



Course length: 4.25 hours **Cost:** \$295-\$350*

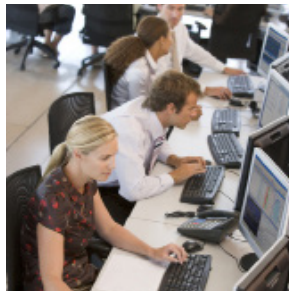
Subscription: 2-12 months

CPE credits: 5 (see website for more details)

Prerequisites: Electric Industry Overview (online course), Understanding Today's Electricity Business (book), or a general knowledge of the electric industry including the basics of generation, transmission, distribution, customers, and regulation.

An in-depth exploration of wholesale electric markets and how they function

As electric markets become increasingly unbundled, energy companies depend more and more on services bought and sold in wholesale power markets. And with the continued growth of gas-fired generation, renewables, and ISO market areas, an understanding of the complex electric markets is now crucially important for many market participants. Wholesale Power Markets helps learners to understand the various ways of organizing markets and provides specifics on how the various electric services are traded in them. This learning path is intended for those with a basic understanding of the electric business who need more detailed information on how power markets function.



WHO WILL BENEFIT FROM THIS COURSE?

- Senior manager needing a broader understanding of electric markets
- Engineers, IT professionals, and other technical experts working in the electric industry who need to understand how markets function
- Experienced energy industry employees needing a deeper understanding of electric markets
- Sales professionals and product developers providing services to the electric industry
- Finance, legal, accounting, public relations, or regulatory professionals

WHAT PARTICIPANTS WILL LEARN

- Who market participants are and how they interact through electric markets
- Various ways that electric markets are structured
- Principles of electric supply and demand including load curves, generation types and characteristics, and dispatch stacks
- Types of markets including bilateral, exchange, ISO, and regulated tariffs
- The types of services that trade in these markets including capacity, energy, ancillary services, transmission rights, renewable energy credits (RECs), and emission allowances
- How services are traded and priced in various market types including wheeling markets, integrated ISOs, and decentralized markets with TSOs
- How energy companies utilize markets to achieve business goals

COURSE AGENDA

Introduction

- Overview of power markets
- Example companies we will use throughout the course:
 - Tradition Utility – a vertically integrated utility in a highly regulated marketplace
 - NuUtilities – a utility operating in a competitive marketplace with ISO
 - MerchGen – a merchant generation company owning central generation and rooftop solar

Power Market Participants and Structures

- Market Participants
 - Functions performed in the market by market participants
 - The five sectors of market participants (electric suppliers, transmission owners and system operators, distribution companies, retail suppliers, consumers)
 - Different types of entities active in each sector and what their needs are
 - Case study: Identifying appropriate market participants for different types of transactions
- Market structures
 - What an electric market is
 - The unique properties of electricity that affect how markets function
 - The differences between vertically integrated and competitive markets
 - The electric market transaction chain (how electricity is physically delivered and how ownership of supply changes throughout the chain)
 - Wholesale markets – organized (ISO/RTO etc.) vs. wheeling
 - Retail markets – retail access (direct access and community aggregation) vs. monopoly utility
 - Market structures
 - o Vertically integrated monopoly utility
 - o Single buyer with competitive generation (with and without an ISO)
 - o Wholesale/industrial competition
 - o Complete retail competition
 - o Hybrid (retail competition with default utility supply)
 - Market structures in the U.S., Canada, and around the world
 - Case study: How market structures impact choices for market participants

Electric Supply and Demand

- Demand
 - Definition of electric demand
 - The key factors affecting electric demand (short-term and long-term)
 - Load curves

* Please contact us for bulk discounts and site license pricing.





- Key demand quantities (baseload demand, average demand, peak demand, load factor)
- Load duration curves
- How residential, commercial, and industrial customers use electricity and characteristics of their usage
- How aggregation of the various customers' usage results in system load curves
- How electric demand varies with time, weather, business activity, and season
- How electric prices affect electric demand
- Demand side management (DSM) programs (energy efficiency, load management) and how they are used to reduce demand
- How demand levels and time-of-use affect generation costs and wholesale prices
- Models used to forecast demand (aggregated and sectoral end-use models)
- Case study: Forecasting future utility demand
- Supply
 - Key factors driving electric supply availability (short-term and long-term)
 - Technologies and fuels used to generate electricity (central plus distributed)
 - Generation mixes in regions of the U.S. and other regions of the world
 - Key characteristics of generation (capital cost, variable cost, flexibility, time to construct, environmental regulations, location of unit)
 - The characteristics of each type of generation in use today
 - How fuel costs affect the marginal cost of electricity
 - DSM as a supply option
 - How the key characteristics combined with available supply results in a dispatch stack
 - How the dispatch stack affects the market price of electricity
 - Using models to predict supply availability
 - Case study: Forecasting market prices based on market supply and demand
- Power Markets and Services
 - Power Markets
 - What a power market is and an overview of different markets
 - Self-owned assets as an alternative to buying services in markets
 - Bilateral markets (including electronic exchanges)
 - ISO markets
 - Tariff (fully regulated) markets
 - Case study: Identifying the right market for a specific transaction
 - Power Services
 - Characteristics and examples of each type of service
 - Capacity (call options, capacity obligations)
 - Energy (forward, day-ahead, real-time)
 - Ancillary services (operating reserves, voltage support or VARs, black start)
 - Transmission (point-to-point, network)
 - Environmental credits (renewable energy credits or RECs, emissions allowances)
 - Which services trade in which markets
 - Case study: Choosing the right service to fulfill a specific need
 - **How Power Markets Work**
 - A definition of trading arrangements
 - The variables that determine how trading arrangements are structured
 - The three methods of organizing trading arrangements (wheeling, integrated, decentralized)
 - The Wheeling Method
 - System operations
 - Ensuring sufficient capacity
 - Generation and load scheduling
 - Ancillary services scheduling
 - Transmission scheduling
 - Providing real-time energy
 - Pricing for various services
 - Types of markets used under this method
 - Roles for market participants
 - Case study: Market participation in a wheeling market
 - The Integrated Method
 - System operations
 - Ensuring sufficient capacity (including capacity auctions)
 - Generation and load scheduling
 - Ancillary services scheduling
 - Transmission scheduling
 - Providing real-time energy
 - Pricing for various services (including Locational Marginal Pricing for energy)
 - Types of markets used under this method
 - Roles for market participants
 - Case study: Market participation in an integrated market
 - The Decentralized Method
 - System operations
 - Ensuring sufficient capacity
 - Generation and load scheduling
 - Ancillary services scheduling
 - Transmission scheduling
 - Providing real-time energy
 - Pricing for various services (including zonal prices for energy)
 - Roles for market participants
 - Case study: Market participant in a decentralized market

