

LNG Review January 2022 - Recent issues and events -

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Introduction

Preliminary figures of trade statistics for the year 2021 of the four major LNG markets in Northeast Asia were all released by the end of January 2022. China was officially confirmed as the largest importer of LNG in the world for 2021 with 78.93 million tonnes, compared to Japan's 74.32 million tonnes. While Japan's LNG import was almost the same one year earlier, China and Korea imported 18% and 15% more LNG than 2020, respectively. The average LNG import prices in December were USD 18.88 in China, USD 17.20 in Korea, USD 17.26 in Chinese Taipei, making Japan's USD 14.36 per million Btu the lowest in the region for four months in a row. For the calendar year 2021, they were USD 10.10 in Japan, USD 10.72 in Korea, USD 10.78 in Chinese Taipei, USD 10.80 in China, and USD 10.54 on the weighted average basis in the region.

As U.S. EIA (Energy Information Administration) expects steady growth of LNG export in 2022 and 2023, Cheniere Energy's Sabine Pass LNG Train 6 and Venture Global's Calcasieu Pass, both in Louisiana, have observed significant increases of feed gas flows lately for their commissioning activities.

Among those LNG production projects advancing toward investment decisions, the Texas LNG project in South Texas executed a pipeline gas transportation agreement and the Commonwealth LNG project in Louisiana signed a heads of agreement with Australia's Woodside for a long-term LNG offtake deal.

In Qatar, an EPC contract was announced for the upstream segment of the North Field East (NFE) project, which took a positive investment decision a year ago.

In Russia, NOVATEK announced two long-term LNG sales contracts with Chinese companies in January 2022 from the Arctic LNG 2 project. A-Property is apparently advancing engineering and marketing activities concerning an LNG production project in Yakutsk.

* 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.

[Asia Pacific]

INPEX CORPORATION announced on 17 January 2022 that it planned to implement exploratory drilling operations offshore Shimane and Yamaguchi prefectures in Japan to explore the possibility of locating oil and natural gas resources through INPEX San'in Offshore Development Co., Ltd.

Wärtsilä announced on 10 January 2022 that it had signed a long-term Optimised Maintenance Agreement with Singapore based NYK Shipmanagement. The 13-year contract is designed to ensure maximum uptime and equipment reliability, with assured maintenance costs, for an LNG carrier vessel featuring three Wärtsilä 50DF dual-fuel engines. The agreement was signed in November 2021.

Mitsui O.S.K. Lines, Ltd. (MOL) announced on 11 January 2022 that the company, along with ITOCHU Corporation had acquired Approval in Principle (AIP) from the American Bureau of Shipping regarding an ammonia bunkering vessel. The project is part of a joint development study on ammonia fuel supply chain in Singapore. MOL will play a leading role in the project together with its partners TotalEnergies Marine Fuels Pte. Ltd. and Pavilion Energy Singapore Pte. Ltd.

Japan Petroleum Exploration Co., Ltd. (JAPEX) announced on 11 January 2022 that it would participate in the project to construct an LNG terminal in the northern part of Vietnam. On 28 December 2021, JAPEX signed a share purchase agreement with ITECO JOINT STOCK COMPANY the promotor of the project. The project involves the construction of an LNG Terminal in the Nam Dinh Vu Industrial Park in Hải Phòng City and procurement, storage, and supply of LNG. The project was approved by the government to be added to the Gas Industry Development Master Plan on 11 February 2020. As the initial development, the construction of a 50,000 m³ LNG storage tank and associated jetty facilities capable of handling a throughput volume of up to 650,000 metric tonnes of LNG annually is planned, and the parties are working to make a final investment decision (FID) expected in the second half of 2022. Besides, an additional LNG storage tank of 30,000 m³ is planned for the latter half of the 2020s as the expansion development. The facilities to be constructed in the project are planned to commence commercial operation in 2025.

China's shipbuilding company Hudong-Zhonghua announced on 10 January 2022 that it had signed a contract with Japan's Mitsui O.S.K. Lines (MOL) for construction of six 174,000-cubic-metres LNG carrier ships of the latest generation of the 'Changheng Series'. CNOOC Gas & Power will charter the ships.

