LNG journal
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October 2018

In this issue:

LNG overcapacity is forecast for 2019 and lasting for about a year

Australian view of Asia-Pacific market and effects of developments such as the Siberia gas pipeline

LNG markets have been expected to enter a period of overcapacity for some time, but stronger than expected demand growth coupled with delays in project completions have delayed its arrival.

However, the expansion in global LNG supply capacity is soon expected to outpace growth in LNG demand, resulting in a short period of overcapacity in global markets starting sometime in 2019 and lasting through to 2020.

That's the conclusion of the latest analysis by the Australian government in its quarterly Resources and Energy Review published on October 2.

'Power of Siberia' gas pipeline will affect future LNG demand in China

Risks

"There are a number of risks to the forecast that could see LNG markets tighten earlier than expected, including stronger than expected LNG demand from China or further delays in bringing new LNG projects online," said its report.

From early in the next decade, the LNG market is expected to begin rebalancing, as demand growth absorbs the available capacity.

Strong growth is expected to continue and imports are projected to rise from 290 million tonnes in 2017 to around 365MT in 2020.

"The emerging and growing Asian market, led by China, is expected to drive demand growth, along with a strengthened European outlook," noted the report.

On the pricing front, LNG contract prices in Asia are forecast to decline modestly from current highs, but remain well above levels seen over the past few years.

"The JCC oil-linked LNG price is forecast to average US$72 a barrel in 2020, down slightly on current levels of US$76 a barrel, but up from an average of US$54 a barrel in 2017," it said.

LNG spot prices in Asia are also expected to decline from current levels over the next two years, as additions to global supply capacity outstrip growth in LNG demand. The futures curve also suggests a modest tapering in of Asian LNG spot prices.

"The average Asian LNG futures price on the New York Mercantile Exchange (NYMEX) was US$11 per million British thermal units in 2019 (A$13 a gigajoule at the forecast. exchange rate) and US$9 per MMBtu in 2020 (A$12 a gigajoule)," said the report.

It is worth noting, however, that the cost of delivering US LNG to Asia is expected to be below these futures prices, and that liquidity on the futures curve declines sharply after around six months.

The number of open futures contracts on the NYMEX - i.e. open interest - was last at around 2,900 between October 2018 and March 2019, but only numbered 60 for 2020 as a whole.

"It is possible that LNG spot prices could decline further than the futures price suggests," said the report.

"The futures curve also suggests that seasonal tightness in Asian LNG markets will continue over the next few years," it stated.

According to the Australian data, it is emphasized that in Asia, gas storage, which moderates the impact of seasonal demand spikes on prices, is limited.

Across the major LNG importers in Asia, Japan, China, South Korea and Taiwan, underground gas storage (UGS) was 5 percent of gas consumption in 2016, compared with a global average of 12 percent.

Japan sources almost all its gas using LNG imports and has been the leading buyer of LNG in the world since the 1970s. Japan's LNG imports declined by 2.4 percent in the first seven months of 2018, compared with the same period last year.

Competition

Gas competes with nuclear power in Japan and several nuclear reactors have come back online over the past year, reducing LNG imports.

"Increasing renewable energy use and slower economic activity have also contributed to lower LNG requirements," said the report.

Japan's LNG imports are projected to fall from 85 million tonnes in 2017 to 81MT in 2020.

The main factor affecting gas demand is the pace at which offline nuclear reactors are recommissioned. To date, the pace of nuclear restarts has been slow, with nuclear energy continuing to face public opposition and legal challenges.

"There remain significant risks of delays and slippages in nuclear restarts," stated the report.

In the context of Asian LNG demand, China remains the largest contributor to growth.

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China edged past South Korea to become the second-largest LNG buyer in the world in 2017, with its imports reaching over 36MT (50 billion cubic metres). Gas consumption rose strongly, with China putting in place policies to address air pollution by encouraging gas use in place of coal.

"Strong growth continued into 2018, with LNG imports up 53 percent year-on-year in the first six months of 2018," the Australian data noted.

The Chinese government is aiming to raise the share of gas in the energy mix from 5.3 percent in 2015 to a target range of 8.3-10 percent in 2020.

LNG is likely to play a major role in servicing rising Chinese gas demand and by 2020, China's LNG imports are forecast to have reached 53MT (73 Bcm).

A key factor affecting China's LNG demand will be the extent of competition from domestic gas production and gas imported through pipelines.

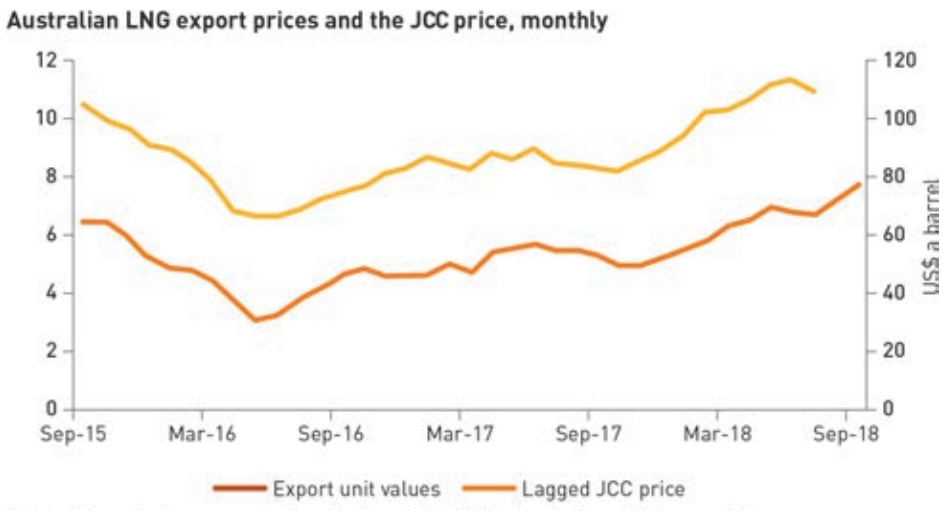
China is expected to begin importing gas from Russia via the Power of Siberia pipeline by 2020.

Imports are expected to be about 5 Bcm in the first year of operation, reaching 38 Bcm in the sixth year (2025).

China's domestic production is expected to grow steadily over the outlook period.

China is reportedly targeting natural gas production of 200 Bcm in 2020, up from around 150 Bcm in 2017.

"China faces challenges in lifting domestic output, and is expected to fall short of this target as it has difficult geology and gas resources are located in densely populated or heavily cultivated areas," stated the report.



Notes: Export prices are export unit values. The JCC price is lagged three months.
Source: ABS (2018); Department of Industry, Innovation and Science (2018)

Australian LNG export prices versus Japanese lagged crude price

South Korea dropped down the list to be the world's third-largest LNG buyer last year, and its imports were up 15 per cent year-on-year in the first seven months of 2018.

"Gas use in electricity generation increased, supported by a heatwave across Northeast Asia that pushed up electricity demand. The South Korean government took some of the country's older coal-fired power stations offline from March to June, in order to cut air pollution, and this likely boosted gas demand over this period," explained the report.

"Import growth is expected to slow in the second half of 2018, as coal-fired power stations resume service," it added.

South Korea's imports are forecast to increase from just under 36MT in 2017 to 38MT in 2020.

South Korea's long-term plan is to increase the share of gas in the energy mix from 15 percent in 2016 to around 19 percent by 2030. Most recently, South Korea has announced a plan to lower taxes on LNG imports and raise taxes on thermal coal imports," said the report.

The new tax rate will apply to LNG cargoes shipped from their supply source after 1 April 2019.

The report said that other economies in emerging Asia were expected to make a large contribution to growth in global LNG imports, including India, Pakistan, Bangladesh, Indonesia, Thailand and Singapore.

The strong growth in emerging Asia is being facilitated by the use of floating storage and regasification units (FSRUs), which provide a low-cost avenue for relatively small LNG import volumes.

"Europe is another major driver of increasing LNG demand. European LNG imports totalled 45MT in 2017, and are expected to grow strongly to 2020 despite relatively flat growth in gas consumption," said the report.

"LNG imports are being driven by long-term declines in domestic gas production, particularly from the Groningen field in the Netherlands. LNG is also seen as a means to diversify energy supply sources in Europe," it added.

Outside of emerging Asia and Europe, Taiwan represents another growth market. By 2025, Taiwan aims to increase the share of LNG in its energy mix to 50 per cent from 35 per cent at present, reducing coal and phasing out nuclear power.

In August, Taiwan's state-owned oil and gas company CPC signed a 25-year contract with US exporter Cheniere for 2 million tonnes of LNG per year, with prices linked to US Henry Hub gas prices. The contract takes effect after 2020.

Already a long-term supply deal between Cheniere and China National Petroleum for 1.2 MTPA of supplies supported an FID in May 2018 for a third Train with 4.5 MTPA of capacity at the Houston-based company's Corpus Christi LNG plant being built in Texas.

"A longer-term market risk is that tariffs discourage or delay final investment decisions for a second wave of US LNG projects," stated the report. ■

The strong growth in emerging Asia is being facilitated by the use of FSRUs, which provide a low-cost avenue for relatively small LNG import volumes.

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Carrying gas that came in from the cold: future of Arctic region LNG exports and shipping

Carrier capacity is building to handle future requirements for Russian deliveries from Siberia and elsewhere

A fleet of about 20 vessels out of the 500 LNG carriers on the water or ordered are servicing the northernmost liquefaction and export plants, the Hammerfest facility of Norway's Equinor and the Yamal plant of Russian natural gas company Novatek.

The current Arctic LNG fleet is much smaller than will be required once all Trains are on stream at the Yamal plant and other new facilities are developed such as the Novatek-led Arctic II LNG project on the Gydan Peninsula.

Norwegians

Equinor's Hammerfest facility is the oldest and biggest liquefaction plant in Western Europe and has been in production since 2006, using feed-gas from the fairytale Snohvit (Snow White) field in the Barents Sea.

The Norwegian gas is sent ashore through a 143-kilometres pipeline to Melkoya Island near Hammerfest. The plant has the capacity to produce 4.3 million tonnes per annum.

It was on July 27, 2017, that the ARC7 ice-class vessel "Christophe de Margerie" began sailing to the port of Boryeong in South Korea.

The world's first ice-breaking LNG tanker had loaded a cargo at Equinor's Hammerfest facility and set its course for South Korea via the Northern Sea Route (NSR).

The voyage marked the inauguration of the vessel, making it the first unescorted merchant ship ever to take this route, which makes it possible to reach Asia via the Bering Strait in 15 days versus 30 days via the Suez Canal.

The "Christophe de Margerie", named after the former Chief Executive of Total who died in a plane accident in 2014 before the French company's investment in the Novatek-led Yamal plant came to fruition in Siberia, was designed to order for Sovcomflot (SCF), the Russian shipping company.

The Arctic LNG fleet is now being expanded to transport cargoes all year round in the difficult ice conditions of the Ob Bay and the Kara Sea.

The "Christophe de Margerie" is the prototype for a series of 15 LNG carriers, which are being constructed and delivered for the Yamal project.

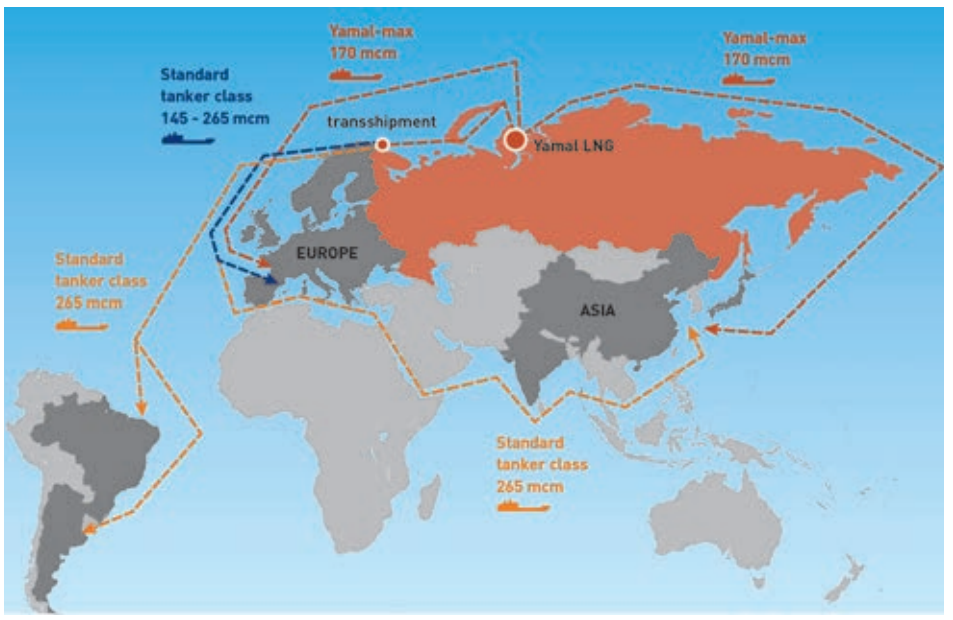
On December 9, 2017, the first tanker load of LNG left Sabetta Port at the Yamal facility on the "Christophe de Margerie", bound for Western Europe.

With a capacity of nearly 20 MTPA the start-up of the Yamal plant, built at a cost of US$27 billion, has been a success.

It is the first Russian LNG project in which Russian shareholders have had a controlling interest from the outset, unlike the Sakhalin Island plant that was mainly developed by Royal Dutch Shell before Gazprom acquired a majority stake.

Vessel Name	Year Built/Expected Delivery	Carrying Capacity, in cm	Charterer(s)/Owner(s)
Clean Ocean	2014	161,881	Yamal LNG, Cheniere; Dynagas LNG (1)
Clean Planet	2014	161,814	Yamal LNG; Dynagas LNG (1)
Clean Horizon	2015	161,870	Yamal LNG; Dynagas LNG (1)
Clean Vision	2016	162,000	Yamal LNG
Yamal Hull 2421	2017	172,410	Yamal LNG
Yamal Hull 2422	2017	172,410	Yamal LNG
Christophe de Margerie	2016	172,845	Sovcomflot (1)
Boris Vilkitsky	2017	172,000; 28,806 (2)	Dynagas LNG (1)
Eduard Toll	2017	172,000	Teekay/CLNG JV (1)
Vladimir Rusanov	2017	128,806 (3)	Yamal LNG
Rudolf Samoylovich	2018	172,000	Teekay/CLNG JV (1
Fedor Litke	2018	172,000	Dynagas LNG (1)
Not yet named	2018	172,000	Teekay/CLNG JV (1
Yamal Hull 2427	2019	172,410	Yamal LNG
Yamal Hull 2428	2019	172,410	Yamal LNG
Yamal Hull 2429	2019	172,410	Yamal LNG

LNG fleet is building up to take Russian cargoes to the main markets



Options for Arctic carriers and plants with the Northern Sea Route to Asia. Carriers can also trans-ship cargoes at West European terminals

Northernmost

The Yamal facility is now the northernmost gas-liquefaction project existing in Russia.

Ice-breaking gas-carriers are needed as the Yamal plant is located above the polar circle in the estuary of the Ob River, a wild, remote region that is frozen for seven-to-nine months a year and where winter temperatures can drop to as low as -50°C.

Yamal is located in Sabetta at the north-east of the Yamal Peninsula. In addition to the LNG plant, the facility has feed-gas infrastructure that includes production from the Yuzhno-Tambeyskoye (South Tambey) gas field, and the Sabetta seaport, as well as an adjoining airport.

The ground-breaking ceremony for the port construction was held in July 2012. However, construction of the port itself began only in the summer of 2013.

Amid the 2014-2015 Russian financial crisis, the Russian government gave 150 billion roubles (more than US$2.6Bln) to subsidize the LNG project.

The three-Train Yamal plant is designed with a nameplate capacity of 16.5 MTPA, with each Train having 5.5 MPTA of output. Train 2 has just come on stream at Yamal and Train 3 is scheduled for commissioning in the first quarter of 2019.

China National Petroleum Corp is a main shareholder with Novatek and Total and the Chinese are taking more than 4 MTPA of offtake once the plant hits its full production capacity.

When winter takes its hold in Siberia, Arctic-class LNG tankers will be delivering more cargoes for trans-shipment at European terminals such as Zeebrugge in Belgium, Rotterdam in the Netherlands and Montoir-de-Bretagne on the Atlantic Coast of France.

Belgian natural gas and network company Fluxys has a contract with the Yamal shareholders to provide services to trans-ship LNG on conventional gas-tankers for further delivery to customers in Asia via the Suez Canal.

According to Yamal LNG's estimate, it will take half as much time to ship LNG to Asian countries using the eastward route as the westward one.

However, the NSR will be easier to navigate in harsh conditions once Russian ice-breaking company Atomflot commissions three nuclear-powered, heavy ice-breakers, the "Arktika", the "Sibir" and the "Ural" in 2019, 2020 and 2021.

Difficulties

The Yamal shareholdings are Novatek (50.1 percent), Total (20 percent), CNPC (20 percent) and the Chinese state-run Silk Road Fund (9.9 percent.)

Novatek, Russia's second-largest gas company after Gazprom, had formed the Yamal project company in 2009.

In 2010, Novatek and Gazprom entered into an agency agreement by which Gazprom Export was to transport feed-gas across the border into Siberia for a commission fee, while Novatek would remain the project's operator.

