

LNG Review July 2018 - Recent issues and events - Hiroshi Hashimoto*

Introduction

Northeast Asia's LNG prices - including both contract prices and spot prices - have been higher so far in 2018 compared to those one year earlier, due to higher global oil prices, higher demand for gas in some markets, and slower-than-anticipated start-ups of new LNG production projects. Spot LNG prices, in particular, were in July the highest in four years.

China continues increasing natural gas consumption and imports. During the first half of 2018, the country consumed 17.5% more gas than it did in the same period in 2017.

Thanks to brighter prospects of the global gas market, there have been progresses of LNG production projects in recent months.

This paper looks at some of major developments in the global LNG industry in July 2018.

[Asia Pacific]

PETRONAS through its subsidiary, Malaysia LNG (MLNG), delivered its first LNG cargo to Japan's Hokkaido Electric Power at the beginning of August 2018. The delivery marks the beginning of MLNG's supply to Hokkaido Electric via a 10-year Sale and Purchase Agreement (SPA).

JERA and EDF Trading (EDFT) signed binding agreements to form an LNG optimisation and trading joint venture JERA Trading Pte. Ltd. (JERAT). JERA holds 66.67% and EDFT holds 33.33% of JERAT. EDF Trading North America will be responsible for supplying electricity and natural gas to meet JERA's capacity requirements at the Freeport LNG project. EDFT will become the exclusive market interface for JERAT with respect to the European natural gas markets. The transaction is expected to be completed by early 2019.

Central LNG Shipping Japan Corporation (CLS), a joint venture between K-Line, Chubu Electric Power, Toyota Tsusho, and NYK, has ordered an LNG Bunkering Vessel from Kawasaki Heavy Industries. The vessel is scheduled to be delivered around September to December 2020, will become the first to be operated in Japan. Kyushu Electric Power, Saibu

* 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.

Gas, Chugoku Electric Power, and NYK signed a memorandum of understanding (MOU) at the beginning of August 2018 for joint discussions on the commercialization of LNG as a marine fuel to ships in the Setouchi and Kyushu areas.

Tokyo Commodity Exchange (TOCOM) admitted that the planned launch of an electric power futures market on 9 October 2018 would delay as it has been taking more time to discuss related matters with market players and now would plan to open the market by the end of the year.

Busan Port Authority (BPA) and Korea Gas Corporation (KOGAS) signed an agreement to develop a floating LNG bunkering terminal. KOGAS is developing ship-to-ship (STS) LNG bunkering infrastructure in Tongyeong in South Gyeongsang.

PetroVietnam signed an agreement with two Japanese companies to sell gas from a South China Sea oil block close to waters disputed by China. Sao Vàng - Đại Nguyệt, located at blocks 05-1b & 05-1c 300 kms southeast of Vietnam's coast, is 43.08% owned by Idemitsu Kosan, 36.92% by Teikoku Oil (Con Son) and 20% by PetroVietnam.

Gas Malaysia signed a memorandum of understanding (MoU) with Tokyo Gas to establish a mutual-beneficial collaboration in relation to any new investment in the development of natural gas value chain in Southeast Asia, except Vietnam. The MoU is valid for two years and can be extended by mutual agreement.

According to China's National Development and Reform Commission (NDRC), the country produced 77.9 bcm, up 4.9% year-on-year, imported 58.4 bcm, up 39.3%, and consumed 134.8 bcm, up 17.5%, of natural gas, during the first six months of 2018.

The Chinese commerce ministry announced retaliatory tariffs on goods from the United States, including LNG, which will be subject to a 25% tariff in early August 2018.

China National Offshore Oil Corporation (CNOOC) started operating a new LNG import terminal in Shenzhen in early August 2018. The terminal has four 160,000 m³ tanks, a jetty for 266,000 m³ ships, and capacity to receive 4 million tonnes of LNG per year.

Sinopec's plan to expand its Qingdao LNG terminal in Shandong was granted approval from the provincial government. The terminal will add two 160,000 m³ tanks, and will thus have annual handling capacity of 7 million tonnes.

The plan for Chinese Taipei's third LNG receiving terminal was rejected in early July 2018 by a government environmental committee, which cited a likely "grave impact" on the ecology of rare algae and coral species.

Excelerate Energy's Excellence FSRU (floating, storage, and re-gasification unit) did not supply regasified LNG to the Bangladesh pipeline network after arriving at the Moheshkhali LNG terminal in the Bay of Bengal, carrying Qatari LNG, in April 2018 until the end of July.

