

LNG Review October 2021 - Recent issues and events -

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Introduction

High prices have persisted in the global LNG and natural gas markets. Assessed spot LNG prices in Asia and spot natural gas prices in Europe have been in the highest ranges in the history although they have slid down from the high in early October.

Chinese companies have been active in securing LNG volumes under long-term contracts. Shenzhen Gas signed a deal in late October with bp to purchase up to 0.3 million tonnes of pipeline gas per year from 2023 for 10 years. ENN Group signed a deal in early October with Cheniere Energy to purchase 0.9 million tonnes per year of LNG from July 2022 for 13 years. Sinochem Group signed a deal in early November with Cheniere Energy to purchase initially 0.9 million tonnes per year from July 2022 eventually increasing to 1.8 million tonnes per year for approximately 17.5 years. Sinopec signed two long-term agreements with Venture Global LNG in early October to purchase 4 million tonnes per year of LNG in total for 20 years.

Separately Cheniere Energy in late October signed an agreement to sell Glencore 0.8 million tonnes per year of LNG for 13 years from April 2023.

The world traded 277 million tonnes of LNG during the first nine months of 2021, increasing by 4.6% or 12 million tonnes year-on-year. Asia's LNG import increased by 20 million tonnes, including China's increase of 11 million tonnes. The European Union and the United Kingdom decreased their combined LNG imports by 11 million tonnes. On the supply side, Australia and Qatar exported just shy of 58 million tonnes apiece, similar to their volumes a year earlier. The United States increased LNG export by 60% or 19 million tonnes year-on-year to 50 million tonnes during the nine-month period.

[Asia Pacific]

According to information presented at a meeting between companies and the METI on fuel procurement issues in Japan, inventories of LNG held by electric power companies as of the middle of October 2021 stood at the highest level in the last five years at the time of

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the year, and higher by 700,000 tonnes than those of the same timing of 2020.

Japan Petroleum Exploration (JAPEX) announced on 8 October 2021 that the company received its first carbon-neutral LNG cargo at the Soma LNG Terminal on 7 October, purchased from Diamond Gas International subsidiary of Mitsubishi Corporation.

INPEX Corporation and Kyushu Electric Power Company announced on 19 October 2021 that the two companies and Thailand's PTT subsidiary PTT International Trading Pte Ltd had signed an LNG business cooperation agreement.

Mitsubishi Corporation (MC) announced on 18 October 2021 that it had established new greenhouse-gas (GHG) emissions reduction targets and energy-transformation (EX) investment guidelines.

INPEX Corporation and Osaka Gas announced on 15 October 2021 that they would launch a technical development business targeting the practical application of a CO₂-methanation system toward the carbon neutralization of gas. This initiative is based on a subsidized project commissioned to INPEX by the New Energy and Industrial Technology Development Organization (NEDO). The joint technical development business is scheduled to be carried out at a newly built location connected to the Koshijihara Plant at INPEX's Nagaoka Field Office in Niigata. The business is scheduled to consist of a demonstration test involving the production of synthetic methane using CO₂ extracted from at the Nagaoka Field from the second half of fiscal year 2024 into fiscal year 2025.

The Japanese Shipowners' Association announced on 26 October 2021 that the Japanese shipping industry would take on the challenge of 2050 net zero GHG.

The Asian Development Bank (ADB) announced on 20 October 2021 that it had approved a new energy policy to support universal access to reliable and affordable energy services, while promoting the low-carbon transition in Asia and the Pacific.

Chiyoda Corporation, Mitsubishi Corporation (MC) and Sembcorp Industries announced on 4 October 2021 a Memorandum of Understanding (MOU) to explore the feasibility and implementation of a decarbonized hydrogen supply chain in Singapore.

Tokyo Gas Engineering Solutions Corporation (TGES) has agreed with the joint venture agreement with Siam Management Holdings Company Limited (SMH) which is the wholly owned subsidiary of PTT Public Company Limited (PTT) and will jointly establish PTT&TGES Optec Company Limited (Optec) to enter into on-site energy service business including improving efficiency technology solutions and fuel supply such as LNG supply in relation to factories, small power producers and utilities in Thailand.

