LNG Import Terminal and Regasification: Option Selection, FSRU Operations and Send-Out

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Paris - Right Bank business hotel



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Introduction:

An LNG import terminal decision locks in decades of cost and supply risk: a concept chosen without testing demand, site conditions and send-out needs can leave an FSRU idle, a tank farm short of berth windows or a grid without gas at peak. This Core Concept course takes terminal managers, engineers, developers and commercial staff through onshore, FSRU and FSU receiving concepts, option selection, berthing and unloading, tank and boil-off control, send-out pumps, vaporisers, metering, safety systems, scheduling and maintenance. Participants build an Import Terminal Option Study and Operating Plan.

Course Objectives:

- Compare onshore regasification terminals, FSRUs and FSU plus regas arrangements against demand, site and schedule criteria and recommend a concept
- Plan carrier berthing, ship-to-ship transfer and cargo unloading sequences that keep tank pressure and vapour return in balance
- Control full containment tank inventory, rollover risk and boil-off gas through recondenser, compressor and send-out settings
- Specify send-out pump staging, vaporiser type and metering arrangements that meet pipeline gas quality and flow requirements
- Assess terminal emergency shutdown, spill containment and fire and gas arrangements using HAZOP and LOPA outputs
- Prepare cargo schedules, send-out nominations, maintenance plans and performance metrics within an import terminal operating plan

Target Audience:

- Terminal managers accountable for safe, continuous send-out and berth utilisation
- Process and operations engineers responsible for tank, boil-off, pump and vaporiser performance
- Project developers who screen sites and select terminal concepts for new gas import capacity
- Commercial managers who administer terminal capacity, cargo slots and send-out nominations
- Maintenance and reliability managers who plan work on cryogenic and rotating equipment
- Marine and FSRU operations managers who oversee berthing, mooring and ship-to-ship transfer

Course Outline:

Day 1: LNG Import Terminal Concepts and Receiving Functions

- Import Terminal Functions Map: Berth, Unloading, Storage, Send-Out and Metering Blocks
- Onshore Regasification Terminal Plot Plan Reading and Process Flow Tracing
- FSRU Configuration: Moored Vessel, Onboard Regas Trains and High-Pressure Gas Arms
- FSU Plus Jetty-Mounted Regas Hybrid Arrangement and Its Operating Limits
- Near-Shore, Offshore Buoy and Gravity-Based Structure Receiving Concepts

Day 2: Terminal Development Options and Selection Criteria

- Demand Profile, Peak Send-Out and Minimum Send-Out Sizing Basis
- Site Screening Matrix: Water Depth, Metocean Data, Land Area and Pipeline Tie-In
- Capex, Opex and Schedule Comparison of Onshore, FSRU Charter and FSU Options
- Weighted Multi-Criteria Scoring Sheet for Terminal Concept Selection
- Delivery Models: Owned Asset, Chartered FSRU and Tolling Operator Structures

Day 3: Marine Interface, Berthing and Cargo Unloading

- Carrier Size Range Compatibility Study and Berth Fit Checklist
- Mooring Layout, Fender Selection and Jetty Approach Criteria
- Ship-to-Ship Transfer Between Carrier and FSRU: Side-by-Side Hose Arrangement
- Unloading Arm Cooldown, Rate Ramp-Up and Vapour Return Balancing
- Powered Emergency Release Coupler and Ship-Shore ESD Link Function Testing

Day 4: Storage Tank Inventory and Boil-Off Gas Control

- Full Containment Tank Operating Envelope: Level, Pressure and Temperature Limits
- Cargo Density Mismatch, Top or Bottom Filling Choice and Rollover Prevention
- BOG Generation Budget: Heat Leak, Unloading Displacement and Pump Heat Input
- Recondenser Operation, BOG Compressor Load Steps and Minimum Send-Out Coupling
- Flaring and Venting Avoidance During Zero Send-Out and Holding Mode

