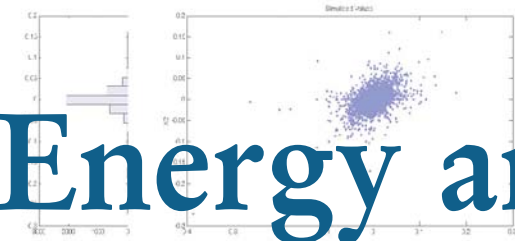


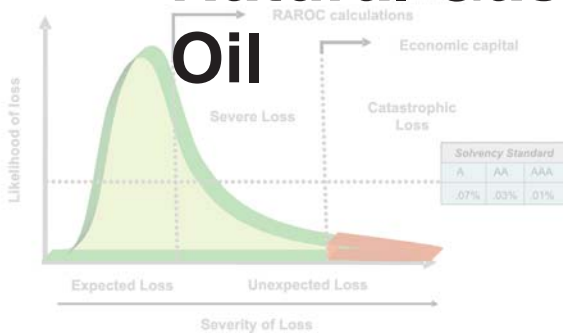
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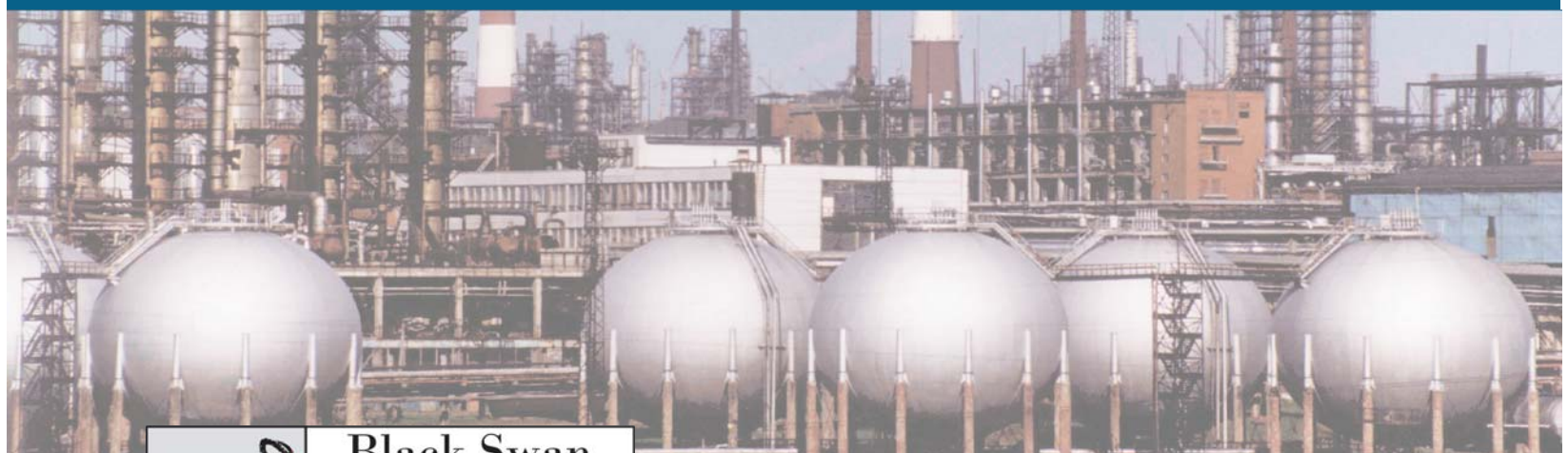
Energy and Commodity Risk Management Workshops



**Power
Natural Gas
Oil**



**Agricultural
Metals
Chemicals**



 **Black Swan
Risk Advisors**

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www.blackswanrisk.com

Risk Education & Development

Cutting-edge Applied Research

BSRA training bring the latest development in derivatives trading, valuation, hedging and risk management. We stay at the forefront by working with some of the world's leading energy and commodity trading firms worldwide.

