

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
7:30 – 8:30 a.m.	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
8:30 – 9:30 a.m.	<b>Welcome and Introductions</b>	<b>Transmission Simulation</b>	<b>Smart Grid Developments</b>	<b>Market Design</b>	<b>Integration of Renewable Resources into the Grid</b>
9:30 – 9:45 a.m.	Break	Break	Break	Break	Break
9:45 – 10:45 a.m.	<b>The New Electricity Business</b>	<b>Transmission Simulation</b>	<b>Transmission Only Companies</b>	<b>Market Design</b>	<b>Moving Solar Forward</b>
10:45 – 11:00 a.m.	Break	Break	Break	Break	Break
11:00 a.m. – Noon	<b>The New Electricity Business</b>	<b>Policy and Regulatory Issues</b>	<b>New Transmission Business Environment Panel</b>	<b>Financial Tools for Congestion Management</b>	<b>Competitive Solutions for Transmission</b>
Noon – 2:00 p.m.	Lunch & Presentation	Lunch & Presentation	Lunch & Presentation	Lunch & Presentation	School Adjournment
2:00 – 3:00 p.m.	<b>Transmission System Basics</b>	<b>Policy and Regulatory Issues</b>	<b>PJM Wholesale Markets</b>	<b>Status of US Electricity Markets</b>	
3:00 – 3:15 p.m.	Break	Break	Break	Break	
3:15 – 4:15 p.m.	<b>Transmission System Operations</b>	<b>Transmission Planning and Reliability</b>	<b>Electricity Markets and Risk Management</b>	<b>Business Models for Transmission Investment</b>	
4:15 – 4:30 p.m.	Break	Adjournment	Adjournment	Adjournment	
4:30 – 5:30 p.m.	<b>Transmission System Operations</b>				
5:30 – 7:30 p.m.	<b>Reception</b>				

## REGISTRATION AND LOGISTICS

### VENUE AND TIMES

The School classes begin at 8:00 a.m. on Monday, May 13 (8:30 a.m. Tuesday-Friday) and continue through noon on Friday, May 17. Classes are held on the fourth floor of the Illini Center, 200 S. Wacker Drive, Chicago, IL. For updates, please consult [www.illinoiseminars.com/tbs](http://www.illinoiseminars.com/tbs)

### LODGING

A block of rooms at the Union League Club of Chicago (65 W. Jackson Blvd., [www.ulcc.org](http://www.ulcc.org)) has been reserved for the period of May 11-19, 2019 for the School participants at a specially negotiated rate of \$197 (plus applicable taxes), with breakfast included. Chicago has many conventions in May and hotel rooms are typically very difficult to find. Make your reservations by **April 16, 2019** to be guaranteed a room at the negotiated rate. Call 800-443-0578 or 312-427-7800.

### ENROLLMENT

The School fees are \$3,195 per person. The class size is limited to provide an appropriate learning environment. Enrollment is confirmed upon receipt of payment.

A limited number of scholarships is available for federal and state government regulatory agency employees. Contact Lynnea Johnson at 217-649-6543 or [lsjohnson@illinoiseminars.com](mailto:lsjohnson@illinoiseminars.com) for additional details.

Each participant will receive a confirmed registration. Cancellations received up to 15 days prior to the conference will be refunded in full, less an administrative fee of \$600 per person. Thereafter, no refunds will be made; however, substitutions may be made at any time.

### CONTINUING EDUCATION UNITS

The School attendees may earn 3.2 continuing education units (CEUs), 32 general continuing legal (CLE) hours, or 32 continuing professional education (CPE) hours (numbers vary by state).

### ADDITIONAL INFORMATION

Please contact Lynnea Johnson at [lsjohnson@illinoiseminars.com](mailto:lsjohnson@illinoiseminars.com) or 217-649-6543. You will find updates of the presentation schedule and details on the special presentations at <http://www.illinoiseminars.com/tbs>

## THE TRANSMISSION BUSINESS SCHOOL MAY 13-17, 2019

Online registration is available at: [www.illinoiseminars.com/tbs](http://www.illinoiseminars.com/tbs)

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**Note:** Enrollment is limited and advance registration is required. Mail this form with payment to  
Lynnea Johnson, IllinoisSeminars,  
P.O. Box 2666, Champaign, IL 61825.

# THE TRANSMISSION BUSINESS SCHOOL

Taught by leading industry practitioners and academic experts, who present key aspects of the most important challenges faced by the industry, the *Transmission Business School* introduces participants to all of the major issues being discussed today, as well as the industry basics, to prepare them for those challenges. The intensive four-and-a-half-day *School* gives an excellent understanding of electric operations and of the key issues in regional transmission organization (RTO) development, the criticality of interconnected transmission network reliability, emerging transmission business structures, the impacts and implications of legislative and regulatory initiatives, how electricity markets work, and the increasingly important role of distributed energy resources, including storage. Each participant gains exposure to the broad trends in the industry, the key players and their roles, as well as the principal drivers and policy questions in this exciting and rapidly changing industry. The presentations are made accessible through the use of examples and simulations, without requiring a technical background from the participants.

