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LNG expansion expected to have impacts on trade flows, pricing and gas security

Annual market report from International Energy Agency plots coming natural gas trends

Strong demand growth from China, greater industrial demand and rising supplies from the United States will transform global pipeline natural gas and LNG markets over the next five years.

Global gas demand will grow at an average rate of 1.6 percent a year, reaching just over 4,100 billion cubic metres (Bcm) in 2023, up from 3,740 Bcm in 2017, according to the annual gas market report of the International Energy Agency, entitled "Gas 2018".

"Most new US supplies will be geared to export markets as LNG or through pipelines," said the report.

Gas-indexed

"The development of destination-free and gas-indexed US LNG exports will provide additional flexibility to the expanding global water-borne traded market," it said.

"LNG is progressively taking a larger share in global gas trade, especially in Asia. LNG trade as a share of total gas trade is forecast to rise from a third in 2017 to almost 40 percent in 2023," added the report.

"Emerging Asian markets will account for about half of global LNG imports by 2023," it said.

"This continued rise in the LNG market will have significant impacts on trade flows, pricing structures and global gas security," explained the IEA.

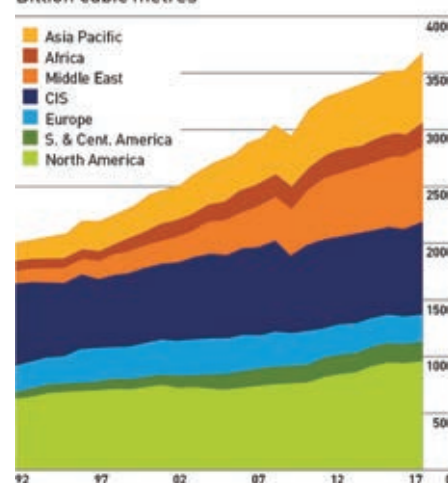
The current wave of LNG export projects will increase liquefaction capacity by 30 percent by 2023.

Growth

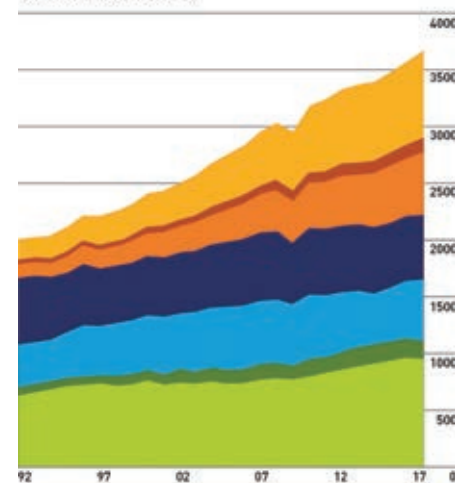
"This will be led by an increase in output from the United States, which accounts for nearly three-quarters of the growth in total global LNG exports in the period, followed by Australia and Russia," said the report.

"However, a lack of new LNG projects after 2020 could lead to a tightening of LNG markets. Given the long-lead time

Natural gas: Production by region
Billion cubic metres



Natural gas: Consumption by region
Billion cubic metres



Natural gas output and consumption by region (IEA data)

of such projects, investment decisions will need to be taken in the next few years to ensure adequate LNG supply beyond 2023," the agency stated.

In the next five years, global gas markets are being re-shaped by three major structural shifts, explained Fatih Birol, the IEA's Executive Director in his report presentation.

China

"China is set to become the world's largest gas importer within two-to-three years, US production and exports will rise dramatically strongly and industry is replacing power generation as the leading growth sector," explained Birol.

"While gas has a bright future, the industry faces tough challenges. These include the need for gas prices to remain affordable relative to other fuels in emerging markets and for industry to curb methane leaks along the value chain," stated the IEA chief.

Chinese gas demand is forecast to grow by 60 percent between 2017-2023, underpinned by policies aimed at reducing local air pollution by switching from coal to gas.

"China alone accounts for 37 percent of the growth in global demand in the next five years and becomes the largest

natural gas importer by 2019, overtaking Japan," said the report.

The IEA also forecasts strong growth in gas use in other parts of Asia, including in South and Southeast Asia, driven by strong economic growth and efforts to improve air quality.

"For end-use sectors, industry will become the largest contributor to the increase in global gas demand to 2023, taking the lead from power generation, which had historically held this role," said the IEA.

"The change is especially marked in Asia and other emerging markets thanks to higher gas use in industrial processes and as feedstock for chemicals and fertilizers," it added.

Overall, industry accounts for over 40 percent of growth in global gas demand to 2023 followed by 26 percent for power generation.

Competition

"Major changes are also evident on the supply side, with the United States leading gas production growth worldwide to 2023, thanks to the on-going US shale revolution.

The report asserted that price competitiveness would be crucial for gas to gain a firm foothold in emerging markets.

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This requires market evolutions and reforms, such as the development of trading hubs, opening up of the downstream to competition and fair access to infrastructure.

“Improving air pollution will be a key driver of gas demand, especially in emerging markets, and industry’s ability to improve its environmental footprint, including by reducing methane emissions and expanding the deployment of carbon, capture, utilization and storage technology, will be critical for gas prospects,” said the IEA.

“LNG appears as the main driver of inter-regional natural gas trade growth, sustained by strong export capacity expansion.

The wave of LNG export projects adds some 140 Bcm of liquefaction capacity between 2018 and 2023, increasing global capacity by almost 30 percent.

Producers

“More than half of that expansion (over 80 Bcm) takes place in the US. Australia and Russia also provide significant contributions with 30 Bcm and 15 Bcm respectively,” it said.

“In comparison, pipeline expansion is more limited, happening mainly in North America (United States to Mexico) and from Eurasia to Europe and China,” explained the IEA.

The emergence of the United States as a global exporter challenges the traditional features of LNG trade. This wave of liquefaction projects, expected in the coming two years, ensures ample supply and growth of LNG trade but also challenges the traditional features of supply contracts.

“Emergence of US exports with flexible destination and gas-indexed pricing

“In the US, the abundance of local natural gas supply encourages further use of gas in chemicals and other industry sectors”

presents
different

US LNG exporters' costs and Asian spot prices
\$/mmBtu



The cost and price differentials from new wave of exports

models from the standard fixed-delivery, oil-indexed supply agreements. Australia and the US appear as new global players likely to challenge Qatar in Asian markets,” the IEA stated.

Natural gas-rich regions, led by the Middle East and North America, also experience sustained growth in consumption.

“The Middle East sees continuous growth throughout the forecast period, primarily led by increasing needs in industry, power generation and seawater desalination,” said the report.

Plentiful

“In the US, the abundance of local natural gas supply encourages further use of gas in chemicals and other industry sectors. The rebound in natural gas availability and use in Egypt plays a large part in the increase in consumption in Africa, while Latin American markets are reforming to develop the role of domestic production,” explained the IEA.

Mature net importing markets such as Europe, Japan and Korea are also expected to see their natural gas demand stagnate.

Industry takes the leadership from power generation in sectoral demand growth.

Gas for power generation, once the primary source of growth, expands slowly amidst tougher competition among generation fuels.

Power

“Power generation accounted for half of the growth in natural gas consumption

over the last decade, helped by abundant fuel supply in mature markets, fuel switching from oil in emerging markets, and the reduction in nuclear generation in the aftermath of the Fukushima nuclear accident,” said the IEA.

“During the projection period, natural gas for power generation continues to grow in North America and the Middle East driven by cheap domestic resources, but slower global electricity demand growth, the rapid rise of global renewable electricity production and tough competition from coal, particularly in Asia, limit its growth prospects,” said the IEA.

Industry emerges as the main driver of growth in natural gas consumption. The industrial sector is expected to account for 40 percent of the increase in natural gas consumption, replacing power generation as the main driver.

“Incremental industrial uses cover both energy for processes and feedstock for chemicals including fertilisers in emerging economies and feedstock for petrochemicals for export in regions with abundant natural gas,” stated the IEA.

Domestic use

“Most of the increase in gas output from other major producing areas, such as the Middle East, China and Egypt, is dedicated to domestic markets,” said the report.

Russia is seeking to diversify its export outlets through new export infrastructure, with a pipeline to China and LNG export terminals.

“By contrast, Europe’s domestic supply deficit increases with the progressive depletion of North Sea production and the phasing out of the Groningen field, calling for additional LNG and pipeline imports to bridge the gap,” said the IEA. ■

US study focuses on how much LNG may be shipped from up to 25 liquefaction and export plants

New York consultancy outlines 'Macroeconomic Outcomes of Market Determined Levels of US LNG Exports'

The US Department of Energy currently lists 25 pending liquefied natural gas export projects at various stages of development and with cumulative volumes equivalent to 21.35 billion cubic feet per day.

How much natural gas can and should be exported from the US was the focus of a new study by the Department of Energy (DoE), examining a range of scenarios to determine what impacts different export levels may have on natural gas markets and the US economy.

Comments

The DOE's Office of Fossil Energy (FE) was taking comments through July 27, 2018, on its fifth LNG economic study, entitled "Macroeconomic Outcomes of Market Determined Levels of U.S. LNG Exports."

The 144-page analysis, was completed by the New York-based consultancy firm, National Economic Research Associates (NERA).

NERA compiled the report by examining the probability and macroeconomic impact of LNG exports with alternative scenarios based on the Energy Information Administration's 2017 Annual Energy Outlook.

"Combining three US supply cases, three US demand cases, three international demand cases, and two international supply cases in all possible combinations yielded a total of 54 different scenarios for LNG exports," said the DoE.

"The probabilities of each of these 54 scenarios were calculated from the probabilities assigned to the four cases making up each scenario," it added.

Model

The DoE said a Global Natural Gas Model (GNGM) developed by NERA was used to project natural gas supply, demand, and prices for the years 2020 to 2040 for each scenario for the US and the rest of world.

Possible future export levels in the scenarios evaluated include very unlikely extremes, from zero in cases in which the US "shale revolution" ends abruptly and global demand is limited to levels that exceed the total export capacity for which LNG export authorization applications

have currently been filed. The US demand case even includes "an aggressive national Renewables Mandate that is in line with California's stringent target" for solar, wind and other non-hydrocarbon power sources.

"Throughout the entire range of scenarios, we find that overall US economic output is higher whenever global markets call for higher levels of LNG exports, assuming that exports are allowed to be determined by market demand," explained the DoE.

The study additionally identified four major sources of uncertainty that affect LNG exports from the US: natural gas supply conditions, domestic demand, supply availability in the rest of the world and global demand.

Prior studies

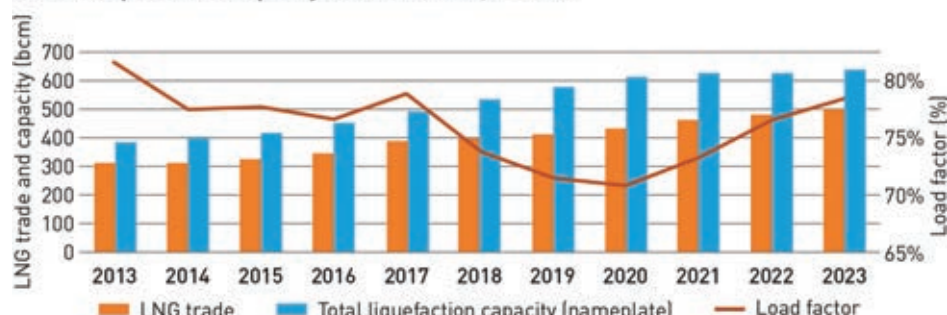
"Like the four prior studies, the 2018 LNG export study examines the impacts of varying levels of LNG exports on domestic energy markets.

The 2018 LNG Export Study also assesses the likelihood of different levels of "unconstrained" LNG exports (defined as market determined levels of exports), and analyses the outcomes of different LNG export levels on the US natural gas markets and the US economy as a whole, over the 2020 to 2050 time period."

The latest study differs from DOE's four previous macroeconomic studies in that it:

- Includes a larger number of scenarios (54) to capture a wider range of uncertainty in four natural gas market conditions than examined in the previous studies;
- Also includes LNG exports in all 54 scenarios that are market-determined levels, including the three alternative baseline scenarios that are based on the Energy Information Administration Annual Energy Outlook (AEO) 2017 projections;
- Examines unconstrained LNG export volumes beyond the levels examined in the previous studies;
- Additionally examines the likelihood of those market-determined LNG export volumes; and
- Provides macroeconomic projections associated with several of the

US LNG liquefaction capacity and utilisation, 2013-23



Trend suggested for LNG export and liquefaction plants

scenarios lying within the more likely range.

NERA used its Global Natural Gas Model to estimate market-determined levels of US LNG exports under different domestic and international natural gas market conditions.

Using its NewERA macroeconomic model of the US economy, NERA also provided macroeconomic projections from 2020-2040 based on those different market conditions and levels of LNG exports.

"Possible future export levels in the scenarios evaluated include very unlikely extremes," said researchers, "from zero in cases in which the US shale output ends and global demand is limited to levels that exceed the total export capacity for which LNG export authorization applications have currently been filed."

Outcomes

In the entire range of scenarios studied, researchers found that overall, "US economic output is higher whenever global markets call for higher levels of LNG exports, assuming that exports are allowed to be determined by market demand."

Using the 54 different scenarios constructed for the study, NERA determined that the most likely range of LNG exports in 2040 would be 8.7-30.7 Bcf/d, which translates into 3.2-11.2 trillion cubic feet of natural gas per annum.

Four major sources of "uncertainty" could affect US LNG exports, according to researchers: domestic gas supply and gas demand conditions, and global gas supply and demand conditions. All scenarios impose no constraints on LNG export volumes.

Three different cases for US gas supply were based on the Energy Information Administration (EIA) Annual Energy Outlook (AEO) for 2017. The AEO also

was used as a basis for the central US demand case.

High demand

For the high US demand case, gross domestic product (GDP) growth was assumed to achieve a compound annual rate of 3.7 percent between 2020 and 2040, and for the low demand case, an aggressive national renewables mandate in line with California's stringent renewable portfolio standard target was assumed.

On the international side, the study defined three gas demand cases, including EIA's International Energy Outlook for 2017 and two based on the International Energy Agency's World Energy Outlook.

"In EIA's projections, the principal determinant of natural gas prices in the United States is the US natural gas resource and by extension, the technology that enables it to be developed," NERA noted.

The low supply scenarios "only support significant exports when international gas needs are high. Therefore, the combined probability of prices in the resulting range of \$10 to \$13/MMBtu in 2040 is only 3 percent."

Under the reference case supply assumptions, "prices are much lower and in a more narrow range when international LNG demand varies. These central cases have a combined probability of 47 percent and prices range from \$5 to about \$6.50/MMBtu in 2040," NERA researchers said.

Prices

"The very low prices are achieved when US supply is high, and these cases have a combined probability of 22 percent. Depending on the level of LNG exports, these prices range from \$3 to \$4/MMBtu

HISTORICAL LNG AND NATURAL GAS PRICES								
US dollars per million Btu	LNG		Natural Gas					Crude Oil
	Japan CIF ¹	Japan Korea Marker (JKM) ²	Average German Import Price ³	UK Heren (NBP Index) ⁴	Netherlands TTF (DA Heren Index) ⁵	US Henry Hub ⁶	Canada (Alberta) ⁷	OECD countries CIF ¹
1987	3.35	—	2.55	—	—	—	—	3.09
1988	3.34	—	2.22	—	—	—	—	2.56
1989	3.28	—	2.00	—	—	1.70	—	3.01
1990	3.64	—	2.78	—	—	1.64	1.05	3.82
1991	3.99	—	3.23	—	—	1.49	0.89	3.33
1992	3.62	—	2.70	—	—	1.77	0.98	3.19
1993	3.52	—	2.51	—	—	2.12	1.69	2.82
1994	3.18	—	2.35	—	—	1.92	1.45	2.70
1995	3.46	—	2.43	—	—	1.69	0.89	2.96
1996	3.66	—	2.50	1.87	—	2.76	1.12	3.54
1997	3.91	—	2.66	1.96	—	2.53	1.36	3.29
1998	3.05	—	2.33	1.86	—	2.08	1.42	2.16
1999	3.14	—	1.86	1.58	—	2.27	2.00	2.98
2000	4.72	—	2.91	2.71	—	4.23	3.75	4.83
2001	4.64	—	3.67	3.17	—	4.07	3.61	4.08
2002	4.27	—	3.21	2.37	—	3.33	2.57	4.17
2003	4.77	—	4.06	3.33	—	5.63	4.83	4.89
2004	5.18	—	4.30	4.46	—	5.85	5.03	6.27
2005	6.05	—	5.83	7.38	6.07	8.79	7.25	8.74
2006	7.14	—	7.87	7.87	7.46	6.76	5.83	10.44
2007	7.73	—	7.99	6.01	5.93	6.95	6.17	11.95
2008	12.55	—	11.40	10.79	10.66	8.85	7.99	16.76
2009	9.06	5.28	8.53	4.85	4.96	3.89	3.38	10.41
2010	10.91	7.72	8.03	6.56	6.77	4.39	3.69	13.47
2011	14.73	14.02	10.49	9.04	9.26	4.01	3.47	18.55
2012	16.75	15.12	10.93	9.46	9.45	2.76	2.27	18.82
2013	16.17	16.56	10.73	10.64	9.75	3.71	2.93	18.25
2014	16.33	13.86	9.11	8.25	8.14	4.35	3.87	16.80
2015	10.31	7.45	6.72	6.53	6.44	2.60	2.01	8.77
2016	6.94	5.72	4.93	4.69	4.54	2.46	1.55	7.04
2017	8.10	7.13	5.62	5.80	5.72	2.96	1.60	8.97

All the global prices and how they have evolved over 30 years

in 2040,” said the report. Under the Natural Gas Act, applications seeking to export gas to non-FTA countries have to be in the public’s interest.

economic impacts, international impacts, security of natural gas supply and environmental impacts.

Before granting a non-FTA export application, the DoE also considers the

cumulative impacts of the total volume of all final non-FTA export authorizations.

To date, DoE has issued 29 final long-term authorizations to export LNG and compressed natural gas to non-FTA countries with cumulative volumes totaling 21.35 Bcf/d, or around 7.79 Tcf/year.

The economic aspects of the latest study included showing how the difference in GDP between each scenario and its baseline is distributed between value-added and resource income to assign resource income to specific factors of production.

However, it has to be said they are complex and require full comprehension of economics beyond the basics.

For scenarios with Low US natural gas supply assumptions, the split between resource income and gross value-added is roughly 50-50 or somewhat more favorable to the resource.

These scenarios, as designed, contain relatively large increases in LNG exports and prices relative to the corresponding baseline. As a result, the resource gets revenue above cost of production.

The two different international demand-pull scenarios with Reference US natural gas supply conditions have a split of 61-39 in favor of value-added.

“When comparing changes in resource income between the baseline and the scenarios, resource income associated with natural gas increases because the value of the natural gas resource as well as returns to specialized capital and labor also increases when additional LNG exports are allowed,” said the study.

“Value-added increases because of the increased opportunity for exports and the resulting boost to both labor income and profits along with GDP.

“The resource income associated with coal and crude oil changes minimally; therefore, the total change in resource income is positive for the scenarios and the changes in resource income increase with the level of LNG exports.

“Income associated with net transfers includes government transfers and all tolling charges on LNG exports. Government transfers remain the same between the baseline and scenarios, so the net transfer reflects the additional

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wealth transfer. Changes in tax revenue are grossed up in value added,” it said.

“It should be noted that since the NewERA model does not differentiate wage rates or human capital between sectors, it is very likely that some of what is categorized as resource income in NewERA will accrue as wages and labor income to workers with the specialized skills required in energy-producing sectors,” the report explained.

“Resource income is a residual, in that the most that an owner of mineral rights can expect to be paid is the difference between the cost of producing oil and gas (including a return on capital and risk) and revenues from its sale.

“Depending on how rapidly the supply of such workers, ranging from petroleum engineers and project managers to roughnecks on drilling crews, responds to demand, a substantial portion of what is shown in these results as resource income would in fact be income to workers.

“Similar considerations apply to capital goods that might be in short supply, such as drilling pipe. This reallocation of income from resource income to labor and capital income would offset an unknown portion of differences in value-added shown within the limits of the ability of the NewERA model,” it stated.

The department’s four previous studies also examined the effects of LNG exports on the domestic economy and energy markets.

The first study, “Effect of Increased Natural Gas Exports on Domestic Energy Markets,” was done by EIA and published in January 2012.

The second, “Macroeconomic Impacts of LNG Exports from

the United States” was written by NERA and published in December 2012.

The third study, “Effect of Increased Levels of Liquefied Natural Gas Exports

on US Energy Markets,” was completed by EIA and published in October 2014.

And the fourth study, “The Macroeconomic Impact of Increasing US

LNG Exports,” published in October 2015, was done jointly by the Center for Energy Studies at Rice University’s Baker Institute and Oxford Economics. ■



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For the Record

AGL Energy of Australia said it signed two agreements in relation to its proposed liquefied natural gas import jetty planned for Crib Point in the state of Victoria, one of two regasification projects planned for the southeast of the country to underpin gas supplies. AGL said it signed a development and Gas Transportation Agreements with APA Group, the pipeline and infrastructure company, for the development and construction of the Crib Point Pakenham Pipeline and the ongoing transportation of gas from the proposed LNG import jetty to the domestic market. “APA will continue early work including sourcing certain long lead-time items for the development of the proposed pipeline,” said AGL. “Construction and operation of the pipeline is subject to regulatory approvals, the granting of the pipeline licence and final investment decision by the AGL board,” added the company. While the AGL project plans to supply the Melbourne region with gas, the second LNG project is aimed at New South Wales and the Sydney area. It is being developed by Australian Industrial Energy, part of the Minderoo Group, and Japanese companies Marubeni Corp. and Jera Co. Inc. The Australian-Japanese joint venture has chosen Port Kembla to bring in shipments of LNG by 2020. Port Kembla is an existing industrial cargo port with man-made breakwaters about 100 kilometres south of Sydney in the Illawarra region. For its project, AGL has also signed a berthing lease and jetty agreement with the Port of Hastings Development Authority for the long-term use of Crib Point Jetty Berth 2.

“The Port of Hastings Development Authority will begin jetty remediation works to prepare for AGL’s exclusive occupation of Crib Point Jetty Berth 2 for the continuous mooring of a floating storage and regasification unit (FSRU),” AGL explained. “The agreement is subject to regulatory approvals and final investment decision by the AGL board,” it added. AGL said it was aiming for a final investment decision on the Crib Point LNG Import Jetty, to be located about 90km south of Melbourne, during the 2019 financial year and or delivery of first gas into the domestic market during 2021. “The Crib Point LNG Import Jetty

project has significant potential to provide AGL with the ability to deliver a new flexible source of gas supply to the southern states of Australia,” said Andy Vesey, AGL Managing Director and Chief Executive. “This will deliver liquidity, increasing competition to put downward pressure on wholesale prices and provide much needed capacity and long-term security of supply,” he added. The AGL CEO said that according to the Australian Energy Market Operator’s Victorian Gas Planning Report released in March 2018, without additional gas supply there is a potential shortfall in the market from 2022 and a potential shortfall in meeting peak Victorian winter daily demand in 2021. “Our proposed project is uniquely placed to address this challenge,” stated Vesey. The Australian-Japanese venture planned for Port Kembla will initially handle around 2 million tonnes per annum of LNG by 2020. The project backer, the Minderoo Group, is controlled by Australian billionaire Andrew Forrest. Marubeni, a long-standing global LNG market participant, is taking part along with Jera, itself a joint venture between two of Japan’s largest utilities, Tokyo Electric Power Co. and Chubu Electric Power. The project will also include a long-term charter of an FSRU, construction of associated onshore and offshore facilities and the provision of gas to local customers in the state of NSW.

