

LNG Review August 2023
- Recent issues and events -
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Introduction

Labour-management negotiations are underway for three large-scale LNG projects in Western Australia, two of which have not reached an agreement at the time of writing, and protected industrial actions may be possible on and after 7 September, which may cause delays or reductions in LNG shipments.

The second-quarter 2023 company results, which reflect the impact of the decline in LNG and gas prices in the first half of the year, were announced by major LNG suppliers, and profits generally declined due to the lower realised prices. Even under these circumstances, companies announced steady progress in their respective LNG production projects.

Cheniere Energy has the largest LNG production capacity in the United States of 45 million tonnes per year from two projects on the Gulf Coast, Sabine Pass Liquefaction (SPL) in Louisiana and Corpus Christi Liquefaction (CCL) in Texas. The company explained the development status of the SPL Expansion project, adjacent to the SPL project, with a total production capacity of up to 20 million tonnes per year from three liquefaction trains.

The company indicated that the CCL Stage 3, adjacent to the CCL project with capacity of 10 million tonnes per year from seven Mid-Scale liquefaction trains, was 38.1% complete. In addition, the company plans to have two Mid-Scale liquefaction trains adjacent to the site, with capacity of 3 million tonnes per year (CCL Mid-Scale 8 & 9 project).

Sempra, which operates the Cameron LNG project in Louisiana with Japanese equity partners and long-term offtake agreement with Japanese LNG buyers, revealed that a competitive FEED process was underway for the Cameron LNG Phase 2 project, aiming to make an investment decision in 2024.

The company also revealed that it planned to fix its equity ownership of the Port Arthur LNG Phase 1 project in Texas, with an annual capacity of 13.5 million tonnes, to 28% after an FID in March.

The company also indicated that the Costa Azul LNG Export Phase 1 project, which is under construction at the site of its LNG import terminal on the Pacific coast of Mexico, was still expected to be operational by summer 2025.

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[Asia Pacific]

Osaka Gas Co., Ltd. and ENEOS Corporation announced on 29 August 2023 that they had started joint studies on the large-scale production of Japan's first domestically produced e-methane using green hydrogen in the Osaka Port area. Green hydrogen produced overseas would be converted into methylcyclohexane (MCH), an efficient mode of hydrogen storage and transportation, transported, and combined with carbon dioxide (CO₂) captured domestically to produce domestic e-methane on a large scale. The companies target to establish production capacity of 60 mcm per year and start operation by 2030 in the Osaka Bay area.

SHPGX (Shanghai Petroleum and Natural Gas Exchange) announced on 23 August 2023 that Singapore's Pavilion Energy would use the Chinese currency (CNY) to pay for an LNG cargo sold by CNOOC (China National Offshore Oil Corporation).

China's National Bureau of Statistics (NBS) said on 15 August 2023 that natural gas production reached 134 bcm from January to July, up 5.7% year on year. Natural gas production in July reached 18.4 bcm, up 7.6% year-on-year. Gas imports stand at 10.31 million tonnes in July, up 18.5%.

Australia's offshore union umbrella group Offshore Alliance (OA) said on 29 August 2023 that at the Wheatstone and Gorgon LNG facilities said rolling labour stoppages, and "bans and limitations" on some tasks would start on 7 September as part of a protected industrial action notice. The actions will "escalate each week until Chevron agrees to our bargaining claims," OA said.

Chevron Australia announced on 23 August 2023 that the company's Wheatstone Project had executed technical enhancements and plant modifications to increase production rates at the domestic gas facility at the project. The official nameplate capacity of Wheatstone's domestic gas plant will increase from 205 terajoules per day to 215 terajoules per day (1.44 million tonnes per year) - an increase of 5%. The company said further work would be undertaken over coming months to trial even higher domestic gas production rates.

Woodside Energy announced on 24 August 2023 that the company had reached in-principle agreement with the Australian Workers' Union and the Electrical Trades Union and other bargaining representatives on an enterprise agreement covering employees on its North West Shelf offshore platforms. The next steps will be for the enterprise agreement to be finalised and then voted on by employees and approved by the Fair Work Commission. The unions have committed to not filing a Notice of Protected Industrial Action while that process is underway.

