

LNG Review September 2017 - Recent issues and events - Hiroshi Hashimoto*

Introduction

For the first time in the year of 2017, spot LNG prices were on the rise in the month on the contrary to the expectation of ample LNG supply and consequential generally low prices in the next couple of years.

On the back of such expectation, portfolio LNG marketing and purchasing activities have been observed here and there around the world. Some existing LNG producers have arranged additional LNG term-sale deals.

Possible causes of the surge in spot LNG prices have included additional seasonal requirements from emerging importers and slowdown in exports from the United States due to hurricanes. As those causes do not look to last long and additional LNG production capacity is expected to come online later in the year, prices are expected to stabilise in the near future.

While also for the first time in the year Japan imported smaller volumes of LNG compared to the same month a year ago in August 2017, China continued increasing gas imports (including LNG and piped gas) in the same month.

This paper looks at the following events and issues during the past month.

[Asia Pacific]

Asian spot LNG prices showed a relatively steep rise from low USD 7s to the middle of USD 8s per million Btu in September 2017. This is due to expectations of higher demand in winter and reduced exports from the United States because of Hurricane activities.

Japan's LNG imports in August 2017 amounted to 7.259 million tonnes, the first significant year-on-year decline for a monthly figure in 2017, by 0.465 million tonnes or 6.0% from a year ago.

TEPCO Fuel & Power, JXTG Energy and Osaka Gas plan to establish the Ohgishima City Gas Supply Company to process and supply city gas. The plans call for construction of heating-value adjustment facilities at the site owned by TEPCO Fuel & Power adjacent to the company's Higashi Ohgishima LNG receiving terminal, and, starting in April 2020, city-gas supply via third-party transmission service mainly to TEPCO Fuel & Power's

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Shinagawa Thermal Power Station.

Kawasaki Kinkai Kisen Kaisha and Kawasaki Kisen Kaisha (K Line) agreed to work on joint study for "K" Line Kinkai's newbuilding passenger ferry being fueled by LNG, whose study includes specifications, engine types and any related technical verifications for LNG handling.

Samsung Heavy Industries (SHI) developed its own LNG regasification system for LNG-FSRU. The S-Regas (GI) utilizes glycol to regasify LNG and reduces chance of corrosion from traditional method of heating LNG directly with seawater, and is another energy efficient solution from SHI saving energy by 5%.

The multi-year agreement between Uniper Global Commodities and Pavilion Gas provides Uniper access to Singapore storage and reload facility while Pavilion benefits from the access to capacities at Gate LNG terminal (Rotterdam, The Netherlands) and Grain LNG terminal (United Kingdom).

FueLNG, a joint venture between Keppel and Shell, achieved the first commercial LNG bunker transfer in Singapore by completing truck-to-ship bunkering for the Floating Liquefaction (FLNG) vessel, Hilli Episeyo. The LNG bunker transfer was carried out in batches from 22 July to 23 September 2017.

The Philippine National Oil Company (PNOC) is looking to construct its LNG hub piece-by-piece, starting from the floating storage and regasification unit with power plant (FSRU-PP) offshore Batangas by 2019 or 2020. Phase 2 will include onshore storage units, regasification, power plant and distribution/redistribution.

Infrastructure investments of USD 80 billion will be needed by 2030 to keep up with increasing LNG demand in East Asia, nations participating in The Eleventh East Asia Summit Energy Ministers Meeting (11th EAS EMM) in the Philippines estimated, according to the statement of the meeting on Thursday 28 September 2017.

China's imports of LNG and piped natural gas in August 2017 were 3.14 million tonnes and 2.52 million tonnes, respectively, according to the country's customs statistics. Cumulative combined imports during the first eight months of the year were 42.52 million tonnes (22.18 million tonnes of LNG and 20.34 million tonnes of piped natural gas), more than 25% higher than the amounts of the same period in 2016.

China's Hubei Energy Group signed a strategic cooperation framework agreement with the Zhoushan local government in China's coastal Zhejiang province and private Great United Petroleum Holding Company Limited (GUPC), to jointly build a 12 million tonne per year LNG import terminal, along with four 600 MW cogeneration facilities.

India has renegotiated the pricing of LNG from Australia's Gorgon project, the Indian oil minister said. Petronet LNG signed a deal in 2009 with ExxonMobil to buy 1.5

million tonnes per year from Gorgon for 20 years. Deliveries under the deal began in January 2017. Petronet LNG said in a stock exchange announcement it had reached a "broad understanding of terms" with ExxonMobil. Sources suspect that Petronet will increase its volumes from the Gorgon LNG project in Australia by 1 million tonnes per year to about 2.5 million tonnes.

Mitsui O.S.K. Lines (MOL) announced the signing of agreements with Swan LNG for the long-term operation / maintenance of a floating, storage and regasification unit (FSRU) in Gujarat, India. MOL has an option to participate in the FSRU joint ownership. The terminal is slated to start operation in early 2020.

