

LNG Review December 2021 - Recent issues and events -

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Introduction

The impacts of extremely high spot LNG prices spread over to overall LNG prices in Asia in November 2021. As the extreme high level of spot LNG prices continued in October and crude oil prices applicable to long-term contract LNG prices have been on the rise, Asian countries' average import prices in November were USD 17.65 in China, USD 15.42 in Korea, and USD 20.89 in Chinese Taipei, making Japan's USD 14.30 the lowest price in the region.

Among supply sources of Japan's LNG import, the average landed price of LNG from the United States in November 2021 was USD 22.30. It was so high as three cargoes, representing about half of 0.4 million tonnes from the United States, fetched over USD 30. Even if LNG in the United States may be produced at low cost, it is not always sold at low prices.

Japan's average landed crude oil import price rose to USD 82.08 / barrel in November 2021, the highest since November 2014. Therefore, the Japan's average LNG import price is expected to continue being firm, as long-term contracts linked to JCC prices still account for 70% - 80% of LNG imports.

European spot gas prices finished the most dramatic year in the history, falling to the low of USD 20s after briefly approaching to USD 60 just ten days earlier. Asia's assessed spot LNG prices were also falling to the high of USD 20s at the end of 2021 just following the trend of the European counterparts.

LNG long-term contracting activities continue involving the Chinese market. Venture Global LNG of the United States has concluded a contract to supply CNOOC with 2 million tonnes per year of LNG for 20 years from its planned Plaquemines LNG export facility in Louisiana. QatarEnergy has concluded contracts to supply Guangdong Energy Group (GEG) with 1 million tonnes per year of LNG for 10 years and S&T International Natural Gas Trading Company (S&T) with 1 million tonnes per year of LNG for 15 years. bp has signed a sale contract to supply China's State Power Investment Corporation (SPIC) with 200,000 tonnes per year of regasified pipeline gas for ten years.

As the referendum in December in Chinese Taipei on relocation of CPC's

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

third LNG receiving terminal project from the planned site was not passed, the project is expected to proceed.

[Asia Pacific]

Hiroshima Gas announced on 27 December 2021 that it would receive its first Carbon Neutral LNG cargo from Malaysia LNG on 2 January 2022 at the company's Hatsukaichi receiving terminal.

Kyushu Electric Power and Saibu Gas announced on 23 December 2021 that they had made a decision to proceed with their plan to develop an LNG-fired power generation plant in Hibikinada, Kitakyushu City. The two companies plan to set up a joint venture company for the project in the beginning of the fiscal year starting in April 2022. They claim that the power plant will adopt the latest combined-cycle power generation technology, which could in the future introduce carbon-free fuels such as hydrogen.

Japan's Agency for Natural Resources and Energy started posting on its website information of collective inventory of LNG owned by the nation's major power generators on weekly basis on 1 December 2021.

Himuka LNG Company, funded by Miyazaki Gas, Osaka Gas, Kyushu Electric Power, Nihon Gas, and Asahi KASEI, held a ceremony on 10 December 2021 to celebrate completion of a small-scale LNG receiving terminal in Nobeoka, Miyazaki.

Iwatani Corporation announced on 14 December 2021 that the company and Soma Gas Holdings would conduct a test programme to inject up to 20% hydrogen into Soma Gas' network of pipeline gas supply currently based on LPG.

Energy Capital Vietnam (ECV), a U.S.-based project holding and development company, announced on 16 December 2021 that B.Grimm Power of Thailand and Siemens Energy had joined its consortium to develop an LNG-to-power project in Mũi Kê Gà (MKG), Bình Thuận Province, in Southern Vietnam.

Russia's NOVATEK announced on 2 December 2021 that the company and PetroVietnam Power had signed the Cooperation Agreement on LNG and power projects in Vietnam.

According to China's Trade Statistics, the country imported 71.36 million tonnes of LNG during the first eleven months of 2021, increasing year-on-year by 20.6% and higher than Japan's 67.28 million tonnes during the same period in 2021. According to the central government figures, China consumed 31.78 bcm of natural gas in November 2021 and 329.26 bcm during the first eleven months of the year, a 14.5% increase year-on-year.

bp's Chinese unit announced on 15 December 2021 that it had signed a sale and purchase agreement with a subsidiary of China's State Power Investment Corporation (SPIC)

for ten years from 2023. bp will sell 200,000 tonnes per year of pipeline gas through the Guangdong Dapeng LNG import terminal.