Day 5: Week-One Case: Terminal Concept and Unloading Walkthrough

- Case Terminal Data Pack: Demand Curve, Site Survey and Carrier Fleet
- Concept Screening of Onshore, FSRU and FSU Options for the Case Terminal
- Unloading Sequence Walkthrough on Piping and Instrumentation Diagrams
- BOG Balance Calculation for Holding, Unloading and Peak Send-Out Modes
- Week-One Concept Memo Drafting and Peer Challenge

Day 6: Send-Out Pumps, Vaporisers and Gas Metering

- In-Tank Retractable Pumps and High-Pressure Send-Out Pump Staging
- Seawater Open Rack Vaporiser Duty, Icing Control and Outfall Temperature Limits
- Submerged Combustion Vaporiser Fuel Demand and Intermediate Fluid Vaporiser Loop
- Send-Out Gas Quality Adjustment by Nitrogen Ballasting or LPG Enrichment
- Custody Transfer Metering Station: Ultrasonic Meters, Gas Chromatograph and Flow Computer

Day 7: Terminal Safety Systems and Process Risk Assurance

- Terminal ESD Hierarchy and Cause and Effect Matrix Review
- Spill Containment: Impounding Basins, Collection Trenches and High-Expansion Foam Coverage
- Fire and Gas Detection Layout: Cold Spill, Flame and Low-Level Gas Detectors
- HAZOP and LOPA Application to Recondenser and Vaporiser Upset Scenarios
- Simultaneous Operations Matrix for Unloading, Maintenance and Ship-to-Ship Activities

Day 8: Terminal Operations, Cargo Scheduling and Commercial Interfaces

- Annual Delivery Programme and Cargo Slot Allocation Across Terminal Users
- Tank Inventory Forecast Against Berth Windows and Send-Out Nominations
- Terminal Use Agreement Structure: Capacity Reservation, Slot Rights and Use-or-Lose Terms
- Daily Send-Out Nomination, Renomination and Gas Grid Operator Coordination
- Heel Management, Cargo Delay Response and Shipper Communication Protocols

Day 9: Reliability, Maintenance and Terminal Performance Metrics

- Criticality Ranking of Send-Out Pumps, Vaporisers and BOG Compressors
- Reliability-Centred Maintenance Plans for Rotating and Cryogenic Equipment
- Seawater Intake Screening, Vaporiser Panel Fouling and Anti-Fouling Dosing Programme
- Terminal KPIs: Send-Out Availability, Berth Occupancy, BOG Losses and Unloading Time
- FSRU In-Water Survey and Class Inspection Planning Without Loss of Send-Out

Day 10: Capstone: Import Terminal Option Study and Operating Plan

- Capstone Brief: Market Demand, Site Constraints and Supply Contract Terms
- Option Study Scoring and Recommended Terminal Concept Justification
- Operating Plan Drafting: Cargo Calendar, Inventory Limits and Send-Out Profile
- Safety, Maintenance and Staffing Sections of the Operating Plan
- Panel Presentation and Peer Challenge of the Option Study

Skills You Will Gain:

- Terminal Concept Screening
- Site Suitability Assessment
- Unloading Sequence Planning
- Boil-Off Gas Balancing
- Vaporiser Duty Specification
- Process Hazard Review
- Cargo Slot Scheduling
- Equipment Criticality Ranking

Why Attend This Course:

- Return with an Import Terminal Option Study and Operating Plan tested on a case terminal and challenged by peers
- Defend a choice between onshore, FSRU and FSU concepts to investors and management with demand, site and cost evidence
- Keep tanks, boil-off and send-out stable through cargo delays, zero send-out periods and equipment outages
- Compare receiving terminal practice with operators, developers and shippers from onshore and floating facilities

Conclusion:

A reliable LNG import terminal depends on matching the receiving concept to demand and site, then running berth, tanks, boil-off and send-out as one system. Week one covers terminal concepts, option selection, berthing and unloading, tank inventory and boil-off control and tests them on a case terminal. Week two adds send-out pumps, vaporisers and metering, safety systems, cargo scheduling and terminal use agreements, and reliability and performance metrics. The final day brings these together in an Import Terminal Option Study and Operating Plan.