studies for international transmission and generation projects.

Mr. Rana holds a BSEE degree from M. S. University (India), an MSEE degree from West Virginia University, and an MBA degree 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 life-senior member of IEEE, and holds the Ohio State PE license. Mr. Rana is also a certified energy manager and project management professional.
INSTRUCTIONAL METHODS

This course will use slide presentation, group discussions, as well as active participation. Attendees will have ample opportunities to actively participate in review questions/answers sessions, group breakout sessions, and simulations/demonstrations offered as part of this course.

REQUIREMENTS FOR SUCCESSFUL COMPLETION

Participants must sign in/out each day, be in attendance for the entirety of the course.

IACET CREDITS

EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

EUCI is authorized by IACET to offer 1.0 CEUs for this course.

REGISTER 3, SEND THE 4TH FREE

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

EVENT LOCATION

A room block has been reserved at the Sheraton Seattle Hotel, 1400 6th Ave, Seattle, WA 98101, for the nights of August 23-24, 2017. Room rates are $249.00 plus applicable tax. Call 1-206-621-9000 or click here for reservations and mention the EUCI event to get the group rate. The cutoff date to receive the group rate is July 19, 2017 but as there are a limited number of rooms available at this rate, the room block may close sooner. Please make your reservations early.
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**INTRODUCTION TO REGIONAL WHOLESALE ELECTRICITY MARKETS- RTOS AND ISOS COURSE:**

AUGUST 24-25, 2017 | Seattle, WA: US $1395,
Early bird on or before August 4, 2017: US $1195

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

Print Name | Job Title
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Company

What name do you prefer on your name badge?

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OR Enclosed is a check for $________ to cover __________ registrations.

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Substitutions & Cancellations

Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before July 21, 2017 in order to be refunded and will be subject to a US $195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, EUCI’s 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.