ADVANCED HEDGING AND ASSET PORTFOLIO OPTIMIZATION

May 22 - 23, 2018
EUCI Conference Center
4601 DTC Blvd
Denver, CO

RELATED EVENT:
INTRODUCTION TO ELECTRICITY TRADING AND HEDGING
May 21-22, 2018 | Denver, CO

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OVERVIEW

Utility hedging and portfolio management has generally focused on creation of balanced physical positions largely independent of market prices and uncertainty. However, increased renewables generation is contributing to a disassociation between the physical and financial, requiring new strategies for portfolio management. This risk is further compounded by renewable generation operating in the real-time energy markets while load and thermal commitments remain in day-ahead markets.

By integrating the uncertainty in market prices and their joint relationship to loads and intermittent generation, more robust and less rigid hedging strategies can be developed that yield substantially greater risk reduction while preserving value.

This is a hands-on course that will walk attendees through exercises on asset hedging for actual utility portfolios. It will provide practical steps and techniques to manage portfolio positions to support stable cash flows, adhering to budgets and risk limits, and optimized operations. The content will also address the new frontiers of portfolio management, including the impact of sub-hourly market operations on margin drift and practical application of liquid cross commodity hedging. In addition, the course provides practical metrics to assess and manage market and physical risks, techniques to differentiate and quantify the sources of risk, hedge instrument effectiveness, and tradeoffs in application of different hedge instruments to address market price and volume uncertainty.

LEARNING OUTCOMES

• Demonstrate process to determine systematic hedge design for budgeted cash flows to equal realized cash flows
• Examine the differences and interrelationship of physical and financial uncertainties
• Assess why renewables are a driver of volatility in prices
• Identify risk factors and relative contributions of forwards, weather, load, renewables, hydro conditions, generation outages and spot prices
• Review different approaches to incorporate risk analysis into budgeting and risk management
• Discuss communicating technical results to non-technical executive audiences and regulators
• Calculate the risk reduction value of hedges, physical generation and storage
• Consider the implications and utilization of disruptive technologies and distributed generation
• Appraise the impact of short term operations, such as real-time versus day-ahead arbitrage, on intermediate term utility portfolio management

WHO SHOULD ATTEND

The course is designed for practitioners and executives that are involved in executing, analyzing, designing and approving hedging strategies for utilities, wholesale generators, and retail suppliers, including:

• Risk management and Middle Office
• Origination
• Structuring
• Portfolio management
• Treasury
• Resource adequacy/Reliability planning
• Strategic and long-range planning
• Financial engineering and analysis
• Generation and load planning

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AGENDA

TUESDAY, MAY 22, 2018

12:30 – 1:00 pm  Registration

1:00 – 1:15 pm  Overview and Introductions

1:15 – 3:15 pm  Review of Key Concepts
- Portfolio management goals, objectives, and expected results
- Position management versus active cash flow management
- Distinction and applications of Mark-to-Market, Value at Risk, Cost at Risk, Rates at Risk, Gross Margin at Risk
- Principal risk factors and relative risk contributions to manage portfolio
- Market dynamics of forward and spot prices and disassociation risks between forward and spot
- New spot market dynamics for both day-ahead and real-time and the impact of higher renewables on market prices and portfolio risks
- Building forward curves in gas and power markets
- Weather as a key structural variable for supply (renewables), demand, and prices
- Intrinsic and extrinsic value and risk components
- Case study - Portfolio management strategies for retailer, wholesaler, and integrated utilities

3:15 – 3:30 pm  Afternoon Break

3:30 – 4:15 pm  Hedge Instrument Dynamics (I): Linear, Non-linear, Exotic
- Linear forward contracts
- Non-linear option instruments on forward contracts
- Power and gas specific spot price base exotics
- Transmission and basis price instruments
- Weather derivatives
- Instrument valuation approaches and issues
- Cross-commodity hedging

