



Electrical Engineering

Understanding Electricity Market Regulations & Economic Regulatory Analysis

Course Introduction

In economic terms, electricity (both Power and Energy) is a commodity capable of being bought, sold and traded. An electricity market is a system for effecting purchases, through bids to buy; sales, through offers to sell; and short-term trades, generally in the form of financial or obligation swaps. Bids and offers use supply and demand principles to set the price. Long-term trades are contracts similar to power purchase agreements and generally considered private bi-lateral transactions between counterparties.

Wholesale transactions (bids and offers) in Electricity are typically cleared and settled by the market operator or a special-purpose independent entity charged exclusively with that function. Market operators do not clear trades but often require knowledge of the trade in order to maintain generation and load balance. The commodities within an electric market generally consist of two types: power and energy. Power is the metered net electrical transfer rate at any given moment and is measured in megawatts (MW). Energy is electricity that flows through a metered point for a given period and is measured in megawatt hours (MWh).

The market mechanisms introduced a new discipline to be used by power systems professionals. This course explores the market economics and the associated exposure that can be mitigated with financial instruments. The course provides a good understanding of the market structures, the power and energy exchanges and the hedging instruments that become part of the engineering tool box. Special attention is given to the identification of Risk Exposure and Mitigation of risk.

Target Audience

- Power system protection engineers
- System planners

- Technical staff responsible for Smart Grid integration into power system monitoring and control

Learning Objectives

- Understanding the Planning and Operating Process
- Understanding the Financial and Economic issues
- Ability to deal with the risks associated with Market

Course Outline

- **DAY 01**

- Module (01) Risk Management**

- 1.1 Risk Framework/Metrics
 - 1.2 Examples of Regulatory Risks
 - 1.3 Types of Instruments
 - 1.3.1 Futures (NYMEX, Amsterdam Exchange)
 - 1.3.2 Strategies: Vanilla and Exotic Options
 - 1.3.3 Swaps
 - 1.4 Design of Contracts (ISDA, EEI, OTC, NYMEX)
 - 1.5 Typical Trades - Futures, SWAPS, OPTIONS
 - 1.5.1 Choice of Hedges
 - 1.5.2 Real life Examples
 - 1.5.3 Types of Trades - Useful to the Producer
 - 1.5.4 Types of Trades - Useful to the Load
 - 1.6 Advantage/Disadvantage of different Tools

- **Day 02**

- Module (02) Market Economics (Best Practices)**

- 2.1 Canada
- 2.2 USA
- 2.3 Europe

Module (03) Lessons Learned from other Jurisdictions

- 3.1 North America Market (FERC)
- 3.2 FERC white paper on Transmission Policy
- 3.3 Challenges of Scale, Scope and Timing

Module (04) Elements of Risks

- 4.1 Basel Committee for Banking Supervision
- 4.2 Market Risk
- 4.3 Operational Risk
- 4.4 Credit Risk
- 4.5 Liquidity Risk
- 4.6 Physical Risk of Generating Assets
- 4.7 Legal and Regulatory Risks
- 4.8 Basic Risk (Locational, etc.)
- 4.9 Trading Controls and Best Practices
- 4.10 Independent Risk Management
- 4.11 Front to Back Office Case Studies
 - 4.11.1 Orange County
 - 4.11.2 Metallgesellschaft AG
 - 4.11.3 Union Bank of Switzerland
- 4.12 Enron's Price Maximization
- 4.13 Quantitative / Qualitative Risks

• Day 03

Module (05) Concepts of Derivatives Part I

- 5.1 Forward Contracts: Contango, Backwardation
- 5.2 Futures Contracts
- 5.3 Contract Standardization
- 5.4 Energy Futures contracts
- 5.5 Arbitrage Pricing Theory
- 5.6 Convenience Yield
- 5.7 Swaps

Module (06) Concepts of Derivatives Part II

- 6.1 Option Contracts
- 6.2 Strategies Involving Options
- 6.3 Basic Options Strategies
- 6.4 Call-Put Parity
- 6.5 Daily Options, Monthly, Spreads
- 6.6 Spark Options on 2 commodities
- 6.7 Spark Options on 3 commodities
- 6.8 Volumetric or Swing Options
- 6.9 Real Options: Power and Physical Constraints

Module (07) Option Valuation

- 7.1 Valuation of Option Strategies
- 7.2 Closed Form Solutions (Black Scholes)
- 7.3 The Binomial Tree Approach
- 7.4 Monte Carlo Valuation of Options
- 7.5 Examples of Hedging

• Day 04

Module (08) Quantitative Financial Models

- 8.1 Quantitative Financial Models
- 8.2 Stochastic Factors: Production and Demand
- 8.3 Mean Reversion Model, Jumps

Module (09) Market Economics

- 9.1 Day Ahead Market
- 9.2 Unconstrained Price
- 9.3 Constrained Price
- 9.4 Bidding Strategy
- 9.5 Locational Marginal Price
- 9.6 Energy Price Cap

Module (10) Portfolio Analysis

- 10.1 Demand
- 10.2 Supply
- 10.3 Demand & Supply Equilibrium Price
- 10.4 Value AT Risk

• Day 05

Module (11) Financial Transmission Rights

- 11.1 Transmission Pricing
- 11.2 Congestion Management
- 11.3 Auction

Module (12) CASE STUDY: Weather Derivatives

- 12.1 Weather Risk
- 12.2 Description of Weather Contracts
- 12.3 Weather Risk Management Instruments

Module (13) Strategic Planning

- 13.1 Multiyear Plan
- 13.2 Multi Area Forecasting
- 13.3 Budget
- 13.4 Forward Prices

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 12, 2025	May 16, 2025	5 days	4250.00 \$	UAE - Dubai
Aug. 4, 2025	Aug. 8, 2025	5 days	2150.00 \$	Virtual - Online
Dec. 8, 2025	Dec. 12, 2025	5 days	4950.00 \$	Austria - Vienna
Nov. 23, 2025	Nov. 27, 2025	5 days	4250.00 \$	Oman - Muscat