

LNG Review March 2019
- Recent issues and events -
Hiroshi Hashimoto*

Introduction

According to preliminary information (figures from customs offices), LNG imports of the four LNG importing markets in Northeast Asia in the first quarter of 2019 decreased by 5% (or 2.5 million tonnes) year-on-year. While China imported more LNG than it did one year earlier, the other three markets imported less. Japan's LNG imports in the period decreased by 9.4% year-on-year to 22.19 million tonnes. Japan's LNG imports in the fiscal year from April 2018 to March 2019 was the lowest since the fiscal year 2010 (to March 2011) at 80.55 million tonnes, decreasing by 4% from one year earlier.

During the first week of April 2019, the LNG 2019 Conference and Exhibition, one of the largest LNG events in the year, was held in Shanghai, China. Although no final investment decision on an LNG production project was announced during the period, there were ten announcements of LNG sales deals during the first nine days of April.

Except for a four-year, 450 thousand tonne per year medium-term contract from Papua New Guinea's PNG LNG into China, the other nine deals will take care of long-term sales amounting to 9.9 million tonnes, including two SPAs (sale and purchase contracts) and seven HOAs (heads of agreement). 1.7 million tonnes each is destined to Japan and China respectively and 1 million tonnes is assigned to the Iberian Peninsula, with remaining 5.5 million tonnes committed by portfolio LNG buyers who have not specified final destinations of those LNG volumes.

Also in early April 2019, Chevron entered into an agreement with Anadarko to acquire all of the outstanding shares of Anadarko. Chevron claims that it will gain a world-class resource base in Mozambique.

[Asia Pacific]

The 8th LNG Producer-Consumer Conference will be held on Thursday 26 September 2019 in Tokyo, Japan, jointly hosted by the Ministry of Economy, Trade and

* The writer belongs to Gas Group, Fossil Fuels and International Cooperation Unit. Some information pieces that some readers may consider very important may not be included due to different reasons.

Industry (METI) the Asia Pacific Energy Research Centre (APEREC).

IHS Markit's Oil Price Information Service (OPIS) signed a strategic agreement for an LNG-trading solution with GLX, an online LNG-trading platform.

According to Japan's customs statistics, the country's LNG import decreased by 9.4% year-on-year in the first quarter of 2019 to 22.19 million tonnes, the lowest first quarter tally since 2011. The average unit price in Dollar fell in February 2019, for the first time since October 2017.

In early April 2019, JERA and EDF Trading (EDFT) announced the completion of the transaction to merge their LNG optimisation and trading activities into JERA Global Markets (JERAGM). JERA announced its newly-formulated business plan after integration of the existing thermal power generation businesses of its shareholders.

Tokyo Gas signed a heads of agreement (HOA) with Shell Eastern Trading for supply of LNG. A pricing formula based on coal indexation is included. An annual volume of 0.5 million tonnes will be delivered ex-ship from April 2020 for ten years.

JFE Engineering was awarded construction of the Niihama LNG Terminal planned by Tokyo Gas Engineering Solutions and four partners at the site of Sumitomo Chemical's Ahime Plant, operational by February 2022.

Sumitomo Corporation, Yokohama-Kawasaki International Port Corporation (YKIP), and Uyeno Transtech ordered an LNG Bunkering Vessel from Japan Marine United Corporation via Ecobunker Shipping Company, a joint venture established by the trio. JXTG Energy and Tepco FP agreed to set up a hydrogen fuelling station at the site of the latter's Ooi thermal power station, where city-gas supply will be processed into hydrogen.

Woodside has invested in the Hydrogen Energy Network (HyNet) consortium that plans to build and operate 100 hydrogen refuelling stations in Korea. The 13-party special purpose consortium is led by Korea Gas Corporation (KOGAS) and Hyundai Motor Company.

