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Russia's LNG economy at risk of losing steam

With a vast gas resource base, Russia's significance to the global LNG market has not changed materially. However, ongoing headwinds since the Ukraine invasion are beginning to chip away at its progress, our Markets Editor Alexander Wilk writes.

Russia's LNG exports to Europe have remained significant despite a drive to curb Russian energy imports following the invasion of Ukraine. As we have reported previously, the European Union has so far avoided imposing sanctions on LNG imports from Russia. Indeed, Russia was the Union's second-largest LNG supplier during the first half of the year due to its extensive natural gas reserves, primarily located in Siberia and the Yamal Peninsula. These reserves have allowed the country to maintain a steady supply of natural gas to Europe, which remains vital for the continent's energy security.

However, whilst there has yet to be a rout in European demand for Russian LNG, several constraints are currently making an expansion of Russian LNG flows difficult. This includes diversifying away from the European market, which, in turn, is at odds with the Kremlin's 2021 directive to increase LNG market share to 20 percent by 2035. Ever since it entered the LNG market with Sakhalin-2 LNG, Russia's global market share has sat stubbornly at around 9 percent.

Unfortunately for Russia's LNG industry, both Novatek, owner and operator of Yamal LNG and lead partner in the Arctic LNG 2 development, and Gazprom, the Russian state-controlled pipeline gas monopoly, have faced headwinds including capacity limits at existing plants, Western sanctions, avoidance by key technology partners and even competition for vital feedgas resources amongst themselves.

Tangentially, although Gazprom can point to some successes in pipeline gas exports to China and an uptick in flows to Europe, this export growth pales in comparison to what has been lost since Russia's invasion of Ukraine.

As a result, these adverse trade conditions have been slowly chipping away at Russia's long-term LNG trade position, our data suggests.

First Half of 2023

European offtakes of Russian LNG slackened but were not (yet) falling drastically in 1H 2023. Instead, they were down only marginally by 0.03mmt year-on-year to 9.30mmt. Whilst Russia's LNG supply thus remained far behind the

32.53mmt delivered by exporters in the United States, it ranked ahead of Qatar's 7.87mmt, a difference of 1.43mmt (15 percent). This ranking for the first half of the year also unfolded in 2022. However, it typically flips in the second half each year, when weather conditions in the Arctic slow LNG flows.

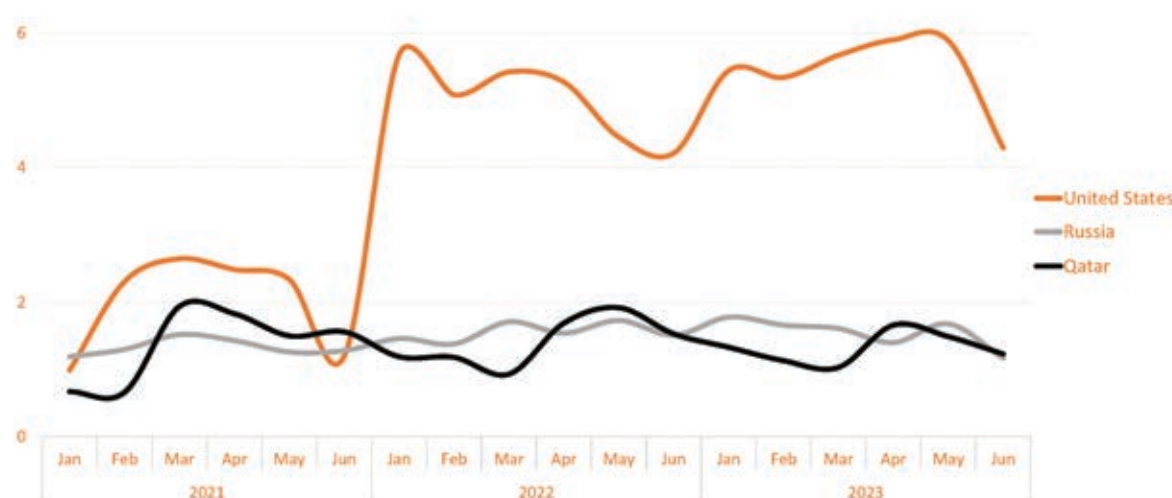
Our data thus did not show that European buyers were rushing to scale down Russian LNG exports. After all, where would 9.30mmt of additional LNG supply to replace Russian deliveries be coming from? In any case, the swift disappearance of that much supply would likely lead to another escalation of European gas prices. For example the mere threat of industrial action in Australia caused Pacific spot prices to increase by more than a third in August, according to reports by Reuters. As such, the majority of LNG imports at Belgium's Zeebrugge terminal amounting to 3.38mmt came from Russia in 1H 2023. They were thus up by 0.71mmt (27 percent) from 2.67mmt in 1H 2022. Moreover, Russia was the second-largest LNG supplier to France over the same period with flows amounting to 1.86mmt.

Russia was equally the second most significant LNG supplier to Spain with 2.77mmt in 1H 2023, up by 1.26mmt (83 percent) year-on-year. Russia's position in this context even rose to number one a month later when its exports to Spain hit 3.42mmt by the end of July, according to our data.

As we reported in May, Spanish Deputy

Top Three LNG Suppliers to Europe (MMt)

1 January – 30 June



Source: LNG Journal



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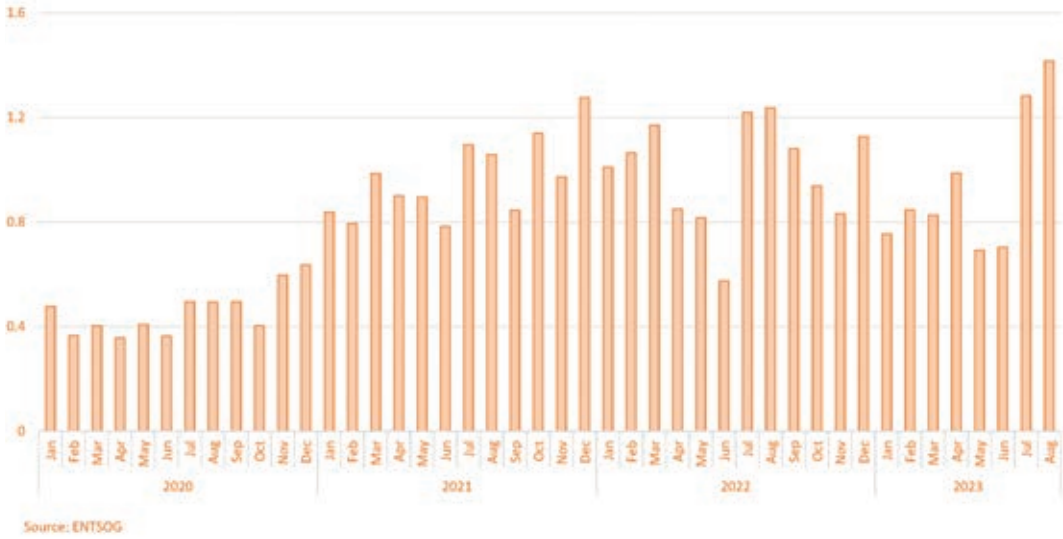
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EU Pipeline Gas Imports via TurkStream (BCM)



Prime Minister Teresa Ribera urged firms such as Naturgy, Repsol, Enagás and Axpo not to land Russian LNG in Spain. Axpo, Repsol and Enagás responded to the notification saying they're not purchasing LNG from Russia, according to a spokesperson of the ministry. However, Spain continues to receive Russian LNG under Naturgy's long-term contract to purchase the fuel from Yamal LNG until 2038.

Pipeline Exports

Meanwhile, Russian pipeline gas supplies to the EU have continued since Russia's invasion of Ukraine, albeit at a fraction of what used to flow through the Nord Stream trunklines alone. Flows via the TurkStream pipeline, which opened in 2020 and connects to the EU via Hungary, Romania and Greece, have continued to ramp up and amounted to roughly 11.92bcm in 2022. As of August this year, monthly flows had accumulated to 7.51bcm since January, according to ENTSOG data.

Gazprom has also been successful in continuously expanding its pipeline gas exports to China. Although the Chinese government has taken to publish pipeline import data with less clarity since 2022, our calculations still allow an estimated breakdown of China's pipeline gas suppliers. The data indicates Russia has been able to ride a growing wave of Chinese pipeline gas imports since 2021 as the Power of Siberia trunkline is ramping up flows and Chinese energy policy

shows an increasing emphasis on gas.

Signs of tipping scales

But within the global LNG market, there are signs the scale may be tipping. Looking beyond 1H 2023, Russia's worldwide LNG supply of 20.22mmt in the year to end-August has been unable to surpass its year-on-year equivalent of 21.11mmt, a decrease of 0.99mmt (-5 percent). Notably, the 20.12mmt exported up to end-August this year include 0.73mmt exported from Gazprom's Portovaya LNG, which only began shipments in November 2022 and thus did not add to the 21.11mmt for 2022. Significant export decreases stemmed from Sakhalin-2 LNG, where higher exports to China could not compensate for fewer shipments to Japan and a cratering of LNG trade with Taiwan. Concurrently, Yamal's global shipments were down by 0.49mmt (-4 percent) year-on-year.

This trend is also evident among European LNG imports from Russia in

the year to August, which had amounted to a total of 11.22mmt from Yamal LNG and Portovaya LNG compared to 11.48mmt in 2022 from Yamal LNG alone.

Current capacity constraints

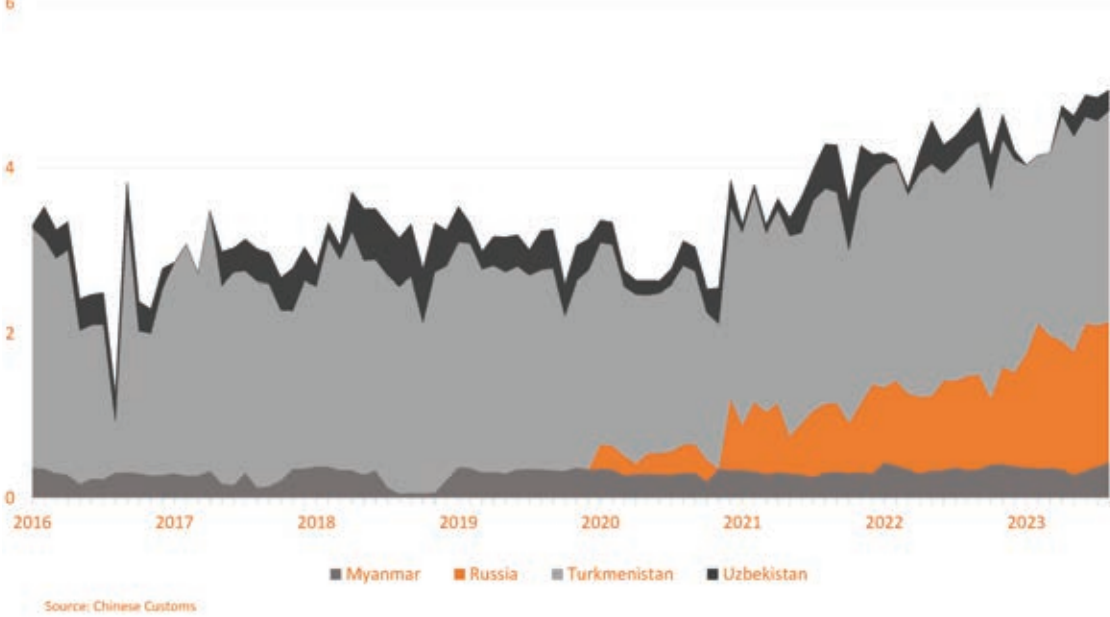
Importantly, even if there were no European offtake reductions, Yamal LNG has seen flat-out production since 2021, effectively removing any spare capacity. The company had gained the approval from Russian regulators to frequently produce at 120

percent of nameplate capacity in 2021 but has on occasion been producing at up to 137 percent of annualised installed capacity, according to our data.

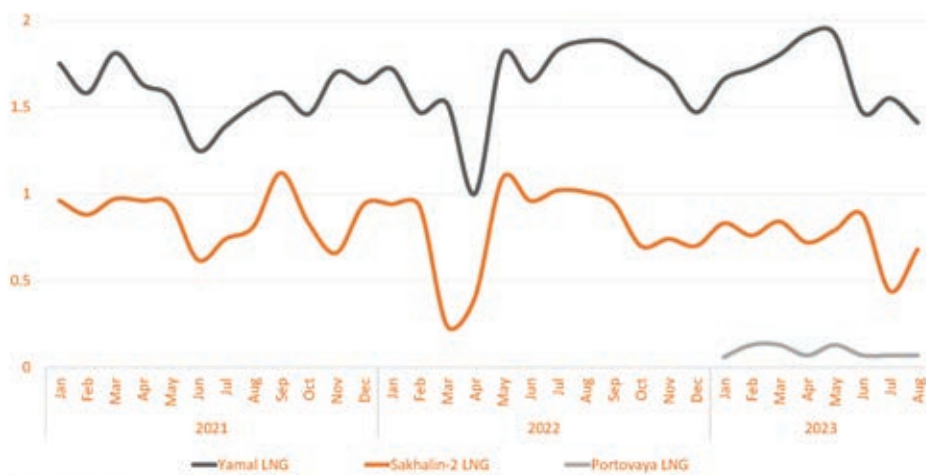
Notably, the Russian government launched a long-term strategy for expanding its LNG industry in March 2021. The aim was to monetize the country's abundant gas supply to increase LNG market share to 20 percent and diversify its customer base by 2035.

This puts into context Novatek's push to advance the development of Russia's Arctic LNG 2 project despite Western sanctions in response to Russia's Ukraine invasion. In particular, financing that looked shaky a year ago has been said by shareholders to be progressing apace in August, according to Xie Weizhi, CFO of Chinese minority shareholder CNOOC. Xie made the announcement during an August earnings briefing in Hong Kong, Reuters reported. A key technical challenge of finding alternatives to Western-made gas turbines for Arctic

Monthly Chinese Pipeline Gas Imports (BCM)



Global Russian LNG Exports (MMt)



Source: LNG Journal

LNG's Trains 2 and 3 has reportedly been overcome by resorting to electric motors. Accordingly, lead project partner Novatek expects Arctic LNG 2's commissioning to take place either late 2023 or early 2024.

Novatek, Russia's principal independent natural gas producer and LNG exporter, is leading the development of the Arctic LNG 2 project, holding a 60 percent stake. The remaining shareholders comprise French energy major TotalEnergies, China's CNPC and CNOOC and Japan Arctic LNG (a consortium of Mitsui & Co and JOGMEC), each holding a 10 percent stake. Notably, unlike shareholder agreements of the Yamal LNG venture, the Arctic LNG 2 project allows liquefied natural gas to be sold by its partners in proportion to their project stakes.

In addition to increased deliveries to China, Japan is also poised to receive more Russian LNG. Novatek recently inked an agreement with Japan for the delivery of 2mmt per year, constituting around 10 percent of the capacity of its new Arctic LNG 2 facility.

Northern Sea Route Gains Importance

One of the notable developments in

Russia's LNG shipments is the utilisation of the Northern Sea Route (NSR) to more readily reach markets in the Far East. The NSR traverses the Arctic Circle and has become increasingly accessible due to melting ice caps and improvements in both ice-capable LNG carrier operations and availability of dedicated ice breakers along the route. In this respect, Russia has been a clear benefiter of global warming. Whenever weather conditions allow, the NSR is set to be a shorter and more cost-effective route for Russian LNG exports to China.

Although variable early-summer ice conditions can still temporarily impede or slow down cargoes en route to Asia, the route is now navigable for approximately five months during the year. Russia's expanding fleet of nuclear icebreakers aims to further extend the navigation season, potentially enabling year-round transportation for vessels with high ice-class ratings.

To highlight the NSR's strategic significance, Gazprom has shipped its first LNG cargo from a non-arctic LNG plant – Portovaya LNG on Russia's Baltic Sea coast – to China via the Northern Sea Route (NSR) in mid-August, our data showed. Gazprom loaded a 0.07mmt cargo aboard the LNG carrier Velikiy Novgorod,

which arrived at Caofeidian LNG in mid-September.

Previously, Russian LNG shipments through the Northern Sea Route were exclusively sourced from Novatek's Yamal plant and thus from within the Arctic Circle. The use of the Arctic route offers a significant reduction of approximately 10 days in voyage time compared to an alternative route via the Suez Canal. It's worth noting that Velikiy Novgorod, unlike Novatek's fleet of 15 ice capable Arc7 LNG carriers, possesses only light ice protection, categorised as Ice2. This limits its Arctic operations to the summer months.

