Natural Gas Liquefaction Investment Activities in 2020

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Abstract

Like in all other sectors, the year 2020 was a very tough one for investment in fossil energy resource development including LNG, in stark contrast to 2019, a historic year for LNG investment, when 6 projects amounting to 71 million tonnes per year of total liquefaction capacity reached final investment decisions (FIDs).

As natural gas demand decreased sharply in many consuming regions due to the spread of COVID-19 in early 2020, several new natural gas liquefaction facilities starting operations in 2019 caused an LNG supply glut in the market. As natural gas prices fell globally, hub prices in Europe and the United States, as well as spot LNG prices in Asia, all hit record lows. The crude oil prices also fell due to a decline in demand and a collapse of a coordinated production cut of OPEC+. WTI futures prices posted the first negative price in history.

In such an unprecedented circumstance, major companies leading the oil and gas industry had a tough year. Oil and gas sales and the companies' cashflows were so squeezed, that many planned investment decisions were postponed. However, the Energía Costa Azul LNG project reached an FID, the only LNG project to do so in 2020.

In this paper, the author examines trends in investment activities in the natural gas liquefaction sector in 2020 and reviews prospects for the future.

2020 Market Trends

Figure 1 shows the capacity of LNG production projects that reached FIDs over the past 10 years. While 71 million tonnes per annum (mtpa) of total liquefaction capacities reached FIDs in 2019, only one project reached an FID with capacity of about 3 mtpa in 2020, the lowest capacity in 10 years.

This was thought to be primarily because of the lower crude oil prices in 2020. Since many major natural gas and LNG companies are also major oil companies, and many LNG contracts use pricing formulae based on crude oil prices, the lower crude oil prices had a significant impact on natural gas and LNG. Demand for natural gas and LNG was also significantly impacted, and the market was disrupted, with record low prices around the world.

The oil majors, who were under pressure to respond to the low-price environment, announced 20%-30% reductions in investment planned for 2020. In addition, many companies announced 2020 financial results with either a significant reduction in profit or a loss. As such, the year 2020 was a very tough one.

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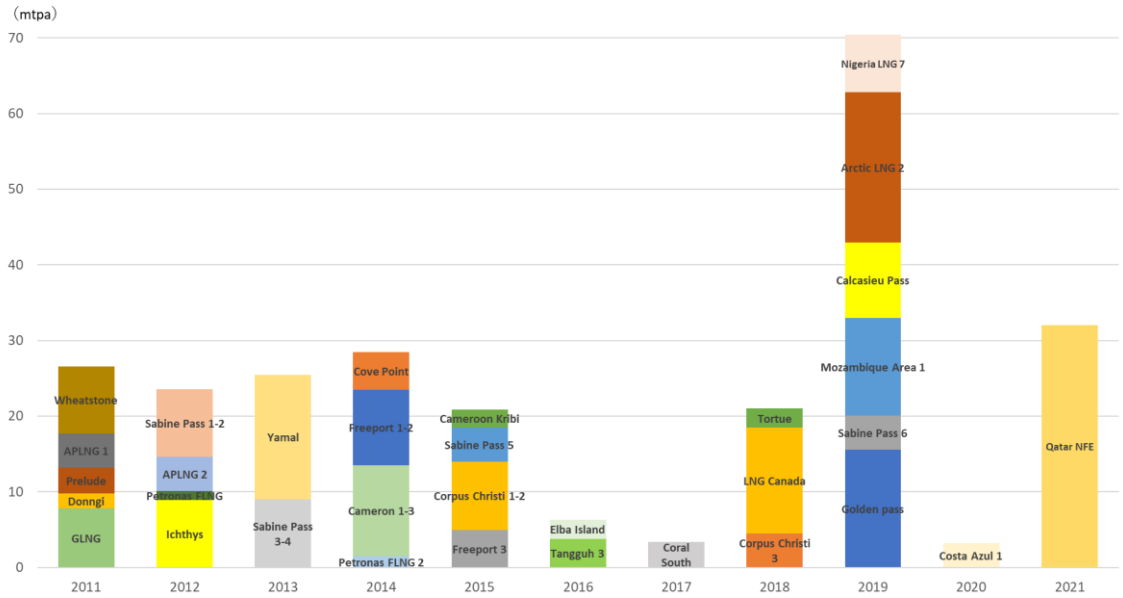