Mitsui O.S.K. Lines Ltd. (MOL) and Royal Vopak (Vopak) announced on 16 December 2021 that an agreement had been reached, whereby Vopak would acquire 49.99% of the shares in the vessel owning company of MOL FSRU Challenger, whose name will be changed to Bauhinia Spirit. The new joint venture company between MOL and Vopak in Hong Kong will own the world's largest floating storage and regasification unit (FSRU) and have a long-term contract with Hong Kong LNG Terminal Limited. The joint venture will provide the FSRU as well as jetty operations & maintenance and port services. The terminal is currently under construction and is expected to be operational around mid-2022. Hong Kong's CLP Power Hong Kong Limited (CLP Power) and The Hongkong Electric Co., Ltd (HK Electric) are the promoters of the FSRU terminal project. The project includes in addition to the FSRU vessel, one double berth jetty with mooring facilities for the FSRU vessel and LNG carriers, two subsea gas pipelines connecting the terminal with the Black Point Power Station (BPPS) and the Lamma Power Station (LPS) respectively, and Gas Receiving Stations (GRSs) located inside the BPPS and LPS respectively.

Along with the other three referendum results, the case of CPC's third LNG receiving terminal project relocating from the coast and sea area of Taoyuan Datan algae reef was not passed on Saturday 18 December 2021.

NYK announced on 24 December 2021 that the company had signed a multi-year time-charter contract with GAIL (India) Limited for the LNG carrier Grace Emilia, which is equipped with a WinGD-made dual-fuel slow-speed diesel engine (i.e., X-DF diesel engine) that has superior fuel-consumption efficiency and can operate on marine gas oil or boil off gas stored in the cargo tank. The vessel also features a re-liquefaction system that can use re-liquefied excess boil-off gas and return it to the cargo tank.

Excelerate Energy announced on 8 December 2021 that the company organized a tree planting initiative on 17 November on Moheshkhali Island in Cox's Bazar, Bangladesh. Excelerate employees, with the help of the local community, business leaders, and officials, planted 10,000 mangroves across two acres of land.

Australia's Veneice Energy announced on 23 December 2021 that the South Australian Government had approved the construction of an LNG import terminal to be built in the Outer Harbor of Port Adelaide. The terminal will become the only LNG import facility in South Australia and the first in the world to be powered by renewable energy, the company claims. Construction is expected begin in the middle of 2022 and will take 12 - 14 months to complete and commission following financial close. The first shipment of LNG into the terminal and connection to the South Australian gas network is anticipated around late 2023

to early 2024. The company will conduct a feasibility study on making the 680 km Seagas pipeline from Victoria to South Australia bidirectional enabling the terminal to supply gas to two states.

ConocoPhillips announced on 8 December 2021 that it had notified Origin Energy that ConocoPhillips was exercising its preemption right to purchase up to an additional 10% shareholding interest in Australia Pacific LNG (APLNG) from Origin Energy. The ConocoPhillips subsidiary currently holds a 37.5% APLNG shareholding interest and would own 47.5% of APLNG upon closing if the other relevant APLNG shareholder does not exercise its preemption rights. The transaction is expected to close in the first quarter of 2022.

Australian Industrial Energy (AIE) announced on 30 November 2021 that the company and Norway's Höegh LNG had concluded a long-term charter for floating storage and regasification unit (FSRU) Höegh Galleon at the Port Kembla energy terminal and agreed to collaborate on the future design and development of a new generation FSRU capable of receiving fuels such as green hydrogen.

Australia's Woodside announced on 9 December 2021 that the company had entered into a memorandum of understanding (MoU) with Viva Energy to progress discussions on capacity rights at Viva Energy's proposed LNG regasification terminal in Geelong, Victoria. The MOU provides a framework and timeline to negotiate binding regasification capacity commitments, to be finalised in definitive agreements prior to a final investment decision (FID) targeted for the third quarter of 2022.

