

Learn Anywhere, Learn Anytime

Catering to meet all your learning needs:

• Face To Face • Live Online Training • On-site & Customised Training



# LNG FUNDAMENTALS

This Live Online Training (LOT) course provides a solid foundation to understand the natural gas and LNG businesses by covering relevant technical, commercial, financial and contractual aspects.

March 2021

Course Parts will commence at **09:00** and end at **13:00 (SGT)**. There will be short breaks during each course Part.

Part 1: 17<sup>th</sup> March    Part 2: 18<sup>th</sup> March    Part 3: 19<sup>th</sup> March    Part 4: 24<sup>th</sup> March    Part 5: 25<sup>th</sup> March    Part 6: 26<sup>th</sup> March

6 Part Series



**Our Expert Course Instructor**



**Geoffrey Hunter**

For the past 18 years Geoff has worked exclusively on LNG projects, including those for ExxonMobil, BHP, Santos and Atlantic LNG, for facilities in Trinidad, Australia and PNG.

## Key Learning Objectives

Whether you are a new entrant to the world of LNG, a LNG technical specialist trying to broaden your knowledge, or an investor, attorney, or other professional service provider working with clients in the LNG industry, this Live Online Training (LOT) LNG Fundamentals course will help you to:

- ▶ Understand critical trends in global and regional LNG supply and demand
- ▶ Evaluate main opportunities and risks associated with financing and developing a large-scale LNG project
- ▶ Gain comprehensive technical knowledge in the process flow and major process units, key equipment, infrastructure requirement, and cost factors associated with onshore and floating LNG liquefaction, regasification and storage projects
- ▶ Learn about how technology innovation, new tanker design concepts, market demand, shipping and fuel costs, as well as safety requirements are affecting the state of the global LNG shipping industry
- ▶ Understand the role of LNG in the context of the global gas business and the medium-term outlook
- ▶ Comprehend the key fundamentals that drive global LNG business including Government policies, commercial, technical and financing rationales
- ▶ Demystify LNG pricing and looking at the choices buyers have today in regional markets
- ▶ Understand the entire LNG value chain (from pipeline transportation to the liquefaction facility, liquefaction, storage, loading/unloading, shipping, regasification and distribution) described by step and analysed.
- ▶ Learn about recent developments including; floating LNG, floating LNG power, small-scale LNG and LNG as an alternative transport fuel

# LNG FUNDAMENTALS

6 Part Series

March 2021

Course Parts will commence at **09:00** and end at **13:00 (SGT)**. There will be short breaks during each course Part.

Part 1: **17<sup>th</sup> March**

Part 2: **18<sup>th</sup> March**

Part 3: **19<sup>th</sup> March**

Part 4: **24<sup>th</sup> March**

Part 5: **25<sup>th</sup> March**

Part 6: **26<sup>th</sup> March**

## ABOUT THE COURSE

Liquefied Natural Gas (LNG) has provided intercontinental mobility to natural gas. The LNG sector is an industry that is constantly changing as it responds to growing demands in international energy markets, with the LNG value chain linking production fields to markets over vast distances to deliver cleaner-burning natural gas around the world.

LNG continues to increase its share of year-on-year growth in the global natural gas trade and remains one of the fastest growing sectors of the energy industry. Global demand for LNG is increasing and diversifying significantly, particularly in Asia and Europe. An increasing number of new producers, shippers and consumers are becoming directly involved in LNG trade. Many new world-scale projects are under development or expansion.

This Live Online Training (LOT) course provides a solid foundation to understand the natural gas and LNG businesses by covering relevant technical, commercial, financial and contractual aspects. This intensive course provides an understanding of the Liquefied Natural Gas (LNG) sector – from technical details, to market strategies through to commercial issues and future trends impacting the LNG supply chain.

