Major LNG Shipping Routes (2016)

Shortest LNG voyage length in 2016
130 nm (Algeria to Spain)

Average LNG voyage length in 2016
7,640 nm

Longest LNG voyage length in 2016
12,280 nm (Norway to China)

LNG Markets
- Importer
- Exporter
- Both
- Both (Re-exporters)

LNG Flow (MMt)
- >10
- 5.1-10
- 0.5-5

- Shortest/longest route

Australia > China
+6.9 MMt (+121% YOY)

Nigeria > Japan
-2.7 MMt (-59% YOY)

Note: Route start and end points are not always indicative of project location.

Sources: Adapted from IHS, provided as is without any warranty © IHS
Key Market Participants

10 Largest Importers in 2016 (bcm)

- LNG:
  - Japan: 108.3
  - South Korea: 43.8
  - China: 34.8
  - India: 25.0
  - Taiwan: 19.5
  - Spain: 12.9
  - UK: 9.6
  - Egypt: 9.5
  - France: 7.3
  - Turkey: 7.3

- Pipeline:
  - Germany: 99.3
  - US: 82.5
  - Italy: 59.4
  - Mexico: 38.4
  - China: 38.3
  - Netherlands: 37.4
  - Turkey: 34.1
  - UK: 32.3
  - France: 22.2

10 Largest Exporters in 2016 (bcm)

- LNG:
  - Qatar: 100.4
  - Australia: 57.6
  - Malaysia: 32.5
  - Nigeria: 24.2
  - Indonesia: 21.6
  - Algeria: 15
  - Russia: 14
  - Trinidad: 13.8
  - Oman: 10.5
  - Papua New Guinea: 9.6

- Pipeline:
  - Russia: 190.8
  - Norway: 109.8
  - Canada: 82.4
  - US: 60.3
  - Netherlands: 52.3
  - Turkmenistan: 37.3
  - Algeria: 37.1
  - Qatar: 20
  - Kazakhstan: 16.6
  - Bolivia: 16.1

Source: BP Statistical Review of World Energy 2017
Changes in Top LNG Market Participants, since 2011

Top 10 LNG Importers
2011 vs 2016

Top 10 LNG Exporters
2011 vs 2016

Source: IGU LNG Reports (2011 and 2017 Editions); EIA, 2017
Price Formation Mechanisms

Regional Price Formation 2016: Total Consumption

- **OPE**: Oil Price Escalation
- **GOG**: Gas-on-Gas Competition
- **BIM**: Bilateral Monopoly
- **NET**: Netback from Final Product
- **RSP**: Regulation: Social and Political
- **RCS**: Regulated Cost of Service
- **RBC**: Regulation: Below Cost
- **NP**: No Price

Source: IGU Wholesale Gas Price Survey, 2017
Liberating Market Dynamic in Pricing

European Import Price Formation 2005-2015

Note:
Oil Price Escalation = prices linked, usually through a base price and an escalation clause, to competing fuels, typically crude oil, gas oil and/or fuel oil.
Gas-on-Gas Competition = prices determined by the interplay of supply and demand - gas-on-gas competition - that are traded at physical or notional hubs.

Source: IGU, LNG World Report, 2017
World Price Formation Shares (2016)

Pipeline Imports
- GOG 57%
- OPE 35%
- BIM 8%

LNG Imports
- OPE 76%
- GOG 24%

Total Imports
- OPE 49%
- GOG 46%
- BIM 5%

Source: IGU Wholesale Price Survey, 2017
Global Price Convergence Trend

Monthly Average Regional Gas Prices

- US (Henry Hub)
- German Border Price
- NE Asia Spot Price
- UK (NBP)
- Japan (based on LNG)

Source: IHS, Cedigaz, US DOE
Natural Gas Regional Price Trends

Wholesale Prices in 2016 by Region

*Factors That Play into Price Determination*

**Supply Side Factors**
- Variations in the amount of natural gas production
- The volumes of natural gas imports and exports
- The amount of gas in storage facilities (referred to as storage levels)

**Demand Side Factors**
- The level of economic growth
- Variations in winter and summer weather
- Prices of competing fuels

*Sources: BP Statistical Review of World Energy 2017; IGU Wholesale Gas Price Survey 2017*
Natural Gas Contracting

Non Long-Term Volumes (1995 - 2016)

- Blue: Non Long-term Trade
- Orange: % of Total LNG Trade (right axis)

Short, Medium, Long-Term Trade (2010 - 2016)

- Red: Short term
- Yellow: Medium term
- Blue: Long term
- Black: % Spot and Short term (right)

Source: IGU World LNG Report, 2017
Natural Gas Contract Trends: Growing Flexibility

Average Contract Length in Years

Recent LNG Contracts by Destination Flexibility

<table>
<thead>
<tr>
<th>Destination Clause</th>
<th>Avg. Quantity (bcm)</th>
<th>Avg. Length (yrs)</th>
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<tr>
<td>Signed in 2015</td>
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Evolution of LNG Contracts

Average Contract Quantity bcm per year

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Average Contract Length in Years