4:15 – 4:45 pm  Physical System Dynamics
- Generation asset modeling
  - Thermal generation
  - Renewables
  - Batteries
- Retail load modeling
- Transmission rights and basis value
- Integrated utilities

4:45 pm  Program Adjourns for Day
AGENDA

WEDNESDAY, MAY 23, 2018

7:30 – 8:00 am  Continental Breakfast

8:00 – 8:30 am  Application of Hedge Contracts
• Application and uses of hedge instrument payoffs
• Case study: Uses of options for protection against price spikes
• Main drivers of option premiums
• Are options a cost or an investment?
• Why most utilities should have options as part of their hedging program

8:30 – 9:45 am  Generating “Meaningful Uncertainty” — Probabilistically Enveloping Market and System States
• Prior to delivery market expectations of forward prices and options on forwards
• During delivery spot price dynamics of day-ahead and real-time prices
• Weather as a fundamental driver of load, renewables, and market price risk
• Structural drivers of spot price formation and impact of renewables on spot price volatility
• Stochastic process for forward and spot price simulation
  o Geometric Brownian Motion
  o Mean reversion
  o Regime switching
  o Structural state-space modeling
• Validation criteria to establish “meaningful” uncertainty
  o Weather
  o Load
  o Renewables
  o Spot prices
  o Forward prices

9:45 – 10:30 am  Asset Portfolio Management Metrics
• Portfolio payoff diagrams’ use and application to visualize and adjust risk components
• Hedge instrument risk factors: incremental, component, and marginal risk
• Greeks for hedging and relationship to spot physical: Delta, Gamma, Vega
• Principal risk factors and relative risk contribution
• Determining volumetric risk of load, hydro, and renewable risks versus market risk
• Intrinsic versus extrinsic risk
• Risk visualization and drill down
• Identification and manage of risk by commodity
• Monetization of risk reduction value

10:30 – 10:45 am  Morning Break
## AGENDA

**WEDNESDAY, MAY 23, 2018 (CONTINUED)**

### 10:45 am – 12:30 pm  
**Case Study: Hedging Strategy for Utilities and Generators**
- Determining native portfolio positions and risks
- Leveraging flexible generation with load as part of hedging strategy
- Hedge value of highly flexible generation and storage as physical hedges
- Minimizing fuel contract risk for coal
- Gas position management
- How should the ratepayer’s risk appetite influence the hedging decisions?
- Balancing ‘potential’ and ‘regret’ in hedge strategy design
- Market views and hedge timing
- Working with utility commissions in hedge program design

### 12:30 – 1:30 pm  
**Group Luncheon**

### 1:30 – 3:00 pm  
**Management of Weather, Load and Price Risk for Utilities**
- Volumetric risk and hedging: Supply and demand risk
- The cost of ignoring volume uncertainty in hedge programs: Lessons learnt from utility hedging debacles
- Designing optimal hedge programs including retail load, unit characteristics, and forced outages
- The ‘meaningful uncertainty’ framework to develop utility hedging programs
  - How to produce realistic weather, load, gas and price scenarios
  - Creating a portfolio view of physical and financial exposures
  - Integrating price and volume risk modeling in a coherent framework
  - 360 degree view of portfolio risk with market, credit, liquidity and volumetric risk metrics

### 3:00 – 3:15 pm  
**Afternoon Break**

### 3:15 – 4:45 pm  
**Comprehensive Case Studies**
- Modeling ranges of costs and revenues under alternative hedging strategies
- Analysis of financial and physical instruments
- How to assess and visualize market and weather risk factors on cash flows
- How to dynamically adjust hedges as a response to weather, operational and price ‘shocks’
- Case study I: Hedging strategy for a vertically-integrated utility in the Midwest
- Case study II: Hedging strategy for a distribution utility in the Northeast