## BENEFITS AND KNOWLEDGE

Each participant will:

### GAIN

- A thorough grounding in the basics of power systems, including power flow concepts on a nontechnical level;
- A sound grasp of the fundamentals of electricity and power system planning, operations, control and economics;
- A good understanding of the fundamentals of transmission services;
- A comprehensive picture of where the industry is headed and how it will get there;
- A thorough appreciation of the need for incentives for transmission investments;
- An essential comprehension of the role of transmission in a greener environment; and,
- Insights into successful experiences in transmission business around the world.

### LEARN

- About the unbundling of transmission services;
- The critical role of transmission and ancillary services;
- The effective use of risk management mechanisms;
- The interrelationships between reliability and markets;
- The nature of a cascading blackout;
- About recent developments in integration of renewable resources; and
- The realization of the *smart grid*.

### UNDERSTAND

- The industry language and acronyms;
- The centrality of the role transmission in competitive electricity markets;
- The fundamental interaction of physics and markets;
- The critical challenges faced by today's electricity business players;
- The role of incentives in the expansion of the power system;
- The overriding need for reliability;
- Interactions between bulk and distribution grids' operators; and
- Models of transmission business structures in use in different countries.

### INTERACT

- With some of the leading practitioners and authorities in the industry;
- With the participants and learn how they solve problems in their organizations and jurisdictions; and
- With the new professionals in the electric power industry.

## FEATURED TOPICS

### POWER SYSTEM BASICS

- Working of the interconnected grid
- Basic power flow concepts
- Role of loads and their curtailments
- System planning and operations
- Reactive support
- Ancillary services
- Transmission control
- Reliability concepts and reliability economics
- Security coordination
- The *smart grid*
- Transmission expansion and investment

### EVOLVING ELECTRICITY MARKETS

- Market basics
- Electricity market design
- The role of auctions
- Forward markets
- Balancing markets
- Ancillary service markets
- Congestion management
- Price spikes
- Risk management
- Transmission access pricing and services
- Effective asset utilization
- Impacts of carbon cap and trade mechanisms
- Meeting of regional transmission needs
- Market monitoring and compliance enforcement
- Seams issues
- Energy Reliability Organization
- PUHCA repeal aftermath
- Carbon legislative/regulatory impacts
- Implementation on new FERC Orders
- Role of renewable energy projects
- Smart grid implementation benefits

### TRANSMISSION BUSINESS MODELS

- Who does what?
- Transmission business structures
- Regional transmission organizations (RTOs)
- Independent system operators (ISOs)
- Transmission system operators (TSOs)
- Who controls the tariffs?
- What is the changing role of regulators?
- Who is responsible for reliability?
- Who manages markets?
- Who does planning and expansion?
- Who monitors markets?
- Merchant transmission projects
- Regulatory initiatives
- Integration of renewable and demand resources

## TRANSMISSION BASICS

An overview on transmission hardware; system design; facility siting; the physics of the interconnected transmission grid; existing and new generation sources; the basics of power systems; and new technology for transmission.

## TRANSMISSION OPERATIONS

Review of the requirements for coordinating the interconnected grid to meet the reliability/security and economy considerations; the functions of the control center; the impacts of mandatory reliability standards; and, the ERO functions.

## TRANSMISSION SYSTEM COMPUTER SIMULATION

A hands-on demonstration of the innate complexities of the interconnected transmission grids; examples of constrained systems; interrelationships between market forces and the movement of energy; 2003 Megablackout simulation.

## ELECTRICITY RESTRUCTURING DEVELOPMENTS AND POLICY

A review of how the industry got to where it is today, the unbundling of the electric industry, its new structures, and the emergence of transmission as a critically important new business; the new structures created by FERC Order Nos. 888, 889, 890 and 2000; the key RTO issues; FERC directions for electricity market and RTO development; market design issues; Order No. 888 reform; impacts of net metering activities mandated by the EPACT 2005, EISA 2007 and ARRA 2009; FERC Orders 1000, 745 and 755 impacts.

## TRANSMISSION PLANNING AND RELIABILITY

Coverage of the planning, siting, asset modernization, utilization and investment aspects and their interrelationships with cost allocation; reliability management under mandatory reliability provisions; environmental impacts; national-interest electric transmission corridors; regional planning challenges; NERC's ERO role; and, environmental matter/policies.

## MARKET DESIGN AND CONGESTION MANAGEMENT

The key aspects of designing efficient market structures, the interrelationships between markets; the role of ancillary service markets; and how congestion is managed, including the role of financial transmission rights.

## THE NEW TRANSMISSION BUSINESS ENVIRONMENT

Evaluation and assessment of the principal thrusts of the EPACT 2005 on transmission; PUHCA repeal aftermath; impacts of Sarbanes-Oxley Act requirements; impacts of new mergers and acquisitions provisions; transmission bottlenecks and national-interest electric transmission corridors; adequacy of financial incentives to stimulate transmission investment and modernization.

## TRANSMISSION SERVICES AND PRICING

Explanation of how transmission service is provided; the key aspects of transmission pricing – access and congestion; incentives for grid expansion and coverage of evolving regulatory requirements; long-term financial transmission rights; the role of investment in improving the provision of transmission services in electricity markets.