APA Group, the Australian pipeline company that controls connections to LNG plants in the states of Queensland and Western Australia and is building a pipeline to a new FLNG import project near Melbourne, has received a A\$13 billion (US\$9.8 billion) takeover offer from a Chinese consortium. The offer came a day after APA signed an agreement with AGL Energy to build the pipeline infrastructure for AGL’s proposed floating LNG import terminal in the state of Victoria. CKI is the global group created by Chinese billionaire Li Ka-shing and is targeting Sydney-based APA, which delivers about half of the natural gas consumed in Australia. Among the pipelines APA owns is the link to the Royal Dutch Shell-operated Queensland Curtis LNG export plant from the coal-seam gas fields in central Queensland to the liquefaction plant on Curtis Island near Gladstone. CKI, originally known as Cheung Kong Infrastructure Holdings, and Power Assets Holdings have made an all-cash offer of A\$11 a share for APA. The offer is 33 percent more than APA’s last

closing price of A\$8.27. CKI previously had a bid for Australia’s network company Ausgrid refused by the government in Canberra, though in 2017 it successfully acquired the Western Australian Duet Group for A\$7.3Bln, which comprises Australian powerlines, gas pipelines and power stations.

The successful Duet Group bid by CK Infrastructure gained control of Western Australia’s most important pieces of energy infrastructure, including the Bunbury to Perth gas pipeline and pipelines from the offshore Carnarvon Basin. However, as part of the bid CK Infrastructure has proposed selling some of the bigger Western Australian pipelines held by APA to allay potential concerns by the Australian Competition and Consumer Commission (ACCC). APA has agreed to let CKI undertake due diligence. CKI said it had already held preliminary discussions on the proposed offer with the ACCC and the Australian Foreign Investment Review Board. APA confirmed the unsolicited offer in a statement to the Australian Securities Exchange. “The APA Board makes no recommendation in response to the proposal at this time,” it said. “Securityholders are advised to take no action at this stage. There is no certainty that the proposal will result in a transaction,” added APA. APA said the Chinese offer was not conditional on any proposed divestments occurring before completion of any transaction. “The APA Board will continue to evaluate the proposal and will update APA’s Securityholders and the market as appropriate,” said APA Group Chairman Michael Fraser. “The Board believes APA has a very attractive business and is well positioned to continue delivering strong results and ongoing growth irrespective of whether the proposal proceeds to an offer,” added Fraser.

ASIAN LNG producer Indonesia is advancing with its exploration and production activities in Algeria by awarding an engineering and construction contract to increase natural gas capacity for one of the fields it operates in the North African nation. Indonesian state-owned energy company Pertamina gave the contract to Italian engineering company Bonatti to upgrade facilities at its Algerian Menzel Lejmat North (MLN) discoveries to improve future natural gas flow. Bonatti, whose headquarters are in the Italian city of Parma, said the provision of engineering, procurement and construction of gas capacity was valued at

85 million euros (\$100M). The MLN field is part of a series of oil and gas fields in Block 405a in Berkine Basin, situated near the town of Hassi Messaoud and about 700 kilometres southeast of Algiers. Block 405a comprises eight discoveries split over three separate development areas. Pertamina acquired its 35 percent stake in the MLN field from Spanish energy company Repsol in 2016. Bonatti has widespread experience in Algeria, having worked on various of the largest ventures, including the Timimoun field development project, the In Salah Gas Pipeline and the Alrar plant and power projects.

Bonatti said its scope of work includes the EPC as well as installation, pre-commissioning, commissioning and assistance in the start-up of the Gas Capacity Increase Project (GCIP) in the MLN Field as part of the Phase-4 Development Project. “The aim of the Project GCIP is the development and upgrading of the existing facility for future expected gas treatment and oil production in 2020 by the installation of two 37.5 million standard cubic feet per day compressors, a dehydration train and their related systems,” said Bonatti. “Being located in an operational field, Bonatti will perform the activities in particularly challenging conditions such as brownfield and live plant, avoiding disturbances to the ongoing production,” the company explained. Bonatti said the contract signing ceremony took place in Algiers in the presence of Abdelmoumen Ould Kaddour, Chief Executive of Algerian state energy company Sonatrach and the Director of Exploration and Production of Pertamina International, Djoko N Imanhardjo. The other licence stakeholders were represented by the General Director of Talisman-Repsol Algeria, Didier Wloszczowski. The project is scheduled to begin by the end of 2018 and is also aimed at increasing gas reinjection capacities for oil output.

AUSTRALIAN Industrial Energy, part of the Minderoo Group investment and mining company, has advanced with plans for the first Australian liquefied natural gas import terminal with Japanese partners, including the choice of location. AIE has joined with Japanese companies Marubeni Corp. and Jera Co. Inc. to develop an LNG import facility near Sydney to make up domestic natural gas shortfalls during peak demand periods on the Southeast Coast. The Australian-Japanese joint venture said it had now

chosen Port Kembla to bring in shipments of LNG for the state of New South Wales by 2020. Port Kembla is an existing industrial cargo port with man-made breakwaters about 100 kilometres south of Sydney in the Illawarra region. The Port Kembla terminal will initially handle around 2 million tonnes per annum of LNG. The project is backed by the Minderoo Group, controlled by Australian billionaire Andrew Forrest and including a one-third stake in Australian iron ore exporter Fortescue Metals. Marubeni, a long-standing global LNG market participant, is also taking part along with Jera, itself a joint venture between two of Japan's largest utilities, Tokyo Electric Power Co. and Chubu Electric Power. The project will include a long-term charter of a floating storage and regasification unit and the construction of associated onshore and offshore infrastructure.

The formal choice of Port Kembla is the first result of a joint feasibility study launched in February 2018 when the joint venture was first revealed to establish an LNG import terminal and gas supply in New South Wales with initial investments of up to A\$300 million (US\$228M). The LNG terminal is regarded as a lower-cost alternative to a proposed Australian inter-state pipeline from West to East at a cost of around A\$5 billion. AIE said the final choice of location had been between Port Kembla and the Port of Newcastle and Kembla was chosen as it was closer to large consumers of industrial gas as well as existing pipeline infrastructure. It added that Japanese partner Jera would supply the LNG while trading house Marubeni is expected to provide infrastructure financing as well as the FSRU. AIE said it had signed preliminary agreements with some industrial customers for the supply of regasified LNG, including a large-scale gas-fired power station in the state. For the second stage of the development, AIE said it was considering the construction of a new 750-megawatts, gas-fired power plant or expanding an existing facility. Australia would be the latest Asia-Pacific nation to import LNG or transport it internally by carriers to meet rising domestic demand following import terminal construction by LNG producers Malaysia and Indonesia.

BAKER Hughes-GE, the US energy services and equipment company, won a contract to supply more turbomachinery to power the third Train at the Cheniere Energy LNG export plant at the Texan

port of Corpus Christi. BH-GE was chosen as the supplier of the equipment by Bechtel, the engineering, procurement and construction partner of Cheniere at Corpus Christi, as well as at Cheniere's operating first plant at Sabine Pass in Louisiana. Bechtel contracted BH-GE to provide turbomachinery for the third Train consisting of six PGT25+G4 DLE gas turbines driving various compressors. BH-GE had provided the same equipment for the other two Trains under construction at Corpus Christi, and similar technology for five Trains at Cheniere's Sabine Pass plant. The value of the latest BH-GE contract was not disclosed. Cheniere is making progress on the first two processing Trains at Corpus Christi and gas was being introduced to the first Train. However, the start-up of the Texas plant located on the La Quinta Channel on the northeast side of Corpus Christi Bay is still at least six months away. Cheniere had announced a positive final investment decision for the third Train in May and issued a notice to proceed with full construction, though preliminary work had already begun.

"This is the fifth order for similar equipment for Cheniere Energy through Bechtel, and an important one as it is the first FID on new liquification in the US since 2015," said Rod Christie, President and Chief Executive of Turbomachinery and Process Solutions at BH-GE. "Our technology provides the necessary refrigeration gas needed to chill the natural gas into liquid form for transportation. This award builds on the unparalleled technology experience and partnership established between Cheniere, Bechtel and BH-GE," stated Christie. The first two Corpus Christi Trains are about 87 percent complete. Trains one and two are currently set to enter service at the 1,500-acre site ahead of schedule in the first and second halves of 2019 respectively, according to Cheniere. The project is being developed for up to three Trains with 13.5 MTPA of capacity, three LNG storage tanks and two marine berths for the largest carriers. Around 8.4 million tonnes per annum of Corpus Christi production has been contracted to third parties on a long-term, free-on-board basis whereby they provide their own shipping. Customers include Australia's Woodside Petroleum and Frances's EDF, Spanish energy companies Endesa, Iberdrola and Gas Natural Fenosa as well as Pertamina of Indonesia. The first two Trains are fully contracted and Train 3 is partially contracted.

BUREAU VERITAS, the French classification society, said it issued a list of approvals to liquefied natural gas maritime storage company Gaztransport and Technigaz (GTT) for its latest containment systems and technology applications. BV said its officers had been working with GTT to approve two new containment systems, the Mark III Flex+, an evolution of the Mark III storage tank but with a lower boil-off rate, and the GTT MARS, a containment system developed for liquefied petroleum gas vessels that is adaptable to any size of tank or ship. As sector leader in LNG storage for ships, GTT sells licensing agreements around the world for up to \$10 million per licence to install its membrane technology in vessels, mostly built up until now at South Korean shipyards. Approval in Principle (AIP) has additionally been provided for a 6,500 cubic metres capacity LNG bunker barge, jointly developed between GTT and South Korea's DSEC, formerly part of shipbuilder Daewoo Shipbuilding & Marine Engineering. BV approval is also pending for the design of a 180,000 cubic metres capacity LNG carrier. "Both demonstrate GTT's move beyond containment technology systems to full ship design," said the class society.

As well as the bigger projects, BV has also approved GTT's solution for vapour pocket management. This allows LNG carriers, in compliance with the revised International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (known as the IGC Code), to operate with an increased filling limit above 98 percent. Other approvals were for GTT's No. 96 tank pressurization system update to provide enhanced maintenance flexibility and safety and for reduced cool-down features of both the No. 96 and Mark III systems to improve cargo operations. "These approvals are helping GTT expand the range and depth of their technologies," said Matthieu de Tugny, Chief Operating Officer of BV Marine & Offshore. "The increasing sophistication of containment systems and expansion of their application, as in CMA CGM's breakthrough order for large containerships with membrane tanks, is driving the adoption and development of gas transportation and LNG as a marine fuel as well as supporting the marine gas trades," added de Tugny. Philippe Berterottiere, Chairman and Chief Executive of GTT, said he was very pleased with the recent approvals from

BV. "We have demonstrated the reliability of our latest developments and their ability to meet the owners' requirements," added Berterottiere. "I believe these new systems and designs will help the shipping industry to move forward and reduce the ecological footprint," he stated. GTT completed an initial public offering in February 2014 to begin trading its shares on the Euronext exchange. The shares were last quoted at 51.25 euros per share, valuing the company at 1.89 billion euros (\$2.2Bln) on Euronext.

CANADA is seeing progress on the Kwispaa near-shore LNG project in cooperation with one of the main First Nation North American tribes of Vancouver Island in British Columbia has strengthened its executive team. Steelhead LNG said it had appointed energy infrastructure and pipeline specialist Corey Goulet as Vice President of its pipeline division effective from July 3. "Goulet brings 33 years of experience in the energy infrastructure industry to Steelhead," stated the BC-based company. "Corey's wealth of pipeline development, implementation and operations experience is a perfect complement to Steelhead LNG's experienced management team" said Steelhead Executive Chairman for Pipelines R.L. "Randy" Jespersen, a former CEO of Canadian energy company Terasen Gas and who himself joined Steelhead in March 2018. Goulet was most recently Vice President of Integrity and Projects at Tundra Energy Marketing. He also spent nearly 20 years at TransCanada Corp., including in senior leadership positions and eight years at Enbridge Inc. Steelhead plans to liquefy natural gas sent through underground pipelines to its floating facilities and to export around 6 million tonnes per annum of LNG to Asia.

The Kwispaa FLNG plant would be located on First Nation land about 10 kilometres north of Bamfield in BC and about 70 kilometres southwest of Port Alberni, where Steelhead had previously planned another project. Steelhead has already been awarded a Canadian National Energy Board export licence for up to 24 MTPA of exports from the Sarita Bay site. Steelhead is one of the few remaining Vancouver-based energy companies focused on LNG export projects and in 2017 changed the name of the former Sarita Bay venture to Kwispaa LNG. The name change for the Sarita project was suggested by the Huu-ay-aht First Nation, an indigenous community

located on the west coast of Vancouver Island and the development partner of Steelhead. The Kwispaa project has received unanimous support from the tribal council of the small First Nation of 750 people. The targeted in-service date for the pipeline project is the fourth quarter of 2024, subject to the receipt of the necessary regulatory approvals and permits in BC. The company had said in January 2018 it was considering ordering two floating liquefaction and storage hulls at a cost of US\$500-million from South Korean shipbuilder Hyundai Heavy Industries.

CENTRICA, the UK energy company and utility, has teamed up with Japanese utility Tokyo Gas to sign a preliminary deal to purchase LNG volumes from the onshore Mozambique export project in southeast Africa being developed by Anadarko Petroleum of the US and joint venture partners. The co-purchasing off-take agreement signed by Centrica and Tokyo Gas is for delivered ex-ship (DES) supplies, whereby the seller provides the shipping, for 2.6 million tonnes per annum from the start-up of production until the early 2040s. “Tokyo Gas and Centrica have a strong global reputation in the industry, and we are delighted they have made this commitment to the Mozambique LNG project,” said Mitch Ingram, Anadarko Executive Vice President for International, Deepwater & Exploration. The deal with the UK-Japanese buyers takes Anadarko a step closer to taking a final investment decision for the African production project. “As like-minded leading natural gas suppliers in our respective home countries, we are delighted to strengthen our strategic partnership with Tokyo Gas and expand our flexible LNG portfolio through this agreement with Mozambique LNG,” said Iain Conn, Centrica’s Group Chief Executive. “Centrica has established strong LNG capabilities over the past few years and this agreement demonstrates further progress in this growth area of our business,” added Conn. Centrica has a 20-year contract for volumes from Train 5 at Sabine Pass on a free-on-board (FOB) basis, giving it destination rights for the cargoes and a purchase price indexed to the US benchmark Henry Hub price. The UK company holds regasification capacity at one of Europe’s largest import terminals, the Isle of Grain facility on the River Medway in Kent.

Tokyo Gas for its part has its own network of import facilities in Japan and

also has volumes booked from the newest US LNG plant, Cove Point in Maryland. The Japanese company’s Negishi import terminal in Yokohama city received the first Tokyo Gas cargo in May 2018 from Cove Point. “For Tokyo Gas, we are hoping that our commitment will contribute to the start-up of the Mozambique LNG Project,” said Takashi Uchida, Tokyo Gas President. “We are very happy that through this first ever joint procurement with Centrica that utilizes the unique central location of Mozambique, we have created the foundation for flexible LNG transactions to occur between the European and Asian markets,” stated Uchida. “I hope that through this innovative agreement, we can further diversify sources and price indexes, which will lead to securing more competitive LNG,” he added. Anadarko is proceeding with development of the Golfinho-Atum natural gas discoveries with its partners in the licence for offshore Area 1 of Mozambique’s Rovuma Basin. The project will be the African nation’s first onshore development, initially consisting of two Trains with total nameplate capacity of almost 12.9 million tonnes per annum. The liquefaction and export plant will be located at the port of Pemba in northeast Cabo Delgado province of Mozambique. Anadarko has a 26.5 percent stake in the Mozambique Area 1 and Japanese trading house Mitsui holds 20 percent. Three Indian companies, Bharat Petro Resources, ONGC Videsh and Oil India Ltd., hold a further 30 percent. The other stakeholders are the Thai energy company PTT Exploration & Production and the Mozambique state-owned oil and gas firm ENH. Anadarko said that the foundation project paves the way for significant future expansion of up to 50 MTPA from other fields in offshore Area 1. Anadarko disclosed on February 2018 that it had signed its supply agreement with French utility Electricite de France for a period of 15 years.

CHART Industries, the US liquefied natural gas equipment-maker and industrial gases company, has named Jillian C. Evanko as Chief Executive and President to replace incumbent William C. Johnson and has elected her to the board. Evanko has served as Vice President, Chief Financial Officer, Chief Accounting Officer and Treasurer of Chart since March 2017. “She succeeds William C. Johnson who has been terminated without cause, in accordance with his employment contract,” said Chart in a statement without adding

further details on the CEO’s departure. Steven W. Krablin has been elected Chairman of the board. Krablin has served as a member of the board since July 2006 and has been the lead independent director since June 2015. “We are pleased to unanimously appoint Jill as CEO and are confident that she has the experience and skills to lead Chart into the next phase of its evolution,” said new Chairman Krablin. “Jill has been instrumental in our balanced growth while simultaneously unlocking significant cost savings through operating synergies,” said the Chairman. “We thank Bill for his contributions, and wish him the best in his future endeavors,” added Krablin.

Evanko thanked the board for appointing her and for the opportunity to guide Chart towards sustainable growth across each of the business units. “Our backlog and order trends, along with our executed cost reduction activities, have positioned us to deliver on our 2018 operating objectives,” said Evanko. “At our recent investor day, we laid out a long-term strategic vision for Chart and provided expectations for what the business can achieve by 2021,” the new CEO added. “We believe the execution of our strategy, including LNG projects and product innovation, will drive significant growth over the next three years and enable Chart to continue to deliver value for our shareholders,” she stated. Chart said it had now started a search for a new CFO to take CEO Evanko’s position. The company also announced the appointment of two corporate executives. Tom Pittet, who serves as Vice President of Tax and Treasury, will assume the additional role of Treasurer, and Michael Schmit has been appointed Chief Accounting Officer, in addition to his current role as Corporate Controller. In conjunction with this announcement, Chart reiterated its full-year 2018 guidance of \$1.15 billion to \$1.20 billion of revenue, and adjusted earnings per share of \$1.75 to \$2.00.

CHENIERE Energy is making progress on the first two liquefaction Trains at the \$13 billion Corpus Christi export project being constructed in Texas as the first gas is being introduced to Train one. However, the commercial start-up of the Texan plant located on the La Quinta Channel on the northeast side of Corpus Christi Bay is still at least six months off. Cheniere filed a request with the US Federal Energy Regulatory Commission on June 7 to

introduce fuel gas to start commissioning Train 1. “On December 30, 2014, the Federal Energy Regulatory issued an Order Issuing Authority Under Section 3 and Section 7(c) of the Natural Gas Act granting the necessary authorization to Corpus Christi Liquefaction (CCL), for the construction and operation of the Corpus Christi Liquefaction Project,” it said.

“CCL is herein requesting authorization to introduce fuel gas to commission Train 1. CCL is requesting authorization at the earliest time possible, but no later than June 29, 2018, in order to remain on schedule,” said Cheniere. The first two Corpus Christi Trains are about 87 percent complete. Trains one and two are currently set to enter service at the 1,500-acre site ahead of schedule in the first and second halves of 2019 respectively, according to Cheniere. The original guaranteed schedule had trains one and two in service by the end of October 2019 and July 2020, respectively. Train three also received its final investment decision in May 2018 and a further expansion after that remained a prospect. The project is being developed for at least three Trains with 13.5 MTPA of total capacity, three LNG storage tanks and two marine berths for the largest carriers.

Around 8.4 MTPA of Corpus Christi production has been contracted to third parties on a long-term, free-on-board basis whereby they provide their own shipping. Customers include Australia’s Woodside Petroleum and Frances’s EDF, Spanish energy companies Endesa, Iberdrola and Gas Natural Fenosa as well as Pertamina of Indonesia. The first two Trains are fully contracted and Train 3 is partially contracted. Any excess capacity not sold under long-term sales agreements will be available for Cheniere Marketing to sell. Cheniere posted net income of \$357 million in the first quarter of 2018 compared with \$54M in the same three months last year as four processing Trains are now producing 18 million tonnes per annum of gas for export at its Sabine Pass plant in Louisiana. During the first quarter, Cheniere engaged a group of international banks to assist in the structuring and arranging of more than \$6 billion of credit facilities for the Corpus Christi venture. Cheniere also has expansion plans that are in the process of being amended from two additional Trains with expected output of 9 MTPA to up to seven mid-scale Trains with production of 9.5 MTPA. The Stage 3 Project as it is called would increase

Cheniere's expected overall output at the Texas plant to about 23 MTPA.

CHEVRON CORP. said production was on stream at the second processing Train at the onshore Wheatstone LNG plant in the Pilbara region of Western Australia, bringing the Australians closer to surpassing the world's largest exporter Qatar in LNG output. Wheatstone Train 2 is the last of five LNG production units built by Chevron and its joint venture partners in the state of Western Australia over the past 10 years at a combined cost of more than US\$85 million. "With the Chevron-operated Wheatstone and Gorgon LNG facilities now operational, we are delivering a significant new source of energy for customers in the region, as well as contributing to significant levels of investment into the Australian economy," said Chevron Australia Managing Director Nigel Hearne. The US major said that in conjunction with the Gorgon plant on Barrow Island in Western Australia, the Wheatstone facility reinforced its position as a leading natural gas supplier and LNG operator in the Asia-Pacific region. Wheatstone, with a total capacity of 8.9 million tonnes per annum, is the eighth LNG project to be completed in Australia. It puts the nation on track to overtake Qatar and its total of 77 MTPA of output. That will happen when two remaining projects fully come on stream in 2018 and 2019, Inpex Corp's Ichthys LNG in the Northern Territory and Royal Dutch Shell's Prelude floating production venture offshore northwest Australia.

Hearne said the first shipment of LNG sourced from Train two at

Wheatstone was expected to leave in the next week. The commercial start-up comes about eight months after Wheatstone's first Train began production. "First LNG

production from Wheatstone Train 2 is another remarkable achievement and is testament to the collaboration of our partners, customers, contractors,

governments, community, and the many thousands of people who worked to deliver this legacy asset," stated Hearne. "Working closely with our customers, we



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are committed to be a safe and reliable natural gas supplier for decades to come,” he stated. Hearne added that the company would also be following the same process as with the first Train and temporarily halt Train two in the September quarter to remove strainers used in the start-up phase. “We’ll take a short outage, remove those strainers then we’ll put Train two back up,” he said. Chevron’s partners in Wheatstone are Kuwait Foreign Petroleum Exploration Company, Australia’s Woodside Petroleum, Kyushu Electric Power Co, and a joint venture part-owned by the world’s biggest LNG buyer, Japan’s Jera Co. Inc.

CLEAN ENERGY Fuels Corp., the California-based supplier of liquefied natural gas and compressed natural gas fuel for the trucking industry, said shareholders approved the sale of a 25 percent stake to French energy major and global LNG market participant Total. Total had earlier agreed to purchase 50.8 million shares of Clean Energy’s common stock for \$83.4 million to become Clean Energy’s largest stockholder. Clean Energy, based in Newport Beach and listed on the Nasdaq stock exchange, is a leading provider of natural gas fuel for transportation in North America and has a network of filling stations completed in 2017 from southern California to the Canadian border as well as elsewhere in the US. The US company has around 550 fuel stations across the country and in Canada as it continues with its growth strategy for LNG, CNG and biogas fuel distribution. Clean Energy said the sale to Total was approved by more than 97 percent of shareholders and was expected to close on or about June 13. The US company stated that this new partnership will combine one of the world’s leading energy companies that operates over 16,000 fueling stations with North America’s leading provider of clean natural gas as a transportation fuel. The investment will also allow Total to nominate two members to Clean Energy’s board of directors.