Energy and Commodity Risk Management Courses

Risk Management Courses	Duration
Derivatives Trading, Valuation and Hedging	1-5 days
Advanced Derivatives Trading, Valuation and Hedging	1-5 days
Market Risk Management	1-5 days
Advanced Market Risk Management	2 days
Credit and Counterparty Risk Management	2-5 days
Enterprise Wide-Risk Management	1-5 days
Risk Governance Best Practices	1-2 days

Introductory Workshops	Duration
Fundamentals of Trading and Hedging: Physical and Derivatives Markets and Instruments.	1-5 days
Fundamentals of Probability and Statistics for Derivatives Pricing and Risk Measurement	1-5 days



Our Clients

We have trained risk managers, finance personnel, senior management, traders and internal audit personnel at some of the largest energy and commodity trading firms worldwide on various derivatives risk management, hedging and valuation issues. A sample list of clients for which we have developed in-house courses:

- Risk management group at leading oil and gas multinational firm in Europe and North America.
- Finance Group at large Refinery of Eastern European Integrated Energy Firm
- Risk management, internal audit, trading and finance personnel for leading international bank.
- Structured product and quantitative analysis group at leading Western European Utility



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Workshop Methodology and Teaching Philosophy

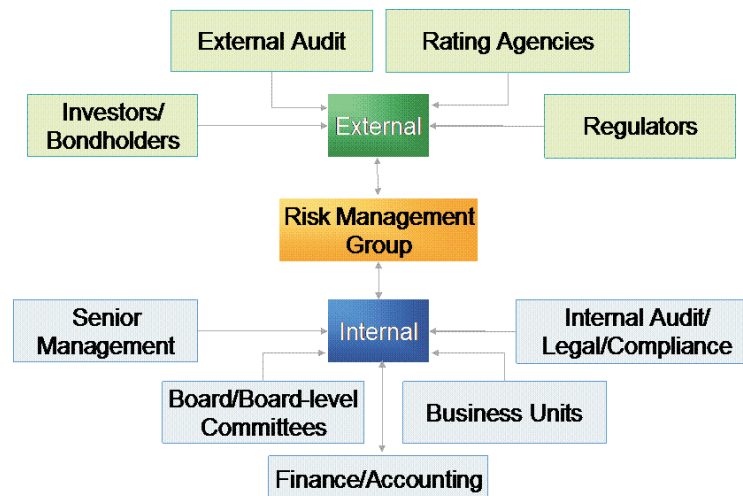
Our teaching philosophy is based on the concept of "learning by doing".

We combine financial theory and lectures with hands-on projects, case studies, simulation exercises, and group discussions. Our objective is to empower course delegates with the applied skills to make an immediate contribution at their work.

Acknowledging that each course should be designed to meet the client's objectives, we work closely with the course coordinator on the design of each workshop. We also provide optional coaching and mentoring support after the completion of the workshops.

Target Groups

Depending on the target groups, our courses are designed based on their technical and professional background and practical needs. We are aware that the need to acquire a particular breadth and depth of knowledge of various topics depends on the role performed within the firm.



Our courses have been designed for the following groups.

CROs and Risk Management Personnel
(market, credit and operations)
Trading managers and traders

Risk and audit committee members
CFOs and Finance department personnel
Internal and external auditors

Instructors

The courses are led by Carlos Blanco, which has over 9 years of experience conducting risk management workshops for a wide variety of audiences. BSRA instructors have extensive hands-on training, risk management and teaching experience. They use simple language and real-world practical examples.

Energy Derivatives Valuation, Structuring, and Hedging

The objective of this course is to provide delegates a comprehensive exposition of derivatives instruments used in the energy markets. Course delegates will learn how to price, and hedge energy derivatives and embedded options in energy contracts. Alternative price processes to describe energy market price behavior will be presented and discussed. Case studies will illustrate how to effectively use "Greeks" to understand derivatives and portfolio's sensitivity to the underlying risk drivers. Various valuation approaches will be presented from a conceptual point of view.

The workshop can focus on the derivatives instruments used in Oil, Gas, Power, Agricultural or Metal markets, or can provide a general overview of energy and commodity derivatives.

Understanding Contract Optionality

- How to unbundle embedded risk structures in energy contracts.
- Building blocks: Long vs. short; option types; Volumes; strike price; exercise style; underlying; trigger event / contingency; payoff type.

Commonly Traded Derivatives in Energy Markets

- Futures and forwards. Swaps.
- European and American options (NYMEX and NYMEX look-alike). caps, floors, collars and straddles.
- Strips of daily, monthly options with limited/unlimited exercise frequency.
- Locational basis swaps and options. Calendar spread swaps and options.