Western Australia's Government announced on 15 August 2023 that the government updated the WA Domestic Gas Policy for the Perth and Canning Basin. The update follows the August 2020 update to the WA Domestic Gas Policy, Revised policy to secure domestic

gas supply and create jobs, which prevents the export of onshore gas through the existing pipeline network. To ensure domestic energy security, the WA Government will not consider exemptions from the WA Domestic Gas Policy for onshore gas developments on the existing pipeline network to export LNG, including those in the Perth Basin. Gas from the existing pipeline is for Western Australian industry and consumers only. For the Canning Basin, these gas resources are not connected to the existing pipeline network and as such a normal application of the WA Domestic Gas Policy applies, which requires gas project developers to make available 15% of exports for the domestic market. The Waitsia Joint Venture has approval to process 7.5 million tonnes of LNG for export at the North West Shelf LNG facilities to the end of 2028, using gas from the Waitsia gas field located onshore in the Perth Basin. The Waitsia Joint Venture's LNG export approval was granted as an exception to the WA Domestic Gas Policy, which prevents the export of WA pipeline gas.

Woodside and LNG Japan announced on 8 August 2023 a strategic relationship which involves three elements: equity participation in the Scarborough Joint Venture, potential LNG offtake and collaboration on opportunities in new energy. Woodside has entered into an agreement with LNG Japan for the sale of a 10% non-operating participating interest in the Scarborough Joint Venture. Woodside and LNG Japan Corporation have entered into a non-binding heads of agreement (HOA) for the sale and purchase of 12 LNG cargoes per year (0.9 million tonnes per year) for 10 years commencing in 2026.

INPEX CORPORATION and TotalEnergies announced on 21 August 2023 that through their respective subsidiaries they had agreed to acquire 74% and 26% of the participating interest held by PTTEP in the AC/RL7 block in Australia. The AC/RL7 block is located off the northern coast of Western Australia and lies approximately 250 kilometers northeast of the Ichthys Gas-condensate Field, which supplies natural gas to the Ichthys LNG Project.

Australia's Santos announced on 7 August 2023 that Santos and its Bayu-Undan joint venture partners had signed a Memorandum of Understanding (MOU) with Timor-Leste's national oil company TIMOR GAP to explore partnership opportunities for the proposed Bayu-Undan carbon capture and storage (CCS) project offshore Timor-Leste. The MOU follows four non-binding MOUs for CO₂ supply to Bayu-Undan CCS that indicate demand for CO₂ storage at Bayu-Undan CCS could be more than 10 million tonnes per year. The MOU with TIMOR GAP includes sharing information about Bayu-Undan CCS and exploring potential partnership opportunities, including equity participation for TIMOR GAP in the Bayu-Undan CCS project. Santos has a 43.4% operated interest in Bayu-Undan. The remaining interest is held by SK E&S (25%), INPEX (11.4%), Eni (11%) and Tokyo Timor Sea Resources (9.2%).

Santos said on 23 August 2023 in its Half-year Results Announcement that at least

one more cargo of LNG was expected to be produced from Bayu-Undan feed gas in 2023, after which the residual gas from the field would be re-directed to the domestic market. If drilling is restarted before the end of 2023, the company expects production from the Barossa project in the first half of 2025.

Indonesia's upstream regulator SKK Migas said on 17 August 2023 that construction and commissioning work at Tangguh LNG Train 3 had been completed. First LNG is targeted for September 2023.

Santos announced on 1 September 2023 that it had executed a binding sale agreement to deliver Kumul Petroleum Holdings Limited (Kumul) a 2.6% participating interest in PNG LNG. Completion is conditional only on the approval of the PNG competition regulator by 31 December 2023. Santos has agreed to grant Kumul a call option to acquire a further 2.4% participating interest in PNG LNG. The Call Option must be exercised by 30 June 2024. On 27 September 2022 Santos announced the receipt of a binding conditional offer from Kumul to acquire a 5% interest in PNG LNG.

[North America]

In its second quarter 2023 report on 3 August 2023, Cheniere Energy explained that the company was developing an expansion adjacent to the SPL Project consisting of up to 3 natural gas liquefaction Trains with an expected total production capacity of approximately 20 million tonnes per year of LNG (the "SPL Expansion Project"). In May 2023, certain subsidiaries of Cheniere Partners entered the pre-filing review process with respect to the SPL Expansion Project with the FERC (Federal Energy Regulatory Commission) under the NEPA (National Environmental Policy Act), and in April 2023, executed a contract with Bechtel to provide the FEED for the SPL Expansion Project.