“This significant investment by Total is a confirmation of Clean Energy’s business plan to expand the use of clean natural gas as a transportation fuel, especially by those vehicles which consume the most fuel and cause the most pollution,” said Andrew J. Littlefair, Chief Executive and President of Clean Energy. “The number one priority of the new partnership between the companies will be to make it easier for more heavy-duty truck fleets to transition away from diesel and adopt a

cleaner, zero emissions natural gas fueling solution,” added Littlefair. Clean Energy, with support from Total, also plans to launch a truck-leasing programme that is intended to place thousands of new natural gas-fueled, heavy-duty trucks on US roads to use Clean Energy fuel stations. “Expected to launch during the third quarter of 2018, the program would also guarantee a five-year fixed discounted price for Clean Energy-supplied natural gas fuel, allowing heavy-duty truck fleets to immediately achieve sustainability goals at the price and ease of operating diesel trucks,” said Clean Energy. The French energy company intends to provide up to \$100 million of credit support for the programme. Total is one of the leading energy majors in the LNG value chain and has access to volumes in the US and around the world.

FRENCH container ship company CMA CGM plans to use the Dutch port of Rotterdam as its primary bunkering port when its new LNG-powered fleet of nine vessels start being delivered by Chinese shipyards from 2020. “The entire plan has been structured in such a way that the bunkers for the ships will be taken in Rotterdam,” said Chief Executive Rodolphe Saadé. The CEO explained that the 22,000 TEU ships are being built in China and their LNG storage tanks will be designed so that they load their entire bunker requirement for a round voyage before embarking on the journey. CMA CGM and French energy company Total had earlier signed an agreement covering the supply of around 300,000 tonnes of LNG per annum for 10 years starting from 2020, though Saadé has now confirmed the delivery point would be Rotterdam. This volume will fuel CMA CGM’s nine newbuild container ships, scheduled for delivery beginning in 2020. CMA CGM, the first shipping company in the world to equip its giant container ships with LNG propulsion, selected Total Marine Fuels Global Solutions, the Total affiliate responsible for marketing marine fuels worldwide, for these future supply operations.

CMA CGM and Total have already signed a cooperation agreement to examine the most environmentally responsible propulsion solutions to meet the International Maritime Organization’s 2020 implementation date for new sulfur regulations. CMA CGM said that by selecting LNG as a fuel, it would be using a solution that would outperform

the sulfur cap of 0.5 percent required under the stricter IMO rules. “LNG is the fuel of the future for shipping,” said CEO Saadé. French LNG storage technology company GTT in February 2018 said it received a tank order for an LNG bunkering vessel ordered by Total and its Rotterdam joint venture bunkering partner, Japanese shipping company Mitsui OSK Lines. The bunkering vessel, with a capacity of 18,600 cubic metres, will have Mark III Flex tanks and will be built by Hudong-Zhonghua Shipbuilding in China, which has yards at Nantong and Shanghai. The vessel will now mostly be based in Rotterdam, specifically aimed at supplying LNG to CMA CGM’s new container vessels.

GLADSTONE LNG, one of three coal-seam-gas to-LNG plants built on Curtis Island in the Australian state of Queensland over the past three years, has delivered its 200th cargo. The GLNG project came on stream in 2015 and produces 7.8 million tonnes per annum of LNG from two processing Trains owned in a joint venture by Australia’s Santos, French energy company Total, Petronas of Malaysia and Korea Gas Corp. The 200th cargo was carried on the 127,125 cubic metres capacity vessel “YK Sovereign” and unloaded at the South Korean Incheon import terminal on June 4. Santos is the operator of GLNG and the company’s Chief Executive Kevin Gallagher said the natural gas industry was building a better future for hundreds of millions of people throughout the Asian region through LNG deliveries. “For the next two decades, the International Energy Agency expects natural gas to grow more than any other energy type, to a market share of more than a quarter of all global energy demand,” explained Gallagher. “Population growth, rapid urbanisation and the need to clean up air pollution across Asia will drive demand for Australian LNG,” he said. “And as a lower carbon alternative to coal, natural gas will continue to play a key role in the pathway to lower carbon emissions” added the CEO.

As well as producing a clean energy, Gallagher said Santos and the GLNG project continued to deliver enormous economic and social benefits to Queensland. “The GLNG project is investing around A\$900 million in upstream production infrastructure this year alone, providing ongoing jobs and business opportunities across Queensland,” he said. GLNG and the

other two Australian CSG-to-LNG plants, Queensland Curtis LNG and Australia Pacific LNG, each require several thousand CSG feed-gas wells over their lifespans of around 30 years. “Santos is drilling a record 300 wells in Queensland this year. More gas production increases total east coast supply which is good for both the domestic gas market and LNG exports,” said Gallagher. GLNG is investing more than A\$400 million (US\$302M) in the Arcadia gas project in the inland Bowen Basin. The Arcadia investment is in addition to the other funds being spent by GLNG on upstream developments in the Maranoa, Western Downs and Central Highlands regions of Queensland.

ITALIAN energy engineering company Saipem was awarded a joint venture contract with CTCI Corp. of Taiwan to construct Thailand’s new Nong Fab LNG import terminal, the nation’s second regasification facility. Saipem said the work had an overall value of \$925 million and the company would operate as leaders of the construction venture. The contract has been awarded by the LNG subsidiary of Thai energy company PTT and the facility would be located in the Mueang Rayong district. Saipem’s scope includes the engineering, procurement, construction and commissioning of the Nong Fab terminal with a maximum receiving capacity of 9 million tonnes per annum. “As well as consolidating Saipem’s presence in an area amid great prospects for development in South-East Asia, the signing of this contract strengthens our position in the LNG sector which is of interest to us in terms of both the liquefaction and regasification segments,” said Stefano Cao, Saipem Chief Executive. “Furthermore, this contract represents a step forward towards achieving greater balance in our portfolio, between downstream and gas projects and those linked to upstream,” added the CEO.

Thailand began LNG imports at its first regasification terminal at Map Ta Phut, near Bangkok, in 2011. The country imported 3.95 million tonnes of LNG in 2017 and is seeking to improve its import and pipeline infrastructure to meet increasing domestic natural gas demand. Its main supplier is currently Qatar, though shipments are received from other nations such as Australia and Malaysia. Thai energy firm PTT holds an 8.5 percent stake in the Area 1 licence offshore Mozambique operated by Anadarko Petroleum and more cargoes

will be shipped to Thailand from the southeast African nation after 2022. PTT has signed a 20-year Sale and Purchase Agreement for 2.6 MTPA of LNG once the Mozambican plant comes on stream.

LLOYD'S Register, the UK maritime classification society, has agreed to jointly develop a dual-fuel bulk carrier, including liquefied natural gas-powered capability, with Shanghai Waigaoqiao Shipbuilding Co. of China. LR and the Chinese company said they would develop the dual-fueled Newcastlemax 210K DWT bulk carrier from an updated existing conventional design to incorporate LNG propulsion. The UK class society said that the Shanghai Waigaoqiao company had become a very experienced designer and builder of Newcastlemax bulk carriers in recent years. "Their design is well established, and now they have chosen to work together with LR to improve it and benefit from LR's experience of incorporating LNG as a fuel option," said LR. The Chinese company's commercial director, Chen Gang, said the shipbuilder had specialized in designing and building large Capesize bulk carriers. "The experience and know-how that has been built to date has been utilised to develop this latest world-class design of the LNG-powered Newcastlemax bulk carrier," said Chen. "This design enables the lowest possible fuel consumption and allows owners to select a design that will meet the future sulfur-oxide emission challenge," stated Chen.

He was referring to the International Maritime Organization deadline of 2020 for maritime fuel to contain 0.5 percent or less of sulfur content. Shipowners are being guided towards LNG propulsion as one of the ways of meeting the IMO restrictions as well as other anti-pollution rules in Emission Control Areas of Europe and North America. "We are extremely happy to cooperate with one of the leading class societies, LR, for the development of this design and it will be very exciting to see how the market responds," added Chen. "SWS is committed to continuing to develop, innovate and create more market-driven, environmentally-friendly and technology-enabled products in the future," he said. Nick Brown, LR's Marine & Offshore Director, presented an Approval In Principle certificate to the Chinese company for the design project at the four-day Posidonia Shipping Exhibition in Athens. "It's been an exciting project where we are delighted to have been able to support SWS in incorporating LNG as a fuel option," said Brown.

LNG LTD, the Australian-based developer of the Magnolia LNG project in Louisiana and the Canadian Bear Head venture in Nova Scotia, is taking a Chinese investor on board in a share placement transaction. The company said it signed a binding agreement for a share placement through an investment made by IDG Energy Investment Group, a Hong Kong Stock Exchange-listed equity fund. The shares of LNG Ltd are listed on the Australian Securities Exchange and the placement will raise proceeds of A\$28.2 million (US\$21.5M) through the issuing of 56.44 million shares at A\$0.50, representing a 14 percent premium on the prevailing price. IDG was formerly known as Shun Cheong Holdings Ltd and is registered in Bermuda as well as being quoted on the Hong Kong exchange. LNG Ltd said the net proceeds from the placement would be used to support offtake marketing efforts, focused on Magnolia LNG, and for general corporate purposes. "It is a great pleasure to welcome IDG Energy Investment to LNGL's investor group," said Greg Vesey, LNGL's Chief Executive. "Proceeds from this share placement provide additional liquidity to LNGL, and the investment from IDG demonstrates a high level of confidence in our company," added Vesey.

Magnolia LNG has all of its US regulatory permits in place as well as the construction contractors. "We are confident that our strategic relationship with IDG Energy Investment will provide LNGL with additional opportunities to market LNG volumes, given IDG's portfolio of infrastructure investments, including regasification interests," said the LNGL CEO. IDG's President Liu Zhihai said his company was excited by the investment in LNGL in support of the Magnolia LNG project. "IDG is particularly bullish on the long-term outlook for US-sourced LNG into China, and we will immediately begin working with LNGL to assist them in unlocking this market," stated Liu. LNGL's Bear Head project in Nova Scotia also has all of its regulatory permits in place and is also awaiting firm long-term offtake agreements before moving forward.

NATIONAL GRID, operator of the Isle of Grain liquefied natural gas import terminal on the River Medway in Kent, said in its annual report that it had loaded 3,950 road tankers with LNG for deliveries to off-grid customers in just over two years and also raised the issue of the post-Brexit situation. The Grain LNG facility, the

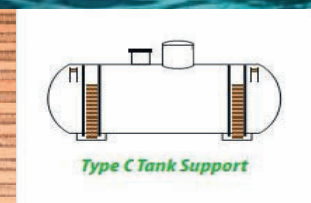
largest of three in the UK, has its main business as imports, though also allows road tanker operators to load and transport LNG in bulk across the country for the off-grid industrial sector. The terminal's LNG truck loading began in November 2015 and its multi-bay facilities are operational all year round. According to the report, Grain LNG posted an annual operating profit of £76 million (\$102M) compared with £74M the previous year and remains a small part of the overall business. Regasification capacity at the facility is held by BP and Centrica of the UK, France's Engie, Germany's Uniper, Spain's Iberdrola and Algerian energy company Sonatrach. Grain LNG also provides berthing, temporary storage, ship reloading and re-gasification into the National Transmission System for cargoes from countries such as Algeria, Qatar and Trinidad. National Grid also noted in the report that Grain LNG had received the first ever UK LNG cargoes from the US and Peru during 2017. The facility received its shipment from the Sabine Pass plant in July 2017 and from the Peruvian Pampa Melchorita plant in March 2017. Grain LNG is one of three UK import terminals, the others being the Dragon facility at

Milford Haven in Wales and the South Hook terminal at the same port.

The Dragon terminal was started up in 2009 by Petronas and BG Group of the UK and then reverted to part ownership of Royal Dutch Shell after the BG takeover. The South Hook terminal is owned by Qatar Petroleum and ExxonMobil and is a regular recipient of Qatari shipments. The National Grid report additionally raised political issues, including how Brexit would affect the business after March 2019 and the prospects of renationalization should the Labour Party gain power in the UK. National Grid said it had been involved in discussions with the UK Government on energy issues related to Brexit, "in particular the importance of remaining within the European Internal Energy Market (IEM) after March 2019" for its power business. "Currently, the UK and the EU share 4 gigawatts of electricity through interconnectors, including 1GW of electricity interconnection with Ireland. "We believe ensuring access to European energy markets will remain tariff-free post-Brexit is in the best interests of energy users in the UK and throughout Europe," said National Grid. "As a result of the Labour Party manifesto for the 2017






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general election, we have given serious consideration to the prospect of renationalisation of National Grid should the Labour Party win the next UK general election,” it added. “The Board believes that since privatisation in 1990, National Grid has created and driven value for customers, society and investors in many ways,” National Grid stated in rejecting a renationalization option.

QATAR Petroleum said it was intent on meeting the LNG requirements of India with shipments from future Qatargas output as the Asian nation moved along the path towards a gas-based economy. “India is a very important country for us, especially with regard to our growing LNG production and India’s rising demand for energy,” said Saad Sherida Al Kaabi, President and Chief Executive of Qatar Petroleum, in a statement. “We are always open to enhance cooperation to meet its energy requirements,” added Al Kaabi. He was speaking as Indian companies continued to broaden their LNG supply portfolios, with Gas Authority of India in 2018 starting contracts for shipments from two US export plants and from the marketing arm of Gazprom of Russia. Several other Indian companies, Bharat Petroleum, ONGC Videsh and Oil India Ltd hold a combined 30 percent stake in the Mozambique LNG project under development led by Anadarko Petroleum of the US. “Currently we are supplying over 8 million tonnes of our LNG to India every year under long-term agreements,” Al Kaabi explained. In total, Qatar supplied more than 10MT to India in 2017, more than half of its shipments of 19.2MT.

“We intend to supply more. A few months ago I visited India and have had meetings with top officials of all the important Indian companies that are buying LNG,” said the QP CEO. “We have had discussions on these issues, and we are looking forward to increase the level of cooperation to satisfy India’s growing LNG

demand,” he stated. Nigeria was the second-largest supplier to India after Qatar in 2017 with 3.08MT of deliveries. Australia intends to supply more cargoes to India and shipped 1.71MT in 2017. US deliveries have only just started along with some from Gazprom Marketing & Trading. Al Kaabi said the Qatari LNG supplier had good relationships with Indian companies and the country was a strategic business partner of QP. “Indian energy companies are good reliant customers and we hope to grow that business because that’s very important for us,” added Al Kaabi. The main Indian import terminal owner, Petronet LNG, operator of the Dahej and Kochi terminals, was formed by the Government of India in 1998 specifically to import LNG from Qatar. At the same time India is having to invest more on LNG infrastructure as its East Coast is still awaiting the first start-up of import and regasification facilities. The national natural gas pipeline network is being expanded as well to increase city-gas domestic availability.

QATAR Petroleum and ExxonMobil Corp. have signed an agreement for the Qataris to purchase a large stake in the US major’s shale assets in the prolific Vaca Muerta play in Argentina. The Vaca Muerta formation within the onshore Neuquen Basin has similar geological properties to the US Eagle Ford shale play near the Gulf of Mexico in Texas in terms of its depth, thickness, pressure and mineral composition. Argentina believes it is still on track to cease LNG imports as substantial shale-gas supplies from its estimated 308 trillion cubic feet of technically recoverable gas resources begin to flow in large quantities from the Vaca Muerta area by 2022. Argentina is one of the few countries in the world after the US, Canada, China and to a limited extent Australia, to have begun commercial development of shale gas. Qatar Petroleum is buying 30 percent of the hydrocarbon licenses for seven blocks

in the Vaca Muerta (Dead Cow) play held by ExxonMobil. The relevant agreements were signed in the Qatari capital Doha by Saad Sherida Al-Kaabi, President and Chief Executive of Qatar Petroleum, and Andrew P. Swiger, Senior Vice President and Principal Financial Officer of ExxonMobil. “We are pleased to enter into this agreement with our long-time partner ExxonMobil, and to participate in the further development of the Vaca Muerta unconventional resource in Argentina,” said Al-Kaabi. ExxonMobil launched a project in the Vaca Muerta formation in October 2017 involving the staged development of about 300 horizontal wells with possible production of 11 million cubic metres per day. The Neuquen Province in Argentina approved ExxonMobil’s investment plan for the Los Toldos I South Block under a 35-year unconventional exploitation concession granted to the US major.

The latest South Block project builds on ExxonMobil’s extensive operations in the Vaca Muerta with its six other licences. It is Qatar’s first investment in Argentina as well as its first significant foray into unconventional oil and gas resources. “We look forward to working with ExxonMobil to leverage our combined world class capabilities to unlock the potential of these assets for the benefit of all stakeholders,” said the QP CEO. “This agreement is an important part of Qatar Petroleum’s growth strategy. It goes hand in hand with the planned expansion of our local production from the North Field, which will further boost Qatar’s leading global position by raising its LNG production from 77 million to 100 million tonnes per year,” he added. ExxonMobil’s Swiger said the agreement builds on the US company’s long-standing and successful partnership with Qatar and underscores its commitment to develop Argentina’s resources to further support domestic production of oil and natural gas. “The Vaca Muerta shale in western Argentina is considered among the most prospective unconventional shale oil gas plays outside of North America,” said the companies. “Activity in the basin has picked up recently, mainly due to governmental incentives and rising domestic energy demand,” they noted. “A number of international operators have established presence in the basin and announced ambitious investment plans,” they stated. ExxonMobil’s wholly owned subsidiary, XTO Energy, which is among the world leaders in unconventional oil and gas operations, is providing

operational support to both companies. This includes developing detailed appraisal and development plans for these assets, based on recently drilled wells and pilot production testing.

SINGAPORE and its Maritime and Port Authority (MPA) awarded grants to support the construction of two liquefied natural gas bunkering vessels as the city state aimed for LNG fuel leadership in Asia. The MPA said it was giving a total of S\$6 million (US\$4.5M) to FueLNG Pte Ltd, a joint venture between Keppel Group of Singapore and Shell Eastern Petroleum, and Pavilion Energy unit Pavilion Gas to help implement ship-to-ship LNG bunkering as part of a cleaner port policy. Both LNG bunkering vessels are scheduled for delivery in 2020 and will be among the first of their kind to operate in Asia. “This is a significant step towards cementing Singapore’s position as a leading LNG bunkering hub in the Far East, catering to large ocean-going LNG-fuelled vessels,” said the MPA. Andrew Tan, Chief Executive of the MPA, said LNG was a viable marine fuel solution to meet global environmental regulations such as the International Maritime Organization’s 0.5-percent global sulphur cap on fuel from 2020.

“As the world’s largest bunkering hub, we are pleased to support the building of the first two LNG bunker supply vessels for the Port of Singapore,” said Tan. “We look forward to the successful applicants contributing to the growth of ship-to-ship LNG bunkering,” he added. Both beneficiaries involve local companies and one of them, FueLNG, said it would also be involved in quayside truck-to-ship bunkering. “Leveraging expertise from both Keppel and Shell, FueLNG aims to provide safe, cost-efficient and reliable solutions in LNG bunkering for global customers who pass through the Port of Singapore, which will encourage the adoption of LNG as a marine fuel,” said Chris Ong, Chairman of FueLNG. Frederic Barnaud, Group Chief Executive Officer of Pavilion Energy, said his company was pleased with the support from the MPA. “Pavilion Gas’s commitment to build its LNG bunkering business and infrastructure in Singapore and globally is a strong signal to shipowners and the bunkering community that LNG is a credible solution to achieve the IMO’s 2020 target,” said Barnaud.

US officials expect the nation to increase its role in global liquefied natural gas

Diary of events

2018
September
Gastech
17-20 September, 2018
Fira Gran Via Conference Centre
Barcelona, Spain
www.gastechevent.com
November
Nineteenth CWC World LNG Summit
27-30 November, 2018
Lisbon, Portugal
world.cwclng.com

2019
February
3rd Annual LNG USA Summit
26-27 February, 2019
Houston, Texas
www.lng-usa.com
April
19th International Conference & Exhibition on LNG
1-5 April, 2019
Shanghai, China
www.LNG19.com

trading as more liquefaction and export plants come on stream in the southern states, including Georgia, Louisiana and Texas. Global trade in LNG reached 38.2 billion cubic feet per day (Bcf/d) in 2017, a 10 percent (3.5 Bcf/d) increase from 2016 and the largest annual volume increase on record. US is expected to add 6.05 billion cubic feet per day of new liquefaction capacity by 2021 in addition to 3.5 Bcf/d already in operation at Sabine Pass and Cove Point. “Before the end of 2018 the Elba Island liquefaction project in Georgia is expected to commission the first 6 of 10 small modular liquefaction units, with a combined capacity of 0.2 Bcf/d,” said the EIA. “New trains at Cameron, Freeport, and Corpus Christi - plants under construction along the US Gulf Coast - are expected to be commissioned in the next three years,” it added. In 2017, there were 19 LNG exporting countries and 40 LNG importing countries. Australia and the United States were among the countries with the largest increases (2.7 Bcf/d combined) in 2017 LNG exports.

“Besides Australia and the United

States, several other countries also increased LNG exports in 2017,” it said, citing data from the International Group of Liquefied Natural Gas Importers (GIIGNL). “The return to service of Angola LNG and increases from several countries including Nigeria, Malaysia, Algeria, Russia, and Brunei added another 1.4 Bcf/d of LNG exports, more than offsetting a combined decline of 0.6 Bcf/d in exports from Qatar, Indonesia, Norway, Peru, the United Arab Emirates, and Trinidad,” stated the report. The EIA noted that China had the largest growth in LNG imports globally (1.5 Bcf/d) and became the world’s second-largest LNG importer in 2017, surpassing South Korea. “LNG imports also increased in South Korea, Pakistan, Taiwan, and Thailand, which collectively added 1.0 Bcf/d,” it said. Europe increased its LNG imports by 1.4 Bcf/d, primarily in Spain, Italy, Portugal, France, and Turkey. LNG imports in the United Kingdom declined by 0.34 Bcf/d (35 percent), one of only two countries in Europe to experience declines in LNG imports, as lower winter heating demand from the residential sector and

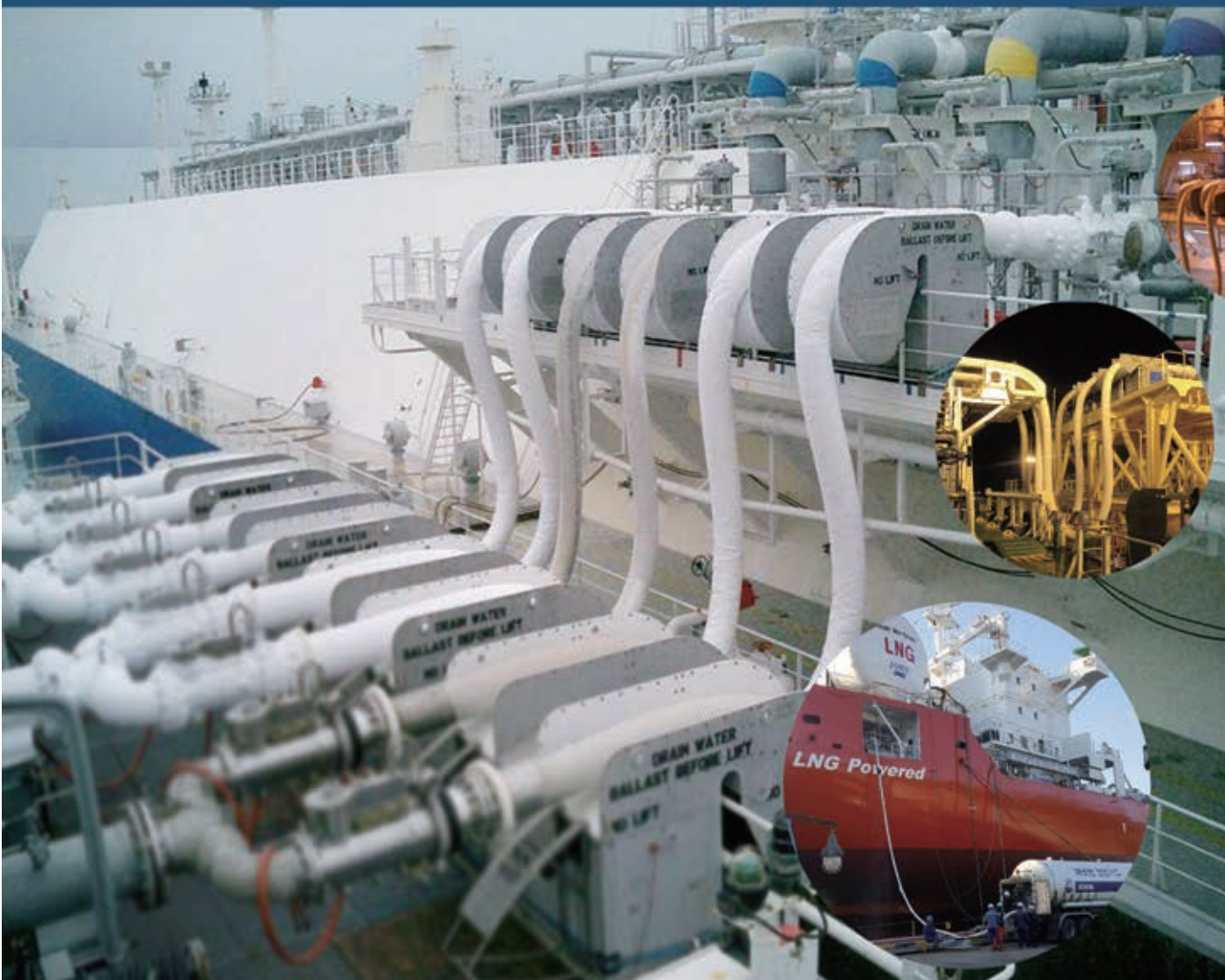
increased electricity generation from wind reduced the demand for natural gas. The EIA said LNG import volumes in South America (Brazil, Argentina, Chile, and Colombia) remained essentially unchanged from 2016.