The first phase of a new LNG power plant was approved in Quảng Trị Province on 8 October 2021. The Hải Lăng LNG power plant is planned by a consortium of T&T Group from Việt Nam, Korea Gas Corporation (KOGAS), Hanwha Energy Corporation (HANWHA) and

Korea Southern Power (KOSPO).

According to China's central government's figures, the country consumed 272.5 bcm of natural gas during the first nine months of 2021, an increase of 15.2% year-on-year.

bp announced on 20 October 2021 that it had signed a gas sales and purchase agreement with Shenzhen Sino-Benny LPG Co Ltd, the first long-term deal with price indexed to international LNG in China's domestic gas market. From 2023, bp will provide Sino-Benny, a subsidiary of Shenzhen Gas Group, with up to 300,000 tonnes of pipeline gas per year. The gas will be supplied through the Guangdong Dapeng LNG terminal.

China's Premier said that China's path to a greener economy needs to be underpinned by a 'stable supply of energy', pointing the need for a thorough assessment of the recent power shortage. He also called on the country to boost domestic production of fossil and for continued additions of advanced coal-fired power plants.

The Australian government announced on 1 October 2021 that it had developed an Emissions Reduction Fund (ERF) method to credit abatement from new carbon capture and storage projects. The government will award large-scale CCS projects that capture and permanently store carbon underground with tradeable high-integrity units (Australian Carbon Credit Units (ACCUs)). Each ACCU earned by a CCS project represents one tonne of carbon emissions avoided. Projects will be able to sell ACCUs to the Australian Government at bi-annual auctions or sell them on the private voluntary market.

Santos announced that it would commence the process to apply to register the Moomba CCS Project with the Clean Energy Regulator and generate Australian Carbon Credit Units (ACCUs). The project will store 1.7 million tonnes per year of carbon dioxide in the same reservoirs that held oil and gas.

Santos and Beach Energy announced on 1 November 2021 a final investment decision (FID) to proceed with the Moomba carbon capture and storage (CCS) project in South Australia, with startup expected in 2024. Santos has registered the project with the Clean Energy Regulator. The Clean Energy Regulator's CCS method provides a crediting period of 25 years, over which period the project will qualify for Australian Carbon Credit Units (ACCUs) for emissions reduction. Santos has a 66.7% interest in the project and is operator. The remaining interest is held by Beach Energy.

Senex Energy Limited announced on 18 October 2021 that it was in discussions with POSCO International Corporation in relation to a potential change of control transaction. On 2 September 2021, POSCO International submitted a revised non-binding and indicative proposal to acquire 100% of Senex, following two prior non-binding proposals.

Origin Energy announced on 25 October 2021 that it had executed an agreement with EIG to sell a 10% shareholding in Australia Pacific LNG (APLNG). After completion of

the sale, the joint venture shareholders will comprise ConocoPhillips (37.5%), Origin (27.5%), Sinopec (25%) and EIG (10%). The divestment will not change Origin's role as upstream operator, responsible for the upstream exploration, development, and production activities.

Mitsui & Co. and Japan Oil, Gas and Metals National Corporation (JOGMEC) announced on 4 October 2021 that they had agreed to conduct a joint feasibility study on Carbon Capture and Storage (CCS) in Western Australia associated with Mitsui's Perth Basin investments. Mitsui has also agreed with Wesfarmers Chemicals, Energy & Fertilisers Limited (WesCEF) to jointly study the commercial and technical viability of building a low carbon ammonia production plant. Mitsui is developing the Waitsia gas field in the mid-west region of Western Australia as the Operator, with a 50% working interest through its subsidiary Mitsui E&P Australia Pty Ltd (MEPAU). MEPAU also holds a 100% working interest in nearby depleted gas fields in Perth Basin. MEPAU will investigate the production and export of low carbon ammonia made from hydrogen generated from the Waitsia gas, with potential for the associated CO₂ to be stored in the depleted gas fields.

Australia's Woodside Energy said on 21 October 2021 that it had issued a limited notice to proceed to Bechtel for Pluto Train 2 engineering, procurement and early works for the construction of the accommodation village in Karratha.