Figure 1: LNG Production Capacity FIDs by Year

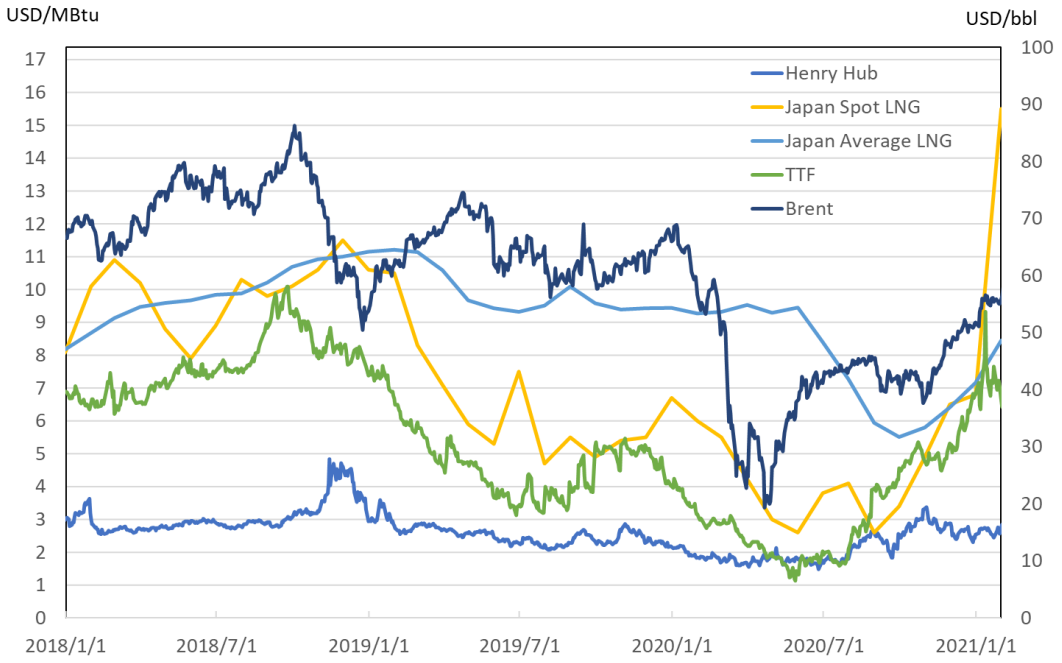


Figure 2: Selected Natural Gas Prices in the World

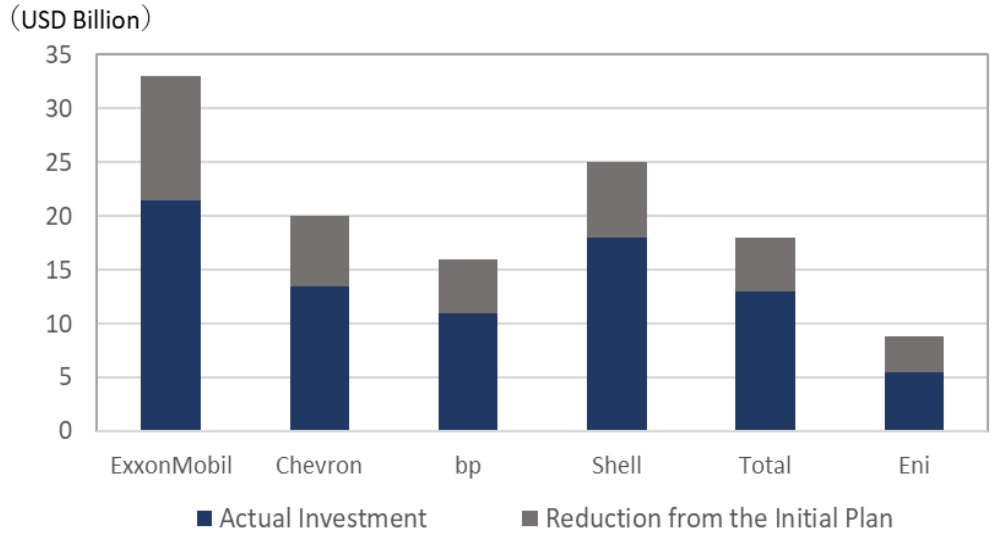


Figure 3: Planned and Actual Investment in 2020 by Company

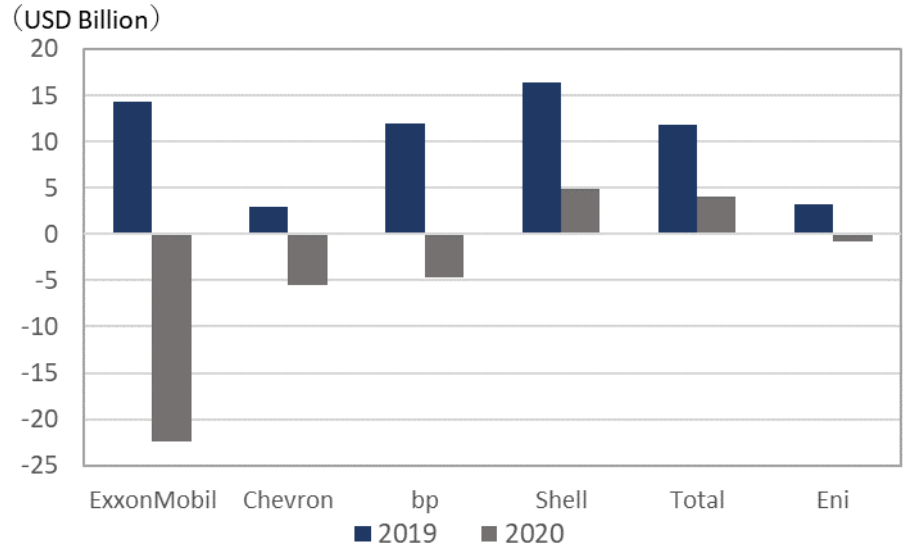


Figure 4: Profits or Losses of Each Company in 2019 and 2020

Several projects which relied on financing underpinned by long-term SPAs were stalled in 2019, because buyers hesitated to sign long-term SPAs due to anticipated oversupply in the LNG market. On the other hand, most of the projects which reached FIDs in 2019 involved major companies and portfolio players which commit themselves to LNG volumes without definitive final end-use customer destinations. While the commitment depended on the financial strength and credibility of major companies in 2019, in 2020 the COVID-19 deprived them of their financial strength, which resulted in slowing down of not only those projects based on financing underpinned by long-term SPAs, but also projects by major companies.

Table 1 shows the projects which announced delays and schedule changes of FIDs and/or production. Even some of those projects that have already made FIDs and been under construction changed their schedules affected by financial, physical or market factors.