US natural gas output growth in 2018 and 2019 will support increasing shorter-term forecasts of more LNG exports from Sabine Pass in Louisiana and Cove Point in Maryland. The latest short-term forecasts from the US Energy Information Administration suggest LNG exports will average 3.0 billion cubic feet per day in 2018 and 5.1 Bcf/d in 2019 compared with LNG exports that averaged 1.9 Bcf/d in 2017. “Dominion Energy’s Cove Point LNG facility is ramping up exports,” said the EIA. “In April, the facility exported an estimated 13.4 Bcf, implying baseload utilization of 65 percent, and in May, it exported an estimated 23.5 Bcf, implying baseload utilization of 94 percent,” said the EIA in its Short-Term Energy Outlook. That’s as overall US dry natural gas production averaged 73.6 Bcf/d in 2017 and will also

be rising steadily. “EIA forecasts dry natural gas production will average 81.2 Bcf/d in 2018, establishing a new record,” said the report. It then expects natural gas output will rise again in 2019 to 83.8 Bcf/d. The EIA additionally forecasts the Henry Hub natural gas spot prices will average \$2.99 per million British thermal units (MMBtu) in 2018 and \$3.08/MMBtu in 2019. New York Mercantile Exchange futures and options contract values for September 2018 delivery that traded during the five-day period ending in the first week of June 2018, suggest that a range of \$2.38 per MMBtu to \$3.57 per MMBtu encompasses the market expectation for September.

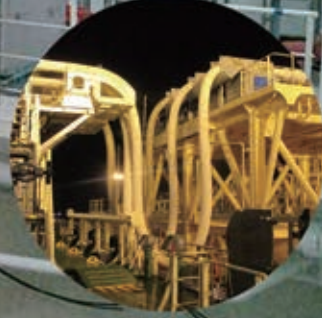
The share of US total utility-scale electricity generation from natural gas-fired power plants is seen rising from 32 percent in 2017 to 34 percent in 2018 and 2019, with the overall natural gas market underpinned by higher oil prices. “Brent crude oil spot prices averaged \$77 per barrel in May, an increase of \$5/b from the April level and the highest monthly average price since November 2014,” said the report. “EIA forecasts Brent spot

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prices will average \$71/b in 2018 and \$68/b in 2019,” it added. “West Texas Intermediate (WTI) crude oil prices will average almost \$7/b lower than Brent prices in 2018 and \$6/b lower than Brent prices in 2019,” stated the report. The report forecasts that US crude oil production will average 10.8 million b/d in 2018, up from 9.4 million b/d in 2017 and will average 11.8 million b/d in 2019. “EIA forecasts crude oil production from the Organization of the Petroleum Exporting Countries (OPEC) will average 32.0 million b/d in 2018, a decrease of 0.4 million b/d from the 2017 level,” said the US agency. “OPEC crude oil production is expected to increase slightly to an average of 32.1 million b/d in 2019,” it added. “The increase in production in 2019 is expected to occur despite falling production in Venezuela and Iran. EIA assumes these decreases will be offset by increasing production from Persian Gulf producers, primarily Saudi Arabia,” said the report.

US congressmen from the western states of Colorado and Utah have voiced support for the Jordan Cove LNG export plant proposed for the northwest state of Oregon as an outlet to Asia for Rocky Mountain region natural gas and huge shale-gas resources from the Piceance Basin. The House Natural Resources Committee Chairman Rob Bishop, a Utah Republican, and Scott Tipton, a Colorado Republican, presided over a committee field hearing in Grand Junction in Colorado to examine opportunities for the export of natural gas. Jordan Cove if approved for Oregon would produce an initial 7.8 million tonnes per annum of LNG for export to Asian markets. Pembina Pipeline of Canada is the developer of the Jordan Cove plant to be located at Coos Bay in the northwest US state. The project had previously been rejected by the Federal Energy Regulatory Commission because of a perceived lack of market interest. However, the Oregon-based project confirmed in May 2018 that it had signed preliminary accords with Jera Co Inc. and Itochu Corp. of Japan to supply LNG. Jordan Cove formally refiled its application with the FERC in September 2017 and is expecting a ruling during the second half of 2018. “The field hearing revealed the abundance of American energy available,” said House Committee Chairman Bishop at the Colorado field hearing. “Our western states hold vast reservoirs of natural gas and oil shale, but there remain unnecessary regulatory burdens to

moving energy products to areas of demand,” stated Bishop. “I would like to thank Representative Tipton for working tirelessly to bring this issue to light for Colorado’s third congressional district and fighting to bring well-paying jobs to the people of Colorado and across the nation. With what we’ve learned, we can better pursue a path forward that will allow for strategic and environmentally safe energy extraction,” added Bishop. “Western Colorado benefits from immense energy resources,” Tipton said at the hearing.

“When developed responsibly, these resources can provide good paying jobs. That’s why I have long called for a responsible energy development on federal lands, and was glad to have the opportunity to speak with expert witnesses about steps the federal government can take to help Western Colorado fulfil its energy potential,” added Tipton. The hearing heard that, according to the United States Geological Survey, the Mancos Shale play in the Piceance Basin in northwest Colorado had the potential to be the second-largest natural gas deposit in the US. The hearing was told that the proposed development of Jordan Cove in nearby Oregon and its affiliated Pacific Connector Gas Pipeline could connect the LNG plant with other pipelines in the Northwest. “These projects would allow natural gas from the Rocky Mountain region, including the Piceance Basin, and elsewhere to be transported to markets in the Pacific Northwest and abroad,” said the statement from the June field hearing. “The opportunity for exports through the Jordan Cove terminal could sustain energy development and job growth in western Colorado for years to come,” it added. It was also noted that in January 2018 Tipton wrote to the Trump Administration requesting White House backing for the Jordan Cove project application.

US energy companies are likely to become larger suppliers of liquefied natural gas to China once the build-out of the next wave of liquefaction and export capacity on the US Gulf Coast is completed because of continued domestic challenges in the Chinese energy and shale-gas sectors. “China is the world’s fastest growing natural gas consumer as its national government pushes programs to replace coal,” said a report from the US think-tank, the Brookings Institution. The report said US LNG export capacity in 2017 reached 20 billion cubic metres of natural gas (15 million tonnes of LNG)

with 2.9 Bcm going to China, accounting for 6 percent of Chinese imports of the fuel. It noted that China’s national energy strategy includes a goal of natural gas making up 15 percent of the nation’s energy mix by 2030. “If China’s primary energy consumption reaches 5.5 billion tonnes coal-equivalent by 2030, natural gas consumption would reach about 650 Bcm, or 2.7 times its level in 2017,” said Brookings. The 2017 US export statistics for LNG saw Mexico, South Korea and China as the leading importers of volumes from the Sabine Pass plant in Louisiana. A total of 1.94 billion cubic feet per day was exported, a 500 MMcf/d increase, according to government figures. The three countries received more than 50 percent of the shipments.

China is also increasing its imports of natural gas by pipeline. These volumes come from the Central Asian Gas Pipeline and the China-Myanmar Oil-Gas Pipeline and account for 46 percent of the nation’s imports. The report said two new pipeline projects are scheduled to come on line within the next two years, the Russian Siberian pipeline in 2019 and additional Central Asian capacity in 2020. The US itself is heading for an estimated 60 MTPA of LNG output by the mid-2020s if most of the current projects advance to benefit from the US shale-gas boom. China also has abundant shale-gas reserves, though will face challenges in ringing the resources to production, according to the report. It pointed out that China has some of the world’s largest shale-gas deposit at up to 361 trillion cubic metres, though only around 200 Tcm is said to be technologically extractable. This is because of geological complexities, especially concerning depths of some reserves at more than 3,500 metres below ground. “As of 2017, shale gas production represents only 6 percent of the total domestic production,” said the Brookings report. “Although China has been implementing reforms in the sector, serious political and economic challenges lie ahead,” it added. “The National Development and Reform Committee (NDRC) concludes that a significant boost in domestic supply is unlikely in the near future because of low investment in exploration, technology barriers, regulatory constraints and inadequate infrastructure,” stated the US report. It cites the Paris-based International Energy Agency forecasting that China’s natural gas production would only reach 255 Bcm by 2030, which means at least 395 Bcm, or 61 percent of

the total projected demand, will have to be met by imports. “To continue expanding natural gas imports is the only way to meet the demand under the current policy,” added the US report.

ZEEBRUGGE LNG Terminal, owned by Belgian company Fluxys, has begun the first loading operations for the small-scale carrier “Coral EnergICE”, an Ice-Class vessel designed to make year-round deliveries of break-bulk cargoes to Scandinavian ports. “The “Coral EnergICE” is designed to operate in the sub-zero temperatures of the Baltic Sea during all weather conditions,” said Fluxys Belgium. “The vessel has a loading capacity of 18,000 cubic metres and is currently assigned to make small-scale LNG deliveries to northern ports in Sweden and Finland,” it added. Fluxys Belgium sees itself as supporting the small-scale distribution of LNG through its special break-bulk jetty at Zeebrugge. Fluxys explained that small LNG carriers have been able to load at the terminal since 2010 and the facility recently opened a second jetty specially designed for loading smaller ships such as distribution and bunkering vessels. “The latter supply LNG to LNG-fuelled ships or small-scale storages. Parent company Fluxys is a partner in such a bunkering vessel which has Zeebrugge as its home port,” said Fluxys Belgium. “Recently Fluxys also started facilitating LNG bunkering in the port of Antwerp,” it added.

The Zeebrugge import terminal imports cargoes from nations such as Qatar at the same time as developing the domestic and regional market for LNG fuel. The nearby Dutch port of Rotterdam is also following the same strategy as both Belgium and the Netherlands market LNG northwards as well as into Europe via its extensive river transportation and barge trading system. The Zeebrugge facility’s customers in the road transportation sector can also load LNG trucks to supply local networks or industrial sites in Europe where pipeline supplies are unavailable. The trucks can also supply filling stations for trucks that use LNG as a fuel or can supply ships powered by LNG from quaysides. “Approximately 100 ships are using LNG as a fuel in Europe and their number is set to double by 2020 when more stringent sulphur emission standards come into force,” said Fluxys. “The development of new infrastructure is in full swing to support this growth of the small-scale LNG market,” it stated. ■

General terms and conditions provided for LNG trading by French law firm De Gaulle Fleurance

Contract aims for efficiency in spot and short-term markets and sets standard for online platforms

French law firm De Gaulle Fleurance & Associés has released the first standard general terms and conditions (GTC) for the sale and purchase of liquefied natural gas, offering a more efficient way to trade LNG on the spot and short-term markets.

These LNG general terms and conditions, known as the “LNG GTCs 2018”, were overseen by lawyer Ruchdi Maalouf, head of oil and gas at De Gaulle Fleurance and who has had papers published on the subject since 2012, including in the LNG Journal when he previously worked for Norton Rose in Singapore.

Process

According to the Paris-based firm, the “LNG GTCs 2018” will be able to debottleneck the cumbersome contracting process used today in the LNG spot trade.

De Gaulle Fleurance explained these LNG general terms and conditions could help streamline legal risk management.

Moreover, the “LNG GTCs 2018” is seen by the firm setting a standard for online LNG trading platforms and OTC derivatives.

“General terms and conditions are already widely used for spot transactions across the oil and gas industry, including for crude oil, LPG and pipeline gas,” stated Maalouf, the author of the “LNG GTCs 2018”.

He explained that historically, LNG has been slower to commoditise than other segments of the oil and gas industry.

Evolution

Spot contracting reflects this evolution. Short-term sales evolved from fully termed LNG sale contracts to a dual structure with a framework agreement, the “master sale agreement” (MSAs) containing the bulk of the sale terms, and a short special form, the “confirmation notice”, which includes the specifics of a particular deal (price, time of delivery, quantity, etc.).

“Over the past 20 years, MSAs emerged and converged. Their continued use is no longer justified and represents a significant hurdle to the commoditisation of LNG markets,” said the firm.

“Today, terms and conditions in MSAs have converged and can be standardised,” said Malouf.

“Having reviewed close to 50 MSAs in the past 8 years, the trend is clear. Leaving aside legal technicalities, commercial terms now have a 95-98

percent convergence,” he added. “The main divergence is the ratio of the liability cap when a seller fails to deliver or a buyer fails to take delivery. That issue does not belong in the MSA anyway, and the LNG GTCs 2018, make it a provision to be agreed in the confirmation notice,” stated the lawyer.

Adjustments

“GTCs are the natural evolution for the industry, and a seamless evolution. Moving from MSAs to GTCs will require minimal adjustments to the trading desks, but they will improve legal risk management which is very complex at the moment with so many MSAs around,” stated Malouf.

The background to the creation of the “LNG GTCs 2018” is linked to the steady development of LNG trading.

- The LNG industry started in the 1960s with a few long term projects involving a small number of producers and importers. As new projects, producers and importers joined the club, a modest short term trade grew at the margins (less than 1 percent before the 1990s, 5 percent in 1998).

- Today, the short term market is well supplied (37 percent of the global LNG trade) but the contracting still reflects the evolution from a market that was not commoditised and where bilateral relations dominated.

- LNG is traded on the short term markets through a peculiar instrument called a “Master LNG sale and purchase agreement” or MSA. An MSA is a contract between two companies which is signed as a precondition to trade LNG. It is not an LNG trading agreement.

- MSAs are intended to simplify future trade by agreeing in advance boilerplates and certain commercial terms such as force majeure and liability for failure to deliver or take.

- However, instead of simplifying the trade, they lock the market in a constellation of bilateral relations outside of which it is virtually impossible to access the short term LNG market.

- An alternative exists: instead of each company signing an MSA with each company, the industry can have a set of general terms and conditions relevant to all trades that can be incorporated in all trading contracts (and tweaked through those trading contracts when necessary).

“General terms and conditions” are the method of choice for crude oil, oil products and LPG.

- In summary, MSAs and GTCs contain substantially the same terms. MSAs are a contract negotiated between 2 parties and signed, whereas GTCs are standalone terms that do not need to be negotiated or signed before incorporation in the trading instrument. In both cases, all LNG sales are done through special trading contracts, the confirmation notices (both for MSAs and GTCs) which incorporate by reference the relevant MSA or the GTCs.

Market access

- For a new entrant, a significant investment is required in time and legal fees to establish market standing, even before trading the first cargo. This is because a new entrant needs to sign MSAs with a large number of counterparties before trading operations can start.

- The requirement to enter many MSAs in order to be able to trade is no longer justified. The market has matured and over time, the terms in the MSAs have converged.”

- Using one set of terms, such as the LNG GTCs 2018, would lift the access barrier that MSAs are maintaining and allow more parties, and smaller ones, to access the LNG short term market without additional delay.

Improving liquidity and tradability

- Using standard terms for trading LNG would also make LNG cargoes more tradable as they could change hands on the same terms easily, which is not the case today.

- At the moment, when a cargo sold by party A to party B is sold on to party C, a different set of terms apply to each transaction. MSAs make each new transaction relating to a specific cargo increasingly lengthy and difficult. Alternatively, the LNG GTCs 2018 are a single set of terms that can apply to all subsequent sales of a cargo instead of several different MSAs.

- By making it easier to sell and resell a specific cargo, and by opening the market access to new entrants, both liquidity and tradability are improved. Increased tradability also contributes towards achieving the churn ratios necessary for an

LNG hub and an LNG spot price to develop.

Streamlining risk management

- When a cargo is traded by more than 2 parties (the initial buyer sells it on to a new buyer for example), additional MSAs enter into play. Due to the length and complexities of MSAs, matching terms between several MSAs is a costly, difficult and risky exercise in risk management for trading teams and legal teams.

- By applying one set of terms such as the LNG GTCs 2018, much of the risk of mismatch between MSAs legal terms is eliminated.

Standard terms for online trading and OTC derivatives

- The LNG industry has recently seen a number of initiatives to develop LNG trades via online platforms. All these initiatives require the interested parties to conclude or have an MSA off line.

- GTCs such as the LNG GTCs 2018 would eliminate that requirement and reduce offline requirements.

- The same applies to derivative products. For ISDAs to be used to develop LNG derivatives (over the counter LNG futures for example), standard reference terms are necessary. These could be provided by the LNG GTCs 2018. ■

About the Authors



Ruchdi Maalouf chairs the oil & gas practice at De Gaulle Fleurance & Associés. He is qualified in England & Wales. He trained and specialised in oil & gas at a top tier City firm in London. He worked in London, Tokyo, Seoul, Singapore and Moscow. He also spent a year on a legal secondment at a major North Asian LNG importer. In addition to his legal experience, Ruchdi Maalouf was involved in LNG projects in a commercial capacity, as an LNG seller with an export project in Russia, and as head of LNG supply with an import project in Pakistan (where he also acted as head of legal).

De Gaulle Fleurance & Associés is a premier international law firm based in Paris. It is an independent and full service firm with over 120 lawyers. De Gaulle Fleurance & Associés has a successful Africa practice focusing on energy and natural resources and is the only independent French law firm offering English law advisory in oil and gas. De Gaulle Fleurance & Associés consistently receives top rankings from industry guides.

Energy chiefs give views on LNG and natural gas evolution for transitional era and security

The 27th World Gas Conference took place in Washington DC from June 24-29 and covered the main issues

US Department of Energy Secretary Rick Perry helped get the World Gas Conference off to a rousing start as he praised technological innovation in the energy sector that would have been unheard of 30 years ago, the last time the conference was held in the United States.

Perry said the Administration of President Donald Trump has been equally innovative in its first 18 months in office by embracing an all-fuels strategy for energy.

"We do not discriminate against any of our fuels," said Perry.

Committed

"We're committed to using every one of them, and maybe even developing some new ones. Our policy works for, not against, the many innovations that are helping produce more of every fuel," said the Energy Secretary.

"Rather than punish fuels that produce emissions through regulation, we seek to reduce emissions by innovation. And by advancing policies like tax and regulatory reform, the President gives both the incentive and the freedom to innovate further," he stated.

Perry told the several thousand conference delegates that the US would set a record 81.2 billion cubic feet per day of dry natural gas production in 2018.

He noted that the nation would become a net exporter of natural gas for the first

time in six years, thanks to LNG shipments and rising pipeline supplies to Mexico.

The US had also now shipped LNG cargoes to 30 countries on five continents.

"We're sharing our energy bounty with the world, and in so doing we're empowering our friends, allies and trading partners, both economically and energy-wise as well," said Perry.

"That gives us the opportunity to share not only our energy, but our energy success story, to encourage others to choose a similar path," he added.

"This is not just about exporting our energy bounty, including our natural gas. It's about exporting the technology, the know-how, that unleashed our bounty in the first place. That includes ways to make the energy sources cleaner," he stated.

Opponents

However, Perry conceded that there were vocal opponents to natural gas around the world.

"I wish I could tell you that the entire developed world is on board with our vision, but I cannot," said Perry.

"In some quarters, at home and abroad, there is still this stubborn opposition to natural gas and other fossil fuels. The opposition exists even as fossil fuels become cleaner, and low emission natural gas increases its share of total fossil production and use," he explained.



US Energy Secretary Rick Perry addressing the WGC in Washington on the opening day when he praised technology innovation in the sector

Perry concluded that most natural gas foes were out of touch with realities in the energy sector. As proof, he cited recent estimates that fossil fuels would still comprise more than 75 percent of the world's energy by the year 2040.

Outgoing International Gas Union President David Carroll said the WGC was the largest natural gas industry event this year in the world.

"The pace of change does seem to be quickening these days, and it's certainly been the case in the natural gas world,"

said Carroll. "Since the last WGC three years ago in Paris, the industry has gone from COP21, the Conference of Parties - where gas was an afterthought - to an age of energy realism with promising outlooks for global market growth," he added.

Australian view

Woodside Petroleum Chief Executive Peter Coleman, whose company has substantial stakes in three Australian LNG plants and is a partner in a US

LNG *shipping* REVIEW

2018



coming soon....



US Energy Secretary Rick Perry met world energy leaders, including having a 'productive bilateral meeting' in Washington with Qatar Petroleum Chief Executive Saad Sherida Al-Kaabi (Photo from US DoE)

project at Port Arthur in Texas, said in his speech that investment in natural gas pipelines only gives an illusion of security of supply

"Sinking funds and time in laying a pipeline delivers dependence and limits choice," said Coleman.

"Just look at what's happening in the Netherlands, where the steep decline in production from the Groningen field due to seismic activity poses serious challenges," he said.

"Or in China, when demand for gas was peaking during winter, Turkmenistan reduced pipeline gas volumes into the country," Coleman noted in a speech listing the three main

advantages of LNG supplies.

"An import terminal that links to a 'virtual pipeline' of shipped LNG ensures resilience," stated Coleman.

He said that his company that operates the North West Shelf plant and Pluto LNG and is a shareholder in the Wheatstone plant in Western Australia was seeing a "real appetite for gas in Asia" and LNG should be the first choice.

Flexible

He said that the second advantage of LNG was that the maturing of trading means buyers can secure the supply they need - and secure it on flexible terms at a competitive price.

"We are transitioning from long-term contracts to more flexible arrangements that hold appeal for buyers who are looking to wean themselves off coal and ensure a reliable energy supply," he said.

The shorter contracts give them a chance to try LNG - and the improvement in air quality will convince them to stick with it.

The growth in spot trading means cargoes are always available, in a range of volumes.

Pricing is increasingly globally-linked and determined through market competition, in contrast with the geopolitical and regional factors that influence pricing of other forms of gas.

Thirdly, he said that LNG was versatile.