Pivot to China via the NSR

China has emerged as a burgeoning buyer of Russian hydrocarbon resources, including LNG. Between January and the beginning of September, Russia's exports to China had amounted to 4.09mmt compared to 2.66mmt over the same period last year, a difference of 1.43mmt (54 percent). Given the existing EU sanctions on crude oil and with ongoing calls on Brussels to include LNG in its sanctions package, Russia is increasingly relying on diverting energy flows towards Asia, with a growing emphasis on the arctic NSR.

Previously, deliveries from the Portovaya liquefaction plant, which commenced operations in September 2022, were primarily destined for Turkey and Greece. Whilst the 1.5 million tonnes per annum (mtpa) Portovaya facility operates on a significantly smaller scale compared to Novatek's Yamal LNG and the upcoming Arctic LNG 2 project, its inaugural shipment via the Arctic offers a glimpse of future developments.

Pivotal role of sanctions

Gazprom has outlined plans to construct additional LNG capacity in the Baltic Sea whilst in the western Arctic region,

Novatek's Arctic LNG 2 is expected by operator Novatek and shareholders such as CNOOC to begin production by early next year. Together, Arctic LNG 2 and Baltic LNG would have a planned peak capacity of roughly 33mtpa. Novatek is also mulling a third, 27mtpa LNG development at Murmansk, originally planned to be operational around 2028.

Nevertheless, Western sanctions in response to Russia's invasion of Ukraine in 2022 are threatening the development of the Baltic LNG project. Apart from the unwillingness of Western companies to even respond to Gazprom tenders to build pipeline capacity connecting the Tambej gas field cluster to Ust-Luga, Novatek has since been pushing hard to secure Tambej's gas resources due to Gazprom's lack of progress, Upstream reported. Whilst it is unclear to what extent Novatek will be successful in its quest to claim Tambej gas, Baltic LNG's general lack of progress and an anticipated delay to at least 2026 indicate the project is under pressure.

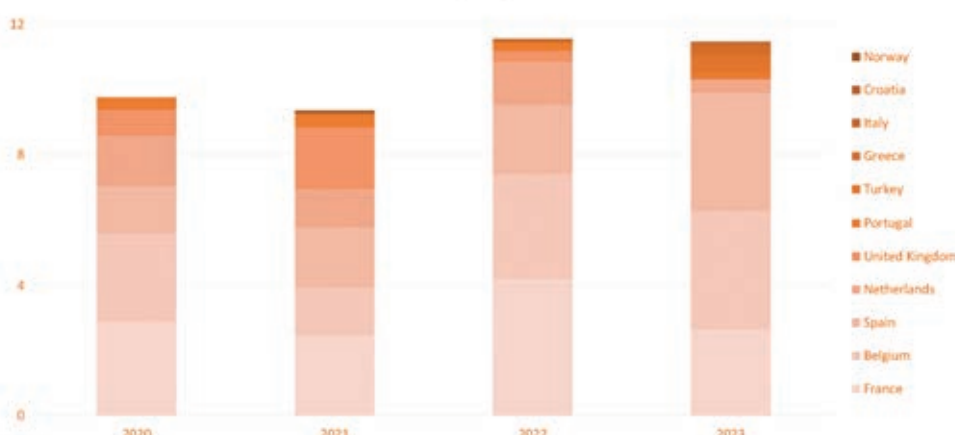
In turn, Gazprom has yet to confirm whether it will supply feedgas to Novatek's proposed Murmansk LNG.

Concluding thoughts

While Russia's extensive gas reserves and its strategic infrastructure continue to underpin its current position within the European LNG market, its LNG economy has been hamstrung by strong headwinds since the invasion of Ukraine. Although European demand for Russian LNG is not in retreat, offtakes have slackened and net growth for Russian LNG exports elsewhere looks equally timid. Moreover, the line is only held due to Yamal LNG habitually producing well above nameplate capacity. This hampers a diversification away from the European market, which, in turn, is at odds with the Kremlin's 2021 directive to increase LNG market share to 20 percent by 2035. ■

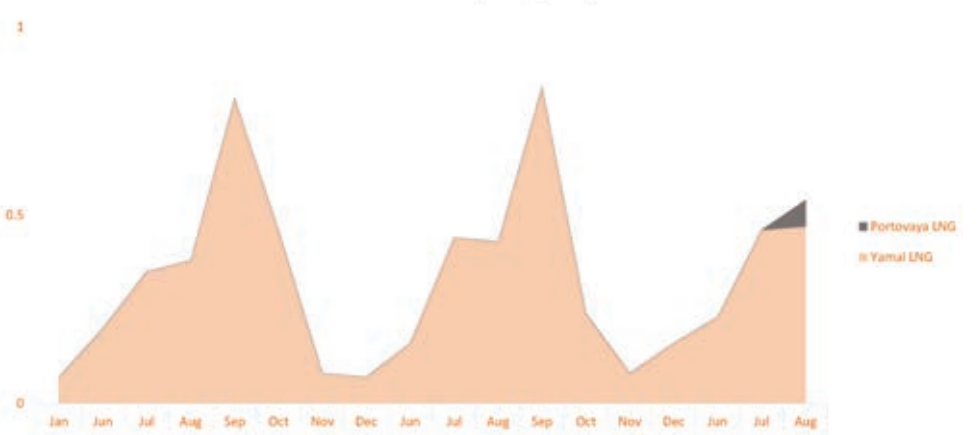
Russian LNG Exports to Europe (MMt)

1 January - 31 August



Source: LNG Journal

Russian NSR LNG Exports (MMt)



Source: LNG Journal

Buyers of US LNG seem prepared to agree to higher tolling fees

Offtakers of US LNG are willing to pay higher tolling fees which gives project sponsors good margins considering the current low gas prices at Henry Hub. Some developers of new-built liquefaction plants have asked long-term buyers for higher liquefaction fees to cover rising interest rates and construction costs – and most agreed as US export is still the cheapest-priced gas worldwide. Our Markets Editor Anja Karl has more.

NextDecade reportedly addressed all offtakers from its recently sanctioned Rio Grande LNG venture, seeking for higher liquefaction fees as project costs increased. Most of them agreed, Poten & Partners understands, and in a filing with the Department of Fossil Energy and Carbon Management in August, NextDecade revealed there have been amends to its contracts with all long-term customers – except TotalEnergies of France and the Japanese trading house Itochu.

“The offtakers agreed because the project was very far advanced and ready to go to FID, and I think some of those contracts were very low-priced by current standards,” Jason Feer, global head of business intelligence at Poten & Partners told Reuters. NextDecade has not yet responded to questions by the LNG Journal about what led to the rise in tolling fees.

The Henry Hub spot price is forecast to stay some \$1.50 per million British thermal units (MMBtu) below the 2022-average at around \$4.90/MMBtu this year and in 2024 as growing dry gas production outpaces domestic demand. But escalating costs of construction and raw materials, along with rising interest

rates have squeezed the margins of LNG project developers.

“It’s fair to say that increased capex costs, whether due to inflation, increased cost of materials or other reasons, will be reflected to some degree in the pricing of services, such as liquefaction fees, by most industry participants,” Lyle Hanna, Vice President of Commonwealth LNG told this publication. The Commonwealth venture is one of several US LNG export projects working toward a financial investment decision (FID).

Though Hanna said it was “natural” that higher costs for developing liquefaction project led to higher tolling fees, he fell short on specifying whether fees have been raised for offtake from Commonwealth LNG as well. “Our highly modularized approach reduces both

schedule and costs, allowing us to offer liquefaction fees that are among the most competitive among U.S.-based LNG facilities,” he noted.

In mid-August, Commonwealth LNG received private funding from the asset management firm Kimmeridge which is said to complete the funding required

for developers to reach FID on its 9.3 million tons per annum (mtpa) LNG export facility in Cameron, Louisiana. The accord includes the terms for Kimmeridge to provide further equity and includes an agreement in principle for a 20-year, 2 mtpa firm LNG offtake commitment from Commonwealth LNG along with the associated gas supply. Farhad Ahrabi, President and CEO of Commonwealth LNG vowed “the most recent LNG

marketing progress, completion of FEED, and conclusion of the EPC contract with Technip Energies ensures Commonwealth will start to deliver LNG to our customers in early 2027.”

Lowering project finance costs by raising equity

Cheniere Energy, the largest U.S. LNG exporter and the one with the deepest pockets, has taken a different approach: Rather than relying on debt finance and raising tolling fees, the company has simply cut financing costs by funding most of its latest Stage 3 expansion of the Corpus Christi terminal from its own balance sheet.

On June 15, Cheniere announced it restated an approximately \$4 billion senior secured term loan due in 2029, upsized a \$1.5 billion working capital facility due in 2027 and contributed a substantial amount of its own equity. Borrowings under the CCH 2029 term loan will be used to fund approximately half of the cost to develop, construct and place into service Corpus Christi Stage 3 – the other half is paid for by Cheniere.

Being built next to three liquefaction trains in Texas that are already in full swing, Corpus Christi Stage 3 consists of



Render of the proposed Rio Grande LNG terminal, looking west along Brownsville Ship Channel



Render of the Commonwealth liquefaction terminal in Cameron Parish

14 new, mid-scale trains with a combined peak capacity of 1.59 Bcf/d. Market observers expect the units start to operation in 2025.

Debt financing becomes harder to get

Though European buyers are prepared to pay premium prices to secure LNG cargoes, developers of US liquefaction plants are having more and more trouble to access debt finance to get their projects over the finish line. Soaring inflation has pushed up interest rates markedly since August 2022 which prevented several projects from securing financing.

Shaken by the banking crisis, investors are getting more demanding when it comes to LNG project finance: almost fully contracted liquefaction capacity is required and equity levels higher than 30 percent. Cautious buyers, meanwhile, refrain from signing offtake agreements if a project cannot reach FID in the next three months.

Melanie Lovatt, financial adviser for the ship brokerage Poten & Partners sees many developers struggle to get funding:

“To get debt finance, US projects are required to sell more of their production upfront. This is the big issue right now – not the availability of bank funds,” she said, suggesting “the timeline of some LNG expansions may well slip,” as financing has become harder to get and more expensive while equity investors are dragging their feet. Some market observers still believe the dam will break and projects with 6.2 Bcf/d of additional capacity could reach financial close.

Despite a “hugely positive” demand outlook due to Europe's ongoing need for energy security, Wood Mackenzie sees investment risk arise from the significant cost inflation for US Gulf Coast projects and major overruns of lead-times as

demand for both manpower and services outstrip supply. Developers cannot hand through these costs to offtakes as competition forces them to keep fixed fees low, meaning project returns are tight. Analysts hence estimates unlevered internal rates of return (IRRs) as low as 5-6 percent for some projects which makes it challenging to secure finance.

Struggling to make ends meet, most

are looking to raise debt to shoulder this investment. Project financing is sought to cover between 60-80 percent of the required capital while the remainder can be funded by equity raises or through the balance sheet. To generate upside and make projects more attractive for equity investors and offtakers, developers seek to re-rate LNG trains for higher capacity and look for more efficient and cheaper feedgas procurement.

Henry Hub natural gas price and NYMEX confidence intervals
dollars per million British thermal units



Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, September 2023, CME Group, and Refinitiv an LSEG Business

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Trade slows during report period to 26 September

Our data for the month to 26 September showed lower LNG output globally both month-on-month and year-on-year. Meanwhile, global net LNG demand was also down, our Market Editor Alexander Wilk reports.

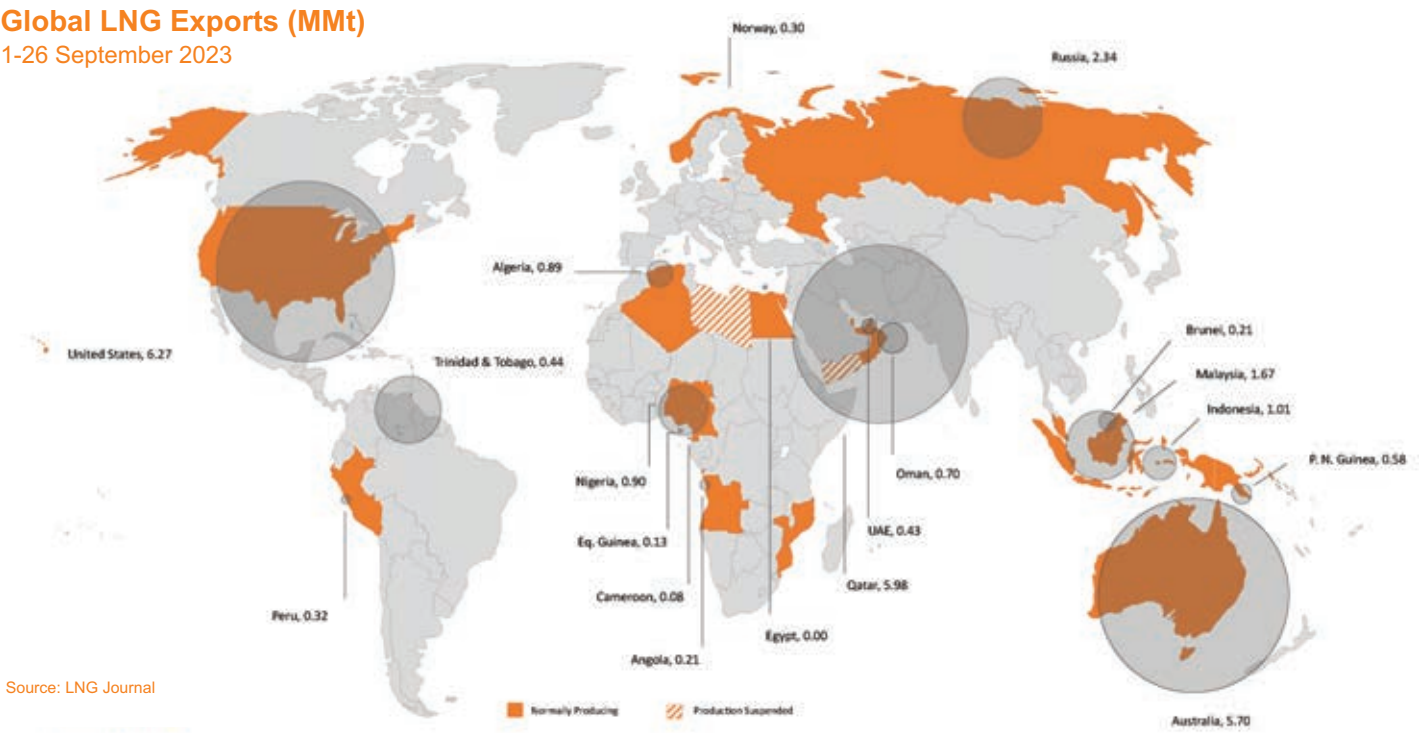
As of 26 September, global LNG exports for the month to date had amounted to 28.48mmt and thus constituted a decrease of 1.02mmt (-3 percent) from 29.50mmt we recorded on 26 August. Among the three most significant exporters in September, the United States faced a decline of 0.38mmt (-6 percent) with 6.27mmt in shipments compared to 6.65mmt in August. Australia also faced a similar decrease with 5.70mmt in shipments, down 0.39mmt (-6 percent) from 6.09mmt in August. These export reductions could thus not be cushioned by the marginal export increase of 0.07mmt from Qatar.

Global LNG demand at the time of writing, meanwhile, was led by China even as the country had also seen the most significant demand reduction during the report period. Japan came in as close second as it had maintained month-on-month imports. In the Atlantic Basin, European demand had seen a steep drop, which even robust demand growth in the Americas could not compensate for. Middle Eastern offtakes, on the other hand, had seen only a moderate reduction.

Exports

In the month to date, 28.48mmt of global LNG exports were down by 1.02mmt (-3 percent) compared to their August

Global LNG Exports (MMt)
1-26 September 2023



Source: LNG Journal

counterparts of 29.50mmt. Pacific Basin shipments lagged their August counterparts by 0.63mmt (-6 percent) at 10.49mmt. Atlantic Basin exports also saw a significant decrease of 0.44mmt (-4 percent) to 10.88mmt. Meanwhile, we only recorded a marginal export increase in the Middle East, where shipments were up by 0.05mmt (1 percent) to 7.11mmt from 7.06mmt. Global exports in the month to 26 September were also down marginally by 0.17mmt (-1 percent) year-on-year.

Pacific Basin

Our September data at the time of writing showed Pacific exports had reached 10.49mmt, coming in below their equivalent August volume of 11.12mmt by 0.63mmt (-6 percent). Consequently, annualised capacity utilisation stood at 82 percent at the time of writing. Exports were also down by 0.95mmt (-8 percent) year-on-year.

