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Energy Programmes Training Directory

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Energy Training Programmes - Contents

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ENERGY MARKETS

WHAT HAPPENS WHEN MARKETS DEREGULATE
- The History of Power Market Deregulation
- The Over Investment and Failure to Hedge of Nascent Companies
- Concentration Risk and Immature Energy Trading
- Market Consolidation

POWER GENERATION SUPPLY & DEMAND
- The Role of The Transmission Operators
- Keeping the Grid Stable, Blackouts
- Role of The Grid – Transmitting Power and Becoming the Market
- Meters on The Grid and Settlement Systems
- Technological Change Presented from Smart Grid, Batteries and Renewable Deployment
- Example of What Australia Is Doing with Battery Storage and Gird Frequency

HOW MARKETS WORK
- Deregulated Market Structures
- Power Pools
- Balancing Markets
- Bilateral Markets
- Exchange-Based Markets
- Market Coupling
- Interconnector Trading
- Ancillary Service Contracts
- Capacity Markets
- Exchanges

WHAT THE ELECTRICAL SYSTEM COULD LOOK LIKE IN 2050
In investment pathways and costs considered, we will build offshore wind, replace our existing gas market with hydrogen and ultimately we establish:
- 45GW of nuclear
- 82GW of wind
- 103GW of solar
- 34GW of hydrogen gas generation
- 8GW of district CHP
- As little as 6GW of electricity storage

HEAT, HYDROGEN AND POWER MIX
- Large businesses and corporates lead the way to decarbonisation
- Through integrated production and consumption of the commodities of the future, Power, Hydrogen and Heat, (gas is gone)
- The Hydrogen Backbone of Europe

FUTURE GENERATION OPTIMISATION
- Pricing Hydrogen, Heat and Storage Through the Cost of Power
- The Optimisation of Renewable Generation with Hydrogen and Electrical Storage
- Market Access to Balancing or Corporate PPAs

FUTURE OPTIONALITY OF END USERS
- Flexibility of end users for consuming and producing Heat, Hydrogen and Power
- Engaging in corporate PPAs
- Full asset optimisation model for corporates
- The GEA investment optimisation model

ENERGY MARKETS continued

THE COMMERCIAL FRAMEWORK FOR POWER, HYDROGEN AND HEAT INTEGRATION
- Hydrogen and Heat Storage Parameters
- Electrical Storage Value Drivers
- Cash-flow and Margin Capital Risks

GLOBAL COMMODITY FLOW
- The Global Carbon Market
- The Global Coal Market
- The Global Gas Market
- The Developing Heat Market and Its Integration with Power Generation and Retail

POWER MARKETS

This session follows on from the technical knowledge of markets gained from earlier in the day and show cases the power markets of:
- Europe, Germany, Greece, Belgium, Netherlands, United Kingdom, Australia, Nigeria, South Africa, Japan, Saudi Arabia, India, Greece, Ireland

THE OFFSHORE WIND MARKET
- Investments
- Cost and Technology
- Hour to Hour Variation in Power
- Global and Regional Offshore Potential
- Levelized Cost of Generation and Recent Auction Prices

ELECTRICAL STORAGE TECHNOLOGY AND OPTIONALITY
- Comparison of Lithium Ion and Flow Based Batteries for Grid Scale Storage
- Levelized Cost of Energy Storage
- Review of Main Technology Providers
- Route to Market for Stored Energy

- **THE CHALLENGES OF THE RETAIL BUSINESS AND THEIR ABILITY TO SELL HEAT OR HYDROGEN**
- Customer Churn
- Quick Growth and Minimizing Overheads with The Use of Technology
- Transfer Price Matrix Between Energy Trading and The Sales Force
- Complicated Tariff Setting
- Mismatch Seasonality of Cash Flows and Billing Cycle
- Data and Billing Errors
- Finding and Matching Competitive Renewable Generation

THE CREDIT RISK OF CURRENT BUSINESSES OPERATING IN ENERGY
- Large generation businesses
- Large vertically integrated supply businesses
- Today’s Independent Power Producer (IPP)/Merchant
- Renewable Developer (Range of Sizes and Technologies)
- Established Retailer
- Small Retailer
- Community and Municipality Retailers
- Transmission Company (On-shore and Off-shore)
- Transmission System Operator
- Energy System Operator

ENERGY MARKETS continued

Overview of Electricity and Heat Regulation
- EU Energy Market Codes for Capacity Allocation and Congestion Management

WHY WE HAVE EUROPEAN FINANCIAL MARKET REGULATION SUCH AS EUROPEAN MARKET INFRASTRUCTURE REGULATION (EMIR)
- Regulation of wholesale energy market integrity and transparency (REMIT)
- Current Heart Policy Developments and Regulation

THE ROLE OF EXCHANGES
- Who and where are the exchanges
- How the exchange works
- Good risk management for Clearing
- Margining when trading on an exchange

CASE STUDY: EEX HEDGING OF CORPORATE PPAS

MARKET RISK
- Unique Power Risk Characteristics
- Comparison of “Traded Options” and “Asset Options”
- Identifying Market Risk
- Price Uncertainty and Drivers
- Types of Portfolio Risks

WIND GENERATION FORECASTING AND TRADING
- How to Trade Wind Power into Short Term Markets?