"It is the ideal partner for renewables. And it has a high energy density that is suitable for new uses, including as a transport fuel in shipping and trucking.

"For all these reasons, the times suit LNG," he stated.

US liquefaction

In another speech, American Gas Association (AGA) CEO Dave McCurdy praised the evolution of the US LNG export sector.

"By safely producing, transporting and delivering natural gas, we are changing the world we live in. Choosing between affordability, efficiency and security is a relic of a bygone era," said McCurdy.

"Now we have an opportunity to pair energy abundance with smart policies that continue to enhance our energy advantage. Natural gas is a foundation fuel for prosperity throughout the world," he added.

French major Total is looking to bolster its already significant LNG with more

brownfield expansion projects such as in Qatar and Nigeria.

Total is the second-largest LNG player among international oil and gas operators, after Royal Dutch Shell, with 40 MTPA of production through participation in projects such as Nigeria LNG, Angola LNG and in Qatar.

Chief Executive Patrick Pouyanne singled out five future LNG projects on which Total is placing particular emphasis.

Qatar and Nigeria

At the North Field in Qatar, Total said it was hoping to win participation in Qatar Petroleum's expansion plans to expand output to 100 MTPA from the current 77 MTPA.

He called the North Field offshore Qatar one of the "jewels in the world of LNG" production.

He said the French company was also interested in reviving expansion proposals in Nigeria.

"We are working in order to be a participant in the next wave of expansion," he said, referring in particular to the Train 7 expansion plan.

This would involve taking Nigerian LNG output to 30 MTPA, adding 7.1 MTPA of capacity.

"NLNG is one of the projects where we want to expand, one of the best projects in the world," said Pouyanne.

In Russia, Total is looking to follow up on its participation in Yamal LNG, alongside the Russian natural gas company Novatek in which it has a 20 percent shareholding.

The new Novatek-led venture is called Arctic LNG 2 project with proposals to use offshore gravity-based platforms and to save on costs by around 30 percent compared with the Yamal project. ■






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Status of shale gas development in China and how it may affect natural gas and LNG requirements

China National Petroleum Corp. gives indications of prospects from experience in the southern Sichuan Basin

The southern Sichuan Basin has ideal preservation conditions with moderate burial depth and high strata pressure, according to a paper presented by China National Petroleum Corp., one of several on Chinese shale-gas and LNG needs presented at the 2018 World Gas Conference in Washington DC in June.

They examined future LNG demand in China as well as the market effects of the development of shale-gas resources.

Consumption

China's natural gas consumption grew by an average annual rate of 12.7 percent from 2011 to 2015, impacted by low oil price and competition from other alternative energy, the average annual growth rate of gas consumption is only 6 percent in the last two years.

In 2017, promoted by the improved macroeconomic situation, policies aiming at environment improving and boost use of natural gas, natural gas consumption of the first half year has achieved 115 billion cubic metres, year on year growth of more than 15 percent.

China's natural gas consumption will exceed 360 Bcm in 2020, assuming a

15 percent growth rate in the following three years.

Meanwhile, domestic production is to maintain growth but the growth rate dropped, and the difference of supply and demand is increasing.

Natural gas dependency rose from 15 percent in 2010 to 35 percent in 2016.

Abundant

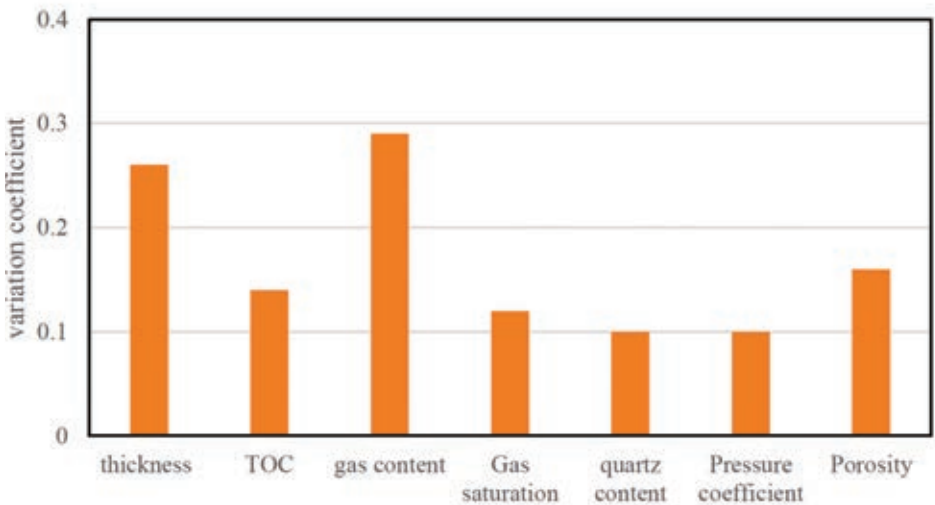
It was noted by many speakers that China has abundant unconventional natural gas resources at various stages of monetization.

After nearly 10 years of research and practice, unconventional key development technologies achieve breakthroughs, especially the success of shale gas industrialization produce which shows that shale gas will become the main incremental part in the domestic gas supply.

Furthermore, shale gas has the potential to be the most realistic field to promote natural gas development.

China's natural gas consumption grew by an average annual rate of 12.7 percent from 2011 to 2015.

Impacted by low oil prices and



Plane variation coefficient of reservoir parameters in Weiyuan shale-gas field

competition from other alternative energy, the average annual growth rate of gas consumption is only 6 percent in the last two years.

Background

China is developing three types of shale, marine, transitional and continental. Shale-gas geological resources amount to 134 trillion cubic metres, and the technically recoverable resources amount to 22 trillion cubic metres.

In the Upper Yangtze region marine

shale recoverable resources is about 13 trillion cubic metres, accounting for 60 percent of the total shale gas resources.

“Marine shale is the most important shale gas exploration and development domain in China. The organic-rich marine shale in the Sichuan basin has ideal preservation conditions with moderate burial depth and high strata pressure,” said a paper presented by China National Petroleum Corp.

Since 2008 when China has launched shale gas exploration and evaluation, the Wufeng-Longmaxi formation was found which spread continuously in the Sichuan Basin Southern Area (SBSA).

“The Wufeng-Longmaxi formation has favorable characteristics to be beneficial to achieve large-scale production and efficient development, including high total organic carbon (TOC) content, high porosity, high gas content, thick superior shale and a high-pressure coefficient,” added CNPC.

Main plays

In 2016, the three main shale gas plays in the south Sichuan Basin, Fuling, Changning-Zhaotong and Weiyuan produced 7.8 billion cubic metres of natural gas.

Chinese energy executives believe that shale-gas development has been a success so far and new technologies have been introduced.

The major developed formation burial depth is above 3500 metres. Depths of between 3,500 to 4,000 metres have been developed in some areas.

However, it is in formation with depths



The Sichuan Basin is of China's main unconventional natural gas resource areas and is being development at a slow and orderly pace by several state companies. In some cases international companies are partners

of less than 4,000 metres that commercial gas flows have been reached.

“Shale-gas exploration and development shows bright prospects in the southern Sichuan basin,” stated CNPC.

Based on the comprehensive analysis of the status of shale development status, it is certain that the marine facies in southern China are the most important areas for shale-gas exploration.

Geology

“Because the lower Paleozoic marine shale age in China was old and entered a large amount of gas generation early, the shale gas experienced long and multi-stage tectonic movements, folds, faults and uplift and denudation,” said the CNPC report.

However it was acknowledged that the surface, geomorphology and geological conditions are complex, and the preservation conditions are quite different.

The CNPC report noted that following the substantial breakthrough made by unconventional oil and gas in North America, China has started the shale gas exploration and development process after a series of preparations in the Sichuan Basin.

“Special research and comprehensive geological evaluation of shale gas were carried out. The potential of shale-gas resources, favorable strata and favorable zones in the southern Sichuan Basin were initially identified,” it added.

“Pilot tests were conducted in 2009 and the first shale-gas evaluation well, Wei 201, was drilled in the Weiyuan shale-gas field, which was a prelude to the industrialization of shale-gas exploration and development in China,” explained the report.

Demonstration

“In 2012, the construction of a national demonstration area was started, and the Jiaoye 1 well was drilled in the Jiaoshiba structure in Fuling.

“The first large-scale shale-gas field in China, the Longmaxi Formation shale gas field at Jiaoshiba, was discovered.

“In 2014, the Jiaoshiba and Changning-Weiyuan shale-gas fields started to get commercial production and by 2017, shale-gas production in China was at nearly 10 billion cubic metres,” said CNPC.

This was the equivalent of 7.4 million tonnes of LNG per annum and was regarded as a good platform to build on, according to analysts.

In the past decade, the geological characteristics of the shale-gas fields have been basically ascertained through continuous exploration and research.

“The potential and distribution of resources and the controlling factors of high production capacity have been clarified,” said CNPC.

Management

“Exploration and development technology for shale gas formation of above -3,500

metres, an efficient management mode and an HSE system were initially formed, and a national shale-gas industrialization demonstration area was established,” added the report.

Exploration and development of shale gas in the Sichuan Basin show that the Wufeng-Longmaxi formation is the most favorable shale-gas play.

Following studies of the various reservoir characteristics and the production potential, the economics of shale-gas development have been confirmed.

The reserves and abundance have been calculated by the volumetric method, based on data from evaluation wells, development wells and 3D seismics in the Weiyuan Shale gas field of the Sichuan Basin.

Assessments

The Sichuan resources numbers have been obtained by analogy to the reserves abundance of Weiyuan, because of the characteristics of the stable distribution of the shale-gas reservoir, the data of evaluation wells is treated as the hard data and 3D seismic data is seen as a trend.

Consideration has also been given to the development experiences of American shale-gas fields and production performances.

Preliminary assessment shows that in the favorable shale-gas resource areas the estimated reserves are 17 trillion cubic metres in the Wufeng-Longmaxi

formation of the southern Sichuan Basin.

It is estimated by CNPC that the recoverable reserves in the area are around 6 trillion cubic metres.

“Recoverable resources of burial depth above 3,500, 3,500-4,000 and 4,000-4,500 meters are about 0.9, 2.2 and 2.9 trillion cubic meters respectively, with working areas of 2,500, 7,000 and 10,000 square kilometres,” said the report.

“Shale gas has the production potential of 50-70 billion cubic meters maintaining 10-15 years in the Sichuan basin southern area,” it added.

At present, the Jiaoshiba and Changning-Weiyuan shale gas fields have been built and achieved an effective development, of which the shale formation buried depth is less than 3,500 metres.

The exploration and development in the south Sichuan Basin have accumulated plenty of dynamic and static data.

“Research shows that the distribution of shale reservoirs is stable. Therefore, the analogy can be used to evaluate the shale gas resources in the south Sichuan Basin with a buried depth of less than 4,500 metres,” added the report. ■

This article is based on extracts from a paper presented at the World Gas Conference by Li Xizhe, Li Yang, Su Yunhe, Dong Dazhong, Shi Zhensheng, Wan Yujin, Zhang Xiaowei, Shi Shi of the Research Institute of Petroleum Exploration & Development, China National Petroleum Corp.

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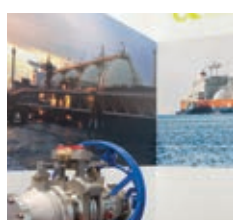
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LNG carrier	Capacity m ³	Owned or Ordered by	Builder	Delivery Date	Flag	Power Plant	Cargo System	No. of tanks	Ship built for Export plant
Aamira	266,000	QGTC	Samsung	Dec-10	Liberia	DRL	TZ Mk. III	5	Qatargas IV
Abadi	135,000	Brunei Gas Carriers	Mitsubishi Nagasaki	Jun-02	Brunei	S	Moss	5	Brunei LNG
Abalamabie	174,900	Bonny Gas	Samsung	June-16	Bermuda	DFDE	TZ Mk III	4	Nigeria LNG
Adam LNG	162,000	Oman LNG	Hyundai	Dec-14	Marshall Is.	DFDE	TZ Mk. III	4	Oman LNG
Al Aamriya	210,100	J5 Consortium	Daewoo	Feb-08	Marshall Is.	DRL	GT NO 96	4	Qatargas
Al Areesh	151,700	Teekay LNG	Daewoo	Jan-07	Qatar	S	GT NO 96	4	Ras Gas II
Al Bahiya	210,185	QGTC	Samsung	Oct-09	Liberia	DRL	TZ Mk. III	5	Qatar-Atlantic
Al Biddah	135,275	J4 Consortium	Kawasaki Sakaide	Nov-99	Japan	S	Moss	5	Qatargas
Al Daayen	151,700	Teekay LNG	Daewoo	Apr-07	Qatar	S	GT NO 96	4	RasGas II
Al Dafna	266,000	QGTC	Samsung	Oct-09	Marshall Is.	LR DRL	GT NO 96	4	Qatar-Atlantic
Al Deebel	145,000	Peninsular LNG	Samsung	Dec-05	Bahamas	S	TZ Mk. III	4	Qatargas
Al Gattara	216,200	OSG/Nakilat	Hyundai	Oct-07	Marshall Is.	DRL	TZ Mk. III	4	Qatargas II
Al Ghariya	210,100	ProNav	Daewoo	Feb-08	Bahamas	DRL	GT No. 96	4	Qatargas
Al Gharaffa	216,200	OSG/Nakilat	Hyundai	Jan-08	Marshall Is.	DRL	TZ Mk. III	4	Various
Al Ghashamiya	216,000	QGTC	Samsung	Mar-09	Liberia	DRL	TZ Mk. III	4	Qatar-Atlantic Basin
Al Ghuwairiya	261,700	QGTC	Daewoo	Aug-08	Marshall Is.	DRL	GT NO. 96	5	Qatar-Atl'c Basin
Al Hamla	216,000	OSG	Samsung	Feb-08	Marshall Is.	DRL	TZ Mk. III	4	QatarGas
Al Hamra	137,000	National Gas Shipping	Kvaerner-Masa	Jan-97	Liberia	S	Moss	4	ADGAS
Al Huwaila	217,000	Teekay	Samsung	May-08	Bahamas	DRL	TZ Mk. III	4	RasGas III
Al Jasra	137,100	J4 Consortium	Mitsubishi Nagasaki	Jul-00	Japan	S	Moss	5	Qatargas
Al Jassasiya	145,700	Maran-Nakilat	Daewoo	May-07	Greece	S	GT No 96	4	RasGas
Al Kharaitiyat	216,200	QGTC	Hyundai	May-09	Liberia	DRL	TZ Mk. III	4	Qatargas III
Al Kharaana	210,000	QGTC	Daewoo	Oct-09	Marshall Is.	DRL	GT NO 96	4	Qatargas IV
Al Kharsaah	217,000	Teekay	Samsung	May-08	Bahamas	DRL	TZ Mk. III	4	RasGas III
Al Khatiya	210,000	QGTC	DSME	Oct-09	Marshall Is.	DRL	GT No. 96	4	Qatargas IV
Al Khaznah	135,500	National Gas Shipping	Mitsui Chiba	Jun-94	Liberia	S	Moss	5	ADGAS
Al Khor	137,350	J4 Consortium	Mitsubishi Nagasaki	Dec-96	Japan	S	Moss	5	Qatargas
Al Khuwair	217,000	Teekay LNG	Samsung	Jul-08	Korea	DRL	TZ Mk. III	4	RasGas
Al Mafyar	266,000	OSG/Nakilat	Hyundai	Oct-07	Marshall Is.	DRL	TZ Mk. III	4	Qatargas II
Al Marrouna	151,700	Teekay	Daewoo	Nov-07	Bahamas	S	GT NO 96		Ras Gas I
Al Mayeda	266,000	QGTC	Samsung	Jan-09	Liberia	DRL	TZ Mk. III	5	Qatar-US/Var.
Al Nuaman	210,000	QGTC	DSME	Dec-09	Marshall Is.	DRL	GT No. 96	4	Qatargas IV
Al Oraiq	210,000	J5 Consortium	Daewoo	Apr-08	Marshall Is.	DRL	GT No. 96	4	Various
Al Rayyan	135,360	J4 Consortium	Kawasaki Sakaide	Mar-97	Japan	S	Moss	5	Qatargas
Al Rekayyat	216,200	QGTC	Hyundai	Jun-09	Bahamas	DRL	TZ Mk.III	4	Qatar-Atlantic
Al Ruwais	210,100	ProNav	Daewoo	Nov-07	Germany	DRL	GT NO 96	4	Qatargas II
Al Sadd	210,100	QGTC	Daewoo	Mar-09	Liberia	DRL	GT NO 96	4	Qatar-Atlantic Basin
Al Safliya	210,100	ProNav	Daewoo	Dec-07	Bahamas	DRL	GT NO 96	4	Qatargas II
Al Sahla	216,200	J5	Hyundai	Jun-08	Japan	DRL	TZ Mk. III	4	Ras Gas III
Al Samriya	261,700	QGTC	Daewoo	Sep-08	Marshall Is.	DRL	GT NO. 96	5	Qatargas II
Al Sheehaniya	210,100	QGTC	Daewoo	Feb-09	Liberia	DRL	GT NO 96	4	Qatar-Atlantic Basin
Al Shamal	217,000	Teekay LNG	Samsung	Jun-08	Qatar	DRL	TZ Mk. III	4	RasGas
Al Thakhira	145,000	Peninsular LNG	Samsung	Sep-05	Bahamas	S	TZ Mk. III	4	Qatargas
Al Thumama	216,000	J5 Consortium	Hyundai	Apr-08	Japan	DRL	TZ Mk. III	4	Rasgas
Al Utouriya	215,000	J5	Hyundai	Sep-08	Panama	DRL	TZ Mk. III	4	RasGas
Al Utourma	215,000	J5	Hyundai	Sep-08	Panama	DRL	TZ Mk. III	4	Ras Gas III
Al Wajbah	137,350	J4 Consortium	Mitsubishi Nagasaki	Jun-97	Japan	S	Moss	5	Qatargas
Al Wakrah	135,360	J4 Consortium	Kawasaki Sakaide	Dec-98	Japan	S	Moss	5	Qatargas
Al Zhubarah	137,570	J4 Consortium	Mitsui Chiba	Dec-96	Japan	S	Moss	5	Qatargas
Alto Acrux	147,000	LNG Marine Transport	Mitsubishi	Mar-08	Bahamas	S	Moss	4	Various
Amali	148,000	Brunei-Shell	DSME	Jul-11	Brunei	DFDE	GT No. 96	4	Brunei LNG
Amanl	154,800	Brunei-Shell	Hyundai	Nov-14	Brunei	DFDE	TZ Mk. III	4	Brunei LNG
Aman Bintulu	18,928	Perbadanan / NYK Line	NKK Tsu	Oct-93	Malaysia	S	TZ Mk. III	3	Petronas
Aman Hakata	18,800	Perbadanan / NYK Line	NKK Tsu	Nov-98	Malaysia	S	TZ Mk. III	3	Petronas
Aman Sendai	18,928	Perbadanan / NYK Line	NKK Tsu	May-97	Malaysia	S	TZ Mk. III	3	Petronas
Arctic Aurora	160,000	Dynagas	Hyundai	Jul-13	Marshall Is.	DFDE	TZ Mk. III	4	Various
Arctic Discoverer	140,000	K Line	Mitsui Chiba	Jan-06	Bahamas	S	Moss	4	Various
Arctic Lady	147,200	MOL/Hoegh LNG	Mitsubishi Nagasaki	Apr-86	Norway	S	Moss	4	Various
Arctic Princess	147,200	MOL/Hoegh LNG	Mitsubishi Nagasaki	Jan-06	Norway	S	Moss	4	Various
Arctic Sun	89,880	Arctic LNG Shipping	IHI Chita	Dec-93	Liberia	S	IHI SPB	4	ConocoPhillips/Marathon
Arctic Voyager	140,000	K Line	Kawasaki	Jul-06	Bahamas	S	Moss	4	Statoil
Arkat	148,000	Brunei-Shell	DSME	Feb-11	Brunei	DFDE	GT. No. 96	4	Brunei LNG
Arwa Spirit	165,000	Teekay LNG	Samsung	Sep-08	Marshall Is.	DFDE	TZ Mk. III	4	Various
Aseem	154,850	K Line-Petronet	Samsung	Nov-09	Malta	S	GT No 96	4	Qatar-India
Asia Endeavour	160,000	Chevron	Samsung	Dec-14	Bahamas	DFDE	TZ Mk. III	4	Various
Asia Energy	160,000	Chevron	Samsung	Sept-14	Bahamas	DFDE	TZ Mk. III	4	Various
Asia Excellence	160,000	Chevron	Samsung	Sept-13	Bahamas	DFDE	TZ Mk. III	4	Various
Asia Venture	160,000	Chevron	Samsung	Sept-17	Bahamas	DFDE	TZ Mk. III	4	Various
Asia Vision	160,000	Chevron	Samsung	June-14	Bahamas	DFDE	TZ Mk. III	4	Various
Barcelona Knutsen	173,400	Knutsen	Daewoo	May-10	N.I.S.	DFDE	GT NO 96	4	Various
Bebatic	75,060	Brunei Shell Tankers	Atlantique	Oct-72	Brunei	S	TZ Mk. I	6	Brunei LNG
Beidou Star	172,000	MOL	Hudong	Oct-15	Hong Kong	DRL	GT NO. 96	4	Various
Berge Arzew	138,088	BW Gas	Daewoo	Jul-04	Norway	S	GT NO 96	4	Sonatrach
Boris Vilkitsky	172,000	Dynagas	Daewoo	Oct-17	Cyprus	DFDE	GT No. 96	4	Various