The LOT is relevant for professionals drawn from both technical (project, shipping and production operational) and non-technical (commercial, finance, legal and governance) backgrounds. Participants with expertise in one area of the value chain will benefit from the LOT course by obtaining good grounding in all other relevant areas. Commercial and managerial staff looking for a concise overview; engineers new to the LNG industry; specialists looking to broaden their general knowledge of LNG and staff involved in LNG commerce and interested in LNG technical fundamentals will all benefit.

The course is designed for those looking to gain a better understanding of the fundamentals of the LNG industry – from the technical to the commercial to the strategic. The agenda will focus on LNG liquefaction technology, shipping, regasification facilities and LNG's role in supplying clean energy globally.

The course provides a broad, but integrated, insight to the technologies, the markets, the economics and the risks of the industry with a balance between technical and commercial issues, that are explained in language suitable for a multi-disciplined audience. Extensive use is made of up-to-date data, quality diagrams and recent photographs.

The course is structured in a presentation-style format, with high levels of attendee interaction as delegates will be invited to ask questions and share their views. The course includes references and examples of the current LNG climate.

This LOT will use real-life examples to illustrate the main concepts and possibilities. Discussions to complement the lecture material (using numerous illustrations and photographs) are used to stimulate discussion and deeper analyses will be encouraged.

## OUR EXPERT COURSE INSTRUCTOR



**Geoffrey Hunter**

For the past 18 years Geoff has worked exclusively on LNG projects, including those for ExxonMobil, BHP, Santos and Atlantic LNG, for facilities in Trinidad, Australia and PNG.

During his fulltime working career, Geoff was employed by Atlantic LNG (3 ½ years), Santos (10 years), BHP Petroleum (3 years), Exxon (17 years) and EPC contractors (13+ years).

For the past 6 years he has worked as an independent LNG Consultant, and in that role he has undertaken studies for Australian LNG import, Mozambique LNG export, Western PNG LNG Export and Darwin containerised LNG export projects. For the past 4 years he has donated his time representing Australia on the International Gas Union LNG Committee 2015-2018 and 2018-2021 Triennium Work Programs, contributing to the preparation of the annual World LNG Reports and Study Group reports.

At Santos he established the corporate LNG role (as Chief Advisor LNG Developments). He was Santos' Joint Venture representative for the liquefaction facilities for the Darwin LNG and PNG LNG Projects. He carried out the initial feasibility and site selection studies that resulted in the Gladstone LNG Project (GLNG) and oversaw the dual Pre-FEED studies for the GLNG Project, involving numerous trips to USA and European based LNG contractors. He was closely involved with the PNG LNG Project during its Feasibility, dual Pre-FEED and dual FEED studies, the latter involving several months in Houston as part of the ExxonMobil PNG LNG bid evaluation team for the LNG plant. In his LNG Advisor role at Santos he also carried out studies for Darwin LNG T2 (Sunrise Project), Bonaparte LNG and many small scale and floating LNG developments. In early 2011 he joined Atlantic LNG in Trinidad, working in their 4 train operating LNG plant as Project Support Services Manager for 3 ½ years.

He has studied the international LNG business in depth and remains current with global LNG related developments (including large and small scale facilities for the export, storage, shipping and import of LNG). He prepared and presented LNG Fundamentals courses to Santos staff in Brisbane, Adelaide and Houston, as well as to ExxonMobil staff and PNG Government personnel in Port Moresby and Brisbane. In Trinidad, these courses were also popular with Atlantic LNG staff and their shareholders. In total he has presented more than forty in-house and external 3 Day, 2 Day and 1 Day LNG Fundamentals courses, in addition to preparing a 5 Day external course (and external LNG training for SPE and University of Queensland).

He has broad international experience from living and working in Trinidad, UK, USA, Iraq and West Germany for approximately 13 years (including more than 5 years in USA with ExxonMobil affiliates).

## WHO WILL BENEFIT

This course is not a basic level introductory course. It has a specific techno-commercial focus for technical and business oriented professionals who are either new to the LNG industry or experienced in one part but could benefit from a wider perspective.