Table 1: Projects which Announced Schedule Changes

Project	Operator	Capacity	Production	FID
United States				
Golden Pass	Qatar Petroleum, ExxonMobil	15.6	2024→2025	2019
Freeport (T4)	Freeport	5	2022→2025	2020→2021
Lake Charles	Energy Transfer	16.45	2025→	2020→
Port Arthur (T1-2)	Sempra Energy	13.5	2024→2025	2020→2021
Rio Grande	NextDecade	27	2023→2024	2020→2021
Magnolia LNG	LNG Limited	8	2022→	2020→
Driftwood LNG	Tellurian	27.6	2023→2024	2020→2021
Texas LNG Brownsville	Texas Brownsville LNG	2	2023→2025	2020→2021
Jordan Cove	Pembina Pipeline	7.8	2024→	2020→
Gulf LNG Pascagoula	Kinder Morgan	11.5	2024→	2020→
Port Arthur (T3-4)	Sempra Energy	13.5	-	2021→
Plaquemines LNG	Venture Global LNG	20	2023→2024	2020→2021
Corpus Christi Stage 3	Cheniere	10	2023→2024	2020→2021
Mexico				
Energía Costa Azul LNG	Sempra Energy	2.4	2024	2020 Q1→Q4
Canada				
Kitimat	Chevron,Woodside	18	2029→	2022→
Woodfibre LNG	Woodfibre Natural Gas	2.1	→2025	2020→2021
Goldboro	Pieridae Energy Canada	10	2025→2026	2020→2021
Qatar				
North Field East	Qatar Petroleum	32	2024→2025	2020→2021
Australia				
Pluto (T2)	Woodside	5	2025→2026	2020→2021
Mozambique				
Rovuma LNG	ExxonMobil	15.2	2024→	2020→2021
Mauritania・Senegal				
Tortue FLNG	bp	2.5	2022→2023	2018
Indonesia				
Tangguh LNG (T3)	bp	2.5	2021→2022	2016