Cheniere Energy announced on 22 August 2023 that Cheniere Marketing, LLC had entered into a long-term LNG sale and purchase agreement (SPA) with BASF. BASF has agreed to purchase up to approximately 0.8 million tonnes per year of LNG on an FOB (free-on-board) basis for a purchase price indexed to the Henry Hub price, plus a fixed liquefaction fee. Deliveries will commence in mid-2026 and, subject to a positive Final Investment Decision with respect to the first train (Train Seven) of the Sabine Pass Liquefaction Expansion Project (SPL Expansion Project) in Louisiana, will increase to approximately 0.8 million tonnes per year upon the start of commercial operations of Train Seven. The term of the SPA extends through 2043. The SPL Expansion Project is being developed for up to approximately 20 million tonnes per year of total LNG capacity.

In its second quarter 2023 report on 3 August 2023, Cheniere Energy explained that it was constructing an expansion adjacent to the CCL Project consisting of 7 midscale Trains with an expected total production capacity of over 10 million tonnes per year of LNG (the

"CCL Stage 3 Project"). The company is developing 2 midscale Trains with an expected total production capacity of 3 million tonnes per year of LNG (the "CCL Midscale Trains 8 & 9 Project") adjacent to the CCL Stage 3 Project. In March 2023, certain of the company's subsidiaries filed an application with the FERC for authorization to site, construct and operate the CCL Midscale Trains 8 & 9 Project under the NGA (Natural Gas Act), and in April 2023, filed an application with the DOE (Department of Energy) requesting authorization to export LNG to FTA and non-FTA countries.

In its second quarter 2023 report on 3 August 2023, Sempra said that the competitive front-end engineering design (FEED) process on the proposed Cameron LNG Phase 2 project was underway. Cameron LNG JV recently informed Bechtel that it had been selected to perform additional value engineering work on the proposed Phase 2 project, and the parties are negotiating the terms and conditions for a definitive engineering, procurement and construction (EPC) contract. Sempra Infrastructure expects this process to continue through the fall, positioning the company to make a final investment decision in 2024.

Tokyo Gas Co., Ltd., Osaka Gas Co., Ltd., Toho Gas Co., Ltd., and Mitsubishi Corporation announced on 30 August 2023 that they had reached a basic agreement with Sempra Infrastructure Partners LP to conduct a joint study to establish a supply chain to produce and liquefy e-methane in the Gulf of Mexico region of the United States and transport it internationally. The plan envisages to liquefy 130 thousand tonnes of e-methane per year at the Cameron LNG facility in Southwest Louisiana where Mitsubishi Corporation holds liquefaction capacity and export the volumes to Japan. Tokyo Gas, Osaka Gas, Toho Gas, and Mitsubishi Corporation had studied the project's feasibility in detail since 2022.

In its second quarter 2023 report on 3 August 2023, Sempra said that Sempra Infrastructure Partners expected to finalize its ownership stake in Port Arthur LNG Phase 1 at an indirect ownership of 28%. The transaction is anticipated to close in the third quarter of 2023. Another component of the proposed Port Arthur energy hub is the development of the Louisiana Connector pipeline. Sempra Infrastructure has acquired pore space for the proposed Titan Carbon Sequestration project, which is located nearby in Jefferson County, Texas.

Tellurian Inc. said on 7 August 2023 that the company secured binding commitment for USD 1 billion in Driftwood financing from the Real Estate platform of Blue Owl. To date, the company has invested over USD 1 billion and received additional commitments for USD 1 billion of Driftwood project costs. Driftwood Phase I is well underway with Bechtel having commenced construction in April 2022. Tellurian extended limited notice to proceed with Bechtel in 2023, continuing project work from 2022. The project has cleared all Phase I critical areas, drove ~45% of Phase I piles and poured all Plant 1 compressor foundations. The advanced site work de-risks the project execution and timeline, a significant benefit to

Driftwood partners. However, the next day, Tellurian said a deal to sell LNG to Gunvor Group Ltd. from its Driftwood project had been terminated. Two other supply deals underpinning Driftwood with Shell and Vitol were also cancelled in 2022. All three deals were signed to provide LNG for terms of 10 years at prices linked to the Title Transfer Facility and Japan-Korea Marker.