### 4:45 pm  
**Program Adjournment**
COURSE INSTRUCTORS

Dr. Gary Dorris  
**President, Ascend Analytics**

Dr. Dorris has been a pioneer of innovative solutions for energy planning and risk. For the last dozen years, Gary has introduced utilities to new solutions to model and analyze planning portfolios. His analytic innovations and expertise are sought by industry leaders including expert testimony in some of the most prominent resource planning and risk management proceedings in the country. His company’s software solutions are used by 3 of the top 5 utilities in America and many COOPs and municipalities. He has established industry standards for model validation, monetization of risk, portfolio selection, and performance metrics. In 2001, Dr. Dorris won distinguished recognition from the IPE for contributions to the field of energy risk management. Dr. Dorris holds a Ph.D. in applied economics and finance from Cornell University and a BS in mechanical engineer and BA in economics with Magna Cum Laude distinction also from Cornell University.

Scott Wrigglesworth  
**Director of Analytics and Strategy, Ascend Analytics**

Scott Wrigglesworth is Director of Analytics and Strategy with Ascend Analytics. Before joining the company, he spent 17 years with Dayton Power and Light and the AES Corporation. There he focused on practical solutions in energy analytics, actionable reporting, margin modeling and portfolio optimization. In that role, Mr. Wrigglesworth provided analytic expertise for portfolio optimization, planning, and risk management activities. These activities included merchant generation optimization, fuel procurement, wholesale hedging, retail energy, load auctions, rate case preparation, asset valuation, and commercial budget development. In his new position, he will apply his experience in commercial portfolio analytics to the Ascend Analytics team in a multifaceted role. Mr. Wrigglesworth teaches a course in Energy Markets at the University of Dayton from where he also earned his MBA. He holds a BA in Global Economics and International Business from Cedarville University.
REQUIREMENTS FOR SUCCESSFUL COMPLETION

Participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

INSTRUCTIONAL METHODS

Powerpoint presentations and case studies will be used in this 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 1.1 CEUs for this course.

CPE CREDITS

CPE - EUCI is registered with the National Association of State Boards of Accountancy (NASBA) as a sponsor of continuing professional education on the National Registry of CPE Sponsors. State boards of accountancy have final authority on the acceptance of individual courses for CPE credit. Complaints regarding registered sponsors may be submitted to the National Registry of CPE Sponsors through its website: www.learningmarket.org.

Upon successful completion of this event, program participants interested in receiving CPE credits will receive a certificate of completion. EUCI is authorized by CPE to offer 13 credits for this course.

There is no prerequisite for this course. Program Level 1: Intermediate, Delivery Method: Group-Live, Advanced Preparation: None

EVENT LOCATION

EUCI Conference Center
4601 DTC Blvd., B-100, Denver, CO 80237

NEARBY HOTELS

PREFERRED HOTEL
Hyatt Place Denver Tech Center
8300 E. Crescent Parkway, Greenwood Village, CO 80111 (0.9 miles away).
Call Central Reservations at 888-492-8847 and ask for the corporate rate of $159 under the Group Code: EUCI or visit https://denvertechcenter.place.hayatt.com/en/hotel/home.html?corp_id=102338 for the corporate rate using the Group Code: EUCI

Hyatt Regency Denver Tech Center
7800 E. Tufts Ave
Denver, CO 80237
Phone: 303-779-1234
0.3 miles away

Hilton Garden Inn Denver Tech Center
7675 E. Union Ave
Denver, CO 80237
Phone: 303-770-4200
0.6 miles away

Denver Marriott Tech Center
4900 S. Syracuse St
Denver, CO 80237
Phone: 303-779-1100
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MAY 21-23, 2018: US $2195,
Early bird on or before May 4, 2018: US $1995

ADVANCED HEDGING AND ASSET PORTFOLIO OPTIMIZATION COURSE ONLY
MAY 22-23, 2018: US $1395,
Early bird on or before May 4, 2018: US $1195

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

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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 April 20, 2018 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 303-770-8800.

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