Advanced Derivatives in Energy Markets

- Average price/strike options (Asian).
- Options on swaps (swaptions.)
- Binary or digital options. Barrier options.
- Exotic swaps (Participation, cancelable.)
- Generation and tolling contracts.
- Interruptible provisions.
- Volumetric contracts. Case study: Swing contracts with various exercise provisions.
- Compound options and spread options.

Overview of Energy and Commodity Price Behavior

- Overview of energy price behavior.
- Spot vs. Forward prices. Market liquidity.
- Seasonality. Mean reversion. Spikes.
- Spot vs. Forward price volatility.

Overview of Probability and Statistics for Derivatives Pricing and Risk analysis

- Probability distributions. Moments.
- Lognormal vs. normal price changes.
- Calculating volatility and correlation.
- Understanding confidence intervals
- Linear vs. non-linear positions
- Histograms and percentiles.
- Correlation and joint distributions.

Introduction to Derivatives Pricing Models: Conceptual Interpretation. Uses. Pros and Cons.

- Close-form solutions (formulas)
- Monte Carlo simulation based models.
- Binomial and trinomial trees.
- Multi-dimensional trees.
- Numerical integration

General Market Data Issues (Derivatives Pricing and VaR Analysis)

- Structuring and visualizing historical data.
- Building forward curves for illiquid markets from actively traded quotes.
- Non-synchronous data. Case study: NYMEX WTI vs. IPE Brent.
- Real-time market data for derivatives pricing and VaR analysis.

Understanding Option Sensitivities through the "Greeks"

- Calculating, monitoring and managing delta, gamma, vega, theta and rho
- Understanding inter-dependencies between option sensitivities.



EMBRACE RISK

Advanced Energy Derivatives Valuation, Structuring, and Hedging

The objective of this course is to provide delegates with a comprehensive exposition of advanced derivatives instruments and pricing methods used in the energy derivatives and physical markets. Case studies will illustrate how to use and calibrate the model parameters for various price processes in order to model the joint evolution of spot and forward prices for accurate pricing and hedging of different derivatives structures. Valuation and risk management of physical assets and structured products are presented and discussed for various markets throughout the course.

The course can be a general overview of derivatives instruments used in Oil, Natural Gas and Electricity markets, or can focus on one or more of those markets.

Parameter Calibration and Market Data (derivatives pricing and VaR analysis)

- Spot vs. Forward Price Volatility. Constant maturity and constant return futures. Seasonality. maturity and constant return futures. Seasonality.
- Introducing Exponentially-weighted moving averages and GARCH volatilities and correlations.
- Exploring and calibrating volatility, mean reversion and jump-diffusion parameters.
- Implied volatility calibration. Skews and surfaces.

Energy Price Behavior: Overview of spot and forward (Black), one-factor and multi-factor models.

- Spot price models for energy and commodity markets.
- Understanding and calibrating price processes.
- Seasonal structure of volatilities for energy and commodity markets.
- Geometric Brownian motion, Mean reversion, jump diffusion and mean reverting with jumps price processes.
- One factor vs. multi-factor models for energy and commodity markets.

Correlation and Dependence in Energy Markets. (multi-asset derivatives pricing and VaR analysis)

- Linear correlations. Seasonality.
- Correlations between spot and forward contracts.
- Using historical simulation as an alternative benchmark.
- Determining the optimal valuation model for locational and calendar basis products.
- Copulas as a measure of comovement.
- Short-run vs. long-run comovement.
- Interaction between correlation and mean reversion rates.

Valuation and hedging of exposures with volumetric risk

- Understanding volumetric risk.
- Modeling load as a function of weather.
- Ruthless vs. non-ruthless exercise.
- Incorporating "expected" exercise strategies.
- Modeling full-requirement deals.

Valuation and Hedging of Multi-asset options.

- Typology of spread and multi-asset options (Spread, Best-of, Worst-Of, Compound, Baskets).
- Modeling spreads depending on the fundamental economic drivers.
- Two-factor vs. One-Factor models for the spread. Calibration and hedging.
- Adding mean-reversion and jumps
- Case Studies. Locational, Calendar and inter-commodity Spreads.

Valuation and Hedging of assets as real options

- Incorporating operational constraints in the valuation
- Case studies. Natural gas transportation, storage, Generation and Refineries as spreads options.