Philippines' Department of Energy approved First Gen's and Tokyo Gas' LNG import terminal project in Batangas, the Philippines. In the country the Tanglawan Philippine LNG is developed by Phoenix Petroleum Philippines, China National Offshore Oil Corporation (CNOOC) and Philippine National Oil Company (PNOC).

China imported 17.36 million tonnes of natural gas during the first two months of 2019, increasing by 18.5% year on year, according to the customs statistics. 10.92 million tonnes of LNG, or 19.7% more than a year ago, was imported in the two months. According to preliminary figures for March from the same statistics, China imported 6.938 million tonnes of natural gas in the month, compared to 5.96 million tonnes a year ago. During the first three months, the country imported 24.269 million tonnes of natural gas, increasing by 17.8% from 20.594 million tonnes a year ago.

The National Development and Reform Commission (NDRC) said China will create a national oil and gas pipeline company in its annual work report published at the opening of the annual meeting of parliament.

In early April 2019, Total and Guanghui signed a long-term Sale and Purchase Agreement (SPA) for the supply of 0.7 million tonnes per year of LNG for a period of 10 years. The gas will be delivered to Guanghui's regasification terminal in Qidong, Jiangsu Province, from Total's global LNG portfolio.

Pakistan LNG announced Gunvor and DXT Commodities as winners of three cargoes each in a tender. Pakistan LNG said it had received 25 bids.

The high cost of gas poses an imminent threat to east coast manufacturers, increasing the likelihood they will wind up or relocate their operations, the Australian competition regulator ACCC said. ACCC called on gas suppliers to consider how they could avoid driving manufacturers and other domestic gas users out of the market.

Chevron commenced domestic gas deliveries from the Wheatstone facility with capacity to supply 200 terajoules of natural gas per day (Tj/d) (1.34 million tonnes per year). At full capacity, the Gorgon and Wheatstone natural gas facilities will be able to produce 500 terajoules per day (3.35 million tonnes per year) for the WA market.

Woodside has invested in two online LNG platforms. GLX was launched in 2016 and its LNG trading platform became operational the following year. Woodside became a foundation member of GLX in July 2017. Gastrayda is a start-up that is preparing for commercial launch. Woodside has provided technical know-how and support to Gastrayda and becomes a warrant holder.

In early April 2019, Woodside signed a Heads of Agreement (HOA) with ENN Group for the sale of 1 million tonnes per year of LNG from Woodside's portfolio for a period of 10 years, commencing in 2025. The HOA remains conditional upon the negotiation and execution of a fully termed Sales and Purchase Agreement and obtaining all necessary approvals and a Final Investment Decision (FID) on Scarborough.

The Western Australian Environmental Protection Authority (EPA) withdrew the revised assessment guidelines on greenhouse gas emissions, until further consultations with industry and stakeholders are more fully complete.

In the middle of April 2019, ConocoPhillips and Shell Australia completed the previously announced transactions to sell their respective 30% and 26.56% stakes in the Greater Sunrise fields to Timor-Leste.

Malaysia's Petronas' floating LNG vessel PFLNG Satu stopped producing LNG in preparation for relocation. Petronas signed a binding Heads of Agreement (HoA) with Vietnam's PetroVietnam for additional gas supply from Malaysia's Block PM3 CAA to

Vietnam's Ca Mau Province.

PT Perusahaan Gas Negara (PGN) is building a small-scale LNG terminal with an initial regasification capacity of 30 BBTu per day (0.2 million tonnes per year) in the East Java province, expected to be operational by the last quarter of 2019.

In early April 2019, Papua New Guinea's PNG LNG Project entered into a mid-term LNG sale and purchase agreement (SPA) with Unipecc Singapore, a subsidiary of Sinopec, for 0.45 million tonnes per year over a four-year period, starting in April 2019.

In early April 2019, Total, ExxonMobil and Oil Search signed the Gas Agreement with the government of Papua New Guinea defining the fiscal framework for the Papua LNG Project. The project will consist of two LNG trains of 2.7 million tonnes per year capacity each. Total operates the Elk and Antelope onshore fields and is the largest shareholder of the PRL-15 permit with a 31.1% interest, alongside ExxonMobil (28.3%) and Oil Search (17.7%), post the State back-in right of 22.5%.