Australia: The Pacific Basin's most significant exporter by installed capacity – Australia – ended the month with a significant decrease in shipments of 0.39mmt (-6 percent) to 5.70mmt as of 26 September from 6.09mmt during the equivalent period in August. Most plants faced a decrease in production. However, Australia's performance was most impacted by NWS LNG, which faced a decrease of 0.73mmt (-59 percent) with 0.51mmt in shipments compared to 1.24mmt in August as it underwent scheduled maintenance. Gladstone LNG, meanwhile, reduced exports by 0.06mmt (-12 percent) to 0.45mmt from 0.51mmt in August. Prelude FLNG was not seen in the market after it had last shipped LNG via a 0.07mmt cargo in August. Additionally, Gorgon LNG and Pluto LNG both reduced their exports by 0.08mmt to 1.23mmt and 0.28mmt, respectively.

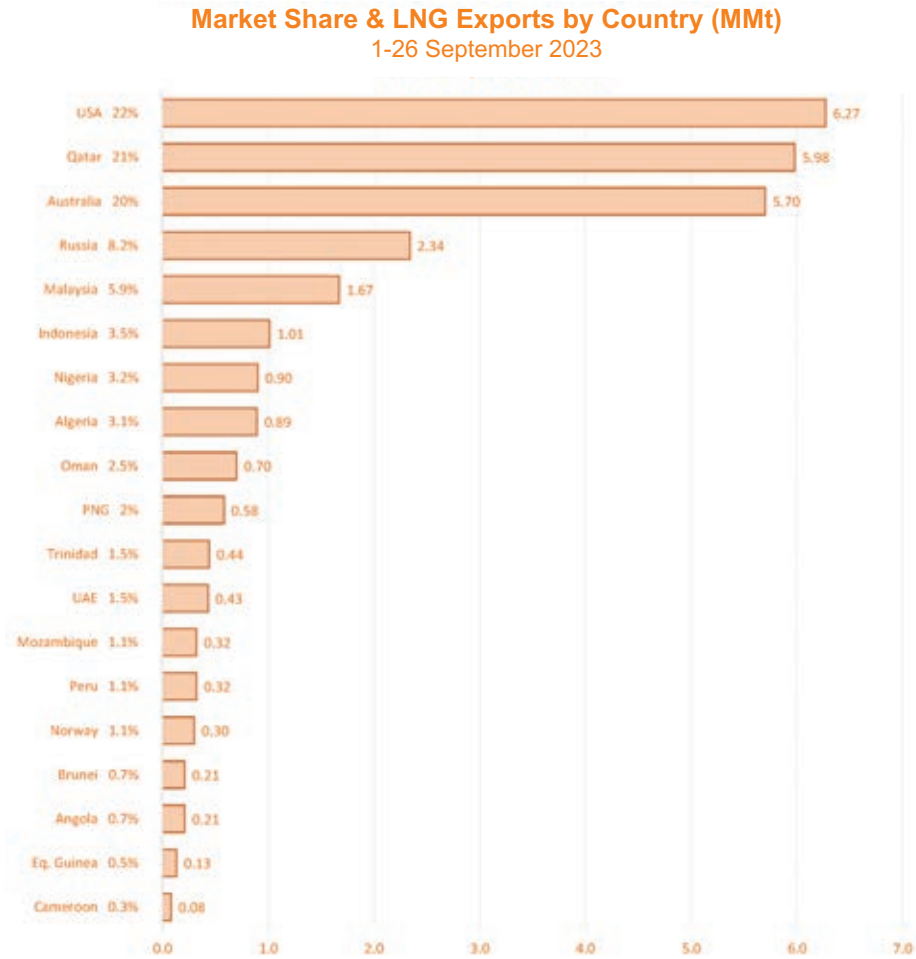
As such, these export reductions could not be compensated even by significant export increases totalling 0.63mmt at Wheatstone LNG, Queensland Curtis LNG and Ichthys LNG. Wheatstone LNG managed an increase in shipments of

0.31mmt (48 percent) to 0.95mmt all the while operator Chevron was negotiating with the Offshore Alliance over its threat of industrial action. Queensland Curtis LNG also saw a boost of 0.28mmt (39 percent) to 1.00mmt in LNG shipments compared to 0.72mmt in August. Ichthys LNG managed a notable increase of 0.04mmt (7 percent) to 0.61mmt. Finally, Darwin LNG had kept its month-on-month LNG exports unchanged at 0.07mmt at the time of writing.

Australian exports were led by shipments to Japan amounting to 2.21mmt in the month to date, up modestly by 0.04mmt (2 percent). Singapore and Taiwan also increased their offtakes from Australia by a total of 0.18mmt. China, however, cut imports by 0.53mmt (-28 percent) month-on-month to 1.39mmt. This was in addition to cuts by South Korea and Malaysia, which together had reduced offtakes by 0.24mmt. Equally significant was the apparent lack of exports to Thailand and the Philippines, which had amounted to 0.23mmt this time in August. Nevertheless, we highlight that at the time of writing 0.54mmt of Australian LNG still had to declare their destinations within the Pacific.

Southeast Asia: North of Australia, PNG LNG recorded a production increase of 0.08mmt (16 percent) to 0.58mmt at the time of writing on 26 September from 0.50mmt in August. The plant's annualised capacity utilisation rate thus stood at 94 percent. PNG LNG's largest offtaker during the report period was

Market Share & LNG Exports by Country (MMt)
1-26 September 2023



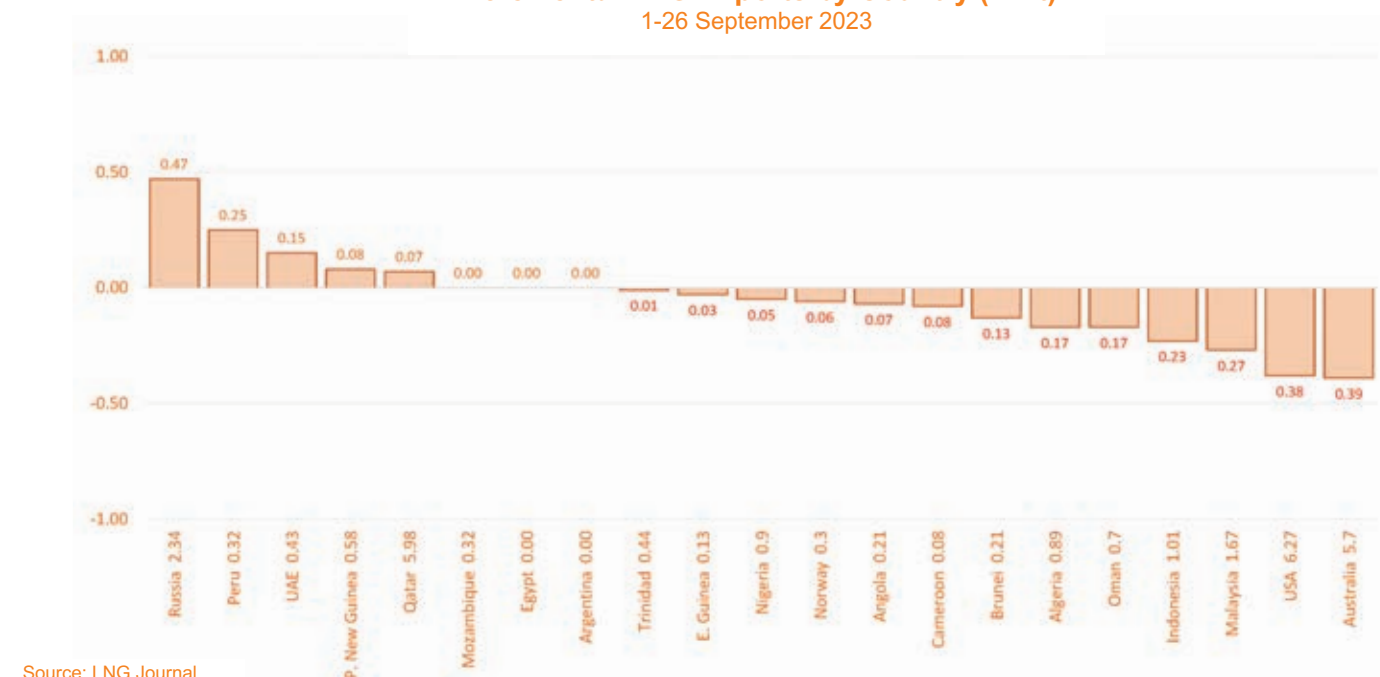
Source: LNG Journal

Japan with flows amounting to 0.22mmt in September, but which also meant they were down by 0.05mmt (-19 percent) month-on-month. China, however, kept PNG offtakes broadly stable at 0.15mmt so that a doubling in Taiwanese offtakes to 0.14mmt and an undeclared Pacific Basin cargo of 0.07mmt constituted net growth month-on-month.

Conversely, neighbouring Indonesia had seen a significant decrease in shipments of 0.23mmt (-19 percent) to 1.01mmt as of 26 September compared to 1.24mmt during the equivalent period in August. Tangguh faced a decline of 0.07mmt (-10 percent) with 0.64mmt in shipments compared to 0.71mmt this time last month. Bontang had also recued exports by 0.18mmt (-46 percent) to 0.21mmt. These export reductions could thus not be compensated by an increase of 0.02mmt (14 percent) to 0.16mmt at Donggi-Senoro LNG. Notably, both Tangguh and Donggi-Senoro produced well above annualised nameplate capacity at 108 and 114 percent, respectively, whilst Bontang's annualised utilisation only reached 25 percent.

Malaysia had also seen a significant decrease in shipments of 0.27mmt (-14 percent) to 1.67mmt as of 26 September compared to 1.94mmt in August. Malaysia LNG managed only 1.53mmt in shipments, down by 0.20mmt (-12 percent) from the 1.73mmt we had recorded as of 26 August. Concurrently, PFLNG 2 had not yet been seen in the market whilst at this time last month it had already shipped 0.21mmt. As such, stable exports from PFLNG 1 of 0.14mmt could not compensate.

Brunei, meanwhile, had also seen an export reduction by 0.13mmt (-38 percent) to 0.21mmt, down from 0.34mmt



this time in August. The plant's annualised capacity utilisation rate thus stood at only 39 percent. As usual, the bulk of Brunei LNG went to Japan. These exports had amounted to 0.14mmt at the time of writing, unchanged month-on-month. In contrast, Thailand took in a rare 0.07mmt cargo from Brunei. China, Malaysia and Taiwan, however, had not yet received a cargo from the Sultanate at the time of writing, which equated to a combined decrease of 0.20mmt.

Russia, Peru & Mozambique: Elsewhere in the Pacific, we had recorded a production increase of 0.06mmt (10 percent) to 0.68mmt by Sakhalin-2 LNG at the time of writing from 0.62mmt during the equivalent time in August. The plant's annualised capacity utilisation rate thus stood at 96 percent. Its performance during the month to date had benefitted from a significant increase in shipments to Japan of 0.12mmt (38 percent) to 0.44mmt whilst South Korea maintained offtakes at 0.06mmt. Only China reduced imports by 0.06mmt (-25

percent) to 0.18mmt month-on-month.

Meanwhile, Peru's Pampa Melchorita LNG recorded a production increase of 0.25mmt to 0.32mmt in the month to date, representing growth of 357 percent from the 0.07mmt it had shipped this time in August. The plant's annualised capacity utilisation rate thus stood at 97 percent.

Finally, with 0.32mmt in exports at the time of writing, Coral Sul FLNG had seen no change in production compared to the equivalent period in August. The plant's utilisation rate thus stood at 127 percent.

Atlantic Basin

In line with negative growth in the Pacific, the Atlantic Basin's overall shipped LNG had decreased by 0.44mmt (-4 percent) to 10.88mmt from the 11.32mmt we had recorded as of 26 August. This translated into annualised export capacity utilisation of 71 percent for the Basin for the month to date.

North Africa & Europe: The amount of LNG shipped from within its northeastern part – comprising the EEA,

Russia and North Africa (and not including European re-exports) – had decreased slightly by 0.05mmt (-1 percent) to 4.17mmt from 4.22mmt.

Russia's Atlantic Basin capacity boosted exports by 0.41mmt (33 percent) to 1.66mmt in September compared to 1.25mmt in August. Yamal LNG experienced a significant increase of 0.33mmt (28 percent) with 1.51mmt in shipments at 124 percent of capacity utilisation whilst Portovaya LNG had raised output by 0.08mmt (114 percent) to 0.15mmt and thus also produced flat-out. Russia's Atlantic exports were still led by shipments to Europe, which were up by 0.54mmt month-on-month at the time of writing. Meanwhile, exports to the wider Pacific Basin were down by 0.13mmt as China's overall import cut during the month to date had made its impact felt.

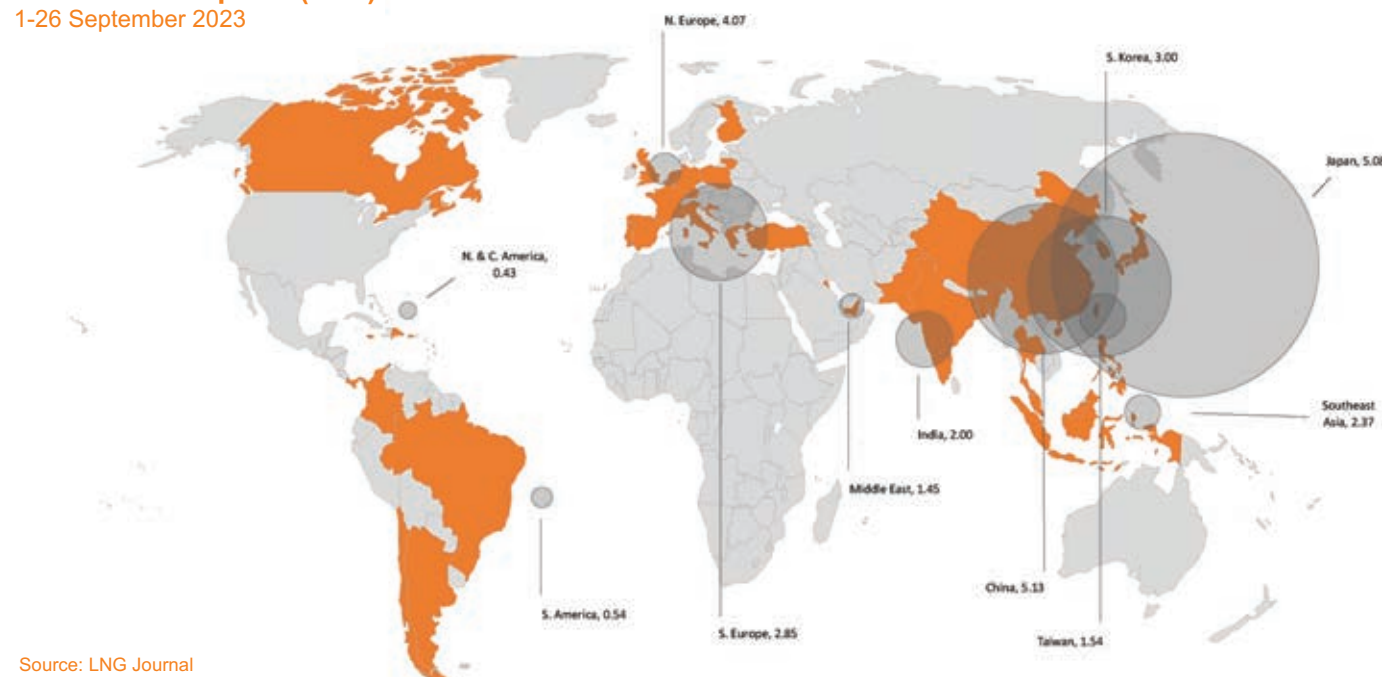
At 0.30mmt, output from Snøhvit LNG in Norway was down by 0.06mmt (-17 percent) month-on-month. The plant thus produced at 97 percent of annualised capacity at the time of writing. Apart from one cargo to the Pacific, all shipments had been sent to Europe. Notably, fresh demand in Germany and the United Kingdom for Norwegian LNG had compensated for similar decreases in France and Spain at the time of writing.

In North Africa, significantly lower output by Algeria had also overshadowed growth in Russia at the time of writing. Whilst the Skikda plant had increased exports by 0.03mmt (12 percent) month-on-month to 0.29mmt with 50 percent of annualised capacity utilisation, Arzew LNG had curtailed shipments by 0.20mmt (-25 percent) to 0.60mmt. Its annualised capacity utilisation thus only stood at 39 at the time of writing.

