



Training Course

Amsterdam, 12-13 Dec 2016

Gas Storage & Swing Contracts

Course Highlights

- Insights into gas storage & swing contract valuation approaches
- Principles of delta hedging, and implementation of hedge strategies
- Analyse different trading strategies with a practical back-test

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Course description

KYOS presents a 2 day course on flexibility instruments in the natural gas market, focusing on gas storage, swing and take-or-pay contracts, and to a lesser degree on transportation and LNG. The purpose of the course is to provide a better understanding of flexibility instruments, their value drivers, risk factors, portfolio management, trading and hedging strategies.

In the course we will study how flexibility instruments fit into a company's portfolio to manage demand variations. You will learn how to value the instruments, how to use them in portfolio products and assets, and develop trading and hedging strategies around them. The course explains various contract structures, including gas and oil indexation, penalty structures, and period quantity constraints.

Who should attend

The course aims to attract a wide range of people active in the energy and financial sector, including energy traders, asset developers, portfolio and risk managers, energy market analysts, regulators and consultants. The course does not require any specific pre-knowledge. The instructors are used to present technical details in an intuitive manner, appealing to people with a quantitative and non-quantitative background.

Course leader

Cyriel de Jong has been working as an advisor for the energy industry since 2001. For the major companies in Europe, Cyriel has led a great number of projects related to energy market valuation, risk management, trading strategies and investment analysis. He is particularly active in price modelling, financial methodologies to value energy assets and contracts, and in stochastic optimization.

Cyriel holds a MSc. in Econometrics from Maastricht University, and finished his Ph.D. on financial derivatives at Erasmus University Rotterdam in 2003.

Date and venue

The training course will take place on 12 & 13 December 2016 in Amsterdam.

The course is organized in hotel Hilton DoubleTree, located next to Amsterdam Central Station.

How to register

<http://www.kyos.com/courses-events/gas-storage-swing-contracts/>

Session 1 – European gas markets, storages and contract structures

- Overview European gas markets and trading hubs
- Traditional use of flexibility instruments in a portfolio:
 - Seasonal: summer – winter demand variations
 - Peak shaving
 - Typical injection/release patterns
- Overview of gas storage assets:
 - Overview of European gas storages
 - Primary parameters: Injection, withdrawal, working gas
 - Pricing of storages in the German market
- Overview of swing / Take-or-Pay contracts
- Variable contract volume, with Take-or-Pay constraints
- Annual and other period constraints
- Indexed strike prices with monthly lagging and averaging
- Hard and soft penalties for violation of constraints
- Carry-Forward and Make-Up rights

Session 2 – Storage valuation: Trading forwards in a dynamic hedging strategy

- Overview valuation approaches to physical and financial storage
- Understanding the forward curve: interaction between storage costs and forward prices
- Forward curve building: from a curve of tradable contracts to a smooth daily 'expected' curve
- Understanding intrinsic value:
 - Daily intrinsic, monthly intrinsic or tradable intrinsic
 - Incorporation of liquidity and trading costs
 - Impact of storage constraints
- Developing a cash-flow valuation model for a storage investment
- Rolling intrinsic valuation: comparison of different 'rolling' strategies
- A storage as a basket of time-spreads
- Forward curve modelling and simulation
 - Forward curve dynamics:
 - Spot versus forward price dynamics
 - The volatility term structure
 - Elements of a multi-factor model: short-term, long-term and winter-summer spread uncertainties
 - Correlation and co-integration between gas and oil prices
 - Implications for the valuation of gas contracts with indexed strike prices

Day 1

Registration
8:30 – 9:00

Training Course
9:00-17:00

Lunch
12:30-13:30

Day 2

Training Course
9:00-17:00

Lunch
12:30-13:30

Session 3 – Option valuation of storage and swing

Gas price dynamics (focus on spot)

- Short intro option theory and real options in energy markets
- Primary price dynamics in natural gas markets
- Volatility levels and estimation procedures for spot and forward prices
 - Historical versus implied volatility
 - Moving average and Exponentially Moving Average volatility
- Mean reversion rate: definition and estimation approaches
 - What history to use for mean-reversion and volatility?
 - Seasonal patterns in volatility and mean-reversion

Option valuation of storage and Take-or-Pay contracts

- The tree approach for valuation of an American-style option:
 - Setting up the tree consistent with market volatility
 - Backward induction
 - Forward valuation
- The least-squares Monte Carlo approach for valuation of an American-style option
 - Similarity with tree approach
 - Benefits of simulations
 - Extension of this approach to storage and swing valuation

Session 4 – Practical application of valuation and trading concepts

- Comparing intrinsic value with rolling intrinsic and full option value
- Trading strategy assumptions behind the different valuations
 - Impact of market liquidity constraints
 - Impact of uncertainty about volatility and mean-reversion
 - Interpreting the delta hedges
- Guidelines for setting up a backtest
 - Impact of changing volatility, forward curve shapes and mean-reversion over time
 - Comparing initial values with realized values
 - Comparing 'optimal' storage injections/withdrawals with actual operator behaviour