However, by the end of 2012, Gazprom Export had not signed a contract to supply the gas from Yamal LNG. As a result, the project's shareholders were unable to use such contracts as collateral to obtain bank financing.

In 2013, LNG exports were partially liberalized. The right to supply LNG abroad had previously been reserved for state companies.

Volume buyers

In addition to Gazprom, the only other company controlled by the state was Rosneft. With the new criteria in force Novatek signed a contract with Gas Natural Fenosa (GNF) from Spain, now known as Naturgy Energy Group.

Naturgy has volumes of 2.5 million tonnes per annum over 25 years. Agreements were also signed with Total (4 MTPA) and CNPC subsidiary PetroChina for 3 MTPA.

Novatek Gas & Power has 2.9 MTPA of offtake and Gazprom Marketing & Trading in Singapore has3 MTPA.

By March 2016, 96 percent of the Yamal volumes were covered by long-term supply agreements.

On the shipping front, Greek company Dynagas has entered into long-term time charter agreements for five ARC7 and four ARC4 carriers for the Yamal project.

Dynagas has ordered five 172,000 cubic metres ARC7 LNG carriers from the Daewoo Shipbuilding & Marine Engineering shipyard in South Korea.

So far, the only builder of ice-breaking carriers for Russia has been Daewoo, which delivered the "Christophe de Margerie" to Sovcomflot at the end of January 2016. Daewoo has 14 Arctic LNG carriers in its order book, all contracted to serve the Yamal project in Russia.

When winter takes its hold in Siberia, Arctic-class LNG tankers will be delivering more cargoes for trans-shipment at European terminals

In addition, four of Dynagas's existing ARC4 LNG carriers will join the Yamal fleet to support deliveries committed to Asian buyers from 2019 onwards and will be time-chartered for a period of 15 years each.

Sovcomflot and oil company Rosneft have also placed orders of several ice-class vessels at the Zvezda (Star) shipyard on Russia's east coast.

The yard is heavily supported by the federal authorities and will construct large-scale tankers, including those with ice classification.

Novatek has also filed preliminary applications and technical documentation through Sovcomflot for 15 Arctic-class LNG carriers with the Zvezda yard.

Expansion

The next Russian export plant to be constructed is likely to be Arctic LNG II, to be located northeast of the Yamal facility in the shallow waters of the Gulf of Ob.

The processing Trains will rest on three stand-alone, ice-resistant platforms to be stationed near shore.

The feed-gas fields are about 40 kilometres (25 miles) from the platforms. Before the feed-gas arrives at the plant for liquefaction it will be processed at a gas treatment facility.

Timetable

The end products of both LNG and gas condensate will be shipped directly from the platforms as these will also have large storage tanks.

The Russians are teaming up with the Italian company Saipem for the development of the several gravity-based structures to be installed on the seabed of the Gulf of Ob.

Arctic LNG II is expected to be ready for production by early 2023. It will be based on three Trains each with a production capacity of 6.1 MTPA.

Natural gas resources are from the Salmanovskoye and Geofizicheskoye fields and possibly also the Gydanskoye, East-Tambey and North-Ob fields.

The project's front-end engineering and design process is under way and a final investment decision could be taken before the end of 2019.

Novatek and Total signed an agreement earlier in 2018 in respect of participation of the French company in Arctic LNG II.

The document was signed after talks between Russian President Vladimir Putin and France's President Emmanuel Macron.

Novatek will sell 10 percent of the venture to Total, according to Novatek Chairman Leonid Mikhelson.

The Russian company plans to close the deal with Total as early as in the first quarter of 2019.

Yamal project investor CNPC has also expressed an interest in taking a stake in the second plant. ■

The report is based on extracts from a presentation and paper by Eugene M. Khartukov, Professor of Economics at Moscow State University for International Relations.

For the Record

ABS, the American Bureau of Shipping, was selected by FueLNG of Singapore to class the Asian city-state's first LNG bunkering barge, scheduled to enter the construction phase in January 2019. "This project is an important milestone for the region and is a key component of Singapore's strategy to become the world's largest bunkering port," said ABS Vice President Global Gas Solutions, Patrick Janssens. "LNG as fuel has become an increasingly popular option for many shipowners looking to comply with environmental requirements and gain new operational efficiencies," added Janssens. "Projects like this are critical to help expand the LNG supply chain and advance adoption of LNG as fuel," he stated. The Singapore bunker barge, with 7,500 cubic metres of LNG capacity, will be owned and operated by FueLNG, a joint venture between Royal Dutch Shell and Singaporean company Keppel Offshore & Marine. The vessel will be based in the Port of Singapore and will supply LNG fuel to large ocean-going LNG-fueled vessels throughout the region.

To help spur the project, Singapore's Maritime and Port Authority (MPA) granted up to S$3 million (US$2.18M) to FueLNG to build the vessel. The Singapore authorities also awarded a grant of the same amount to a second LNG bunkering vessel to be ordered by Singapore's Pavilion Energy and its affiliate, Pavilion Gas to help implement ship-to-ship bunkering as part of a cleaner port policy. Both Singaporean LNG bunkering vessels are scheduled for delivery in 2020 and will be among the first of their kind to operate in Asia. Companies such as ABS, Shell, Pavilion Energy and Keppel are among the many global companies helping to build-out LNG fuel infrastructure to provide fuel to meet new restrictions on emission and pollution from measures such as the International Maritime Organization's sulfur cap to be implemented in 2020. ABS published its "Guide for LNG Bunkering" in 2017 setting out standards for LNG bunkering systems fitted to vessels intended for ship-to-ship LNG transfers.

ABS said it granted approval to a 174,000 cubic metres capacity LNG carrier being constricted at Hudong-Zhonghua Shipbuilding in China, strengthening its position in the Chinese market. The vessel will have Mark III Flex storage tanks designed by French technology company GTT. "ABS is pleased to award Hudong-Zhonghua this Approval In Principle for their design to help meet the industry's diversifying LNG shipping requirements, in this growing segment," said Vassilios Kroustallis,Vice President Europe Regional Business Development for ABS. "ABS continues to review advanced LNG designs, drawing on our extensive experience in safe handling, storage and transport of gas," added the class society. Through this partnership with ABS, Hudong-Zhonghua can now offer its clients designs using both GTT membrane containment systems, the MARK III Flex and No. 96 series.

This allows Hudong-Zhonghua to use different kinds of cargo containment systems to best meet the diversified requirements of customers throughout the LNG carrier's operational span. Hudong-Zhonghua is a subsidiary of state-owned China State Shipbuilding Corp. The shipbuilder's main construction yards are in the ports of Nantong and Shanghai, where Hudong-Zhonghua also has its headquarters. "Working with ABS through the AIP process we have demonstrated our ability to meet our clients' requirements for more efficient LNG vessel design," said Chi Benbing, Vice President of Hudong-Zhonghua. The shipyard delivered its most recent LNG carrier, the "CesiI Lianyungang", to Chinese energy major China Petroleum & Chemical Corp. known as Sinopec, in June 2018. That 174,100 cubic metres vessel was the sixth in a series built for cargo deliveries from the Australia Pacific LNG plant in Queensland where Sinopec is a shareholder.

ARGENTINA is set to change from being an importer to an exporter of liquefied natural gas and has initiated a study on the first liquefaction and export venture with US floating project specialist Excelerate Energy. Argentina's biggest natural gas pipeline company transporter, Transportadora de Gas del Sur (TGS), and Texas-based Excelerate have just signed a memorandum of understanding to evaluate building the country's first liquefaction plant as more shale-gas production comes on stream. The TGS system transports natural gas through 5,700 miles of pipelines to distribution companies, power plants and industrial customers and is now planning to send volumes to the coast for export as LNG. Argentina previously exported pipeline gas to Chile until the supplies were halted 11 years ago to enable Argentina to meet its own requirements from its dwindling energy production. However, the discovery in 2010 of the huge Vaca Muerta (Dead Cow) shale formation by Repsol-YPY, the Spanish-Argentine joint venture, has changed Argentina's energy fortunes. Argentina's total reserves in the area covering four provinces amount to 308 billion cubic feet of natural gas and 27 billion barrels of oil, according to US estimates Excelerate and TGS will jointly collaborate on the assessment of a liquefaction project near the Argentina coastal city of Bahia Blanca, where Excelerate set up a floating import facility in 2008 when the South American nation started LNG imports. Argentina still imports LNG volumes through two FLNG facilities, particularly during the country's peak winter consumption. The successful development of Argentina's shale-gas reserves has resulted in a potential excess of natural gas during the summer months and exports can now be considered. "The project aims at studying the technical and commercial viability of liquefying and exporting natural gas during the summer season, allowing a more sustainable development of shale-gas resources and reducing Argentina's annual natural gas net import needs," said Excelerate and TGS. Natural gas accounts for about half of Argentina's electricity generation followed by a 28 percent output from hydroelectricity.

Most of the remaining power generation is fueled by petroleum products or nuclear and very small amounts of coal and other renewables. As a result of lower production and higher demand over the past decade, Argentina had turned to natural gas imports to fill its supply gap. "The study is expected to be completed by the end of 2018, at which time Excelerate and TGS will share the results with government and industry officials and decide on further actions towards the implementation of the Project," added the two companies. Excelerate's Chief Commercial Officer Daniel Bustos said that given the high seasonality of Argentina's natural gas consumption, LNG has played a critical role in meeting the country's energy demands. LNG imports are via the Escobar terminal, located on the Parana River north of Buenos Aires and the Bahía Blanca terminal, located 400 miles south of the capital. Argentinian LNG imports have come from Trinidad, international commodities companies and most recently the US. Bolivia is the source of virtually all of Argentina's pipeline natural gas imports. Following the installation of a new pipeline from Bolivia in 2012, Argentina has imported slightly more than 200 billion cubic feet each year from neighbouring countries. "This LNG export project will significantly enhance Argentina's capacity to maximize the use of local resources by allowing a more predictable development of shale-gas production while reducing the overall costs of importing LNG," added Bustos. Prior to joining Excelerate, Bustos worked for energy company Repsol YPF in various positions in Latin America, including leading Repsol YPF's oil and gas commercial activities in Argentina, Bolivia and Brazil. In 2008, Bustos was part of the Repsol team that developed the Bahia Blanca FLNG import facility. Pipeline company TGS is also currently in the midst of a midstream project aimed at the transportation and conditioning of the natural gas production derived from the Vaca Muerta Basin, located in the western province of Neuquen. TGS said this project represented "an essential contribution to the development of shale-gas reserves", supported by the national government and the provinces to ensure that there is the infrastructure required to inject additional gas production into the pipeline systems. "Carrying out LNG production through the project will be key to promoting the development of unconventional gas, since it will allow the expansion of the gas market, increasing export opportunities, after having met domestic market needs in Argentina," stated TGS Chief Commercial Officer Nestor Martin.

AUSTRALIAN regulators said they would not oppose the $13 billion (US$9.8 billion) acquisition of natural gas pipeline company APA Group by the CK Consortium of Hong Kong after the Chinese company agreed to sell-off some assets in Western Australia. APA controls key connections across the country, including to LNG export plants. The Australian Competition and Consumer Commission (ACCC) granted its approval to the deal after the CK Group addressed competition concerns by pledging to sell-off all APA's pipeline assets in Western Australia. APA first received the unsolicited proposal in June 2018 from the consortium led by CK Infrastructure Holdings, CK Asset Holdings Limited and Power Assets Holdings. CK Infrastructure is the global group created by Hong Kong-based Chinese billionaire Li Ka-shing, who has now retired and left his son, Victor Li, in charge. 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

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Queensland to the liquefaction plant on Curtis Island near Gladstone. The approved deal will make CK Group, led by CK Infrastructure Holdings, the biggest pipeline player on the nation's East Coast. However, one more hurdle remains, the clearance from the federal government's Foreign Investment Review Board. The ACCC had expressed its concern the acquisition would give CK Group a monopoly grip on most gas transmission and storage facilities in Western Australia.

ACCC Chairman Rod Sims said the Chinese group had undertaken to divest its WA acquisitions to address anti-competition concerns. The original deal would have given the CK Consortium ownership of most gas transmission and storage facilities in the West. "The undertaking addresses these concerns and creates an opportunity for a new operator to acquire a valuable set of assets, together with the personnel needed to operate and manage the assets," Sims said. The assets to be sold by the CK Consortium after a completed takeover transaction, include the Parmelia Gas Pipeline, the Goldfields Gas Pipeline, the Kalgoorlie to Kambalda Pipeline and the Mondarra gas storage facility. "Concerns raised by industry participants mostly related to APA's pre-existing dominance in gas transmission. However, this acquisition does not alter that situation in a material way," stated Sims. "The purchaser of the divestment assets will need to be approved by the ACCC and when approving a new owner, we will focus on its ability to be an effective and long-term competitor for the development of new pipelines," stated Sims.

BAHRAIN has completed the construction of the jetty and offshore sections of its first LNG import facility at a location about 5 kilometres from the existing breakwater at the Khalifa Bin Salman Port and the terminal is on schedule for completion in 2019. The new facility, whose subsea pipeline has also been installed east of the port, will have capacity to receive 800 million standard cubic feet a day. The Bahrain LNG project is aimed at supplementing natural gas production in the kingdom and ensuring capacity to meet peak-season demand and industrial growth. Bahrain is moving forward with LNG facility even as it recently made new oil and gas discoveries, including extensive tight oil reserves amounting to 200,000 barrels per day and deep natural gas resources of between 10 and 20 trillion cubic feet. Bahrain would become the latest of the Gulf Cooperation Council states to have LNG import facilities installed following the United Arab Emirates and Kuwait. The main contractor of the terminal and infrastructure is GS Engineering & Construction on behalf of the joint venture known as Bahrain LNG. The completed facility will include the offshore jetty and breakwater to receive LNG shipments, as well as a floating storage unit (FSU) and a regasification platform. Onshore infrastructure will include a gas receiving plant and a nitrogen production facility. The LNG terminal construction began in the second week of January 2017 and has made fast progress.

"The construction work was challenging and included breakwater, dredging activities, and the ground piling works for the jetty and associated platform," said Bahrain LNG. The Bahrain LNG consortium comprises four companies, the Gulf state's National Oil & Gas Authority (30 percent), Teekay LNG (30 percent), South Korea's Samsung C&T (20 percent) and the Gulf Investment Corporation (20 percent). "Many aspects of the project have been quite challenging, such as completing the offshore works in the open sea, including the specialised equipment and offshore teams required to complete the ultra-optimised design," said a statement from the contractors. "Unfortunately, we also had excessive delays due to bad weather. This, coupled with challenging logistics and the tight schedule, added additional pressure to the team, but we tackled those challenges successfully and completed all the contractual milestones on time," they added. The cost of the latest Gulf import facility is put at less than $750 million. Financial organisations that have provided loans or underwriting include the Standard Chartered Bank, Arab Petroleum Investments Corp. and the Korea Development Bank. Other banks such as the Ahli United Bank, Santander, Credit Agricole, ING Bank, Natixis, and Societe Generale have also provided funds.

DOMINION Energy, the owner of the Cove Point liquefied natural gas export plant on Chesapeake Bay in Maryland, has secured $3 billion in lending commitments from over 20 banks for a three-year term loan that underscored that bankability of LNG. Initial interest for the term loan is set at the London Inter-Bank Rate (Libor) plus 1.375 percentage points. "Dominion Energy intends to use the proceeds from the financing to reduce debt," said the US company. Dominion spent about $4 billion to add export and liquefaction facilities at Cove Point to the existing import terminal and storage tanks. Cove Point began commercial operations in April 2018 and the facility has a nameplate capacity of 5.25 million tonnes per annum of LNG from a single Train. The plant is owned by Dominion Energy and had previously operated as an import terminal before the US shale-gas boom. The Cove Point plant is relatively small in comparison to Cheniere Energy's Sabine Pass plant where 18 MTPA of LNG is being produced from four Trains and where two more Trains are being constructed.

"We have been very pleased with the strong interest among lenders to participate in this important financing which has resulted in very attractive terms," said Mark F. McGettrick, Chief Financial Officer. "The announcement represents another milestone toward successfully completing the previously announced credit improvement initiatives which demonstrates our commitment to a strong credit profile," added McGettrick. Construction of the Cove Point liquefaction facility began in October 2014, following more than three years of federal, state and local permit reviews and approvals. The liquefaction plant is producing LNG for a Japanese joint venture comprising Sumitomo Corp. and Tokyo Gas as well as a second customer, Gas Authority of India. The Asian companies have signed 20-year tolling contracts with Dominion.

DNV GL, the European classification society said natural gas projects would receive more investment in the coming years and LNG capacity would double by the late 2040s as gas overtook oil as early as 2026 as the world's primary energy source, accounting for a quarter of the world's energy by mid-century. DNV GL's 2018 "Energy Transition Outlook", described as an independent forecast of the world energy mix in the lead-up to 2050, forecasts global upstream gas capital expenditure to grow from $960 billion in 2015, to a peak of $1.13 trillion in 2025. Upstream gas operating expenditure is set to rise from $448Bln in 2015 to $582Bln in 2035, when operational spending will be at its highest. While DNV GL's model predicts global oil demand to peak in 2023, demand for natural gas (from current resources) will continue to rise until 2034. New resources will be required long after these dates to continue replacing depleting reserves. "The energy transition will be made up of many sub-transitions. Our Outlook affirms that the switch in demand from oil to gas has already begun," said Liv A. Hovem, Chief Executive of the DNV GL oil and gas division. "Significant levels of investment will be needed in the coming decades to support the transition to the least carbon-intensive of the fossil fuels," added Hovem, referring to natural gas. DNV GL, a Norwegian-German company whose main offices are split between Oslo and the German port of Hamburg, said LNG capacity would increase as production rose.