BW GDF-Suez Boston	138,059	BW Gas	Daewoo	Jan-03	Norway	S	GT NO 96	4	Suez LN
BW GDF Suez Everett	138,028	BW Gas	Daewoo	Jun-03	Norway	S	GT NO 96	4	Suez LNG
BW Integrity	170,000	BW Gas	Samsung	May-17	Singapore	DFDE	TZ Mk. III	4	FSRU
BW Pavilion Leeara	161,880	BW Gas	Hyundai	Feb-15	Singapore	DFDE	TZ Mk. III	4	Various
BW Pavilion Vanda	161,880	BW Gas	Hyundai	Feb-15	Singapore	DFDE	TZ Mk. III	4	Various
BW Singapore	170,000	BW Gas	Samsung	May-15	Singapore	DFDE	TZ Mk. III	4	FSRU
BW Suez Paris	162,400	BW Gas	Daewoo	May-09	N.I.S.	DFDE	GT NO 96	4	Yemen-Atlantic
Bilbao Knutsen	138,000	Knutsen / Marpetrol	IZAR Sestao	Jan-04	Spain	S	GT NO 96	4	Atlantic LNG
Billis	77,730	Brunei Shell Tankers	La Seyne	Mar-75	Brunei	S	GT NO 82	5	Brunei LNG
Bishu Maru	162,000	K Line-Transpacific	Kawasaki Sakaide	Dec-15	Panama	S	Moss	4	Australia-Japan
British Diamond	155,000	BP Shipping	Hyundai	Sep-08	IOM	DFDE	TZ Mk. II	4	Indonesia-Various
British Emerald	155,000	BP Shipping	Hyundai	Jun-07	UK	DFDE	TZ Mk. III	4	Tangguh LNG
British Innovator	138,200	BP Shipping	Samsung	Jul-03	Isle of Man	S	TZ Mk. III	4	Various
British Merchant	138,000	BP Shipping	Samsung	Apr-03	Isle of Man	S	TZ Mk. III	4	Various
British Ruby	155,000	BP Shipping	Hyundai	Jan-08	U.K.	DFDE	TZ Mk. III	4	Various
British Sapphire	155,000	BP Shipping	Hyundai	Sep-08	IOM	DFDE	TZ Mk. III	4	Tangguh
British Trader	138,000	BP Shipping	Samsung	Dec-02	Isle of Man	S	TZ Mk. III	4	Engas
Broog	135,466	J4 Consortium	Mitsui Chiba	May-98	Japan	S	Moss	5	Qatargas
Bu Samara	266,000	QGTC	Samsung	Dec-08	Qatar	DRL	TZ Mk. III	5	Qatargas
BW Suez Paris	162,400	BW Gas	Daewoo	May-09	N.I.S.	DFDE	GT NO 96	4	Yemen-Atlantic
BW Suez Brussels	162,400	BW Gas	Daewoo	May-09	N.I.S.	DFDE	GT NO 96	4	Yemen-Atlantic
Cadiz Knutsen	138,826	Knutsen / Marpetrol	IZAR Puerto Real	Jun-04	Spain	S	GT NO 96	4	Engas
Castillo de Santisteban	173,600	Elcano	STX	Aug-10	Malta	S	GT NO. 96		Various
Castillo de Villalba	138,000	Elcano	IZAR	Nov-03	Spain	S	GT NO 96	4	Sonatrach
Catalunya Spirit	138,000	Teekay LNG Partners	IZAR Sestao	Mar-03	Liberia	S	GT NO 96	4	Atlantic LNG
Celestine River	145,000	KLNG	Kawasaki	Dec-07	Bahamas	S	Moss		Various
Cesi Beihai	174,100	MOL-China LNG	Hudong	June-17	Hong Kong	S	GT No 96	4	Australia-China
Cesi Gladstone	174,100	MOL-China LNG	Hudong	Oct-16	Hong Kong	S	GT No 96	4	Australia-China
Cesi Qingdao	174,100	MOL-China LNG	Hudong	Nov-16	Hong Kong	S	GT No 96	4	Australia-China
Cesi Tianjin	174,100	MOL-China LNG	Hudong	Sept-17	Hong Kong	S	GT No 96	4	Australia-China
Challenger FSRU	263,000	MOL LNG	Daewoo	Oct-17	St Kitts	DFDE	GT No. 96	4	Various
Cheikh Bouamama	75,500	Skikda LNG Transport	USC	Jul-08	Bahamas	S	TZ Mk. III	4	Sonatrach
Cheikh El Mokrani	75,500	Med LNG Corp	USC	Jun-07	Bahamas	S	TZ Mk. III	4	Sonatrach
Christophe de Margerie	172,600	SCF	Daewoo	Nov-16	Cyprus	DFDE	GT NO 96	4	Various
Clean Energy	150,000	Dynagas	Hyundai	Mar-07	Marshall Is.	S	TZ Mk. III	4	Various
Clean Force	150,000	Dynagas	Hyundai	Jan-08	Marshall Is.	S	TZ Mk. III	4	Various
Clean Ocean	155,900	Dynagas	Hyundai	Mar-14	Marshall Is.	DFDE	TZ Mk. III	4	Various
Clean Planet	155,900	Dynagas	Hyundai	Mar-14	Marshall Is.	DFDE	TZ Mk. III	4	Various
Clean Vision	160,000	Dynagas	Hyundai	Jun-15	Marshall Is.	DFDE	TZ Mk. III	4	Various
Cool Explorer	160,000	Thenamaris	Samsung	Oct-13	Bermuda	DFDE	TZ Mk. III	4	Various
Cool Runner	160,000	Thenamaris	Samsung	May-14	Bermuda	DFDE	TZ Mk. III	4	Various
Cool Voyager	160,000	Thenamaris	Samsung	Oct-13	Bermuda	DFDE	TZ Mk. III	4	Various
Corcovado LNG	160,106	TMSC Gas	Daewoo	Jun-14	Malta	TFDE	GT No 96	4	Various
Creole Spirit	174,000	Teekay	Daewoo	Jan-16	Bahamas	MEGI-DF	NO. 96 GW	4	Cheniere
Cubal	160,400	Mitsui/NYK/Teekay	Samsung	Jan-12	Bahamas	DFDE	TZ Mk. III	4	Various
Cygnus Passage	145,400	Cygnus LNG	Mitsubishi	Feb-09	Panama	S	Moss	4	Various
Dapeng Moon	147,000	China Ships	Hudong	Jul-09	China	S	GT NO 96	4	Various
Dapeng Star	147,000	China Ships	Hudong	Nov-09	China	S	GT NO 96	4	Various
Dapeng Sun	147,000	China Ships	Hudong	Jul-07	China	S	GT NO 96	4	Woodside Energy
Disha	136,000	Petronet LNG Ltd.	Daewoo	Jan-04	Malta	S	GT NO 96	4	Qatargas
Doha	137,350	J4 Consortium	Mitsubishi Nagasaki	Jun-99	Japan	S	Moss	5	Qatargas
Duhail	210,100	ProNav	Daewoo	Jan-08	Germany	DRL	GT NO 96	4	Various
Dukhan	135,000	J4 Consortium	Mitsui Chiba	Oct-04	Japan	S	Moss	4	Qatargas
Dwiputra	127,385	Humpuss Consortium	Mitsubishi Nagasaki	Mar-94	Bahamas	S	Moss	4	Pertamina
Ebisu	147,547	Golar LNG	Kawasaki	Sep-08	Bahamas	S	Moss	4	Various
Eduard Toll	172,000	Teekay-CLNG	Daewoo	Dec-17	Bahamas	MEGI-DF	GT No. 96	4	Various
Ejnan	145,000	4J	Samsung	Jan-07	Bahamas	S	TZ Mk. III		RasGas
Ekaputra	136,400	Humpuss Consortium	Mitsubishi Nagasaki	Jan-90	Liberia	S	Moss	5	Pertamina
Energy Advance	145,000	Tokyo LNG Tankers	Kawasaki Sakaide	Mar-05	Japan	S	Moss	4	Darwin
Energy Atlantic	159,924	Alpha	STX Jinhae	Sep-15	Malta	DFDE	No. 96	4	Various
Energy Confidence	155,000	Tokyo LNG Tankers	Kawasaki	Apr-09	Panama	S	Moss	4	Various
Energy Frontier	147,600	Tokyo LNG Tankers	Kawasaki Sakaide	Sep-03	Japan	S	Moss	4	Darwin
Energy Horizon	177,000	Tokyo LNG Tankers	Kawasaki	Jul-11	Japan	S	Moss	4	Pluto LNG
Energy Navigator	147,000	Tokyo LNG Tankers	Kawasaki Sakaide	May-08	Japan	S	Moss	4	Various
Energy Progress	145,000	MOL	Kawasaki	Nov-06	Japan	S	Moss	4	Bayu Undan LNG
Esshu Maru	162,000	K Line-Transpacific	Kawasaki Sakaide	Dec-14	Panama	S	Moss	4	Australia-Japan
Excalibur	138,200	Exmar/ Excelerate	Daewoo	Oct-02	Belgium	S	GT NO 96	4	Various
Excel	138,106	Exmar/ MOL	Daewoo	Sep-03	Belgium	S	GT NO 96	4	Various
Excelerate	138,000	Exmar/Excelerate	Daewoo	Oct-06	Belgium	S	GT NO 96	4	Various
Excellence	138,000	GKFF Ltd.	Daewoo	May-05	Belgium	S	GT NO 96	4	Excelerate Energy
Excelsior	138,000	Exmar	Daewoo	Jan-05	Belgium	S	GT NO 96	4	Various
Exemplar	150,900	Excelerate	Daewoo	Jun-10	Belgium	S	GT NO 96	4	Various
Expedient	151,000	Excelerate	Daewoo	Nov-09	Belgium	S	GT NO 96	4	Various
Experience RV	174,000	Exmar/Excelerate	Daewoo	Jul-14	Marshall Is.	DFDE	GT NO 96		Various
Explorer	150,900	Exmar/Excelerate	Daewoo	Mar-08	Belgium	S	GT NO 96	4	Excelerate
Express	151,000	Exmar/Excelerate	Daewoo	May-09	Belgium	S	GT NO 96	4	Various
Exquisite	150,900	Excelerate	Daewoo	Sep-09	Belgium	S	GT NO 96	4	Various
Fedor Litke	172,636	Dynagas	Daewoo	Nov-17	Cyprus	DFDE	GT No. 96	4	Various
Flex Endeavour	173,400	Flex LNG	Daewoo	Jan-18	Marshall Is.	MEGI-DF	NO. 96 GW	4	Various
Flex Enterprise	173,400	Flex LNG	Daewoo	Jan-18	Marshall Is.	MEGI-DF	NO. 96 GW	4	Various



Fraiha	210,100	J5 Consortium	Daewoo	Sep-08	Marshall Is.	DRL	GT NO 96	4	Qatargas
FSRU Independence	170,000	Hoegh	Hyundai	Feb-14	NIS	DFDE	TZ Mk. III	4	Various
FSRU Lampung	170,000	Hoegh	Hyundai	May-14	Indonesia	DFDE	TZ Mk. III	4	Various
Fuji LNG	147,895	TMSC Gas	Kawasaki	Jun-04	Malta	S	Moss	4	Various
Fuwairit	138,000	Peninsular LNG	Samsung	Jan-04	Bahamas	S	TZ Mk. III	4	RasGas II
Galea	134,425	Shell Shipping	Mitsubishi Nagasaki	Oct-02	Singapore	S	Moss	5	Shell
Galicia Spirit	140,620	Teekay LNG Partners	Daewoo	Jul-04	Liberia	S	GT NO 96	4	Engas
Gaselys	153,500	GdF/NYK	Atlantique	Mar-07	France	DFDE	CS 1	4	Engas
Gallina	134,425	Shell Shipping	Mitsubishi Nagasaki	Oct-02	Singapore	S	Moss	5	Shell
GasLog Chelsea	153,000	GasLog	Hanjin Korea	Dec-09	Panama	TFDE	TZ Mk. III	4	Various
Gaslog Geneva	174,000	GasLog	Samsung	Sept-16	Bermuda	TFDE	TZ Mk. III	4	Shell charter
Gaslog Gibraltar	174,000	GasLog	Samsung	Oct-16	Bermuda	TFDE	TZ Mk. III	4	Shell charter
Gaslog Glasgow	174,000	GasLog	Samsung	Jun-16	Bermuda	TFDE	TZ Mk. III	4	Shell charter
Gaslog Greece	174,000	GasLog	Samsung	Mar-16	Bermuda	TFDE	TZ Mk. III	4	Shell charter
GasLog Salem	165,000	GasLog	Samsung	Apr-15	Liberia	TFDE	TZ Mk. III	4	Various
GasLog Santiago	155,000	GasLog	Samsung	Mar-13	Liberia	TFDE	TZ Mk. III	4	Various
GasLog Saratoga	155,000	GasLog	Samsung	Dec-14	Bermuda	TFDE	TZ Mk. III	4	Various
Gaslog Savannah	155,000	GasLog	Samsung	May-10	Bermuda	DFDE	TZ Mk. III	4	Various
GasLog Seattle	155,000	GasLog	Samsung	Oct-13	Bermuda	TFDE	TZ Mk. III	4	Various
GasLog Shanghai	155,000	GasLog	Samsung	Jan-13	Liberia	TFDE	TZ Mk. III	4	Various
Gaslog Singapore	155,000	GasLog	Samsung	Jul-10	Bermuda	DFDE	TZ Mk. III	4	Various
Gaslog Skagen	155,000	GasLog	Samsung	Oct-13	Bermuda	DFDE	TZ Mk. III	4	Various
Gaslog Sydney	155,000	GasLog	Samsung	May-13	Bermuda	DFDE	TZ Mk. III	4	Various
GDF-Suez Global Energy	74,000	Gaz de France	Chantiers	Dec-06	France	DFDE	CS1	4	Sonatrach
GDF-Suez Cape Ann	145,000	Hoegh LNG/MOL	Samsung	May-10	Liberia	DFDE	TZ Mk. III	4	Various
GDF-Suez Neptune	145,000	Hoegh LNG/MOL	Samsung	Dec-09	Liberia	DFDE	TZ Mk. III	4	Various
GDF-Suez Point Fortin	154,200	LNG Japan	Imabari/Koyo	Feb-10	Panama	DFDE	TZ Mk. III	4	Various
Gemmata	138,100	Shell Shipping	Mitsubishi Nagasaki	Mar-04	Singapore	S	Moss	5	Shell
Ghasha	137,510	National Gas Shipping	Mitsui	Jun-95	Liberia	S	Moss	5	ADGAS
Gigira Laitebo	177,000	MOL-Itochu	Hyundai	Feb-09	Panama	DFDE	TZ Mk. III	4	Various
Golar Arctic	140,645	Golar LNG	Daewoo	Dec-03	Marshall Is.	S	GT NO 96	4	Shell Spot
Golar Bear	160,000	Golar	Samsung	Mar-14	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Celsius	160,000	Golar LNG	Samsung	Sep-13	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Crystal	160,000	Golar LNG	Samsung	Oct-13	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Eskimo (FSRU)	160,000	Golar LNG	Samsung	Jan-15	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Freeze	125,850	Golar LNG	HDW	Feb-77	UK	S	Moss	5	Various
Golar Glacier	162,000	Golar LNG	Hyundai	Sep-14	Marshall Is.	DFDE	TZ Mk. III	4	Various
Golar Grand	145,880	Golar LNG	Daewoo	2006	IoM		GT NO 96	4	Various
Golar Ice	160,000	Golar LNG	Samsung	Feb-15	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Igloo (FSRU)	160,000	Golar LNG	Samsung	Oct-13	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Kelvin	160,000	Golar LNG	Samsung	Jan-15	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Maria	145,950	Golar LNG	Daewoo	2006	Marshall Is.		GT NO 96	4	Various
Golar Mazo	135,225	Golar LNG/CPP	Mitsubishi	Jan-00	Liberia	S	Moss	5	Pertamina
Golar Penguin	160,000	Golar LNG	Samsung	Mar-14	Marshall Is.	DFDE	TZ Mk. III	4	Various
Golar Seal	160,000	Golar LNG	Samsung	Aug-13	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Singapore (FSRU)	160,000	Golar LNG	Samsung	June-15	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Snow	160,000	Golar LNG	Samsung	Jan-15	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Tundra (FSRU)	160,000	Golar LNG	Samsung	Dec-15	Bermuda	DFDE	TZ Mk. III	4	Various
Golar Viking	140,000	Golar LNG	Hyundai	Jan-05	Marshall Is.	S	Moss	4	Various
Golar Winter	138,250	Golar LNG	Daewoo	Apr-04	Marshall Is.	S	GT NO 96	4	Petrobras
Grace Acacia	150,000	Algaet Shipping	Hyundai	Jan-07	Japan	S	TK MK III	4	Various
Grace Barleria	150,000	Swallowtail Ship	Hyundai	Oct-07	Japan	S	TZ Mk. III	4	Various
Grace Cosmos	150,000	AGH Shipping	Hyundai	Mar-08	Japan	S	TZ Mk. III	4	Various
Grace Dahlia	177,000	Tokyo Gas	Kawasaki	Oct-13	Japan	S	Moss	4	Various
Gracilis	138,830	Golar LNG	Hyundai	Jan-05	Marshall Is.	S	TZ Mk. III	4	Shell BG
Granatina	140,645	Shell Shipping	Daewoo	Dec-03	Singapore	S	GT NO 96	4	Shell
Grand Aniva	147,200	Sovcomflot/NYK	Mitsubishi	Jan-08	Japan	S	Moss	4	Various
Grand Elena	147,200	Sovcomflot/NYK	Mitsubishi	Oct-07	Japan	S	Moss	4	Various
Grand Mereya	147,200	Primorsk/MOL/K Line	Chiba	May-08	Japan	S	Moss	4	Sakhalin II
Hanjin Muscat	138,200	Hanjin Shipping	Hanjin	Jul-99	Panama	S	GT NO 96	4	Oman Gas
Hanjin Pyeong Taek	130,600	Hanjin Shipping	Hanjin	Sep-95	Panama	S	GT NO 96	4	Pertamina
Hanjin Ras Laffan	138,214	Hanjin Shipping	Hanjin	Jul-00	Panama	S	GT NO 96	4	QatarGas
Hanjin Sur	138,333	Hanjin Shipping	Hanjin	Jan-00	Panama	S	GT NO 96	4	Oman Gas
Hispania Spirit	140,500	Teekay LNG Partners	Daewoo	Sep-02	Spain	S	GT NO 96	4	Atlantic LNG
Hoegh Gallant FSRU	170,050	Hoegh LNG	Hyundai	May-14	Marshall Is.	DFDE	TZ Mk. III	4	chartered
Hoegh Giant FSRU	170,050	Hoegh LNG	Hyundai	Jan-18	Marshall Is.	DFDE	TZ Mk. III	4	various
Hoegh Grace FSRU	170,050	Hoegh LNG	Hyundai	May-15	Marshall Is.	DFDE	TZ Mk. III	4	various
Hyundai Aquapia	135,000	Hyundai MM	Hyundai	Mar-00	Panama	S	Moss	4	Oman Gas
Hyundai	135,000	Hyundai MM	Hyundai	Jan-00	Panama	S	Moss	4	RasGas
Hyundai Ecopia	145,000	Hyundai	Hyundai	Nov-08	Panama	S	TZ Mk. III	4	Various
Hyundai Greenpia	125,000	Hyundai MM	Hyundai	Nov-96	Panama	S	Moss	4	Pertamina
Hyundai Oceanpia	135,000	Hyundai MM	Hyundai	Jul-00	Panama	S	Moss	4	Oman Gas
Hyundai Technopia	135,000	Hyundai MM	Hyundai	Jul-00	Panama	S	Moss	4	RasGas
Hyundai Utopia	125,182	Hyundai MM	Hyundai	Jun-94	Panama	S	Moss	4	Pertamina
Iberica Knutsen	138,000	Knutsen OAS	Daewoo	Aug-06	Norway	S	GT 96	4	Gas Natural
Ibra LNG	147,100	Oman Gas	Samsung	Jun-06	Panama	S	TK Mk. III	4	Oman LNG
Ibri LNG	145,000	Oman Gas	Mitsubishi	Jul-06	Panama	S	TK Mk. III	4	Oman LNG
Ish	137,540	National Gas Shipping	Mitsubishi Nagasaki	Nov-95	Liberia	S	Moss	5	ADGAS
K Acacia	138,017	Korea Line	Daewoo	Jan-00	Panama	S	GT NO 96	4	Oman Gas
K Freesia	135,256	Korea Line	Daewoo	Jun-00	Panama	S	GT NO 96	4	RasGas



K Jasmine	145,700	Korea Line	Daewoo	Mar-08	Panama	S	GT NO 96	4	Kogas offtake
K Mugungwha	152,000	K Line	Daewoo	Nov-08	Panama	S	GT NO 96	4	Various
Kita LNG	160,106	TMSC Gas	Daewoo	Jun-14	Malta	TFDE	GT No 96	4	Various
Kotawaka Maru	125,200	J3 Consortium	Kawasaki Sakaide	Jan-84	Japan	S	Moss	5	Darwin
Kumul	172,000	MOL	Hudong	May-16	Hong Kong	DRL	GT NO. 96	4	PNG-Asia
Lalla Fatma N'Soumer	145,000	Algeria Nippon Gas	Kawasaki Sakaide	Dec-04	Bahamas	S	Moss	4	Various
Lijmilya	261,700	QGTG	Daewoo	Sep-08	Marshall Is.	DRL	GT NO. 96	5	Various
LNG Abalamabie	174,900	Bonny Gas	Samsung	Nov-16	Bermuda	DFDE	TZ Mk III	4	Nigeria LNG
LNG Abuja	126,530	Bonny Gas Transport	GD Quincy	Sep-80	Bahamas	S	Moss	5	Nigeria LNG
LNG Abuja II	174,900	Bonny Gas	Samsung	Oct 16	Bermuda	DFDE	TZ Mk III	4	Nigeria LNG
LNG Adamawa	141,000	Bonny Gas Transport	Hyundai	Jun-05	Bermuda	S	Moss	4	Various
LNG Akwa Ibom	141,000	Bonny Gas Transport	Hyundai	Nov-04	Bermuda	S	Moss	4	Various
LNG Aquarius	126,300	MOL/LNG Japan	GD Quincy	Jun-77	Marshall Is.	S	Moss	5	Various
LNG Barka	153,000	NYK	Kawasaki	Jan-09	Bahamas	S	Moss	4	Various
LNG Bayelsa	137,500	Bonny Gas Transport	Hyundai	Feb-03	Bermuda	S	Moss	4	Nigeria LNG
LNG Benue	145,700	BW Gas	Daewoo	Mar-06	Bermuda	S	GT NO 96	4	Nigeria LNG
LNG Bonny	177,000	Bonny Gas Transport	Hyundai	Oct-15	Bermuda	DFDE	TZ Mk III	4	Nigeria LNG
LNG Borno	149,600	NYK Line	Samsung	Aug-07	Japan	S	TZ Mk. III	4	Nigeria LNG
LNG Capricorn	126,300	MOL/LNG Japan	GD Quincy	Jun-78	Marshall Is.	S	Moss	5	Pertamina
LNG Cross River	141,000	Bonny Gas Transport	Hyundai	Sep-05	Bermuda	S	Moss	4	Various
LNG Dream	145,000	Osaka Gas	Kawasaki	Sep-06	Japan	S	Moss	4	Woodside Energy
LNG Ebisu	147,500	MOL	Kawasaki	Sep-08	Bahamas	S	Moss	4	Various
LNG Edo	126,530	Bonny Gas Transport	GD Quincy	May-80	Bahamas	S	Moss	5	Nigeria LNG
LNG Enugu	145,000	BW Gas	Daewoo	Oct-05	Bermuda	S	GT NO 96	4	Nigeria LNG
LNG Fimina	175,000	Bonny Gas Transport	Samsung	Oct-15	Bermuda	DFDE	TZ Mk III	4	Nigeria LNG
LNG Flora	127,700	J3 Consortium	Kawasaki Sakaide	Mar-93	Japan	S	Moss	4	Pertamina
LNG Fukurokuju	165,000	MOL	Kawasaki	June-15	Japan	S	Moss	4	Various
LNG Gemini	126,300	MOL/LNG Japan	GD Quincy	Sep-78	Marshall Is.	S	Moss	5	Pertamina
LNG Imo	148,300	BW Gas	Daewoo	Jun-08	Bermuda	S	GT NO 96	4	Nigeria LNG
LNG Jamal	135,330	Osaka Gas/J3 Consortium	Mitsubishi Nagasaki	Oct-00	Japan	S	Moss	5	Oman Gas
LNG Jupiter	145,000	NYK Line	Kawasaki	Jul-09	Bahamas	S	Moss	4	Various
LNG Jurojin	155,300	MOL	MHI Nagasaki	Nov-15	Japan	S	KM	4	Various
LNG Kano	148,471	BW Gas	Daewoo	Jan-07	Bermuda	S	GT No. 96	4	NLNG
LNG Lagos	177,000	Bonny Gas	Hyundai	Oct-15	Bermuda	DFDE	TZ Mk III	4	Nigeria LNG
LNG Leo	126,400	MOL/LNG Japan	GD Quincy	Dec-78	Marshall Is.	S	Moss	5	Pertamina
LNG Lerici	65,000	Exmar	Italcantieri Sestri	Mar-98	Italy	S	GT NO 96	4	Sonatrach
LNG Libra	126,400	Hoegh LNG	GD Quincy	Apr-79	Marshall Is.	S	Moss	5	Various
LNG Lokoja	148,300	BW Gas	Daewoo	Dec-06	Bermuda	S	GT No. 96	4	Nigeria LNG
LNG Mars	155,000	MOL/Osaka Gas	Mitsubishi	Oct-16	Marshall Is.	S	Moss	5	Various
LNG Ogun	148,300	NYK Line	Samsung	Aug-07	Japan	S	TZ Mk. III	4	Nigeria LNG
LNG Ondo	148,300	BW Gas	Daewoo	Sep-07	Bermuda	S	GT NO 96	4	Nigeria LNG
LNG Oyo	140,500	BW Gas	Daewoo	Dec-05	Bermuda	S	GT NO 96	4	Nigeria LNG
LNG Pioneer	138,000	MOL	Daewoo	Jul-05	Bahamas	S	GT No 96	4	Idku
LNG Port Harcourt	175,000	Bonny Gas	Samsung	Oct-15	Bermuda	DFDE	TZ Mk III	4	Nigeria LNG
LNG Portovenere	65,000	Exmar	Italcantieri Sestri	Jun-96	Italy	S	GT No 96	4	Sonatrach
LNG River Niger	141,000	Bonny Gas Transport	Hyundai	May-06	Bermuda	S	Moss	4	Various
LNG River Orashi	145,910	BW Gas	Daewoo	Nov-04	Bermuda	S	GT No 96	4	Nigeria LNG
LNG Rivers	137,231	Bonny Gas Transport	Hyundai	Jun-02	Bermuda	S	Moss	4	Nigeria LNG
LNG Saturn	153,000	MOL	MHI	Nov-15	Japan	S	Moss	4	Various
LNG Sokoto	137,231	Bonny Gas Transport	Hyundai	Aug-02	Bermuda	S	Moss	4	Nigeria LNG
LNG Taurus	126,300	MOL/LNG Japan	GD Quincy	Aug-79	Marshall Is.	S	Moss	5	Various
LNG Venus	155,000	Osaka/MOL	MHI	Oct-14	Japan	S	Moss	4	Various
LNG Vesta	127,547	Tokyo Gas Consortium	Mitsubishi Nagasaki	Jun-94	Japan	S	Moss	4	Pertamina
LNG Virgo	126,400	MOL/LNG Japan	GD Quincy	Dec-79	Marshall Is.	S	Moss	5	Pertamina
Lobito	160,400	Mitsui/NYK/Teekay	Samsung	Oct-11	Bahamas	DFDE	TZ Mk. III	4	Various
Lusail	138,000	Peninsular LNG	Samsung	May-05	Bahamas	S	TZ Mk. III	4	Qatar
Macoma	173,400	Teekay	Daewoo	Oct-17	Bahamas	DFDE	GT No. 96	4	Various
Madrid Spirit	138,000	Teekay LNG Partners	IZAR Puerto Real	Jan-05	Spain	S	GT No 96	4	Engas
Magellan Spirit	165,500	Teekay LNG Partners	Samsung	Sep-08	Denmark	DFDE	TZ Mk. III	4	Various
Malanje	160,400	Mitsui/NYK/Teekay	Samsung	Jul-11	Bahamas	DFDE	TZ Mk. III	4	Various
Maran Gas Achilles	174,000	Maran	Hyundai Samho	Feb-16	Greece	DFDE	GT No 96	4	Various
Maran Gas Agamemnon	174,000	Maran	Hyundai Samho	May-16	Greece	DFDE	GT No 96	4	Various
Maran Gas Alexandria	161,870	Maran	Hyundai Samho	Sep-15	Greece	DFDE	TZ Mk. III	4	Various
Maran Gas Amhipolis	173,400	Maran	Daewoo	Aug-16	Greece	DFDE	GT No 96	4	Various
Maran Gas Apollonia	161,870	Maran	Daewoo	Jan-14	Greece	DFDE	GT No 96	4	Various
Maran Gas Asclepius	145,000	Kristen Navigation	Daewoo	Jul-05	Bermuda	S	GT No 96	4	Qatar
Maran Gas Coronis	145,700	Maran	Daewoo	Sep-07	Greece	S	GT No 96	4	Rasgas II
Maran Gas Delphi	159,800	Maran	Daewoo	Feb-14	Greece	DFDE	GT No 96	4	Various
Maran Gas Efessos	159,800	Maran	Daewoo	Jun-14	Greece	DFDE	GT No 96	4	Various
Maran Gas Hector	174,000	Maran	Hyundai Samho	Nov-16	Greece	DFDE	GT No 96	4	Various
Maran Gas Lindos	159,800	Maran	Daewoo	Jun-15	Greece	DFDE	GT No. 96	4	Various
Maran Gas Mystras	155,900	Maran Gas	Daewoo	May-15	Greece	DFDE	GT No 96	4	Various
Maran Gas Olympias	174,500	Maran	DSME	Feb-17	Greece	DFDE	GT No 96	4	Various
Maran Gas Pericles	174,000	Maran	Hyundai Samho	June-16	Greece	DFDE	GT No 96	4	Various
Maran Gas Posidonia	161,870	Maran	Daewoo	May-14	Greece	DFDE	GT No 96	4	Various
Maran Gas Roxana	173,400	Maran	Daewoo	Jan-17	Greece	DFDE	GT No 96	4	Various
Maran Gas Sparta	161,870	Maran	Hyundai Samho	April-15	Greece	DFDE	G TZ Mk. III	4	Various
Maran Gas Troy	155,900	Maran Gas	Daewoo	May-15	Greece	DFDE	GT No 96	4	various
Maran Gas Ulysses	174,000	Maran	Hyundai Samho	Jan-17	Greece	DFDE	GT No 96	4	Various
Maria Energy	174,000	Tsakos	Hyundai	Mar-15	Marshall Is.	TFDE	GTT Mk II	4	Various



