US LNG Exports
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Agenda

• Global LNG
  • Infrastructure capabilities
  • Supply
  • Demand

• US LNG
  • Liquefaction Capacity
  • US LNG deliveries

• Pricing Mechanisms for Global & US LNG
  • Evolution of contracts/prices
Putting global LNG in perspective

- Global Natural Gas Demand: ~122 Tcf or 335 Bcf/d (2015)

- Lower-48 US Natural Gas Demand: ~27.1 Tcf or 74 Bcf/d (2016)

- Global LNG Demand: ~11.7 Tcf or 32 Bcf/d (2015)

- Roughly 70% of all gas is consumed in the country it is produced.

- Since 2000, LNG demand has grown about 6.6% a year, compared to 2.8% for natural gas.

- About 114 countries use natural gas as a fuel source, while only 37 nations import LNG.

Source: Platts Analytics’ Eclipse Data, IGU, IEA, CIA World Fact Book
Global LNG infrastructure

**Liquefaction**
Global LNG Liquefaction Capacity: 301.5 MTPA or 38.6 Bcf/d
2015 utilization rate: 81%
LNG Exporting Countries: 19
LNG Re-Exporting Countries: 10

**Regasification**
Global LNG Regasification Capacity: 757 MTPA or 96.9 Bcf/d
2015 utilization rate: 32%
LNG importing countries: 37

Source: Platts Analytics’ Eclipse Data, IGU
Natural gas/LNG to play a larger role in the future

Natural Gas

40% of the growth in global energy demand from 2014-2040 is projected to be met by natural gas.

LNG

IEA report forecasts liquefaction capacity to grow 45% between 2015-2021.

China, India, Brazil, Mexico, South Africa, Nigeria, Egypt, Turkey, Saudi Arabia, Iran, Thailand & Indonesia will account for roughly 80% of the new growth in energy demand through 2040.

Source: Platts Analytics’ Eclipse Data, IGU, IEA, CIA World Fact Book, Exxon
LNG exports by region

<table>
<thead>
<tr>
<th>Region</th>
<th>Year to Sep 2015 (Bcf)</th>
<th>Year to Sep 2016 (Bcf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific</td>
<td>4,500</td>
<td>5,000</td>
</tr>
<tr>
<td>Middle East</td>
<td>4,000</td>
<td>4,500</td>
</tr>
<tr>
<td>Europe</td>
<td>1,000</td>
<td>1,500</td>
</tr>
<tr>
<td>Americas</td>
<td>1,500</td>
<td>2,000</td>
</tr>
<tr>
<td>Africa</td>
<td>1,500</td>
<td>2,000</td>
</tr>
</tbody>
</table>

Source: Platts Analytics’ Eclipse Data
LNG exports by country

Source: Platts Analytics’ Eclipse Data

<table>
<thead>
<tr>
<th>Country</th>
<th>Volume (Bcf) Year to Sep 2015</th>
<th>Volume (Bcf) Year to Sep 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qatar</td>
<td>3700</td>
<td>4000</td>
</tr>
<tr>
<td>Australia</td>
<td>1500</td>
<td>2000</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1000</td>
<td>1100</td>
</tr>
<tr>
<td>Indonesia</td>
<td>700</td>
<td>800</td>
</tr>
<tr>
<td>United States</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

S&P Global Platts
LNG imports by country

<table>
<thead>
<tr>
<th>Country</th>
<th>Volume (Bcf)</th>
<th>Year to Sep 2015</th>
<th>Year to Sep 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>4000</td>
<td>3000</td>
<td>2500</td>
</tr>
<tr>
<td>South Korea</td>
<td>1500</td>
<td>1000</td>
<td>900</td>
</tr>
<tr>
<td>Middle East</td>
<td>300</td>
<td>400</td>
<td>500</td>
</tr>
<tr>
<td>South America</td>
<td>700</td>
<td>600</td>
<td>500</td>
</tr>
<tr>
<td>Europe</td>
<td>1600</td>
<td>1400</td>
<td>1200</td>
</tr>
<tr>
<td>China</td>
<td>800</td>
<td>600</td>
<td>700</td>
</tr>
</tbody>
</table>

