# 5-DAYS IN-DEPTH OIL TRADING & RISK MANAGEMENT

## Learning objectives

Acquiring insight and knowledge of:

The working of processes in the oil industry

- Upstream, midstream, downstream - Production & consumption
- Market participants & their roles – The reasons for executing transactions
- The working of refineries & refinery processes – Crack spreads & ratios
- The working of international oil markets – Trading of crude and derivatives
- Products traded in the oil markets – Crude qualities & refinery products
- The working of oil trading platforms – OTC trading & oil exchanges
- The working and applications of oil-related derivatives – Futures, Options & Swaps
- Valuation & pricing - Benchmarks & indices
- Risks connected to oil trading – Market risk, Credit risk & FX risk
- Hedging techniques – Mitigation of risk & lowering exposures
- Correlation, liquidity & volatility - Skew & kurtosis in distribution of chances
- Common trading techniques & strategies – Proprietary trading & Spread trading

## Target group

This Oil Trading training courses are particularly suitable for compliant financial and energy community including:

- Commodity traders
- Analysts
- Mid office staff & Risk managers
- Back office employees in the oil sector, with energy companies, and with banks
- ICT staff in the oil sector – Project managers
- Asset managers & Portfolio managers
- Consultants in the energy sector
- Staff from utilities

## Training

The course is designed to provide participants in-depth knowledge to oil products, oil trading, market participants and fundamentals such as pricing. Additionally, a broad practical insight regarding risk management and trading strategies with derivatives is provided.
The training sessions have a strong interactive character whereby the contribution of participants is of utmost importance. A picture of the working of oil markets, relevant developments, risks and other relevant issues are given during the training sessions by means of questions, theory and theses.

## Contents

This training course covers five full days. The course can, of course, be adapted to specific sections, and we can tailor the course to your specific requirements. While dealing with each subject, attention is given to the various characteristics, aspects, opportunities and risks attached to that subject.

## DAY 1

### Introduction to the oil industry

- Sectors
  - Upstream - Production
  - Midstream - Transport & Storage
  - Downstream - Consumption
- Features of crude oil
  - Sweet versus sour
  - Light versus heavy
- Global benchmarks
  - WTI – Extension of contract specifications at NYMEX
  - Brent - Dated Brent & Forties, Oseberg, Ekofisk
  - Dubai quality – DME contracts relate also to Oman crude
- Reserves & Technique
  - Conventional vs. unconventional
  - OPEC figures
- Refineries, refinery processes & products
  - Gasoline
  - Diesel
  - Kerosene
  - Heating oil
  - Others
- Transport
  - Pipelines & Vessels (carriers & barges)

**Exercise**
**Chartering of freight & Freight derivatives**

### The refinery process

- Refining
  - Refinery products - Derivatives
  - Types of refineries - Simple, complex, semi-complex
  - The construction of refineries – Lead time and lifetime
  - And where should they be located? – Cooling water & crude processing
  - The quality of crude influences the relative output of derivatives – Growth Product Worth
  - The competition with bio-fuels – Bio-ethanol & biodiesel (correlation to softs)
- Hedging refineries
  - Gross processing margin
    - Crack spreads
      - Ratios
        - 5:3:2
        - 3:2:1
        - 2:1:1
      - Speculation

**Exercise**
**Calculate Crack Spreads; preferred ratio depends on refinery output, or -in case of prop position- on market view.**

### Oil pricing

- Oil pricing
  - Benchmarks & indices
  - Platts
  - Argus
  - Heren
- Fundamental price drivers
  - Economy & demography
  - Geographical spreading
  - Quality
  - Reserves
  - Currency of denomination
  - Production (capacity)
  - Consumption
  - Transport & infrastructure
  - Weather
  - Seasonality
  - Geo-politics
- Non-fundamentals
  - Hedge funds – Statistical arbitrage
  - Sentiment – Psychology of markets

**Exercise**
**Weather derivatives – CAT bonds & HDDs**

## DAY 2

### Oil trading

- Working of the oil markets
  - The role of cartels – OPEC adjusting supply
    - Production according to reserves
    - Saudi Aramco as swing supplier
- Market participants
  - Physical players
  - Hedgers
  - Arbitragers
  - Speculators
- Structuring of contracts
  - Forward & futures contracts
    - Contract specifications
      - Trading unit
      - Price quotation
      - Trading months
      - Trading at Settlement (TAS)
      - Alternative Delivery procedure (ADP)
      - Exchange of Futures for Physicals (EFP)
      - Trading & position limits
      - Physical vs. financial settlement
      - Deliverable grades