Trafigura plans to open another FSRU LNG terminal at Port Qasim in Karachi in Pakistan. Trafigura has already taken a minority stake in a separate Pakistani import project. Pakistan's Younus Brothers Group Pakistan and Sapphire Group decided to develop ENER GAS LNG Terminal at Port Qasim to commence operations by early 2019. Pakistan's second LNG terminal is expected to be commissioned by the middle of November 2017.

Bangladesh's Petrobangla shortlisted Trafigura and Gunvor to arrange the installation of two floating LNG import terminals in 2018. Petrobangla signed a 15-year deal with Qatar's RasGas to import LNG starting in 2018, marking RasGas' first long term contract delivered to an FSRU. RasGas will supply 1.8 million tonnes per year for the first five years and 2.5 million tonnes per year for the next 10, officials said. The deal is for less than the 4 million tonnes Bangladesh agreed to take in a 2011 memorandum of understanding (MoU) with RasGas. In June 2017, Petrobangla issued a notice looking to shortlist suppliers of LNG spot cargoes starting in 2018. Bangladesh's first FSRU, supplied by Excelebrate Energy, is to be commissioned by April 2018. Its second, supplied by the Summit Group, is due for commissioning by October 2018. Petrobangla also signed initial LNG supply deals with Oman LNG, Indonesia's Pertamina and Gunvor in September.

The Sri Lankan Government issued a Letter of Intent (LoI) to the Government of India during the visit of External Affairs Minister to Colombo in early September 2017. Petronet LNG will partner with Mitsubishi and Sojitz to set up Sri Lanka's first LNG terminal near Colombo, its CEO said after the company's annual general meeting.

Total Australian natural gas output was a record 3,770 petajoules (PJ) in FY 2017 (to June 2017), up 27% from the previous year. East coast LNG production and east coast domestic gas production both increased in the second quarter, up by 19.4% to 5.0 million tonnes of LNG exports and by 11.9% to 193.2 PJ of domestic gas, according to EnergyQuest.

The Australia Energy Market Operator (AEMO) published an update to the 2017 Gas Statement of Opportunities to provide the latest domestic demand and supply market

information. The projected shortfall risk for 2018 is between 54 petajoules (PJ) to 107 PJ (1,966,125 tonnes), and in 2019 between 48 PJ to 102 PJ. However, LNG exporters have given the government a guarantee that they will offer the volumes identified as the expected gas shortfall in 2018 and 2019 to the domestic market.

Shell Australia claims that for the last two winters the company diverted gas bound for export markets to locations like Melbourne. In 2017 Shell will sell 75 PJ (1.4 million tonnes) of gas to east coast customers representing 10% of the entire east coast gas market from the QGC project. Santos and GLNG partners will supply 30 PJ (0.55 million tonnes) of gas to the east coast domestic market over 2018 and 2019, which would otherwise be exported as LNG. These arrangements follow recent Santos announcements for the delivery of up to 72 PJ of gas over four years into the southeast market through a swap agreement and the sale of 15 PJ to the Pelican Point Power Station in South Australia.

Santos and Origin signed a new agreement to supply ethane gas to Qenos, Australia's sole producer of polyethylene. Santos and Origin will supply an estimated 27 PJ to Qenos for the remainder of 2017 until the end of 2019. The ethane is processed at the Santos-operated Moomba gas plant and piped to Qenos' operations at Botany Bay in Sydney for use as a feedstock in the manufacture of polyethylene.

Origin Energy entered into an agreement to sell its conventional upstream oil and gas business, Lattice Energy, to Beach Energy. As part of the sale, Origin has secured access to a significant portion of Lattice Energy's future east coast gas production under long-term gas supply agreements to support its domestic gas business.

Australia and Timor-Leste have resolved their dispute over maritime boundaries in the Timor Sea. The Permanent Court of Arbitration in The Hague announced the parties reached an agreement on Wednesday 30 August 2017 over the disputed territory.

Keppel Offshore & Marine Limited (Keppel O&M) entered into a Heads of Agreement (HOA) with Pavilion Energy and Indonesia state-owned PT Perusahaan Listrik Negara (PLN) to explore opportunities in the development of small-scale LNG distribution in West Indonesia. LNG can be delivered to floating and onshore LNG terminals using small LNG carriers, where it is used to generate electricity at PLN's power plants.

The Papua New Guinea government has started paying local landowners around the PNG LNG Plant near Port Moresby benefits from the project. The project has been exporting for more than three years, with a 2% royalty set aside, but payments had been held up by disputes over who is eligible. Identification of those eligible for royalties still needs to be resolved with landowners in the highlands, where gas is produced.