PRICE RISK MANAGEMENT TYPES OF PPA STRUCTURES
- Energy Derivatives
- Futures
- Options
- Swaps
- Contract for Differences
- Tolling Agreements
- Types of PPA Master Agreements
- PPA Accounting

MEASURING MARKET RISK
- Value at Risk
- Methods of Calculation
- Appropriateness for Energy Companies
- Earnings at Risk
- Portfolio Optimization

CREDIT RISK INSTRUMENTS FOR MITIGATION
- Letters of credit
- Parent company guarantees
- Cash and margin
- Insurance

MANAGING CREDIT RISK
- Financial control policies
- Credit lines
- Netting
- The importance of working to strict limits
- Mark to market accounting pitfalls

CREDIT RISK IN ENERGY MARKETS

CREDIT RISK – WHAT IS IT?
- Introduction to credit risk
- Risk mutates, through price risk to credit risk and liquidity risk
- Mark to market and settlement conventions
- Cash flow at risk reporting
- The importance of commercial banks as financial partners

THE MAIN FEATURES OF ELECTRICITY MARKETS
- This session details the mechanics of power markets, their consequential price volatility, and prudential arrangements:
- Pool systems
- Single buyer
- Bilateral and Balancing Markets
- Ancillary services
- Deregulation and overcapacity
- Timescales for trading
- Summary of Markets around the world

THE POWER MARKET OF THE FUTURE
- The electrical system of the future in an environment of net zero
- Nuclear power generation
- Offshore wind investment
- Onshore solar project scale
- Future Transmission connection

INTRODUCTION TO THE HYDROGEN COMMODITY
- Hydrogen backbones
- Offshore wind and electrolysis
- The retrofit of CCGT to hydrogen
- Examples of hydrogen hubs

INTRODUCTION TO THE HEAT COMMODITY
- The size of the heat market
- Heat market flexibility and seasonality
- The Inter relationships between power, heat, and hydrogen from a customer perspective
- District heating overview and investment models from a credit risk perspective

STRUCTURED FINANCE
- What is structured finance?
- Main features of the contract
- Its application in the power industry

PRICE HEDGING
Types of PPA contracts
Structures
Corporate Synthetic PPA
Corporate back-to-back PPA

CASE STUDY CREDIT RISK AND STRUCTURED FINANCE FAILURES
- Calpine
- NRG
- Current Alternative Funding

CREDIT RISK IN ENERGY MARKETS continued

RATING AGENCIES
- Who they are
- What the ratings mean
- How they caught up with the deregulated power markets

THE CREDIT RISK OF CURRENT BUSINESSES OPERATING IN ENERGY
- Large generation businesses
- Large vertically integrated supply businesses
- Todays Independent Power Producer (IPP)/Merchant
- Renewable Developer (Range of Sizes and Technologies)
- Established Retailer
- Small Retailer
- Community and Municipality Retailers
- Transmission Company (On-shore and Off-shore)
- Types Transmission System Operator
- Energy System Operator
- Interconnectors
- Exchanges
- Distribution Company
- Storage Developer

THE CASH FLOW CHALLENGES OF THE SUPPLY BUSINESS AND EXAMPLES OF FIRM FAILURE
- Compliance challenges
- Single Contact
- Margin requirements
- Reason for failure based on research from over 29 energy supplier failures

THE ROLE OF EXCHANGES
- Who and where are the exchanges
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- Good risk management for Clearing
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CASE STUDY EEX HEDGING OF CORPORATE PPAS

CREDIT RISK INSTRUMENTS FOR MITIGATION
- Letters of credit
- Parent company guarantees
- Cash and margin
- Insurance

MANAGING CREDIT RISK
- Financial control policies
- Credit lines
- Netting
- The importance of working to strict limits
- Mark to market accounting pitfalls

CENTRE
- How Centre works
- Pricing example of Centre for the power industry

WORKSHOP: IMPLEMENTING CENTRE IN YOUR FIRM AND ITS USE IN OUR JOURNEY TO NET ZERO

FUTURE POWER MARKETS

PRIVATISATION, CONSOLIDATION AND THE MOVE TO NET ZERO
Power market deregulation began over 30 years ago. The complexity of the commodity and its delivery have created marketplaces and interactions that have created a plethora of cashflow risks and consolidation. We look at the privatisation process and how it formed the power market place with scenarios of generation investment as we move to a carbon neutral economy.