"DNV GL expects it (LNG capacity) to double by the late 2040s, as the midstream sector connects shifting sources of gas with changing demand centres," said the DNV GL report. "Seaborne gas trade is forecast to treble from North America to China by 2050. An increase in trade from Sub-Saharan Africa to the Indian Subcontinent and South East Asia is also expected," according to the forecasts. Rising global demand for gas will impact activity across the oil and gas value chain, said the DNV GL report. Conventional onshore and offshore gas production is forecast to decline from about 2030, while unconventional onshore gas is expected to rise to a peak in 2040. "Gas will fuel the energy transition in the lead-up to the mid-century. It sets a pathway for the increasing uptake of renewable energy, while safeguarding the secure supply of affordable energy that the world will need during the energy transition," added CEO Hovem. According to DNV GL data, North East Eurasia (including Russia) and the Middle East and North Africa would account for most onshore conventional gas production in the lead-up to 2050, while North America would continue to dominate unconventional gas production. "In the offshore sector, the Middle East and North Africa would see the highest annual rate of new gas production capacity from now until at least 2050," said the report. DNV GL forecasts further transition for the sector in the lead-up to 2050, as greener gases, including biogas, syngas and hydrogen, enter transmission and distribution systems. "Our forecast points to a faster, leaner and cleaner oil and gas industry in the future. It's time for our sector to focus on developing the digital technologies that will enable quicker and more agile exploration and production, and the smooth integration of less carbon-intensive gases into the energy system," stated Hovem.

ENERGY WORLD Corp., the Hong Kong-based and Australian-listed LNG developer, reported mixed preliminary full-year results as it progressed with its Philippines LNG and power hub and small-scale liquefaction plant at Sengkang in

Indonesia where its production sharing contract is expected to be renewed. EWC said revenue for the group for the year was US$158.2 million. This represented an 11.0 percent decrease on the revenues posted in fiscal 2017 of US$177.8M. Net profit was down by 13.5 percent to US$22.07M compared with US$25.55M as the company has been spending more on putting the finishing touches to its LNG and power ventures. "Construction on the Pagbilao Power Plant and LNG Hub terminal in Quezon Province continued throughout the year," said EWC. So far, the jetty and regasification infrastructure as well as one storage tanks at the LNG terminal have been completed. "Further progress on the Pagbilao project included a land agreement for 12 kilometres of right of way access to the main grid secured," said EWC. "A temporary tie-in connection to the power lines adjacent to the power station was also secured," it added. Meanwhile, the Philippines Department of Energy presented a report to the Senate stating imported LNG would be the cheapest source of fuel for electricity generation. "The Philippines Senate asked the DOE, the Energy Regulatory Commission and the National Grid Corporation to assist EWC to ensure that the power plant can be brought into production at the earliest opportunity," said EWC.

In Indonesia, revenue from gas sales decreased to US$6.5M due to lower volumes of gas delivered. The fall in volumes was a result of decreased flow rates at the Kampung Baru wells. "While this has not had a significant impact on operations, new compressors have been ordered to increase gas pressure going forward and thus to increase gas sales," said the company. "The revenue from power has decreased by $11.4M compared to fiscal 2017 as a result of the decrease in the availability of gas from Kampung Baru," it added. EWC is expecting to be granted a 20-year extension to its Indonesia natural gas production sharing contract. The company also has a small-scale liquefaction venture and power project located on the South Sulawesi coast in eastern Indonesia. "Our principal focus in Indonesia with regard to project development has been our efforts to secure an extension to the Sengkang gas field PSC beyond 2022," said EWC. "We have made our formal application to the regulator (SKK Migas) and have been working very closely with them over the last few months," said the company. "In line with current Indonesian policy, it is likely that any extension of the PSC may require involvement of a local Indonesian partner. Whilst timelines are unclear, we are optimistic that an outcome can be reached before the end of 2018," EWC stated. "In April we made a scheduled repayment of US$17.8m in principal and interest in relation to the project funding of the Sengkang Power Plant, repaying six lenders in full," added EWC.

EXXONMOBIL has signed a preliminary accord for the sale of its 13.8 trillion cubic feet of natural gas resources in the Prudhoe Bay and Point Thomson fields of Alaska's North Slope to Alaska Gasline Development Corp., the state-owned body leading the development of Alaska LNG. The agreement follows a similar commitment of gas to the LNG project made in May 2018 by BP of the UK, also a major North Slope natural gas resource owner. The AGDC said the two agreements committed 22.7 Tcf to the LNG project. This comprises most of the 32 Tcf of the confirmed and easily recoverable feed-gas resource on the North Slope. The current terms of the accord between ExxonMobil and AGDC include price and a volume basis for a Gas Sales Agreement. "The parties anticipate finalizing long-term gas sales agreements to purchase ExxonMobil's share of 30 Tcf of gas from Prudhoe Bay and Point Thomson," said ExxonMobil. The US major has a 62.75 percent share in the North Slope field and 36.4 percent share of the nearby Prudhoe Bay field, the largest oil and gas field in North America. Alaska LNG is expected to cost up to $45 billion to build an 800-mile gas pipeline from the North Slope in northern Alaska to a planned liquefaction plant in Nikiski on the Kenai Peninsula, south of Anchorage. A gas processing plant, needed mainly to remove carbon dioxide from the Prudhoe Bay gas, would also be built on the North Slope. "This precedent agreement is good for Alaska and ExxonMobil to help advance the state-led gasline project," said ExxonMobil Alaska President Darlene Gates. "As the largest holder of discovered gas resources on the North Slope, ExxonMobil has been working for decades to tackle the challenges of bringing Alaska's gas to market," added gates. This development comes less than a year after President Donald Trump and China's President Xi Jinping witnessed the signing in Beijing of the five-party joint development agreement to monetize Alaska's natural gas.

"The Alaska LNG project has made meaningful progress over the past year," said AGDC President Keith Meyer. AGDC is currently in advanced negotiations with Chinese companies, including Sinopec as a buyer, and Bank of China and China Investment Corp. as financiers for 75 percent of the expected 20 MTPA of LNG to be exported from Alaska. Final agreements between AGDC and the Chinese companies are expected to be signed by the end of December. "We have secured the customers, we have advanced the project with regulators, and now we have ExxonMobil's Gas Sales Precedent Agreement executed," added Meyer. The price terms agreed between AGDC and the two companies remain confidential. However, AGDC has estimated that the wellhead price the state itself would receive for its royalty share of gas would likely range between $1.00 per million British thermal units and $2 per MMBtu. Alaska Governor Bill Walker thanked ExxonMobil for its support of the project. "This agreement means Alaska is one step closer to monetizing the North Slope's vast and proven natural gas resources," said the Alaska Governor Bill Walker. "I am pleased with the engagement and alignment from ExxonMobil for the Alaska LNG project." Apart from the China LNG sales prospects, talks are continuing with Tokyo Gas Corp., Korea Gas Corp. and PetroVietnam on the remaining 5 MTPA not booked by China and comprising 25 percent of the LNG expected to be produced. The US Federal Energy Regulatory Commission is working on Alaska's environmental impact statement and expects to have it finalized by November 2019. A federal record of decision, which would clear the way for the FERC approval, is expected in February 2020. That would allow for a final investment decision in 2020 for construction to be underway in 2021 and completion and commercial operations could be expected by 2025.

EXXONMOBIL signed a cooperation framework agreement with the Guangdong provincial government of southeast China to advance discussions concerning the proposed construction of a chemicals complex with an LNG import project as part of the package. The new facility is aimed at helping to meet demand growth for chemical products in China. The multibillion-dollar project, which remains subject to a final investment decision, would include a 1.2 million-tons-per-year ethylene flexible feed steam cracker, two performance polyethylene lines and two differentiated performance polypropylene lines. ExxonMobil's decision to proceed with the project will be based on a number of factors, including receipt of permits and project competitiveness. Start-up is

planned for 2023. "The framework agreement also confirms Guangdong Province's support in progressing the Huizhou LNG receiving terminal, in which ExxonMobil intends to participate, including supply of LNG," said the US major. ExxonMobil is one of the world's largest LNG industry participants with interests in production plants in nations such as Australia, Qatar and elsewhere. Natural gas is the fuel that powers most chemical and refining processes at advanced plants and is also a feedstock.

John Verity, president of the ExxonMobil Chemical Company said the agreement with the Guangdong government demonstrated ExxonMobil's interest in advancing this project from concept to completion. "We value the government's support and its experience in moving such a large-scale project forward," said Verity. China currently has 19 LNG import terminals along its coastline from north to south and UK major BP backed the very first LNG terminal at Dapeng Bay in Guangdong that started operations in 2006. The new complex would rely on advanced proprietary technologies in direct crude steam cracking and performance polymers manufacturing. "It would support progress toward China's national petrochemical development priorities, which include self-sufficiency, diversified feedstock sources, rebalancing fuels versus chemicals and advancing new competitive technology," said the US company. ExxonMobil said it was also evaluating other chemicals manufacturing projects in Asia to help meet expected demand growth in the region.

FREEPORT LNG, the project at Quintana Island in Texas led by US energy entrepreneur Michael Smith, has signed a preparatory accord for a future tolling services agreement with Japanese trading house Sumitomo Corp. Freeport and Sumitomo have entered into a binding heads of agreement for 2.2 million tonnes per annum of LNG. Under the deal, Sumitomo has agreed to negotiate for a 20-year liquefaction tolling agreement (LTA) expected to start in 2023 upon the commencement of commercial operations of the fourth Train at the Texas facility Sumitomo and Japanese utility Tokyo Gas hold a similar 20-year tolling agreement with Dominion Energy at its Cove Point LNG export plant in Maryland, which started commercial operations in April 2018. "We are pleased to announce the start of a long-term relationship with Sumitomo as our first Train 4 foundation customer," said Smith, Chairman and Chief Executive of Freeport. "Sumitomo's significant US gas trading and LNG operations makes it an especially great addition to our outstanding group of existing customers," added Smith. "Sumitomo's 2.2 MTPA of capacity under this HOA is a major step towards Freeport contracting the approximately 3.5 MTPA needed for financing and commencing construction of Train 4," stated Smith.

About 13.4 MTPA of LNG cargoes have already been contracted for the first three Trains under use-or-pay tolling agreements with a group of customers, including BP of the UK, Japanese utility Osaka Gas, Jera Energy of Japan, Toshiba Corp. of Japan and South Korean energy company SK E&S LNG. Freeport LNG Marketing announced an additional sales deal in June 2018 with the Singapore-based LNG trading arm of global commodities company Trafigura for 500,000 tonnes per annum of cargoes. "This valuable partnership with Freeport LNG is an excellent step as we continue to expand our business within this sector," said Shingo Ueno, President and CEO of Sumitomo Corp. of Americas on the Texas deal. "We believe our ability to learn and grow through this long-term project will allow us to provide real value to the energy industry globally, connecting the growing natural gas supply in the US and the increasing appetite for LNG worldwide," explained Ueno. Freeport is a former import

terminal that started operations in 2008 and is now being transformed into an export plant. Shipments are scheduled to begin from the first three Trains by 2019.

GALVESTON Bay LNG, a project planned on the Gulf Coast by Houston-based company NextDecade, has requested the start-up of its authorization process by the Federal Energy Regulatory Commission to produce an initial 16.5 million tonnes of LNG from a proposed liquefaction facility near Texas City. The Galveston Bay venture has already received a Department of energy permit to ship cargoes for 20 years to nations with a Free Trade Agreement with the US and a non-FTA permit was pending. NextDecade is additionally developing the Rio Grande liquefaction and export plant to be located on the northern shore of the Brownsville Ship Channel in Texas. The Nasdaq-listed company has a portfolio of projects that also includes the Rio Bravo Pipeline that would have 4.5 billion cubic feet of capacity to supply the Rio Grande liquefaction plant with feed-gas from the Agua Dulce area hub. NextDecade told the FERC that the Galveston Bay facilities will be designed to include three liquefaction Trains, each with capacity to produce 5.5 MTPA, and four LNG storage tanks, each with a capacity of around 200,000 cubic metres. The Galveston Bay plant would receive its feed-gas through a proposed 97-mile pipeline to be developed by a company affiliate. NextDecade said that the pipeline would run from the Katy Gas Market Hub and its capacity is expected to be about 3 Bcf per day, providing "a modest amount of firm service to third parties".

The export plant will be sited on a part of Galveston Bay known as Shoal Point, with the northern and western perimeters of the site located adjacent to the Texas City Ship Channel. The Galveston Bay plant will occupy almost 1,000 acres of land and NextDecade has entered into an initial three-year lease for the site from two landholders who are the Texas General Land Office and the municipal authorities of Texas City. The developers expect to begin construction in the fourth quarter of 2022 for an initial in-service date of the second quarter of 2027. "The project's pipeline header system will connect with a combination of interstate and intrastate pipelines at multiple interconnect points, 15 are currently planned," it told the FERC. "The developers intend to own the natural gas and the LNG that passes through the Project prior to the sale of LNG to third parties; or (2) process natural gas owned by third parties into LNG under tolling agreements and export the LNG as agent for such third parties," NextDecade explained to the regulator. The company expects that any agreements for LNG sales or tolling arrangements will be in the form of long-term contracts. NextDecade pledged to work with the Commission and other federal, state and local agencies to obtain all necessary permits and approvals and will hold open houses and distribute information detailing the project to interested members of the public. "It is seeking to increased public understanding and enhance the public's ability to constructively participate in the GB Project approval process," said the company.

GASUM, the natural gas network operator in Finland and owner of the Skangas LNG distribution business, plans to invest in the construction of around 50 more natural gas filling stations for heavy-duty vehicles in Finland, Sweden and Norway by the beginning of the 2020s. Gasum said the investment would multiply the size of the Nordic heavy-duty vehicle gas filling station network, enabling considerable reductions in green-house gas emission cuts. In the Nordic countries, heavy-duty road transport already plays a key role in the logistics system. The Finnish company said that for the emission reduction targets set at the national and international levels to be reached, concrete solutions are needed to reduce heavy-duty road transport emissions considerably from the current levels. "Among the low-emission fuels, the most competitive alternative for this purpose is liquefied natural gas (LNG)," stated Gasum. "Gasum's strategy is based on achieving Nordic gas market growth. Use of gas as a heavy-duty road vehicle fuel is a strategic focus for Gasum. "In the next few years, Gasum's gas filling station network serving heavy-duty road transport will become several times larger than today. "The 50 new filling stations will be located at key transport routes as regards road haulage, and they will enable significant increases in the use of liquefied natural gas and biogas in heavy-duty transport," stated Gasum.

The company explained that the switch of heavy-duty vehicles to LNG or liquefied biogas (LBG) will result in significant cuts in carbon dioxide, nitrogen dioxide, particulate and noise emissions from transport. "We're on our way towards a carbon-neutral society and it's now time to accelerate the pace. Gas plays an indisputably important role in this transition," said Gasum Chief Executive Johanna Lamminen. "In recent years, we've been making purposeful efforts to build the Nordic LNG and biogas infrastructure to improve access to gas" added Lamminen. "In early 2018, the Swedish Environmental Protection Agency granted Gasum an investment subsidy for the expansion of our filling station network as part of the 'Climate Leap' program," she stated. "This is key proof of the enormous potential of the gas market and enables the establishment of the role of gas as a low-emission fuel for road transport," said the CEO. Gasum said that heavy-duty road vehicles are currently responsible for more than a quarter of road transport emissions in the European Union. "Together with new gas vehicle models, the expanding gas filling station network creates good conditions for road fuel gas market growth and emission cuts," said the company.

HOEGH LNG, one of the main LNG project companies with a growing fleet of floating storage and regasification units, has overhauled the management of its group and its US-listed affiliate as part of long-term strategy development. Hoegh is listed on the Oslo stock exchange and has its corporate headquarters in Hamilton, Bermuda, while its Hoegh LNG Partners subsidiary is listed on the New York Stock Exchange to take advantage of energy partnership corporate benefits. The management changes at Hoegh LNG Partners (HMLP) involves the post of Chief Executive. Steffen Foreid, the current Chief Financial Officer at the Hoegh LNG group will take on the dual role of CEO and Chief Financial Officer of HMLP. Hoegh said the search to employ the new CFO at the Hoegh LNG group has already started and Foreid would retain the formal role until his replacement is in place. The Norwegian company said Richard Tyrrell, the current CEO and CFO of HMLP, would take on the role of Chief Development Officer at the Hoegh LNG group. Ragnar Wisloff, the current Chief Development Officer of Hoegh LNG would be handed a new role as Head of Change and Transformation at Hoegh. In the final change, Camilla Nyhus-Moller was promoted from Senior Vice President of Legal & Compliance to Chief Legal & Compliance Officer.