Woodside announced on 25 October 2021 plans of H₂Perth to establish a hydrogen and ammonia production facility at a site in Perth with the support of the State Government of Western Australia. The project would be built on approximately 130 hectares of industrial land to be leased from the State in the Kwinana Strategic Industrial Area and Rockingham Industry Zone. It would produce up to 1500 tonnes per day of hydrogen for export in the form of ammonia and liquid hydrogen. Local refuelling stations can be built independently of the export project timelines and could operate as early as 2023.

Malaysia's PETRONAS announced on 27 October 2021 that the inaugural virtual ASEAN Energy Sector Methane Roundtable 2021 was held to discuss opportunities to collaborate on methane emissions management. It was attended by PETRONAS, PTT, PERTAMINA and Shell as well as organisations such as the United Kingdom Oil and Gas Industry Association Limited (OGUK), International Energy Agency (IEA), World Bank, the UN Environment Programme (UNEP) and Methane Guiding Principles (MGP).

PETRONAS announced on 7 October 2021 that the company under PETRONAS Marine brand has conducted its first LNG bunkering operation in Sabah via its first dedicated LNG Bunker Vessel (LBV), MV Avenir Advantage. The LNG bunkering for HL Green, the world's largest 180,000-tonne LNG-powered vessel, was carried out 12 nautical miles from Sandakan Port.

[North America]

The U.S. Environmental Protection Agency (EPA) proposed on 2 November 2021 new protections to reduce pollution from the oil and natural gas industry - including, for the first time, reductions from existing sources nationwide. The proposed new Clean Air Act rule tries to significantly reduce methane emissions and other air pollutants. In the United States, the oil and natural gas industry is the largest industrial source of methane emissions, emitting more methane than the total emissions of all greenhouse gases from 164 countries combined. EPA analyzed the proposed rule's impact on natural gas and oil prices from 2023 to 2035 and estimates that changes would be small - pennies per barrel of oil or thousand cubic feet of gas. The proposed rule would reduce 41 million tonnes of methane emissions from 2023 to 2035.

The Federal Energy Regulatory Commission (FERC) issued on 21 October 2021 orders to approve increases of liquefaction capacity at its Sabine Pass and Corpus Christi LNG plants from 1,509 billion cubic feet per year (Bcf/y) to 1,661.94 Bcf/y, and from 767 Bcf/y to 875.16 Bcf/y, respectively, resulting in an increase of 5.43 million tonnes in total, to reflect the actual capabilities, without any new facilities or construction activities.

Cheniere Energy announced on 25 October 2021 that Cheniere Marketing had entered into an LNG sale and purchase agreement (SPA) with Glencore. Glencore has agreed to purchase approximately 0.8 million tonnes per year of LNG from Cheniere Marketing on an FOB basis for 13 years beginning in April 2023.

Cheniere Energy announced on 11 October 2021 that Cheniere Marketing, LLC had entered into an LNG sale and purchase agreement (SPA) with ENN LNG (Singapore) subsidiary of China's ENN Natural Gas Co., Ltd. ENN LNG has agreed to purchase approximately 0.9 million tonnes per year of LNG from Cheniere Marketing on a free-on-board (FOB) basis for 13 years from July 2022.

Cheniere Energy announced on 5 November 2021 that Cheniere Marketing had entered into a binding LNG sale and purchase agreement (SPA) with China's Sinochem Group. Sinochem Group has agreed to purchase an initial volume of approximately 0.9 million tonnes per year beginning in July 2022, which increases to 1.8 million tonnes per year. The SPA has a term of approximately 17.5 years and Sinochem Group will purchase the LNG volumes on a free-on-board basis.

FERC issued a letter on 29 October 2021 granting Venture Global Calcasieu Pass, LLC's request to introduce commissioning feedgas volumes into the plant.

Venture Global LNG and China Petroleum & Chemical Corp. (Sinopec) announced on 4 November 2021 the signing of two 20-year Sales and Purchase Agreements (SPA) for the supply of a total of 4 million tonnes per year of LNG from Venture Global's Plaquemines

LNG export facility, in Plaquemines Parish Louisiana. In addition, UNIPPEC, a Sinopec subsidiary has agreed to purchase 3.5 million tonnes of LNG from Venture Global's Calcasieu Pass LNG facility for a shorter duration. Venture Global LNG said that this represented the largest single LNG supply deal to China ever signed by a U.S. company.