Venice Energy reportedly plans to submit a development application to the South Australian government within the next month to have a floating storage and regasification unit (FSRU) in Port Adelaide.

Korea Gas Corporation (KOGAS) signed a memorandum of understanding (MOU) with Woodside on collaboration in the research and development of hydrogen fuel.

For the proposed Scarborough development, Woodside accelerated target ready for start up to 2023 for the upstream component and 2024 for the downstream. The company increased the design capacity of the proposed Pluto Train 2, to four to five million tonnes per year. Alignment was reached between the North West Shelf participants on non-binding key commercial terms and pricing for processing third-party gas. A preliminary tolling agreement is expected between the NWS Project participants and Browse Joint Venture in Q3 2018.

Inpex announced that the Ichthys LNG Project has commenced production of gas from the wellhead following the completion of final safety verifications. The Project expects to begin the shipment of products in the order of condensate, LNG and LPG.

Indonesia's Pertamina decided not to go ahead with a land-based LNG receiving terminal in Bojonegara. The terminal was to be developed in a joint venture between Kalla Group unit Bumi Sarana Migas and Pertamina.

Chevron submitted an official development plan for Indonesia's Rokan Block, detailing its plans for the tract post-2021 after the PSC expires. However, the government picked Pertamina to operate the block, after Chevron operatorship contract expires in 2021.

ExxonMobil stopped construction on its Angore gas pipeline in Papua New Guinea's highlands in late June 2018 after building sites were vandalized. The 11-km pipeline is being built to connect the Angore gas field with the Hides gas conditioning plant.

The PNG LNG Project co-venturers entered into a mid-term LNG sale and purchase agreement (SPA) with PetroChina International (Hong Kong) Corporation Limited (PCI), for the supply of LNG commencing in July 2018. The SPA is for a supply of 0.45 million tonnes per year over a three-year period.

[North America]

The United States Trade and Development Agency announced cooperation with Japan's Ministry of Economy, Trade and Industry (METI) on the Liquefied Natural Gas (LNG) Value Chain and Natural Gas Cooperation Training Program.

The United States Department of Energy (DOE) has issued an advisory opinion stating that LNG shipments from the United States to the United States Naval Station Guantanamo Bay Cuba would not constitute an "export" subject to DOE's jurisdiction under

Natural Gas Act section 3(a). DOE released a final rule under which DOE will automatically approve gas export applications if they would be at or below 51.75 billion cubic feet of exports per year (1.08 million tonnes per year) and do not rise to the level of requiring an environmental review.

The Federal Energy Regulatory Commission (FERC) announced no delays of 12 to 18 months regarding the timing of pending applications for LNG plants. Chairman Kevin McIntyre said that recent media reports of such letters are incorrect.

The United States Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) and FERC announced that they had agreed to develop a Memorandum of Understanding (MOU) that would refine and reduce the permit application review process for proposed LNG facilities.

CME Group and Cheniere Energy reached an agreement through which CME Group will develop an LNG futures contract with physical delivery to Cheniere's Sabine Pass plant.

FERC authorized Corpus Christi Liquefaction, LLC (CCL) to introduce gas and commission the Train 1 fuel gas system. Corpus Christi Liquefaction Stage III, LLC (CCL) filed an application with FERC for authorization to site, construct, and operate an expansion of the Corpus Christi Liquefaction Project currently under construction at Corpus Christi, Texas. The proposed Stage 3 expansion project would add seven mid-scale liquefaction trains, one LNG storage tank, and an additional interconnected pipeline to the existing project. The Stage 3 Project would increase the expected aggregate nominal LNG production capacity at the Liquefaction Project to approximately 23 million tonnes per year.

Construction continues on the Elba Liquefaction Project with a total of six liquefaction units. The project will have a total liquefaction capacity of approximately 2.5 million tonnes per year. Initial in-service is expected in the fourth quarter of 2018 with final units coming online by the third quarter of 2019.

Woodside Petroleum decided to pull out of Sempra Energy's Port Arthur LNG export project in Texas, Sempra said.

DOE issued an order granting Jordan Cove Energy Project's (JCEP) request to amend its existing authority to export LNG to nations with a Free Trade Agreement (FTA) with the United States from its proposed LNG terminal at Coos Bay, Oregon. The order resets the date by which LNG exports must commence from December 2021 to July 2028, and lowers the authorized LNG export volume from 438 Bcf/year to 395 Bcf/year (8 million tonnes per year) to match the terminal capacity reflected in JCEP's renewed application pending before FERC for authorization to construct the terminal facility, which was filed in September 2017. The company is positioned to receive a FERC decision during the second half of 2019. Pembina continues to anticipate first gas in 2024.