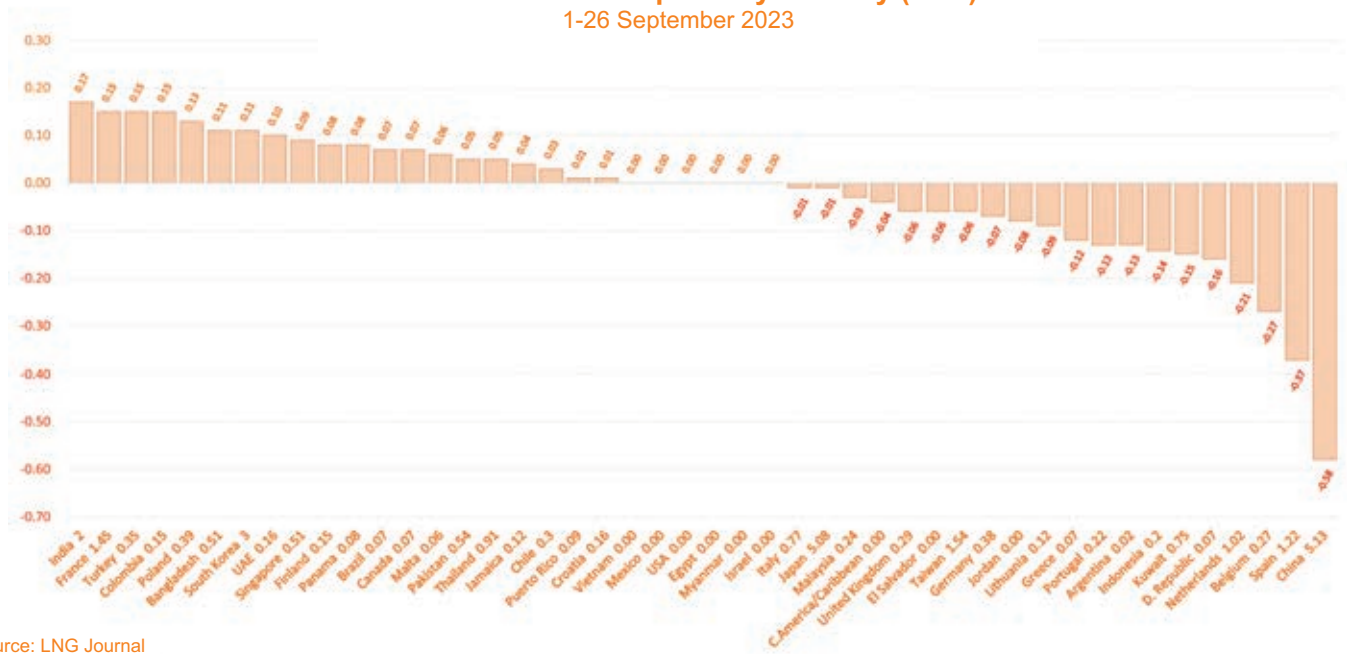
West Africa: West African LNG flows

Global LNG Imports (MMt)

1-26 September 2023



Incremental LNG Imports by Country (MMt)
1-26 September 2023



Source: LNG Journal

saw a significant decrease in shipments of 0.23mmt (-15 percent) to 1.32mmt during the report period compared to 1.55mmt this time in August.

Output at EG LNG was down by 0.03mmt (-19 percent) to 0.13mmt from 0.16mmt in August. Nigeria’s Bonny Island, meanwhile, faced a decline of 0.05mmt (-5 percent) with 0.90mmt in shipments compared to 0.95mmt in August. Additionally, Angola LNG had decreased exports by 0.07mmt (-25 percent) to 0.21mmt at the time of writing whilst Cameroon FLNG had halved shipments to 0.08mmt. The average annualised utilisation of installed capacity among West African plants thus stood at only 50 percent for the report period to 26 September. Overall, West African exporters lost market share in China, Chile, the Caribbean, Bangladesh and Kuwait.

Americas: Exports from the United States ended the report period with a significant decrease in shipments of 0.38mmt (-6 percent) to 6.27mmt compared to 6.65mmt during the month to 26 August.

Notably, Freeport LNG exports were down by 0.40mmt (-32 percent) with 0.86mmt in shipments compared to 1.26mmt this time in August. This was followed by Cameron LNG with a decrease of 0.29mmt (-25 percent) to 0.86mmt from 1.15mmt in August. Sabine Pass LNG reduced exports by 0.11mmt (-5 percent) to 2.20mmt alongside an export reduction of 0.14mmt (-28 percent) at Cove Point LNG. These export reductions were thus only cushioned by increases amounting to 0.56mmt at Calcasieu Pass LNG, Corpus Christi LNG and Elba Island LNG.

Calcasieu Pass LNG had more than doubled exports to 0.77mmt at the time of

writing, up by 0.46mmt (148 percent) from 0.31mmt in August. Corpus Christi LNG also saw a notable increase of 0.08mmt (8 percent) to 1.08mmt whilst Elba Island LNG had grown exports by 0.02mmt (17 percent) to 0.14mmt. The average annualised capacity utilisation in the United States thus stood at 87 percent at the time of writing.

In South America, Atlantic LNG in Trinidad & Tobago had seen a slight export decrease of 0.01mmt (-2 percent) to 0.44mmt at the time of writing in September. The plant's annualised capacity utilisation rate thus stood at 39 percent. Atlantic LNG shipments particularly suffered from a lack of exports to Chile, France and India whilst only partially offsetting those reductions with additional cargoes to Europe and the Americas.

Middle East

Middle Eastern LNG exports at the time of writing in September had amounted to 7.11mmt and thus represented broadly steady exports month-on-month. Accordingly, our data showed the Basin’s annualised utilisation of operational export capacity (i.e., excluding Yemen) at 103 percent.

The Middle East’s exports were underpinned by significant month-on-month growth at the UAE’s Das Island plant, which had increased by 0.15mmt (54 percent) to 0.43mmt at the time of writing from 0.28mmt during the equivalent period in August. Das Island LNG had thus produced flat-out at 106 percent of annualised capacity utilisation. Qatar’s Ras Laffan LNG complex had also increased exports, albeit only marginally by 0.07mmt (1 percent) month-on-month to 5.98mmt. Nevertheless, it had also produced above capacity at 104 percent.

Together, Qatar and the UAE thus compensated for a significant export reduction of 0.17mmt (-20 percent) to 0.70mmt in Oman as of 26 September. This time in August, the country’s plant at Qalhat had shipped 0.87mmt. Nevertheless, annualised capacity utilisation remained high at 91 percent.

In Egypt, both the Damietta and Idku LNG plants had yet to see another export since their last shipments in July. At the time, Egyptian LNG cargoes totalled 0.10mmt as Idku LNG only shipped one

cargo of 0.07mmt whilst Damietta did not ship internationally but only delivered a small 0.03mmt cargo to Egypt’s Ain Sokhna FSRU terminal. Egypt has been suffering from an energy demand crisis as the country has struggled with a protracted heatwave, which also points to insufficient gas production.

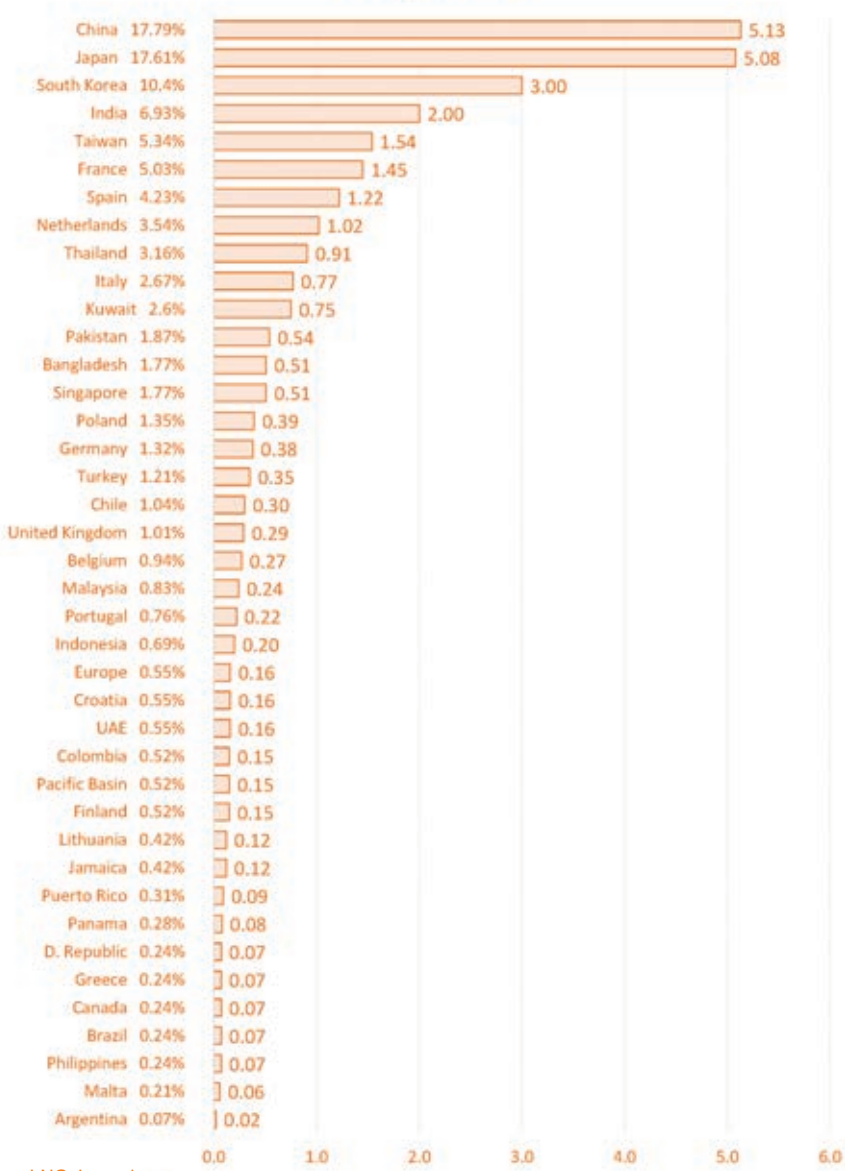
Imports & Domestic Trade

Alongside a drop in supply, global LNG offtakes were down by 0.71mmt (-3 percent) month-on-month to 28.84mmt from the 29.55mmt we recorded on 26 August. The drop in demand was mainly due to lower imports in the Atlantic Basin whilst demand reductions in the Pacific and the Middle East had not been as significant as of the time of writing.

Pacific Basin

Month-on-month Pacific Basin imports were down by 0.29mmt (-1 percent) net to 19.56mmt on 26 September from 19.85mmt on 26 August. The Basin’s annualised import capacity utilisation thus stood at 52 percent at the time of writing. Among larger-scale importers, China and Taiwan had decreased their offtakes by 0.64mmt (-9 percent) in total to 6.67mmt. Japan, meanwhile, had kept offtakes

Market Share & LNG Imports by Country (MMt)
1-26 September 2023



Source: LNG Journal

broadly steady month-on-month at 5.08mmt. Negative growth among the Pacific's major buyers during the month to date was thus only cushioned by a demand increase of 0.17mmt (9 percent) to 2.00mmt in India and an uptick of 0.11mmt (4 percent) to 3.00mmt in South Korea.

Concurrently, the roster of smaller Pacific buyers— including Bangladesh, Thailand, Chile, Indonesia, Malaysia, Mexico, Singapore, El Salvador, Myanmar and Vietnam – had collectively seen imports increase by 0.05mmt (2 percent) to 2.74mmt at the time of writing. This increase was primarily due to demand growth in Bangladesh and Singapore, where offtakes were up by 0.11mmt (28 percent) to 0.51mmt and by 0.09mmt (21 percent) to 0.51mmt, respectively. Smaller bouts of growth totalling 0.08mmt came from Thailand and Chile. This growth was tempered, however, by reductions totalling 0.23mmt (-34 percent) to 0.44mmt in Indonesia, Malaysia and El Salvador with the latter having not returned to the market after a 0.06mmt import in August. The Philippines, meanwhile, had maintained imports at 0.07mmt. Myanmar, Mexico and Vietnam, meanwhile, had continued their market absences during the report period.

Atlantic Basin

Alongside the Pacific, LNG demand in the Atlantic Basin had decreased noticeably in the month to 26 September. Demand was down by 0.46mmt (-6 percent) to 7.75mmt from 8.21mmt, with annualised utilisation of installed capacity at 32 percent.

The significant European net demand decrease of 0.75mmt (-10 percent) to 7.23mmt was an important factor. Strong negative import growth in Spain of 0.37mmt (-23 percent) to 1.22mmt in addition to reductions totalling 0.96mmt in Belgium, Italy, the Netherlands, Greece, Portugal, Germany and Lithuania could not be compensated by growth of 0.58mmt stemming from France, Poland, Malta, Croatia, Finland and Turkey.

The decrease in European demand was thus also only partially compensated by net growth in the Americas during the report period to 26 September, with total imports up by 0.13mmt (24 percent) net. The region saw monthly LNG demand increase particularly in Colombia, where offtakes were up by 0.15mmt month-on-month following no demand this time in August. Brazil, Jamaica, Panama Puerto Rico and Canada also increased their total offtakes by 0.27mmt to 0.43mmt.

This growth in the Caribbean was tempered, however, by demand reductions totalling 0.29mmt (-68 percent) to 0.09mmt in Argentina and the Dominican Republic. We had not yet recorded LNG demand elsewhere in the Americas at the time of writing.

Middle East

Middle Eastern LNG demand of 1.45mmt

at the time of writing on 26 September represented a noticeable decrease of 0.08mmt (-5 percent) from the 1.53mmt seen this time in August. Offtake levels were mainly determined by a month-on-month demand reduction of 0.15mmt (-17 percent) in Kuwait, which was exacerbated by Jordan's market absence. The country's Aqaba FSRU terminal had seen a 0.08mmt import this time in

August as Egypt was unable to maintain gas supply via pipeline. These reductions were only cushioned by a demand boost of 0.10mmt (167 percent) to 0.16mmt in the UAE and a more moderate increase of 0.05mmt (10 percent) to 0.54mmt in Pakistan. As such, the Middle East's annualised import capacity utilisation stood at 37 percent at the time of writing.







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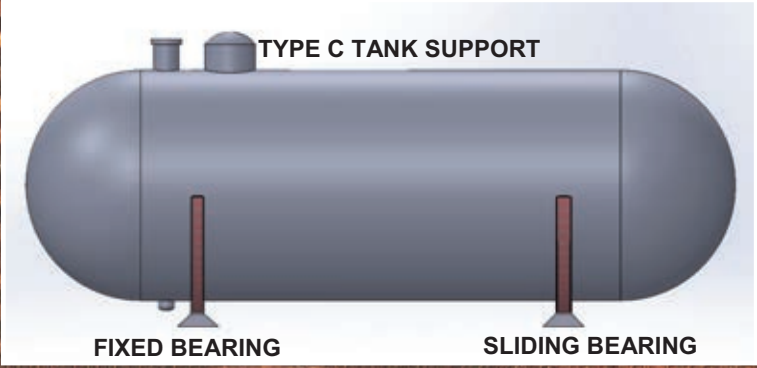




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Business case for fitting a CCS on an LNGC analysed

DNV recently co-ordinated a Joint Industry Project (JIP) set up to examine the business case and feasibility of fitting a carbon capture and storage (CCS) system on board a 174,000 cu m LNGC. Technical Editor Ian Cochran reports.

For the project, the LNGC was assumed to start operating in 2025.

The JIP partners were - DNV, TotalEnergies (vessel charterer), HD-HHI (shipbuilder and CCS equipment manufacturer), SK Shipping (vessel owner) and Marubeni as financier.

Specifically, the project looked at whether a strong business case could be made for fitting a CCS on an LNG powered vessel to tackle the de-carbonisation challenge set by the IMO and others, following the success of a project last year, in which a consortium analysed several de-carbonisation pathways.

DNV said that the IMO's de-carbonisation plan was best illustrated by using the carbon intensity indicator (CII). This measures, in grams of CO₂ emitted per cargo carrying capacity and nautical miles, how efficiently a ship will transport cargo in terms of carbon emissions.

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It was shown that even with the added costs in the least favourable scenario, the fitting of an CCS still makes a highly relevant business case going forward. In addition, the system gives the owner/operator increased flexibility and marketability, as the CCS reduces the impact of fuel price fluctuations.

If biofuels become very expensive, or are in short supply, CCS will help the vessel operator by providing the option to use fossil fuels.

On land, CCS is a mature product and several projects are underway to adapt the technology for marine use, DNV said.

In this case study, the CCS' process arrangement will be sited on deck to minimise any interference with other equipment and the line of sight from the navigating bridge. The CO₂ capturing skid (CO₂ absorber, stripper, solvent tank and solvent heat exchanger) will be located aft behind the deck house.

The CO₂ liquefaction skid (pre-cooler, dryer, compressor and condenser) will be placed amidships, while several storage tanks for the captured and liquefied CO₂ will be fitted on deck. Some hull reinforcements and a raised superstructure may be necessary.