Singapore's LNG Alliance announced on 5 January 2022 that it had signed a Cooperation Agreement with India's New Mangalore Port Trust (NMPT), Karnataka, to develop an LNG import terminal with an initial capacity of 4 million tonnes per year, with

provision for LNG virtual pipelines and an LNG bunkering facility.

Kawasaki Heavy Industries (KHI), Electric Power Development Co., Ltd. (J-Power), Iwatani Corporation, Marubeni Corporation, and Sumitomo Corporation announced on 21 January 2022 arrival of the Suiso Frontier, the world's first liquefied hydrogen carrier, in Victoria, Australia, as part of the Hydrogen Energy Supply Chain (HESC) Pilot Project.

Australia's Woodside submitted on 10 January 2022 the proposal for its 500 MW Solar Facility to the Western Australian Environmental Protection Authority. Woodside looks to install up to one million solar panels to help power industrial customers in the region, including its own Pluto LNG export facility. Woodside announced the initial phase in May 2021 to supply 50 MW of power to the LNG plant. The Perdaman urea plant that may be built near Pluto was a potential customer for a further 50 MW.

Woodside announced on 18 January 2022 that the company had completed the sale of a 49% non-operating participating interest in the Pluto Train 2 Joint Venture to Global Infrastructure Partners (GIP). The deal was initially announced on 15 November 2021. On 22 November 2021 the Pluto Train 2 Joint Venture announced its final investment decision, contemporaneously with the final investment decision for the Scarborough development. Pluto Train 2 is a key component of the Scarborough development and includes a new LNG train and domestic gas facilities to be constructed at the existing Pluto LNG onshore facility. The first LNG cargo from Pluto Train 2 is targeted for 2026.

McDermott International announced on 10 January 2022 that it had been awarded a contract by Woodside, on behalf of the Scarborough Joint Venture, for the engineering, procurement, construction, installation and commissioning (EPCIC) services for its Floating Production Unit (FPU) offshore Western Australia. The integrated scope also includes the design, fabrication, integration, transportation and installation of the hull and topsides. The topside, which will be approximately 30,000 tonnes, will be fabricated by McDermott's joint venture fabrication yard in China. The project scope includes a battery energy storage system to reduce emissions on the topsides.

Chevron said on 28 January 2022 that although it held its one-sixth stake in Australia's North West Shelf project for sale about 18 months ago, it was no longer in a position to sell it.

Malaysia's Sabah State Government and PETRONAS on 4 January 2022 launched the Sabah Gas Masterplan that serves as a reference for both parties in guiding the way forward for the further development of natural gas in the State. The Masterplan highlights investment opportunities for Sabah's natural gas resources, including an LNG plant with a capacity of 2 million tonnes per year at the Sipitang Oil and Gas Industrial Park.

[North America]

LNG Allies - an LNG industry association - on 20 January 2022 submitted comments to the Export-Import Bank of the United States (EXIM) pursuant to their information request on potential parameters of EXIM bank financing for domestic projects. LNG Allies' key comment: LNG exports create tens of thousands of U.S. jobs and billions of dollars in economic growth, enhance the security of America's allies (especially in Europe), help reduce GHG emissions and air pollution abroad by replacing coal and other dirtier fuels, and contribute to alleviating energy poverty. An EXIM financing program that directly supported U.S. export facilities could assist U.S. LNG projects (all of whose output is exported) to reach final investment decisions and support all of these U.S. goals.

Cameron LNG on 18 January 2022 asked the Federal Energy Regulatory Commission (FERC) to amend the authorization under section 3 of the NGA in the Cameron Expansion Project Order. Cameron LNG has proposed to amend the authorization to construct Train 4 and associated design enhancements to reduce the GHG emissions from the project and increase the overall reliability and capacity of Train 4. The design enhancements of Train 4 will include the use of an electric drive ("E-Drive") motor to replace the Frame 7 Gas Turbine drives, and tie-ins to allow optionality of carbon sequestration of the acid gas from Train 4. The proposed amendment will include one liquefaction train (Train 4) with its own feed gas pre-treatment facility. Cameron LNG no longer plans to construct Train 5, so the overall maximum production capacity of the Amended Expansion Project will be reduced from 9.97 to 6.75 million tonnes per year, sourced exclusively from Train 4.