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Middle Eastern Demand Profile pre FSRUs

Middle Eastern Demand (Mcm)

- May-14
- Jun-14
- Jul-14
- Aug-14
- Sep-14
- Oct-14
- Nov-14
- Dec-14
- Jan-15
- Feb-15
- Mar-15
- Apr-15
- May-15
- Jun-15
- Jul-15
- Aug-15
- Sep-15
- Oct-15
- Nov-15
- Dec-15
- Jan-16
- Feb-16
- Mar-16
- Apr-16
- May-16
- Jun-16
- Jul-16
- Aug-16

Dubai
Kuwait

Source: Platts Analytics
New Indian Ocean Demand

Demand from the Middle East and Pakistan (Mcm of gas)

- Dubai
- Kuwait
- Egypt
- Jordan
- Pakistan

Source: Platts Analytics
New Indian Ocean Demand

Middle Eastern and South Asian Demand (Mcm of gas)

- India
- Dubai
- Kuwait
- Egypt
- Jordan
- Pakistan

Source: Platts. Private & Confidential.
US LNG Export Overview

AEO 2005 US Net Natural Gas Imports

AEO 2016 US Net Natural Gas Imports

Market prices reflect change

Regional Gas Prices

Source: Platts Analytics’ Bentek Data & Eclipse Data

Tight period
Supply growth
US LNG Deliveries
February 2016 – October 24, 2016

Source: Platts Analytics' Bentek Energy

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US LNG Exports Forecast

Source: Platts Analytics' Eclipse Data
US LNG Liquefaction Utilization Forecast

US LNG Liquefaction Fleet Utilization

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## Key US LNG Stakeholders

<table>
<thead>
<tr>
<th>Company:</th>
<th>Shell/BG</th>
<th>Gas Natural Fenosa</th>
<th>KOGAS</th>
<th>GAIL (India)</th>
<th>Sumitomo</th>
<th>Cheniere Marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment (Bcf/year)</td>
<td>163</td>
<td>104</td>
<td>104</td>
<td>211</td>
<td>107</td>
<td>NA</td>
</tr>
<tr>
<td>Fixed Fee ($/MMBtu)</td>
<td>$2.25-$3.00</td>
<td>$2.49</td>
<td>$3.00</td>
<td>$3.00*</td>
<td>$3.00*</td>
<td>NA</td>
</tr>
<tr>
<td>Pricing Mechanism</td>
<td>Sales Purchase Agreement (SPA)</td>
<td>SPA</td>
<td>SPA</td>
<td>SPA &amp; Tolling</td>
<td>SPA &amp; Tolling</td>
<td>NA</td>
</tr>
</tbody>
</table>

*While Cheniere’s Sabine Pass fixed fee is public information, Dominion’s Cove Point fixed fee is confidential. Platts Analytics estimates a $3.00 fixed fee at Cove Point.*

Source: Platts Analytics
LNG Pricing Mechanisms

Oil-Indexed
Example: 13% of Brent or JCC

Gas Hub-Linked
Example: Henry Hub plus 15%, contracts based off of differentials of NBP or TTF

Benchmarks
Example: Platts JKM™

Assessments
Example: Platts GCM, EAM, NWE, DES West India
### LNG Pricing Mechanism #1: Henry-Hub linked Sales Purchase Agreement

<table>
<thead>
<tr>
<th>Cheniere Example: 115% of Henry Hub + Liquefaction</th>
<th>$/MMBtu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Henry Hub spot  ($3.00 for example)* 115%</td>
<td>$3.45</td>
</tr>
<tr>
<td>Liquefaction charge (Customer pays liquefaction charge regardless of lifting LNG cargo or not)</td>
<td>$2.25</td>
</tr>
<tr>
<td>FOB cost</td>
<td>$5.70</td>
</tr>
<tr>
<td>Shipping (Japan via Panama Canal)</td>
<td>$1.10</td>
</tr>
<tr>
<td>DES cost</td>
<td>$6.80</td>
</tr>
</tbody>
</table>

Supply Chain Responsibility: Terminal operators obligation in green. Offtaker’s obligations in red.