"I am pleased to announce the new composition of the group executive team of Hoegh LNG which is part of the group's long-term development strategy," said Sveinung J. S. Stohle, President and CEO. "I would like to thank Steffen Foreid and Ragnar Wisloff for their service in previous roles, welcome them to their new roles and welcome Camilla Nyhus-Moller on her elevation to the group executive team, while welcoming Richard Tyrrell from Hoegh LNG Partners," added Stohle. Hoegh is continuing to build its FSRU fleet and earlier in September 2018 it organized a Chinese financing deal for a sale and lease-bank transaction for one of its newbuilds. The Norwegian company said it had received a commitment letter for the financing of its FSRU No. 10 for a sum of around US$206 million. The newbuild is currently under construction at Samsung Heavy Industries in South Korea, and is scheduled for delivery in the second quarter of 2019. Hoegh said the facility was being provided by CCB Financial Leasing Co., a wholly owned subsidiary of China Construction Bank, one of the four biggest Chinese banks. "Hoegh LNG is the leading provider of floating LNG services and the new team further strengthens the group and positions it for the exciting opportunities on offer in the LNG market," stated Stohle. Following the executive changes, the main Hoegh group team would comprise the following members: Sveinung J. S. Stohle, President & CEO; Steffen Foreid, CFO (interim); Richard Tyrrell, Chief Development Officer; Oivin Iversen, Chief Technical Officer; Vegard Hellekleiv, Chief Operations Officer; Tom Solberg, Chief of Staff; Camilla Nyhus-Moller, Chief Legal & Compliance Officer; and Ragnar Wisløff, Head of Change and Transformation.

HOEGH LNG has found a Chinese financing deal for a sale and lease-bank transaction for one of its FSRU newbuilds. The Norwegian company said it had received a commitment letter for the financing of its FSRU No. 10 for a sum of around US$206 million. The newbuild is currently under construction at Samsung Heavy Industries in South Korea, and is scheduled for delivery in the second quarter of 2019. Hoegh said the facility was being provided by CCB Financial Leasing Co., a wholly owned subsidiary of China Construction Bank (CCB), one of the four biggest Chinese banks. The fleet owner explained that the funding is available for 70 percent of the delivered cost of the FSRU, increasing to 80 percent once long-term employment for the unit has been secured.

The facility bears a 20-year amortisation profile and Hoegh can fix the interest rate, and based on the current swap rate environment, the fixed interest rate is expected to be around 6 percent. The loan is subject to final documentation. "With this sale and leaseback facility, Hoegh LNG's current newbuilding programme is now

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fully equity and debt funded," said Sveinung J.S. Stohle, Hoegh's Chief Executive and President. "Combined with the recent three newbuilding debt facilities, Hoegh LNG continues to demonstrate support from a wide group of leading international banks and credit institutions, now also including CCB," he added. "We are pleased to welcome CCBFL to our lending group and appreciate its support in the financing of the last FSRU in our current newbuilding programme," he added. "This agreement is also fully in line with HLNG's strategy of expanding our activities in China, where we currently have the FSRU 'Hoegh Esperanza' on charter to China National Offshore Oil Corp. and are actively pursuing new projects," explained Stohle.

KINDER MORGAN, one of the main US pipeline operators and owner of two LNG facilities, said it could now move forward with modifying its Gulf LNG import facility in Mississippi to handle exports as it is already doing with its Elba Island plant near Savannah, Georgia. Kinder said that the existing Gulf terminal at the port of Pascagoula in Mississippi could be taken forward by other parties, supported by Kinder. Speaking at a conference in New York, Chief Executive Steve Kean said Kinder already supplies around 42 percent of the more than 3 billion cubic feet per day in current US liquefaction capacity. The company has feed-gas volumes for LNG on the Tennessee Gas Pipeline, the Natural Gas Pipeline Co. of America and on the Kinder Morgan Louisiana Pipeline, as well as capacity on other lines. With more than 10 Bcf/d of US LNG export projects awaiting final investment decisions, under construction or in service, the company said it had multiple paths to capture more growth. Among those projects is the Elba Liquefaction Project, which includes a total of 10 liquefaction units with liquefaction capacity of about 2.5 million tonne per annum. "The first of the units is expected to be online later this year, with each subsequent unit then coming online 30-45 days sequentially," said Kean. "The final unit is expected to come online by mid-year or within the third quarter of 2019," he added. The liquefaction project at the existing Southern LNG Company facility at Elba Island is supported by a 20-year contract with Royal Dutch Shell.

"KMI is also looking to structure its proposed Gulf LNG export facility similarly to the Elba Island terminal with a long-term off-take agreement with someone who is willing to take on the risk and opportunity and lace the molecules in the international market," stated Kean. The proposed Gulf LNG project would consist of two Trains, each with capacity of about 5 MTPA. "There are a number of ways in which you can participate in LNG. We like the Elba model, and that's what we're looking for as a potential on our Gulf LNG facility," said Kean. "We know how to build pipelines. We know how to expand our pipeline network, and it creates a very good opportunity for us," he added. The Gulf LNG project had previously been paused rather than postponed for design development reasons. The Gulf terminal at Pascagoula had originally been constructed to import LNG cargoes from Angola in southwest Africa from a production plant developed by international oil companies, including Chevron Corp. However, the shale-gas boom made LNG imports into the US uneconomic and Kinder later decided to consider the export option. The Gulf terminal was originally owned by US pipeline company El Paso and later acquired by Kinder. The existing Pascagoula terminal, located next to the Bayou Casotte Navigation Channel, already includes a five-mile send-out pipeline. It is interconnected to several downstream pipelines, including Transco, Florida Gas Transmission, the Destin Pipeline and the Gulfstream Natural Gas Pipeline from where feed-gas can be transported for processing and export from Pascagoula.

KOREA GAS Corp., the Asian nation's main utility and liquefied natural importer, said it would invest 1 trillion won (US$895 million) through 2025 to establish infrastructure for LNG-powered vessels and trucks. Kogas has stakes in global LNG production projects such as Gladstone LNG in Queensland, Australia, and the Royal Dutch Shell-led LNG Canada. Kogas is consulting with the Korean government to expand the use of LNG for ship fuel and for increased subsidies for LNG-powered ships to prepare for a stricter global sulfur cap being brought in by 2020 under

International Maritime Organization rules. The company's domestic LNG assets include four of Korea's import terminals at Incheon, Pyeong-Taek, Samcheok and Tong-Yeong. The Korean company is one of the leading participants in the LNG terminal sector with contracts to help with the setting up of facilities in nations such as in China, Mexico, Thailand and Kuwait.

The Korean company said it will build a new bunkering facility in the southeast region in 2022 to deal with a growing number of LNG-powered ships, and expand LNG fuel stations in major ports and cargo terminals by 2020. "The new investment plan was set to meet the rising demand for LNG bunkering, which is expected to increase from 310,000 tonnes in 2022 to 1.36 million tonnes in 2030 under the tougher environmental regulations," said Kogas. Kogas said it was also backing proposals for the introduction of more LNG-fueled trucks in the North Asian nation as alternatives to diesel-powered vehicles to reduce carbon emissions. Kogas is negotiating with Daewoo Tata, the nation's second-largest commercial vehicle manufacturer, to develop a 400 horsepower truck using LNG fuel. The Kogas-Daewoo Tata plans are aimed at having a commercial version of the vehicle in production by 2021.

LLOYD'S REGISTER, the UK maritime classification society, has given more details of its joint development of a dual-fuel bulk carrier, including liquefied natural gas-powered capability, with Jiangnan Shipyard Group of China. At the leading international maritime trade fair in the German port of Hamburg, the UK class society said it had agreed to jointly develop an LNG dual-fuelled Newcastlemax 210,000 DWT bulk carrier from an updated conventional design to incorporate LNG propulsion. LR said the Jiangnan shipyards had become a very experienced designer and builder of Newcastlemax bulk carriers in recent years and the dual-fuel vessel design has now received LR's approval in principle. The Newcastlemax will feature dual-fuel main engines (MAN B&W ME-GI or WinGD X-DF), dual-fuel auxiliary engines, fuel gas system (high pressure or lower pressure), cylindrical IMO Type C LNG tanks and an LNG-related safety system. "All LNG related components are located stern part, with no impact to the cargo handling operation," said LR. It explained that the stern-hull form and the strength of the hull girder are well optimised for providing compensation due to supplemental weight of LNG equipment. The full-width stern deck makes full endurance of an LNG dual-fuel propulsion system possible, while maintaining comfort level as equivalent to a conventional Newcastlemax.

A shelter for the LNG tank can be provided as an option for enhancing safety against mechanical damage. "Jiangnan has rich experience and strong capability in providing LNG options for either new building or retrofitting on bulk carriers as turn-key projects," said Lin Ou, Chairman of Jiangnan. "Jiangnan has its own facility and qualified team to integrate the fuel gas system and fabricate Type C tank of the LNG Performance Test Code," added Lin. "When considering longer trade voyages, Jiangnan has another two fuel tank systems (Type B and GTT Membrane) as alternative solutions," he stated. Nick Brown, LR Marine & Offshore Director, presented the "Approval in Principle Certificate" to Jiangnan at the Hamburg event. "We are delighted to have worked with Jiangnan on this project. LR provided assistance and support in terms of fuel-tank design, analysis of support structure and the LNG fuel system application and checked the design against IGF code, LR Gas Fuelled Rules as well as other relevant applicable standards," explained Brown. The dual-fuel option will help with the International Maritime Organization rules from 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.

MCDERMOTT International, the US energy engineering company that this year completed the takeover of US peer Chicago Bridge and Iron, said it completed phase two of the Greater Western Flank project Phase II to help boost LNG output in Western Australia. The contract was awarded by Woodside Energy, operator of

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the North West Shelf LNG plant and Pluto LNG, in January 2016. The GWF-2 development concept and scope consisted of eight production wells developed in four drill centres and tied back to GWA via a subsea pipeline, around 35 kilometres in length. The completed project provides the next phase in feed-gas supply to the existing North West Shelf (NWS) plant's Goodwyn Alpha platform. GWF-2 developed the Keast, Dockrell, Sculptor, Rankin, Lady Nora and Pemberton gas fields which are in close proximity. The fields are located in production licences WA-5-L, WA-6-L, WA-24-L, WA-57-L and WA-58-L in Commonwealth waters located 135km northwest of Dampier, the LNG export terminal in Western Australia.

McDermott was responsible for the procurement, fabrication, installation and testing of a series of pipeline initiators, pipeline end-terminations and the 35km of 16-inch, corrosion-resistant alloy (CRA) pipeline. "McDermott's strong execution capability is one of the reasons why clients continue to entrust their most important projects to us," said Ian Prescott, McDermott's Senior Vice President for Asia Pacific. "Greater Western Flank 2 is a testament to our execution, preparation and vertical integration capabilities. It shows McDermott can deliver challenging projects in challenging environments," he added. McDermott deployed two of its specialty vessels to complete the installation phase, namely "DLV 2000" for the pipelay campaign and the Lay Vessel 108 for the pre-lay and post-lay campaign. McDermott also set up an onshore portable and temporary facility at its Batam fabrication yard in Indonesia to simulate the offshore installation campaign.

MITSUI OSK Lines, the Japanese shipping company and LNG fleet owner, has held a naming ceremony in South Korea for an ice-breaking LNG carrier to deliver shipments to Asia from the Russian Yamal LNG export plant in Siberia. The 172,000 cubic metres capacity vessel "Vladimir Vize" was jointly ordered by MOL and China COSCO Shipping Corp. and constructed at Daewoo Shipbuilding & Marine Engineering in South Korea. The name "Vladimir Vize" was chosen in honour of the Russian Arctic explorer and oceanologist. The "Vladimir Vize" is the sister vessel of the "Vladimir Rusanov", which started transport service at the end of March 2018 under a long-term charter contract with Yamal LNG, whose owners are Russia's Novatek, French energy major Total, China National Petroleum Corp. and the Chinese Silk Road equity fund. MOL was scheduled to put the new carrier into service by the end of September.

The "Vladimir Vize" will be able to deliver cargoes from the Yamal LNG port at Sabetta via the Northern Sea Route to Asia without ice-breaker support. "Construction of the last of the three newbuilding ice-breaking LNG vessels ordered by MOL has been progressing as planned in DSME, and the vessel is expected to be delivered to the Yamal LNG Project in the next year," said the Japanese company. "Furthermore, regarding the four conventional LNG carriers destined for the Yamal LNG project announced in June 2017, construction to a high safety standard is proceeding with our project partner, China COSCO Shipping, using both internal and external supervisors," added MOL. The four vessels are expected to be completed in 2019-2020. "The second Train at the Yamal LNG plant started its operation in August 2018 and LNG production from the plant has been expanding steadily," said MOL.

QATARGAS, the world's largest liquefied natural gas producer and with plans to take output to 110 million tonnes per annum, said it signed a 22-year agreement with PetroChina to supply Chinese import terminals with around 3.4 million tonnes of liquefied natural gas. The supplies would come from the Qatargas II project, one of the biggest Trains at the Ras Laffan production complex in Qatar. Qatargas II is owned by Qatar Petroleum, Exxon Mobil Corp. and French major Total. The Train was completed in 2009 and produces 7.8 MTPA of LNG. Qatar is already a supplier to China and the Chinese could also be in the market for further supplies from three planned new Trains. The Qataris currently produce 77 MTPA and an expansion project to be completed by 2024 includes the addition of three liquefaction Trains with 7.8 MTPA each of output with associated pre-investment to add a fourth LNG Train in the future. The onshore facilities will receive about 4.6 billion standard cubic feet per day of feed gas from the southern sector of Qatar's North Field, which is the largest single non-associated gas field in the world. Qatar has the southern portion of the North Field in the Arab Gulf and the other part is under the jurisdiction of Gulf neighbour Iran. "I would like to thank the Government of the People's Republic of China and PetroChina for this important Sales and Purchase Agreement," said Saad Sherida Al-Kaabi, President and Chief Executive of Qatar Petroleum, owner of Qatargas. "This agreement underscores Qatar's trusted capability in ensuring energy security to countries around the world, particularly in Asia, as well as its unique position as the world's largest LNG producer, supplying safely and reliably across the globe," added Al-Kaabi.

The new Qatari shipments for China from its existing capacity will be imported through the network of regasification terminals being established by PetroChina, including Dalian, Jiangsu, Tangshan and Shenzhen. Chinese LNG imports surged by 33 percent in July and were also up in the January-July period by 47 percent as the Asian nation maintained its growing levels of natural gas demand as part of an anti-pollution campaign to replace coal with gas. Imports to China during July amounted to 4.15 million tonnes compared with the 3.12MT received in the same month a year ago. In the seven months from January to July, China imported 27.9MT of LNG versus 19.2MT in January-July 2017. That's as China took its LNG terminal network to 19 as two more facilities were formally brought into service in August at Zhoushan in the eastern Zhejiang province and at Dapeng New District in the southern province of Guangdong. China also receives comparable quantities of pipeline gas from the countries of the former Soviet Central Asian republics of Turkmenistan, Kazakhstan and Uzbekistan, as well as on the Myanmar-China gas pipeline. The Chinese are scheduled in 2019 to further boost their pipeline gas supplies by starting imports from Russia under the Power of Siberia project.

REPSOL, the Spanish energy company, has agreed to buy 1 million tonnes per annum of LNG under a 20-year agreement signed with the Calcasieu Pass export project in Louisiana being built by Venture Global, becoming the Washington DC-based developer's fifth European customer. Venture Global said that Repsol would purchase the cargoes on a free on board (FOB) basis after the start of commercial operations at the facility in Cameron Parish. The start-up of the planned 10 MTPA Calcasieu Pass plant, located at the intersection of the Calcasieu Ship Channel and the Gulf of Mexico, is expected in 2022. The Venture Global plant is proposed for a 1,000-acre site along with associated facilities, including the TransCameron Pipeline. The Calcasieu LNG project has already signed several 20-year sales and purchase agreements, including with BP of the UK and Galp Energia, the Portuguese oil and gas company. The project is already in the Federal Energy Regulatory Commission permit process and the pipeline will be 23.4 miles long and be linked-up to other intra-state and inter-state natural gas connections. Other facilities will include two full-containment LNG above-ground storage tanks, each with capacity of around 200,000 cubic metres.

A 720 megawatts electric generating plant would provide power and the largest LNG carriers would be received at the planned marine terminal consisting of a turning basin and ship berths. Venture Global, owned by former investment banker Michael Sabel and lawyer Robert Pender who act as joint chief executives, is also constructing a second plant at Plaquemines near river mile-marker 55 on the west side of the Mississippi River, 30 miles south of New Orleans. The Mississippi River project will produce 20 MTPA of LNG and will also include small-scale liquefaction Trains, four LNG storage tanks and three marine loading berths. Three other European companies Royal Dutch Shell, Edison SpA of Italy and Polish Oil & Gas Company (PGNiG) are among the buyers of volumes from Venture Global's projects. "Our contract execution with Repsol, an industry leader across the LNG value chain, represents another significant milestone as we accelerate the development of our Calcasieu Pass project," said joint CEOs Sabel and Pender. "We are delighted that Repsol, supporting the innovative, low-cost approach Venture Global is deploying at both Calcasieu Pass LNG and Plaquemines LNG, will be joining our existing, high-quality partners: Shell, Edison, Galp, BP and PGNiG of Poland," they added.