NextDecade unveiled on 4 January 2022 in its Rio Grande LNG Presentation that it expected an FID on a minimum of two trains of the project in second half of 2022.

Glenfarne Group announced on 18 January 2022 that its subsidiary Texas LNG Brownsville LLC, developing a four million tonnes per year LNG export project in the Port of Brownsville, South Texas, and Enbridge Inc. had executed a pipeline transportation precedent agreement for the expansion of the Valley Crossing Pipeline (VCP) to deliver 0.720 bcf per day of natural gas to Texas LNG's export facility for 20 years. VCP consists of a 160-mile (257 km) 42- and 48-inch diameter pipeline originating at Agua Dulce, a major Texas gas hub, and extending to the Port of Brownsville. Glenfarne is a developer, owner, and operator of energy transition infrastructure.

Australia's Woodside announced on 19 January 2022 that Woodside Energy Trading Singapore Pte Ltd had signed a heads of agreement (HOA) with Commonwealth LNG to negotiate a sale and purchase agreement for the supply of LNG from the proposed Commonwealth LNG development in Cameron, Louisiana. The HOA contemplates the purchase by Woodside of 2.0 million tonnes per year of LNG over 20 years, beginning in Q2

2026. Woodside's offtake obligation can be reduced or even eliminated as Commonwealth achieves increasing thresholds of offtake commitments from other buyers. Woodside would also have an option to purchase an additional 0.5 million tonnes per year of LNG.

Excelerate Energy announced on 7 January 2022 that it had filed a registration with the U.S. Securities and Exchange Commission (SEC) for a proposed Initial Public Offering (IPO) on the New York Stock Exchange (NYSE).

ExxonMobil announced on 18 January 2022 its ambition to achieve net zero greenhouse gas emissions for operated assets by 2050. The net-zero ambition is contained in the company's Advancing Climate Solutions - 2022 Progress Report. The net-zero aspiration applies to Scope 1 and Scope 2 greenhouse gas emissions and builds on ExxonMobil's 2030 emission-reduction plans, which include net-zero emissions for Permian Basin operations and ongoing investments in lower-emission solutions in which it has extensive experience, including carbon capture and storage, hydrogen and biofuels. The company's 2030 greenhouse gas emission-reduction plans include a 20-30% reduction in corporate-wide greenhouse gas intensity, which includes 40-50% reduction in upstream greenhouse gas intensity, 70-80% reduction in corporate-wide methane intensity, and 60-70% reduction in corporate-wide flaring intensity. The 2030 emission-reduction plans are expected to achieve World Bank Zero Routine Flaring by 2030 and reduce absolute greenhouse gas emissions by an estimated 30% for the company's upstream business and 20% for the entire corporation. Similarly, absolute flaring and methane emissions are expected to decrease by 60% and 70%, respectively by 2030.

Around 30 oil and gas facilities across the Permian emitted large volumes of methane over the three years of aerial surveys by EDF (Environmental Defense Fund) and research group Carbon Mapper. . . which did not disclose the corporate owners of the biggest sources but provided coordinates. According to an EDF analysis "Leak detection methods for natural gas gathering, transmission, and distribution pipelines" pipelines from wellheads to processing sites could be the biggest industry source of methane leaks.

Australia's Woodside announced on 18 January 2022 that the company entered front-end engineering design (FEED) on a hydrogen project for the first time, awarding a contract in late December 2021 for FEED engineering services to Kellogg, Brown & Root LLC (KBR) for its proposed H2OK project in Oklahoma, a liquid hydrogen production facility. Phase 1 involves construction of an initial 290-megawatt (MW) facility, producing up to 90 tonnes per day of liquid hydrogen through electrolysis, targeting the heavy transport sector. Woodside is targeting a final investment decision (FID) on H2OK in the second half of 2022, and first liquid hydrogen production in 2025.

[Middle East]

Engineering, Procurement, Construction, and Installation (EPCI) Contract for the offshore scope of QatarEnergy's North Field Expansion Project has been awarded to McDermott. The scope for the contract includes 13 normally unmanned wellhead platforms topsides (eight for NFE and five for NFS), in addition to various connecting pipelines and the shore approaches for the NFE pipelines, beach valve stations and buildings.