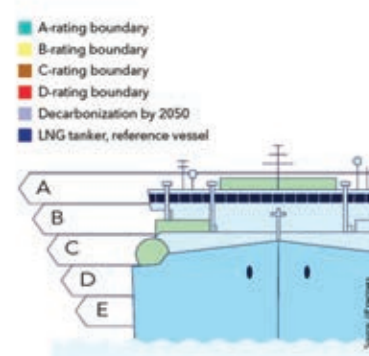
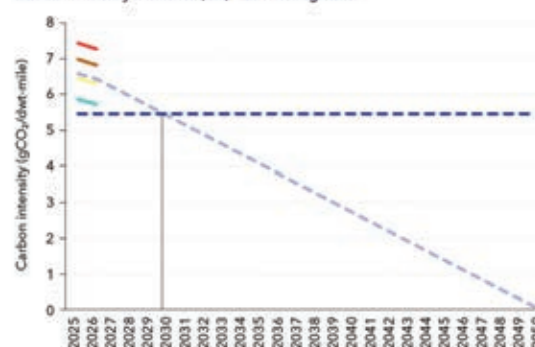
For the project, four CO₂ tanks, each of 750 cu m capacity, were recommended.

Several scenarios

The JIP examined several scenarios taking into account key fixed assumptions. The results concluded that a CCS system fitted with an energy penalty of 14% was inefficient. However, with a better performing CCS solvent pushing the energy penalty to 10% or even 9%, the fuel costs would be lower, as the vessel could use lower priced fossil fuels without blending in bioLNG with the CCS in operation.

In this scenario, the total OPEX will be slightly higher than those of a vessel not fitted with a CCS due to extra costs

Carbon Intensity Indicator (CII) - the driving force



Source: DNV

resulting from offloading, as well as the CCS CAPEX. Here, the CCS is operational for about two thirds of the vessel's lifecycle.

DNV stressed that following the in-depth study, what is clear is that a CCS offers flexibility for LNGC operators taking their de-carbonisation journeys from 2030.

A better performing, reasonably priced CCS and more powerful CO₂ solvents will greatly improve the business case. CSS system manufacturers should be incentivised to continue their R&D, the class society and co-ordinator continued.

Also of utmost importance is a logistics and value chain, which includes in port offloading infrastructure for captured liquefied CO₂. CCS systems are being planned for many ports but for these to succeed, low offloading costs are crucial and should be underwritten by governments, as part of their national de-carbonisation strategies.

The CCS' feasibility on the vessel used in the study depends on the energy penalty associated with the CO₂ capture rate that must be adhered to in order to remain compliant. To minimise OPEX,

the CCS must be designed to enable a balance to be struck between the optimum capture rate and a minimum energy penalty.

If future fossil fuel prices are low and bioLNG prices are high, this will improve the business case for a CCS fitted on board significantly.

Given that the price of fuel is almost non-negotiable, it is a strong argument for a CCS, as it reduces the ship operator's exposure to fuel price fluctuations.

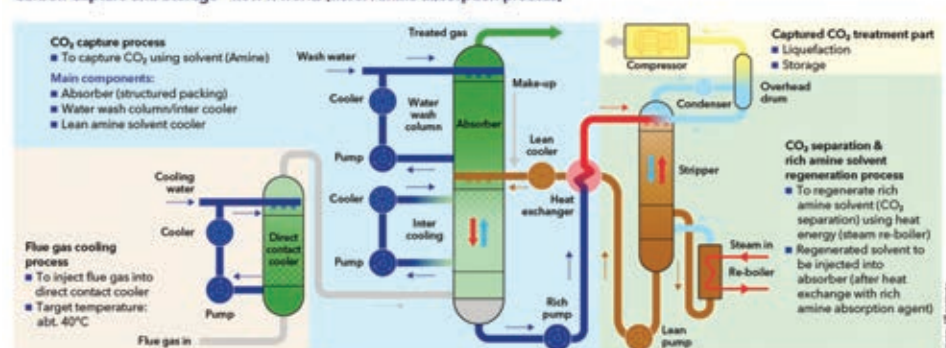
In summary, DNV said that after a thorough investigation, it was evident that that a CSS offers flexibility for LNGCs on their de-carbonisation journey from 2030.

Due to uncertain fuel availability and pricing, a CCS presents a robust solution even if using a relatively poor performing system.

It becomes even more relevant should energy penalties improve, offloading CO₂ costs fall, CO₂ taxes rise and carbon capture rates increase.

Finally, retrofitting a CCS in the 2030s, such as during the second drydocking phase, will be a positive result for LNGCs, the study revealed.

Carbon Capture and Storage - how it works (here: Amine absorption process)



Source: DNV

On-board CCS arrangements



Source: DNV

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Advancing the LNG industry through materials technology

*LNG has a pivotal role to play in the greater adoption of gas as part of the energy transition from more carbon-intensive fossil fuels toward renewable sources.**

Many vessel owners and operators are moving towards the greater adoption of gases – whether LNG, propane, or ethane – which are considered transitional fuels.

For its part, the LNG industry should aim to de-carbonise as much of its value chain as possible to become more efficient, profitable, and sustainable. Greater electrification and integration with renewable sources can provide excellent opportunities for LNG assets to achieve their net-zero emissions (NZE) ambition. Materials technology can play a key role.

To enable and potentially accelerate the energy transition, it is critical that LNG vessel and facility operators adopt the most effective production processes available. However, there can be significant inhibitors to achieving these ambitions.

Cryogenic conditions, corrosive seawater, and several kilometres of vulnerable tubes have traditionally presented a recipe for potentially huge productivity losses in the LNG regasification process, due to corrosion and leakage.

The use of direct seawater in LNG vaporising heat exchanger units has been a common practice for years but presents a significant corrosion challenge. High levels of chlorides in the water, the higher ambient temperatures that the equipment may encounter, and the lack of effectiveness in flushing the units can lead to severe corrosion of heat exchanger tubes.

Crevice corrosion, one of the most common forms of corrosion affecting LNG heat exchanger tubing, can occur in crevices and other narrow spaces that are exposed to chloride-bearing seawater.

Traditionally, the most popular materials used in the manufacture of vaporising units have been super austenitic stainless steels such as AL6XN and 254 SMO.

However, in the fight against seawater corrosion, current alternatives for LNG cryogenic vaporiser tubing involve steep trade-offs. Super alloys, such as alloy 625 or alloy C276, may improve performance but are costly. More economical materials are available but can carry the risk of significant leakage.

Alternative heating solutions, such as the indirect seawater/glycol heating

process can eliminate seawater corrosion. However, they are expensive to implement and maintain and can take up significant space on board an FSRU.

Progressive partner

LNG producers need solutions that deliver lasting performance and are proven to outperform current materials in corrosion resistance, mechanical strength, and weldability.

To improve the direct seawater process, vaporiser designers and fabricators have investigated material and design alternatives to extend the life of vaporiser units, or even mitigate seawater corrosion.

An answer to this material challenge has been developed by Alleima, a manufacturer of high-value-added products in advanced stainless steels and special alloys, as well as products for industrial heating. The company has developed a stainless-steel grade called Sanicro® 35 (UNS N08935) PRE 52, which can significantly extend the lifespan of LNG heat exchanger tubes.

The super-austenitic microstructure provides impressive impact toughness in cryogenic environments, superior pitting corrosion resistance in chloride-containing environments, and improved crevice corrosion in seawater, compared to some common nickel alloys.

The material's crevice corrosion resistance properties make it ideal for use in shell-and-tube heat exchangers. Deploying Sanicro® 35 for FSRU vaporiser units using seawater as a heat transfer media enables existing direct seawater users to simply re-tube their equipment. Being seamless allows for the upgrading of the tube material without the challenging demand for tube-to-tube sheet back seal welding or in-bore welding.

High mechanical strength of the material (a minimum of 425 MPa in a Rp0.2 for tubes made from Sanicro® 35) under cryogenic conditions enables significantly thinner tube designs, depending on the weight savings per vaporiser. The thinner design can also improve heat transfer to further advance operational efficiency.

As a result, the material represents a significant advance for cryogenic

vaporiser tubing, offering excellent resistance to the highly corrosive conditions found in LNG applications.

Sanicro® 35 allows for the maintenance of a simplified vaporiser design for FSRUs based on the continuous use of direct seawater. The fact that the tubes can be easily welded using standard procedures and consumables helps reduce installation costs. The high mechanical strength of the material means designs can be easily tailored and downtime, due to corrosion resistance and leakage, can be substantially reduced.

This can accelerate productivity while simplifying maintenance and inspection.

Challenging corrosion

In direct seawater vaporising units, the two main corrosion challenges impacting materials used are crevice corrosion and pitting corrosion.

Sanicro® 35 was tested for critical crevice temperature (CCT) alongside Alloy 625 and Alloy C276. Coupons were tested using two methods: in the first method (ASTM G48 method D developed for nickel alloys with 6% iron chloride (FeCl3)), the test lasted 72 hours and a torque of 0.28 Nm was applied; and, in the second method (ASTM G48 Method F developed for stainless steels), a torque of 1.58 Nm was applied, and the test lasted 24 hours.

In both test methods, Sanicro® 35 provided a CCT that was significantly higher than for alloy 625, despite both materials having a similar PRE. In ASTM G48 method D, Sanicro® 35 showed a CCT of 52.5 °C, while in ASTM G48 method F, the CCT was 45 °C. The CCT values for alloy 625 were 45 °C and 25 °C, respectively.

In ASTM G48 method D the CCT values for Sanicro® 35 were similar to alloy C276, which has a higher PRE. However, in ASTM G48 method F it had a better CCT than C-276. Across both tests, Sanicro® 35 was shown to offer more resistance than alloy 625, while in the test for stainless steels with a higher crevice force, Sanicro® 35 displayed a higher CCT than alloys 625, C276, and 254 SMO.

Pitting attacks can occur on steel tubes exposed to high chloride-containing



Author Barinder Ghai

seawater. The material can be penetrated in a very short time, leading to leakage, reductions in productivity, and unscheduled maintenance.

In a modified ASTM G150 test, polished samples of Sanicro® 35 were used for critical pitting testing (CPT), using a test solution of 3M Magnesium Chloride (MgCl2). This is a more aggressive solution than the standard G150 sodium chloride (1M NaCl) test.

Previous tests had proven that the CPT for Sanicro® 35 was 110 °C or 230 °F. This was found to be 45 °C (80 °F) higher than the CPT identified in comparisons with 6Mo alloys such as 254 SMO, indicating Sanicro® 35's suitability for high chloride content environments. A PRE of 52 means Sanicro® 35 has a pitting resistance high enough for excellent resistance in seawater applications.

For the LNG industry to maximise its potential, it must be prepared to constantly innovate and make changes to bring about the biggest differences. That requires the adoption of best practices, processes, and materials technologies. Advances in materials can create industry benefits, increase energy-efficiency and sustainability, as well as driving greater customer benefits. ■

*This article was written by Barinder Ghai, Director Technical Marketing and New Business Development EMEA, at Swedish-based technology company, Alleima.

Cylinder control technology promises to slash LNG methane slip

New technology designed to halve the amount of methane slip from gas engines, promises to improve the environmental profile of LNG-fuelled vessels by optimizing combustion processes. Fuelling Editor Malcolm Ramsay has more.

A common occurrence in all LNG-powered engines, methane slip occurs when unburned gas fuel is released to the atmosphere instead of being combusted in the engine. While natural gas engines are typically designed to have at least 98% combustion efficiency - meaning at least 98% of fuel input to the engine is burned - this also means that 2% of methane is released methane slip.

"We have managed to reduce methane slip by 85% since 1993," Göran Österdahl, sales director of marine power at Finnish marine technology firm Wärtsilä tells *LNG Journal*, noting that the firm now has a technology roadmap addressing methane emissions "for both four-stroke and two-stroke engines" with the objective of providing "the right solution both for new builds and existing vessels."

Wärtsilä, Furetank strengthen partnership

To achieve this aim, Wärtsilä recently partnered with Swedish shipping firm Furetank to co-develop two new technologies aimed at halving the amount of methane slip in LNG engines. The first technology being studied under this partnership, is known as the Greenhouse Gas (GHG) reduction package and seeks to actively controls the engine during demanding conditions – such as manoeuvring, harsh sea conditions or varying fuel quality – allowing for optimisation of combustion and minimising unburned gas emissions.

"The GHG package reduces unburned total hydrocarbon (THC) emissions

because it reduces the charge air pressure and air-fuel ratio," Österdahl notes. "The upgrade is based on adaptive combustion phasing control, which optimises engine behaviour according to the ambient and operating conditions."

In parallel with this research, the partners are also exploring a Low Load Optimization package. This solution reduces methane slip during idling or low engine loads, such as loading and unloading operations at harbour.

Österdahl explains that this Low Load Optimisation package includes "a new performance calibration strategy, including advanced combustion phasing controls, which enable an engine to operate efficiently at various conditions."

By monitoring and actively controlling the air/fuel ratios for each individual cylinder, this package is able to deliver the best balance for low load operations. And in early tests, performed in the laboratory and at sea, the results have been highly promising, with methane slip reduced by around 45-50%.

"This individual control is made possible through the embedded, powerful Wärtsilä Unified Controls (UNIC) system," Österdahl adds, noting that these "are great results, far exceeding what we had expected or technically believed."

For Furetank, the findings are already shaping the next evolution of their Vinga vessel series, as part of the firm's strategy to develop the most energy efficient ships in their segment.

"We had many discussions with Wärtsilä during the past years on how to



Furetank LNG vessel

counter the methane slip. It is a tough nut to crack and the most important technical issue for us to solve," Clas Gustafsson, Technical Manager at Furetank comments. "There is an ongoing chase for new engine solutions which will only intensify with the EU ETS system and stricter IMO regulations. We are happy to have this fast track to developers and manufacturers of advanced engine technology."

Daphne launches SlipPure trial

Swiss climate solutions firm Daphne Technology has also recently announced a major stride forward in methane abatement as it SlipPure technology will be installed aboard the LNG carrier Maran Gas Chios.

This pilot initiative will see the experimental system retrofitted to one of the Wärtsilä 34DF auxiliary engines on board the Maran Gas Chios, allowing for detailed readings and technical analysis of the SlipPure technology, and paving the way for further research next year.

"We are thrilled to see this pilot project taking shape together with industry leaders to address methane emissions with our SlipPure solution," Mario Michan, CEO of Daphne Technology, says. "By retrofitting our technology onto an LNG carrier, we aim to showcase its effectiveness in reducing methane slip, contributing to a more sustainable and environmentally responsible maritime industry. This collaboration... marks a significant step forward in our journey to decarbonise hard-to-abate industries."

This trial is supported by several key

players in the maritime sector, including: Lloyd's Register as independent auditor; Maran Gas Maritime, as the ship operator; Wärtsilä as engine provider; and Shell as charterer of the vessel and project co-ordinator.

"Reducing methane emissions is a top priority for the maritime industry," Steve Brown, Technology Manager at Shell, comments. "and this trial of innovative technology on an operational ship marks an important milestone. LNG is the lowest-carbon marine fuel available at scale today, and this project, combined with efforts to reduce upstream methane emissions, will help to enhance LNG's decarbonisation potential even further."

MAN trials ME-GA opti

Tackling methane slip through individual cylinder control is also on the agenda for German engine developer MAN, which this quarter completed gas trials for the first LNG carrier utilising its Exhaust Gas Recirculation (EGR) system on its ME-GA engines. Sporting a feature called 'ME-GA opti', this system offers optimal engine operation through individual cylinder control and aims to significantly reduce methane slip.

"We have made EGR standard for the ME-GA, thereby reducing methane slip compared to first-generation Otto-cycle engines without EGR, which simultaneously improves fuel efficiency in both gas and fuel-oil operation," Bjarne Foldager, Senior Vice President and Head of Two-Stroke Business, MAN Energy Solutions, explains. "ME-GA-opti continues this trend and will further boost the ME-GA's reputation." ■



The Angelicoussis Group LNG carrier, Maran Gas Chios

For the Record

ADNOC Gas, the stand-alone spin-off from Abu Dhabi National Oil Company in the United Arab Emirates, has signed a natural gas supply agreement with Chinese major PetroChina International.

The company said the deal was valued at up to 2 billion UAE dirhams (\$550 million) and underscored the company's growing global presence, especially in the East Asian and South Asian energy markets.

ADNOC Gas was spun off from ADNOC in March 2023 and signed its first deal in the form of a three-year LNG supply agreement with French major TotalEnergies.

Following an initial public offering ADNOC Gas is now listed on the Abu Dhabi Securities Exchange as a separate company and is responsible for running Abu Dhabi's world-scale LNG, natural gas processing and gas marketing operations in the UAE.

The ADNOC Gas liquefaction plant on Das Island in the Arabian Gulf currently has export capacity of 6 million tonnes per annum. ADNOC is also planning to build another LNG production plant with nameplate capacity of around 9.6 MTPA and likely located at Al Ruwais in Abu Dhabi.