SANTOS Chief Executive Kevin Gallagher said the Australian energy and LNG production company was committed to boosting Cooper Basin production and working with domestic industry to deliver competitively priced natural gas as it signed another wholesale agreement. Santos will supply wholesale gas to Australian packing company Visy for its operations in the state of New South Wales. The agreement starts in January 2019 and was awarded following a competitive process. Santos has its oil and gas interests in Australia and is also a stakeholder in three Asia-Pacific LNG production plants. It operates the Gladstone LNG plant in Queensland and also has stakes in Darwin LNG, operated by ConocoPhillips, and in the ExxonMobil-led Papua New Guinea LNG plant and expansion project. LNG output in Australia at liquefaction facilities in the states of Western Australia and Queensland had led to concern among

domestic gas users that LNG was keeping prices high and affecting security of supplies. Companies such as Santos have since countered this suggestion by signing up Australian companies and domestic networks to agreements guaranteeing future supplies at economic prices.

Santos has also boosted operations in the Cooper Basin, the exploration and production area closest to the South Australian, New South Wales and Victoria markets. "We're drilling about 87 wells in the Cooper Basin this year, more wells in a single year since 2014," said Gallagher. "We've arrested production decline in the Cooper and production is actually growing again, which is great news for the east coast gas market," added the Santos CEO. "We're also drilling a record 300 GLNG wells in Queensland," he added. "Since 2015, we've reduced our completed well costs by 50 percent in the Cooper Basin and connected well costs by a phenomenal 84 percent in Queensland, locking in our position as Australia's lowest cost onshore gas developer," stated Gallagher. Chief Operations Officer Mark De Wit of Melbourne-based Visy said the agreement with Santos provided certainty of gas supply in 2019 for its energy-intensive operations in NSW. "We appreciate the strong and continuing relationship between Santos and Visy," added De Wit.

SEMBCORP Marine of Singapore has completed the acquisition of the intellectual property rights of Oslo-listed Sevan Marine for US$39 million, including the Sevan subsidiary HiLoad LNG and in an additional purchase has bought the outstanding 5 percent of HiLoad held by a minority shareholder. Sembcorp Marine said its subsidiary Sembcorp Marine Integrated Yard now holds the titles to all of Sevan Marine's intellectual property. The main transaction includes a 95 percent equity interest in HiLoad LNG. Sevan Marine has designed and been developing offshore solutions based on its unique cylindrical hull design and the HiLoad LNG offloading and regasification technologies. Sembcorp's transaction involves the takeover of all operating and associated costs, including unexpired leases, in maintaining Sevan Marine's three office locations and the transfer of 26 Sevan employees, subject to their acceptance, at a consideration of US$39M.

The Singapore company has additionally acquired the balance of 5 percent equity interest in HiLoad LNG from a minority shareholder for a cash sum of 625,000 Norwegian crowns (US$74,570). Sembcorp had previously raised its purchase price for the acquisition of the intellectual property rights to US$39M from US$28M. The price increase had been decided after further negotiations with several of Sevan Marine shareholders. Sevan Marine is a specialized engineering and design house and its cylindrical hull is a proven alternative to traditional offshore, floating designs. Sembcorp has said that through the acquisition it would be better placed to design and engineer solutions for the global offshore and marine sectors.

SOJITZ Corp., the Japanese conglomerate, plans to expand international LNG activities with Spanish company Reganosa, owner of the Mugardos import terminal in northwest Spain. The Spanish company's name, Regasificadora del Noroeste (Reganosa), stands for northwest regasification. Sojitz is already a shareholder in the Mugardos terminal company. Sojitz energy and infrastructure executive Masakazu Hashimoto and Emilio Bruquetas, Chief Executive of Reganosa have signed a memorandum of understanding (MoU) on their proposals. Reganosa Holding has a 75 percent stake in the terminal assets while Sojitz owns 15 percent and Algerian energy company Sonatrach has a 10 percent share. In addition to owning the Mugardos terminal, Reganosa is certified as a Transmission System Operator at European level, operates a natural gas pipeline network and also manages the first regasification facility opened last year in the Mediterranean nation of Malta.

"The agreement will promote the search for areas of collaboration and the development of opportunities that are identified, both in the fields of gas infrastructure and renewable fuels as well as gas-to-power projects and smart grids," said a statement. "The geographical area that the joint effort will cover will be across Asia, Europe, the Middle East, and Latin-America," it added. "Both parties have great hopes for the alliance, as it combines the strength of a powerful global corporation with the knowledge and readiness to design made-to-measure solutions in the gas sector," explained the two companies. "Furthermore, it strengthens the relationship of Sojitz with Reganosa, of which it is a significant shareholder," they said. Sojitz has widespread business interests and its Energy & Civic Infrastructure Division owns energy projects and assets in the fields of power generation, as well as LNG liquefaction and receiving terminals.

SOUTH KOREAN power operators have seen the cost of coal-fired power increase to narrow its differential with liquefied natural gas and because of its environmental burden, thermal coal can no longer be regarded as a cheap option in Asia. The cost of coal-fired power hit a new record in the first half of 2018 as Asian supplies dropped and prices rose, raising concern in Korea where it is still the biggest source of power generation. During the first half of 2018 a total of 41 percent of the North Asian country's generated power came from coal, 28.8 percent from LNG and 21.5 percent from nuclear reactors. South Korea, the world's third-largest importer after Japan and China, received 2.75 million tonnes of LNG imports in July, a rise of 1.5 percent when compared to 2.70MT received in July 2017. The country paid $1.42 billion for LNG in July 2018 versus $1.1Bln in July last year. Qatar is Korea's largest supplier followed by Australia. However, Korean energy companies and the data show that the overall cost of gas-fired power compared with LNG has been narrowing as thermal coal prices have surged. The Korean report said the average coal-fired power generation cost was now around 52.64 won (US$0.047) per kilowatt-hour (kWh).

This is 10.5 percent higher than last year's 47.62 won and breaks the 48.74-won record set in 2012. "Compared with 2016, the latest figure is more than a 50 percent increase from 34.71 won that year," said the EPSIS report. Korean industry officials attributed the rising cost to the supply drop by major producers of thermal coal such as Australia. "The price of coal rose an average 21.2 percent annually over the most recent three-year period," said the report. "Coal was previously priced at $57.5 per ton in 2015 and it now costs $101.4 per ton," it added. The data showed that the cost difference between coal-fired power and LNG has been steadily narrowing. "In 2014, the cost of the former (coal) was $37.02 compared with $145.54 for LNG. This year, comparative figures were $52.64 (coal) and $93.70 (LNG)," explained the report. "If you consider taxes and the environmental burden, coal is no longer a cheap source of energy," stated the report.

TEEKAY LNG Partners, the New York-listed affiliate of the shipping company with 48 liquefied natural gas carriers in its fleet, has made board changes as it continues to develop its LNG strategy. Kenneth Hvid, Teekay Corp. President and Chief Executive has been reappointed as a member of the board, replacing Vince Lok, Teekay's Executive Vice President and Chief Financial Officer. The company has a global fleet of 207 ships and its LNG carriers are operated with ownership portions ranging from 30 percent to 100 percent. Teekay is divided into four main corporate entities, the parent company Teekay Corp., Teekay Tankers, Teekay Offshore Partners and Teekay LNG Partners. Bill Utt, the former President and Chief Executive of US energy and LNG engineering company KBR, was been appointed as a new member of the Teekay LNG Partners board. Utt currently serves as the director and Chairman of Teekay and Teekay Offshore, the general partner of Teekay Offshore Partners. "On behalf of our board and leadership team, I would like to thank Vince for his significant contributions and dedication to Teekay LNG," commented Jane Hinkley, the Teekay General Partnerships's Chairperson.

"I would like to welcome back Kenneth to the Board and I am also pleased to welcome Bill to our board, who has extensive experience in the energy industry and across the Teekay Group, and we look forward to working with both of them as we continue executing on Teekay LNG's strategic plan," said Hinkley. Utt has been a Teekay board member since December 2015 and was appointed Chairman of Teekay and a director and Chairman of Teekay Offshore partners in June 2017. Utt has over 30 years of engineering and energy industry experience. He retired from Houston-based KBR in 2014. Teekay Tankers also just announced the closing of its sale-leaseback transaction for six Aframax tankers. "As a result, the company has increased its liquidity position by approximately $60 million after the repayment of outstanding debt related to these vessels," said Teekay Tankers.

Diary of events

2018
November
Nineteenth CWC World LNG Summit
27-30 November, 2018
Lisbon, Portugal
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2019
February
3rd Annual LNG USA Summit
26-27 February, 2019
Houston, Texas
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TELLURIAN INC, the developer of the Driftwood LNG export plant in Louisiana and its three affiliated pipelines, received a draft environmental impact statement from US regulators to stay on track for a start-up in 2023. The US Federal Energy Regulatory Commission prepared the draft EIS following an extensive evaluation process, including months of assessment and feedback from federal and state agencies and the public. Tellurian and its founder and Chairman Charif Souki, the former Chief Executive of Cheniere Energy, have proposed developing six liquefaction Trains and associated facilities to produce 27 million tonnes per annum of LNG. "We appreciate the hard work the FERC, the US Coast Guard and supporting agencies have put forth to ensure the Driftwood Project can produce LNG safely and efficiently beginning in 2023," said Tellurian President and Chief Executive Meg Gentle. "The draft EIS is a significant milestone in the regulatory process for the project and was completed ahead of the FERC's recently updated schedule," she added. "We continue to work in partnership with all the regulatory agencies to complete the final environmental impact statement by January 2019 and begin construction of the Driftwood project thereafter, with approximately $30 billion of infrastructure investment and nearly 50,000 direct and indirect jobs," stated Gentle.

Tellurian is based in Houston, Texas, and its common stock is listed on the Nasdaq global exchange. The company also plans to develop its own pipeline network, including the previously announced Driftwood Pipeline and two additional pipelines to expand supply alternatives for liquefaction and domestic distribution in Louisiana. The three pipelines are anticipated to be in-service between mid-2021 and the end of 2022, subject to commercial agreements. Tellurian agreed in 2017 to purchase natural gas producing assets and undeveloped acreage in in the Haynesville Shale of northern Louisiana from Rockcliff Energy. This includes around 4 million cubic feet per day of natural gas production, about 1.3 trillion cubic feet of gas resource and about 138 drilling locations.

TEXAS LNG, one of several LNG export projects being developed on the Gulf Coast near the port of Brownsville, said it was one of the ventures provided with anticipated dates for issuance of an environmental impact statement and a final regulatory deadline under the new speeded-up process. The Texan venture has proposed to the Federal Energy Regulatory Commission an export plant with two liquefaction Trains and output of around 4 million tonnes per annum. The environmental impact report dates and the FERC deadline are the final major steps in the process before issuance of an order to proceed. "Based on the date and timelines of other approved LNG export projects, Texas LNG expects to receive its final FERC order authorizing construction and operation of its facility in the second half of 2019," said the Texas project. As per FERC's expected timeline, Texas LNG said it would receive its Draft Environmental Impact Statement (DEIS) in October 2018, and final environmental impact statement by March 15, 2019. Other agencies issuing federal authorizations have 90 days to complete all necessary reviews and to reach a final decision on the request for a federal authorization. The Federal Authorization Decision Deadline for Texas LNG is June 13, 2019.

Vivek Chandra, founder and Chief Executive of Texas LNG, said he was very pleased to receive this important notice and thanked the FERC and all the nine other supporting agencies. They were the US Department of Energy, US Coast Guard, US Department of Transportation, US Army Corps of Engineers, US Environmental Protection Agency, the US Fish and Wildlife Service, the National Park Service, the National Marine Fisheries Service and Federal Aviation Administration, that have been involved in the process. "We are confident the Texas LNG project will provide benefits for all our stakeholders, especially the Brownsville community, and look forward to progressing toward the final investment decision for the first 2 MTPA Train in 2019, and construction beginning soon thereafter," stated Chandra. Langtry Meyer, the other project founder and who is chief Operating Officer, said the FERC final schedule provided clarity to Texas LNG stakeholders and buyers. "We are particularly proud that we have reached this milestone by diligently deploying our resources cost effectively thereby providing superior value to our investors," added Meyer.

TRELLEBORG of Sweden has announced a partnership with leading Australian engineering consultancy Synertec to meet growing demand for more accurate and efficient LNG custody transfer measurements. The Swedish company said its marine solutions subsidiary that supplies port docking and mooring equipment and systems for oil and LNG transfers would now distribute Synertec's LNG custody transfer product. "LNG custody transfer, the transfer of the ownership of LNG from one organization to another, has long involved fiscal risk given significant uncertainties in traditional tank measurement," explained Trelleborg. "Quantities are invoiced in units of transferred LNG based on a calculation of volume, density, and gross caloric value," it added. "However, measurement inaccuracies have a significant financial impact for both exporters and importers. For instance, just a one percent error in LNG transferred can result in a significant loss of revenue due to misallocation during transfer," stated Trelleborg. Synertec's automated custody transfer system is recognized by the International Standardization Organization and the Paris-based Group of International LNG Importers.

"Used to great success across many high-profile LNG projects across Australasia, the transfer system is a skid-mounted module suitable for all LNG applications," said Trelleborg.

Richard Hepworth, President of Trelleborg's marine systems, said that with more LNG capacity coming on stream there is increasing demand for custody transfer accuracy for cargo shipments, floating storage and regasification unit applications and for LNG as a maritime fuel. "All of these applications have one key requirement in common, the safe, efficient and timely transfer of LNG from one tank system to another," added Hepworth.

"There are clear synergies between the two companies, from our combined technical expertise to our shared commitment to optimizing the interface, which is critical to supporting the business model of every transfer operation," stated Hepworth. Michael Carroll, Managing Director of Synertec, said: "We've built a strong reputation across Australasia and now, boosted by the global reach of Trelleborg, we look forward to meeting the global demand for more accurate and efficient LNG custody transfer."

TRINIDAD and Tobago, the Caribbean nation that once sent most of the LNG cargoes imported into the US before the shale gas boom and still supplies one terminal, is widening its customer base while increasing sources of feed-gas for the Atlantic LNG liquefaction and export plant at Point Fortin on Trinidad. The government of Trinidad and Tobago has just signed an agreement with Venezuela to purchase 0.15 billion cubic feet per day (Bcf/d) of natural gas from Venezuela's offshore Dragon field, providing much needed additional feedstock for the Atlantic LNG plant. "LNG production from ALNG, has decreased in recent years as a result of upstream natural gas feedstock shortages," noted a report from the US Energy Information Administration. "The maturing offshore fields that supply the project are in decline, which has led to reduced LNG output from the ALNG facility," added the report. ALNG project stakeholders have also identified several new domestic fields to shore up LNG production. In 2017, BP of the UK started production from the Juniper field, which will supply 0.59 Bcf/d in feed gas and also sanctioned the development of the Angelin field for 0.6 Bcf/d and where production is expected to start in 2019.