- Technical (exploration and production, geoscience and engineering).
- Non-technical (commercial, finance, government, marketing and legal) backgrounds.
- Those who have recently joined an LNG market development team with expertise in one area of gas development.

# LNG FUNDAMENTALS

6 Part Series

March 2021

Course Parts will commence at **09:00** and end at **13:00 (SGT)**. There will be short breaks during each course Part.

Part 1: 17<sup>th</sup> March    Part 2: 18<sup>th</sup> March    Part 3: 19<sup>th</sup> March    Part 4: 24<sup>th</sup> March    Part 5: 25<sup>th</sup> March    Part 6: 26<sup>th</sup> March

## Course Outline

### Part 1 - LNG Introduction & Commercial

- What is LNG – provides background and includes an informative video highlighting physical attributes of LNG.
- LNG HSSE – explains specific health, safety and environmental issues associated with LNG, with several incidents covered in detail.
- Global Gas Supply/Demand – provides background and history of both global gas and LNG supply/demand. Discusses LNG versus pipeline trade-offs. Includes current industry generated forecasts of gas and LNG supply/demand.
- LNG Supply Chain – provides details regarding the LNG supply chain (liquefaction, shipping and regasification facilities), including forecasts for long-term and short-term LNG demand.
- Regional markets – explains the different LNG quality, pricing, seasonality and dependency mechanisms in play in the various international LNG markets.
- Provides details regarding current and future LNG sources and project development timetables.
- Explains different forms of LNG contracts and terms (SPAs, MSAs, FOB, DES/DAT, spot/short-term etc).

### Part 2 - Unconventional gases, North American & Australian LNG and Generic LNG liquefaction

- Unconventional gas – provides details regarding unconventional gases (shale, tight and coal-seam) and explains technologies involved in their extraction.
- Australian & USA LNG growth.
- Liquefaction processes – provides background to LNG gas pre-treatment and generic liquefaction processes, via diagrams, photographs and technical details. Covers refrigeration compressors, compressor drivers, air versus water cooling (and impact of varying ambient air temperatures), inlet air cooling, duty curves etc.

### Part 3 – Air Products, Shell and Statoil/Linde liquefaction processes

- APCI C3MR & AP-X processes - provides information regarding Air Products main LNG liquefaction processes, including details and photographs of their spiral wound main cryogenic heat exchangers.
- APCI plants – includes photographs and technical details for many of the LNG plants that use an APCI liquefaction process.
- Other processes - includes photographs and technical details for LNG plants that use a Shell or the Statoil/Linde liquefaction processes, including details and photographs of the Linde spiral wound main cryogenic heat exchangers.

### Part 4 – One APCI C3MR process plant in more detail

- Covers one plant using the APCI C3MR process in more detail - including many photographs and technical details for the plant during construction and initial operation.

### Part 5 - ConocoPhillips Optimised Cascade Process (OCP)

- Provides information regarding the ConocoPhillips LNG liquefaction process, including details of brazed aluminium core-in-kettle and main cryogenic heat exchangers/cold boxes.
- CoP plants – includes photographs and technical details for LNG plants that use the CoP liquefaction process.

### Part 6 – One CoP OCP plant in more detail

- Covers one plant using the ConocoPhillips Optimised Cascade liquefaction process in more detail - including many photographs and technical details for the plant during construction and initial operation.

### Part 7 - Storage tanks

- Provides diagrams, photographs and technical details for the various types of large LNG storage tanks (including aboveground and in-ground) used in LNG export and import facilities.
- Many construction photographs used to show containment, equipment and insulation features.

### Part 8 - Loading/unloading facilities

- Provides diagrams, photographs and technical details for the various types of berths, loading arms, loading/vapour return line insulation systems used in LNG export and import facilities.
- Provides diagrams, photographs and technical details of in-tank LNG pumps.
- Berth safety systems - provides diagrams, photographs and technical details for typical berth safety systems.
- Provides photographs and technical details for many of the different types of LNG export and import facility berths.