[North America]

Based on data from the Energy Information Administration (EIA), primary energy consumption in the United States reached a record high of 101.3 quadrillion British thermal units (Btu) in 2018, up 4% from 2017 and 0.3% above the previous record set in 2007. Rising by 10% from 2017, natural gas consumption reached a record high 83.1 billion cubic feet/day (Bcf/d), or 31 quadrillion Btu, in 2018. Natural gas consumption in the power sector increased 15% from 2017 levels to 29.1 bcf/d. Renewable energy consumption reached a record high 11.5 quadrillion Btu in 2018, rising 3% from 2017.

Based on data from DOE, the United States exported more than 2.6 million tonnes of LNG in January 2019, the most ever and increasing by 75% from one year earlier.

Working natural gas in storage in the Lower 48 states as of the end of March 2019, the traditional end of the heating season (November - March), totaled 1,137 billion cubic feet (Bcf) (24 million tonnes) according to EIA's Weekly Natural Gas Storage Report. The stocks were 491 Bcf (30%) lower than the five-year (2014-18) average and at the lowest level for working natural gas stocks since 2014 of 837 Bcf.

During winter 2018-19, LNG played an important role in moderating natural gas prices in New England. In addition to nine LNG cargoes received by the Everett LNG terminal in Massachusetts from December through February, Northeast Gateway Deepwater Port offshore from Boston also received two cargoes in January. The Canaport LNG terminal in New Brunswick, Canada, also contributed to meeting demand in New England.

Cheniere Energy and Bechtel announced that Substantial Completion of Train 1 of the Corpus Christi liquefaction project was achieved in February 2019. Under sale and

purchase agreements (SPAs) with Endesa and Pertamina, the date of first commercial delivery is expected to occur in June 2019. Additionally, bridging volumes are expected to begin in June 2019 under an SPA with Iberdrola. Cheniere also announced Substantial Completion of Train 5 of the Sabine Pass liquefaction project in Cameron Parish, Louisiana. Under sale and purchase agreements (SPAs) with Centrica and Total, the date of first commercial delivery is expected in August 2019.

The Federal Energy Regulatory Commission (FERC) approved introducing feed gas, as well as other commissioning activities, at Train 1 of Sempra Energy's Cameron LNG facility in Louisiana. In the middle of April, the company announced that Cameron LNG has begun pipeline feed gas flow to the first train. FERC approved Freeport LNG's request to introduce hazardous fluids to commission the liquefaction flare pilot system. The first train is expected to enter commercial service in the third quarter of 2019.

In early April 2019, Toshiba was informed by China's ENN Ecological Holdings Co., Ltd. (ENN) that ENN intends to terminate the purchase and sales agreement for the transfer to ENN of all outstanding shares of Toshiba America LNG Corporation. On 1 April 2019, Toshiba disclosed that the transfer was not completed before the end of March 2019, but that it expected to complete the Transfer in April 2019 or shortly thereafter.

Energy Transfer and Shell signed a Project Framework Agreement (PFA) to further develop a large-scale LNG export facility in Lake Charles, Louisiana. Shell will act as the Project Lead and Energy Transfer will act as Site Manager and Project Coordinator. The project is a 50/50 venture between Energy Transfer and Shell. The project would convert Energy Transfer's existing Lake Charles LNG import terminal to an LNG export facility with a liquefaction capacity of 16.45 million tonnes per year. The project is fully permitted.

FERC (Federal Energy Regulatory Commission) has issued a notice to proceed permitting Golden Pass Products and Golden Pass Pipeline to begin initial site preparation related to their proposed liquefaction and LNG export facility in Texas.