"BP has also commissioned the Trinidad onshore compression project (0.2 Bcf/d) to increase feedstock supply to the facility," said the EIA report. "Additional offshore fields that could provide natural gas feedstock for the project were also discovered, including BHP Billiton's LeClerc field containing 4 trillion cubic feet (Tcf) to 5 Tcf of reserves and BP's blocks near Juniper and Cashima fields containing 2 Tcf of reserves," added the report. ALNG has four liquefaction Trains and last year exported 10.19 million tonnes of LNG, down from 10.46MT the previous year, from combined plant capacity of 2 Bcf/d. ALNG began LNG production in 1999 and was the first LNG facility built in the Atlantic Basin. Project stakeholders considered further expansion of the facility in 2005-2007 by adding one new Train, though they were unable to identify a sufficiently large natural gas resource base to support the plan. "Since 2014, the facility has experienced the declining use of its capacity, which in 2016 reached an all-time low of 1.46 Bcf/d, implying facility utilization of only 73 percent compared to 103 percent in 2010," said the US report. "Most of ALNG's exports are shipped to South America, Europe, and the United States. Declining demand in Argentina, Brazil, and Europe post-2014 coincided with an overall decline in ALNG output in this period," it added. Trinidad is still the largest supplier to the declining US LNG import market. ALNG exports to the US are shipped primarily to Everett import terminal near Boston, Massachusetts, and serve as an important supply source to meet seasonal winter peak demand in New England. In 2017, US LNG imports from Trinidad accounted for 96 percent of total US LNG imports, of which 91 percent (0.18 Bcf/d) went to the Everett terminal. ■

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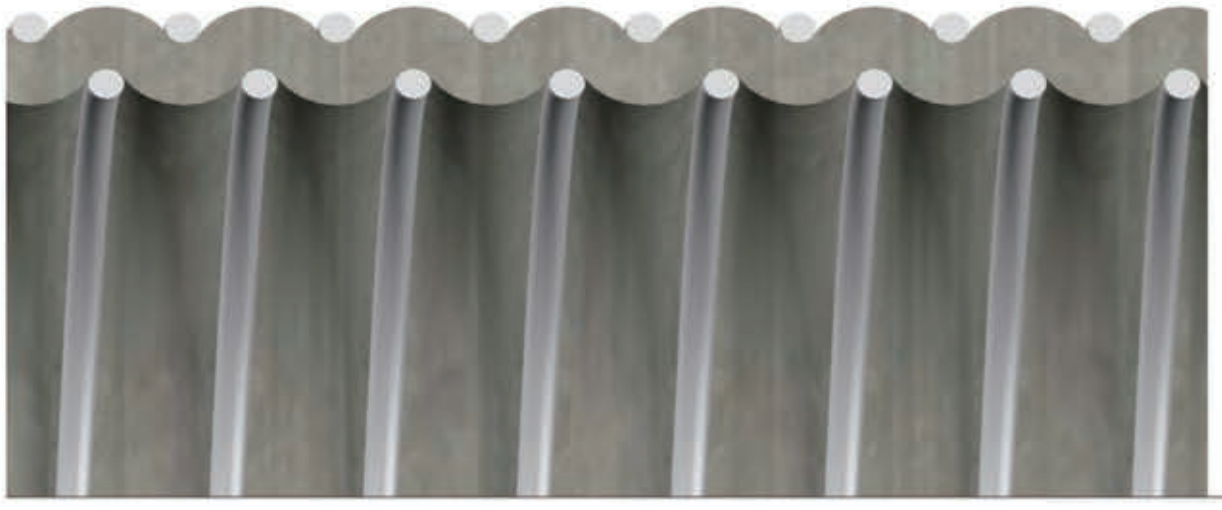

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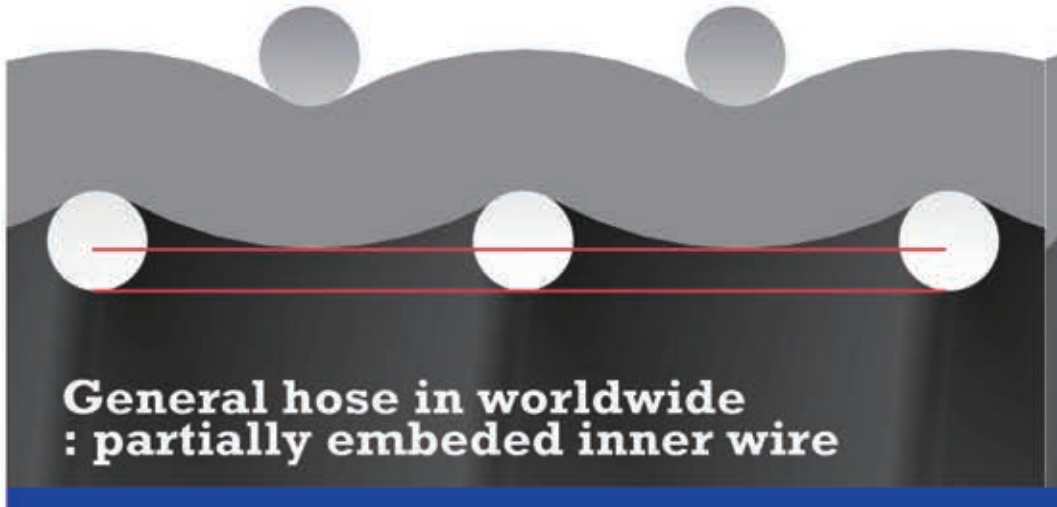

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Development and financing trends for future global production using floating LNG facilities

Alistair Black and Charles Wood of Dentons report on the unforeseen pace of FLNG vessels now becoming commoditised

The technology that has enabled this development is the retro fitting by major vessel operators of existing LNG carriers with topsides using established liquefaction processes such as from US companies Air Products or Black and Veatch.

This "commoditised" market is now gathering momentum, with one project operational and a number of others proceeding to final investment decisions.

Innovations

Whilst many innovations within the sector inevitably become commoditised due to the competitive advantage they confer, the pace of development within a single technology cycle is rapid.

When FPSOs debuted in the early 1980s, their complexity (for the time) meant they were the preserve of oil majors for nearly a decade, until greater understanding of the technology resulted in a reduction of initial capex requirements.

At this point, these assets became available to many National Oil Companies (NOCs) and large or mid-cap independents, who could afford to charter them from independent operators.

By contrast, the rapid innovation of these same vessel operators within the FLNG space (including the likes of Exmar and Golar) has meant that the first generation of highly bespoke FLNGs built by Royal Dutch Shell, Petronas of Malaysia and Italy's Eni at significant expense (at a capital expenditure of as much as US$4,000 per metric ton per annum) and largely on balance sheet have almost been beaten to market by the second generation of commoditised FLNG, with CAPEX in the region of US$500-US$700 per MTPA.

Whilst these newer vessels are typically not as "bespoke" with regard to their configuration for the particular characteristics of a given field, they have greater flexibility in deployment and greatly reduced lead times (a vessel can be delivered within 18-24 months, with certain operators now considering whether to build vessels on a speculative basis) allied to the aforementioned significant cost savings (as compared with bespoke vessels). And "nearshore" deployment (with feed-gas supplied from facilities located onshore) can significantly reduce the need for more bespoke on-board processing and storage.

All of this implies that commoditised FLNG is now within reach of independents, as evidenced by the recent development and deployment of Golar's "Hilli Episeyo" FLNG vessel on behalf of Perenco and SNH (the Cameroonian NOC).

Whilst these developments give cause for optimism, significant challenges remain.

The current LNG supply glut is clearing due to Chinese market demand, the processing, operation and maintenance costs are not yet cost effective with dedicated onshore trains and effective annual capacity likely to remain lower than the nameplate capacity.

For the short term, at least, FLNG for large field developments is likely to remain the preserve of sponsors with the ability to attract and deploy significant amounts of risk capital.

As well as its suitability for smaller, remote, offshore gas fields, commoditised FLNG can offer advantages over onshore projects in terms of land usage and environmental factors.

There is a variety of possibilities for near-shore projects: feed-gas may be sourced from a pooled supply in an onshore network, or from dedicated production onshore, or dedicated offshore production landed for initial processing.

Development and funding models

We outline the alternative financing and development options that now exist for commoditised FLNG projects, which are particularly interesting to majors, NOCs and independents given their ability to unlock "stranded" or marginal reserves, or even as a stopgap solution for larger fields until onshore liquefaction trains can be put in place.

The legal models for commoditised FLNG can be broadly categorised into "integrated" versus "midstream" models (though it is important to note that there are many variations of each based upon the requirements of the particular development, the applicable E&P regime and the sponsor's own objectives).

Golar's 'Hilli Episeyo' FLNG hull deployed off African state of Cameroon

Broadly, integrated models involve a single entity or group owning upstream and midstream assets, with a single finance package that covers both. The strength of this model is its simplicity.

One ultimate entity/group holds all assets, and lenders benefit from a common pool of upstream and midstream security, avoiding complex inter-creditor issues. Where (as is often the case) the upstream participants are an unincorporated joint venture (under a JOA), they may for convenience establish a separate SPV, owned by them, to hold the FLNG.

This entity may also act as the immediate borrower (and potentially the LNG seller, although that will depend on factors such as preferences for equity LNG entitlements and joint selling concerns).

The structure remains economically integrated and the principle of the common pool of security remains. The SPV may on-lend to its upstream shareholders (where the financing extends to upstream capex). An integrated approach will engage issues around the boundary of the E&P regime (such as PSC, concession, licence or services contract).

In the simplest integrated arrangement, midstream activities such as liquefaction will fall within the E&P regime; the FLNG costs (CAPEX and operational expenditure) will be part of upstream cost recovery; the FLNG as an asset will be subject to the same treatment (for example on expiry of E&P rights, or as to decommissioning) as other upstream investments.

Point of sale

The "delivery point" under the E&P regime will be the point of LNG sale (or potentially LNG loading); the delivery of feed-gas from well to the FLNG is not a sale (or other transaction) under the E&P regime.

An integrated approach may simplify the exercise of operational control of upstream assets (wells and SSPS) from the FLNG.

Alternatively, the FLNG may fall outside the boundary of the E&P regime, in which case it will require separate regulation, and its costs (on an OPEX basis) will be part of the LNG price netback to the "delivery point" under the E&P regime.

The E&P regime may then require a separate FLNG entity but as noted above this can still be economically integrated.

From an economic perspective, the question of whether it is preferable (for investors and government respectively) to have the FLNG costs subject to direct cost recovery or deducted in a netback calculation will be complex, depending on the treatment of financing costs and the definition of any "R-factor" in the upstream fiscal/financial regime.

One variation of this particular model is to separate the financing of the upstream from the midstream.

This approach has been adopted in Mozambique for Coral South. The FLNG is owned and financed by an SPV and, whilst there is commonality of ownership, lenders to the SPV do not have direct recourse to upstream security (i.e. rights under the upstream concession contract), but do enjoy rights over the vessel, the throughput agreement/toll and (most importantly) the downstream LNG sales proceeds accounts.

Operational integration

This "operationally integrated" model does require common ownership, as the upstream interest holders will need to make available LNG sales proceeds as security, and provide some form of comfort to lenders that production from the field will be dedicated exclusively to the FLNG, but its major advantage is that it facilitates separate financing of subsequent and much larger phases of the upstream.

Notwithstanding their simplicity, integrated models are still reliant on the credit quality of the LNG buyers.

One of the benefits of commoditised FLNG is that the lower capex requirements mean that a financing can be supported off the back of a single offtake agreement, particularly where the buyer is considered highly creditworthy (such as a major or trading house) and the SPA is sufficiently "robust" (preferably take-or-pay).

This has been the approach adopted on Perenco's Cameroon transaction, where Gazprom takes the full capacity of the "Hilli Episeyo".

Credit analysis

No commoditised project at this moment has proposed securing non-recourse finance using a portfolio sales basis - that is not to say that it cannot be achieved, but it would require sophisticated credit analysis and mitigation techniques to prevent default off the back of any single LNG SPA, in addition to lenders' pre-existing concerns with regard to technology and operational track record.

Whilst integrated models lend themselves to more traditional project finance techniques, only Eni's Coral South FLNG project has so far managed to successfully secure debt – approximately US$4.7 billion - from a consortium of 15 international banks and five ECAs.

It is worth noting that, notwithstanding Eni and its partners CNPC, ExxonMobil and BP (as the offtaker) each having excellent credit ratings, the leverage achieved was 60 percent (US$4.7 billion out of a total cost of c. US$8 billion).

Financing was particularly reliant on a group of key "pathfinder" ECAs and institutions, leveraged through Korean technology and construction and Chinese involvement through CNPC's direct investment in the project.

This form of state-supported lending (in the form of ECA or other state institutions) is particularly important to extractive industries at this moment.

Given the technology risk and limited track record for FLNG, commercial lenders find it difficult to finance these projects on a true non-recourse basis (that is, without some form of financial support from the sponsors or owners, as was the case in Mozambique).

Chinese and Korean finance can be classed as "state-supported" insofar as involvement is contingent on inputs (either technology selection or construction input) or outputs in the form of long-term export of offtake, either of which is required before significant sums can be lent.

Service models

The simplest "midstream" (or "services") model would involve separate ownership and financing of the FLNG unit, which is either tolled or (where owned by a service provider) chartered on a long-term basis.

This latter model most closely resembles the traditional asset finance model used for FPSO and LNGC charter, although (as we shall discuss later) it may be some time before this model, in its simplest form, can be applied to FLNG given lender concerns over cost and complexity.

The most obvious case (illustrated in the first diagram below) would be for deployment by the gas producers, for example for small, remote or "stranded" assets.

However, a near-shore FLNG project in the US could in principle be structured similarly to many onshore US LNG export projects, with buyers sourcing feed-gas in the US natural gas market, and contracting with the FLNG owner for liquefaction and loading services.

The gas producer (or buyer, in the alternative structure) would charter the FLNG from an independent owner/operator on a long-term basis (sufficient at least to facilitate finance), and make LNG sales on either a free-on-board (FOB) or delivered ex-ship (DES) basis (based upon its portfolio and LNGC charter availability).

Redeployment

The beauty of this approach is that, subject to the characteristics of any given field/source of feed-gas, a vessel could be redeployed at relatively short notice without interaction with the vessel lenders, who would provide typical "letters of quiet enjoyment" that would permit redeployment so long as timely charter payments continue to be made.

The parallels of these "service models" with precedent FPSO and LNGC hire transactions lend themselves to asset finance (though not exclusively) but, again, cost and complexity is the limiting factor at this moment in time.

The only example of a truly "independent" (i.e. agnostic to its intended deployment) asset financing to date is Golar LNG's converted "Hilli Episeyo" FLNG unit, which was sanctioned in 2015, started operations with Perenco in Cameroon this year, and exported its first cargo to China.

The "Hilli Episeyo" was converted from an aging tanker for approximately US$1.2 billion. Chinese involvement was of paramount importance - Golar managed to secure 80 percent of anticipated construction CAPEX for hull conversion from China State Shipbuilding Corp., which will ultimately transition into a sale and leaseback structure.

The last eight years have seen a number of new Chinese lessors enter the market, in part to replace the shortfall in market capacity attributable to the exit of more traditional lenders (and subsequently hedge funds) and in part to support domestic newbuild efforts (though not exclusively).

Chinese financiers are particularly keen on the sale and leaseback structure due to their concerns over payment default, and consequently have largely focused on creditworthy lessees. Under these types of arrangements, the banks can more easily take control of the asset should the lessee default on its payment obligations.

Criteria

For lessees that meet the necessary credit criteria (or that can provide prerequisite credit support), Chinese institutions can offer relatively high levels of leverage (Golar secured 80 per cent), which more conventional owners have used to either refinance vessels or release equity for new projects.

A major question is whether a greater number of these institutions are willing to accept technology risk on FLNG and, if so, whether this support is tied to conversion in domestic shipyards.

Whilst this has not been a pre-requisite for other vessel types (as these lessors are pure financial institutions and consider themselves distinct from export credit agencies), it is likely that Chinese shipyards will push to attempt to capture a share of this growing and particularly lucrative market.

In the case of the Golar "Hilli Episeyo", significant leverage was proffered by China State Shipbuilding Corporation through a construction financing mechanism transitioning into a more conventional sale and leaseback structure. At approximately US$500/MTPA, the "Hilli Episeyo" compares very favourably against the "PFLNG Satu" (>US$1,600/MTPA) and "Prelude" FLNG (>US$4,000/MTPA).

Whilst the vessel's successful commissioning partly removes uncertainty about technology risk, it remains to be seen whether Golar can

The 'PFLNG Satu' hull owned by Malaysia's Petronas was a world first. It produces LNG from the Kanowit natural gas field offshore Sarawak

demonstrate a long-term and reliable operational track record, although Golar is in talks to develop similar projects in Senegal-Mauritania with BP.

Problems and challenges

At the time of writing (mid-2018), technology risk is the key issue that must be addressed for commoditised FLNG to really take off.

At this point within the technology cycle, lenders are (for the most part) not prepared to accept construction/technology risk on FLNG vessels, even those benefiting from robust yard contracts.

This means that, for the time being, the majority of projects will require some form of completion support, from either sponsors (if on a project finance basis) or asset owners/operators (if on an asset finance basis).

Whilst the CAPEX requirements of commoditised FLNG are much lower than those of bespoke vessels, the cost savings themselves are insufficient to attract non-recourse finance (irrespective of the potential economic return) until these projects have developed a track record in terms of both delivery and reliable operation.

The industry is well aware of these issues and is pushing hard to address these challenges - at this moment, the "Hilli Episeyo" FLNG has delivered multiple cargoes, and the vessel itself was reportedly delivered under budget (both impressive achievements for early-stage technology).

In the current market, high-quality LNG buyers will be no less demanding than lenders in terms of acceptance of technology risk.

Offtake arrangements may present other challenges. In the case of the Coral South project, there is a single offtaker (BP), buying on an FOB basis. That provides a very simple arrangement from both a commercial and an operational perspective.

A variety of factors may dictate the need for multiple offtakers (and possibly for DES sales) in other projects - the scale of the project, the purchasing capacity of individual buyers, diversification of buyer credit risk, and the goal of the project to target specific markets.

Having multiple offtakers will add complications. The relatively limited storage capacity of an FLNG may present challenges in scheduling and managing multiple offtaker liftings.

And, until there is greater experience of the start-up performance, and outturn capacity, of FLNG vessels, there will also be a need for some commercial flexibility to be built into the SPAs, which again will be more complex with multiple buyers.

Whilst balance sheet finance is still the preserve of majors and large NOCs, following the downturn, operators and independents have struggled to maintain liquidity. A combination of construction financing and sale and leaseback structures becomes an attractive option in situations where project financing is not ideal (for example, debt capacity and ratio, commercial terms and overall risk appetites of commercial banks).

Project financing will always be available to the largest and most creditworthy sponsors, but may be more difficult for independents to pursue. Irrespective of the type of financing, ECA coverage will remain critical in order to mitigate political risk.

Success breeds confidence

The success of the current FLNG projects should help lenders develop greater confidence in the FLNG sector - as technological risks are sufficiently mitigated, commercial risk shifts into focus, with external financing highly unlikely in situations without strong offtake.

Financing from Chinese-Asian entities will continue to be extremely competitive in situations where the operator-developer's preference is potentially for higher leverage with relatively less restrictive financing terms.

