

## LNG Review December 2018 - Recent issues and events - Hiroshi Hashimoto\*

### **Introduction**

In late December 2018, the third and last final investment decision (FID) on a large-scale LNG production project in the year was announced - Phase 1 of the Tortue development in Mauritania and Senegal. This represents another example of relatively quick implementation of an FLNG project and a portfolio player underpinning a project by committing full-capacity.

In the United States, the third LNG export project in the Lower 48 made its first shipment of LNG, representing the first purely greenfield LNG export project development following the two projects developed in the sites of previous LNG import terminals. Several other greenfield LNG export projects made progress toward potential positive investment decisions in the near future, along with several brownfield projects.

Japan's average LNG import price in November 2018 surpassed USD 11 per million Btu. As the country's average crude oil import price climbed to USD 81.74 per barrel, the average LNG import price is expected to be more than USD 12 in February 2019.

China's natural gas production, import and consumption in the first eleven months of 2018 grew by 7%, 36% and 20%, respectively, compared to the same period in 2017. LNG imports in particular grew by 44% to 48 million tonnes in the period.

### **[Asia Pacific]**

Among developments surrounding Japan's LNG importing companies, Saibu Gas signed a memorandum of understanding (MOU) with Russia's Novatek on potential cooperation to enter the end-customer market and optimize the latter's LNG portfolio supplies to the Asia-Pacific region by utilizing Saibu's Hibiki LNG terminal. Chugoku Electric Power and JFE Steel have agreed to abandon their coal-fired power generation project in Chiba and instead study a plan to develop a natural gas-fired power station.

Tokyo Gas started a natural gas distribution business in Thailand through Gulf WHA

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\* 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.

MT Natural Gas Distribution Company Limited (GWHAMT) which is invested by MITG (Thailand) Limited, a joint venture between Tokyo Gas and Mitsui & Co. This marks Thailand's first fully private natural gas distribution business targeting industrial users. Tokyo Gas signed a joint development agreement on an LNG receiving terminal with First Gen Corporation in the Philippines. In the country, Energy World Corporation (EWC) was granted a permit by the Department of Energy of the Philippines to build the LNG import facility at Pagbilao Grande Island. EWC said that the permit provides the company an additional 24-month construction period.

Australia's energy infrastructure company Jemena announced that construction of the 622 km Northern Gas Pipeline (NGP) is complete. APPEA said the pipeline means northern Australia's gas resources will for the first time be able to be delivered to the gas markets of eastern Australia. The pipeline has the capacity to bring up to an additional 90 terajoules per day (0.6 million tonnes per year) into the east coast gas network. Meanwhile, ExxonMobil made a final investment decision (FID) to develop the West Barracouta gas field in the VIC/L1 block in Bass Strait to bring new gas supplies to the Australian domestic market by 2021. The project is part of the Esso-BHP Gippsland Basin Joint Venture.

AGL executed a long-term charter contract with Höegh LNG for the supply of a Floating Storage and Regasification Unit (FSRU) for the proposed Gas Import Jetty project at Crib Point. Korean company EPIK signed an agreement with the Port of Newcastle to establish a new FSRU terminal, which will include a 170,000m<sup>3</sup> class new-build FSRU and associated on-shore infrastructure.

Woodside entered into a long-term gas sale and purchase agreement (GSPA) with Alcoa for the supply of up to 36.4 PJ (0.7 million tonnes) of pipeline gas. Supply will commence in 2020 from Woodside's portfolio of domestic gas facilities, including the North West Shelf, Pluto and Wheatstone. The Woodside-operated Pluto project supplied its first gas to the Dampier to Bunbury Natural Gas Pipeline. The Pluto pipeline gas facility has a capacity of 25 terajoules per day (1.7 million tonnes per year). Additional domestic gas supply from Pluto is scheduled to start up in early 2019 with the commissioning of the Pluto LNG trucking facility. Domestic gas infrastructure on the Pluto site will also be expanded as part of the proposed Pluto Train 2 Project. Woodside awarded a contract to Bechtel to undertake front-end engineering design (FEED) for the Pluto Train 2 Project. The project will underpin Woodside's preferred concept for the development of the Scarborough gas resource. The project will include a second LNG train at the Pluto site with a targeted capacity of 5 million tonnes per year and installation of domestic gas infrastructure. Woodside is targeting FID for the project in 2020 and ready for start-up in 2024.