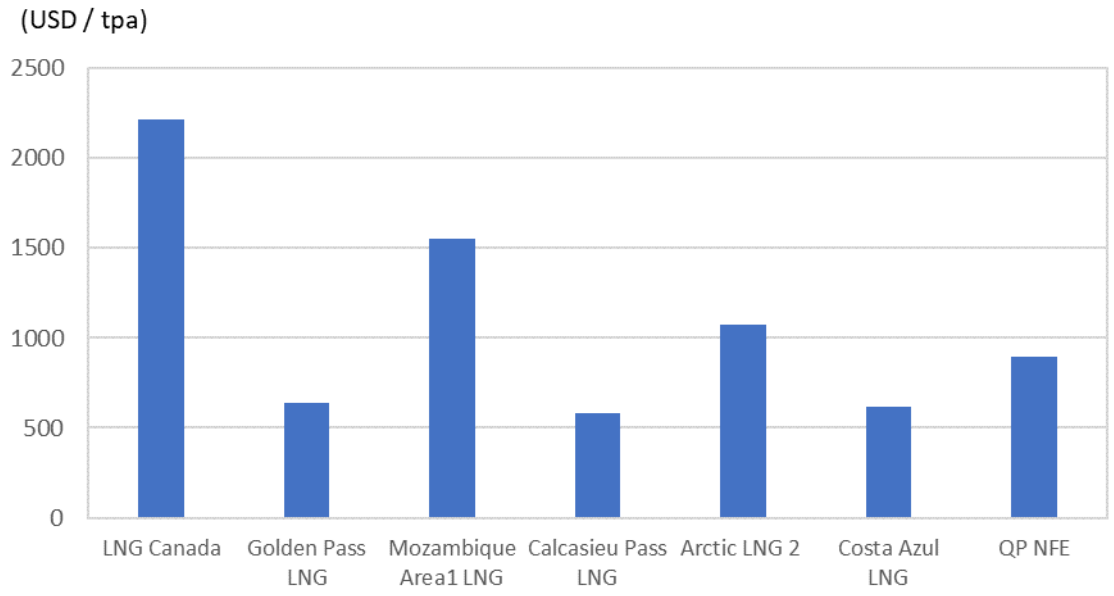
* Green-shaded are those after investment decisions

Only One 2020 Project FID

In such a harsh market environment, the Energía Costa Azul (ECA) LNG Phase 1 project was the only large-scale LNG production project that reached an FID in 2020. The FID was carried out in October 2020. ECA LNG is promoted by Sempra Energy in the United States with IEnova

(Infraestructura Energética Nova, S.A.B. de C.V.), Sempra's affiliate in Mexico. They are going to build a liquefaction facility at the site of an existing LNG receiving terminal located in the northern part of Ensenada, Baha California, Pacific Coast of Mexico. The project will import competitive natural gas from the United States by pipeline and use it as feed gas. As the first step of the ECA LNG, the Phase 1 project will develop Train 1 with production capacity of 3.25 mtpa. Production is expected to begin in the second half of 2024.

There have been several favourable factors for the project. As the ECA LNG is a brownfield project that will add liquefaction facilities at the site of an existing LNG receiving terminal, existing facilities such as LNG tanks can be utilized and the initial investment cost is relatively low. Its location on the Pacific Coast is closer to the Asian markets with no need to transit the Panama Canal than the projects on the United States' Gulf Coast. In that sense, ECA LNG may look attractive for Asian buyers. Total and Mitsui have signed 20-year SPAs for 1.7 mtpa and 0.8 mtpa from the project, respectively.



Note: Calculation is based on announced investment costs by companies and scopes covered by the costs may be different by project.

Figure 5: Recent FID Project Investment per Annual Liquefaction Capacity

Sempra Energy is thought to have other advantages. The energy infrastructure company, which also has energy transmission and distribution businesses in the United States, has also been significantly impacted by the decline in overall energy demand. However, in the LNG business, as Sempra Energy offers liquefaction tolling services based on capacity at the Cameron LNG project, actually processed LNG volumes do not necessarily affect the company's revenue.

The only major obstacle was the permission process in Mexico. The process took more time than initially expected because ECA was Mexico's first LNG export project, and the process was also affected by the pandemic. The FID was previously planned for the first half of 2020.