Potential Counterparty Exposure for Energy Derivatives

- Potential future exposure using analytical solutions and simulation.
- Step by step calculations and interpretation for forwards, swaps and options.
- Dynamic Credit Derivatives
- Potential exposure and the role of margin, collateral and settlements.
- Impact of mean reversion and jumps.
- Counterparty VaR and dynamic exposure.
- Adding default probabilities.
- Counterparty limits.
- Incorporating plant outages and pipeline "blow-ups" in the simulation framework.

Market Risk Measurement and Management for Energy and Commodity Firms: VaR, Stress Tests, Backtesting

The objective of this course is to provide delegates a comprehensive exposition of energy risk management best practices including models, policies and infrastructure. Delegates will learn main uses of VaR for measurement, monitoring and management of energy and commodity derivatives portfolios. Case studies will illustrate VaR calculations using alternative methodologies using spreadsheets.

The course can be designed as a general overview of risk management for Oil, Natural Gas, Electricity, Agricultural and Metals markets, or can provide a general overview with examples from various markets.

Understanding and Interpreting "at-Risk" measures

- Why does my firm need to calculate risk?
- Learning from energy and commodity trading risk management disasters.
- Confidence level and horizon for "at-Risk" calculations.
- Overview of methodologies: Analytic, Monte Carlo and historical simulation
- VaR vs. Expected tail loss (ETL).
- Uses of "at-Risk" measures in risk reports.

Market Data and Volatility and Correlation Analysis.

- Volatility structure in energy markets. Constant maturity futures and constant maturity returns
- Case study: Main pitfalls building constant maturity futures series and possible solutions.
- Taking the best of both worlds: Combining information from CMF and actual futures prices for VaR calculations.
- Dealing with illiquid data for Energy Markets
- Implied and subjective volatilities.

Analysis and Comparison of Value at Risk Methodologies.

- Analytic VaR. Monte Carlo simulation. Historical simulation. Step by step. Flow Diagram. Example.
- Comparison of VaR methodologies.
- Energy and commodity specific issues.
- Case study: Calculating VaR in a spreadsheet.

Stress Testing for Energy and Commodity Firms.

- Designing and conducting stress tests

Backtesting: Evaluating the accuracy of VaR models

- Understanding the calculation flow and the impact of model assumptions.
- Exploratory data diagnosis.

Overview of Probability and Statistics for Derivatives Pricing and Risk analysis

- Probability distributions. Moments.
- Lognormal vs. normal price changes.
- Calculating volatility and correlation.
- Understanding confidence intervals
- First-order derivatives (linear vs. non-linear positions)
- Histograms and percentiles.
- Correlation and joint distributions.

Introduction to Derivatives Pricing Models: Conceptual Interpretation. Uses. Pros and Cons.

- Close-form solutions (formulas)
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- Real-time market data for derivatives pricing and VaR analysis.

Understanding Option Sensitivities through the "Greeks"

- Calculating, visualizing, interpreting, monitoring and managing delta, gamma, vega, theta and rho
- Understanding inter-dependencies between option sensitivities.



Advanced Market Risk Measurement and Management

This is an advanced course on market risk measurement and management. Advanced topics such as hybrid simulation approaches, Extreme Value Theory, copulas and advanced volatility estimation are presented. This course is designed for risk management professionals interested in developing a more in-depth knowledge of market risk models and programs.

Course delegates will learn the main limitations and how to measure and mitigate model risk of traditional VaR models. Case studies will illustrate possible abuses and "black holes" of VaR models. Next-generation dynamic models are introduced throughout the course.

Advanced Volatility Estimation for pricing, hedging and risk analysis

- GARCH models to estimate volatilities.
- Implied Volatilities and VaR calculations.
- Incorporating spot and forward volatilities.
- Volatility as a risk factor. Skews and surfaces.

Correlation and dependence in Risk Management. Introducing Copulas.

- Implied correlations and implied correlation "smiles" and "frowns".
- Pitfalls of correlation as a measure of dependence.
- Case Study: Natural gas location basis risk.
- Alternative measures of dependence: copula.
- Some examples of copulas applied to energy and commodity markets.

Model Risk.

- Understanding, documenting and controlling model risk.
- Evaluating the accuracy of model assumptions
- Model risk in pricing and risk models.
- Reporting model risk. CCRO recommendations.

Liquidity risk and VaR calculations.

