EXPANSION AND EVOLUTION OF THE ASIA PACIFIC LNG MARKETS

By: Hiroshi Hashimoto, Tsukasa Koyama,
The Institute of Energy Economics, Japan (IEEJ)
Wednesday 17 April 2013
Outline

1. The current biggest issue: cost of LNG procurement
   – Widening gaps of regional gas prices

2. Evolution in the LNG markets in recent years
   – Increasing shares of the Asia Pacific markets and Japan

3. Changing pattern of LNG procurement
   – Shifts between contract and cargo purchases

4. More proactive involvement in projects
   – Incremental supply sources and accompanying more proactive involvement of Asian buyers
The biggest problem: widening gaps

From 2003 to 2007, prices in the United States were often more expensive than prices of Japanese imports. Since 2008, price gaps have been much wider.

(Data sources) Japan’s custom statistics, Department of Energy (United States), Energy Intelligence, compiled and converted by the authors.
Bloody performance by the Japanese electric power sector

(Note) *2012 preliminary estimates.
(Data source) companies, compiled by the authors.
Shifting primary energy mix

(Source) EDMC Energy Trend, April 2013, IEEJ
Japanese LNG buyers’ dilemma: misinterpreted both in and outside of the country

- Ordinary people in Japan tend to think that “Japan buys the most expensive LNG because it is supplied as LNG and because the utility buyers do not work hard to reduce prices.”
- Some external experts describe “Asian buyers are willing to pay higher prices for security of supply” and “Utility companies can easily pass incremental fuel costs onto customers.”
- Anti-nuclear and pro-nuclear discussions in Japan do not always recognise global implications of Japanese policy, including those on global LNG supply/demand and pricing.
Global LNG trades declines in 2012, whereas share of Asia (Japan) increases.

(Data source) GIIGNL, customs statistics, etc.
Japan’s LNG imports by source

(million tonnes)

- United States (Alaska)
- Indonesia
- Australia
- Abu Dhabi
- Oman
- Egypt
- Nigeria
- Norway
- France
- Trinidad and Tobago
- Peru
- Brunei
- Malaysia
- Russia
- Qatar
- Yemen
- Algeria
- Equatorial Guinea
- Belgium
- Spain
- Japan
- Brazil

(note) Figures are for fiscal years. *Only 2012 Figures are for the calendar year.
(Date source) Japan’s customs statistics.
Changing supply sources from 2010 to 2012

(note) Figures are for fiscal years. *Only 2012 Figures are for the calendar year. (Date source) Japan’s customs statistics.
Changing flows of LNG trade

2012 (major shifts of products from the Atlantic to the Pacific)
Changing flows of LNG trade

1997 (before major Atlantic sources began exports)
Evolving short-term procurement

- Flexibility of global LNG has responded to Japan’s nuclear crisis.

(Data sources) compiled from customs statistics and GIIGNL data
Evolving short-term procurement

Trading patterns tend to shift back from spot/short-term to term contracts.

Monthly spot cargo purchase in 2011-2012

(Data sources) compiled from ICIS Heren, Argus, Platts information
More proactive involvement by Japanese companies

<table>
<thead>
<tr>
<th></th>
<th>Tohoku</th>
<th>Tepco</th>
<th>Chubu</th>
<th>Kansai</th>
<th>Chugoku</th>
<th>Kyushu</th>
<th>Tokyo Gas</th>
<th>Osaka Gas</th>
<th>Toho Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>NWS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Darwin</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pluto</td>
<td></td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gorgon</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheatstone</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prelude</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(☐ )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ichthys</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>QCLNG</td>
<td>(☐ )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GLNG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APLNG</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrow LNG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNG LNG</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td>Cordova</td>
<td></td>
<td></td>
<td>Cordova</td>
<td>Cordova</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td></td>
<td>Cameron</td>
<td>Freeport</td>
<td>Cove Point (Freeport)</td>
<td>Cove Point</td>
<td>Freeport</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Africa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Note) ☐ = long-term purchase, ☐ = equity participation, ( ) = suspected main supply source under portfolio deals
Other Asian players are also increasingly active in supply projects

<table>
<thead>
<tr>
<th></th>
<th>Kogas</th>
<th>CNOOC</th>
<th>PetroChina</th>
<th>Sinopec</th>
<th>CPC</th>
<th>Petronet</th>
<th>Gail</th>
<th>PTT</th>
<th>Petronas</th>
</tr>
</thead>
<tbody>
<tr>
<td>NWS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Darwin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pluto</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gorgon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheatstone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prelude</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ichthys</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QCLNG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GLNG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APLNG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrow LNG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNG LNG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Africa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Note) □ = long-term purchase, □ = equity participation, ( ) = suspected main supply source under portfolio deals
• United States
  – Freeport - Osaka Gas and Chubu Electric Power
  – Cameron – Mitsubishi/Mitsui + Tepco
  – Cove Point - Sumitomo + Tokyo Gas/Kansai Electric

• Canada
  – LNG Canada
  – Inpex / JGC
  – Idemitsu
  – Japex

More LNG is looking at Japan

Final Investment decisions (FIDs) made (or expected to be made) on LNG export projects since 1999. A red circle indicates Japanese buyers’ offtake commitments before the FID.
There have already been many notable events in the LNG industry so far in 2013

1. Rate cases by electric power companies in Japan are explicitly linked with future LNG procurement costs
2. There have been limited spot LNG deliveries into Asia partly because South American markets attract more cargoes
3. Tepco, Tokyo Gas, and Kansai Electric Power plan to purchase LNG from the United States and BP reserves liquefaction capacity at Freeport LNG
4. LNG Canada is granted a federal license to export LNG
5. Chevron becomes the Kitimat LNG operator
6. Idemitsu and Japex respectively participate in LNG projects in Canada
7. LNG export projects in Mozambique continue to advance
8. Nigeria and Egypt reduce LNG production
9. A new LNG liquefaction plant starts operation in Algeria
10. Winter gas prices spike in New England and the United Kingdom
11. New LNG import terminals start operation in Singapore, Israel and India
12. Methane hydrate production test is carried out in Japan
The 10 biggest question marks in the LNG industry

1. When and how much LNG will be allowed to be exported from (how many projects in) the United States
2. How effective LNG imports from the United States will be in reducing Japan’s (and Asian) LNG prices
3. How the Panama Canal expansion will facilitate more LNG trades
4. How Australia’s LNG projects will be realised on schedule and within budget
5. How LNG supply/demand balance beyond 2015 will be relaxed or tightened
6. How much incremental LNG Japan will import
7. How many more LNG receiving terminals Japan will have
8. If Japan will have a nationwide trunk pipeline network, as well as any international pipeline
9. How far and effectively Japanese companies will be able to go into and lead LNG supply value chains
10. If Asia will have an LNG trading hub
Thank you for your attention.

LNG is expected to expand its market reach, so long as...

1. it is priced reasonably to both buyers and sellers, as well as to final consumers;
2. projects are structured beneficially to both buyers and sellers, as well as to other parties involved; and
3. diversification of supply sources (markets), supply routes and pricing terms, as well as flexibility of LNG trades, are maintained and enhanced.

Contact:
Hiroshi Hashimoto
hiroshi.hashimoto@tky.ieej.or.jp