LNG Market Outlook from an EPC Contractor Perspective

January 20, 2022
Kentaro Ogawa
General Manager, Planning & Marketing Dept.
Business Development Division
Energy Solutions
JGC Corporation
Contents

1. Current Market
   1. Current LNG market trends
   2. Current client stance on capital investment

2. Future Market Outlook
   1. Primary energy consumption forecast
   2. LNG supply and demand forecast
   3. Regional trends
   4. Trends in LNG applications
   5. Clients trends over the medium to long term
   6. JGC policies in serving the LNG market
1. Current Market
1. Current LNG market trends

**2019-2020: LNG price stagnation**
- LNG supply glut, as more new LNG terminals started operation
- Significant decline in global upstream development investment amid sluggish demand due to the pandemic

**2021: Record-high LNG spot prices**
- Widespread economic activity amid progress in pandemic containment
- In China and elsewhere in Asia, a shift from coal to LNG
- Lower stocks of supplies, due to cold waves in winter 2020
- In Europe, a shift due to lower wind power generation

Source: First meeting of the public-private council on supply and demand of electricity and gas and procurement of fuel (LNG), reference material 3-3, METI
2. Current customer stance on capital investment

Clients remain cautious about capital investment, but there are signs of recovery

Background considerations

- Lingering concerns about the resurgence of infection, from factors such as new variants
- Transitory factors are behind jumps in LNG spot prices; clients are monitoring medium- to long-term trends

Signs of recovery

- More inquiries and orders for feasibility studies and front-end engineering and design
  (such as a FEED order for an FLNG plant planned by Petronas)
2. Future Market Outlook
1. Primary energy consumption forecast

- Future increases in global demand expected, driven by economic development accompanying population growth
- Energy sources that help balance supply and demand will become more important as renewable energy (solar, wind) expands
- Natural gas (including LNG) will quickly become more valuable, as a realistic energy transition is sought

Source: IEEJ Outlook 2022, Institute of Energy Economics, Japan
2. LNG supply and demand forecast

- Increasing demand centered in the Asia-Pacific region, driven by population growth and a shift from coal to LNG
- 600–700 million tons by 2040; requires LNG capital investment (liquefaction plants, receiving terminals) to avoid regional and supply/demand imbalances
- Capital investment outside of Southeast Asia will be needed, in consideration of concerns about depletion of local gas fields

**LNG Demand Outlook by Region**

<table>
<thead>
<tr>
<th>Year</th>
<th>Asia</th>
<th>Middle East</th>
<th>Europe</th>
<th>North America</th>
<th>Central/South America</th>
<th>Africa</th>
<th>International bunker</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>100</td>
<td>500</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>2030</td>
<td>200</td>
<td>500</td>
<td>150</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>2040</td>
<td>400</td>
<td>500</td>
<td>500</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>2050</td>
<td>600</td>
<td>500</td>
<td>500</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: Prepared by JGC based on Natural Gas and LNG Data Hub 2022, JOGMEC

**Projected Global LNG Supply and Demand**

- Supply under construction
- Supply in operation
- Demand

Source: Shell LNG Outlook 2021

(Unit: million tons)
3. Regional trends

**Russia**
- Pipeline gas supply to Europe, stepped-up LNG supply to Asia
- Announcement of a long-term LNG production development plan, the first such plan focused on LNG
- Targeting production of up to 140 million tons by 2035
- Increased LNG supply potentially sought by India via arctic routes, according to joint statements with Russia

**Middle East, Africa**
- FID made for large project in Qatar
- Large gas fields in East Africa, many small and midsize fields in West Africa
- Mozambique remains strategically important

**North America**
- Increased natural gas production, mainly from shale gas
- World’s largest monthly export volume in December 2021

**Asia, Oceania**
- Higher energy demand driven by population growth
- Increased LNG imports to cover needs unmet by domestic natural gas
- Small and midsize gas field expansion sought
4. Trends in LNG applications

Increasing demand for LNG-powered vessels

- Stricter International Maritime Organization (IMO) regulations on marine sulfur oxides (SO₂) since January 2020
- Gaining momentum in moves to deploy ships converted from heavy oil to LNG; LNG viewed as a clean power source with sulfur removed in the pre-liquefaction process
- Growing needs for LNG bunkering infrastructure for fuel supply, especially in Europe but also in Singapore and Japan
- LNG is seen as satisfying some 35% of energy consumption for international shipping by 2050