- Incorporating liquidity risk in VaR estimates
- Market liquidity vs. firm's liquidity.
- Bid-Ask spreads and trading volumes as a measure of liquidity.
- Hedging liquidity risk.
- Dynamic simulation and liquidity risk.
- Integrating liquidity risk into stress tests

Advanced Backtesting: Issues

- Understanding the calculation flow and the impact of model assumptions.
- Exploratory data diagnosis.
- Quantitative tests. Frequency of failure tests
- Distribution-based back tests. Forecast evaluation. Simulation-based back testing

- Case study: Diagnosis and recommendations for model improvements based on backtest results.

Gaming VaR models and ways to detect and prevent gaming behavior.

- Gaming Variance-Covariance, Monte Carlo and historical VaR models.
- Setting up a program to create warning signals about potential gaming behavior.
- Benchmarking top-down with bottom-up VaR numbers to identify possible model risk and potential gaming activity.
- Designing policies and procedures to prevent potential gaming behavior by risk takers.
- Gaming Monte Carlo based models.
- Gaming historical Simulation based methods.

Dynamic Simulation of risk

- Dynamic simulation of portfolios responding to changing market conditions.
- Risk measures with dynamic hedging, stop loss, and optimal liquidation rules.
- Bringing counterparty and liquidity risks into the simulation framework
- Integrating liquidity risk into stress tests.

Tail Risk and Extreme Event Analysis.

- Expected tail loss and coherent risk measures.
- Non-normal distributions and extreme risks.
- Tail "heaviness" and Tail "asymmetry".
- Integrating stress tests into the tail analysis.
- Key insights from behavioral finance regarding extreme risk probabilities.

Extreme Value Theory.

- Extreme events and the central limit theorem
- Extreme value VaR and ETL
- Pitfalls and limitations of EVT
- Designing stress tests with EVT
- EVT applied to portfolios

Credit and Counterparty Risk Management

The objective of this course is to provide delegates with a comprehensive exposition of modern credit and counterparty risk measurement and management. This course is highly practical and a wide range of case studies will illustrate how to effectively measure and mitigate credit and counterparty risk. There will be several hands-on exercises and group discussions to measure and interpret credit risk reports with the tools presented throughout the seminar.

Overview of Credit Risk Management for Energy and Commodity Trading Firms

- The importance of a strong credit risk group in energy and commodity trading firms
- Internal vs. external rating systems
- Overview of main rating agencies classifications. Comparison amongst ratings.
- Key ratios for credit risk analysis.
- A step-by-step approach to build an effective internal rating system

Credit Risk Mitigation tools.

- Collateral
- Margining
- ISDA agreements
- Letters of credit, Parent Guarantees
- Analysis of key credit-related clauses in OTC energy derivatives
- Understanding Credit Derivatives.

Default Probabilities.

- The role of default probability estimation in setting and controlling counterparty exposure limits
- KMV model for default probabilities
- Rating transition matrices
- Moody's and S&P default probability tables and ratings
- Case Study: Enron. What went wrong and why were the rating agencies late?
- Case Study: Bankruptcy of various US airlines in 2002-2005.
- Additional analysis of evolution of credit ratings

Potential Counterparty Exposure for Energy and Commodity Derivatives

- Potential future exposure using analytical solutions and simulation.

- Step by step calculations and interpretation for forwards, swaps and options.
- Impact of mean reversion and jumps in potential future exposure calculations.
- Counterparty VaR and dynamic exposure.
- Adding default probabilities.
- Counterparty limits.
- Dynamic Credit Derivatives
- Potential exposure and the role of margin, collateral and settlements.

Credit Risk Portfolio Models

- Overview of main credit portfolio models (KMV, Creditmetrics)
- Aggregating risk at the portfolio level
- Calculating Credit VaR and other credit risk measures
- Marginal contribution to credit risk.
- Credit risk in an economic capital framework

Credit Risk Policies and Procedures.

- CCRO recommendations
- Key issues and lessons learnt
- The role of the internal rating system and credit risk committees
- Extending/Contracting credit risk lines
- Chargin for credit risk. Alternative approaches.

Communication with Credit Rating Agencies.

- The importance of managing communication flows with rating agencies.
- Liquidity risk management for energy and commodity trading firms.
- Trading vs. Funding liquidity.
- S&P liquidity risk surveys
- S&P analysis of the quality of the risk management process and its impact on credit risk
- What not to do: Lesson learnt



Enterprise Wide Risk Management: Integrating Market, Credit and Operational Risk for Energy and Commodity Firms

The objective of this course is to provide delegates a comprehensive exposition of best practices in Enterprise Wide Risk Management covering market, credit and operational risk. Course delegates will learn Numerous case studies will be shown how to achieve efficient use of risk capital. Numerous case studies will illustrate how to use Economic Capital and Risk-adjusted return metrics for effective decision making.

