

LNG FUNDAMENTALS

**Master the Essential Commercial and Technical Forces
Driving the Global LNG Value Chain**

25 - 27 October 2010, Singapore

Expert Course Faculty:
Michael Williams & Richard Harrison



petro**EDGE**

www.petroedgeasia.net

About this training course

The 21st century has been coined the century of gas. The course will address the fundamental technical and economic factors that have driven and will drive the successful development of natural gas reserves by means of an integrated liquefied natural gas (LNG) project. The current exponential growth in the use of natural gas through international trade in LNG is explored.

This 3 day course is limited to 25 participants only.

Course Overview

The course contrasts the technical and commercial differences between LNG and natural gas to point out benefits and constraints that arise from the LNG option. A description is given of the elements in the “gas chain” which apply to LNG and of drivers that would lead to optimisation of design and commercial operation. The range and role of relevant parties to a successful LNG project are described. Regulatory authorities are also concerned with LNG safety, which is covered in detail. Ways and means by which a new entrant to a proposed LNG project may ensure an investment that meets expectations.

Actual case histories will be used frequently to demonstrate learning points. Case histories and exercises will deal with examples taken from international and local experience.

An introduction to terminology and practical “rules of thumb” should further enhance the participant’s ability to immediately contribute to a successful gas project – and to ask the right questions to test and improve the viability of a proposed project.

Course learning outcomes

On completion, participants in the course will be able to

- Understand the special characteristics of LNG which both broaden and yet constrain the commercial and technical links in the “gas chain”
- Generate options for market development proposals
- Understand risks and their mitigation
- Negotiate more effectively the terms of LNG sales agreements
- Understand the perspectives of the investor, the operator, the customer and government towards the LNG project
- Recognise political and diplomatic implications of international trade in LNG

Who should attend

LNG project development executives are drawn from both technical (E&P geoscience and engineering) and non-technical (commercial, finance and legal) backgrounds. Participants who have recently joined an LNG market development team, perhaps with expertise in one area of gas development, will benefit from the course by obtaining a good grounding of all other areas.

You will meet the following professionals from the LNG industry:

Sales & Marketing, Economist, Risk Management, Finance & Accounting, Project Financiers, Investment Analyst, Energy Lawyers, Strategic Planners, Gas Engineers and Asset Managers.

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COURSE PROGRAMME

Time	Day 1	Day 2	Day 3
Session 1	Introduction Course Overview	Gas Liquefaction - continued	Business Structure - continued
<i>Break</i>			
Session 2	Technical Characteristics of NG and LNG	LNG Shipping, LNG Terminals and end-users	International Competition for LNG Markets
<i>Lunch</i>			
Session 3	Natural Gas Exploration & Pipelines	LNG Safety	Competition - continued “Rules of Thumb”
<i>Break</i>			
Session 4	Gas Liquefaction	Business Structure LNG Project	Future Trends & Course Summary
<i>Close</i>			

DAY ONE

08.00 Registration

08.30 Session 1: Introduction of Delegates and Course Overview

Objectives of the course are outlined - to provide the newcomer to an LNG project development team with an insight to fundamental principles governing the successful development and operation of the natural gas system from reservoir to burner tip. Useful “rules of thumb” will be offered as a means to assess technical and commercial ranking. Natural gas in the context of world energy use.

10.00 Morning Break

10.30 Session 2: Characteristics of Natural Gas and LNG

An introduction to the unique physical characteristics of NG and LNG is presented so that technical and commercial opportunities and constraints may be understood and contrasted with other liquid and gaseous fuels. The LNG industry also combines many distinct engineering and commercial disciplines each with established measurement conventions. An ability to understand the scale and value of the units employed and to convert between them is an essential basic skill. Consideration of gas as a “commodity”; comparison with crude oil and NGLs; capital intensity of gas infrastructure; parties involved in the “gas chain”.

12.00 Lunch

1.00 Session 3: Natural Gas Exploration and Pipeline Gas Delivery

Consideration of factors impacting successful gas exploration and production. Typical well-head gas properties and gas treatment to meet pipeline specifications. Pipeline transit fees and their economics

2.30 Afternoon Break

3.00 Session 4: Gas Liquefaction Processes

Capital costs and economies of scale, cost trends and benchmarks; technology and typical processes, lead and construction times; storage requirements; typical EPC contracts, their operation and examples

4.30 End of Day 1

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DAY TWO

08.30 Session 1: Gas Liquefaction (continued)

10.00 Morning Break

10.30 Session 2: LNG Shipping and Terminal Issues

Capital costs and operating conditions of LNG carriers, benchmarks, typical designs, lead and construction times; vessel size and constraints; FoB vs. DeS; fleet management issues. Discussion of degree of technical and commercial flexibility in LNG delivery schedules and associated contractual terms. Examples of delivery arrangements are examined from Buyer and Seller perspective. Terminal costs and benchmarks, typical designs, lead and construction times; storage requirements; upset conditions and responses; capacity/storage optimization; special issues involving power generation.