Once FLNG technologies and projects become more mainstream, and lenders develop greater comfort around commercial risks associated with the FLNG projects, FLNG financing could potentially move towards smaller syndicates of project financing. ■

About the Authors

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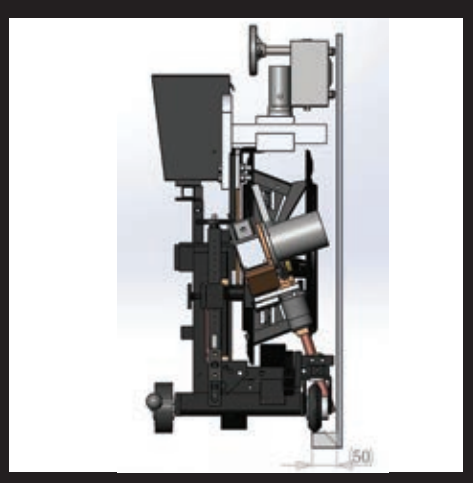

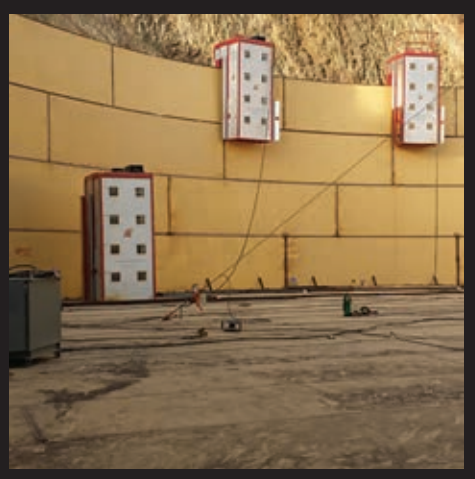

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LNG importer France is on track for a single gas market as Germans plan first regas projects

European Union nations continue large-scale spending on development of natural gas markets

The French Val de Saone pipeline allowing the supply of additional natural gas supplies from the North to the South of France will be fully operational next month and provide the final part in the creation of a single French gas trading market.

French pipeline operator GRTgaz said the Val de Saone project being completed at a cost of around 670 million euros ($780M) would enable the supply of up to 250 gigawatt hours per day of gas on the North-South axis.

Start-up

From November 2018, there will be a single French gas marketplace called the Trading Region France.

Created jointly by the main pipeline operator GRTgaz and southern regional operator TIGF, it will have a single exchange point for gas known as the PEG and which was previously divided into the PEG North and the PEG South.

"The new structures increase the availability of the capacities and therefore allow more flows to transit from the North to the South," explained GRTgaz.

"For end-users, this implementation of the single national trading market will have several benefits," said GRTgaz.

"These include a single price of gas, a more competitive, liquid and dynamic French market better interconnected with Europe and the world and a reinforced security of supply in France," it added.

Pipelines Vs LNG

Most of France's gas supply is imported, 70 percent by pipelines from Russia, Norway via the Netherlands and 30 percent as LNG delivered to four terminals, mostly from Algeria, Nigeria, Qatar and Norway.

The GRTgaz network operates 32,414 kilometres of pipelines and is interconnected with the German, Belgian, and Swiss networks, as well as with the TIGF network which serves the south-west of France where the network has two connections to Spain.

While GRTgaz is the dominant partner, TIGF still transports 12 percent of France's gas supply and has 24 percent of French storage capacity. The main work has been carried out in interconnections in the northern half of Eastern France.

Since March 2017, a 190-kilometres pipeline between the cities of Etrez (Ain) and Voisines (Haute-Marne) and an interconnection station in Etrez have been built.

Interconnections

In addition, an existing compressor station has been reinforced and two interconnection stations, located at Palleau in Saone-et-Loire and at Voisines, have been adjusted.

The Val de Saone operations of GRTgaz and the Gascogne-Midi network (cost 152M euros) of TIGF and GRTgaz were approved by French regulators as the foundations for the creation of a single trading zone.

Furthermore, both GRTgaz and TIGF have developed joint contractual mechanisms along with market participants.

"From now on, the teams of both TSOs will be working on the latest tests, final trials and system settings while regularly keeping the market participants updated," said GRTgaz.

"There will be no impact on access to PEG contracts. There will be automatic access to PEG on November 1 for all shippers with access to PEG Nord or IRS," said GRTgaz.

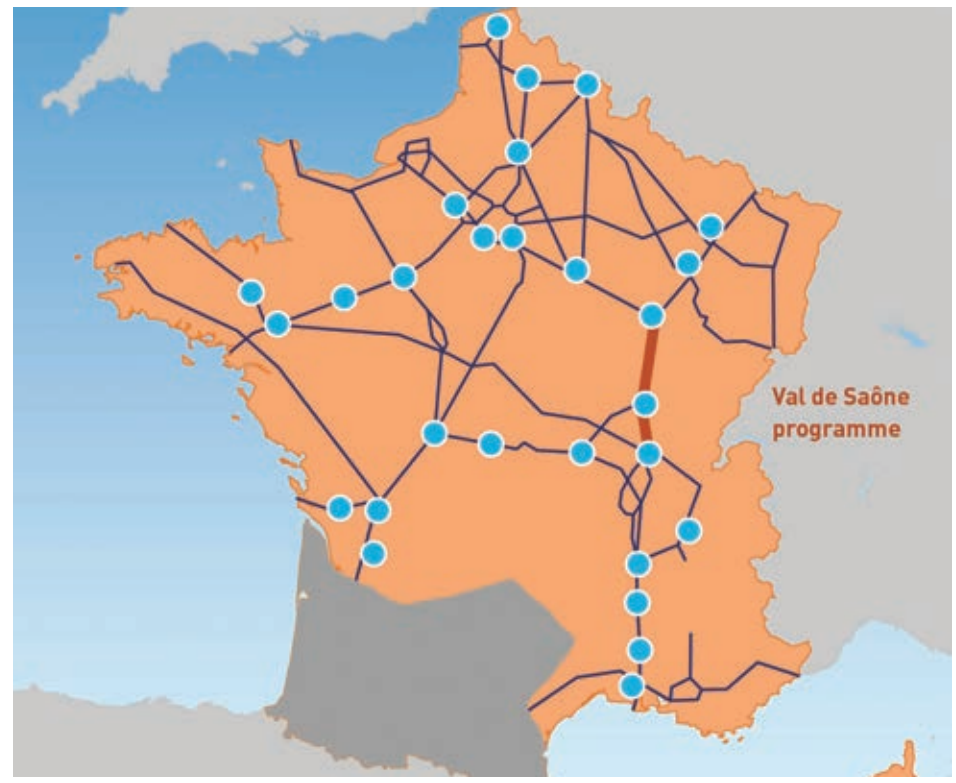
"All exchanges, PEG North and IRS (spot, prompt and futures) with a physical delivery as of the November 1 (6:00 am), are maintained but must be renamed in PEG," it added.

"For the contracts which have a delivery date beginning before the merger and finishing after, the gas quantity will have to be nominated on the PEG Nord or TRS until October 31 and on the PEG as of November 1," explained GRTgaz.

"Five working days before the November launch of Trading Region France there is the possibility of nominations on the PEG for a date after the merger," it said.

German terminals

At the same time, the first German LNG import terminals are under developments



New part of system boosts North-South supply axis in eastern France

RWE, one of Europe's leading energy companies and utilities based in the German city of Essen, said it had secured "a considerable part" of the capacity from Germany's first LNG terminal planned for Brunsbuettel on the Elbe River near the port of Hamburg.

RWE said its contract follows a successful "open season" in which market interest was tested for the facility planning to import around 4 million tonnes per annum of LNG.

Multi-service

Dutch Gate LNG terminal owners, the utility Gasunie and global storage company Vopak, plan to develop the Brunsbuettel facility.

Meanwhile, German energy company Uniper, with LNG volumes booked from the US and Canada, is considering taking part in plans to develop a second German import terminal at the North Sea port of Wilhelmshaven.

For the Brunsbuettel terminal Vopak and Gasunie are teaming up with German company Oiltanking GmbH for the project and have already gained the European Commission's approval under merger regulations to establish a joint venture.

The three companies are planning to construct an onshore multi-service LNG terminal at Brunsbuettel, including imports and additional services such as truck-loading and bunkering.

"LNG will play an important role in the North-West European gas market and therefore we are very pleased to take this step forward towards an LNG terminal in Germany," said Andree Stracke, Chief Commercial Officer of Gas Supply at RWE Supply & Trading.

"We believe that with a German LNG Terminal we can fully develop a significant business around it, delivering LNG and gas to our customers in Germany and throughout Europe," added Stracke.

"LNG remains a key growth area for RWE. This this agreement will enable us to continue growing our portfolio and provide us with additional flexibility to take advantage of new opportunities as they present themselves in the global LNG market," explained Stracke.

If approved, construction could start in 2020, and the terminal could be fully operational by the end of 2022.

Assessments

The feasibility study for Brunsbuettel had consisted of economic, technical, nautical and regulatory assessments as well as the permits procedures.

Germany is the only major European Union nation without LNG import facilities, though it is advancing some

LNG fuel and bunkering services in Baltic ports such as Rostock and on the European river networks for barge traffic.

Building an LNG terminal at Brunsbuettel would put it near a nuclear power plant set for closure in 2022.

Germany's transition to the cleaner fuel era, outside of nuclear plants, has not so far depended on LNG, but on Russian pipeline natural gas.

The volumes of German gas received from Russia amount to more than 53 billion cubic metres per annum.

This is the equivalent of 39 million tonnes of LNG while the Brunsbuettel import terminal would have initial capacity of around 4 million tonnes.

Up until now Europe's largest economy has been forging closer pipeline ties with Gazprom as the Russian natural gas giant also acquires more German gas assets.

Uniper plans

The second terminal project, the Wilhelmshaven LNG venture, is still in the early stages.

"We are in talks with interested parties in building a floating liquefied natural gas import terminal at Wilhelmshaven," said Uniper in a statement.

"We are talking to a wide range of people, including in the US," said Uniper.

Uniper has signed two main North American agreements for LNG supplies, one with the Freeport export plant in Texas and a second with the proposed Goldboro export facility in the Canadian Atlantic Coast province of Nova Scotia.

The German company, based in Duesseldorf said the floating storage and regasification unit would have a throughput capacity of around 10 billion cubic metres a year, or 7.3 million tonnes per annum of LNG and accept the largest carriers.

Uniper said it would not invest in the Wilhelmshaven terminal itself but it would be the buyer and distributor of the regasified LNG.

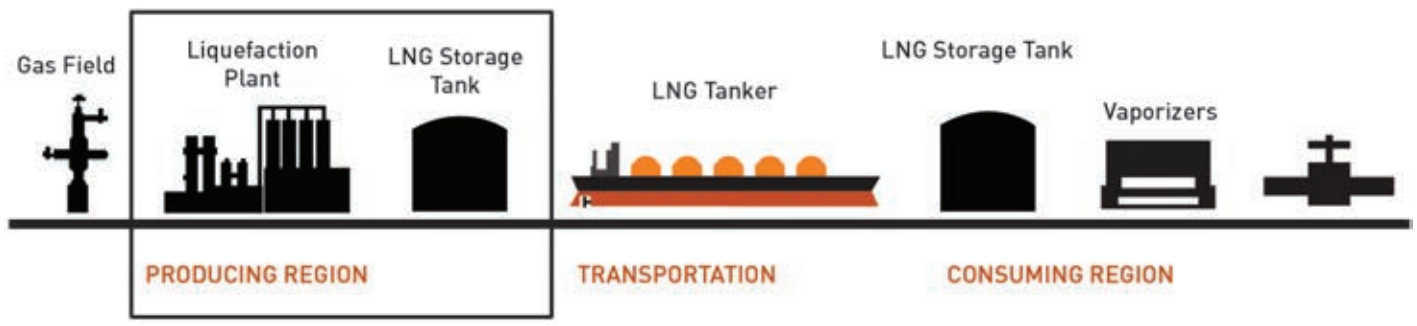
Uniper says it favoured the North Sea port because of its access to the main European pipeline system and storage facilities such as its own plant at Etzel to where natural gas arrives by pipeline from Norway. ■

Main steps to develop an LNG export plant from financing through to construction and shipping

Deepak Bawa, project manager in LNG and energy projects, outlines construction challenges

Opportunities to export liquefied natural gas has become a desirable option for American energy companies and producers due to the price differential between the US and the rest of the world, particularly in Europe and Asia.

While production has brought domestic natural gas prices down, the demand is still strong from many industrialized and emerging nations, offering high profit potential for US LNG exporters.



LNG value chain covers exploration and development through shipping and storage to end-users

Fast pace

We are in a market growing at a very fast pace and its future looks bright. LNG production has quadrupled over the last two decades and is expected to double over the next two.

The challenge now is to sustainably build a new LNG export plant, where costs have to be kept low to be remain competitive.

There are many factors which affect the final price whether it is getting feed-gas at low prices, using new LNG technologies or increasing operational efficiencies.

Profitability: The first question that comes to mind is whether it is profitable to build an LNG export plant. Can the production cost be kept lower than the competition? Can we build in the shortest time with the lowest costs?

Generally, there are two structures for the economic assessments of LNG projects; i.e. integrated and disintegrated.

Calculations

In the integrated structure, the partners participate in gas field development, gas processing and its conversion into LNG (in an integrated form).

However, it is possible for the partners (without developing a gas field) to purchase gas from a company or government that holds the gas resources (i.e. disintegrated project). In this paper due to the current situation, we have considered the disintegrated structure.

In the disintegrated projects, by considering a determined price for each unit of natural gas, only the investment and operation costs and the incomes of LNG installations are calculated. In this paper we are considering the disintegrated option

In order to develop a liquefaction facility for the 21st century, a few key elements are necessary to be "right" to place a new project on the LNG world map:

- Plant location
- Cost of labor
- Feed gas composition
- Product specification

The difficult part of this plan is to define what is "right" in order to achieve the lowest cost and the shortest schedule. "Lowest cost" is the most crucial driving factor in every project. Although Life Cycle Cost is often cited as a criterion in plant design, it seldom becomes more influential than lowest capital cost.

Partners and risks: Assessing commercial risk is what keeps many owners, partnerships, financial institutions and analysts in extensive negotiations to ensure each member can assure a win-win situation to their stakeholders. For example, a low risk project might qualify for a cumulative interest rate as low as 8 percent, while a high risk project would have to offer 15 percent or more to attract the necessary funds.

A project relies on the credit rating of its sponsors to mitigate risk. The sponsors might even have some obligations beyond their equity obligations, such as a completion guarantee or limited price support. To achieve investment grade ratings, the sponsors may put a nominal amount of their assets at risk for a limited time. [1]

Structure

The project structure must be clear to all the partners about how much time & money we are looking to build the project & how much profit in first 10 years we can make after starting the production.

A risk matrix needs to be developed on the basis of the risks which you can foresee at this point. This risk register should be a dynamic document & should be updated regularly & shared with all the partners on a regular basis.

Thomson Financial, which sponsored the pfi - market intelligence publication LNG Finance: Funding the Fuel of the 21st Century, suggests three levels of analysis:

- Project level risk
- Sovereign risk
- Institutional business and legal risk

As there are many references that address these risks in great detail, this

paper will only highlight the major issues.

Project Level Risk: Project level risk addresses the contractual foundation that protects the investors from market, operating and ownership risk for assurance of repayment. In essence, the project and local law will give investors the security of the entire project's assets. Financial leverage is used to find common ground for multisponsor projects that have different relative strengths that impact the cost of funding; especially if local partners have sub-par investment ratings and include political risk.

The choice between an incorporated and unincorporated joint venture is driven by the Paper PS4-1 PS4-1.15 partners' willingness to seek funds on a project basis rather than individually. This choice could also be driven by the degree of integration of the overall LNG chain if it is easier to finance each phase of the project vs. a single large scale financing

Sovereign Risk: A country rating factor such as the "Coface Country Rating Factor" gives an indication of security or territorial risk for the investment. The country risk factor includes the local business environment, economic, and political issues. The developed risk factor is between 0 and 1 in order to give the risk a numerical value.

A country such as Australia shows a very low factor of 0.0, while countries like Libya, Indonesia, Yemen and Nigeria may have factors ranging from 0.8 and 1.0. Fiscal issues by the host government will not turn an uneconomical project into a profitable investment, but can improve the attractiveness for investors, which can be crucial during times of scarce fund availability among competing projects.

Earnings gap

Timely provision of permits for construction and operation by the host government are important to expedite project development, since the time between incurring expenditures and earning revenues can be long for a project of this magnitude.

Relative Institutional Risk: This risk addresses the existence of vital business and legal institutions, or non-existence in emerging markets, which are not measured in Standard & Poor's sovereign country rating. These risks can be property rights and commercial law adverse to investor's experience, or lack of a legal basis for SPA's as collateral to lenders.

Location of Plant: Location of the plant mainly depends on these factors:

- Feed gas pipeline,
- Feed gas Reserve
- Labor rates.
- Land requirement
- Storage Facilities

Pipelines are crucial part of the LNG export infrastructure network. Pipelines are the mechanism by which natural gas is transmitted from the regions in which it is produced to LNG export facilities. Networks of pipelines often take many years to construct. Regions such as the Gulf Coast are at a distinct advantage because these pipelines are already in place.