Chevron issued on 11 October 2021 an updated climate change resilience report that further details the company's ambition to advance people's lower carbon future. Chevron adopted a 2050 net zero aspiration for equity upstream Scope 1 and 2 emissions. The TCFD-aligned report describes how Chevron is incorporating Scope 3 emissions into its greenhouse gas emission targets by establishing a Portfolio Carbon Intensity (PCI) target inclusive of Scope 1 and 2 as well as Scope 3 emissions from the use of its products. The company has set a greater than 5% carbon emissions intensity reduction target from 2016 levels by 2028.

The New York State Department of Environmental Conservation (DEC) announced on 27 October 2021 the agency's denial of the required Title V air permits for Astoria Gas Turbine Power, LLC., a wholly owned subsidiary of NRG Energy, and the Danskammer Energy Center located in the town of Newburgh, Orange County.

LNG Canada said on 6 October 2021 that work across the LNG Canada project had surpassed the 50% completion mark. The project company also said it remained concerned about cost and schedules increases disclosed by TC Energy to complete its Coastal GasLink pipeline that would connect to the LNG project.

TC Energy's Coastal GasLink announced on 29 October 2021 that it had completed more than 50% of the project, working towards its target completion date in 2023. The project has installed more than 200 km of pipe out of the 670-km route. The project also said that it had completed the Kitimat Meter Station and Murray River Crossing.

Mexico Pacific Limited LLC (MPL), developer of the MPL LNG export project in Puerto Libertad, Sonora, Mexico, announced on 25 October 2021 that it had entered into a collaboration agreement with ConocoPhillips and Bechtel, working with Techint S.A. de C.V., to advance innovative lower carbon LNG design solutions for the project future phases. The MPL LNG project is a 14.1 million tonne per year LNG export facility.

[Middle East]

Qatar Petroleum (QP) announced on 3 October 2021 that it had ordered four new LNG carriers from Hudong-Zhonghua Shipbuilding Group Co. Ltd. (Hudong), a subsidiary of China State Shipbuilding Corporation Limited (CSSC). The carriers are the first batch of orders in QP's LNG shipbuilding program, which will cater for future LNG fleet requirements for the North Field expansion projects as well as for existing vessel replacement requirements. This order is also the first ever placed by QP or its affiliates with a Chinese shipyard for LNG

ships, and the first with Hudong in connection with the agreement to reserve ship construction capacity that was executed in April 2020.

Qatar Petroleum (QP) announced on 11 October 2021 its new name QatarEnergy and a new slogan "Your Energy Transition Partner".

Qatargas tweeted on 17 October 2021 that it had started construction of four new LNG mega-trains in Ras Laffan Industrial City.

[Europe / Russia]

The European Commission announced on 13 October 2021 a Communication on Energy Prices, to tackle the exceptional rise in global energy prices. The Communication includes a "toolbox" that the EU and its Member States can use to address the immediate impact of current prices increases, and further strengthen resilience against future shocks. Short-term national measures include emergency income support to households, state aid for companies, and targeted tax reductions. The Commission will also support investments in renewable energy and energy efficiency; examine possible measures on energy storage and purchasing of gas reserves; and assess the current electricity market design.

QatarEnergy said on 19 October 2021 that the company and Shell had signed an agreement to pursue investments in blue and green hydrogen projects in the United Kingdom.

Gate terminal B.V. announced on 11 October 2021 plans to invest in a further capacity expansion of 1.0 bcm per year. Together with the earlier announced investments to increase the capacity by 0.5 bcm per year this will result in a total capacity of 13.5 bcm per year. The additional send-out capacity is planned to become available from October 2024, when Uniper will be the biggest capacity holder at the terminal with 4 bcm.

Mitsui O.S.K. Lines, Ltd. (MOL) announced on 1 November 2021 the conclusion of a Transition linked loan to finance one of the world's largest LNG bunkering vessels 'Gas Vitality'. The vessel is owned by MOL's subsidiary Emerald Blue Maritime. The loan is provided by Société Générale and Sumitomo Mitsui Banking Corporation. The vessel 'Gas Vitality' is the sister ship to the 'Gas Agility', which was delivered in April 2020. The 'Gas Vitality' was delivered at Hudong-Zhonghua Shipbuilding in China on 31 October 2021 and chartered to TotalEnergies Marine Fuels.