Venture Global LNG announced on 10 August 2023 that its Plaquemines LNG export plant in Louisiana had received its first two liquefaction modules.

The U.S. DOE's (Department of Energy) Office of Fossil Energy and Carbon Management gave notice of receipt of an Application filed on 18 August 2023, by Lake Charles Exports, LLC (LCE), seeking long-term multi-contract authorization to export domestically produced LNG up to the equivalent of 851 billion cubic feet (17.71 million tonnes) of natural gas per year to Non-Free Trade Agreement (Non-FTA) countries.

Delfin Midstream Inc. announced on 23 August 2023 that it had entered into a design and engineering contract with Wison Offshore & Marine to develop Floating LNG (FLNG) vessels for application on the company's deepwater port projects under construction in North America. Merchant commodities firm Hartree Partners LP is conducting marketing operations to Chinese LNG buyers on Delfin's behalf and Delfin is also progressing the development of additional deepwater port projects in North America. Delfin has been developing the Delfin LNG Deepwater Port project, which can support four FLNG vessels with a combined export capacity of up to 13.3 million tonnes per year. The company has secured commercial agreements for LNG sales and liquefaction services and is in the final phase towards FID on its first two FLNG vessels.

Commonwealth LNG announced on 14 August 2023 that it had closed an investment of development capital from private funds managed by Kimmeridge Energy Management Company, LLC. This investment completes the development funding required for Commonwealth LNG to reach a final investment decision (FID) on its 9.3 million tonne per year LNG export facility in Cameron, Louisiana, according to the company. Commonwealth LNG and Kimmeridge have also agreed in principle on terms for a 20-year, 2 million tonnes per year LNG offtake commitment from the facility along with the associated gas supply. The company further said that recent LNG marketing progress, the completion of FEED, and the conclusion of the EPC contract with Technip Energies ensured Commonwealth commences delivering LNG to our customers in early 2027.

Commonwealth LNG announced on 21 August 2023 a strategic agreement with Baker Hughes related to Commonwealth LNG's facility. Baker Hughes will work with Commonwealth LNG on maximizing the project's output and minimizing emissions through the use of Baker Hughes' LM9000 aeroderivative gas turbine technology. The LM9000 equipment order is expected to be granted in conjunction with financial close of the

Commonwealth LNG project, which is expected in the first quarter of 2024.

Canada's Haisla Nation and Pembina Pipeline announced on 3 August 2023 that the Cedar LNG project elected to progress a second Front End Engineering Design (FEED) process for the floating LNG vessel in late 2022 and had been waiting for that work to progress to the same stage as the original FEED. In conjunction with detailed commercial discussions and ongoing negotiations between LNG Canada and Coastal GasLink, this has resulted in the anticipated final investment decision (FID) being revised to the fourth quarter of 2023. On 6 July, Cedar LNG received its LNG Facility Permit from the BC Energy Regulator, following the receipt of the Environmental Assessment Certificate from the B.C. Environmental Assessment Office, a positive Decision Statement from the federal Minister of Environment and Climate Change, and a pipeline permit for the Cedar LNG Pipeline connection to the Coastal GasLink Pipeline. The partners said that in addition to the Memorandum of Understanding (MOU) with ARC Resources Limited, Cedar LNG had signed incremental non-binding MOUs with investment grade counterparties for long-term liquefaction services and is fully subscribed in relation to the project's total capacity.

McDermott revealed on 7 August 2023 that it had started construction of Canada's Woodfibre LNG project at its fabrication yard in China.

In its second quarter 2023 report on 3 August 2023, Sempra said construction continued according to plan at the Energía Costa Azul LNG Phase 1 project on the Pacific Coast, remaining on track to reach commercial operations by summer of 2025.