[North America]

The United States' Department of Energy (DOE) announced a proposed rule that will provide for faster approval of small-scale exports of natural gas, including LNG. This proposed rule provides that DOE, upon receipt of any complete application to export natural gas (including LNG) to non-free trade agreement countries, will grant the application provided that the application meets two criteria - the application proposes to export no more than 0.14 billion cubic feet per day, and the proposed export qualifies for a categorical exclusion under DOE's National Environmental Policy Act (NEPA) regulations

The United States exported 107 cargoes of LNG in the first seven months of 2017. Cumulative exports of LNG during the period amounted to 363,976,704,000 cubic feet, equivalent to 7.57 million tonnes, almost doubling the 183,773,189,000 cubic feet (3.82 million tonnes) for the 12 months in 2016.

GAIL India chartered an LNG tanker from Total for three years to transport cargoes from the United States beginning in early 2018. GAIL had through the Shipping Corporation of India (SCI) invited bids for hiring four LNG carrying tankers. Total offered a ship it chartered from Teekay LNG Partners for ferrying LNG from Yemen.

Tellurian entered into an agreement with a private seller to acquire natural gas producing assets and undeveloped Haynesville acreage in northern Louisiana.

Edison and Venture Global entered into an LNG Sales and Purchase Agreement (SPA) for 1 million tonnes per year from the Calcasieu Pass LNG export facility, developed by Venture Global in Cameron Parish, Louisiana. Edison will purchase the LNG on a free on board basis (FOB) for a 20 year term starting from the commercial operation date of the Calcasieu Pass facility, currently expected in 2021.

Jordan Cove Energy Project and Pacific Connector Gas Pipeline filed applications with the Federal Energy Regulatory Commission (FERC) for the construction and operation of a 7.8 million tonne per year LNG export plant in Oregon and a related pipeline that will transport natural gas from the Malin Hub in southern Oregon to the LNG plant. Jordan Cove and Pacific Connector are requesting that FERC issue a Draft Environmental Impact Statement (DEIS) in 2018, leading to FERC decisions by the end of 2018.

The United States Department of Energy (DOE) approved a long-term application from Eagle LNG Partners Jacksonville II LLC (Eagle Maxville) to 0.01 billion cubic feet per day of LNG. Eagle Maxville is authorized to export LNG in ISO containers loaded at the Maxville Facility located in Jacksonville, Duval County, Florida, to anywhere in the world not prohibited by United States law or policy.

Williams Partners reported that construction is underway in Pennsylvania on the greenfield portion of the Atlantic Sunrise pipeline project - an expansion of the existing

Transco pipeline to connect Marcellus gas supplies with markets in the Mid-Atlantic and South-eastern United States. The project to increase natural gas deliveries by 1.7 billion cubic feet per day, is scheduled to be placed into full service in mid-2018.

ExxonMobil announced an enhanced program to reduce methane emissions from its production and midstream facilities across the United States. The program prioritizes actions at sites operated by subsidiary XTO Energy and includes efforts to develop and deploy new, more efficient technologies to detect and reduce facility emissions.

The Alaska Gasline Development Corporation (AGDC) concluded the capacity solicitation process for foundation customer capacity on the Alaska LNG system. In addition to an Alaska producer submitting a conforming intent to subscribe for capacity on the system, each of the three major producers expressed interest in selling gas to AGDC for further sale to the global LNG markets. The producers and AGDC independently indicated their desire to reserve capacity on Alaska LNG.

Canada's National Energy Board (NEB) granted the LNG Canada project in British Columbia a five-year extension to its initial licence to the end of 2027. The NEB said LNG Canada asked for more time "to account for the market uncertainty affecting the timing of a final investment decision and the required timeframe for construction".

Aurora LNG and its partners, Nexen Energy (a wholly-owned subsidiary of CNOOC Limited) and INPEX Gas British Columbia (IGBC), made the decision to end the Aurora LNG feasibility study and will cease all investigation activity, effective immediately. The current macro-economic environment does not support the partners' vision of developing a large LNG business at the proposed Digby Island site.

[Middle East]

Saudi Aramco is expected to finish building facilities soon in the north of the kingdom that will allow it to produce shale gas for the first time, sources said.

Al Ain Properties, owned by an investment vehicle of the Abu Dhabi royal family, is seeking to sell Dolphin Tower in Doha, the Qatari headquarters of Dolphin Energy, according to sources. Dolphin Energy operates the Dolphin Gas project, which supplies natural gas from Qatar to the United Arab Emirates (UAE) and Oman.

Qatargas announced the signing of a medium term sales and purchase agreement with BOTAS Petroleum Pipeline Corporation (BOTAS). Qatargas will deliver 1.5 million tonnes per year of LNG for three years from October 2017, supplied from Qatargas 2.