THE HISTORY OF POWER MARKET DEREGULATION
- Countries that deregulate and why
- The privatisation process through to floatation
- Lessons learned

OVER INVESTMENT AND FAILURE TO HEDGE OF NASCENT COMPANIES
- The principles of privatisation
- Competition in generation
- Competition in retail

CONCENTRATION RISK AND IMMATURE ENERGY TRADING
- Deregulated power and the need for energy trading
- The traders of the past
- What happened to the markets

THE IPP BUSINESS MODEL
- Structured finance
- Power purchase agreements
- CCGT and emissions targets

MARKET CONSOLIDATION
- Markets consolidate or refine
- The Reasons for consolidation
- Examples of consolidation
- UK
- Europe
- Australia

THE ROLE OF THE TRANSMISSION OPERATORS
- Keeping the Grid Stable, Blackouts
- What are Frequency and Inertia?
- Role of The Grid – Transmitting Power and Becoming the Market
- Electricity System Planning in the USA
- Bilateral and Pool Markets
- Ancillary Services

KEEPING THE GRID STABLE, BLACKOUTS
- Blackouts across the word

CASE STUDY: COUPLED POWER MARKET OF EUROPE

CASE STUDY: THE POWER MARKET OF GERMANY

CASE STUDY: THE POWER MARKET OF AUSTRALIA

CASE STUDY: THE POWER MARKET OF UNITED KINGDOM

CASE STUDY: BATTERY USE IN UK BLACKOUT 9TH AUGUST 2019

Case Study: Battery Storage and Gird Frequency ir

FUTURE POWER MARKETS continued

ASSET OPTIONALITY, OFFSHORE WIND & STORAGE

Power will decarbonise our heat marketplace with significant amounts of offshore wind generation bringing challenges to power grids, our markets, energy trading and setting tariffs.

The objective of this unit is to understand the asset optionality of all main forms of generation and storage to give delegates the best of knowledge for future generation investment decisions.

THE HYDROGEN COMMODITY

- How hydrogen is produced
- Hydrogen market place and backbone of Europe
- Flexibility of end users for consuming and producing Heat, Hydrogen and Power and engaging in corporate PPAs
- Case Study Q13A Neptune Energy Netherlands
- Case Study H21 Gateway Leeds, UK

THE HEAT COMMODITY

- Seasonality
- Market size
- Hydrogen or electric heating?

THE OFFSHORE WIND MARKET

- The characteristics of offshore wind, the players and market size
- The challenges of integrating offshore wind generation.
- Wind in ancillary services markets (which is a growing market for decades to come)
- Case Study: Storage and Levelized Cost of Storage in International Markets

ROUTE TO MARKET FOR STORED ENERGY

- To find a route to market for storage and offshore wind, whether it be through the balancing market or a Corporate Power Purchase Agreement (CPPA).
- Case Study: Hywind

CHALLENGES OF THE POWER RETAIL BUSINESS MANAGING STOCHASTIC RENEWABLE POWER GENERATION

Serving end customers, from a complex, competitive, volatile market, filled with stochastic generation, on a gross 2% margin makes “power retail” a challenging business. Building on the Course Director’s international experience the key risks to cashflow and profit are discussed in detail. Then the challenges presented are escalated to: managing both customer demand uncertainty as the heat market decarbonises and renewable embedded generation negates demand. From a practical intercompany perspective all of these factors have to be priced and set in to tariffs. We are not aware of this topic ever being accessible before.

ELECTRICITY SUPPLY AND PRICES

- The Role of the Regulator
- Compliance
- The Supplier Hub Model
- Electricity Price Components
- Balancing risks

FUTURE POWER MARKETS continued

THE VALUE DESTRUCTION OF CUSTOMER CHURN
- Marketing and attracting customers
- The competitive pricing process
- Operational risks and estimated billing

CUSTOMER OPTIONALITY
- Sources of customers providing flexibility in a net zero environment
- Risk and reward for customer flexibility

QUICK GROWTH AND MINIMIZING OVERHEADS WITH THE USE OF TECHNOLOGY
- Low margin business
- Economies of scale
- Supplier failure example Bristol Power

BALANCING RISKS
- What are they?
- How can a supply business anticipate and price them
- Profiles

CHALLENGES OF THE POWER RETAIL BUSINESS MANAGING STOCHASTIC RENEWABLE POWER GENERATION
- Price Hedging with Power Purchase Agreements
- How to hedge power price risk
- Demand forecasting for domestic customers
- Demand forecasting for commercial customers
- Trading bilaterally or Exchange trading

TRANSFER PRICE MATRIX BETWEEN ENERGY TRADING AND THE SALES FORCE
- Mismatch between trading short term and sales round windows
- Case Study Scottish Procurement Service flexible purchasing

COMPLICATED TARIFF SETTING
- Price components explained
- Reconciled charges
- Forecasting charges
- Policy support pricing
- Seasonality
- Billing

FINDING AND MATCHING COMPETITIVE RENEWABLE GENERATION
- The advantages of selling renewable stochastic generation
- Cash flow risks
- Balancing risks

MARGIN REQUIREMENTS UNDER INDUSTRY CODES
- Industry codes – what are they?
- Why collateralise?
- The cost to the customer of pricing for margin

CASE STUDY: A REVIEW OF 26 SUPPLY BUSINESS FAILURES

FUTURE POWER MARKETS continued

NET ZERO TRANSITION WORKSHOPS
- Workshop Summary of Market Opportunity to Net Zero
- Work Shop Delegates Critique of Market Players
- Work Shop Summary of Lessons Learned and Information for a Risk Register

DEREGULATED MARKET BUSINESS MODELS WITH A FOCUS ON IDENTIFYING CASHFLOWS AND RISKS

Power market deregulation began over 30 years ago. The complexity of the commodity and its delivery have created marketplaces and interactions that have created a plethora of cashflow risks and consolidation:

Many business models are no longer fit for purpose or equipped to invest in future decarbonisation opportunities. The current attractiveness of the business models are revealed in the context of risk management and “Know your Customer”.