Mexico Pacific and ConocoPhillips announced on 3 August 2023 that they had signed sales and purchase agreements (SPAs) for ConocoPhillips to offtake 2.2 million tonnes per year of LNG across trains 1, 2 and 3 of Mexico Pacific's anchor LNG export facility, Saguaro Energía, located in Puerto Libertad on the west coast of Mexico. ConocoPhillips also has an option to contract further expansion train volumes. ConocoPhillips will purchase LNG on an FOB (free on-board) basis over 20 years. When fully operational, the first phase of the facility will have three trains with a combined capacity of 15 million tonnes per year.

New Fortress Energy (NFE) said on 8 August 2023 that the first rig for FLNG 1 at Altamira was installed in the second quarter of 2023 and targeting a commercial operation date in the third quarter.

[Middle East]

Abu Dhabi's ADNOC Gas plc announced on 17 August 2023 a five-year LNG supply agreement with Japan Petroleum Exploration Co., Ltd. (JAPEX).

Spain's Técnicas Reunidas announced on 21 August 2023 that QatarEnergy had awarded Técnicas Reunidas additional Engineering, Procurement and Construction (EPC) work including the pipelines, interconnections, ancillary systems, and other supporting

components for the LNG Off-plot facilities for the North Field South Project. Técnicas Reunidas is executing the EPC works for the expansion of the Condensate, LPG, and MEG storage, distribution, and associated facilities for the North Field Expansion Project. Tecnicas Reunidas is also executing the EPC works for the Sulfur Handling Facility for the North Field Expansion Project in a Joint Venture with Wison Engineering Ltd. The new scope includes the engineering, procurement, construction, and commissioning of a range of off-plot facilities. These include the LNG rundown lines, boil-off gas (BOG) recovery and utility pipelines that will connect the southern part of Ras Laffan Industrial City to new storage tanks and export facilities in RLIC. The scope of the project also includes the commissioning of LNG Tanks, an LNG loading berth, BOG compressors, and associated equipment. Total contract value is around USD 560 million.

Oman LNG and Germany's SEFE (Secure Energy for Europe) announced on 14 August 2023 a binding term-sheet agreement to supply 0.4 million tonnes per year of LNG for four years from 2026. On 30 August 2023 Oman LNG signed an agreement with Shell's Middle East trading arm to supply 800,000 tonnes per year of LNG for 10 years from 2025. Oman LNG also agreed to supply OQ Trading, owned by the government of Oman, with around 750,000 tonnes per year for four years from 2026.

Israel's Ministry of Energy and Infrastructure announced on 24 August 2023 that it was promoting plans to expand the annual production of natural gas from the Tamar field by approximately 6 BCM in 2026, a roughly 60% increase in the reservoir's production capacity.

[Africa]

Eni announced on 28 August 2023 that the company had started production of oil and gas from the Baleine Field, located in the waters offshore Côte d'Ivoire after the discovery in September 2021. The company claims it as the first emissions-free - Scope 1 and 2 - production project in Africa. The project leverages the best available technologies to minimize emissions. Residual emissions are offset through initiatives developed within the country, including supplying and distributing improved stoves to local communities, eliminating the need for wood or coal for cooking. Simultaneously, Eni has launched studies for Nature-Based Solutions projects.

bp revealed on 1 August 2023 in its presentation of its second quarter of 2023 results that its Phase 1 of the Greater Tortue Ahmeyim (GTA) gas and LNG development offshore Senegal and Mauritania was expected to be online in the first quarter of 2024.

Italy's Saipem announced on 10 August 2023 that the company had been awarded a new contract by Eni Congo. The contract is for the conversion of Scarabeo 5 semisubmersible drilling unit into a separation and boosting plant (Floating Production Unit - FPU). The FPU is a semisubmersible production platform that receives the production fluids from wellheads

riser platforms, separate the gas from liquids and boosts the gas in order to feed the Floating LNG (FLNG) unit. The commissioning offshore and the start-up of the FPU are scheduled by the fourth quarter of 2025. The contract is part of Eni's Congo LNG Project that is expected to reach an overall LNG production capacity of 3 million tonnes per year from 2025.

[Europe / Surrounding regions]

PRISMA announced on 23 August 2023 that the third tendering round via AggregateEU would be launched on 21 September, opening the Demand Collection process for companies which subscribing to AggregateEU. The window stays open until 27 September. The submitted demand will be subsequently aggregated and ultimately matched with sellers' offers through a tender. The process will allow for demand and bids to be placed for the months of November 2023 until March 2025.