[Africa]

Russia expects to sign memoranda with Morocco on the use of peaceful atom,

supplies of LNG, and construction of an LNG terminal in October 2017, Russian Energy Minister said at a meeting with Moroccan Minister of Energy and Mines.

Nigeria's Shoreline signed an agreement with Shell Petroleum Development Company to develop gas infrastructure around the commercial capital, Lagos. Shoreline said the agreement was to develop, buy, market, distribute and sell natural gas in areas that contain the city's business hub and some of the most expensive residential properties.

Baker Hughes signed an agreement for the provision of Asset Performance Management (APM) software and services to enhance the performance of the LNG trains at the Nigeria LNG Limited's plant in Bonny Island, to reduce unplanned outages and trips for the LNG trains.

Angola LNG entered into a multi-year LNG sales agreements with Vitol, RWE Supply & Trading (RWEST), and Glencore, respectively, under which LNG cargoes will be delivered at destinations around the world.

The Government of Equatorial Guinea signed a memorandum of understanding (MoU) with the Government of Burkina Faso to supply LNG and build critical infrastructure. The initial three-year agreement compels both sides to negotiate and sign an LNG sales and purchase agreement (SPA) and a terminal use agreement (TUA). The President of Ghana praised the LNG sales agreement between the Ghana National Petroleum Corporation (GNPC) and Gazprom.

China National Petroleum Corporation (CNPC) and Eni signed cooperation agreement in order to cooperate in oil & gas exploration and production, gas and LNG value chain opportunities, trading and logistics opportunities, refining and petrochemicals. The partnership will regard both China and overseas activities.

PTT is expected to seal a deal to purchase 2.6 million tonnes per year of LNG from Mozambique's Rovuma Area 1 project in 2018, a company executive said.

[Europe / Russia]

Volkswagen Group Logistics and Scania support the use of LNG trucks and logistics. In future, more than 100 Scania LNG trucks are to be used on the roads of north Germany. Gas suppliers are to construct LNG refueling stations in the region.

The Management Board of GAZ-SYSTEM of Poland issued recommendations to Polskie LNG concerning the commencement of design and preparation works for the expansion of the LNG Terminal in Świnoujście. The project will involve building an additional loading/unloading berth for vessels and a loading berth for LNG bunker vessels.

Mitsui O.S.K. Lines (MOL) will put its new offshore LNG terminal to work in Turkey in 2017. The company ordered the floating storage and regasification unit (FSRU) in

2013 from Korea's Daewoo Shipbuilding & Marine Engineering (DSME) and will receive the vessel in October 2017. The FSRU can store 263,000 cubic meters of LNG.

The European Parliament approved the new security of gas supply regulation. Its aim is to prevent potential gas supply crises. Natural gas companies will have to notify long-term contracts that are relevant for security of supply.

Gazprom and Mitsui & Co. signed the Framework Agreement for cooperation on small- and mid-scale LNG. The document reflects the commitment of the parties to collaborate in producing, transporting and marketing small- and mid-scale LNG in Japan, as well as in LNG bunkering in the Sea of Japan. Gazprom and Japan Bank for International Cooperation (JBIC) signed a Memorandum of Understanding (MOU) aimed at advancing cooperation.

Alexander Medvedev, Deputy Chairman of the Gazprom's Management Committee, pointed out that the Sakhalin 2 LNG plant produced 10.9 million tonnes in 2016, exceeding its annual design capacity of 9.6 million tonnes. The design documentation for the plant's third train is nearly ready. The train will have the capacity of up to 5.4 million tonnes.

[South America]

BP agreed with Argentina's Bridas Corporation to form a new integrated energy company by combining their interests in the oil and gas producer Pan American Energy (PAE) and the refiner and marketer Axion Energy (Axion). The new company, Pan American Energy Group (PAEG), will be the largest privately-owned integrated energy company in Argentina. PAEG will be owned equally by BP and Bridas Corporation, itself a 50:50 joint venture of Bridas Energy Holdings of Argentina and CNOOC of China. PAE is currently owned 60% by BP and 40% by Bridas, while Axion is wholly-owned by Bridas.

Shell and Petrobras sign technical cooperation agreement to strengthen deep water partnership - Memorandum of Understanding (MoU) focuses on sharing technical and cost-efficient solutions - Shell and Petrobras signed a Memorandum of Understanding (MoU) to establish a long-term mutual collaboration in developing pre-salt fields in Brazil.

New Fortress Energy reportedly signed an agreement to acquire Bolognesi Energia's planned LNG terminal and associated 1.3 GW Rio Grande power project in Brazil.

Reference: Company announcements, Reuters, Bloomberg, Power Philippines News, Daily Times Pakistan, Radio Pakistan, The Peninsula Qatar, Gulf Times, Press Trust of India, EnergyQuest, CNBC, il Velino (Morocco), World Oil, Bangkok Post, TASS, ISTOÉ Dinheiro, Cedigaz News Report.

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