Longevity

The diversity of supply is extremely important when considering the longevity of an LNG project; it is not enough to have one pipeline connected to a single supply source because the risk is too great that unforeseen events may occur to limit the consistent availability of that single source.

The Elba Island facility is directly connected to three major pipelines and indirectly connected to two others, making it readily accessible from both southeast and mid-Atlantic supply areas. The Cove Point facility is directly connected to the Marcellus shale. The Cove Point region has already experienced a surge in pipeline expansions as gas producers look for ways to get their gas to markets.

Land requirements for an LNG export terminal vary depending on the size of the facility, how many LNG trains will be constructed, and what import operations are already in place.

In Cove Point, Maryland, the property owned by Dominion encompasses more than 1,000 acres. Roughly 130 of these acres lie within an existing fence around the operating industrial area.

New liquefaction facilities is installed inside this fence, utilizing approximately 40-60 acres. In Elba Island, Georgia, the existing LNG import terminal occupies approximately 230 acres.

Approximately 80 additional acres will be utilized in new export operation facilities. Both the Cove Point and Elba Island facilities were import terminals. Most proposed LNG export terminals have import operations and have detailed plans available electronically.

The Jordan Cove Energy Project in Oregon is one such project. The Jordan Cove project has a total land size of almost 300 acres. Approximately 250 of these acres would be temporarily affected by construction, while a total of almost 200 acres will ultimately be permanently affected by operations.

Tanks

Storage facilities are a vital part of the LNG export infrastructure network. Above ground storage tanks are needed to store the LNG once it is liquefied.

The LNG is kept in the storage tank until an LNG carrier arrives to transport the LNG to another location. Current LNG import locations already have above ground LNG storage tanks as well as additional storage caverns or subsurface gas storage reservoirs where regasified gas is held until it is delivered to the gas pipeline distribution system.

Storage capacity varies depending on the size of the facility. Elba Island, Georgia currently has five LNG storage tanks with a total capacity of 11.5 Bcf.

Cove Point, Maryland currently has seven LNG storage tanks with a total capacity of 14.6 Bcf.

Permits

The FERC is responsible for authorizing the siting and construction of onshore and near-shore LNG import or export facilities.

In conducting environmental impact analyses, FERC accounts for a wide variety of potential environmental impacts resulting from proposed natural gas facilities. FERC proposes project-specific mitigation measures on geology, soils, water resources, vegetation, wildlife, fisheries, special status species, and air quality.

For each project, FERC identifies issues such as soil content and erosion control; impacts on drinking water and wetlands; sensitive wildlife habitat and dredging-related impacts; forest clearing; and federally listed endangered and threatened species.

Any release of LNG at a facility would present a fire risk in the presence of an ignition source. However, an unignited release would vaporize and dissipate into the atmosphere as it warmed with contact with the ambient soils, water and air. Methane is non-toxic; therefore, no environmental impact to the soil, water or groundwater would occur and no impact to the biota would occur unless by asphyxiation or freezing

Engineering and design of the plant: The liquefaction unit accounts for approximately 50 percent of the total capital costs of US$1-2 billion for a baseload LNG plant. The type of liquefaction process, in combination with the rotating equipment and ambient cooling system, affects the capacity and availability of the entire LNG system so it is essential that the best process is selected. The world of baseload LNG processes is dominated by the propane pre-cooled/mixed refrigerant (C3/MR) process, introduced by Air Products and Chemicals, Inc. in the early seventies.

Nearly 95 percent of the word wide LNG production capacity is based on this process in various forms, employing

Hubs of organization for development of an LNG export project

steam turbines, and gas turbines as compressor drivers and water and air cooling for heat rejection.

Over the years APCI was able to enlarge its spoolwound main cryogenic heat exchanger and to adopt the C3/MR process for a wide range of conditions.

Shell has further advanced the C3/MR process by the introduction of large gas turbines/compressors, liquid expanders, air cooling, new gas scrubbing and Nitrogen rejection systems, etc., thus improving the competitiveness of the process.

Sales of LNG

With the high capital cost of the LNG chain, LNG sellers have sought security of LNG offtake whilst, at the same time, buyers in markets such as Japan and Korea with no other gas supply source (such as domestic gas production or pipeline gas supply) have also sought security of gas supply.

The LNG business has, therefore, evolved around a regional structure with, in 2010, 80 percent of LNG being sold on long-term 15-20 year LNG sales agreements and the balance 20 percent being sold under shorter term contracts with variations in pricing based on which market the cargo is discharged into.

This enables LNG suppliers, who have surplus capacity in the system, to take advantage of global pricing differentials.

The LNG trade is therefore structured in two ways:

1. A long-term basis where sellers structure contracts on a pricing basis that provides reliable revenues to the project, often with price protection should prices fall too low in the case of new LNG projects. For financing, the majority of LNG volume needs to be committed on a long-term basis to support the project cashflows, so spot/short-term LNG volumes from base production will be lower. For older projects (20 years+) this is not the case and an LNG seller can take more risk and sell a greater portion in the spot market.
2. A shorter term basis where LNG sellers and buyers seek to sell/buy surplus cargoes into higher priced markets, sometimes diverting cargoes that were previously destined for one market to another to optimize revenues.

Financing the project: The LNG chain can be complex and carries risks, but the risks can be identified, quantified and mitigated through due diligence. Lenders can get themselves comfortable with the level of risk that they are taking. In the case of more risky projects, export credit agencies can cover political and some commercial risks. This was particularly the case for the PNG LNG project in Papua New Guinea, which reached financial close in March 2010, during the 2008–10 financial crisis.

Project financing for LNG projects has both advantages and disadvantages. It gives a project the ability to generate large debt capacity whilst passing the project risk to the lenders, with the sponsors able to assume limited recourse, after project start-up and in many cases enjoy flexibility of loan repayment to improve the overall project economics.

Backing

Often LNG projects have governments, as well as domestic and international companies as shareholders, who all have different credit ratings. The international companies, who often have the highest credit rating, do not want to use their rating to support the weaker shareholders.

Through the establishment of a project company that constructs and operates the LNG facility, and more importantly is the commercial entity that funds the project development, project finance allows the project, not the individual shareholders, to be the borrower. The revenue to the project comes from the LNG buyer (or the capacity users in the case of a tolling facility).

There are also disadvantages to raising finance this way; higher interest rates, it takes more time and costs more to put together a project finance deal as well as the constant involvement of the lenders during the loan period; project shareholders prefer this non-recourse structure as it ensures that if the project were to default then there would be no recourse to the individual shareholder companies. An example of this structure is set out in figure below.

Utilities

As previously indicated and as described below, the Project would utilize existing and new utilities and other facilities to support LNG import and export operations.

Utilities for Dominion Cove Point: Electric power for the LNG Terminal is currently generated on-site, with only a limited connection to the outside power distribution grid for backup power. All of the electric power necessary to operate the Liquefaction Facilities is provided by two new 65 megawatt (MW) steam turbine power generators located within the Fenced Area.

The steam needed to drive the generators is obtained from heat recovery steam generators (HRSG) installed in the refrigerant compressor gas turbine exhaust duct and two auxiliary boilers. In addition to driving the electric generators, steam also serve low, medium, and high pressure steam systems.

Heat is removed from a portion of the steam system and used for process heating. The existing on-site electric power system provides supplemental and back-up power to the Project.

Water necessary for Project construction and operation is obtained from existing water wells at the LNG Terminal. DCP has applied to the Maryland Public Service Commission (PSC) for a Certificate of Public Convenience and Necessity (CPCN).

The CPCN application includes a request to modify the LNG Terminal's existing water appropriations permit to allow for the additional groundwater use required for the Project.

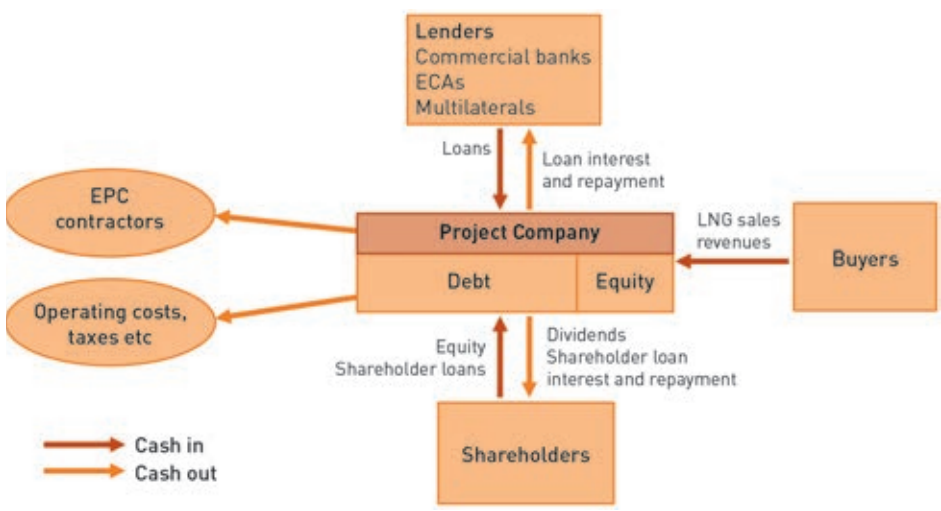
The Maryland Department of the Environment (MDE) has reviewed the request and has conditionally recommended granting authorization for up to an average daily withdrawal of 233,000 gallons, and 275,000 gallons per day (gpd) during the month of maximum use.

Shipping

Shipping facilities are necessary to transfer the cooled LNG contained in storage tanks to LNG carriers and ultimately to an LNG import location. Typically, a system exists to pump LNG from the storage tanks to the LNG carrier through LNG transfer lines and loading arms. Berths of sufficient size are necessary to accommodate the LNG carrier.

As an example, Elba Island has two marine berths, constructed in a berthing pocket just off the main channel of the Savannah River. Each berth is designed to accept LNG carriers up to the following criteria:

- Length Overall (max.): 345 meters (1132 ft)
- Beam (max.): 55 meters (180 ft)
- Cargo Capacity: 267,000 cubic meters (max.)
- Displacement: 177,000 Tonnes (max.)[1] ■



Finance, debt, equity and earnings flows in liquefaction plant

About the Author

Deepak Bawa is a Project Manager in the Oil & Gas field who is currently working with SNC-Lavalin in Houston, Texas, and has more than 15 years of experience in LNG, Petrochemicals, Chemical plants & Heavy Engineering projects with companies like KBR, Technip -FMC, IHI E&C and UOP-A Honeywell.

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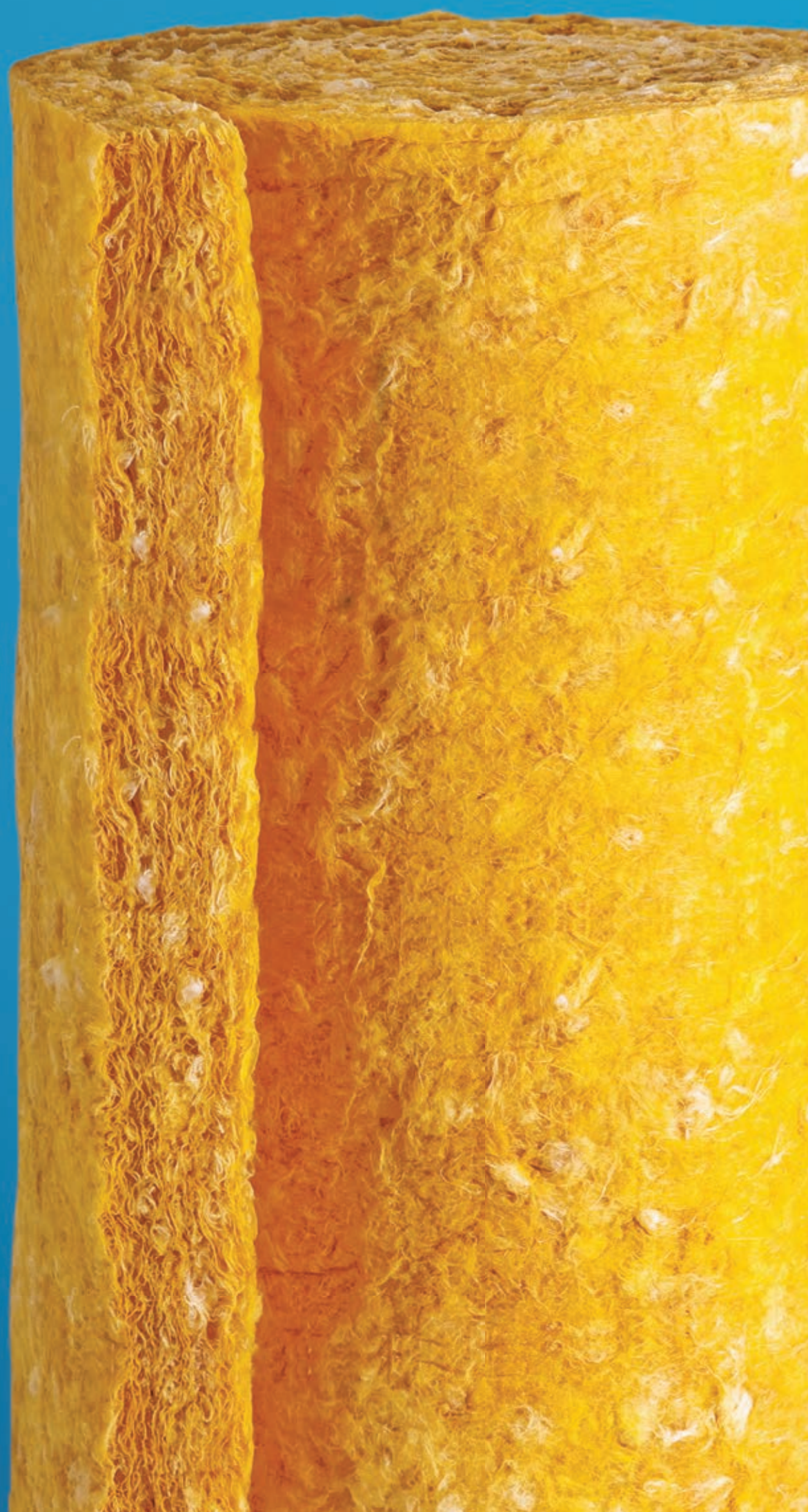

World LNG Carrier Fleet

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 Khattiya	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
Bilis	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 Lianyungang	174,100	MOL-China LNG	Hudong	June-18	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 Glory	165,000	Tokyo LNG Tankers	JMU	Sept-18	Japan	S	Moss	4	Various
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
Flex Rainbow	174,000	Flex LNG	Samsung	July-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 Esperanza FSRU	170,000	Hoegh	Hyundai	April-18	Norway	DFDE	GTT MIII	4	Various
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	QGTC	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
Magdala	173,400	Teekay	Daewoo	Feb-18	Bahamas	DFDE	GT No 96	4	Various
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 Amphipolis	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 Spetses	174,000	Maran	Daewoo	Feb-18	Greece	DFDE	GT No 96	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
Marib Spirit	165,000	Teekay LNG	Samsung	May-08	Marshall Is.	DFDE	TZ Mk. III	4	Various
Matthew	126,540	Suez LNG Shiping	Newport News	Jun-79	Bahamas	S	TZ Mk. I	6	Atlantic LNG
Mekaines	266,000	Naklilat	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	Naklilat	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 Firuz 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
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
Vladimir Rusanov	172,000	MOL-China Shipping	Daewoo	Mar-18	Hong Kong	DFDE	GT No 96	4	Yamal
Vladimir Viz	172,000	MOL-China Shipping	Daewoo	Sept-18	Hong Kong	DFDE	GT No 96	4	Yamal
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	Storage 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
	Dapeng ND Guangdong	CNOOC	2018	4	640,000
	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, Zheijang	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 OII	2006	3	420,000
	Mizushima	Nippon Oil, Chugoku Electric	2006	2	320,000

LNG Import Terminals (continued)

Country	Location (Project)	Owners	Start up	Storage Tanks	Storage Capacity
	Sakaide	Shikoku Electric, Cosmo Oil	2011	1	180,000
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	5	800,000
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	Storage 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, Pertimana	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 Mediterrana	ElectroGas	2016
Pakistan	Port Qasim	Excelerate, Engro Corp	2015
	Port Qasim	BW-Mitsui, PGP Consortium	2017
Turkey	Aliaga FSRU, Neptune	Etki 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 m^3
ABU DHABI (UAE)	Das Island (Adgas)	ADNOC, Mitsui, BP, Total	1977	2	3.2	3	240,000
			1994	1	2.5		
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
		(Mistubishi/Mitsui)	2004	1	4.4	1	130,000
		NWS partners	2008	1	4.4	1	130,000
	Darwin	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	Equinor, Total, Petoro	2007	1	4.2	2	280,000
OMAN	Oman LNG	Oman Govt., Shell, Total, Korea LNG Mitsubishi, Mitsui, Partex and Itochu	2000	2	7.1	2	240,000
		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-TI	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		
	RasGas II- T4	QP, ExxonMobil	2005	1	4.7	6	840,000
	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	5	22.5	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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