Woodside announced on 22 December 2021 that Woodside, Keppel Data Centres Holding Pte Ltd, City Energy Pte Ltd. (as Trustee of City Energy Trust), Osaka Gas Singapore and City-OG Gas Energy Services had signed a Memorandum of Understanding (MOU) to study the feasibility of a supply chain of sustainable Liquid Hydrogen (LH₂) from Western Australia to Singapore and potentially Japan. The agreement follows the announcement of the proposed H₂Perth Hydrogen facility in Kwinana where Woodside will seek to establish a large-scale LH₂ and Ammonia export hub. The study is expected to continue until mid-2022.

Australia's offshore safety regulator NOPSEMA ordered on 24 December 2021 Shell to shut down its Prelude floating LNG vessel off Western Australia's Northwest coast until Shell can convince the regulator there will be no repeat of the power problems that started on 2 December impacting the Prelude's ability to respond to emergencies, operate safety equipment and evacuate personnel.

JERA announced on 8 December 2021 that JERA had concluded an equity purchase agreement with Santos to acquire a 12.5% stake in the gas Barossa/Caldita field. The production is expected to start around 2025. JERA will receive about 0.425 million tonnes per year of LNG in accordance with its equity stake in the Barossa gas field. Japan Bank for

International Cooperation (JBIC) announced on 27 December that JBIC concluded a loan agreement on 24 December with JERA with a loan amount of USD 346 million. The loan is cofinanced with a private financial institution and has a total cofinancing of USD 497 million.

PETRONAS announced on 1 December 2021 that the company had awarded two Front End Engineering Design (FEED) contracts to a JGC Corporation-Samsung Heavy Industries consortium and to SAIPEM Spa as part of an international dual FEED design competition for a nearshore LNG project in Sabah with a minimum capacity of 2 million tonnes per year. The FEED design competition is expected to take place over the course of 10 months with the Final Investment Decision (FID) planned for end of 2022. PETRONAS said that the winning FEED contractor would be rolled over to the Engineering, Procurement, Construction and Commissioning (EPCC) phase. The nearshore LNG plant is planned to be Ready for Start Up (RFSU) by end of 2026. PETRONAS operates two floating LNG facilities, the PFLNG SATU and PFLNG DUA, at the Kebabangan and Rotan offshore gas fields respectively.

ConocoPhillips announced on 8 December 2021 that it had entered into an agreement to sell the subsidiary that indirectly owns the company's 54% interest in the Indonesia Corridor Block Production Sharing Contract (PSC) and a 35% shareholding interest in the Transasia Pipeline Company. The sale to MedcoEnergi is expected to close in early 2022.

[North America]

EQT Corporation responded on 7 December 2021 to the 23 November 2021 letter from a Senator (who blamed LNG exports for high gas prices) that LNG exports had the potential to be the biggest green initiative on the planet.

Cheniere tweeted on 8 December 2021 that the first cargo of LNG had been achieved from Train 6 at Sabine Pass LNG. Substantial Completion is expected in Q1 2022.

Cheniere's Corpus Christi Liquefaction Stage III, LLC submitted on 7 December 2021 to the FERC (Federal Energy Regulatory Commission) request for an extension of time until 30 June 2027 to complete construction and make the Corpus Christi Stage 3 Project available for service.

Sempra announced on 21 December 2021 that it entered into a definitive agreement to sell a non-controlling 10% interest in Sempra Infrastructure Partners to a subsidiary of the Abu Dhabi Investment Authority (ADIA). In October, Sempra completed the sale of a 20% non-controlling interest in Sempra Infrastructure to an affiliate of KKR. Upon closing of the ADIA transaction, Sempra will own a 70% controlling stake in Sempra Infrastructure. Sempra Infrastructure was created in 2021 through the consolidation of two infrastructure

companies - Sempra LNG and Infraestructura Energética Nova, S.A.B de C.V. (IEnova). The transaction is expected to be completed in the summer of 2022.

FERC granted for Venture Global Calcasieu Pass, LLC's request to commission the Block 2 Liquefaction Modules on 13 December 2021.