### Part 9 - Shipping

- Containment systems - provides diagrams, photographs and technical details for the various types of containment and insulation systems used in LNG vessels.
- LNG carrier equipment - provides diagrams, photographs and technical details for the typical equipment (such as in-tank pumps) used in LNG vessels.
- Propulsion systems - provides diagrams, photographs and technical details for the different types of propulsion systems in LNG vessels.

- LNG carrier fleet – provides historical data and forecasts of LNG vessel numbers, capacities, containment and propulsion types.
- Discusses Q-Flex and Q-Max ships and provides diagrams, photographs and technical details for these.

### Part 10 - Import/regasification terminals

- Provides details regarding typical onshore LNG import terminal equipment and operations.
- Vaporizers - provides diagrams, photographs and technical details for the different types of vaporiser systems used.
- Onshore import terminals - provides photographs and technical details for many of the different types of LNG import facilities.

### Part 11 – Floating LNG

- Floating liquefaction, storage and offloading (FLSO) – provides diagrams, photographs and technical details.
- Floating storage and regasification units (FSRU) – provides diagrams, photographs and technical details for many of the FSRU ships that are currently in operation (both conversions and newbuilds).
- Also covers small scale FLSOs and FSRUs – provides diagrams, photographs and technical details.

### Part 12 - Small-scale LNG

- Small-scale LNG liquefaction - provides diagrams, photographs and technical details for many of the small-scale LNG liquefaction processes that are currently in operation.
- Peak shaving - explains the concept via diagrams and photographs.
- Vacuum-perlite pressure storage tanks - explains the concept via diagrams and photographs.
- Vaporizers - provides diagrams, photographs and technical details for ambient air vaporiser systems used.
- Satellite LNG - explains the concept via diagrams and photographs of these facilities in various countries.
- Virtual pipelines - explains the concept via diagrams and photographs of these small scale LNG export/transport/import facilities in Norway, China and Australia.
- Small LNG ships - provides diagrams, photographs and technical details for the different types of containment and propulsion systems used for small LNG vessels.
- LNG as transport fuel (trucks, trains and ships) - describes many of the uses of LNG for fuel, via diagrams and photographs.

# LNG FUNDAMENTALS

6 Part Series

March 2021

Course Parts will commence at **09:00** and end at **13:00 (SGT)**. There will be short breaks during each course Part.

Part 1: **17<sup>th</sup> March**   Part 2: **18<sup>th</sup> March**   Part 3: **19<sup>th</sup> March**   Part 4: **24<sup>th</sup> March**   Part 5: **25<sup>th</sup> March**   Part 6: **26<sup>th</sup> March**

## 4 Easy Ways to Register

- 1 Telephone**  
Customer Service Hotline +65 6508 2476
- 2 Email**  
sgtraining@informa.com
- 3 Fax**  
+65 6508 2407
- 4 Web**  
www.informaconnect.com.sg/lngfundamentals

## LNG Fundamentals

Course Codes	Location	Course Dates	Standard Price	4+ Dels Discount
P21GR235GV	Live Online Training	March 21	SGD 3,395	<b>Great Savings:</b> When you book <b>4 or more</b> participants! <b>Call us</b> today on <b>+65 6508 2476</b> or email <b>sgtraining@informa.com</b> to take advantage of the discount offer.

A 7% Goods & Services Tax (GST) is applicable to all Singapore based companies.