The production wells were opened at Shell's Prelude Floating LNG (FLNG) facility

off the coast of Western Australia. Prelude enters the initial phase of production where gas and condensate are produced and moved through the facility. Meanwhile, Total signed an agreement to divest a 4% interest in the Ichthys LNG project in Australia to operating partner INPEX. The transaction reduces Total's interest in the asset to 26%.

Timor Leste's President vetoed a government bid to increase access to its petroleum fund for investment and called for the proposal to be revised, potentially delaying a buyout of holdings of Shell and ConocoPhillips in the Greater Sunrise project. In November 2018 the government announced an agreement to buy Shell's 26.56% stake after another agreement in October to buy ConocoPhillips' 30% stake.

PT Jawa Satu Power, owned by Marubeni, Pertamina and Sojitz, and PT Jawa Satu Regas, owned by Marubeni, Pertamina, Sojitz and Mitsui O.S.K. Lines (MOL), each signed a separate loan agreement in October 2018 for limited-recourse project financing for the construction of a gas-fired power plant and an attached FSRU in West Java, Indonesia, and scheduled to begin construction in December 2018.

Eni will start the Merakes Development Project in the Kutei Basin, offshore East Kalimantan, with subsea wells and a dedicated transportation system in 1,500 m water depth to be connected to the Jangkrik Floating Production Unit (FPU). The gas production will be shipped to the Bontang LNG plant via the other existing facilities of Jangkrik field as well as the East Kalimantan transportation network.

### **[North America]**

The Department of Energy's Office of Fossil Energy (DOE/FE) decided to discontinue its practice, adopted in 2016, of including an "end use" reporting provision in orders authorizing the export of domestically produced natural gas, including LNG, issued under section 3 of the Natural Gas Act (NGA). DOE/FE will revert to its prior practice of requiring authorization holders to report, in relevant part, the country (or countries) into which the exported LNG or natural gas "was actually delivered."

Cheniere Energy announced that the first commissioning cargo of LNG had loaded and departed from its Corpus Christi liquefaction facility in Texas, marking the first export of LNG from the state and from a greenfield liquefaction facility in the lower 48 states. The facility consists of three large-scale LNG production trains and supporting infrastructure, with an additional seven smaller trains proposed. The facility's first train produced first LNG in November and is expected to reach substantial completion in the first quarter of 2019. Train 2 is expected to reach substantial completion in the second half of 2019, and Train 3 in the second half of 2021. The seven smaller trains under development would increase the facility's total expected nominal production capacity to 23 million tonnes per year.

Cheniere announced that its subsidiary Sabine Pass Liquefaction entered into an LNG sale and purchase agreement (SPA) with PETRONAS LNG (PLL). PLL agreed to purchase approximately 1.1 million tonnes per year from Sabine Pass Liquefaction on a free on board (FOB) basis for 20 years following the date of first commercial delivery for Train 6. Woodside signed an agreement with RWE for the mid-term supply of LNG from the fourth quarter of 2020 and to until December 2022, on an FOB basis with the primary source from the Corpus Christi Project in the United States.

NYK signed long-term contracts with Diamond Gas International (DGI), a subsidiary of Mitsubishi Corporation (MC) in Singapore, for DGI to charter from NYK three newly built LNG carriers. The first one, to be delivered in 2020, will transport LNG from the Cameron LNG project, as well as from other locations around the world for 18 years. The other two, to be delivered in 2021, will transport LNG from the LNG Canada project in British Columbia, Canada, as well as from other locations around the world for 17 years.

