

Modelling and pricing of energy and commodity derivatives: hands-on training course

Course Highlights

- Insights into the characteristics and dynamics of energy and commodity markets
- State-of-the-art modelling and pricing of energy and commodity derivatives
- Highly interactive course with a maximum of 6 participants
- The course can be customised to your needs

d-fine GmbH
Opernplatz 2
60313 Frankfurt am Main
Germany
+49 69 90737 0
info@d-fine.de
www.d-fine.de

d-fine (HK) Limited
Unit 2105 Kinwick Centre
32 Hollywood Road
Central, Hong Kong
+852 3711 5800
info@d-fine.hk
www.d-fine.hk

Course description

Energy and commodity markets have been developing rapidly in recent years. A complex interplay between physical supply and demand patterns and financial investment has emerged. The skills to analyse energy and commodity markets and evaluate associated derivatives are in high demand. They represent an essential building block for a successful risk management operation both for physical market participants and financial institutions seeking for new trading and investment opportunities. Furthermore, fair value accounting and hedge accounting for complex energy and commodity derivatives compliant with the International Accounting Standards (IFRS) and others requires a high level of quantitative skills.

The training course comes in two parts, each taking one day.

The first part of the course will provide attendees with significant insight into the characteristics and dynamics of the underlying physical and financial markets. Thus prepared, the attendees will be ready to grasp the specific know-how indispensable to successfully master the challenges in modelling and pricing basic energy and commodity derivatives. Industry-standard modelling and pricing skills are developed in an efficient hands-on training. The attendees work through case studies that closely follow the essential tasks and workflows given in practice.

The second part introduces state-of-the-art modelling and pricing approaches with corresponding numerical schemes that are appropriate even for highly complex derivatives structures. For example, these include derivatives on underlying spreads or multi-commodity baskets and specific swing optionalities. Model validation and selection techniques are discussed in detail. The hands-on training features case studies designed to apply the sophisticated approaches and methodologies presented in this course part.

The two course parts may be attended separately or in combination. To add more flexibility, the different course sections can be arranged individually according to previous knowledge. In addition, we will be happy to tailor and / or structure course contents such as coverage of specific markets or derivatives according to your needs.

Who should attend

Quantitative modellers, financial engineers, risk managers, portfolio managers, traders, accountants and anyone who seeks to gain a practical understanding of best-practice modelling and pricing approaches for energy and commodity derivatives.

Prerequisites

Basic economic and quantitative knowledge in financial derivatives is required. Experience in MS Excel / VBA programming is beneficial.

Course fee

The course fee per delegate is USD 950 for one day or USD 1,800 for two days. For courses held in the European Union, the fees are 850 EUR and 1,600 EUR, respectively.

For each delegate, the course fee includes lunch and course material (presentation and model implementations used for the case studies). Upon completion of the course each participant will receive a Certification of Attendance.

The individual extension of standard course contents e.g. by including modelling exercises for specific complex derivatives might lead to considerable additional efforts on our side. Such efforts will be compensated for on a case-by-case basis.

As far as applicable for in-house courses, travel expenses for two trainers depending on costs for local accommodation and transport from / to our nearest office will be determined and charged on an individual basis.

Group booking discounts:

3 delegates – 15% discount

4 or more delegates – 20% discount

Please note that a minimum of two delegates is required if the course is to be conducted in-house.

The course can be conducted in-house or on our premises in Hong Kong, China, London, UK, or Frankfurt, Germany. We will arrange a mutually convenient date.

Hong Kong: please contact us at info@d-fine.hk or call +852 3711 5800. Or download the registration form, complete it, and fax it to +852 2544 9989.

Europe: for courses to be held in the European Union, please contact us at info@d-fine.de or call +49 69 90737 0. Alternatively, fax the completed registration form to +49 69 90737 200.