# 5-DAYS IN-DEPTH OIL TRADING & RISK MANAGEMENT

- Contract specifications
  - Alternative delivery Procedure (ADP)
  - Trading at Settlement (TAS)
  - Exchange for Physicals (EFP)
- Trading
  - Bilateral transactions – OTC trading
    - Counterparty risk
      - Credit risk
      - Limit structures – Credit lines
  - Bunker trading
    - Rotterdam
    - Houston
    - Singapore
    - Fujeirah

**Case**
WTI contract specifications
**Case**
Gas supply contracts: Gas pricing based on oil formula (gas to-oil pricing)

### OTC vs. Exchange trading

- OTC markets
  - Credit risk
  - The credit crisis & new legislation
    - Regulation of commodity markets
- Exchange trade
  - Oil Exchanges
    - NYMEX
    - ICE
    - DME
  - Clearing
    - Margining
      - Margin calls
- Initial margin
- Variation margin
  - Collateralization
- Listed products
  - Futures
  - Options
  - Swaps
  - Crack spreads
- Integration of OTC markets & exchanges
  - OTC give up facility

**Exercise**
Netting – Bilateral & Multilateral
**Exercise**
Margining – Initial & Variation margin
**Trading simulation**
Trading futures; Proprietary trading including depositing margin, fees and P/L reporting

## DAY 3

### Risk Management

- Return is only half the equation
- Volatility as measure for risk
- Oil-related exposures
- Identification of risk types & kinds
  - Operational risk – Assets
  - Counterparty risk – Credit risk, delivery risk, political risk
  - Volume risks – flexibility in contracts
  - Market risk – Price risk
  - Event risk
  - Liquidity risk
    - Market/asset liquidity
    - Finance liquidity
- Measuring risk
  - Value at Risk
    - Historical simulation
    - Variance-covariance
    - Monte Carlo
  - Stress testing
    - CVaR
    - Expected shortfall
    - Scenario analysis
- Controlling risk
  - Hedging
  - Derivatives contracts
    - Futures
    - Options
    - Swaps

**Exercise**
VaR – Oil portfolio (Euro versus USD)
**Exercise**
Calculation of the exposure of a Oil vs. Gas portfolio
**Exercise**
Stress testing – Expected shortfall (scenario analysis)
**Trading Simulation**
Monte Carlo – Dynamic calculation of exposure

## DAY 4

### Hedging tools & strategies

- Option
  - Greek variables
    - Delta
    - Gamma
    - Theta
    - Vega
    - Rho
- Combining scenarios with sensitivity analysis
- Reporting – Matrix
- Hedging strategies
- Natural counterparties
- Long term vs. short term hedging
- Frequent mismatches
- Caps – maximum price for consumers
- Floors – Minimum price for producers
- Collar – Zero cost collar
- Collateral & margin
- Clearing & settlement
- Settlement of contracts
- Physical delivery vs. cash settlement
- Paper trading

**Exercise**
Hedging a kerosene portfolio with heating oil futures
**Exercise**
Credit risk
**Exercise**
Oil swap: fixed-for-floating
**Trading simulation**
Greeks variables of options portfolio; Greeks of oil refinery

### Volatility

- What is volatility?
- Historical volatility, future volatility & implied volatility
- How is volatility measured?
- What does volatility imply?
- Volatility as input for pricing options

**Exercise**
Volatility trading

### Real option approach

- Oil refineries as real options
  - Optimization of oil refineries
  - Asset-backed trading
  - Asset-optimization
    - Delta hedging

**Exercise**
Volatility of the crack spread essential for valuation of the asset; Greek variables

## DAY 5

### Spread Trading

- Correlation
- Pairs & proxies
- Forward curves
  - Backwardation
  - Contango
  - Convenience yield
- Curve trading & arbitrage
- Spread trading
  - Quality spreads
  - Location spreads (basis trading)
- Cross margining

Trading simulation
Correlation trading; WTI vs. Brent

### Forward curves

- Forward curves
- Contango
- Backwardation
- Normal backwardation
- Storage theory
- Convenience yield
- Dynamics of forward curves

**Trading simulation**
Spread trading – Trading futures with different maturities

### Liquidity

- Liquidity risk
- Liquidity on the forward curve
- Roll-over of positions
- Roll yield

Exercise
Liquidity risk, proxy hedging & time spreads