Port Arthur LNG, a subsidiary of Sempra Energy, and the Polish Oil & Gas Company (PGNiG) entered into a 20-year sale-and-purchase agreement (SPA) for 2 million tonnes per year of LNG on a Free-On-Board basis from the Port Arthur LNG facility under development in Texas. In addition to the PGNiG agreement, Sempra signed a Memorandum of Understanding (MOU) with Korea Gas Corporation (Kogas) in 2017 for potential participation in the project. The Port Arthur facility is proposed to include two liquefaction trains capable of processing 11 million tonnes per year of LNG; up to three LNG storage tanks; two marine berths, and associated facilities. The facility is scheduled to receive its final environmental impact statement (EIS) from the Federal Energy Regulatory Commission (FERC) in January 2019. In 2018, Bechtel was selected by Port Arthur LNG to serve as the engineering, procurement, construction and commissioning (EPCC) contractor, subject to reaching a definitive agreement.

NextDecade announced that the Texas Commission on Environmental Quality (TCEQ) voted to issue a series of air permits to NextDecade's Rio Grande LNG project in South Texas. The project remains subject to review by FERC. FERC issued a draft EIS on the project and associated Rio Bravo Pipeline in October 2018. A final EIS will be issued on 26 April 2019. FERC has established a 90-day Federal Authorization Decision Deadline of 25 July 2019. NextDecade anticipates a final investment decision (FID) on the project in the third quarter of 2019.

Venture Global LNG and Kiewit announced that Kiewit was awarded the engineering, procurement, and construction (EPC) contract for the Calcasieu Pass LNG export project in Cameron Parish, Louisiana. Kiewit will design, engineer, construct, commission, test and guarantee the facility of 10 million tonnes per year capacity to be completed in 2022. The

facility will employ mid-scale, modular, factory-fabricated liquefaction trains. The project has signed binding offtake agreements with Shell, BP, Edison, Galp, Repsol and PGNiG.

Annova LNG received a draft EIS from FERC for the Annova LNG Brownsville Project. Annova LNG estimates commercial operations to begin in 2024. Annova LNG is a 6 million tonne per year LNG facility under development at the Port of Brownsville, Texas. Equity owners include Exelon, Black & Veatch and Kiewit.

Osaka Gas acquired a 25% interest from Competitive Power Ventures and a 24.5% interest from GE Energy Financial Services of CPV Towantic Energy Center in Connecticut, a 785MW combined-cycle facility that has been in operation since May 2018.

The Aguirre Offshore GasPort project was officially cancelled as Exceleerate Energy requested FERC to withdraw its authorization.

### **[Middle East]**

Qatar Petroleum (QP) said the company aimed to announce foreign partners for new LNG trains by the middle of 2019, but was keeping open the possibility of going it alone. QP said it will self-finance the LNG expansion rather than borrow.

INPEX signed a Memorandum of Understanding (MOU) with ADNOC Logistics & Services on LNG bunkering partnership in United Arab Emirates.

### **[Africa]**

A final investment decision (FID) was announced for Phase 1 of the Greater Tortue Ahmeyim development, following agreement between the Mauritanian and Senegalese governments and partners BP, Kosmos Energy and national oil companies of the two countries. A floating liquefaction (FLNG) facility with capacity of 2.5 million tonnes per year will be installed at a nearshore hub located on the Mauritania and Senegal maritime border by 2022. The project is planned to provide LNG for export as well as making gas available for domestic use in both Mauritania and Senegal. BP Gas Marketing has been selected as the sole buyer for the investor partners' LNG offtake for Phase 1. The FLNG vessel will be provided by Golar LNG. The vessel conversion would take place at Keppel Shipyard.

Mozambique's Area 4 co-venture participants ExxonMobil, Eni, China National Petroleum Corporation (CNPC), Empresa Nacional de Hidrocarbonetos, Kogas and Galp have secured LNG offtake commitments by affiliated buyer entities of the partners for the first phase of the Rovuma LNG project. In July 2018, Mozambique Rovuma Venture submitted the development plan to the government of Mozambique for the first phase. The development plan for the first phase specifies the proposed design and construction of two trains of 7.6 million tonnes of LNG per year each.