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Marib Spirit	165,000	Teekay LNG	Samsung	May-08	Marshall Is.	DFDE	TZ Mk. III	4	Various
Matthew	126,540	Suez LNG Shipping	Newport News	Jun-79	Bahamas	S	TZ Mk. I	6	Atlantic LNG
Mekaines	266,000	Nakilat	Samsung	Mar-09	Liberia	DRL	GT No 96	4	Qatar-Atlantic Basin
Meridian Spirit	165,500	Teekay LNG	Samsung	Jan-10	Denmark	DFDE	TZ Mk. III	4	Various
Mesaimeer	210,100	Nakilat	Hyundai	Mar-09	Liberia	DRL	GT No 96	4	Qatar-Atlantic Basin
Methane Alison Victoria	145,000	GasLog	Samsung	Aug-07	Bermuda	S	TZ III	4	Eq.Guinea LNG
Methane Becki Anne	170,000	GasLog	Samsung	Sep-10	Bermuda	TFDE	TZ Mk. III	4	Various
Methane Heather Sally	145,000	GasLog	Samsung	Jul-07	Bermuda	S	Tz Mk. III	4	Eq.Guinea LNG
Methane Jane Elizabeth	145,000	GasLog	Samsung	Jun-06	Bermuda	TFDE	TZ Mk. III	4	Engas
Methane Julia Louise	170,000	GasLog	Samsung	Dec-09	Bermuda	TFDE	TZ Mk. III	4	Various
Methane Kari Elin	138,200	Shell	Samsung	Jun-04	Bermuda	S	TZ Mk. III	4	Various
Methane Lake Charles	145,000	Shell	Samsung	Feb-07	Bermuda	S	TZ Mk. III	4	Marathon Oil
Methane Lydon Volney	145,000	Shell	Samsung	Aug-06	Bermuda	S	TZ Mk. III	4	Engas
Methane Mickie Harper	170,000	Shell-GasLog	Samsung	Nov-10	Bermuda	TFDE	TZ Mk. III	4	Various
Methane Nile Eagle	145,000	Shell-GasLog	Samsung	Dec-07	Bermuda	S	TZ Mk. III	4	Engas
Methane Patricia Camila	170,000	Shell-GasLog	Samsung	Oct-10	Bermuda	TFDE	TZ Mk. III	4	Various
Methane Princess	138,159	Golar LNG	Daewoo	2003	UK	S	GT No 96	4	Spot BG
Methane Rita Andre	145,000	GasLog	Samsung	Mar-06	Bermuda	S	TZ Mk. III	4	Engas
Methane Shirley Elizabeth	145,000	GasLog	Samsung	Apr-07	Bermuda	S	TZ Mk. III	4	Marathon Oil
Methane Sprit	165,000	Teekay LNG	Samsung	Mar-08	Singapore	DFDE	TZ Mk. III	4	Various
Milaha Qatar	145,000	Milaha	Samsung	Apr-06	Denmark	S	TZ Mk. III	4	Qatar
Milaha Ras Laffan	138,270	Milaha	Samsung	Mar-04	Denmark	S	TZ Mk. III	4	RasGas II
Min Lu	147,000	China Ships	Hudong	Aug-09	China	S	GT No 96	4	Various
Min Rong	147,000	China LNG Ships	Hudong	Feb-09	Hong Kong	S	GT No 96	4	Australia-China
Mourad Didouche	126,130	Hyproc Shipping	Atlantique	Jul-80	Algeria	S	GT No 85	5	Sonatrach
Mozah	266,000	QGTC	Samsung	Aug-08	Qatar	DRL	TZ Mk III	5	Qatargas II
Mraweh	137,000	National Gas Shipping	Kvaerner-Masa	Jun-96	Liberia	S	Moss	4	ADGAS
Mubaraz	137,000	National Gas Shipping	Kvaerner-Masa	Jan-96	Liberia	S	Moss	4	Various
Muraq	210,100	J5-K Line	Daewoo	May-08	Marshall Is.	DRL	GT No 96	4	Qatar-Atlantic Basin
Murex	173,400	Teekay	Daewoo	Oct-17	Bahamas	DFDE	GT No 96	4	Various
Murwab	210,100	J5 Consortium	Daewoo	May-08	Marshall Is.	DRL	GT No. 96	4	Qatargas
Muscat LNG	149,170	Oman Gas/MOL	Kawasaki Sakaide	Mar-04	Japan	S	Moss	4	Oman Gas
Neo Energy	149,700	Tsakos	Hyundai	Feb-07	Liberia	S	GTT Mk II	4	Various
Nizwah LNG	145,000	Oryx LNG Carriers	Kawasaki Sakaide	Dec-05	Japan	S	Moss	4	Oman Gas
Northwest Sanderling	127,525	Australia LNG	Mitsubishi Nagasaki	Jun-89	Australia	S	Moss	4	NWS
Northwest Sandpiper	127,500	Australia LNG	Mitsui Chiba	Feb-93	Australia	S	Moss	4	NWS
Northwest Seaeagle	127,450	Australia LNG	Mitsubishi Nagasaki	Nov-92	Bermuda	S	Moss	4	NWS
Northwest Shearwater	127,500	Australia LNG	Kawasaki Sakaide	Sep-91	Bermuda	S	Moss	4	NWS
Northwest Snipe	127,747	Australia LNG	Mitsui Chiba	Sep-90	Australia	S	Moss	4	NWS
Northwest Stormpetrel	127,600	Australia LNG	Mitsubishi Nagasaki	Dec-94	Australia	S	Moss	4	NWS
Northwest Swallow	127,708	J3 Consortium	Mitsui Chiba	Nov-89	Japan	S	Moss	4	NWS
Northwest Swan	138,000	Australia LNG	Daewoo	Mar-04	Australia	S	GT NO 96	4	NWS
Northwest Swift	127,590	J3 Consortium	Mitsubishi Nagasaki	Sep-89	Japan	S	Moss	4	NWS
Oak Spirit	173,400	Teekay	Daewoo	Jan-16	Bahamas	MEGI-DF	NO. 96 GW	4	Cheniere
Ob River	150,000	Lance Shipping	Hyundai	Oct-07	Marshall Is.	S	TZ Mk. III	4	Various
Onaiza	210,100	Nakilat	Daewoo	Apr-09	Liberia	DRL	GT NO 96	4	Qatar-Atlantic Basin
Ougarta	171,866	Hyproc Shipping	Hyundai	Mar-17	Algeria	DFDE	GTT Mk III	4	Sonatrach
Pacific Arcadia	147,200	NYK Line	MHI	Oct-14	Bahamas	S	KM	4	Various
Pacific Enlighten	145,000	LNG MT	Mitsubishi	Mar-09	Japan	S	Moss	4	Various
Pacific Eurus	137,000	LNG Marine Transport	Mitsubishi Nagasaki	Mar-06	Bahamas	S	Moss	4	Darwin
Pacific Mimosa	155,300	NYK Line	MHI	Nov-17	Bahamas	S	Moss	4	Australia-Japan
Pacific Notus	137,006	Pacific LNG Shipping	Mitsubishi Nagasaki	Sep-03	Bahamas	S	Moss	5	Darwin
Palu LNG	160,106	TMSC Gas	Daewoo	Jun-14	Malta	TFDE	GT No 96	4	Various
Pan Asia	174,000	Teekay	Hudong-Zhonghua	July-17	Bahamas	TFDE	NO. 96 GW	4	Cheniere
Papua	171,800	MOL-China	Hudong	Jan-15	Hong Kong	DFDE	SSD	4	PNG LNG
Polar Eagle	89,880	Polar LNG	IHI Chita	Jun-93	Liberia	S	IHI SPB	4	ConocoPhillips/Marathon
Prachi	173,000	NYK-SCI	Hyundai	Nov-16	Singapore	TFDE	GT No 96	4	Petronet
Provalys	153,500	Gaz de France	Chantiers	Nov-06	France	DFDE	CS1	4	ELNG
Pskov	170,200	SovComFlot	STX	Mar-14	Liberia	DFDE	GT No. 96	4	Various
Puteri Delima	130,400	MISC	Atlantique	Jan-95	Malaysia	S	GT NO 96	4	Petronas
Puteri Delima Satu	137,100	MISC	Mitsui Chiba	Apr-02	Malaysia	S	GT NO 96	4	Petronas
Puteri Firuz	130,400	MISC	Atlantique	May-97	Malaysia	S	GT NO 96	4	Petronas
Puteri Malay Satu	137,100	MISC	Mitsubishi Nagasaki	Sep-04	Malaysia	S	GT NO 96	4	Petronas
Puteri Intan	130,400	MISC	Atlantique	Aug-94	Malaysia	S	GT NO 96	4	Petronas
Puteri Intan Satu	137,100	MISC	Mitsubishi Nagasaki	Dec-01	Malaysia	S	GT NO 96	4	Petronas
Puteri Mutiera Satu	137,100	MISC	Mitsui Chiba	Apr-05	Malaysia	S	GT NO 96	4	Petronas
Puteri Nilam	130,400	MISC	Atlantique	Jun-95	Malaysia	S	GT NO 96	4	Petronas
Puteri Nilam Satu	137,100	MISC	Mitsubishi Nagasaki	Sep-03	Malaysia	S	GT NO 96	4	Petronas
Puteri Zamrud	130,400	MISC	Atlantique	May-96	Malaysia	S	GT NO 96	4	Petronas
Puteri Zamrud Satu	137,100	MISC	Mitsui Chiba	Apr-87	Malaysia	S	GT NO 96	4	Atlantic LNG
Raahi	136,000	Petronet LNG Ltd	Daewoo	Dec-04	Malta	S	GT NO 96	4	Qatargas
Ramdane Abane	126,130	Hyproc Shipping	Atlantique	Jul-81	Algeria	S	GT NO 85	5	Sonatrach
Rasheeda	266,000	QGTC	Samsung	Jun-10	Liberia	DRL	TZ Mk. III		Various
Ribera del Duero Knutsen	173,400	Knutsen	Daewoo	Nov-10	Nor-NIS	DFDE	GT NO. 96	4	Various
Rioja Knutsen	176,300	Knutsen	Daewoo	Dec-16	Nor-NIS	DFDE	TZ Mk III	4	Various
Salalah LNG	147,000	Oman Gas/MOL	Samsung	Dec-05	Japan	S	TZ Mk. III	4	Oman
SCF Polar	71,500	Sovcomflot	Kockums	Aug-69	Liberia	S	GT NO 82	6	Sonatrach
Seishu Maru	162,000	K Line-Transpacific	Kawasaki Sakaide	Jan-15	Panama	S	Moss	4	Australia-Japan
Seri Alam	138,000	MISC	Samsung	Oct-05	Malaysia	S	TZ Mk. III	4	Yemen LNG
Seri Amanah	145,000	MISC	Samsung	Mar-06	Malaysia	S	TZ Mk. III	4	Yemen LNG

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Seri Anggun	145,000	MISC	Samsung	Nov-06	Malaysia	S	TZ Mk. III	4	Yemen LNG
Seri Angkasa	145,000	MISC	Samsung	Feb-07	Malaysia	S	TZ Mk. III	4	Petronas
Seri Ayu	145,000	MISC	Samsung	Oct-07	Malaysia	S	TZ Mk. III	4	Various
Seri Bakti	152,300	MISC	Mitsubishi	Mar-07	Malaysia	S	GT NO 96	4	Petronas
Seri Balhaf	152,000	MISC	Mitsubishi	Sep-08	Malaysia	S	GT NO 96	4	Various
Seri Balquis	152,000	MISC	Mitsubishi	Dec-08	Malaysia	S	GT NO 96	4	Various
Seri Begawan	152,300	MISC	Mitsubishi	Dec-07	Malaysia	S	GT NO 96	4	Various
Seri Bijaksana	152,300	MISC	Mitsubishi	Feb-08	Malaysia	S	GT NO 96	4	Petronas
Seri Camar	150,200	MISC	Hyundai	Feb-18	Malaysia	S	Moss	4	Petronas
Seri Camellia	150,000	MISC	Hyundai	Nov-16	Malaysia	S	Moss	4	Petronas
Seri Cemara	150,200	MISC	Hyundai	Apr-18	Malaysia	S	Moss	4	Petronas
Seri Cempak	150,200	MISC	Hyundai	Feb-18	Malaysia	S	Moss	4	Petronas
Seri Cenderawasih	150,000	MISC	Hyundai	Jan-17	Malaysia	S	Moss	4	Petronas
Sestao Knutsen	138,000	Knutsen	IZAR Sestao	Jan-07	Spain	S	GT NO 96	4	Atlantic LNG
Sevilla Knutsen	173,400	Knutsen	Daewoo	Jun-10	N.I.S.	DFDE	GT NO 96	4	Various
Shahamah	135,500	National Gas Shipping	Kawasaki Sakaide	Oct-94	Liberia	S	Moss	5	ADGAS
Shangra	266,000	QGTC	Samsung	Nov-09	Liberia	DRL	TZ Mk. III	5	Qatargas IV
Shen Hai	147,100	China LNG	Hudong Zhonghua	Sep-12	China	AB/CC Steam	GT NO 96	4	Various
Simaisma	147,700	Maran Gas Maritime	Daewoo	Jul-06	Greece	S	GT No 96	4	Qatar
SK Audace	180,000	SK-Marubeni	Samsung	Jul-17	Panama	DFDE	TZ Mk. III	4	Various
SK Splendor	138,375	SK Shipping	Samsung	Mar-00	Panama	S	TZ Mk. III	4	Oman Gas
SK Stellar	138,375	SK Shipping	Samsung	Dec-00	Panama	S	TZ Mk. III	4	RasGas
SK Summit	138,000	SK Shipping	Daewoo	Aug-99	Panama	S	GT NO 96	4	RasGas
SK Sunrise	138,306	I. S. Carriers	Samsung	Sep-03	Panama	S	TZ Mk. III	4	RasGas
SK Supreme	138,200	SK Shipping	Samsung	Jan-00	Panama	S	TZ Mk. III	4	RasGas
Sohar LNG	137,250	Oman Gas/ MOL	Mitsubishi Nagasaki	Oct-01	Malta	S	Moss	5	Oman Gas
Solaris	155,000	GasLog	Samsung	Jul-14	Bermuda	TFDE	TZ Mk. III	4	Various
Sonangol Benguela	160,500	Sonangol	Daewoo	Sep-11	Bahamas	S	GT No. 96	4	Angola LNG
Sonangol Etosha	160,500	Sonangol	Daewoo	Sep-11	Bahamas	S	GT No. 96	4	Angola LNG
Sonangol Sambizanga	160,500	Sonangol	Daewoo	Sep-11	Bahamas	S	GT No. 96	4	Angola LNG
Southern Cross	172,000	MOL	Hudong	May-15	Hong Kong	DRL	GT NO. 96	4	Various
Soyo	160,400	Mitsui/NYK/Teekay	Samsung	May-11	Bahamas	DFDE	TZ Mk. III	4	Various
Spirit of Hela	177,000	MOL	Hyundai	Oct-09	Panama	DFDE	TZ Mk. III	4	Various
Stena Blue Sky	145,700	Stena	Daewoo	Jan-06	Panama	S	GT No 96	4	Various
Stena Clear Sky	171,800	Stena	Daewoo	Sep-10	Panama	DFDE	GT NO 96	4	Various
Stena Crystal Sky	171,800	Stena	Daewoo	Jul-10	Panama	DFDE	GT NO 96	4	Various
STX Kolt	145,700	STX Panocean	Korea Hanjin	Nov-08	Panama	DFDE	TZ Mk. III	4	Various
Suez Point Fortin	154,200	Trinity LNG	Koyo Japan	Nov-09	Panama	S	TZ Mk. III	4	Yemen LNG
Taitar No. 1	145,000	NYK Line	Mitsubishi	Oct-09	Liberia	S	Moss	4	Various
Taitar No. 3	145,000	NYK Line	Mitsubishi	Jan-10	Liberia	S	Moss	4	Various
Taitar No. 4	145,000	NYK	Mitsubishi	Jan-10	Liberia	S	Moss	4	Various
Tangguh Batur	145,700	Sovcomflot/NYK	Daewoo	Dec-08	Cyprus	S	GT NO 96		Tangguh
Tangguh Foja	155,000	K Line	Samsung	Jul-08	Panama	DFDE	TZ Mk. III	4	Tangguh LNG
Tangguh Hiri	155,000	Teekay LNG	Hyundai	Nov-08	IOM	DFDE	TZ Mk. III	4	Tangguh
Tangguh Jaya	145,700	K Line	Samsung	Nov-08	Panama	DFDE	TZ Mk. III	4	Tangguh
Tangguh Palung	155,000	K Line	Samsung	Mar-09	Panama	DFDE	TZ Mk. III	4	Tangguh
Tangguh Sago	155,000	Teekay LNG	Hyundai	Mar-09	IOM	DFDE	TZ Mk. III	4	Tangguh LNG
Tangguh Towuti	145,700	Sovcomflot/NYK	Daewoo	Oct-08	Cyprus	S	GT NO 96	4	Tangguh
Tembek	216,200	OSG/Nakilat	Samsung	Sep-07	Marshall Is.	DRL	TZ Mk. III	4	Qatargas II
Tenaga Satu	130,000	MISC	Dunkerque	Sep-82	Malaysia	S	GT NO 88	5	Petronas
Tessala	171,866	Hyproc Shipping	Hyundai	Dec-16	Algeria	DFDE	GTT Mk III	4	Sonatrach
Torben Spirit	173,000	Teekay	Daewoo	Feb-17	Bahama	MEGI-DF	No 96 GW	4	Various
Trinity Arrow	154,900	K Line	Imabari Shipbuilding	Mar-08	Panama	S	TZ Mk. III	4	Various
Umm Al Amad	210,100	J5	Daewoo	Aug-08	Marshall Is.	DRL	GT NO 96	4	Ras Gas III
Umm Al Ashtan	137,000	National Gas Shipping	Kvaerner- Masa	May-97	Liberia	S	Moss	4	ADGAS
Umm Bab	145,000	Kristen Navigation	Daewoo	Nov-05	Bermuda	S	GT NO 96	4	Qatargas
Umm Slaal	266,000	QGTC	Samsung	Nov-08	Qatar	DRL	TZ Mk. III	5	Qatargas
Valencia Knutsen	173,400	Knutsen	Daewoo	Sep-10	Nor-NIS	DFDE	GT NO. 96	4	Various
Velikiy Novgorod	170,200	SovComFlot	STX	Feb-14	Liberia	DFDE	GT No. 96	4	Various
Wakaba Maru	125,000	J3 Consortium	Mitsui Chiba	Apr-85	Japan	S	Moss	5	Pertamina
WilEnergy	125,500	Awilco LNG	Mitsubishi	Oct-83	NIS	S	Moss	5	Various
WilForce	156,000	Teekay LNG	Daewoo	Aug-13	NIS	DFDE	GT NO 96	4	Various
WilGas	125,500	Awilco LNG	Mitsubishi	Jul-84	NIS	S	Moss	5	Various
WilPower	125,500	Awilco LNG	Mitsubishi	Jul-84	NIS	S	Moss	5	Various
Woodside Cheney	174,000	Maran	Hyundai Samho	March-16	Greece	DFDE	GT No 96	4	Various
Woodside Donaldson	165,500	Teekay LNG	Samsung	Dec-09	Singapore	DFDE	TZ Mk. III	4	Various
Woodside Goode	159,800	Maran	Daewoo	Jul-14	Greece	DFDE	GT No. 96	4	Various
Woodside Reeswithers	173,400	Maran	Daewoo	Nov-16	Greece	DFDE	GT No 96	4	Various
Woodside Rogers	155,900	Maran Gas	DSME	Jul-13	Greece	DFDE	GT NO 96	4	Various
Yari LNG	159,983	TMSC Gas	Daewoo	Jun-14	Malta	TFDE	GT No 96	4	Various
Yenisei River	155,000	Dynagas	Hyundai	Jul-13	Marshall Is.	DFDE	TZ Mk. III	4	Various
YK Sovereign	127,125	SK Shipping	Hyundai	Dec-94	Panama	S	Moss	4	Pertamina
Zarga	266,000	QGTC	Samsung	Dec-09	Liberia	DRL	TZ Mk. III	5	Qatar-Atlantic
Zekreet	135,420	J4 Consortium	Mitsui Chiba	Dec-98	Japan	S	Moss	5	Qatargas

Any observations, additions or suggested revisions to the LNG journal World LNG Carrier Fleet list should be sent to editor@lngjournal.com

LNG Import Terminals

Explanatory Notes

- The tables do not include the following types of LNG facilities :
 - ◆ Small marine satellite terminals receiving LNG from liquefaction plants in their own country (such as exist in Norway) or which receive LNG transhipped from nearby reception terminals in their own country (such as in Japan)
 - ◆ Satellite LNG storage facilities that receive LNG transported only by road or rail
- Expansions of LNG reception terminals are only shown if they involve new storage tanks
- Where there is a blank in the table the information is uncertain or unknown.