Venture Global LNG and CNOOC Gas & Power Group announced on 21 December 2021 a 20-year Sales and Purchase Agreement (SPA). Venture Global will supply 2 million tonnes per year of LNG on an FOB basis from its Plaquemines LNG export facility in Louisiana. In addition, CNOOC will purchase 1.5 million tonnes of LNG from Venture Global's Calcasieu Pass LNG facility for a shorter duration.

Venture Global LNG announced on 2 December 2021 that the company would develop a fourth LNG export facility in Louisiana. The CP2 LNG project will be located in Cameron Parish, adjacent to Venture Global's first facility, Calcasieu Pass. Venture Global also announced that it has submitted a formal application requesting authorization from FERC to site, construct and operate the CP2 LNG facility and the CP Express Pipeline. CP2 LNG will build, own and operate an LNG plant with a nameplate liquification capacity of 20 million tonnes per year.

Tennessee Gas Pipeline (TGP), a subsidiary of Kinder Morgan, Inc. on 15 December 2021 filed with FERC a proposal to implement a responsibly sourced natural gas (RSG) supply aggregation pooling service at select locations across the TGP system. RSG is third-party certified natural gas that meets certain environmental, social and governance standards, particularly related to methane emission reductions. The proposed service is designed to enable suppliers and customers on TGP to purchase and sell RSG supply at non-physical trading locations, ultimately serving end-users, utilities, power plants and LNG facilities connected to the TGP system. Producers who have obtained RSG certifications from qualified third-party organizations are anticipated to supply the RSG needed for the proposed pooling service. The service is expected to be available in the first quarter of 2022.

Jordan Cove Energy Project L.P. (JCEP) and Pacific Connector Gas Pipeline, LP (PCGP) asked FERC on 1 December 2021 to vacate the authorizations.

ExxonMobil announced on 6 December 2021 that it planned to achieve net zero greenhouse gas emissions from operated assets in the U.S. Permian Basin by 2030. The plans are part of the corporate-wide effort to reduce Upstream greenhouse gas emissions intensity by 40%-50% by 2030, compared to 2016 levels.

ExxonMobil announced on 13 December 2021 that the company and Scepter, Inc. had agreed to work together to deploy advanced satellite technology and proprietary data processing platforms to detect methane emissions at a global scale. In the first phase of the project, the companies will design and optimize the plan for satellite placement and coverage,

initially focused on capturing methane emissions data from ExxonMobil operations in the Permian Basin. Scepter will deploy satellites in 2023 and increase coverage to more than 24 satellites over three years.

Australia's Woodside announced 7 December 2021 plans to expand its portfolio of hydrogen production opportunities to the United States, securing land in Oklahoma for future development of a modular hydrogen facility and entering a memorandum of understanding (MoU) with Hyzon Motors. The H2OK concept involves construction of an initial 290-MW facility, which will use electrolysis to produce up to 90 tonnes per day (tpd) of liquid hydrogen for the heavy transport sector.

[Middle East]

Saudi Aramco announced on 6 December 2021 that the company had signed a lease and leaseback deal involving its gas pipeline network with a consortium led by BlackRock Real Assets and Hassana Investment Company, the investment management arm of the General Organization for Social Insurance (GOSI) in Saudi Arabia. Newly-formed subsidiary Aramco Gas Pipelines Company will lease usage rights in Aramco's gas pipelines network and lease them back to Aramco for a 20-year period. Aramco will hold a 51% majority stake in Aramco Gas Pipeline Company and sell a 49% stake to investors led by BlackRock and Hassana.

QatarEnergy announced on 6 December 2021 that its LNG producing affiliate, Ras Laffan Liquefied Natural Gas Company Limited, entered into a long-term Sale and Purchase Agreement (SPA) with Guangdong Energy Group Natural Gas Co., Ltd. (GEG) for the supply of one million tonnes per year of LNG to China over 10 years from 2024.