THE FOLLOWING BUSINESS MODELS ARE PRESENTED, ANALYSED AND CRITIQUED:
- Large generation businesses
- Large vertically integrated supply businesses
- Todays Independent Power Producer (IPP)/Merchant
- Renewable Developer (Range of Sizes and Technologies)
- Established Retailer
- Small Retailer
- Community and Municipality Retailers
- Transmission Company (On-shore and Off-shore)
- Transmission System Operator
- Energy System Operator
- Interconnectors
- Exchanges
- Distribution Company
- Storage Developer

CASE STUDY: LOSERS OF THE DEREGULATION PROCESS

WORK SHOP DELEGATES CRITIQUE OF MARKET PLAYERS

WORKSHOP SUMMARY OF LESSONS LEARNED AND INFORMATION GATHER FOR A RISK REGISTER

FUTURE POWER MARKETS continued

ELECTRICITY & HEAT REGULATION
The deregulated power market is over 30 years old. This unit discusses the principles of power regulation against a backdrop of developed policy being applied to nascent Heat Networks.

We also analyse their regulation through EU Market Codes which facilitate the transition to a renewable, grid integrated future. It also outlines the key financial market regulation brought into the sector after the financial crisis of 2008.

It gives an overview of key regulation that exists for power as well as developing regulation of the heat sector.

- EU Energy Market Codes for Capacity Allocation and Congestion Management
- Why we have European Financial Market Regulation such as
  - European Market Infrastructure Regulation (EMIR)
  - Regulation of wholesale energy market integrity and transparency (REMIT)
- Current Heat Policy Developments and regulation

RISK MANAGEMENT OF HEAT & POWER MARKETS FROM A TRADER, RISK MANAGER & FINANCE PERSPECTIVE
Building on the risks of the retail business this unit focuses in the value that can be created or destroyed from energy trading. It starts with a description of the unique risk nature of the power commodity and presents key industry risk matrices. Credit and concentration risks are also key elements of power price risk and risk mitigation tools are also presented. There is a case study of the credit risk of the global power market where a firm can go out of business in only 10 days.

THE NATURE OF RISK
- Risk management is as much an opportunity as an overhead
- Types of Energy Risk
- Risk Identification

RISK MITIGATION
- Types of risk
- Basis Risk
- Price Volatility
- Volume Risks
- How electricity risks will translate into the Hydrogen and Heat commodities
- Enterprise Wide Risk Management
- Culture and Governance

RISK MEASUREMENT
- Value at Risk
- Methods of Calculation
- Earnings at Risk
- Portfolio Optimization

GENERATION & STORAGE PPA NEGOTIATION

MARKETS AND TECHNICAL ASPECTS OF POWER SYSTEMS AND STORAGE

GENERATION TECHNOLOGY
- Introduction to the main generation technologies of the future and understanding their optionality and cost
- Electricity the commodity
- Nuclear power
- Wind
- Solar
- Coal super critical technology
- Combined Cycle Gas Turbine (CCGT) based on Hydrogen
- Combined Heat and Power (CHP)

WHAT WE NEED TO KNOW ABOUT PLANT OPERATION TO EXPERTLY NEGOTIATE A PPA
- Professional industry terms
- Levelized Cost of Electricity what is it?

HOW MARKETS WORK
- Efficient power markets are to the benefit of all: Markets allow investment in new power markets to take place
- Deregulated Market Structures
- Power Pools
- Balancing Markets
- Bilateral Markets
- Exchange-Based Markets
- Market Coupling

POWER GENERATION SUPPLY & DEMAND & THE ROLE OF TRANSMISSION Connected Batteries
- The role of the Transmission Operators and blackouts
- Role of the grid – transmitting power and becoming the market
- Meters on the grid and settlement systems
- Technological change presented from smart grid, batteries and renewable deployment
- Example of what Australia is doing with battery storage and gird frequency
- Case Study: Battery Storage and Gird Frequency in South Australia

BALANCING RISKS
- The volatility of balancing markets
- The opportunity for storage balance trading
- The need for margin capital

Case Study: Commercial application of back up generation

TOOLKIT FOR NEGOTIATION
- Storage and levelized cost of storage in international markets

CASE STUDY: THE ROLE OF BATTERIES IN THE POWER CUT IN THE UK

TOOLKIT FOR NEGOTIATION
- Cost Toolkit: Cost and operational characteristics for 62 power stations which will be used in negotiation