The course is built around a framework based on policies, methodologies and infrastructure required to turn enterprise-wide risk management into a competitive advantage.

Overview of ERM

- Building blocks of ERM.
- Enterprise Risk Management Metrics
- Review of Probability and Statistics
- Energy and Commodity Price Behavior
- Market Instruments

Market Risk Management

- Analysis and Comparison of "at Risk" Methodologies. Value at Risk, Earnings at Risk and Cash Flow at Risk.
- Mark-to-Market vs. Mark-to-Model:
- Introduction to Derivatives Pricing Models
- Risk limits and their role in the risk management structure
- Risk decomposition, Incremental and Marginal VaR analysis
- Designing and communicating and effective Hedging Program

Credit and Counterparty Risk Management

- Overview of Credit Risk Management for Energy and commodity trading firms.
- Internal vs. external credit Rating Systems
- Potential Counterparty Exposure for Energy Derivatives
- Portfolio Credit Risk Models
- Set up a Counterparty Risk Management system

Operational Risk Management

- Overview of OR: Operations vs. Operational Risks
- Approaches to measuring and monitoring operational risk

- Integrating Liquidity, Credit and Operational Risk in the formal risk management process
- Developing Key Risk Indicators (KRIs)

Liquidity Risk Management

- Funding liquidity vs. Market Liquidity
- Approaches to measuring and monitoring liquidity risk
- S&P Liquidity risk surveys
- Liquidity risk and capital adequacy
- Monitoring and reporting liquidity conditions

Risk Communication

- Interaction with the investor community
- Communicating with rating agencies
- Communication with senior management
- Designing effective risk reports

Risk Governance and disclosures

- Sarbanes-Oxley Act and its Impact on Risk Management
- Introduction to the COSO Framework.
- Designing Policies and Procedures around market, credit and operational risk controls.
- Best practices in Risk Communication

Integrated ERM

- Stress Testing for Energy and Commodity Firms: Market, Credit, Operational and Liquidity Issues
- Risk-based Capital Allocation and Performance Measurement.
- Model Risk.
- Diagnosing Risk Process Problems: Common flaws in the Risk Management Process

Risk Management and Governance for Senior Executives and Boards of Directors of Energy and Commodity Firms

An effective corporate governance and risk management framework relies on an independent and proactive first-class management of risk. This course provides an overview of corporate governance and risk management best practices for board members, senior and "C-level" executives, as well as for risk and audit professionals in energy and commodity firms.

Best practices in Risk governance.

- Expectations from internal and external stakeholders.
- Risk disclosures. SEC. Sarbanes-Oxley. COSO.
- CCRO Recommendations regarding corporate governance.
- Lessons from other industries.
- Learning from risk governance failures.

Linking business strategy with risk management.

- How to measure, monitor, and control risk taking units in order to contribute to achieve business objectives.
- EWRM and the unified view of exposures and risks.
- Identifying natural hedges and suboptimal hedging programs.

Risk philosophy, Risk Appetite and Risk Tolerance

- Clearly articulating the risk philosophy of the business strategy to internal and external stakeholders.
- Quantifying risk appetite and risk tolerance.
- A structured approach to determine the firm's risk policy.

Fundamentals of Risk Management for Directors

- Risk reports in board-level presentations.
- Using and Interpreting VaR for financial decision making.
- Setting the risk appetite of the firm in terms of VaR.
- RAROC and risk-adjusted performance measurement.

Designing Policies and Procedures around market, credit and operational risk controls.

- Formulating policies governing derivatives use.
- Overview of best practices policies and procedures.

- CCRO recommendations regarding minimum standards for policies and procedures for market, credit and operative risk.
- Communicating and enforcing the policies.
- The role of the risk management function.

Designing and Effective Hedging Program

- Understanding operations and entity-wide objectives.
- Evaluating the impact of inaction vs. hedging.
- Evaluating the use of derivatives to control market risk and linking use to entity-wide and activity-level objectives.
- Defining risk management activities and terms.
- Assessing the appropriateness of specified activities and strategies relating to the use of derivatives.
- Establishing procedures for obtaining, monitoring and communicating risk management activities and their results.