### **[Europe / Russia]**

Uniper and Mitsui O.S.K. Lines (MOL) confirmed an agreement on an FSRU (Floating Storage and Regasification Unit) in Wilhelmshaven, Germany. The FSRU would have send-out capacity of 10 bcm per year with 263,000 m<sup>3</sup> storage capacity as early as the second half of 2022. Uniper and MOL also entered into a transportation agreement where MOL will provide Uniper with shipping capacity equivalent to an 180,000 m<sup>3</sup> LNG carrier commencing in December 2020. Uniper intends to use the additional shipping capacity to optimize LNG volumes sourced from Freeport LNG in the United States. In 2015 Uniper contracted 0.9 million tonnes per year of LNG exports from the United States for 20 years.

Equinor and partners started production from the Aasta Hansteen gas field in the Norwegian Sea, along with the 482 km Polarled pipeline, the first offshore pipeline to cross the Arctic Circle. Located 300 km west of Sandnessjøen in 1,300 m of water, Aasta Hansteen is the deepest field development on the Norwegian continental shelf.

Spain's conventional (including industrial, residential and commercial) demand for natural gas has grown by 4.4% in 2018 year-on-year, reaching 287,316 GWh (28 bcm). Industrial demand, which accounts for 60% of the total demand for natural gas, increased by 4%, while residential and commercial demand grew by more than 7%. Total demand for natural gas, including the power generation sector, was almost similar to that in 2017.

The first phase of the Market Test for the regasification capacity at the floating LNG Terminal in Alexandroupolis developed by Greece's GASTRADE was completed with Expressions of Interest (EOIs) submitted by 20 companies for a total of up to 12 bcm per year of capacity reservation at the terminal and delivery to the Greek National Natural Gas Transmission System. The EOIs exceeded the technical design capacity of 5.5 bcm.

Keppel Offshore & Marine (Keppel O&M) was awarded a contract to design and construct an ice-class LNG bunker vessel from Shturman Koshelev. When completed in 4Q 2020, the vessel will be chartered to Gazpromneft Marine Bunker (Gazpromneft) for operations in the Baltic Sea. Keppel O&M has delivered 11 ice-class vessels to-date and is currently building LNG-fuelled vessels.

Russia's Gazprom and Japan's Itochu Corporation signed a memorandum of understanding (MOU) for the Baltic LNG project in Russia's Leningrad Region, the Russian company said in a statement. In 2017, Gazprom and Shell agreed on the main terms of a joint venture to implement the project. In September 2018, Gazprom and Mitsui also signed an MOU, under which the latter can take part in the project. Russia's first LNG floating storage and regasification unit (FSRU) *Marshal Vasilevskiy* docked at the port of Kaliningrad. The FSRU is being installed by Gazprom.

Yamal LNG, operated by Novatek, has offloaded its one hundredth cargo of LNG since the first shipment in December 2017, making the cumulative to-date delivery 7.4 million tonnes. Yamal LNG has reached full capacity at the plant's three LNG trains. Novatek, along with Gazprombank, is also building an LNG plant in the port of Vysotsk with a capacity of 660,000 tonnes per year, expecting its first production in February 2019.

Novatek awarded an onshore E&C contract to Saipem / Renaissance joint venture and launched tenders for the construction of an airport and recruitment of personnel for its Arctic LNG 2 project. Novatek plans to start producing LNG at the Gydan Peninsula in 2022 - 2023, with production volumes reaching 19.8 million tonnes per year from three trains, that will be installed on Concrete Gravity Based Structures (GBS).

### **[South America]**

EXMAR's Floating LNG Liquefaction Unit (FLNG), to be renamed Tango FLNG, left China for Bahía Blanca, Argentina. Upon its arrival, Tango FLNG will be put in operation for YPF and is expected to start up LNG production in the second quarter of 2019. Tango FLNG is designed for a liquefaction capacity of about 0.5 million tonnes per year.

BP Trinidad and Tobago (BPTT) announced the sanction for two new gas developments offshore Trinidad, Cassia Compression and Matapal. The Cassia Compression project will enable BPTT to access and produce low pressure gas reserves from existing fields in the Greater Cassia Area. First gas from the facility is expected in 3Q 2021. The Matapal project will develop the gas resources discovered by BPTT in 2017. First gas from Matapal is expected in 2022.

Reference: Company announcements, Reuters, El Nuevo Día, Cedigaz News Report.

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