QatarEnergy announced on 8 December 2021 that its LNG producing affiliate, Qatar Liquefied Gas Company Limited (2), entered into a long-term Sale and Purchase Agreement (SPA) with S&T International Natural Gas Trading Company Limited (S&T) for the supply of one million tonnes per year of LNG to China over 15 years starting in late 2022. LNG deliveries under the SPA will utilize Qatar's fleet of conventional, Q-Flex and Q-Max LNG vessels allowing S&T to receive the LNG quantities primarily at the Tangshan LNG Receiving Terminal.

TotalEnergies announced on 21 December 2021 that it had signed with the Ministry of Energy and Minerals of Oman agreements for the sustainable development of the country's natural gas resources. These agreements include: The establishment of Marsa LNG, an integrated company between TotalEnergies (80%) and Oman National Oil Company, OQ (20%). Marsa LNG will produce natural gas from Block 10, with a view to subsequently develop a low-carbon LNG plant in Sohar, powered by solar electricity, for the production of

LNG for bunker fuel; A concession agreement for Block 10, to develop and produce natural gas from this block. Marsa LNG will hold a 33.19% interest in Block 10, together with its partners OQ and Shell Integrated Gas Oman B.V. (operator); and a Gas Sales Agreement, under which Marsa LNG will sell natural gas from Block 10 to the Government of Sultanate of Oman, for a duration of 18 years or until the start-up of Marsa LNG plant.

[Africa]

QatarEnergy announced on 13 December 2021 that it had entered into agreements with Shell to acquire working interests in two offshore exploration blocks in the Egyptian side of the Red Sea. QatarEnergy plans to hold a 17% working interest in Red Sea Blocks 3 and 4.

New Fortress Energy (NFE) announced on 21 December 2021 the execution of a Memorandum of Understanding (MOU) with Mauritania for the development of an Energy Hub, including natural gas, power, LNG and blue ammonia, utilizing gas reserves off the coast of Mauritania. NFE will deploy its "Fast LNG" liquefaction technology to produce LNG for local gas and power markets as well as international exports. NFE will supply natural gas to both the existing 180 MW Somolec Power Plant and a new 120 MW combined cycle power plant that will be developed.

[Europe / Russia]

The European Commission revealed on 15 December 2021 a proposed regulation aimed at cutting down methane emissions as part of a gas package of legislation. The draft includes a ban on routine flaring and venting. It also introduces requirements for EU countries to monitor emissions of methane and for companies to fix leaks in infrastructure. Gas operators will have to submit a report on source-level methane emissions and put together a leak detection and repair programme. Companies would be required to provide information on imported fossil fuels.

Shell announced on 20 December 2021 that the Board of Royal Dutch Shell decided to proceed with its proposal to simplify the company's share structure and align its tax residence with its country of incorporation in the United Kingdom. The Board has also decided to change the company's name to Shell plc to be implemented in January 2022.

SGN, Macquarie's Green Investment Group (GIG) and Esso Petroleum Company, Limited (an ExxonMobil affiliate) announced on 8 December 2021 that they had signed a Memorandum of Understanding (MoU) to explore the use of hydrogen and carbon capture to help reduce emissions in the Southampton industrial cluster.

Greece's Gastrade SA announced on 30 December 2021 that the country's National Natural Gas System Operator (DESFA SA) and Gastrade had signed a share transfer

agreement to transfer 20% of the latter's share capital to DESFA. Gastrade develops a Floating Storage and Regasification Unit (FSRU) of LNG in Alexandroupolis which is expected to be operational by 2023.

QatarEnergy announced on 10 December 2021 that its consortium with ExxonMobil signed an exploration and production sharing contract (EPSC) with the government of Cyprus for the offshore Block 5 located southwest of the island. It is QatarEnergy's second exploration block in Cyprus, in addition to Block 10, which was awarded to the same consortium in 2017 and resulted in the "Glaucus" gas discovery announced in February 2019. QatarEnergy will hold a 40% working interest in Block 5 while ExxonMobil will be the operator and will hold a 60% working interest.

According to preliminary data from the company, Gazprom produced 467.6 bcm of gas in January-November of 2021, which is 14.7% more than in the same period of 2020. Gazprom ramped up its domestic supplies by 15.8% over said period of 2021. The company increased its gas exports to the countries beyond the FSU to 171.5 bcm, which is higher than the figure for the same period of 2020 by 6.6%. Gas supplies to China continue growing. The company added since November, supplies had been topping Gazprom's daily contractual obligations by more than one-third every day as requested by China.