Gate terminal and its shareholders Gasunie and Vopak announced on 23 August 2023 that the final investment decision (FID) had been taken to expand Gate terminal's storage and regasification capacity. The expansion consists of a new LNG storage tank of 180,000 m³ and additional regasification capacity of 4 BCM per year. The new capacity is already rented out under long term commercial agreements and is expected to be ready for operation by the second half of 2026. Once all envisaged projects at Gate terminal have been completed, the terminal will have a total regas capacity of 20 billion cubic meters per year.

Deutsche ReGas, the operator of a privately-owned LNG terminal in Germany's port of Mukran, announced on 9 August 2023 that companies had booked all of the offered regasification capacities at the planned Phase II of the Deutsche Ostsee LNG project. Deutsche ReGas said that a total of 4 Bcm per year of capacity was offered for a period of at least 10 years. The additional capacity comes from another floating storage and regasification unit (FSRU) in addition to the existing Neptune FSRU, now known as Lubmin LNG, that Deutsche ReGas charters from TotalEnergies operating since January 2023. Deutsche ReGas also plans to offer remaining volumes at a later date, which can be booked at short notice.

Norway's Equinor announced on 8 August 2023 that the government had approved the Snøhvit partners' plans for the future operation of Snøhvit and Hammerfest LNG. The approval entails onshore compression from 2028, and electrification of the plant from 2030.

Spain's Enagás announced on 11 August 2023 that the LNG terminal of El Musel, in Gijón, received Endesa's first vessel following the final technical tests required before the plant's commercial commissioning, the 180,000 m³ capacity 'Gaslog Warsaw'. On 31 July, following the capacity allocation procedure (Open Season) carried out by Enagás, Endesa began operations as the company awarded the contract for the terminal's logistics services. In July, the terminal received two ships as a necessary technical precursor to the commercial commissioning of the terminal.

Germany's RWE announced on 24 August 2023 that the Czech Republic's state-owned operator of the electric power transmission system ČEPS, a.s., had agreed with RWE on the sale of its subsidiary RWE Gas Storage CZ, s.r.o. RWE Gas Storage CZ, s.r.o. is the largest operator of gas storage facilities in the Czech Republic with six underground gas storage facilities with a total operating volume of more than 2.7 bcm. The transaction is expected to be closed in 2023.

Poland's GAZ-SYSTEM announced on 18 August 2023 that GAZ-SYSTEM and ORLEN had signed an agreement for regasification services at the FSRU Terminal in the Gulf of Gdańsk. The FSRU (Floating Storage Regasification Unit) project is expected to perform regasification process of 6.1 bcm per year. GAZ-SYSTEM is currently conducting an Open Season procedure for the second FSRU Terminal for additional 4.5 bcm per year.

Russia's Novatek announced on 13 August 2023 that the company had completed the installation of the first gravity-based structure platform of its Arctic LNG 2 project located on the Gydan peninsula at the Utrenneye field. The project is planned to include three LNG production trains with a capacity of 6.6 million tonnes per year each.

According to media reports, the Russian government has tasked Novatek with construction of an LNG terminal on the Kamchatka Peninsula.

[South America]

The Panama Canal Authority (ACP) said in a 16 August 2023 shipping advisory that the canal was maintaining restricted booking conditions for a significant portion of its available locks until 2 September. ACP was planning to originally lift these restrictions on 21 August. The Canal is currently facing significant drought conditions, which forced authorities to limit daily transit capacity to 32 vessels per day instead of the usual average of 36 for the rest of 2023 and part of 2024.

Osaka Gas, Marubeni, and Peru LNG S.R.L. announced on 22 August 2023 that they had signed a joint study agreement to commence a Preliminary-Front End Engineering and Design study (Pre-FEED) for a project to produce e-methane from green hydrogen and carbon dioxide (CO₂) in Peru. The three parties have conducted an initial study for the project since July 2022. The initial study investigated the potential for procuring renewable energy and CO₂ required to produce 60,000 tonnes of e-methane per year for domestic use and export to Japan, confirming abundant renewable energy sources, including solar, wind, and hydropower, and the project site Peru LNG plant's capacity of CO₂. An investment decision could be made by 2025, aiming for production and sales of e-methane by 2030.

Reference: Company announcements.

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