<b>Delegate 1 Details</b> Name: Dr/Mr/Ms _____ Job Title: _____ Department _____ Tel: _____ Mobile No.: _____ Email: _____	<b>Delegate 2 Details</b> Name: Dr/Mr/Ms _____ Job Title: _____ Department _____ Tel: _____ Mobile No.: _____ Email: _____
<b>Delegate 3 Details</b> Name: Dr/Mr/Ms _____ Job Title: _____ Department _____ Tel: _____ Mobile No.: _____ Email: _____  Who is Head of your Department? _____	<b>Delegate 4 Details</b> Name: Dr/Mr/Ms _____ Job Title: _____ Department _____ Tel: _____ Mobile No.: _____ Email: _____  Who is Head of Training? _____
<b>Company Information</b> Company Name: _____   Main Business/Activity: _____ Address: _____   Postal Code: _____	

Please photocopy for additional delegates

### Payment Method (Please tick:)

- I enclose my bankers draft / cheque payable to IBC Asia (S) Pte Ltd
- I am paying by bank transfer (copy attached)
- Payment by Credit Card. (AMEX, VISA or MasterCard accepted)

### CREDIT CARD PAYMENTS

The best way to pay by credit card is through our secure on-line registration process, simply log on to the website at [www.informaconnect.com.sg/lngfundamentals](http://www.informaconnect.com.sg/lngfundamentals) and click "Register On-line". If you would prefer to pay over the phone please complete the contact name and details and our Customer Services Team will call within 24 hours to take payment. As we treat your credit card information in the strictest confidence, please do not send payment details by email.

Credit card contact: \_\_\_\_\_ Department: \_\_\_\_\_  
Direct phone number: \_\_\_\_\_ Email: \_\_\_\_\_

### PAYMENT TERMS

Payment must be received 10 business days prior to the event. To take advantage of discounts with an expiry date, registration and payment must be received by the cut-off date.

- Payment by bankers draft or cheque in S\$ or US\$ should be made in favour of 'IBC Asia (S) Pte Ltd' and mailed to:  
IBC Asia (S) Pte Ltd  
c/o Informa Regional Business Services  
103 Penang Road, Visioncrest Commercial #04-01, Singapore 238467  
**Attn: The Accounts Receivable Team**
- Payment by bank transfer in S\$ or US\$ made payable to:  
**IBC Asia (S) Pte Ltd**  
A/C No.: 147-059513-001 (S\$)  
A/C No.: 260-457866-178 (US\$)  
The Hongkong and Shanghai Banking Corporation Limited 21 Collyer Quay, HSBC Building  
Singapore 049320  
**Bank Swift Code: HSBCSGSG**  
**Bank Code: 7232**
- Payment by Credit Card (AMEX, VISA or MasterCard). The best way to pay by credit card is through our secure portal built into the website. To pay by phone please indicate the contact name and details below and our Customer Services Team will call within 24 hours to take payment. Please do not send credit card information by email.

### CANCELLATIONS / SUBSTITUTION

Should you be unable to attend, a substitute delegate is welcome at no extra charge. Cancellations must be received in writing at least 10 business days before the start of the event, to receive a refund less 10% processing fee per registration. The company regrets that no refund will be made available for cancellation notifications received less than 10 business days before the event.

### IMPORTANT NOTE

Please quote the name of the delegate, event title and invoice number on the advice when remitting payment. Bank charges are to be deducted from participating organisations own accounts. Please fax your payment details (copy of remittance advice, cheque or draft to +65 6508 2407).

Attendance will only be permitted upon receipt of full payment. Participants wishing to register at the door are responsible to ensure all details are as published. Informa Connect Singapore assumes no further liability or obligation, beyond the refund of the paid registration fee, in the event of postponement or cancellation by Informa Connect Singapore.

### DATA PROTECTION

The personal information entered during your registration/order or provided by you will be held on database and may be shared with companies in the Informa Group in the UK and internationally. Occasionally, your details may be obtained from or shared with external companies who wish to communicate with you offers related to your business activities. If you do not wish your details to be used for this purpose please contact our Database Department at Email: [database.sg@informa.com](mailto:database.sg@informa.com), Tel: +65 6508 2400 or Fax: +65 6508 2408.