GENERATION & STORAGE PPA NEGOTIATION CONTINUED

MARKETS, COMMERCIALS, NEGOTIATING A PPA

GLOBAL COMMODITY FLOW IN THE CONTEXT OF NEGOTIATING A PPA PRICE

- Global Coal: Update and price drivers of the global coal market
- Global Carbon: Update and price drivers of the global carbon market
- Global Gas: Update and price drivers of the global gas market

PHYSICAL STEPS IN DEVELOPING A WIND POWER STATION

- What is needed for bankability
- Firms involved in the project and their roles
- Agreements to support the project with details of:
  - Shareholders agreement
  - Power Purchase Agreement
  - Contract for Difference
  - Construction Contracts
  - Operation and Maintenance Agreements
  - Connection Agreements
  - Financing Documentation

TYPES OF PPAS STRUCTURES

- Energy Derivatives
- Futures
- Options
- Swaps
- Contract for Differences
- Tolling Agreements
- Corporate Power Purchase Agreements
- Synthetic PPA

CASE STUDY - 3 EXAMPLES OF PPA HEDGING AND STRUCTURED FINANCE FAILURE

NEGOTIATION SKILLS

- Negotiation Discipline
- Styles of Negotiation
- Negotiation Situations
- Body Language

WORKSHOP

- Review of an Investor Ready Power Purchase Agreement
- High-level review of Power Purchase Contract for Difference Contract
- Discussion of high-level structure – the logical flow
- Areas that delegates understand to be attractive or risky
- The purpose of this working session is to demystify the contract

TOOLKIT: CHECK LIST OF REQUIRED CONTRACT CLAUSES

TOOLKIT: CHECK LIST OF KEY ISSUES FOR NEGOTIATING A PPA

WORKSHOP

- PPA negotiation preparation
- The teams will be split into groups of no more than 4 and will prepare to perform a renewable PPA with storage for 20 years

GENERATION & STORAGE PPA NEGOTIATION continued

PROFESSIONAL PPA NEGOTIATION

This is a 4-hour workshop where the delegates are taught negotiation skills: learn to negotiate as a disciplined team. A strategic investment PPA is proposed with negotiation objectives from there:

- Take part in a professional negotiation
- Great negotiation skills can build strong relationships and add significant value to companies, so the trainer provides expert feedback and individual coaching on style and technical progress of the negotiation

KNOW YOUR CUSTOMER AND CREDIT RISKS

MARKET RISK

- Unique power risk characteristics
- Comparison of “traded options” and “asset options”
- Identifying market risk
- Price uncertainty and drivers
- Exchange rate risk in power markets – coal plant example

MEASURING MARKET RISK

- Value at Risk
- Methods of Calculation
- Appropriateness for Energy Companies
- Earnings at Risk
- Portfolio Optimization

CASE STUDY WIND FIRMING PPAS IN AUSTRALIA

KNOW YOUR CUSTOMER ATTRACTIVENESS OF PPA OR TRADING COUNTERPARTIES

- Large generation businesses
- Large vertically integrated supply businesses
- Independent Power Producer (IPP)/Merchant
- Renewable Developer (Range of Sizes and Technologies)
- Established Retailer
- Small Retailer
- Community and Municipality Retailers
- Storage Developer

THE CASH FLOW CHALLENGES OF THE SUPPLY BUSINESS AND EXAMPLES OF FIRM FAILURE

- Compliance challenges
- Single Contact
- Margin requirements
- Reason for failure based on research from over 29 energy supplier failures

MANAGING CREDIT RISK

- Credit Risk Mitigation Tools
- The Credit Quality of the European Power Market
- Importance of Margin Capital
- Best credit practice: CENTRE (Credit Enhancement of Traded Energy)

RISK MANAGEMENT OF POWER MARKETS

THE POWER BUSINESS EXPLAINED
- How Markets Work
- Transmission and Trading
- Market Types
- Deregulation, the Process and Lessons Learned
- Case Study: Bank Lending to The Global Power Market
- Finance and Power
- Evolving Business Models
- Types of Portfolio Risk

RISKY BUSINESS
- The Nature of Risk
- Types of Energy Risk
- Risk Identification
- Risk Mitigation
- Culture and Governance

PUTTING RISK MANAGEMENT INTO PRACTICE
- Risks Tolerance Statement
- The Process of Defining the Risk Management Framework
- Summary of Key Stakeholder Roles
- Crucial Aspects to Get Right

REGULATORY RISK: WHAT YOU NEED TO KNOW

MARKET RISK
- Unique Power Risk Characteristics
- Comparison of “traded options” and “asset options”
- Identifying Market Risk
- Price Uncertainty and Drivers

MEASURING MARKET RISK
- Value at Risk,
- Methods of Calculation
- Appropriateness for Energy Companies
- Earnings at Risk
- Portfolio Optimization

CREDIT RISK IS AN ENDEMIC FEATURE OF POWER MARKETS
- Credit Risk Management in The Industry
- Case Study: ENRON
- Credit Risk Mitigation Tools
- The Credit Quality of the European Power Market
- Importance of Margin Capital
- New Credit Product
- Introducing CENTRE (Credit Enhancement of Traded Energy)
- Case Study: Williams “Out of Business In 10 Days”