Two other natural gas development projects without expanding liquefaction capacity advanced in 2020. Shell Australia made an FID in the first phase of the Surat Gas project with the Arrow Energy joint venture in Queensland in May 2020. The project will produce up to 90 billion cubic feet (1.87 million tonnes) of gas annually and is used for sales to local customers and export through the Curtis Island liquefaction facilities.

In December 2020, the North West Shelf (NWS) project participants announced that they had signed two tolling contracts to process third-party gas from Woodside's Pluto gas field and Mitsui and Beach Energy's Waitsia Gas Project Stage 2. From the Pluto field Woodside will send gas to NWS to produce a total of 3 million tonnes of LNG and process 24.7 petajoules of gas for the domestic market between 2022 to 2025. The Waitsia project will send gas to NWS to produce a total of 7.5 million tonnes of LNG between 2023 to 2028.

2021 and Future Prospects

Although they are sporadic, signs of economic recovery have been observed. The Brent crude oil price exceeded USD 60 per barrel in February 2021. Natural gas hub prices and LNG spot prices are also higher than those of one year earlier. The apparently improved market conditions could increase companies' cashflows and encourage new investment. Although natural gas demand in the world in 2020 is estimated to have decreased by -2.5% year-on-year, LNG trade volumes increased again in 2020. LNG demand, mainly in developing countries in Asia, is still expected to increase.

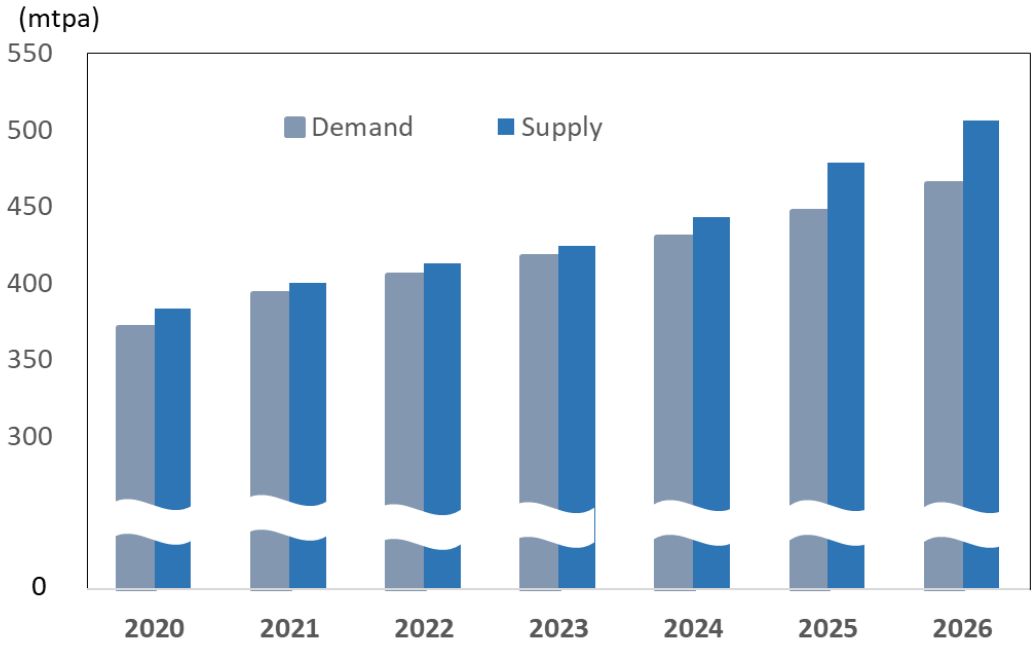


Figure 6: LNG Supply and Demand Forecast for the Next 5 Years

In February 2021, Qatar Petroleum (QP) announced an FID for the North Field East (NFE) project, and an EPC contract with a consortium including Chiyoda Corporation. The NFE project will raise Qatar's LNG production capacity from 77 mtpa to 110 mtpa. In addition to LNG, the project will produce condensate, LPG, ethane, sulphur and helium. Production of LNG is expected to begin in the fourth quarter of 2025. In the project, a CO_2 capture and sequestration (CCS) system will be also installed and electric power will be provided from solar power generation projects under development. These will represent significant initiatives to reduce GHG emissions. In addition to the further North Field South (NFS) expansion project, even further expansions are also considered by QP.