12.00 Lunch

1.00 Session 3: LNG Safety

The cryogenic temperature of LNG and the generation of large quantities of gas on vaporization require significant and different safety requirements for the safe handling, storage and use of LNG.

2.30 Afternoon Break

3.00 Session 4: Business Structure of an LNG Project

Developing immature markets. History of LNG market development and their pricing mechanisms. Outline of LNG sales and purchase agreements; related contract terms and conditions and their evolution

4.30 End of Day 1

DAY THREE

08.30 Session 1: Business Structure (continued)

International convergence in capital costs allow estimation of netbacks or margins at each element of the gas chain – local variations may call for explanation. The LNG value chain and consideration of transfer pricing.

10.00 Morning Break

10.30 Session 2: International Competition for LNG Markets

Current intense competition for markets is placed in historical context; effect on pricing formulae and contract terms; the short-term trade – “the spot market”. Regional pricing conventions and their robustness will be discussed; signs of price convergence examined. Market share data and relative positions of LNG participants will be analysed

12.00 Lunch

1.00 Session 3: An Integrated LNG Project - “Rules of Thumb”

An opinion on “normal” dimensions of critical success factors – enables a participant to contribute to a project development debate

2.30 Afternoon Break

3.00 Session 4: LNG Outlook and Future Trends

“The century of gas” – the basis for expected future market expansions and extensions is presented. Limiting factors and any time constraints are discussed. Pointers are suggested for early warning of likely and sustained market changes; potential forces which impact on commoditisation and/or price convergence

Summary and Course Review

4.30 End of Course

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Your Expert Faculty



Michael Williams is an energy professional with worldwide experience particularly in gas and LNG, most recently in China and Taiwan. As Managing Director (Gas & Power) for Shell in China, was acknowledged as a major influence in the change of China's energy policy to import LNG and to utilise gas. He has expertise in all phases of the gas and LNG business, and is acknowledged by industry experts, Governments and Government Expert Committees. Now a consultant and Board Member. Has consulted worldwide on all aspects of gas and LNG. Member of the Western Australia Gas Panel of Experts.

His influence on the development of energy policy in China and in Taiwan was recognised by the Energy Working Group of APEC and by the associated policy development body, APERC (Asia Pacific Energy Research Centre, based in Tokyo). For the past 4 years, has been invited to recommend energy policies to APERC and to critique energy policies developed by APERC.

He has extensive experience of working with Joint Venture partners, including as a senior member of the management of the actual JV team. As Technical and Planning Manager in the Venezuelan LNG Project was responsible for all technical and planning aspects. As LNG Manager in the Sakhalin LNG Project, led all LNG planning for the project. Led the consortium of Shell, Marubeni and Osaka Gas to bid for the Guangdong LNG Project.

He was the inaugural manager of the Onshore Treatment Plant of the North West Shelf LNG Project in Karratha. Set up the organisation and managed the start-up and operation of the plant.

He has always maintained a keen interest and capability in the technology of the gas and LNG business, and is respected by consultants and industry commentators for insight into the technology and its business applications.



Richard Harrison is a private consultant in the field of natural gas market development and is interested also in the integration of commercial and environmental opportunities offered by the use of natural gas.

Mr Harrison was formerly with the Shell Group of Companies for 30 years. His final post was General Manager, Natural Gas and Project Development Manager for Shell in China from 1997 to 2001. His main responsibility was to develop a liquefied natural gas (LNG) import project, as well as sales and marketing of natural gas, in China.

Mr Harrison acted as the Shell delegate on the Joint Venture Project Committee of the Australian North West Shelf LNG project between 1993 and 1997. During that period he was also seconded part-time to COAG Natural Gas Taskforce (to develop a national gas regulatory regime) to coordinate and report on the deliberations of the Upstream Working Group. Prior to that, Mr Harrison was involved in managing the application of onshore and offshore technologies for Shell's own exploration and production programme - the successful development of gas projects for base and peak load duties in the UK Southern North Sea gas province, gas and oil venture assessments in Russia, Kazakhstan and Turkmenistan, and deep-water gas and oil discoveries in The Philippines.