TotalEnergies, Air Liquide, and VINCI announced on 1 October 2021 that they were combining forces with other large international companies to sponsor the creation of the world's largest fund exclusively dedicated to clean hydrogen infrastructure solutions.

NYK announced on 4 October 2021 that The LNG carrier LNG Enterprise, owned by France LNG Shipping (a French ship-owning company jointly owned by NYK and Geogas LNG) and under a long-term charter contract with TotalEnergies Gas & Power Ltd, was

delivered on 30 September 2021. The vessel was built at Samsung Heavy Industries Co., Ltd. (SHI) in Korea. The LNG carrier will be equipped with a WinGD X-DF diesel engine that can operate on fuel oil or boil off gas stored in its cargo tank.

Fluxys announced on 11 October 2021 that Dunkerque LNG would launch a subscription window for its available truck loading slots as of 2022. The available truck loading capacity amounts to 2,000 slots per year.

Gasum announced on 2 November 2021 that it had reached an agreement with North Sea Midstream Partners (NSMP) on the divestment of the Risavika LNG liquefaction plant while continuing under a long-term contract as a major offtaker of the LNG and LBG (liquefied biogas).

Spain's Enagás announced on 15 October 2021 that the company had completed a second extraordinary auction of slots for the unloading of LNG tankers at the regasification terminals of the Spanish Gas System. In October, the company has allocated 23 extraordinary slots for the next 12 months, in addition to the 22 slots awarded in the extraordinary auction held in September. With these two auctions, a total of 45 additional slots have been allocated in addition to those initially planned for the next 12 months. As for the winter period (November 2021 - March 2022) and after the launch of these extraordinary auctions 136 slots have already been allocated, compared to a total of 86 vessels discharged between November 2020 and March 2021.

Depositi Italiani Gnl (Dig), the first Italian coastal depot of LNG with a storage capacity of 20,000 cubic meters, was inaugurated on 26 October 2021 in the port of Ravenna. The project is 51% owned by PIR (Petrolifera Italo Rumena), 30% by Edison and 19% by Scale Gas. Spain's Enagás supported the start-up phase of the terminal's commissioning.

Russia's Gazprom announced on 13 October 2021 that the government and Gazprom signed an Agreement of Intent aimed at advancing the hi-tech area of activity "Development of hydrogen energy and decarbonization of industry and transport on the basis of natural gas" in the Russian Federation.

Russia's president said on 13 October 2021 that the rise in natural gas prices in Europe had stemmed from shortages of electricity. He says Russia fulfils its contractual obligations to its partners in full, including its partners in Europe, ensuring guaranteed, uninterrupted gas supply. He says Russia is always willing to meet its partners in the process and is ready to discuss additional actions.

Gazprom announced on 1 November 2021 that it produced 422.6 billion cubic meters of gas during the first 10 months of the year, 15.8% (or 57.7 bcm) more than in the same period of 2020. Gazprom increased its supply to the domestic market by 17.2% (or by 28.8 bcm) over said period of 2020. The company increased its gas exports to the countries

beyond the FSU to 158.8 bcm, higher than the same period of 2020 by 10.4% (or by 14.9 bcm).

Gazprom announced on 29 October 2021 that it had reached the set level of working gas inventories in Russian underground gas storage facilities at 72.638 bcm. The potential maximum daily deliverability of the facilities was brought to the level of 847.9 million cubic meters. The work on injecting gas into Russian UGS facilities will continue until 8 November.

Nord Stream 2 announced on 18 October 2021 that the gas-in procedure for the first string of the Nord Stream 2 pipeline had been completed. As planned and in line with the system design requirements, the string is filled with some 177 million m³ of so-called technical gas, reaching a pressure of 103 bar in the pipeline.