In early April 2019, Tellurian and Total signed a Heads of Agreement (HOA) for Total to make a USD 500 million equity investment in the integrated Driftwood project and to purchase 1 million tonnes per year of LNG from Driftwood. The HOA also specifies that Tellurian and Total will enter into a sales and purchase agreement (SPA) for a further 1.5 million tonnes per year of LNG from Tellurian Marketing's LNG offtake volumes from Driftwood. The SPA will be for the purchase of LNG free on board (FOB) for a minimum term of 15 years, at a price based on the Platts Japan Korea Marker (JKM).

In early April 2019, NextDecade signed a 20-year sales and purchase agreement (SPA) with Shell for the supply of 2 million tonnes per year of LNG from the Rio Grande LNG project with full destination flexibility with three-quarters of volumes indexed to Brent oil

prices. Shell will buy LNG on a free-on-board (FOB) basis starting from commercial operation of the project expected in 2023.

The DOE Office of Fossil Energy issued the authorization for Venture Global Calcasieu Pass LNG to export domestically produced LNG to non-free trade agreement (FTA) countries. Calcasieu Pass is authorized to export up to 620 billion cubic feet (Bcf) (12.9 million tonnes) per year for a period of 25 years. This order follows the recent FERC Order Granting Authorizations to site, construct and operate the project. Buyers include Shell, BP, Edison, Galp, Repsol, and PGNiG. The 10 million tonnes per year nameplate facility will employ a comprehensive process solution from Baker Hughes, a GE company (BHGE) that utilizes mid-scale, modular, factory-fabricated liquefaction trains. Venture Global has executed an integrated turnkey EPC contract with Kiewit to design, engineer, construct, commission, test and guarantee the facility. Venture Global is also developing the 20 million tonnes per year nameplate Plaquemines LNG export facility and associated Gator Express Pipeline in Plaquemines Parish, Louisiana. Plaquemines LNG has executed a binding 20-year SPA with PGNiG. FERC has issued a notice authorizing Venture Global Calcasieu Pass to commence full site preparation activities, with certain exceptions, for the proposed Calcasieu Pass Project along the Calcasieu Ship Channel in Cameron Parish, Louisiana.

FERC released the final environmental impact statement (EIS) for Texas LNG Brownsville's proposed Texas LNG plant on the Brownsville Ship Channel in Cameron County, Texas. The EIS concludes that "approval of the Texas LNG Project would result in adverse environmental impacts. However, with the mitigation measures recommended in the EIS, impacts in the project area would be avoided or minimized and would not be significant, with the exception of visual resources when viewed from the Laguna Atascosa National Wildlife Refuge. In addition, the Texas LNG Project, combined with other projects in the geographic scope, including the Rio Grande LNG and Annova LNG Projects, would result in significant cumulative impacts. Construction and operation of the Texas LNG Project would result in mostly temporary or short-term environmental impacts; however, some long-term and permanent environmental impacts would occur."

The FERC Staff released a draft environmental impact statement (EIS) for the Jordan Cove LNG Project and the interconnected Pacific Connector Gas Pipeline Project. Jordan Cove requests authorization to liquefy up to 1.04 Bcf per day of natural gas at a proposed terminal in Coos Bay, Oregon, for export. In the draft EIS, FERC Staff "concludes that approval of the Project would result in a number of significant environmental impacts; however, the majority of impacts would be less than significant because of the impact avoidance, minimization, and mitigation measures proposed by Jordan Cove and Pacific Connector and those recommended by staff in the draft EIS."

Southern California Gas (SoCalGas) filed a request with the California Public Utilities Commission (CPUC) seeking to offer renewable natural gas produced from waste and agriculture to its customers in Central and Southern California. Under the proposed program, millions of Californians would have the option to purchase a portion of their natural gas from renewable sources, just as many today can opt to purchase renewable electricity.

The Alaska Gasline Development Corporation (AGDC) signed an agreement with BP and ExxonMobil to collaborate on ways to advance the Alaska LNG project.