SCHOOL OF ENERGY MARKETS

ENERGY MARKETPLACES

WHAT HAPPENS WHEN MARKETS DEREGULATE

- The History of Power Market Deregulation
- The Over Investment and Failure to Hedge of Nascent Companies
- Concentration Risk and Immature Energy Trading
- Market Consolidation
- How Markets Evolve with Scenarios for The Future

DEREGULATED MARKET BUSINESS MODELS WITH A FOCUS ON IDENTIFYING CASH FLOWS AND RISKS

- National Champions and Vertical Integration
- Generation
- IPP/Merchant
- Renewable Developer (Range of Sizes and Technologies)
- Established Retailer
- Small Retailer
- Community and Municipality Retailers
- Transmission Company (on shore and offshore)
- Transmission System Operator
- Energy System Operator
- Exchanges
- Case Study of EEX Hedging
- Distribution Company
- Storage Developer
- ETRM Technology Provider
- Metering and Data Collector
- Heat Network Providers

WORKSHOP: CURRENT MARKET CONDITIONS WITH A CRITIQUE AND DESCRIPTION OF THE RISKS AND REWARDS OF FUTURE BUSINESS MODELS BUILDING ON THE PREVIOUS SESSION

CASE STUDY: LOSERS OF THE DEREGULATION PROCESS

- Enron
- NRG
- Calpine

CASE STUDY: WINNERS OF THE DEREGULATION PROCESS

- EDF Trading
- NGC (USA and UK)
- Origin Energy (Australia)

DEREGULATED POWER MARKETS SUPPLY & DEMAND

- The Role of The Transmission Operators
- Keeping the Grid Stable, Blackouts
- Role of The Grid – Transmitting Power and Becoming the Market
- Technological Change Presented from Smart Grid, Batteries and Renewable Deployment
- Example of What Australia Is Doing with Battery Storage and Gird Frequency

SCHOOL OF ENERGY MARKETS continued

GENERATION TECHNOLOGY

- Introduction to the main generation technologies of the future and understanding their optionality
- Electricity the Commodity
- Power Generation
- Nuclear
- Wind
- Solar
- Hydrogen Combined Cycle Gas Turbine (CCGT)
- Hydrogen CHP
- What We Need to Know About Plant Operation to Expertly Negotiate A PPA
- Professional Industry Terms
- Levelized Cost of Electricity What Is It?

HOW MARKETS WORK

- Deregulated Market Structures
- Power Pools
- Balancing Markets
- Bilateral Markets
- Exchange-Based Markets
- Market Coupling
- Interconnector Trading
- Ancillary Service Contracts
- Capacity Markets
- Demand Side Response

CASE STUDY: COMMERCIAL APPLICATION OF BACK UP GENERATION

CASE STUDY: STORAGE AND LEVELIZED COST OF STORAGE IN INTERNATIONAL MARKETS

CASE STUDY: SYSTEM PLANNING AND SUSTAINABILITY PLANNING IN THE US POWER MARKET

CASE STUDY: COMMERCIAL APPLICATION OF BACK UP GENERATION

CASE STUDY: STORAGE AND LEVELIZED COST OF STORAGE IN INTERNATIONAL MARKETS

CASE STUDY: SYSTEM PLANNING AND SUSTAINABILITY PLANNING IN THE US POWER MARKET

POWER MARKETS OF THE WORLD

This session follows on from the technical knowledge of markets gained from earlier in the day and show cases the power markets of:
Coupled Europe, Germany, Belgium, Netherlands, United Kingdom, Australia, Nigeria, South Africa, Japan, Saudi Arabia, India, Greece, Ireland

SCHOOL OF ENERGY MARKETS continued

ASSET OPTIONALITY
The objective of this day is to understand the asset optionality of generation, storage and retail culminating in a workshop bringing them together for the benefit of commercial return but also developing a project in a risk-controlled way

THE OFFSHORE WIND MARKET
- Investments
- Cost and Technology
- Hour to Hour Variation in Power
- Global and Regional Offshore Potential
- Levelized Cost of Generation and Recent Auction Prices

TOOLKIT: GENERATION COST BASE
- Cost Toolkit: Cost and operational characteristics for 62 power stations which will be used in the optimisation process

ELECTRICAL STORAGE TECHNOLOGY AND OPTIONALITY
- Levelized Cost of Energy Storage
- Review of Main Technology Providers
- Fluence
- TESLA
- Lockheed Martin
- Panasonic
- Electric Vehicles
- Route to Market for Stored Energy

THE CHALLENGES OF THE RETAIL BUSINESS
- Customer Churn
- Quick Growth and Minimizing Overheads with The Use of Technology
- Transfer Price Matrix Between Energy Trading and The Sales Force
- Complicated Tariff Setting
- Mismatch Seasonality of Cash Flows and Billing Cycle
- Data and Billing Errors
- Finding and Matching Competitive Renewable Generation
- Margin Requirements Under Industry Codes