Before joining Shell in 1972, Mr Harrison worked for two years as a Field Geophysicist in Central Australia and Papua New Guinea for the Australian Government, Bureau of Mineral Resources (now 'Geoscience Australia') and for a further two years as a field party leader in Central Australia for a private exploration contracting company.

Learn more about our Strategic Learning Solutions for Oil & Gas

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www.petroedgeasia.net

REGISTRATION FORM

Fees for 3 day training course	Early Bird Price	✓	Normal Price	✓	
25 – 27 October 2010, Singapore	S\$ 3700		S\$ 3900		TEAM DISCOUNTS! PetroEdge recognises the value of leaning in teams. Group bookings at the same time from the same company receive the following: 3 or more at 5% off 5 or more at 7% off 8 or more at 10% Team discount are not applied with any other offers or promotions including early bird offers
PetroEDGE In-house Training { } Yes, I would like to organise this training on-site and save over 20% of total course fees! For further information about On-site Solutions, please +65 67419927 or email info@asiaedge.ent					

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Delegate 1: _____
Mr Mrs Ms Dr Other ☐

Telephone: _____ Email: _____

Job Title: _____

Department: _____

Delegate 2: _____
Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Other ☐

Telephone: _____ Email: _____

Job Title: _____

Department: _____

Head of Department: _____

Company: _____

Address: _____

Country: _____

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- photocopy this form to register multiple delegates.

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More about the LNG Training Series



"Many newcomers aspire to membership of the "LNG Club" – are there tactics that lead to success?"

The global LNG market has been growing at 7% since the mid-1960s - more than three times the accepted growth rates for oil or traditional gas - and has done so through cycles of high and low commodity prices. This growth rate, coupled with attractive margins for both international and national oil companies, is drawing unprecedented interest. As these companies seek to maximize stakeholder return, capitalize on stranded hydrocarbon assets, and efficiently use excess cash flows to increase margins, the global battle to increase LNG market share is reaching a frenzied pace and generating many unanswered questions.

The petroEDGE LNG Training Series is aimed at those requiring a clearer picture of the industry's growing significance in the energy world. This modularised LNG Training series will explore issues regarding the implications of the development of the LNG sector and factors such as gas markets and pricing, transportation and the environment. It will also examine commercial and technical aspects of the natural gas and LNG industry.

Participants will learn the elements in the "gas chain" which apply to LNG and the drivers involved in optimizing design and commercial operations. Any professional who needs a complete understanding of the entire LNG value chain for years to come will not want to miss this training series.

LNG Training Series Modules	Duration (days)	Lecturers
1. LNG Fundamentals	3	2
2. LNG Commercial, Contracts & Trading	3	2
3. LNG Export Terminals	3	2
4. LNG Import Terminals	3	2
5. LNG Transportation – Shipping	3	2
6. LNG Demand and Forecasting	2	1
7. Master Class on World LNG	1	2

All modules are presented by highly qualified international practitioners. The target outcome focuses on intrinsic theoretical knowledge and practical skills applicable in the LNG business today. Choosing a suitable module will depend on the individual's technical and business learning requirements and current competency level. Modules are structured into several distinct specialisations, each dealing with a particular aspect of the LNG business landscape.



All modules are presented by qualified top-notch international practitioners and consultants who have experience gained working in the field for an operator or world-class service company. Each trainer has an established reputation in teaching as well as retaining a fully operational role as a practising engineer involved in current consulting projects.

To learn more about our Strategic Learning Solutions for the LNG Training Series please contact:

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About **petroEDGE** **Strategic Learning Solutions (SLS)**

The core competencies of professionals in the Oil & Gas industry are constantly evolving. To meet this ever growing gap, PetroEDGE Strategic Learning Solutions provides targeted up- to-date, practical and technically sound training solutions that enable professionals to be continuously relevant in industry.

What is the value of our Strategic Learning Solutions (SLS) to you:

- Our ability to translate current Oil & Gas business challenges to training solutions to meet your short to long term business needs.
- Unaffiliated to any technology or equipment service provider ensuring independent advice best suited to your requirements and interests.
- Assisting in developing core engineering, business and management competencies to ensure capability through functional training road-maps:
 - Engineering Schools
 - Upstream fundamentals
 - Downstream fundamentals
 - Management Skills Accelerator for Engineers & Technical Professionals
- Accelerate and engage your local workforce to stimulate personal development and increase retention to initiate long-term commitments for global competitiveness.
- On-going research and local presence to facilitate continuous engagement and post training support

To learn more about our Strategic Learning Solutions for the LNG Training Series please contact:

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