1. **Liquefaction/usage fee**: Paid regardless of whether the customer uses the facility. Covers the project company’s facilities and fixed costs.
2. **Gas fee**: Payable based on amount of gas liquefied.

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LNG Pricing Mechanism #2: Tolling model

Cove Point Example – Cove Point produces LNG but does not take title or market LNG


LNG buyer pays:

1. Reservation/capacity fee: Paid regardless of whether the customer uses the facility. Covers the project company’s facilities and fixed costs.
2. Liquefaction/usage fee: Payable based on amount of gas liquefied.

<table>
<thead>
<tr>
<th>Risks</th>
<th>Rewards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source, secure, nominate &amp; scheduling gas into pipeline &amp; LNG plant</td>
<td>Long-term control of gas supply needs (up to 45 years)</td>
</tr>
<tr>
<td>Contract sufficient pipeline capacity at liquid market points to the LNG plant, ensuring competitive gas supply.</td>
<td>Not competing with the plant owner in marketing LNG</td>
</tr>
<tr>
<td>Manage a new business model with value-chain segments upstream of liquefaction to control</td>
<td>Vertical integration beyond DES and FOB, back to wellhead</td>
</tr>
<tr>
<td>Gas supply interruptions (freeze-offs or hurricanes)</td>
<td>HH – supply gas arbitrage opportunities</td>
</tr>
</tbody>
</table>

Source: Navigant Consulting; Susan L. Sakmar, *Energy for the 21st Century: Opportunities and Challenges for LNG*
### LNG Pricing Mechanism #3: Spot Indexation

**Platts announces the launch of Platts GCM (Gulf Coast Marker)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Published each business day, reflecting the close of Asian Markets <em>(13:30 Houston time)</em></td>
</tr>
<tr>
<td>Basis &amp; Location</td>
<td>Cargoes lifted Free On-Board (FOB) from production/reload ports across the US Gulf Coast. Laycan is normalized to the geographical location of <strong>Sabine Pass</strong>, using an assessed deviation cost.</td>
</tr>
<tr>
<td>Unit</td>
<td>All prices are quoted in US dollars per million British Thermal Units <em>($/MMBtu)</em></td>
</tr>
<tr>
<td>Quality</td>
<td>Price assessments reflect <strong>lean and rich</strong> gas</td>
</tr>
<tr>
<td>Volume</td>
<td>Standard loading cargoes of <strong>135,000-175,000 cu m</strong></td>
</tr>
<tr>
<td>Timing</td>
<td>GCM represents the average of the <strong>two half-month cycles which represent the first full month</strong>.</td>
</tr>
<tr>
<td>Contract Roll</td>
<td>GCM <strong>rolls on the 1st and 16th</strong> of each calendar month</td>
</tr>
</tbody>
</table>
GCM currently a “netback” assessment

Shipping rates of August 25, 2016

<table>
<thead>
<tr>
<th>Freight Rates $/MMBtu</th>
<th>Japan/Korea</th>
<th>South China/Taiwan</th>
<th>West India</th>
<th>SW Europe</th>
<th>NW Europe</th>
<th>Argentina</th>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Gulf Coast (Most Economic)</td>
<td>$1.09</td>
<td>$1.29</td>
<td>$1.19</td>
<td>$0.46</td>
<td>$0.46</td>
<td>$0.63</td>
<td>$0.50</td>
</tr>
</tbody>
</table>
Continuous Pricing and Market Coverage

- As each market closes, information is passed onto the next desk in the following time-zone, allowing for continuous price and market data gathering
- Allows for wider survey of market participants; portfolio players, traders, end-users etc..

Source: Platts Analytics’ Eclipse Data, IGD, IEA, CIA World Fact Book
Platts launches the FOB Gulf Coast Marker (GCM)

Prices as of October 20, 2016
Future LNG pricing mechanisms

- Up to 43% of total global LNG deliveries could be traded on a spot/short-term basis by 2020, versus around 25% today
Thank You

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