Gazprom said on 2 January 2022 that the year 2021 was a record-breaking year for the company as it produced 514.8 billion cubic meters of gas, the best result in the last 13 years, and exports beyond the FSU amounted to 185.1 billion cubic meters of gas, ranking fourth among the company's all-time records. The company noted that Nord Stream 2 became fully ready for operation on 29 December 2021.

Russia's NOVATEK announced on 7 December 2021 that the company and RWE Supply & Trading GmbH signed a Memorandum of Understanding (MOU) to cooperate in LNG supply and decarbonization. The MOU envisages the supply by NOVATEK to RWE of low-carbon ammonia and hydrogen to be produced at the Company's planned project Obskiy GCC (Gas Chemical Complex) and delivered to German and European markets. The Parties also intend to deepen their cooperation in supply of LNG (including carbon-neutral LNG) by NOVATEK to RWE by expansion of existing spot supplies as well as possible long-term supplies of LNG to be produced by the Arctic LNG 2 and other NOVATEK's projects.

NOVATEK announced on 22 December 2021 that the company and Uniper signed a Term Sheet on long-term supply of up to 1.2 million tonnes per year of low-carbon ammonia. The product price will be indexed to relevant European and global benchmarks. The ammonia is expected to be produced at NOVATEK's planned Obskiy GCC (Gas Chemical Complex) project, which will include carbon capture and storage (CCS) facilities, and delivered to Uniper's planned terminal in Wilhelmshaven. The imported ammonia will be

used as hydrogen carrier, transformed into gaseous hydrogen and fed into the future German hydrogen pipeline system, as well as supplied directly as a clean feedstock and as a fuel.

Gazprom announced on 21 December 2021 that the company completed the construction works on the expansion of the Sakhalin - Khabarovsk - Vladivostok gas trunkline at the 390.8 km section between Komsomolsk-on-Amur and Khabarovsk.

[South America]

Excelerate Energy announced on 9 December 2021 that on 8 December it started natural gas deliveries to the Brazilian market at the Bahia Regasification Terminal (TR-BA) in Salvador, Bahia, based on a lease contract with Petrobras. Excelerate's floating storage and regasification unit (FSRU) Excelerate Sequoia, which has an LNG storage capacity of 173,400 m³ and a regasification capacity of up to 700 million cubic feet per day (5.3 million tonnes per year) is deployed under the Excelerate Flexible Integrated Terminal (E-FIT) offering.

New Fortress Energy Inc. (NFE) announced on 13 December 2021 the execution of a 15-year gas supply agreement (GSA) with a subsidiary of Norsk Hydro ASA to the Alunorte Alumina Refinery in Pará, Brazil. NFE has agreed to supply Hydro with 29.5 TBtu of natural gas annually (equivalent to approximately 1 million gallons of LNG per day) to the refinery from NFE's Barcarena LNG terminal to be completed in 2022.

Höegh LNG announced on 28 December 2021 that it had concluded a 10-year FSRU charter with Terminal de Regaseificação de GNL de São Paulo S.A. (TSRP). TSRP is a subsidiary of Compass Gás & Energia, a Cosan Group company, that through its distribution company, Comgás, is Brazil's largest gas distributor. The Höegh Gannet is assigned to the charter and operations are expected to start in late 2022 or early 2023.

Eagle LNG Partners LLC announced on 10 December 2021 that the company had completed a long-term supply contract to establish an LNG receiving terminal in Aruba with WEB Aruba, the local power and water utility. The Aruba LNG Terminal will serve as WEB's LNG receiving terminal for its Balashi power plant.

[Global issues]

Gunvor announced on 16 December 2021 that the company had signed a new syndicated borrowing base facility for USD 1.135 billion to support the working capital needs of the company's LNG activities. As a part of the facility, Gunvor has committed to CO₂ carbon emissions reporting of the company's LNG value chain.

Reference: Company announcements, Cedigaz News Report.

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