Any comments on the tables, and corrections / additional information from terminal shareholders and project developers would be most welcome, and should be sent to John McKay e-mail editor@lngjournal.com

Country	Location (Project)	Owners	Start up	Tanks	Storage Capacity
Belgium	Zeebrugge	Fluxys	1987	4	380,000
Canada	Canaport Saint John	Irving Oil, Repsol	2009	3	480,000
Chile	Quintero	ENAP, Metrogas, Enagas	2009	3	334,000
	Mejillones	Engie, Codelco	2010	1	175,000
China	Beihai LNG, Guangxi	Sinopec	2015	4	640,000
	Dalian	PetroChina	2011	3	480,000
	Dongguan, Guangdong	Jovo Group	2013	2	160 000
	Fujian LNG (Xiuyu)	CNOOC, Fujian I&D Corp.	2008	2	640,000
	Guangdong	CNOOC,BP	2006	3	480,000
	Haikou, Hainan LNG	CNOOC	2014	3	480,000
	Ningbo, Zhejiang	CNOOC, Zhejiang Energy	2012	3	480,000
	Qidong, Jiangsu	Guanghui Energy	2018	1	60,000
	Qingdao, Shandong	Sinopec	2014	3	480,000
	Rudong	PetroChina	2011	3	530,000
	Shanghai	CNOOC, Shenergy Group	2009	3	495,000
	Shanghai, Mengtougou	Shanghai Gas	2008	3	120 000
	Shenzen, Diefu	CNOOC	2016	2	320,000
	Tangshan, Hebei	PetroChina	2013	3	480,000
	Tianjin North	Sinopec	2017	2	320,000
	Yuedong, Guangdong	CNOOC	2016	2	320,000
	Zhoushan Zhejiang	Enn Group	2018	2	320,000
	Zhuhai, Gaolan	CNOOC	2013	3	480,000
Dominican Republic	Punta Caucedo	AES Andres	2003	1	160 000
Finland	Pori	Gasum Skangas	2016	1	30,000
	Tornio	Gasum Skangas	2018	1	30,000
France	Fos Tonkin	Elengy	1972	3	150,000
	Montoir-de-Bretagne	Elengy	1980	3	360,000
	Fos Cavaou	Engie, Total	2010	3	330,000
	Dunkirk LNG	EDF, Fluxys, Total	2016	3	570,000
Gibraltar	Gasnor	Shell	2018	1	5,000
Greece	Revithoussa	DEPA	2000	3	225,000
India	Dabhol	GAIL, NTPC (Ratnagiri Gas & Power)	2009	3	480,000
	Dahej	Petronet LNG	2004	4	592,000
	Hazira	Shell India, Total	2005	2	320,000
	Kochi, Kerala	Petronet LNG	2013	2	320,000
	Mundra	Gujarat State Petroleum, Adani Group	2018	2	320,000
Indonesia	Arun	Pertamina	2015	5	507,000
Italy	Panigaglia	Snam	1969	2	100,000
	Porto Levante (offshore GBS)	ExxonMobil, Qatar Petroleum, Edison Gas	2009	2	250,000
Japan	Negishi	Tokyo Gas	1969	14	1,180,000
	Sodegaura	Tokyo Gas	1973	35	2,660,000
	Ohgishima	Tokyo Gas	1998	4	850,000
	Higashi-Ohgishima	Tokyo Electric	1984	9	540,000
	Futtsu	Tokyo Electric	1985	10	1,110,000
	Yokkaichi LNG	Chubu Electric	1988	4	320,000
	Kawagoe	Chubu Electric	1997	6	840,000
	Yokkaichi Works	Toho Gas	1991	2	160,000
	Chita LNG Joint	Toho Gas, Chubu Electric	1978	4	300,000
	Chita LNG	Toho Gas, Chubu Electric	1983	7	640,000
	Chita - Midorihama	Toho Gas	2001	3	600,000
	Senboku I	Osaka Gas	1972	4	180,000
	Senboku II	Osaka Gas	1977	18	1,585,000
	Himeji	Osaka Gas	1984	8	740,000
	Himeji LNG	Kansai Electric	1979	7	520,000
	Yanai	Chugoku Electric	1990	6	480,000
	Niigata	Nihonkai LNG, Tohoku Electric	1984	8	720,000
	Oita	Oita Gas, Kyushu Electric	1990	5	460,000
	Tobata	Kitakyushu LNG	1977	8	480,000
	Fukuoka	Saibu Gas	1993	2	70,000
	Sodeshi	Shizuoka Gas	1996	3	337,200
	Hatsukaichi	Hiroshima Gas	1996	2	170,000
	Kagoshima	Nippon Gas	1996	2	136,000
	Shin-Minato	Sendai City Gas	1997	1	80,000
	Nagasaki	Saibu Gas	2003	1	36,000
	Sakai	Kansai Electric, Cosmo Oil	2006	3	420,000
	Mizushima	Nippon Oil, Chugoku Electric	2006	2	320,000
	Sakaide	Shikoku Electric, Cosmo Oil	2011	1	180,000

LNG Import Terminals (continued)

Country	Location (Project)	Owners	Start up	Storage	
				Tanks	Capacity
Japan (continued)	Ishikari LNG	Hokkaido Gas, Hokkaido Electric	2012	2	380,000
	Okinawa	Okinawa Electric Power	2012	2	280,000
	Naoetsu	Inpex	2013	2	360,000
	Joetsu	Chubu	2011	3	540,000
	Hachinohe LNG	Nippon Oil	2015	2	280,000
	Hitachi LNG	Tokyo Gas	2015	1	230,000
	Soma Fukushima	Japan Petroleum Exploration	2017	1	225,000
Korea	Boryyeong	GS Energy, SK E&S	2017	3	200,000
	Incheon	Kogas	1996	20	2,880,000
	Kwangyang	POSCO	2005	4	530,000
	Pyeong-Taek	Kogas	1986	23	3,360,000
	Samcheok	Kogas	2014	3	600,000
	Tong-Yeong	Kogas	2002	17	2,620,000
Malaysia	Pengerang Johor	Petronas Gas	2017	2	400,000
Mexico	Altamira	Vopak, Enagas	2006	2	300,000
	Energia Costa Azul	Sempra LNG	2008	2	320,000
	Manzanillo	Samsung, Kogas, Mitsui	2012	2	300,000
Netherlands	Gate LNG	Gasunie, Royal Vopak	2011	3	540,000
Panama	Costa Norte	AES	2018	1	130,000
Phillipines	Pagbilao LNG	Energy World Corp.	2017	1	130,000
Poland	Swinoujscie	Baltic Gaz System	2015	2	320,000
Portugal	Sines	REN Atlantico	2004	3	390,000
Puerto Rico	Penuelas	EcoElectrica	2000	1	160,000
Singapore	Singapore	Singapore Energy Authority	2013	3	540,000
Spain	Barcelona	Enagas	1969	8	840,000
	Huelva	Enagas	1988	5	610,000
	Cartagena	Enagas	1989	5	587,000
	Bilbao	Enagas, EVE	2003	3	450,000
	Sagunto	GNF, Osaka Gas, Oman Oil	2006	4	600,000
	Reganosa, Ferrol	Galicia, Sonatrach, Tojeiro	2006	2	300,000
	El Musel, Gijón,	Enagas	2013	2	300,000
Taiwan	Yung-An	CPC	1990	6	690,000
	Tai-Chung	CPC	2009	3	480,000
Thailand	Map Ta Phut	PTT LNG	2011	2	320,000
Turkey	Marmara Ereglisi	Botas	1994	3	255,000
	Izmir	EgeGaz	2006	2	280,000
USA	Everett	Suez LNG NA	1971	2	155,000
	Lake Charles	Shell, ETE	1982	4	425,000
	Elba Island	Kinder	2001	5	535,000
	Cove Point	Dominion	2003	5	530,000
	Freeport	Freeport LNG Development	2008	2	320,000
	Cameron	Sempra LNG	2009	3	480,000
	Golden Pass, TX	Qatar Petroleum, ExxonMobil	2010	5	775,000
	Pascagoula, MS	Gulf LNG, Kinder	2012	2	320,000
UK	Isle of Grain	National Grid	2005	8	1,000,000
	South Hook	ExxonMobil, Qatar Petroleum, Total	2009	5	775,000
	Dragon LNG, Milford Haven	Shell, Petronas	2009	2	310,000

LNG Import Terminal Projects

Country	Location/Project	Owners/Project Developers	Start up	Storage	
				Tanks	Capacity
China	Shenzhen	CNPC Yudean Power	2021	2	120,000
	Yangjiang	CNPC Yudean Power	2023	2	120,000
	Zhangzhou Fujian	CNOOC	2022	2	160,000
India	Ennore	Indian Oil Corp	2019	2	320,000
	FSRU Andhra Pradesh	Andhra Pradesh Gas	2019	1	135,000
	Pipovav LNG (FSRU), Gujarat	Swan Energy	2019	2	320,000
	Andhra Pradesh	Hindustan LNG, Andhra Pradesh	studies	1	135,000
UK	Port Meridian, Barrow-in-Furness	Port Meridian Energy Ltd.	2020	1	150,000

LNG FSRU Import Facilities

Country	Location (Project)	Owners	Start up
Argentina	Bahia Blanca GasPort	Excelerate/YPF Repsol	2008
	Escobar GasPort	Excelerate/Enarsa	2011
Brazil	Pecem, FSRU	Petrobras	2009
	Guanabara Bay FSRU	Petrobras	2009
	Salvador, Bahia FSRU	Petrobras	2013
Colombia	Cartagena FSRU	Promigas, Sociedad Portuaria El Cayao	2016
Egypt	Ain Sokhna, Suez	EGAS, Hoegh	2015
	Ain Sokhna, Suez	EGAS, BW Gas	2015
Indonesia	Lampung	Hoegh LNG, PGN LNG	2014
	Nusantara (Jakarta Bay)	Golar LNG, Pertamina	2012
Italy	Livorno	OLT Offshore LNG Toscana	2013
Jordan	Aqaba, Jordan	Golar LNG	2015
Kuwait	Mina Al-Ahmadi	KPC	2009
Lithuania	Klaipeda	Klaipedos Nafta Hoegh LNG	2014
Malaysia	Malacca FSRU	Petronas	2012
Malta	FSU Armada Mediterranea	ElectroGas	2016
Pakistan	Port Qasim	Excelerate, Engro Corp	2015
	Port Qasim	BW-Mitsui, PGP Consortium	2017
Turkey	Aliaga FSRU, Neptune	Etik LNG	2016
	Dortyol FSRU Challenger	Botas	2018
UAE	Ruwais, Abu Dhabi	Gasco (UAE)	2016
	Jebel Ali Port, Dubai	DSA (UAE)	2010
UK	Teesside GasPort	Excelerate	2007

LNG Export Projects

Country	Location/Project	Project Developers	Planned Start Up	Number of Trains	Capacity In MTPA
AUSTRALIA	Pluto LNG expansion	Woodside	2021+	2	10.0
	Ichthys LNG	INPEX, Total	2018	2	8.4
	Prelude FLNG	Shell, Inpex, Kogas CPC	2018	1	3.5
CANADA	Bear Head LNG, Nova Scotia	LNG Ltd.	2024	4	8.0
	Goldboro LNG, Nova Scotia	Pieridae Energy	2024	2	10.0
	Kitimat LNG, BC	Woodside, Chevron	2024	2	10.0
	LNG Canada, BC	Shell, Mitsubishi, Kogas, PetroChina, Petronas	2024	2	12.0
	Melford LNG project, Nova Scotia	H-Energy Hiranandani Group	Studies		
	Kwispaa FLNG, Vancouver	Steelhead LNG	2024	4	12.0
	Vancouver Tilbury	WesPac Midstream	2021	1	3.25
	Woodfibre LNG, Squamish	Pacific Oil & Gas Co	2020	2	2.1
EQ.GUINEA	Equatorial Guinea Fortuna FLNG	Ophir, Golar LNG, GEPetrol	2020+	1	2.0
INDONESIA	Sengkang LNG	Energy World Corp.	2018	4	2.0
MALAYSIA	Rotan FLNG (Sabah)	Petronas, Murphy Oil	2019	1	1.5
MOZAMBIQUE	Area 1 Onshore	Anadarko Petroleum and partners	2023+	2	10.0
	Area 4 Onshore	Eni and partners	2023+	2	10.0
	Area 4 FLNG	Eni and partners	2019	1	2.5
NIGERIA	NLNG Train 7	NNPC, Shell, Eni, Total	2022+	1	7.0
PAPUA NEW GUINEA	Elk-Antelope LNG	Total, ExxonMobil Oil Search, Petromin	Studies		
RUSSIA	Sakhalin II expansion	Gazprom, Shell, Mitsui, Mitsubishi	2021	studies	
	Vladisvostok LNG	Gazprom, Itochu, various	2023+	2	10.0
USA	Alaska LNG Nikiski	Alaska Gasline Development Corp.	2023+	3	20.0
	Annova LNG, Brownsville	Exelon Corp.	2023+	6	6.0
	Cameron LNG, Louisiana	Sempra, Total, Mitsui, Mitsubishi	2019	3	14.95
	Commonwealth LNG, Louisiana	Commonwealth LNG LLP	2022	8	9.0
	Corpus Christi Liquefaction, Texas	Cheniere	2019	5	22.5
	Delfin LNG, Louisiana	Delfin, Hoegh	2021	3	9.0
	Driftwood LNG, Louisiana	Tellurian Investments	2022	6	26.0
	Elba Island, Georgia	Kinder Morgan, EIG Energy	2018	10	2.5
	Freeport LNG, Texas	Freeport LNG	2018	4	20.4
	Galveston Bay LNG	NextDecade	2023+	6	27.0
	Golden Pass, Texas	Qatar Petroleum, ExxonMobil	2021	3	15.6
	Jordan Cove, Coos Bay	Pembina Corp.	2024	2	7.8
	Lake Charles, Louisiana	Shell, ETE	2024	3	15.0
	Magnolia LNG	Louisiana LNG Ltd.	2023+	4	8.0
	Port Arthur LNG	Sempra	2023+	2	10.0
	Rio Grande LNG	NextDecade	2023+	6	27.0
	Sabine Pass LNG, Louisiana	Cheniere	2018-19	2	9.0
	Texas LNG Brownsville	Chandra, Meyer, Samsung, others	2023+	2	4.0
	VG LNG (Cameron Parish)	Venture Global	2021	5	10.0
	VG LNG (Plaquemines)	Venture Global	2021	10	20.0

LNG Exporters

Country	Location/Project	Shareholders	Start up	Liquefaction		Storage	
				Trains	capacity (nominal) mtpa	No. of tanks	Total capacity m³
ABU DHABI (UAE)	Das Island (Adgas)	ADNOC, Mitsui, BP, Total	1977 1994	2 1	3.2 2.5	3	240,000
ALGERIA	Arzew	Sonatrach GL4Z	1964	3	1.1	3	35,000
	Arzew	Sonatrach GL1Z	1978	6	7.8	3	300,000
	Arzew	Sonatrach GL2Z	1980	6	8.0	3	300,000
	Arzew	Sonatrach	2014	1	4.7		
	Skikda	Sonatrach GL1K II	1980	3	3.0	5	308,000
	Skikda	Sonatrach (rebuild)	2013	1	4.5		
ANGOLA	Soyo	Sonangol, Chevron, BP, ENI, Total	2012	1	5.2	2	370,000
AUSTRALIA	Karratha	NWS Woodside, Shell, BHP	1989	2	5.0	4	260,000
		(BP, Chevron	1992	1	2.5	1	130,000
		(Mitsubishi/Mitsui)	2004	1	4.4	1	130,000
		NWS partners	2008	1	4.4	1	130,000
		Darwin (Bayu Undan) ConocoPhillips, Santos, Eni, Inpex, TEPCO, Tokyo Gas	2006	1	3.5	1	188,000
	Australia Pacific LNG	ConocoPhillips, Origin Energy, Sinopec	2016	2	7.5	2	320,000
		Gladstone LNG Santos, Petronas, Total, Kogas	2015	2	7.8	2	280,000
		Gorgon LNG Chevron, Shell, ExxonMobil	2016	3	15.6	2	360,000
		Pluto LNG Woodside, Tokyo Gas, Kansei	2012	1	4.8	2	240,000
		QCLNG Shell, CNOOC	2014	2	8.0	2	280,000
		Wheatstone LNG Chevron, Woodside, Kuwait (KUFPEC), Jera, Kyushu	2017	2	8.9	2	300,000
BRUNEI	Lumut	Brunei/Shell/Mitsubishi/Total	1972-74	5	7.2	3	176,000
CAMEROON	Hilli Episeyo FLNG	Kribi Perenco	2018	1	1.2	1	125,000
EGYPT	Damietta	Union Fenosa, EGPC, EGAS	2004	1	5.0	2	300,000
	Idku	EGPC, EGAS, Shell, Total, Petronas	2005	2	7.2	2	280,000
EQ.GUINEA	Bioko Island	Marathon, Sonagas, Mitsui, Marubeni	2007	1	3.4	2	272,000
INDONESIA	Bontang I	Pertamina, VICO, JILCO, Total	1977	2	5.2	5	635,000
	Bontang II		1983	2	5.2		
	Bontang III		1989	1	2.8		
	Bontang IV		1993	1	2.8		
	Bontang V		1997	1	2.8		
	Bontang VI		1999	1	3.0		
	Sulawesi LNG	Medco Energi, Pertamina, Mitsubishi	2015	1	2.0	1	170,000
	Tangguh	BP, MI Berau, CNOOC, Nippon, LNG Japan	2008	2	7.6	2	340,000
MALAYSIA	Bintulu (MLNG Satu)	Petronas, Sarawak, Mitsubishi	1983	3	8.1	4	260,000
	Bintulu (MLNG Dua)	Petronas, Shell, Sarawak, Mitsubishi	1995	3	7.8	1	65,000
	Bintulu (MLNG Tiga)	Petronas, Shell, Sarawak, Mitsubishi, Nippon Oil	2003	2	6.8	1	120,000
	Bintulu Train 9	Petronas	2016	1	3.6		
	Kanowit FLNG	Petronas	2016	1	1.2		
NIGERIA	Bonny Island	NNPC, Shell, Total, Eni	1999	2	6.4	2	168,400
		Nigeria LNG (formed by above)	2002	1	3.2	1	84,200
		Nigeria LNG	2006	2	8.2		
		Nigeria LNG	2008	1	4.1	1	84,200
NORWAY	Snøhvit/Melkoya Island	Statoil, Total, GDF-Suez, Petoro	2007	1	4.2	2	280,000
OMAN	Oman LNG	Oman Govt., Shell, Total, Korea LNG	2000	2	7.1	2	240,000
		Mitsubishi, Mitsui, Partex and Itochu					
		Oman Govt., Oman LNG Union Fenosa, Osaka Gas, & Itochu	2006	1	3.7	2	240,000
PAPUA NEW GUINEA	PNG LNG	ExxonMobil, Oil Search, Santos, JX Nippon Oil	2014	2	6.9	2	320,000
PERU	Peru LNG	Hunt Oil, Shell, Marubeni, SK Group	2010	1	4.4	2	260,000
QATAR	Qatargas 1-T1&2	QP, ExxonMobil, Total, Marubeni, Mitsui	1997	2	6.4	4	340,000
	Qatargas 1-T3	QP, ExxonMobil, Total, Marubeni, Mitsui	1999	1	3.1		
	Qatargas II-T1	QP, ExxonMobil	2009	1	7.8		
	Qatargas II-T2	QP, ExxonMobil, Total	2009	1	7.8	8	1,160,000
	Qatargas III-T1	QP, ConocoPhillips, Mitsui	2010	1	7.8		
	Qatargas IV-T1	QP, Shell	2010	1	7.8		
	RasGas I- T1&2	QP, ExxonMobil, Kogas, Itochu, LNG Japan	1999	2	6.6		
	RasGas II- T3	QP, ExxonMobil	2004	1	4.7	6	840,000
	RasGas II- T4	QP, ExxonMobil	2005	1	4.7		
	RasGas II- T5	QP, ExxonMobil	2007	1	4.7		
	Rasgas III – T6	QP, ExxonMobil	2009	1	7.8		
	Rasgas III – T7	QP, ExxonMobil	2010	1	7.8		
RUSSIA	Sakhalin Island	(Sakhalin Energy) Gazprom, Shell, Mitsui, Mitsubishi	2009	2	9.6	2	200,000
	Yamal LNG Siberia	Novatek, Total, CNPC, Silk Fund	2017	3	16.5	4	640,000
TRINIDAD & TOBAGO	Point Fortin Train 1	BP, Shell, CIC, NGC	1999	1	3.0	2	204,000
	Train 2	BP, Shell	2002	1	3.3	1	160,000
	Train 3	BP, Shell	2003	1	3.3	1	160,000
	Train 4	BP, Shell, NGC	2005	1	5.2	1	160,000
USA	Cheniere Sabine Pass	Cheniere Energy	2016	4	18.0	5	800,000
	Cove Point LNG	Dominion Energy	2017	1	5.3	7	695,000
YEMEN	Bal-Haf	Yemen LNG, Total, Yemen Gas, Hunt Oil, SK Group, Hyundai	2009	2	6.7	2	320,000

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