Many other projects may also have chances. In the United States, Tellurian has said that its Driftwood LNG will reach an FID in summer 2021. The company claims that Driftwood LNG offers contracts with low price volatility and gives a choice to buyers looking for diversified pricing or stable prices. The Plaquemines LNG project, promoted by Venture Global LNG, is also a strong candidate, which will utilize the same module designs as the Calcasieu Pass LNG project currently under construction. KBR has been selected as Plaquemines' EPC contractor. Although Plaquemines is a greenfield project, the expected low development cost has attracted buyers mainly from Europe.

In Canada, the Woodfibre LNG and the Goldboro LNG projects are scheduled to reach FIDs in 2021. Both the projects have already had enough LNG SPAs for their expected outputs.

In Australia, the Scarborough gas field development (Pluto Train 2) project promoted by Woodside has secured customers and is apparently ready to advance. Woodside has expanded sales volumes under the SPA with Uniper from 1 mtpa to 2 mtpa. Woodside has also signed an SPA with

RWE for 0.84 mtpa. The Barossa gas field development, as backfill for the Darwin LNG plant led by Santos, is also expected to advance.

Challenges

While the LNG market balance may be tight around 2023 due to steady increases in demand, the balance after 2025-2026 is likely to ease due to expected incremental LNG supply from those projects which reached FIDs in 2019 - 2020, as well as the Qatari expansion. The expected looser market balance will push down prices, stagnate the return on investment necessary for liquefaction facility operators, and hinder the progress of projects currently planned. However, demand is expected to continue to increase firmly, requiring further incremental LNG supply capacity again around 2030. Additional LNG production projects will need to advance toward the latter half of the 2020s. It is necessary to reduce costs of upstream, liquefaction and transportation segments, and to foster a flexible LNG market to maintain stable prices.

Natural gas and LNG markets are expected to continue expanding. At the same time, however, the methane emissions in the LNG supply chain are attracting attention recently. In October 2020, the European Commission published its Methane Strategy, warning against methane emissions in the fossil fuel supply chain. If there is a large amount of methane emissions in the natural gas supply chain, the status of natural gas as the cleanest fossil fuel could be challenged. In a possible response to such a policy, a European company might have stopped discussions over an LNG purchase deal with an LNG project in the United States.

As European authorities are likely to require accurate measurement, report, verification of methane emissions in the supply chain, natural gas supply chain operators may be forced to meet the requirement in both existing and new facilities. In the United States, where LNG export facilities have expanded significantly in recent years, natural gas production and LNG facilities are not directly linked making verification complicated. However, the new administration could overcome these challenges by improving environmental regulations.

Outside of Europe, Singapore's Pavilion Energy carried out a tender for LNG purchase contracts requiring a statement of GHG emissions for each cargo measured from the wellhead to the discharge port. QP in November 2020 and Chevron in February 2021 signed contracts with Pavilion Energy, respectively, that are in line with the requirement. The two companies will work to develop methodologies for quantifying and reporting GHG emissions on the LNG supply chain with Pavilion Energy.

Consumers' increasing awareness has led to suppliers' initiatives toward decarbonization of LNG export facilities in various regions. The QP’s expansion project mentioned earlier is planned with CCS and renewable energy utilization. Cheniere Energy plans to provide "Cargo Emissions Tags (CE

Tags)", quantifying the estimated GHG emissions of LNG cargoes from the wellhead to the cargo delivery point, to customers beginning in 2022. In Canada, many LNG production projects are planning to use abundant hydroelectric power, rather than onsite gas turbines, to supply electricity used in liquefaction facilities. In Australia, one of the world's largest CCS projects has been already running at the Gorgon LNG project. Russia's NOVATEK has announced that it will launch a hydrogen-based emission reduction program at its LNG facilities in collaboration with engineering firm Baker Hughes.

These days people often see the word “Role of Gas”. While many countries and regions have set a goal of carbon neutrality by 2050, the role of “low-carbon” natural gas in the transition toward decarbonization is a hot topic. Although natural gas is still needed to contribute to economic development in emerging countries and development in the heavy industry and transportation sectors as high-density energy sources, so long as it is not free from carbon emissions, measures to make it carbon neutral by 2050 are essential. That also means the closer natural gas moves to low-carbon and decarbonization, the longer and the more important the Role of Gas will be. Therefore, further efforts for low-carbon and decarbonization in the supply chain, including liquefaction facilities, will be a point of focus in the future.

Reference

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