WORKSHOP: BRAIN STORMING SESSION OF SUPPLY BUSINESS RISK IDENTIFICATION AND QUANTIFICATION

CASE STUDY: CREDIT STANDING OF THE MAIN EUROPEAN MARKET PLAYERS

CASE STUDY: A REVIEW OF 26 SUPPLY BUSINESS FAILURES

CASE STUDY: DAILY OPERATIONS OF A MODERN ENERGY SUPPLY ENTITY
- Demonstration of A Web Based Utility Software Showing the Daily Operational Tasks of a Modern Energy Supply Business

WORKSHOP: MATCHING GENERATION TO SUPPLY PROFILE OVER YEAR AND CALCULATING THE MISMATCH

SCHOOL OF ENERGY MARKETS continued

OFFERING COMMERCIAL TERMS

GLOBAL COMMODITY FLOW IN THE CONTEXT OF NEGOTIATING A PPA PRICE

- Global Coal: Update and price drivers of the global coal market
- Global Carbon: Update and price drivers of the global carbon market
- Global Gas: Update and price drivers of the global gas market
- Developing Heat Market with Integration with Power

TYPES OF PPAS STRUCTURES

- Energy Derivatives
- Futures
- Options
- Swaps
- Contract for Differences
- Tolling Agreements
- Types of PPA Master Agreements
- PPA Accounting

PRICE AND DERIVATIVES MODELLING

- Price Processes and Distributions, Jump Diffusion, Mean Reversion and Regime Switching
- Volatility Modelling
- Modelling Derivatives
- Imbalance Pricing

CASE STUDY: THE ROLE OF POWER PURCHASE AGREEMENTS AS AN INVESTMENT TOOL

NEGOTIATION SKILLS COACHING SESSION

- Negotiation Discipline
- Styles of Negotiation
- Negotiation Situations
- Body Language

WORKSHOP REVIEW OF AN INVESTOR READY PPA

- Review of an Investor Ready Power Purchase Agreement
- High-level review of Power Purchase Contract for Difference Contract
- Discussion of high-level structure – the logical flow
- Areas that delegates understand to be attractive or risky
- The purpose of this working session is to demystify the contract

TOOLKIT: CHECK LIST OF KEY CONTRACT CLAUSES

PROFESSIONAL PPA NEGOTIATION

- The teams will be split into groups of no more than 4 and will prepare to perform a renewable PPA with storage for 20 years
- This is a detailed workshop where the delegates are taught to negotiate as a disciplined team. A strategic investment PPA is proposed with negotiation objectives from there:
- Take part in a professional negotiation
- Great negotiation skills can build strong relationships and add significant value to companies, so the trainer provides expert feedback and individual coaching on style and technical progress of the negotiation

SCHOOL OF ENERGY MARKETS continued

RISK MANAGEMENT & GOVERNANCE

RISKS SPECIFIC TO THE GLOBAL ENERGY MARKETS
- Basis
- Price Volatility
- Volume Risk
- Liquidity and Credit Concentration

MARKET RISK
- Unique Power Risk Characteristics
- Comparison Of “Traded Options” And “Asset Options”
- Identifying Market Risk
- Price Uncertainty and Drivers
- Types of Portfolio Risks

WIND GENERATION FORECASTING AND TRADING
- How to Trade Wind Power into Short Term Markets?

CASE STUDY: WIND FIRMING PPAS IN AUSTRALIA

MEASURING MARKET RISK
- Value at Risk
- Methods of Calculation
- Appropriateness for Energy Companies
- Earnings at Risk
- Portfolio Optimization

THE CORPORATE PPA MARKET GLOBALLY
- Sleeved and Synthetic PPA’s
- The Need for Asset Optimization
- New Generation Agreement

RISKY BUSINESS
- The Nature of Risk
- Types of Energy Risk
- Risk Identification
- Risk Mitigation
- Enterprise-Wide Risk Management
- Culture and Governance

BUILDING CAPABILITY
- Putting Risk Management into Practice
- Risks Tolerance Statement
- The Process of Defining the Risk Management Framework
- Summary of Key Stakeholder Roles
- 4 Crucial Aspects to Get Right

RISK CAPITAL
- Risk Capital for Assets
- Risk Capital for Traders

SCHOOL OF ENERGY MARKETS continued

INTRODUCTION TO ENERGY OPERATIONAL RISK MANAGEMENT
- Basic principles of risk management
- The role of the risk manager
- Example of a risk report
- Jobs the systems do
- Cloud-based vs. server technology
- System vendors in market development

INTRODUCTION TO PPA CREDIT RISK
- Credit Risk is an endemic feature of the global power market examples of credit risk failures across the market and why they occurred with specific attention is given to the Enron
- Credit Risk Mitigation Tools
- The Credit Quality of the European Power Market
- Importance of Margin Capital
- Innovative Credit Product: Introducing CENTRE (Credit Enhancement of Traded Energy)

CASE STUDY: GOING OUT OF BUSINESS IN 19 DAYS – WILLIAMS CASE STUDY

HOW PPAS ARE REGULATED
- Financial Market Regulation
- High Level European Energy Market Codes