BP agreed to acquire a portfolio of unconventional oil and gas assets from BHP. The acquisition will bring BP extensive oil and gas production and resources in the liquids-rich regions of the Permian and Eagle Ford basins in Texas and in the Haynesville gas basin in Texas and Louisiana. The transaction is anticipated to complete by the end of October 2018.

Crowley Maritime took delivery of its first combination container/roll on-roll off cargo ship that will be powered by LNG at shipbuilder VT Halter Marine's fabrication yard in Pascagoula, Mississippi. The "ConRo" ship El Coquí delivered its first cargo from Jacksonville, Florida, to San Juan, Puerto Rico.

Alaska Gasline Development Corporation (AGDC) said Sinopec is still interested in 75% of the LNG produced from the project, but is no longer being considered as a construction manager for Alaska LNG.

Bear Head LNG and the Nova Scotia Construction Labour Relations Association Limited (CLRA) and Cape Breton Building and Construction Trades signed a Memorandum of Agreement (MOU), ensuring access to the skilled workforce needed for the proposed LNG export project in Nova Scotia.

TransCanada's Topolobampo Pipeline project has been placed into service in northern Mexico, providing capacity for 670 million cubic feet of natural gas per day to markets in the states of Chihuahua and Sinaloa. The project provides the upstream interconnection with the company's Mazatlan Pipeline.

[Africa]

The Nigeria LNG Limited (NLNG) awarded the contracts for Front End Engineering Design (FEED) of its planned plant expansion project, Train 7, to B7 JV Consortium and SCD JV Consortium. B7 JV Consortium comprising KBR, Technip and JGC and SCD JV Consortium of Saipem, Chiyoda and Daewoo will participate in the dual FEED process.

The revised capex forecast assumes the commencement of any Fortuna related spend will be deferred until 2019

Mozambique Rovuma Venture submitted the development plan to the government for the first phase of the Rovuma LNG project, which will produce, liquefy and market natural gas from the Mamba fields in the Area 4 block offshore Mozambique. The plan details the proposed design and construction of two trains each producing 7.6 million tonnes of LNG per year. ExxonMobil will lead construction and operation of natural gas liquefaction and related facilities, and Eni will lead construction and operation of upstream facilities. A final investment decision (FID) is scheduled in 2019, with LNG production expected to commence in 2024.

Anadarko said in its second quarter 2018 operations report that its onshore LNG

development cost was anticipated to be highly competitive at less than USD 600/tonne/year. Anadarko and its Area 1 co-venturers consider FID in the first half of 2019.

[Europe / Russia]

According to the 2018 GLE LNG New Services Inventory and List of Services published by Gas Infrastructure Europe (GIE), volumes in truck loading of LNG increased by 8% in 2017 compared to 2016. Small-scale ship loading increased by more than 9%.

Jacobs Engineering was awarded a feasibility study contract from Equinor to evaluate the possibilities for building a hydrogen production plant, including CO₂ capture and export facilities, in Eemshaven, the Netherlands. The hydrogen will be supplied as fuel to an existing natural gas-fired power plant that will be converted into a hydrogen-fueled power plant designed to lower the plant's carbon emissions at a large scale.

The European consortium consisting of Snam (60%), Enagás (20%) and Fluxys (20%) signed the agreements with the Hellenic Republic Asset Development Fund (HRADF) and Hellenic Petroleum for the acquisition of a 66% interest in DESFA, the national operator in the natural gas infrastructure sector. DESFA owns and operates, under a regulated regime, a high pressure transport network of about 1,500 km, as well as a LNG regasification terminal at Revithoussa.

All Baltic natural gas market participants are invited to participate in the LNG terminal required volume surplus auction organized by the Baltic Gas Exchange GET Baltic, during which it will be possible to purchase 110 GWh of natural gas (7,300 tonnes). The auction is organized upon receipt of a request from LITGAS, which carries out the designated supplier activity. Bids starting from 31 July 2018 up to 8 August. Auction results and winning bidder will be announced on 10 August. The period of supply is from 15 August until 30 September. The maximum amount supplied per day is equal to 15 GWh.

From January to 15 July 2018, Gazprom produced 270.1 bcm of gas. This is by 8.5% (21.2 bcm) more than in the same period of 2017. Gazprom's exports to the Far Abroad countries from January to 15 July 2018, reached 108.9 bcm, which is by 5.8% (6 bcm) more than in the same period of 2017.