Sarbanes-Oxley Act and its Impact on Risk Management

- Overview of the SOX Act of 2002. Sections 302 & 404.
- Financial Reporting and SOX.
- Roles and responsibilities of board members, senior management and audit groups in SOX.
- Hierarchical view of process controls.
- Control activity documentation guidelines.
- Keys to effectively implementing SOX.

Enterprise Risk Management: Introduction to the COSO Framework.

- Enterprise Risk Management definition.
- The eight building blocks of the COSO ERM framework.
- Impact on strategy, operations, reporting and compliance.
- Implementation issues for energy and commodity firms. Internal control issues and derivatives usage

Course Leaders

Carlos Blanco, Ph.D., Managing Director.

Carlos is co-founder and managing director of BSRA, and an expert in energy, commodity and financial risk management and modeling. "He has over 9 years of experience conducting workshops in various derivatives and risk management topics for leading trading firms worldwide."

Carlos is a former VP, Risk Solutions at Financial Engineering Associates, where he worked over six years as an essential contributor in the development of the energy and risk management models of the firm, and providing strategic and tactical leading-edge risk advisory and educational services to over 500



Institutional Clients. He also managed the development and execution of market and product strategic plans Prior to FEA, Carlos worked for a hedge fund investing in Emerging Markets and also at an asset management firm in Madrid, Spain. He has published over 75 articles on risk management and derivatives pricing, and lectures extensively on topics related to enterprise wide risk management, derivatives pricing and hedging and other risk topics. He is a regional director of the Professional Risk Managers' International Association (PRMIA) and lectures at the MBA level at the University of California, Berkeley.

Kevin Dowd Ph.D., Director Research

Kevin is a leading expert in financial risk measurement and management. He has authored the groundbreaking books *Measuring Market Risk* and *Beyond Value at Risk*, and has published numerous articles on in academic and trade journals. He is also a Professor of Financial Risk Management at Nottingham Business School. Kevin has active links with policy institutions in a number of countries, and is currently engaged in a large-scale research project on risk measurement in financial institutions. His work also involves the application of new methods of risk measurement and model validation (applying wavelets, neural networks, copulas, etc.), as well as the application of risk measurement methods to risk-return analysis and longer-term investment risk management.

He is also a columnist for Financial Engineering News.

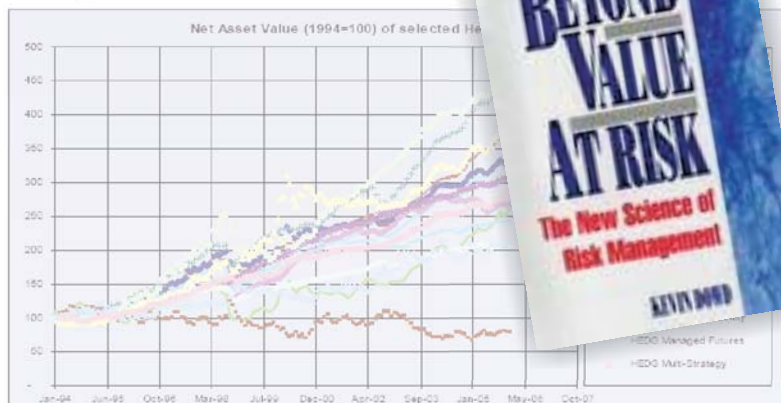
Chris Mammarelli, Director - Risk Advisory Services

Chris is a former energy trader and independent risk management consultant who has worked with leading regulated utilities, energy trading organizations, petroleum refiners, and end-users (airlines, trucking companies, railroads, etc.) to develop risk management programs and trading strategies.

He began his career in the U.S. logistics group at Mobil Oil Corporation. Later, he worked as a petroleum products trader for Marubeni Corporation, as the vice president of products trading for Tosco Refining Corporation, and as an energy derivatives trader for NationsBanc - Chicago Research and Trading.

He has also provided expert testimony to the FERC on petroleum market structure in the Western United States. He graduated summa cum laude from Arizona State University, and is an alumni of the UCLA Executive Program.

Figure 1. Evolution of Net Asset Value of Selected Hedge Funds



Source: Credit Suisse/Tremont

Figure 2. Tail Loss Distribution of Profit and Losses (US\$ millions)