CASE STUDY THINGS TO GET RIGHT WHEN SETTING UP AN INTEGRATED RENEWABLE ENERGY SUPPLY BUSINESS
- Enterprise-Wide Risk Management & Governance
- Risks Tolerance Statement
- Defining the Risk Management Framework
- Risk Capital for the Trading Asset Business

APPLYING RISK UNDERSTANDING AND USING CAPABILITIES TO NAVIGATE INVESTMENT NEED
- Overview of European Financial Market Regulation
- EMIR and REMIT MIFID 2
- Main Energy Policy Developments

SETTING UP A TRADING BUSINESS OR DEREGULATING FOR THE FIRST TIME
- 5 key elements and examples of success
- Examination of margin requirements of trading
- Case study Captains of Collateral

CAPABILITIES WORKSHOP
- Review of Current Firm Competencies Using the proprietary 220 KPI Framework of the Utility Firm of the Future
- Putting evaluation and review into Practice
- Capabilities Framework Methodology and Briefing
- Mapping KPIs to Current Business Model

ENERGY DERIVATIVES

THE STRUCTURE AND OPERATION OF ENERGY MARKETS
- Overview of oil, gas and electricity markets
- Why companies trade
- Using energy derivatives to risk manage energy market exposure
- Introduction to financial engineering

TECHNICAL ANALYSIS FOR THE ENERGY MARKETS
- Overview of oil, gas and electricity markets
- Bar and candle charts
- Candle patterns
- Support and resistance lines
- Trend lines
- Moving Averages (Simple, Exponential and Hull Moving Average)
- Moving average crossover
- MACD, RSI and Bollinger Bands
- Elliott Wave Theory

CHARACTERISTICS OF THE ENERGY MARKETS
- The forward curve
- Backwardation /contango
- Mean reversion
- Seasonality in prices and volatility
- Jump diffusion and state transition
- Different approaches to spot price modelling

STRUCTURES AND APPLICATIONS OF ENERGY INSTRUMENTS
- Forwards
- Futures
- Options
- Asian options
- Swaps
- Swaptions

SPECIALISED TRADING PRODUCTS
- Structured trading
- Asian options
- Special purpose EFTs (e.g. DXO)
- The volumetric Swing Option (take or Pay)

METHODOLOGIES FOR PRICING DERIVATIVE PRODUCTS USED IN ENERGY MARKETS
- Analytic models
- Numerical integration
- Binomial pricing
- Tree-based models
- Monte Carlo simulation

SPOT PRICE MODELLING AND BEHAVIOUR
- Why traditional risk management methods are difficult to implement in the energy markets
- Combining mean reversion and jump diffusion
- Calibrating a spot price model
- Choosing the right model for the instrument
- Modelling spreads

ENERGY DERIVATIVES continued

FORWARD CURVE MODELS
- Relationship between spot prices and forward curves
- Why we may need a separate forward curve model
- Principal component analysis

REAL OPTIONS IN THE ENERGY MARKETS
- Introduction to real options – power generation: spark spread model

WEATHER DERIVATIVES
- Weather derivatives – what are they?
- Trading in Weather Derivatives
- How to hedge Weather Derivatives

DEFINING RISK
- Market risk
- Strategic risk
- Credit risk
- Operational risk

VALUE-AT-RISK FOR ENERGY PORTFOLIOS
- Market value-at-risk
  - uses and benefits
  - assumptions and limitations
- Getting started: first steps to a value-at-risk calculation
  - identifying risk factors
  - observing market data
  - preparing datasets
- Main approaches to calculating value-at-risk
  - parametric (variance-covariance)
  - Monte Carlo
  - historical simulation
  - advantages and disadvantages of each methodology
- Applying at-risk methods to energy portfolios
  - modelling/decomposing common trade types
  - interpreting the value-at-risk number
- Comparing the tails of the distribution of portfolio returns under the three different methodologies and for various portfolio compositions
- Extending the value-at-risk analysis by performing stress testing and scenario analysis on the value-at-risk portfolio
- Cashflow at Risk and Earnings at Risk (CfaR and EaR)

CREDIT RISK FOR ENERGY COMPANIES
- Elements of credit risk
- PD, LGD, EAD

Final thoughts on partnering with JH Consulting International

All our trainings are built around the specific needs of your business and the groups being trained – everything we do is customised for you at no extra charge!

You'll be able to implement your new skills immediately – our courses are designed by practitioners for practitioners.

Our courses can be delivered via virtual platforms or delivered in person where it is safe and appropriate to do so.

We know how to make virtual trainings engaging, impactful and highly effective – don't waste your time with a boring trainer talking to a set of PowerPoint slides!

We are focused on creating value, by giving you the best possible training for the best possible price – we know our fees are better than our competitors, but so is our service!

You'll receive a level of service that is so unique you'll ask why other providers don't go the extra mile the way we do!

We have relationships with universities and professional bodies around the world and are able to secure academic accreditation where appropriate.

With five decades of international training experience under our belts, you can trust us to deliver.

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