Naftogaz submitted a proposal on changes to the current methodology for calculation of tariffs for the natural gas transmission services to the National Commission for State Regulation on Energy and Utilities of Ukraine (NCSREU). Naftogaz used a scenario of almost full utilization of capacity of Ukrainian gas transmission system. Such scenario can be possible if Nord Stream-2 is not built and if transit of gas produced by Russian private companies and companies from Central Asia is unblocked by Russian side. Based on this scenario, the average cost of gas transit through the territory of Ukraine in the next regulatory

period is 20% less than the transit tariff based on the existing transit contract between Naftogaz and Gazprom.

The Gazprom Management Committee held in Bovanenkovo (Yamal-Nenets Autonomous Area) a meeting on the pre-development project for the Kharasaveyskoye gas and condensate field and the gas transmission system. Two gas production facilities are operating at the Bovanenkovskoye field. In 2018 the third and final gas production facility will bring the field to its design production capacity of 115 billion cubic meters of gas per year. It was resolved at the meeting to begin the full-scale development of the Kharasaveyskoye field in 2019. Kharasaveyskoye is located north of Bovanenkovskoye, mostly onshore in the Yamal Peninsula and partly offshore in the basin of the Kara Sea. The gas reserves are estimated at 2 trillion cubic meters (C1+C2 categories). The start of gas production slated for 2023 at a design capacity of 32 billion cubic meters per year.

The offshore installation barge "Castoro 10" (C10) started preparatory works for future pipelaying for the Nord Stream 2 project at the German shore. According to Uniper, works for Nord Stream 2 pipelaying in the Baltic Sea started in July 2018.

Yamal LNG Project Ice-Breaking LNG Carrier "Vladimir Rusanov" arrived at the Bering Strait on 6 July 2018, after loading LNG at the Yamal LNG plant on 25 June. The vessel is scheduled to arrive at the Rudong port, Jiangsu, China. The voyage marks the Yamal LNG's first direct LNG delivery to East Asia.

NOVATEK shipped its first cargos of LNG from the Yamal LNG project to China via the Northern Sea Route. An official ceremony was held to commemorate the arrival of Arc7 LNG tankers "Vladimir Rusanov" and "Eduard Toll" to the port of Jiangsu Rudong. The net voyage time from the port of Sabetta through the Northern Sea Route to the destination port was completed in 19 days as compared to 35 days for the traditional eastern route via the Suez Canal and the Strait of Malacca.

Russia's Novatek expects the initial launch of the mid-scale Cryogas-Vysotsk LNG project by end of 2018 or sometime in the beginning of 2019. After the start of first LNG train of roughly 600,000 tonnes per year, the project will consider making another FID decision for the second LNG train with a capacity of 600,000 to one million tonnes per year. The LNG will be marketed for bunkering services as well as potential mid- to small-scale business consumers in the European markets. Novatek holds a 51% ownership interest in Cryogas-Vysotsk, with the rest hold by Gazprombank (49%).

Novatek's subsidiary OOO Arctic LNG 3 commenced drilling of the first well at the North-Obskiy license area located in the shallow waters of the Ob Bay.

1,954 kilometers, or 90.5% of the linear section of Power of Siberia Gas Pipeline running from Chayandinskoye to the Chinese border in the Amur Region, is finished. The

bulk of construction and installation work for this section will be completed in 2018.

[Global issues]

Total closed the acquisition of Engie's portfolio of upstream LNG assets for an overall enterprise value of USD 1.5 billion. Additional payments of up to USD 550 million could be payable by Total in case of an improvement in the oil markets in the coming years. This portfolio includes participating interests in liquefaction plants, notably the interest in the Cameron LNG project in the United States, long term LNG sales and purchase agreements, an LNG tanker fleet as well as access to regasification capacities in Europe. This transaction makes Total the second largest global LNG player among the majors with a worldwide market share of 10% and the Group will manage an overall LNG portfolio of around 40 million tonnes per year by 2020.

New satellite data released shows a significant decline in gas flaring at oil production sites around the world in 2017, despite a half-percent increase in global oil production. The nearly 5% flaring decline begins to reverse years of increases in global gas flaring that started in 2010. The data reveals about 141 billion cubic meters (bcm) of natural gas was flared in 2017, down from nearly 148 bcm in 2016. While Russia remains the world's largest gas flaring country, it also saw the largest decline in flaring in 2017.

Reference: Company announcements, Reuters, AFP, IHS Fairplay, Yonhap News, 经济形势分析 (中华人民共和国国家发展和改革委员会), 中国新闻网, Energy Bangla, The Jakarta Post, Katadata News, Alaska Journal of Commerce, Business Day Nigeria, Cedigaz News Report.

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