Gazprom announced on 1 October 2021 that Hungary and Croatia started receiving Russian natural gas via the TurkStream gas pipeline and across the national gas transmission systems of Bulgaria, Serbia, and Hungary. TurkStream is an export gas pipeline stretching from Russia to Turkey across the Black Sea with design capacity of 31.5 bcm per year.

Gazprom announced on 7 October 2021 that Gazprom, Linde, and RusKhimAlyans had signed a Memorandum of Intent (MOI) to assess the possibility of a third production train at the LNG production plant as part of the Gas Processing Complex near Ust-Luga.

Gazprom said on 28 October 2021 that the company and RusGazDobycha were building the Ust-Luga Complex for processing ethane-containing gas. The Complex will include an LNG production plant with its capacity of 13 million tonnes of LNG per year. The Portovaya LNG production, storage and shipment project in the Leningrad Region with its capacity of 1.5 million tonnes of LNG per year is under construction. Another mid-scale LNG plant near Vladivostok is considered. Gazprom has been operating a small-scale LNG plant and three natural gas receiving and regasification stations since 2014 in the Perm Territory. Gazprom is working to implement similar projects in the Tomsk and Sakhalin Regions.

Gazprom announced on 2 November 2021 registration of Gazprom Dobycha Tambey Limited Liability Company, a joint venture between Gazprom and RusGazDobycha. The venture will develop the Tambeyskoye field in the Yamal Peninsula, with production scheduled to start in 2026. Gas contained in the field is characterized by high ethane content.

NYK announced on 4 October 2021 that NYK signed long-term time-charter contracts for four newly built LNG carriers with NOVATEK Gas & Power Asia Pte. Ltd. through a joint venture with Sovcomflot. The carriers will be constructed at Samsung Heavy Industries (SHI) in Korea and are slated for delivery from 2023 to 2024. The vessels will be equipped with WinGD-made dual-fuel slow-speed diesel engines (i.e., X-DF diesel engines) that have superior fuel-consumption efficiency and can operate on marine gas oil or boil-off gas stored in the cargo tank. Each ship will have a re-liquefaction unit on board that can use re-liquefied excess boil-off gas and return it to the cargo tank, in addition to a shaft generator

system that uses the rotating propeller shaft for power generation.

Gazprom announced on 28 October 2021 that 432 out of 803.4 kilometers the pipeline section between Kovyktinskoye and Chayandinskoye had been welded, laid, and backfilled. Gas from Chayandinskoye is going into the Power of Siberia pipeline. In 2023, Power of Siberia will be receiving gas from the Kovyktinskoye field in the Irkutsk Region.

Gazprom announced on 22 October 2021 that the Amur GPP's first of three helium separation, liquefaction and packaging units had been brought into operation and first shipments were already on their way to the buyers.

Gazprom announced on 22 October 2021 that it held a meeting of the working group with the Mongolian Government on the implementation of the Memorandum of Understanding regarding the project for pipeline gas supply to China across Mongolia. The parties discussed the progress of the feasibility study for the Soyuz Vostok pipeline.

[South America]

The Panama Canal Authority announced on 29 October 2021 that its fiscal year 2021 (FY21 October 2020 - September 2021) had a record-breaking annual tonnage, 8.7% and 10% higher than FY20 and FY19, respectively, driven by LNG, LPG, and others. LNG carriers registered a 31.4% increase in tonnage through the Panama Canal, representing the largest gain across all segments.

New Fortress Energy (NFE) said on 2 November 2021 that the company expected to complete LNG terminal and power plant construction in Nicaragua in Q4 2021 and to begin commissioning of the company's power plant in Q1 2022. The company's La Paz LNG terminal in Baja California Sur, Mexico, is fully operational.

[Global issues]

The United States, the European Union, and 103 countries on 2 November 2021 launched the Global Methane Pledge, with a collective goal of reducing global methane emissions by at least 30% from 2020 levels by 2030 and a focus on high emission sources.

The United Nations and the European Commission announced on 31 October 2021 that the UN Environment Programme (UNEP) with support from the European Union launched the International Methane Emissions Observatory (IMEO) at the G20 Summit. IMEO will initially focus on methane emissions from the fossil fuel sector, and then expand to other major emitting sectors like agriculture and waste.

Reference: Company announcements, Cedigaz News Report.

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