## GRID INTEGRATION OF RENEWABLE AND DEMAND RESOURCES

The key obstacles to overcome for the effective integration of renewable generation and demand response resources; current opportunities; major challenges and the way markets and regulation are shaping the various decisions; recent legislation; role of aggregated distributed energy resources, including storage; and actual system experiences.

## ELECTRICITY MARKETS AND RISK MANAGEMENT

The evolution of electricity markets from bilateral transactions to sophisticated pools; public and private markets; the role of forward markets in risk mitigation; role of financial institutions and hedge funds; credit worthiness standards.

## MARKET MONITORING

The role and nature of market monitoring; market behavior metrics and monitoring data requirements; modes of market power, mitigation approaches and FERC priorities; market performance in RTO and bilateral markets; inter-RTO seams issues; nature of investigations, audits and compliance enforcement.

## BUSINESS MODELS FOR TRANSMISSION INVESTMENT AND OPERATIONS

Overview of the RTO structure; review of international experiences; the role and the nature of incentives in new transmission asset investments; key issues.

## REALIZATION OF THE SMART GRID POTENTIAL

The key drivers for making the grid smarter; basic definition and nature of the smart grids; the key building blocks – architectural design, communication infrastructure and standards; policy and cost recovery issues and the roles of the US Department of Energy, FERC and state regulatory agencies; advanced metering infrastructure; implementation status.

## SPECIAL PRESENTATIONS

The lectures in the *School* curriculum are augmented by additional presentations that discuss various issues from the continuing critical future role of reliability in the competitive environment to the views of several transmission-only ownership companies, the RTO market design and implementation developments, the establishment of new structures and topical overview of the FERC activities and developments in the new administration.

## FACULTY

- **George Gross**, Professor, University of Illinois at Urbana-Champaign (UIUC); Director of the *Transmission Business School*
- **Lynnea Johnson**, School Coordinator, Illinois Seminars
- **Richard Doying**, Chief Operating Officer, MISO
- **Jay Giri**, Former Director, GE Grid Software Solutions
- **Teoman Guler**, CIO, Roscommon Analytics, LLC
- **Leonard Hyman**, Board Member, Target Rock
- **Martin Lin**, Principal, The Lin Group LLC
- **John D. McDonald**, Director, GE Digital Energy
- **Elliot Mainzer**, Administrator, BPA

- **Carl Monroe**, Executive VP and CEO, Southwest Power Pool
- **Mahesh Morjaria**, VP Systems Development, First Solar
- **Rana Mukerji**, VP Market Structures, NYISO
- **Thomas J. Overbye**, Professor, Texas A & M University
- **Alex Papalexopoulos**, President, ECCO International, Inc.
- **David M. Perlman**, Partner, Bracewell & Giuliani
- **Mike Rowe**, Chairman, President and CEO, ATC
- **Harry Singh**, VP, Goldman Sachs
- **Jennifer T. Sterling**, VP, NERC Compliance & Security, Exelon



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# TRANSMISSION BUSINESS SCHOOL

MAY 13-17, 2019

CHICAGO, ILLINOIS

The dynamic forces of competitive energy supply unleashed by FERC Orders No. 888, 889, and 2000 and the many recent initiatives and decisions have led to dramatic changes in the electricity industry. The mega-blackout of August 14, 2003 reenforced the criticality of transmission in ensuring the reliability of the nation's electricity supply. The numerous sweeping changes of the EPACT 2005 and of the 2007 Energy Independence and Security Act are extensively impacting the energy infrastructure, in general, and the transmission grid, in particular. The American Recovery and Reinvestment Act of 2009 has brought new focus on the implementation of the *smart grid* and the integration of renewable resources. There is starting to develop a consensus in the industry on the critical need to stimulate transmission investment to modernize the aging grid and to integrate the increasing penetration of renewable resources. FERC's Order No. 1000 is a key development in that direction and additional developments are expected to follow to spur on the big transmission build-out to become reality. To ground interested industry participants in the essential aspects of this rapidly evolving industry, the updated 2019 version of the top-rated *Transmission Business School*, the leading training offering in the electricity industry, will be given in Chicago from May 13-17, 2019. The *School* provides an unparalleled training opportunity to the power industry professionals in your organization to gain the skills and knowledge to manage the many challenges and opportunities of the changing business.

## WHO SHOULD ATTEND?

- |  |   |
|--|---|
| Energy business managers/executives  | Environmental interest and community group representatives        |
| Attorneys  | Regulatory and legislative professionals                          |
| Rate analysts  | Energy industry consultants                                       |
| Financial Analysts   | Energy issues legislative analysts                                |
| Investment bankers for the energy industry   | Public affairs specialists  |
| Economists   | Power marketers, aggregators and brokers                          |
| Policy Analysts and Lobbyists  | Gas industry professionals interested in the electricity business |
| Energy company professionals with public communications and local affairs responsibilities | Venture capitalists in the energy sector                          |
| Energy business corporate communications staff   | Energy buyers   |
|  | Municipal load aggregators  |