"LNG plays a crucial role as a transitional fuel, generating lower-carbon emissions compared to other fossil fuels. ADNOC Gas is committed to ensuring reliable supply to its customers around the world," said a statement.

"It also serves as an important raw material in industrial value chains and its versatility allows its application across a broad range of industries, fostering economic growth," ADNOC Gas added.

Ahmed Mohamed Alebri, Chief Executive of ADNOC Gas, said he was pleased to sign this LNG supply agreement with PetroChina to further strengthen the company's presence in one of the world's fastest growing gas markets.

"China continues to be a key market for ADNOC Gas and this agreement further reinforces our role as a major LNG supplier," Alebri added.

The deal with PetroChina follows

several other significant international LNG sales agreements since the spin-off, including with Japan Petroleum Exploration Company and India Oil Corp. Limited (IOCL).

The Abu Dhabi-listed firm signed a 14-year supply agreement with IOCL for the export of up to 1.2 million tonnes per annum of LNG in July 2023.

"Energy is an important area of collaboration between China and the UAE," said Wu Junli, Chairman of PetroChina International.

"We are delighted to partner with ADNOC Gas, a company committed to providing stable and reliable energy supply," Wu added.

"This agreement signifies an extension of the cooperation between our two companies and reaffirms PCI's commitment to ADNOC Gas as our global partner," he stated.

ADNOC Gas also delivered the first ever LNG cargo to be shipped to Germany from the Middle East in February 2023.

The UAE company additionally invested \$3.6 billion in August to boost its gas processing capabilities as the company looks to expand its production capacity.

The investment is aimed at providing sufficient energy to the UAE's growing industrial sector while stimulating economic growth and diversification.

AVENIR LNG, the London-headquartered global energy supplier for small-scale projects and gas carriers, has awarded the management of three LNG bunker vessels to Wilhelmsen Ship Management of Norway.

The bunkering ships concerned are the "Avenir Achievement", the "Avenir Ascension" and the "Avenir Aspiration".

"We look forward to managing these state-of-the-art LNG bunker tankers, which hold a pivotal role in the industry's ongoing energy transition," said Carl Schou, Chief Executive and President of Wilhelmsen Ship Management.

"We are excited about the opportunities this collaboration will bring and the value it will deliver to both parties," Schou added.

Avenir is a new customer to Wilhelmsen. The three vessels were previously managed by Hoegh LNG, one of three shareholders in Avenir LNG alongside London-based Stolt Nielsen Ltd and Golar LNG.

"Hoegh LNG have contributed enormously to the success of Avenir LNG since the company was established in

2018, paving a solid foundation for the future," said Avenir LNG CEO Peter Mackey.

"We applaud all their hard work and Hoegh LNG will continue to be key part of our growth trajectory as a key shareholder," Mackey added.

CEO Mackey explained that with "a new strategic vision and robust asset base" Avenir was well-placed to weather what can often be a volatile market.

The Oslo-stock listed company currently has a total fleet of five tankers in the water.

The latest vessel to join the Avenir fleet was the "Avenir Achievement" with 20,000 cubic metres capacity in May 2022.

Avenir also owns a small-scale LNG terminal in Sardinia, with assets/partnership now operating in China, Malaysia, the Mediterranean, the Baltic Sea and the Caribbean.

The joint venture company had agreed at the end of March 2022 to buy out the shareholdings of its Italian partners in the LNG terminal at Port of Oristano in Sardinia.

The Higas terminal was the first dedicated small-scale LNG facility in the Mediterranean.

The terminal also has the capacity to load up to 8,000 LNG trucks per annum via the two truck-loading bays.

EQT CORP., the leading US natural gas producer in the Appalachia Shale Basin of the northeast US, said it was seeking overseas LNG customers after signing a second accord with a US Gulf Coast project and this time with the proposed Commonwealth LNG venture in Louisiana.

EQT said the deal with Commonwealth was for 1 million tonnes per annum of LNG under a 15-year tolling agreement.

The Pittsburgh, Pennsylvania-based exploration and production company said the Commonwealth venture anticipated a final investment decision on the project in the first quarter of 2024, with first cargo deliveries expected in 2027.

Toby Z. Rice, President and Chief Executive of EQT, said the accord with Commonwealth represented another step forward in EQT's risk-adjusted LNG strategy, which seeks to diversify a portion of its production to international markets via arrangements that offer the best combination of upside exposure and downside risk mitigation.

"Our tolling capacity gives us the

flexibility to sell our gas directly to end-users globally and we are currently pursuing long-term purchase agreements with prospective international buyers," Rice explained.

"EQT's scale, peer-leading inventory depth and environmental attributes uniquely position us to provide energy security while driving emissions reductions via coal displacement both domestically and abroad. We are excited to begin unleashing EQT's reliable, low emissions natural gas on the global stage," the CEO declared.

EQT, which has shale-gas operations in the Marcellus and Utica formations of western Pennsylvania, Ohio and West Virginia, said in its last earnings that quarterly production dropped to 471 billion cubic feet equivalent from 502 Bcfe in the second quarter of 2022.

EQT's first LNG accord was signed earlier in 2023 with US pipelines and terminals company Energy Transfer, which signed three heads of agreements in July 2023 for volumes, the other two of them with global commodities firm Gunvor and with US company Chesapeake Energy Marketing.

Commonwealth LNG is developing its LNG export plant with at least 8.4 million tonnes per annum of output and located on the Calcasieu River in Louisiana.

Commonwealth is talking with other companies as well and has already signed LNG Sale and Purchase Agreements with the Singapore trading unit of Australian liquefaction plants operator Woodside.

The SPAs are for the supply to Woodside of up to 2.5 MTPA of LNG over 20 years from Commonwealth's export plant.

Woodside said its agreements with Commonwealth secured low-cost LNG volumes in the Atlantic Basin in a period of expected strong demand as Europe lines up firm alternatives to Russian pipeline gas.

Commonwealth's plan is for an export plant consisting of six liquefaction Trains, each with a nominal production capacity of 1.4 MTPA and totalling 8.4 MTPA on a nameplate basis.

EQUINOR, the Norwegian oil and gas company and LNG export plant operator has submitted a fast-track plan to the government for development and operation of the Eirin natural gas field gas field in the North Sea that will provide more supplies to the Europe.

Eirin is a gas field located 250 kilometres (155 miles) west of Stavanger.

It was proven back in 1978 and was long part of the Gina Krog field development but was later put on hold.

“Recoverable reserves in the field are estimated at 27.6 million barrels of oil equivalent, most of which is gas,” said Equinor.

The Eirin field will be developed as a subsea facility tied to the Gina Krog platform in the North Sea.

Total investments are estimated at just over 4 billion Norwegian crowns (\$370 million). The field is situated at a depth of around 4,000 metres and the water depth at the field is about 120 metres.

The licence partners are Equinor with 78.2 percent and Kuwait Foreign Petroleum Exploration Company (KUFPEC) in Norway with 21.8 percent.

Equinor explained that the field would be developed as a subsea facility, which will be adapted and ready for tie-in of future discoveries in the area, including an optional expansion for two to four new wells.

The development solution is a subsea template tied back to Gina Krog through a production flowline and an umbilical.

“Utilising Gina Krog’s infrastructure will enable Eirin to bring new gas to Europe fast, with good profitability and low CO₂ emissions from production,” stated Camilla Salthe, Equinor’s Senior Vice President for field life extension.

“The development will extend Gina Krog’s productive life from 2029 to 2036, and will be vital for the Sleipner area,” Salthe added.

Equinor noted that since the start of the European natural gas crisis, there has been close cooperation with Norwegian authorities to deliver as much gas as possible to Europe.

“Increased gas export from Gina Krog, by exporting gas that was previously injected to improve oil recovery, was an important contribution,” Equinor added.

“At the same time, this brought the need to accelerate projects to extend the field life,” the company said.

Equinor further explained that the Eirin field was a central part of this work and the project has been matured in record time with the production start-up expected as early as 2025.

“Extending Gina Krog’s productive life also gives us the opportunity to mature additional new reserves in the area. We’re still seeing possibilities for new discoveries, which is why Eirin’s new subsea facility will enable tie-in of new fields,” stated Equinor.

EXXONMOBIL Corp., the US major and significant participant in the liquefied natural gas business, said oil, pipeline natural gas and LNG would still make up more than half of the world’s energy supply through 2050 because the usefulness of oil and gas in meeting the world’s needs remained unmatched.

The ExxonMobil “2023 Global Outlook” for energy said that new LNG export projects were expected to diversify the market and meet about 50 percent of the growth in natural gas demand to 2050.

“Natural gas trade is a critical link between resource-rich regions and demand centers in Asia Pacific and Europe,” said the ExxonMobil Outlook.

The report said that North America’s “abundant unconventional natural gas” is expected to feed new LNG projects and meet growing demand.

“Africa’s natural gas production could drive economic growth and prosperity, as demand and exports are poised to accelerate, led by Mozambique, Nigeria, Algeria and Egypt,” the Outlook added.

“The Middle East is expected to continue investing in LNG export projects, more than doubling their export capacity by 2050 while Europe is likely to continue to rely on natural gas trade to meet consumer demand as local production declines,” ExxonMobil explained.

In 2021, Asia-Pacific’s LNG imports were larger than all other regions combined.

“Around 2030, the region’s total natural gas demand will likely surpass North America’s and in 2050, LNG trade is expected to meet about half of Asia-Pacific’s natural gas demand,” said the report.

About half of the growth in natural gas demand is for electricity generation and 40 percent is for industrial use. Residential users rely on natural gas for heating and cooking and there is increased penetration of natural gas-fueled buses and trucks to help urban areas manage air quality.

LNG trade in 2021 met about 10 percent of global natural gas demand and by 2050, the same LNG trade will meet nearly 20 percent of the world’s natural gas needs.

The Outlook forecasts that the Asia-Pacific region would absorb about 85 percent of the growth in LNG to 2050, helping the region to reduce its carbon intensity while sustaining economic growth.

ExxonMobil noted that China’s “war on smog” and “blue-sky” policies have led to

“measurable improvements in urban air quality” while boosting demand for LNG imports.

“India and other Asian importers are expected to look to LNG to supplement domestic natural gas production, often leveraging existing natural gas infrastructure,” said the report.

Europe is expected to continue to tap competitive LNG to diversify its natural gas import portfolio.

“While about 70 percent of LNG exports originated in Asia Pacific, the Middle East or Africa, North America’s LNG exports are projected to grow the most on an absolute basis as low-cost unconventional gas production prompts investment,” said the Outlook.

“Projects developed in East Africa, Qatar and Russia are expected to expand and diversify LNG exports,” it added.

“The LNG market is expected to remain highly competitive due to abundant natural gas resources and many aspiring exporters,” the report declared.

The diversity and reliability of LNG supplies, combined with the flexibility to ship it where it is needed, make LNG a favorable choice for nations needing dependable, lower-emission energy sources to foster economic growth.

ExxonMobil forecasts that in China and other nations in the Asia-Pacific region, natural gas demand would double from 2021 to 2050 and coal would still play a significant role in the region.

“Coal demand grows by about 40 percent in developing Asia-Pacific countries outside China, partially offsetting major strides to reduce the use of coal in developed countries and China,” the report explained.

In 2050, coal is expected to still meet about 14 percent of global energy demand and produce 27 percent of energy-related carbon-dioxide emissions.

ExxonMobil’s Outlook also emphasized that given that oil and natural gas are projected to remain a critical components in a global energy system through 2050, “sustained investments are essential” to offset depletion as production naturally declines by 5-7 percent per year.

“Natural gas grows over the period, reaching almost 30 percent of all demand and oil continues to play a leading role, with growing demand driven by commercial transportation and feedstocks for the chemicals industry,” said the report.

Natural gas, including LNG-powered ships, will remain a prominent energy

source as will biofuels to be used for sustainable aviation fuels.

ExxonMobil noted that while oil use was expected to decline significantly in personal transportation, it would remain essential for the industrial processes and heavy-duty transport like shipping, long-haul trucking and aviation that underpin economic growth.

ExxonMobil also stated that “If every new passenger car sold in the world in 2035 were an electric vehicle, oil demand in 2050 would still be 85 million barrels per day,” which was the same as it was around 2010.

Energy from solar and wind is projected to more than quintuple, from 2 percent of the world’s supply to 11 percent.

“Even in a higher-energy future, the rise of renewables, the decline of coal and improvements in energy efficiency mean that the world will produce far fewer carbon emissions than it does today,” said ExxonMobil.

The Houston-based major also outlined the future roles of Carbon Capture and Storage (CCS) and the future use of hydrogen and biofuels.

“CCS is a proven and safe technology that reduces emissions from manufacturing and power generation. CO₂ emissions are captured, transported by pipeline to suitable geologic formations and permanently stored deep underground,” the Outlook said.

However, on hydrogen the ExxonMobil explanation also highlighted its complexity.

Hydrogen like electricity is a secondary energy that has to be produced using other energies.

“Hydrogen is a fuel that, when combusted, produces only water as a by-product. One way to produce low-carbon hydrogen is to convert natural gas into hydrogen and carbon dioxide with the hydrogen used as fuel while the CO₂ is captured and stored,” explained the report.

“Other sources of low-emission hydrogen involve using electricity from nuclear or renewables to split water molecules into hydrogen and oxygen,” the report added.

ExxonMobil said that Biofuels can be a drop-in substitute for fossil fuels in a low-emissions manner on a life-cycle basis.

“Particularly useful in commercial transportation, biofuels return to the atmosphere the CO₂ that was absorbed during the growing process, thereby making them a low-carbon alternative,” it added.

ExxonMobil also pointed out that while technology advances are required to meet ambitious net-zero targets only two of the 55 technologies needed to reach net-zero emissions by 2050 are on track.

The company also favoured “market-driven solutions” reducing emissions.

“Governments across the world can't afford to pay in perpetuity to reduce the amount of emissions needed to be removed or avoided,” stated ExxonMobil.

“Ultimately, to achieve global emission-reduction goals, the world will need to move to widespread adoption of markets where society as a whole incentivizes driving emissions down,” the Outlook said.

FRANCE'S port of Le Havre has again become a liquefied natural gas importation point for the first time since the 1980s as commissioning activities were starting for the floating storage and regasification unit (FSRU) “Cape Ann” after its safe arrival in the face of protests.

The LNG import terminal project had been in the planning stages for more than a year before the 145,130 cubic metres “Cape Ann” FSRU arrived to begin a five-year contract.

The French-flagged “Cape Ann” docked in Le Havre after leaving Gibraltar on September 12.

“Cape Ann” is one of several vessels TotalEnergies has on charter from Norwegian shipping company Høegh LNG and had previously been deployed as an import terminal at the port of Tianjin in northeast China.

The arrival of the FSRU on September 18 brought out large numbers of police to counter the extremist demonstrators who endangered lives by trying to board the FSRU in open water.

Until now, France has been supplied by four LNG import terminals, two at Fos-sur-Mer east of Marseilles, one at Montoir-de-Bretagne in Western France and another at the Channel port of Dunkirk.

The FSRU was eventually moored after several delays at the Océan dock at the Bougainville quay in Le Havre.

TotalEnergies said it condemned some of the demonstrators who went beyond expressing free speech with “violence in the verbal, physical and material” forms.

Four tugboats from Le Havre went out to the Channel to guide the FSRU to the Bougainville quay and law enforcement officers were positioned in numbers in and around the port, while the eco-extremists launched boats to try and hinder maritime operations.

The northwest Normandy port had previously hosted an onshore facility that handled deliveries of LNG from Algeria.

The previous Le Havre LNG terminal was operational between 1965 and 1989 and was run by Gaz de France.

The terminal received cargoes from Algeria on the predecessor to today's modern LNG carriers, the “Jules Verne” gas tanker, though the onshore facility was eventually closed at the end of the 1980s.

The FSRU project in Le Havre will allow France to increase its regasification capacity by around 5 billion cubic metres per annum, which corresponds to the average annual gas consumption of more than 4 million households in France.

GTT, the French LNG storage technology company, has received another order from Dalian Shipbuilding Industry Co. in Northeast China for the tank designs for three LNG carrier newbuilds.

GTT said the latest order was received from its technology partner Dalian Shipbuilding on behalf of Chinese company China Energy.

The Paris-based company added that the tanks chosen for these three vessels, which will each offer a capacity of 175,000 cubic metres, will be the Mark III Flex membrane containment system.

GTT said that the delivery of the vessels was scheduled for the first half of 2027 and the first quarter of 2028.

The latest order is the second this month from the Dalian yard after a previous order for two ships from Sea Jade Investment, a joint venture comprising Hong Kong-based shipping company Wah Kwong as well as China Gas and China Ship Leasing.

