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LNG Market Outlook from an EPC Contractor Perspective

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1. Current Market



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1. Current LNG market trends





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)



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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



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



3. Regional trends

Russia

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- 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

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

North America

- Increased natural gas production, mainly from shale gas
 - World's largest monthly export volume in December 2021

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4. Trends in LNG applications

Increasing demand for LNG-powered vessels

- Stricter International Maritime Organization (IMO) regulations on marine sulfur oxides (SO_x) 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 preliquefaction 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



Breakdown of Energy Consumption for International Shipping

Source: MLIT website (https://www.gov-online.go.jp/eng/publicity/book/hlj/html/202103/202103_08_en.html)

5. Client trends over the medium to long term (1)

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)

5. Client trends over the medium to long term (2)

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

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



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

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•changes in government regulations or tax laws in jurisdictions where we conduct business

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