Oil majors

- LNG remains a key area
- Announcements on accelerated investment in low carbon and decarbonization

Moves among oil majors

- ExxonMobil and Chevron join others in establishing the Asia Natural Gas and Energy Association (ANGEA), a private-sector organization supporting energy transition in Asia
- ExxonMobil looking at carbon-capture technology for more environmentally sound LNG business in Mozambique
- BP, Shell, and TotalEnergies join others in establishing the Oil and Gas Climate Initiative (OGCI)
Oil- and gas-producing countries, national oil companies

- Continued LNG development
- Low carbon and decarbonization also promoted

**Moves among national oil companies**

- Malaysia: Sabah Gas Master Plan announced by the Sabah state government and Petronas to promote further development of natural gas in Sabah
- Qatar also working to reduce CO₂ emissions in LNG value chains by incorporating CCS in FEED for new facilities, according to a statement by Qatar's energy minister at the 2021 LNG Producer-Consumer Conference
- CCS applications to be explored in Malaysia under a MoU between Petronas and ExxonMobil; collaboration on CCS solutions to be pursued with Shell
6. JGC policies in serving the LNG market

Basic policies

**Supporting the emerging energy transition**

- Continue taking an active stance in development of LNG plants of all sizes and FLNG plant projects
- Focus on LNG receiving, an area that is growing as consumption increases

**Contributing to low-carbon/decarbonized LNG**

- Technical support and facility orders for low-carbon and decarbonized LNG production
  - Focus on promoting carbon dioxide capture and storage (CCS); provide technical services
6. JGC policies in serving the LNG market

Contributing to low-carbon/decarbonized LNG

Extensive JGC record in CCS

<table>
<thead>
<tr>
<th>Client</th>
<th>Country</th>
<th>Plant</th>
<th>Completed</th>
<th>Highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP Exploration (In Salah) Ltd./Sonatrach</td>
<td>Algeria</td>
<td>Natural gas processing</td>
<td>2004</td>
<td>World's 2nd CCS plant at a natural gas processing site</td>
</tr>
<tr>
<td>Gorgon JV</td>
<td>Australia</td>
<td>LNG plant</td>
<td>Not disclosed</td>
<td>One of the world's largest CCS projects</td>
</tr>
<tr>
<td>Naftna Industrija Srbije (NIS)</td>
<td>Serbia</td>
<td>Natural gas processing</td>
<td>2015</td>
<td>Applies HiPACT® co-developed with BASF (licensed)</td>
</tr>
<tr>
<td>Japan CCS Co., Ltd.</td>
<td>Tomakomai, Hokkaido</td>
<td>Oil refinery (hydrogen production facility)</td>
<td>2016</td>
<td>First large-scale CCS in Japan</td>
</tr>
</tbody>
</table>

In Salah Gas, Krechba, Algeria

Export CO₂

CO₂ injection

In Salah natural gas plant

Gorgon LNG plant

Tomakomai CCS facilities
6. JGC policies in serving the LNG market

Contributing to low-carbon/decarbonized LNG

Recent CCS initiatives

Feasibility study underway for first Southeast Asia CCS demonstration project in Gundih, Indonesia

- Conducting a feasibility study with Japan NUS and Electric Power Development (J-Power) for a proposed CCS demonstration project – CO₂ separated during natural gas production at the Gundih gas field is transported by pipeline to a nearby injection well for underground storage.

- Eliminates CO₂ generation at the stage of resource development by injecting all 300,000 tons CO₂/year associated with natural gas production underground for storage.

- Contributing to GHG reduction in both countries through Joint Crediting Mechanism credits, studying future business opportunities.
Cautionary Statement

This presentation may contain forward-looking statements that reflect JGC’s plans and expectations.

Such statements are based on currently available information and current assumptions of future events which may not prove to be accurate. Such statements are also subject to various risks and uncertainties that could cause actual results to differ materially from those forward-looking statements.

JGC Holdings Corporation undertakes no obligation to update any forward-looking statements after the date of this presentation. These potential risks and uncertainties include, but are not limited to:
• changes in general economic conditions, including foreign currency exchange rates, interest rates and other factors that could affect our profitability
• changes in government regulations or tax laws in jurisdictions where we conduct business

For questions concerning this material please contact:
JGC HOLDINGS CORPORATION
Group Management Development Department
Tel: 81-45-682-1111 Fax: 81-45-682-1112
E-mail : ir@jgc.com