Those two vessels will each have capacity of 175,000 cubic metres and will be fitted with the GTT Mark III Flex membrane containment system.

The delivery of the vessels for the Sea Jade consortium is scheduled between the first and the third quarters of 2027.

GTT has also noted in its most recent newsletter just published that the LNG sector had demonstrated more than 60 years of successful and safe operations.

The French firm said it had contributed to this success though continuous innovation in new solutions, new design proposals and efficient assistance in the construction of well over 2,500 LNG storage tanks.

GTT is also advancing marketing propositions for its modular LNG storage tanks that can be delivered by ships or barges, for example, to areas isolated from

on the ground engineering expertise.

“Amid rising global energy prices and higher demand, new greenfield onshore projects are running into inflationary headwinds and facing significant challenges to deploy cost-effective LNG storage solutions,” said GTT.

“This is particularly true when accessing remote areas where logistics are complex and skilled manpower is difficult to deploy,” the firm added.

“Moreover, as projects become increasingly modularised, slower erection times inherent to stick-built tanks often drive overall project delivery,” GTT said.

HOEGH LNG and Aker BP, two Norwegian companies, have entered a strategic partnership to develop a carbon transport and storage offering for industrial carbon-dioxide emitters in Northern Europe.

The agreement combines the respective strengths and expertise of the companies to establish a “strong value chain for CCS” on the Norwegian Continental Shelf (NCS) that includes gathering, transportation and securely injecting CO2 for permanent storage in subsea reservoirs.

Aker BP is a Norwegian oil exploration and development company focusing on petroleum resources on the NCS.

The company listed on the Oslo Stock Exchange operates six main field assets, the Alvheim, Ivar Aasen, Skarv, Edvard Grieg, Ula and Valhall fields and is a partner in the Johan Sverdrup field, the third largest oil field on the NCS operated by Equinor and a major supplier of energy to Europe.

Høegh LNG is the owner and operator of 13 LNG vessels including floating storage and regasification (FSRU) units.

“Høegh LNG welcomes the opportunity to join forces with Aker BP and deliver a large scale, one-stop shop CCS value chain to industrial emitters before 2030,” said Erik Nyheim, Chief Executive of Høegh LNG.

“Together we will provide market-leading solutions for decarbonizing at a low unit cost, contributing to the energy transition in Europe,” added Nyheim.

Karl Johnny Hersvik, CEO of Aker BP, said he expected CCS to play a key role in the transition to a low-carbon energy future.

“This partnership reflects our ambition to advancing CCS solutions by combining Aker BP's strengths in subsurface understanding and large-scale project development with Høegh LNG's technical

expertise in the LNG sector,” Hersvik explained.

The collaboration encompasses various fields including technical development.

Høegh LNG will spearhead the further development of their concept of Floating CO2 Storage Units (FCSO) enabling purification and aggregating CO2 from multiple emitters in key export hubs.

The company added that such units would make it possible to offer cost-efficient solutions also to smaller emitters that would otherwise not be able to develop solutions on their own.

The liquified CO2 would be transported by CO2 shuttle tankers at low pressure that results in larger transportation capacity and lower CO2 unit cost due to scale.

Aker BP would lead the development of offshore injection facilities and identify suitable subsea reservoirs for CO2 storage.

“Høegh LNG and Aker BP will work together to unlock potential new business opportunities for CO2 transportation and storage solutions, within the Norwegian Continental Shelf, for CO2 captured from multiple identified industrial emitters in North-West Europe,” they added.

“By entering into this agreement, Aker BP and Høegh LNG are collaborating as strategic partners to develop seaborn transportation and injection solutions for CO2,” they stated.

INDIAN liquefied natural gas imports jumped by 10 percent as lower prices helped encourage buyers while domestic gas output also increased along with the nation's gas demand.

LNG imports for the month of August 2023 was 1.65 million tonnes, or 24 cargoes, which was 10 percent higher than the 1.50MT, or 22 cargoes, reported in August 2022, according to provisional data from India's Ministry of Petroleum and Natural Gas.

LNG imports for the month of July had declined to 1.65MT, which was 10.8 percent lower than the 1.85MT received in July 2022.

The Ministry data showed that the cumulative imports for the first five months of the fiscal year from April to August increased by 3.5 percent to 9.03MT from 8.73MT in August 2022.

LNG cargo costs in August 2023 declined to 10,810 crore Indian rupees (\$1.3 billion) from the 12,482 crore rupees (\$1.5Bln) paid in August 2022.

India paid 49,931 crore rupees (\$6.0Bln) for five months of LNG imports,

which was less than the 67,407 crore rupees (\$8.10Bln) paid in the prior-year fiscal period.

Deliveries of LNG to Indian terminals in 2023 have come from Qatar, which provides over one-third of volumes, as well as West Africa, the US, Asia-Pacific nations, the spot market and Russia.

The latest regional spot LNG indicator price, the West India Marker (WIM), was last at \$13.466 per million British thermal units for November 2023 deliveries compared with \$12.704 per MMBtu for October deliveries

The WIM futures prices are for spot LNG cargoes delivered ex-ship (DES) into West Asia and the Arabian Gulf states.

The August increase in Indian LNG imports came as more facilities were on line than a year ago after the start-up of the country's seventh LNG import terminal at Dhamra in the East Coast state of Odisha.

That facility is the second import terminal on the East Coast and is a joint venture owned by France's TotalEnergies and India's Adani group.

The Ministry data showed that domestic natural gas production for August increased by 9.3 percent from gas fields such as those in offshore areas of the Bay of Bengal to 3.166 billion cubic metres from 2.896 Bcm in August 2022.

Output of natural gas by India in the five months of the fiscal year rose by 3.6 percent to 14.852 Bcm from 14.332 Bcm in the same period last year.

Ministry data also gave average capacity utilization rates for the LNG terminals for the April-August 2023 period.

The total capacity of existing terminals has now risen to 47.7 MTPA from seven facilities with the TotalEnergies and Adani group's Dhamra LNG terminal in Odisha now listed by the Ministry.

The largest Indian terminal at Dahej, located north of Mumbai and operated by Petronet LNG, has capacity of 17.5 MTPA and had a lower utilisation rate of 93.4 percent, down on the previous month's 95.7 percent utilization.

At the Hazira facility, operated by Shell India, the utilisation rate increased to 36.0 percent from 33.3 percent previously for 5.2 MTPA of capacity.

The GAIL (India) terminal at Dabhol, south of Mumbai, reported a fall to 38.2 percent in throughput, down from 49.4 percent previously for 5 MTPA.

The West Coast terminal at Mundra posted an increase to 11.7 percent from 11.1 percent last month for 5 MTPA.

At the Kochi facility in the southwest

state of Kerala usage edged down to 20.1 percent from 20.2 percent for 5 MTPA.

At Kamarajar (Ennore) terminal on the East Coast, capacity usage was down to 14.3 percent from the 14.7 percent logged previously at the facility with 5 MTPA of capacity.

The Adani-TotalEnergies terminal had a steady utilisation rate of 18.9 percent, slightly down from 19 percent last month for its 5 MTPA of regasification capacity.

The Ministry figures also showed that natural gas consumption for August was 5.345 Bcm, which was higher by 10 percent than the consumption of 4.858 Bcm in August 2022 and up on the July 2023 total of 5.297 Bcm.

The cumulative consumption for the five months from April to August increased by 3.7 percent to 26.743 Bcm versus 25.782 Bcm in the same period of last year.

The major consumers of natural gas in the country are the fertilizer industry with around 34 percent of consumption, city-gas 22 percent, power generation 15 percent, refineries 9 percent, petrochemicals 5 percent and others 15 percent.

INDONESIAN Minister of Energy and Mineral Resources Arifin Tasrif said 68 of the country's 128 oil and gas basins remained entirely unexplored and that international energy companies would receive better terms for exploration and production in the country where the Abadi LNG project is advancing along with the Tangguh LNG expansion.

The Minister was speaking at the 4th International Convention of Upstream Oil and Gas in Indonesia held on the island of Bali. SKK Migas, the Indonesian Upstream regulator, was host to the three-day event.

Indonesia's improvements in its oil and gas terms would allow investors to have well over 50 percent of production sharing contracts.

"The Government is strongly committed to accelerating the development of these untapped oil and gas reserves," Arifin told the conference.

He said the new and better terms were being offered starting with the third E&P licence bidding round this year that was announced on September 20.

"The government is offering new working areas with more attractive terms and conditions, including improvements in the equity split between the government and contractors, enabling contractors to secure a share exceeding 50 percent," the Minister explained.

Under the previous Indonesian system

oil and gas companies chose to either use a cost recovery or gross split-based production sharing contract (PSC) for projects.

In a cost recovery-based PSC, the government reimbursed companies for upstream related costs in exchange for a higher share, up to 85 percent, for each company's earnings from exploiting the nation's oil and gas blocks.

The Minister's plan will make contracts more flexible and give more incentives to international energy majors to invest.

Among LNG projects, Japanese company Inpex Corp. is the operator of the Masela natural gas block that will underpin the proposed Abadi LNG joint venture.

Inpex has finalised the development plan for the onshore liquefaction plant to be constructed on one of the Tanimbar Islands of Indonesia to further boost Asian LNG availability in Asia.

The investor line-up for Abadi LNG is also currently re-aligning with Malaysian energy company Petronas and Indonesia's state-owned Pertamina agreeing to take over the minority stake in the Masela block and LNG project previously held by Shell.

The Inpex-led project also has a carbon capture and storage (CCS) project attached as does the BP-led Tangguh LNG expansion project

A BP executive speaker at the conference expressed optimism about the CCS project for Tangguh LNG.

The BP's speaker was Anja-Isabel Dotzenrath, Executive Vice President for gas and low-carbon energy, and she said that the Tangguh CCS project was under development in eastern Indonesia and would see 30 million tonnes of carbon dioxide re-injected into a reservoir.

Dotzenrath said the project would cut carbon emissions by half at the Tangguh LNG plant where feed gas comes from Indonesia's largest gas field currently under production.

The other shareholders in Tangguh with BP are Japan's Mitsubishi Corp. and Inpex as well as China National Offshore Oil Corp.

IUMI, the International Union of Marine Insurance, reported a surge in the annual global premium base with the total reaching \$35.8 billion, an 8.3 percent increase on the previous year in a business with liquefied natural cargoes currently valued at around \$40 million and LNG carriers, for example, worth \$250M.

The overall shipping insurance trends

were released for all sectors at the body's annual conference in Edinburgh in Scotland.

Global income was split by region with Europe accounting for 47.7 percent, Asia-Pacific 28.4 percent, Latin America 10.3 percent, North America 8.5 percent and others 5.1 percent.

Marine underwriting is the oldest form of insurance and one that has adapted to change and evolution over hundreds of years.

"Of late, we have seen a much welcomed reversal of fortunes for marine insurers and I'm confident this will enable underwriters to manage future change and continue to provide the best possible cover for their assureds," said Jun Lin, Chair of the IUMI's Facts & Figures Committee.

The IUMI review said that by line of business, the largest share was commanded by transport-cargo at 57.3 percent followed by global hull 23.4 percent, offshore energy 11.5 percent and marine liability (other than P&I covered by IG clubs) 7.7 percent.

"Marine underwriters have suffered poor returns over several years but from 2020 results started to improve and particularly 2022 has shown relatively strong growth in the global premium base across all lines of business," said Astrid Seltmann, Vice-Chair of the IUMI's Facts & Figures Committee.

"In combination with a benign claims impact, this has translated into a much better performance in terms of loss ratios, specifically for hull and cargo," explained Seltmann.

"The reasons are complex but are likely due to the post-pandemic rebound in global trade coupled with reduced market capacity, particularly for hull," she said.

"We've seen a continued strong performance from Europe after many years of decline but, while still increasing, Asian market growth appears to be slowing," Seltmann noted.

The IUMI stated that overall, the general trend for global premiums continued to be upwards, though fires continued to be a concern in 2022 and also into 2023.

The report said that claims frequency had a long-term downward trend, though has shown some increase after the extraordinary dip in 2020, following a return to pre-Covid vessel activity.

"Average repair costs have seen some upward trend probably due to the impact of inflation," said the report.

Major losses were moderate in recent

years with the exception of fires but 2023 has seen an uptick including, again, a number of severe fires.

Global premiums in the offshore energy market for 2022 were reported at \$4.1Bln, an increase of 7.3 percent for the previous year.

“There now appears to be an upward trend in the premium base following a prolonged reduction to the bottom of the trough in 2019,” said the report.

Losses in this sector remained low and relatively stable but the youngest underwriting years will continue to develop and this will be reflected in the loss ratios.

Cargo insurance returned a global premium base for 2022 of \$20.5Bln, an 8.3 percent increase on the previous year.

“There was growth in all regions especially in Europe and North America although the Asia-Pacific region experienced a slowdown, likely due to the combined effect of economic conditions and major Asian currencies weakening against the US dollar,” said the report.

The report said that cargo premiums demonstrated positive market development over a number of recent years and, in the main, tend to follow the trends in world trade.

“Global trade, in terms of value and volume, rebounded strongly post-Covid and further growth is projected,” it added.

The report said that recent underwriting years, including 2022, have returned to a more normal (i.e. flatter) pattern in terms of loss ratios following a few years of extraordinary upwards claims adjustments.

“Loss ratios for 2022 are starting at their lowest level since 2015 and, although they will develop, this is positive and may indicate a sustainable improvement for this line of business,” the report said.

Global premiums relating to the ocean hull sector increased by 5.7 percent in 2022 to reach \$8.4Bln.

“While the distribution of premiums across the regions was relatively static, the Nordic countries enjoyed a marked increase, possibly due to their activity in covering war risks,” the report said.

The past year had also seen continued growth in the world fleet as well as its overall value and this, coupled with reduced market capacity has impacted positively on the premium base.

The gap between total gross tonnage-number of vessels and global premiums - which opened markedly from 2011-2018 - has closed slightly since 2020 and now appears to be relatively stable.

JAPANESE liquefied natural gas imports dropped again last month as storage increased and North Asian prices declined with thermal coal deliveries also plunging while nuclear plant usage is increasing.

Cargo deliveries to the nation’s regasification terminal network plunged by 9.6 percent in August 2023 to 5.67 million tonnes, or 84 cargoes, from the 6.27MT, or 92 shipments, received in August 2022.

Japan’s shipments had dropped by 17.4 percent in July 2023 to 5.09MT from 6.16MT in July 2022.

The Finance Ministry figures also showed that LNG cargoes cost 43 percent less in August 2023 at 500.77Bln (\$3.39Bln) compared with 878.99Bln yen (\$5.95Bln) in August 2022.

Deliveries of thermal coal to Japanese ports tumbled by over 31 percent year-over-year to 8.38MT.

The Ministry data showed the imports of LNG in August from Asian nations like Malaysia, Indonesia and Brunei edged lower by just 0.1 percent to 1.25MT.

Middle East shipments from nations like Qatar came to 700,000 tonnes, down by 22.2 percent from the same month last year.

US imports of LNG cargoes almost doubled from a year ago to 648,000 tonnes.

Russian LNG deliveries to Japan declined by 12.8 percent to 392,000 tonnes.

The balance of deliveries to Japan in August 2023 came to 2.61MT from Australia and the spot market, which was lower than the 3.33MT imported in the same month last year.

Japan had regained the global No. 1 spot as an LNG importer from China in 2022 with its 72MT of volumes, though the pace of Chinese deliveries is increasing in 2023.

Japan is also using more nuclear power and intends to bring other reactors on line over the next year or so as public opposition lessens with energy security taking priority.

Almost a dozen reactors are now back in operation compared with the 54 that were online in 2011 before the Fukushima disaster and which had supplied around 30 percent of Japan’s energy needs.

The latest nuclear restart was the Takahama-1 plant owned by LNG importing utility Kansai Electric Power Company and brings to 11 the number of plants in operation from the 33 that are capable of re-starting.

Kansai Electric said the plant was now the third of four to come online

at the Takahama site.

Kansai’s facility is located in Fukui prefecture in Western Japan and the re-start will add 780 megawatts of power from what is now the nation’s oldest operating plant first put into operation in November 1974.

Japan’s Nuclear Regulation Authority is examining the re-start proposals for 10 more N-plants.

Among them is Chugoku Electric Power’s plans to restart the No. 2 reactor at its Shimane nuclear power station in August 2024.

The 11 restarted reactors so far are: Genkai-3 and Genkai-4, Ikata-3, Mihama-3, Ohi-3 and Ohi-4, Sendai-1 and Sendai-2 and Takahama-1, Takahama-3 and Takahama-4.

NEWMED Energy, the Israeli company with a stake in the Aphrodite natural gas field offshore Cyprus, said talks would continue with the Cypriot Government after the rejection of a new field development plan that includes transporting pipeline gas to Egypt for liquefaction and export to Europe as LNG or for domestic use.