[Africa]

TotalEnergies and Inpex announced on 17 January 2022 that they had signed an agreement to sell the company Angola Block 14 B.V. to the Angolan Company Somoil. Angola Block 14 B.V., owned by TotalEnergies Holdings International B.V. (50.01%) and Inpex Angola Block 14 Ltd (49.99%) holds a 20% interest in block 14 in Angola and a 10% interest in block 14K. The offshore blocks have been producing since 1999.

Mozambique's National Petroleum Institute (INP) announced on 3 January 2021 that the floating platform that would be installed in Area 4 of the Rovuma Basin for gas exploration had arrived in Mozambique. The platform left the shipyards of Samsung's industrial division in Geoje, Korea, on 15 November 2021, for Cabo Delgado, northern Mozambique. The platform has storage tanks on the hull and 13 modules above them, including a liquefaction plant, an eight-storey module where 350 people can live, and a helipad.

Baker Botts (UK) L.L.P. announced on 26 January 2022 that it had been hired by the Tanzania Petroleum Development Corporation (TPDC) as the Transaction Adviser to the Government Negotiation Team and TPDC regarding the development of an LNG project. The project involves development and construction of an onshore plant to liquify natural gas from offshore discoveries and to export LNG. The project would involve TPDC with international energy companies including Equinor, Shell, ExxonMobil, Pavilion Energy and Ophir Energy.

[Europe / Russia]

The United States and the European Union issued a joint statement on U.S.-EU Cooperation on Energy Security on 28 January 2022: "The United States and the EU are working jointly towards continued, sufficient, and timely supply of natural gas to the EU from diverse sources across the globe to avoid supply shocks, including those that could result from a further Russian invasion of Ukraine. The United States is already the largest supplier of liquefied natural gas (LNG) to the EU. We are collaborating with governments and market operators on supply of additional volumes of natural gas to Europe from diverse sources across the globe. LNG in the short-term can enhance security of supply while we continue to

enable the transition to net zero emissions. The European Commission will work for improved transparency and utilization of LNG terminals in the EU."

The European Commission released on 19 January 2022 a feasibility report on clean hydrogen (Blending hydrogen from electrolysis into the European gas grid) studied by JRC. According to the report, the EU's existing gas pipeline network could carry 40 GW to 70.8 GW of hydrogen made from electrolysers. The EU's existing gas network and appliances can blend 5-10% of hydrogen into their systems without modification. Post-modification, up to 20% hydrogen blending is possible, which the EU expects to be feasible by the end of this decade, equating to around 4.5 million tonnes of hydrogen per year.

Britain's Energy Networks Association (ENA) published Britain's Hydrogen Blending Delivery Plan on 13 January 2022, setting out how the five gas grid companies will meet the Government's target for Britain's network of gas pipes to be ready to deliver 20% hydrogen around the country from 2023, as a replacement for up to a fifth of the natural gas currently used.

The Netherlands' Ministry of Economic Affairs initially assumed 3.9 bcm of gas production from the Groningen field during the gas year (October 2021 to September 2022), but the extraction will amount to a maximum of 7.6 billion cubic meters, according to calculations by grid operator GTS (Gasunie Transport Services B.V.).

Wärtsilä announced on 4 January 2022 that it had been selected to supply a broad scope of solutions for new LNG-fuelled container ships ordered by CMA CGM of France. The latest series comprises 12 container vessels to be built in China. Six 13,000 TEU container vessels are being built at the Hudong-Zhonghua Shipbuilding (Group) CO. Ltd, with the other six 15,000 TEU container vessels under construction at the Jiangnan Shipyard (Group) Co., Ltd. The Wärtsilä equipment is scheduled for delivery to the yards commencing in 2022, and the first of the 12 vessels is expected to be launched in Q3 2023. Wärtsilä was earlier contracted to supply a similar scope for nine 23K TEU CMA CGM vessels which have been delivered and five 15K TEU whereof 2 vessels are delivered, and 3 vessels are under construction now.