Date & venue

How to apply

AGENDA

DAY 1

Sessions I & II (Morning)

Day 1: Modelling and Pricing of Energy and Commodity Derivatives I

Session I: Energy, metal and agricultural commodity markets

1. Market structure and regulation
 - Physical market participants and supply chain
 - Physical trade channels and transport
 - Financial market participants
 - Investment vehicles
 - Trading instruments and marketplaces
 - Regulatory aspects
2. Market dynamics
 - Price drivers and price formation in spot and futures / forward markets
3. Market information
 - Sources
 - Availability and research
 - Interpretation

Session II: BASIC price and derivatives modelling

4. Modelling of price processes: Main challenges
 - Price mean reversion
 - Convenience yield dynamics
 - Seasonal price patterns
 - Price jumps and spikes
 - Volatility dynamics
5. Overview of modelling approaches (real world and risk-neutral)
 - Spot-convenience yield models
 - Forward price models
 - Market models
6. Mathematical background
 - Mean reversion
 - Stochastic convenience yield
 - Seasonality
 - Jump diffusion
7. Market data pre-processing
 - Data quality
 - Outlier removal
 - Data amendment

Session III (Afternoon)

8. Model calibration

Comparison of calibration techniques based on:

- Historical market data
- Current market data (implied calibration)

9. Derivatives pricing

- Futures, forwards and swaps
- Vanilla call and put options
- Exotic options with European payoff structures

Session III: Hands-on - price and derivatives modelling I

10. Case Study I: Future curve modelling

Model calibration and validation for the commodity groups:

- Crude oil
- Natural gas

11. Case Study II: Volatility surfaces and exotic options

- Modelling and validation of implied volatility surfaces
- Pricing of exotic options on futures with European payoff structures

DAY 2

Session IV (Morning)

Day 2: Modelling and Pricing of Energy and Commodity Derivatives II

Session IV: ADVANCED price and derivatives modelling

12. Mathematical background

- Stochastic volatility
- Complex / combined (stochastic volatility and jump diffusion etc.)
- Regime switching and spikes
- Correlated forward curve dynamics
- Market models
- Multi-commodity extensions

13. Practical numerical schemes for calibration and pricing

- Binomial / trinomial trees
- PDE solvers
- Monte Carlo schemes
- Fast Fourier Transform

14. Derivatives pricing

- Barrier options
- Spread options
- Basket options
- Swing options
- Real options (generation assets)

15. Model validation and selection

Validation and selection criteria for practical modelling approaches:

- Feasibility and accuracy for intended purposes
- Sensitivity to key features in market dynamics
- Robustness
- etc.

Session V: Hands-on - price and derivatives modelling II

16. Case Study III: Option pricing and model validation / selection

- Model calibration
- Pricing of barrier, spread and basket options
- Model validation and selection

17. Case Study IV: Swing option pricing in power markets and model validation

- Model calibration using European power market data
- Swing option pricing
- Model validation

Session V (Afternoon)

Modelling and pricing of energy and commodity derivatives: hands-on training course

● REGISTRATION FORM ●

*mandatory fields

Title	:	<input type="checkbox"/> Ms	<input type="checkbox"/> Mr	<input type="checkbox"/> Miss	<input type="checkbox"/> Dr
First name*	:	.....		
Last name*	:	.....		
Job title	:	.....		
Company*	:	.....		
Address*	:	.....		
	:			
	:			
City*	:	.....		
Country*	:	.....		
E-mail*	:	.....		
Phone	:	.....		
Fax	:	.....		
Course date	:	.....		
Course venue	:	.....		
<u>Privacy Policy</u> : Your details will not be exchanged with 3rd parties					

Date Signature

Terms and Conditions

1. We reserve the right to cancel, modify and/or postpone the course.
2. All payments must be settled before course commencement.
3. Participants who have settled payments will receive course confirmation by e-mail 7 days prior to the course date.
4. In case of over-subscription, priority will be given to those who have settled the course fees.
5. As far as applicable to the course venue, all courses will be held as scheduled if Typhoon Signal No. 8 or above/Black Rainstorm Warning is lowered 3 hours before the course's start time.