In early April 2019, JERA entered into a Heads of Agreement (HOA) with Diamond Gas International for the sale and purchase of LNG from LNG Canada. The contract is for the purchase of up to 16 cargoes of LNG a year on a delivered ex-ship condition for approximately 15 years beginning in fiscal 2024. The destination clause in this HOA is in line with the Survey on LNG Trades report released by the Japan Fair Trade Commission in June 2017.

Chevron and Woodside applied for a new license from Canada's National Energy Board (NEB) for their Kitimat LNG plant in northern British Columbia with capacity nearly doubling to 18 million tonnes per year from up to three LNG trains, instead of two.

New Fortress Energy's subsidiary NFEnergía entered into a contract with the Puerto Rico Electric Power Authority (PREPA) for the supply of natural gas and conversion of Units 5 and 6 of the San Juan Combined Cycle Power Plant. The initial term of the contract is five years, with options for PREPA to extend for three additional five-year periods.

Sempra Energy subsidiary Energía Costa Azul (ECA) LNG received two authorizations from the DOE to export natural gas to Mexico and to re-export LNG to countries that do not have a free-trade agreement (non-FTA) with the United States, from its Phases 1 and 2 facilities in Baja California, Mexico. Phase 1 development is a single train LNG facility to be located adjacent to the existing LNG receiving terminal. Phase 2 will include the addition of two trains and one LNG storage tank. The DOE authorizations allow the export of 636 billion cubic feet (Bcf) a year. Phase 2 of the project will require additional DOE approval in order to export its full expected capacity. In November 2018, Sempra subsidiaries IEnova and Sempra LNG announced Heads of Agreements (HOAs) with Total, Mitsui & Co. and Tokyo Gas for Phase 1. TechnipFMC and Kiewit were selected as the engineering, procurement, construction and commissioning (EPC) contractors.

[Middle East]

Qatar Petroleum (QP) issued the Invitation to Tender Package for Engineering Procurement and Construction (EPC) of the four LNG mega-trains of its North Field Expansion (NFE) project. The package has been issued to three EPC Joint Ventures: Chiyoda Corporation and Technip France; JGC Corporation and Hyundai Engineering and

Construction; and Saipem, McDermott Middle East and CTCI Corporation. The tender calls for the EPC of the four mega-LNG trains with gas and liquid treating facilities, ethane and LPG production and fractionation, a Helium plant, and utilities and infrastructure to support the processing units. The package issue follows the recent contract award for the fabrication and installation of eight NFE offshore jackets to McDermott Middle East, and the contract award for early site works for the onshore project to the joint venture between Consolidated Contractors Company (CCC) and Teyseer Trading and Contracting Company.

[Africa]

Qatar Petroleum (QP) entered into an agreement with Eni to acquire a 30% interest in the Tarfaya Shallow Exploration Permit, a series of 12 neighbouring offshore blocks along the Atlantic coast of Morocco. The partners in the Permit will be Eni 45%, QP 30%, and Office National des Hydrocarbures et des Mines (ONHYM) 25%.

Noble Energy approved the Alen natural gas development offshore Equatorial Guinea. Natural gas from the Alen field will be processed through the existing Alba Plant LLC liquefied petroleum gas processing plant (Alba Plant) and EG LNG production facility located at Punta Europa, Bioko Island. Noble Energy and partners will maintain ownership of the hydrocarbons through the processing facilities, and the Company will be progressing negotiations for offtake agreements to sell the LNG in global markets.

QP entered into an agreement with Eni to acquire a 25.5% participating interest in block A5A, located in the Angoche basin, offshore Mozambique. Subject to regulatory approvals, the partners interest in the block will be Eni (Operator) with 34%, Empresa Nacional de Hidrocarbonetos (ENH) with 15%, Sasol with 25.5%, and QP with 25.5%. Block A5A is located adjacent to block A5B for which QP entered into an agreement in December 2018 with ExxonMobil to acquire a 10% participating interest.