Norway's Equinor said on 31 January 2022 that due to continuing consequences from the pandemic and operational restrictions the time of start-up of the Hammerfest LNG plant was pushed from 31 March 2022 to 17 May 2022.

px Group announced on 26 January 2022 that it had been appointed as the operator of the Risavika Liquefaction Plant (RLP) in Southern Norway by North Sea Midstream Partners (NSMP). The plant has a capacity of 300,000 tonnes of LNG per year. The plant operates predominantly on electricity produced from renewable sources.

Greece's Gastrade announced on 31 January 2022 that the Final Investment

Decision (FID) for the construction of the Independent Natural Gas System (INGS) of Alexandroupolis was taken on the previous day. The Floating Storage and Regasification Unit (FSRU) will be connected to the National Natural Gas Transmission System of Greece with a 28 km long pipeline, enabling the gasified LNG to be transmitted to the markets of Greece, Bulgaria and the wider region, from Romania, Serbia and North Macedonia, as all the way to Moldova and Ukraine. The Terminal is expected to operate by the end of 2023, with the contracted regasification capacity already reaching up to 50% of its technical capacity of 5.5 bcm per year.

Russia's Gazprom said on 2 January 2022 that in the year 2021 the company 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.

NOVATEK announced on 11 January 2022 that NOVATEK Gas & Power Asia Pte. Ltd., and Zhejiang Energy Gas Group Co., Ltd., a subsidiary of the Zhejiang Provincial Energy Group signed a long-term LNG sale and purchase agreement (SPA) for 1 million tonnes per year of LNG for 15 years from the Arctic LNG 2 project. On the day NOVATEK also announced that NOVATEK Gas & Power Asia Pte. Ltd., and ENN LNG (Singapore) Pte. Ltd., a subsidiary of ENN Natural Gas Co., Ltd. had signed a long-term LNG sale and purchase agreement (SPA) for 0.6 million tonnes of LNG for 11 years from the project.

Gazprom announced on 25 January 2022 that the feasibility study for the Soyuz Vostok gas trunkline construction project, which will stretch for 962.9 kilometers in Mongolian territory, had been completed. The pipeline will become an extension of Russia's Power of Siberia 2 gas pipeline in Mongolian territory.

Russia's A-Property announced on 19 January 2021 that the company and China's Zhejiang Energy had signed indicative terms of a deal for the sale of 10% stakes in the companies of the Yakutsk gas project - YATEK PJSC and Globaltek LLC. Japan's JGC and Norway's Aker Solutions will conduct the front-end engineering design and project documentation for Russia's Yakutsk LNG project, according to A-Property. A-Property plans to develop the project via Yatek, to produce up to 18 million tonnes of LNG per year.

[South America]

The Energy Ministry of Trinidad and Tobago announced on 25 January 2022 the execution by the Government, and Atlantic LNG Shareholders, companies affiliated with BP, Shell Trinidad and Tobago Limited (Shell) and The National Gas Company of Trinidad and Tobago Limited (NGC) of a Heads of Agreement for the restructuring of Atlantic LNG. It was

agreed that that the Atlantic LNG facilities would be managed more efficiently if brought under the framework of a single ownership structure. The proposed date for completion and execution of the Definitive Restructuring Agreements is 30 June 2022.

[Global issues]

According to DNV, 240 LNG-fuelled vessels were ordered in 2021, led by the container ship, tanker and bulk carrier sectors. As of 1 January 2022, 251 LNG-fuelled vessels were in operation and 403 were on order or under construction. There are another 210 LNG-ready vessels. By 2028, there will be at least 864 LNG-fuelled and LNG ready vessels. There are 33 LNG bunker vessels in operation. LNG bunkering is available at 141 ports worldwide.

The Oxford Institute for Energy Studies (OIES) published on 18 January 2022 a series of short articles on 20 key themes for the global energy economy in 2022. In "From 'Carbon-Neutral' to 'GHG Verified' LNG Cargoes" Professor Jonathan Stern raises the debate around "carbon neutral LNG" and suggests that 2022 should be the year when definitions around the GHG emissions in the LNG value chain should be tightened to allow for accurate measurement, reporting, and verification. He argues that the term carbon-neutral LNG should be abandoned in favour of "GHG verified LNG (with or without offsets)".

Reference: Company announcements, Cedigaz News Report.

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