In the middle of April 2019, Chevron entered into an agreement with Anadarko to acquire all of the outstanding shares of Anadarko. The companies claim that Chevron will gain a world-class resource base in Mozambique.

[Europe / Russia]

The Gate LNG terminal in Rotterdam, the Netherlands, with current send-out capacity of 12 billion cubic meters per year, is considering increasing capacity by up to 2 bcm by installing additional send-out equipment from September 2021. Gate is inviting parties to indicate their interest through an open season. During the open season, parties can book the additional capacity as well as the currently available capacity of 1 bcm of the existing terminal for the period from September 2021 to August 2031.

According to Gazprom, in the period from 1 January to 15 March 2019, Gazprom produced an estimated 112.8 billion cubic meters of gas, an increase of 2.6% (+2.9 billion cubic meters) against the same period of 2018. In the same period, the company delivered to Europe 40.8 bcm, 8.2% less than the same period in 2018.

Gazprom and RusGazDobycha made a decision on the final configuration of the Baltic LNG project that will process ethane-containing gas and produce LNG near the settlement of Ust-Luga, Leningrad Region. The project would process 45 billion cubic meters of gas from the Achimov and Valanginian deposits of the Nadym-Pur-Taz region and produce 13 million tonnes of LNG, up to 4 million tonnes of ethane and over 2.2 million tonnes of LPG per year. About 20 billion cubic meters will go into Gazprom's gas transmission system. The first and second trains are expected to be operational in the second half of 2023 and in late 2024, respectively. The project operator is RusKhimAlyans, a special-purpose company established on a parity basis by Gazprom and RusGazDobycha.

In early April 2019, Shell Russia said that following Gazprom's announcement regarding the final development concept, Shell decided to stop its involvement in the Baltic LNG project. In late 2018, the two companies signed a framework agreement on the technical concept of the project. In March of 2019, Gazprom changed the concept of the project, which provides for the full integration of the Baltic LNG and the gas processing plant. The RusGasDobycha company was announced as the only partner of Gazprom in the project. The project will be located in the area of Ust-Luga seaport on the Baltic Sea.

NOVATEK and TOTAL signed a Sales and Purchase Agreement in relation to the sale of a 10% participation interest in the Arctic LNG 2 project. Front-end engineering and design (FEED) work was completed in October 2018 confirming the preliminary cost estimates between USD 20 billion and USD 21 billion. Additional exploration drilling confirmed significant reserve growth at the Project's Utrenneye field.

In early April 2019, Novatek signed a non-binding Heads of Agreement (HOA) for the supply of LNG with Repsol. Novatek and Vitol announced signing of Heads of Agreement (HOA) for the supply of LNG.

[South America]

In early April 2019, an ENGIE's consortium with la Caisse de dépôt et placement du Québec (CDPQ) won the bidding process conducted by Petrobras for the sale of a 90% shareholding in Transportadora Associada de Gás S.A. (TAG) with a final and binding offer amounting to USD 8.6 billion. TAG is the largest natural gas transmission network owner in Brazil. TAG's assets include 4,500 km of gas pipelines, representing 47% of the country's entire gas infrastructure. Petrobras will maintain a 10% equity stake in TAG.

[Global issues]

According to the IEA (International Energy Agency, while energy demand worldwide grew by 2.3% in 2018, natural gas emerged as the fuel of choice, posting the biggest gains and accounting for 45% of the rise in energy consumption. Solar and wind generation grew at double-digit pace, with solar alone increasing by 31%. Still, that was not fast enough to meet higher electricity demand around the world that also drove up coal use.

"The second wave of the US shale revolution is coming," the IEA's Executive Director said. "It will see the United States account for 70% of the rise in global oil production and some 75% of the expansion in LNG trade over the next five years. This will shake up international oil and gas trade flows, with profound implications for the geopolitics of energy."

Contact: report@tky.ieej.or.jp