The Cypriots are in favour of the Aphrodite volumes being shipped to Egypt, though are against the new plan that does not include a previously outlined floating gas processing plant at the field in Cypriot waters.

The partners in the Aphrodite licence are NewMed and energy majors Chevron Corp., the operator of the Aphrodite field, and UK-based major Shell.

The Shell stake came from its acquisition of BP Group and Chevron’s from buying Noble Energy.

The field is located in Block 12 of the Cypriot Exclusive Economic Zone (EEZ) 170 kilometres (106 miles) offshore the Cypriot city of Limassol and is estimated to hold around 4.4 trillion cubic feet of natural gas.

“The Partnership respectfully reports that, according to a letter of reply delivered to the project’s operator, Chevron Cyprus Limited, the government of Cyprus has decided not to approve the Updated Plan, and has invited the partners in the Aphrodite Reservoir to continue the discussions on the matter in early September 2023,” NewMed explained.

According to the Updated Plan, the production of natural gas from the Aphrodite field and the processing thereof would be done through the construction of a subsea pipeline and connection to existing offshore and onshore

infrastructure in Egypt, without the construction of a floating production and processing facility within the area of the Reservoir.

“The letter of reply states several reasons for the decision of the Cypriot government not to approve the Updated Plan, including the claim that the Updated Plan is expected to increase the technical and commercial complexity of the project, and is not expected to produce the advantages put forward as detailed in the report of 31 May 2023,” NewMed added.

“The partners in the Aphrodite Reservoir, with the assistance of their outside counsel, intend to consider the implications of the decision by the government of Cyprus and are preparing for the continued discussions,” stated NewMed.

Scheduled for commissioning by 2026, the Aphrodite gas field will be capable of delivering more than \$9 billion of direct economic benefits while providing energy independence to the Republic of Cyprus.

The Israeli company, headquartered at Herzelia, north of Tel Aviv, said that the updated plan was expected to accelerate and reduce the cost of development.

Analysts say that the Aphrodite volumes are likely to be directed to the Egyptian Idku liquefaction plant east of Alexandria where Shell is the operator.

NewMed has a 30 percent shareholding in the Aphrodite licence while Shell and Chevron each own 35 percent.

NewMed’s other main asset is its large stake with partners in the Leviathan gas field offshore Israel, which is one of the largest in terms of its customer base in the East Med.

Leviathan is the subject of continuing pre-engineering work and discussions for the promotion of a Leviathan field expansion and the development of a floating LNG project.

The Leviathan field already supplies the Israeli domestic market as well as exporting pipeline gas to Egypt and Jordan.

Leviathan project shareholders are the NewMed Partnership with 45.34 percent, Chevron subsidiary, Chevron Mediterranean Ltd with 39.66 percent and Ratio Energies with 15 percent.

NewMed was formally known as Delek Drilling and changed its name to NewMed Energy in February 2022.

NEXTDECADE Corp., the developer of the Rio Grande LNG export project in Brownsville in Texas, has entered into a credit agreement with a group of lenders

for \$356 million of senior loans to finance a portion of the first three liquefaction Trains.

A final investment decision was taken on Rio Grande LNG in July 2023 with a budget of over \$11 billion and ultimate plans for a facility with 27 million tonnes per annum of output.

“The senior loans were disbursed in one advance for the full amount of \$356M which resulted in a reduction in the commitments outstanding under RGLNG’s existing term loan facilities for Phase 1 from \$11.1Bln to under \$10.8Bln,” NextDecade explained.

“These senior loans will mature in July 2033, will accrue interest at a fixed rate of 6.72 percent and rank ‘pari passu’ (on an equal footing) to RGLNG’s existing term loan facilities, the \$500M working capital facility and the \$700M of 10-year senior notes issued at FID of Phase 1,” the company added.

A statement said that an indirect subsidiary of NextDecade entered into a credit agreement as borrower and with Wilmington Trust National Association as the administrative agent and Japan’s Mizuho Bank (USA) as the collateral agent.

NextDecade said that the financing transaction aligned with the company’s long-term balance sheet strategy for Phase 1, which includes “extending and staggering debt maturities, diversifying sources of capital” and reducing bank capital over time to provide potential capacity for financing future LNG expansions.

The FID statement in July followed financial and volumes agreements announced in June 2023 for the first phase of the Rio Grande project signed with French oil and gas major TotalEnergies, which has taken an equity stake in NextDecade and bought 5.4 MTPA of volumes from the first three Trains, and the US equity fund Global Infrastructure Partners.

Joint venture financial commitments for \$5.9Bln have now been made by other investors, the Abu Dhabi-based firm Mubadala Investment Company, the investment fund of the emirate of Abu Dhabi in the United Arab Emirates, and GIC Private Limited, the Singaporean sovereign wealth fund.

New York-based GIP and the Abu Dhabi and Singapore wealth funds were referred to by NextDecade in the July FID statement as the “Financial Investors”.

In conjunction with the FID, the NextDecade venture issued a notice to

proceed to US LNG engineers Bechtel Energy for the lump-sum turnkey engineering, procurement and construction contract for the first phase of the Rio Grande plant to produce 17.2 MTPA (higher than the 16.2 MTPA aggregate) of LNG from the initial three Trains.

The involvement of TotalEnergies as a key investor and Bechtel as the engineers gives NextDecade the benefit of expertise in project development.

It also gives TotalEnergies access to competitive LNG with low production costs and with the volumes from the first phase boosting the French company’s US export capacity to over 15 MTPA by 2030.

The Port of Brownsville has said that the Rio Grande LNG project would see the creation of around 5,000 jobs in the construction sector alone.

PGC, the US Potential Gas Committee, has released its latest report showing that the world’s No. 1 liquefied natural gas exporting nation has record natural gas resources in the prime basins in terms of recoverable gas and reserves.

The PGC assessment called “Potential Supply of Natural Gas in the United States” was released at an event in Washington DC hosted by the American Gas Association.

Experts from the PGC presented on the current state of technically recoverable reserves in the US, providing valuable information on a region-by-region basis.

Future gas supply totals 3,978 trillion cubic feet in 2022, an increase of 3.6 percent from the comparable year-end estimate in 2020.

Analysts point out that a measurement of the volumes of resources available is that several floating LNG export projects are in operation worldwide with start-up resources of just 2 Tcf.

“Technically recoverable resources of natural gas, those in the ground but not yet recovered, total 3,352 Tcf in 2022,” according to the PGC assessment.

“An independent assessment of proved reserve volumes of 625 Tcf brings total future supply to the highest level assessed in the 59-year history of the PGC,” said the report.

The PGC biennial assessment is the most comprehensive report of the potential for future natural gas supplies in the US.

The body is made up of approximately 80 knowledgeable and highly experienced volunteer members who work in the

natural gas exploration, production, transportation, and distribution industries and the technical services and consulting sectors.

The PGC assesses the natural gas resource potential for each of 90 geologic provinces comprising six geographic areas of the Lower 48 States and Alaska, 56 of which are onshore and 34 offshore.

Since its founding in the early 1960s, the sole purpose of the PGC has been to organize and train geoscientists, engineers and others for the timely preparation and dissemination of the two-yearly assessments of the natural gas resource base.

“The assessments capture the status of a dynamic system of drilling and appraisal where potential natural gas resources transition into proved reserves and eventually into flowing natural gas production,” said the report.

As a result of the current assessment, the Atlantic Area continues to rank first as the country’s richest resource area with 40.0 percent of total Traditional resources, followed by the Mid-Continent Area with 18.5 percent, Rocky Mountain Area with 17.0 percent, and the Gulf Coast (including the Gulf of Mexico) with 16.3 percent.

The PGC’s assessment of Traditional resources for year-end 2020 to year-end 2022 reported a decrease of 15 Tcf, while Future Gas Supply, which includes additions or subtractions to proved reserves, increased by 137 Tcf.

Adding current future supply (3,978 Tcf) to cumulative production (1,554 Tcf) changes the Ultimate Recoverable Resource to 5,532 Tcf, an increase of 213 Tcf (4.0 percent) from year-end 2020.

“These evaluations are critically important to help ensure that policymakers, regulators and other key stakeholders understand the potential of natural gas supplies in the United States,” said Richard Meyer, AGA Vice President of Energy Markets, Analysis, and Standards.

“Future gas supplies continue to increase as the energy industry innovates, improves processes, optimizes resources, invests in efficiency, and reduces emissions,” Meyer added.

“However, to fully realize the potential of this natural gas supply, new infrastructure will be required to connect production zones to demand centers,” stated Meyer.

The year-end 2022 total shale gas assessment of 1,791,310 Bcf (“most likely” value), represents a 36,474 Bcf (2.0 percent) decrease over that for year-end 2020.

The year-end 2022 total shale gas mean value is 2,092,335 Bcf. The net decrease impacted mostly by revised assessments of shales in the Appalachian basin of the Atlantic Area and the Louisiana-Mississippi-Alabama Salt basins and Texas Gulf basin of the Gulf Coast Area.

Comparing just the 2022 “most likely” values, shale gas accounts for 68.8 percent (1,793,920 Bcf) of the Lower 48 States.

Traditional resources (2,604,170 Bcf), increased from 65.8 percent in 2020, and 65.3 percent of the Total US Traditional resources (2,747,220 Bcf).

Based on the year-end 2022 mean values, total shale gas resources (2,092,335 Bcf) account for 65.4 percent of Traditional resources (3,196,190 Bcf) and 62.4 percent of Grand Total mean US potential gas resources (3,352,920 Bcf).

Below are synopses of the changes in PGC’s regional assessments from 2020 to 2022.

Atlantic Area: The year-end 2022 assessment for the Atlantic Area has decreased by approximately 3 percent since the last biennial reporting period.

“All of the increases in the Atlantic Area’s assessment since 2016 arose from ongoing evaluation of Appalachian basin shales, predominantly the prolific Marcellus in Pennsylvania and West Virginia. The basin’s shale gas assessment also includes contributions from the liquids-rich Utica Shale of eastern Ohio, the Genesee-Burket shales of Pennsylvania and West Virginia, and other Devonian shales in the Appalachian basin,” said the report.

Gulf Coast Area: The PGC’s year-end 2022 assessment for the Gulf Coast Area has decreased by 29,175 Bcf (6.3 percent) relative to 2020. The overall decrease in potential resources for the onshore area is attributed to downward revisions to the Louisiana-Mississippi-Alabama Salt basins and Texas Gulf Coast basin, despite an upward revision for the East Texas basin.

Mid-Continent Area: The 2022 assessment for the Mid-Continent Area remains unchanged from 2020.

Rocky Mountain Area: This total assessment increased by 37,975 Bcf from the year-end 2020 assessment, due to a combination of upward revisions in the Wind River basin, Denver et al., Uinta, Piceance, Eagle, Lake and Park, and San Juan basins. Resource assessments for other Rocky Mountain provinces remained unchanged.

RENCO Ltd of the UK has joined with Dutch company Nordsol to establish a bio-liquefied natural gas plant to produce fuel from waste and targeting customers in the truck transportation sector.

The plant will be located near the town of Rushden in the Central English county of Northamptonshire and will be under the ownership of RenEco.

The facility will represent an expansion of their current organic waste processing operations that focuses on biogas production and electricity.

“Leveraging Nordsol's innovative technology, RenEco will convert biogas into bio-LNG (liquefied biomethane) with production to commence in the first quarter of 2024,” said a statement.

Bio-LNG is positioned to play a pivotal and expanding role in the UK and the European Union in the transformation of waste to cleaner fuel for the long-haul road and maritime transport industries.

Its advantages over diesel mean significant reductions in carbon-dioxide and other harmful emissions.

“Bio-LNG is the best solution for decarbonizing the hard-to-abate long-haul transport sector today,” said Léon van Bossum, Chief Executive of Nordsol, the Dutch company that has a facility near Amsterdam.

“With this inaugural production plant in the UK we will demonstrate that onsite biogas liquefaction to bio-LNG is not only sustainable but also affordable and scalable,” Van Bossum stated.

The small-scale bio-liquefaction facility will produce enough bio-LNG to fuel 100 heavy trucks operating 24 hours per day and 7 days per week.

“This investment is part of a combination of initiatives RenEco is undertaking designed to direct the biogas produced onsite away from renewable heat and power to instead produce products for customers that directly replace traditional fossil-derived products which are typically more challenging to displace,” RenEco explained.

RenEco's plant process involves the collection of organic waste from all parts of the food supply chain and its conversion into biogas and organic fertilizers via anaerobic digestion and the transformation of the biogas into the renewable products like bio-LNG.

“After extensive market research investigating how to decarbonize both our own heavy-goods vehicle fleet and our retail customers’ fleets, Nordsol was chosen as a long-term partner to provide their liquefaction technology,” explained

William Wykes, director of RenEco.

Wykes said that the Rushden facility was the inaugural step in a broader strategy to establish multiple bio-LNG plants across the UK.

He added that given the growing demand within the transportation sector, bio-LNG's economic viability is increasingly appealing to existing biogas producers.

“Simultaneously, Nordsol's innovative, highly integrated production process ensures a cost-effective conversion of biogas into bio-LNG and biogenic CO₂,” the statement said.

RenCo added the partnership underscored Nordsol's dedicated organizational support for the transition from biogas to bio-LNG in the UK.

SAIPEM, the Italian energy and LNG engineering company, was awarded a contract by Italian gas system operator SNAM for the construction of the associated facilities for the new Floating Storage and Regasification Unit (FSRU) to be located in the Adriatic Sea offshore Ravenna as Italy's fifth import terminal.

The contract, awarded jointly via a temporary venture with two other Italian companies Rosetti Marino and Micoperi, comprises the Engineering, Procurement, Construction and Installation (EPCI) of a new offshore facility and for the docking and mooring of the FSRU.

“The vessel will be connected to shore via a 26-inch offshore pipeline of 8.5 kilometres in length, plus a 2.6 km onshore pipeline and a parallel fibre optic cable,” said Saipem.

“The shore crossing will utilize a micro-tunnelling system to minimize environmental impacts. Offshore operations will be executed by Saipem's pipelay ‘Castoro 10’ barge,” added Saipem.

“The new FSRU will enable an increase in Italy's LNG import capacity to improve the country's energy security and diversification of gas sources,” stated Saipem.

Gas grid operator SNAM has already signed a \$400-million deal with BW LNG of Singapore to buy the FSRU that will be used at Ravenna, the “BW Singapore” with 170,000 cubic metres capacity.

The Italian region of Emilia Romagna has approved the FSRU project to deploy the “BW Singapore” in the upper Adriatic.

Emilia Romagna's Economic Development department said that a total of almost €1 billion (\$1.07Bln) would be invested in the LNG import venture.

Ravenna is also the location of a small-

scale LNG bunkering station established under the European Union's clean fuel policies.

Spanish LNG terminals and gas grid operator Enagás and Italian utility company Edison are among the shareholders in the small-scale facility serving the LNG trucking and ship bunkering sectors.

SNAM in July started commercial operations at the fourth Italian large-scale import terminal at the Tuscan port of Piombino.

The Piombino terminal comprises the 154,950 cubic metres capacity FSRU “Golar Tundra” and associated facilities.

The vessel had received its commissioning cargo in May 2023 and is now fully operational with 2 billion cubic metres of gas deliveries expected in 2023 and double that next year.

SNAM already operates the onshore Panigaglia LNG facility near Genoa and which has been in service since 1969.

The grid operator also has a controlling stake in the “FSRU Toscana” moored off the Italian port of Livorno.

The new FSRU facility at Ravenna will be in the same area as the Adriatic LNG terminal

Adriatic LNG terminal is majority-owned by US major ExxonMobil and with QatarEnergy also a shareholder at the terminal located 15 kilometres (9.3 miles) off the Veneto coastline.

The terminal is a gravity-based structure and SNAM is a 7.3 percent shareholder in the facility.

The Adriatic terminal has been on line since autumn 2009 and includes two LNG storage tanks, each with a capacity of 125,000 cubic metres.

SEMPRA Infrastructure, the subsidiary of California-based utility and energy company Sempra and with stakes in LNG plants and projects in the US and Mexico, has completed the sale of a stake in the Port Arthur LNG project in Texas to US asset management firm Kohlberg Karvis Roberts (KKR), which is already a stakeholder in Sempra Infrastructure.

Sempra said the sale was complete to KKR on a 42 percent indirect, non-controlling interest basis in the Port Arthur LNG Phase 1 project.

The transaction results in Sempra Infrastructure retaining a controlling 28 percent indirect interest in Phase 1 at the project level, and ConocoPhillips owning the remaining 30 percent interest.

“The closing of this transaction continues the positive momentum of our

world-class Port Arthur LNG facility and highlights Sempra Infrastructure's ability to access capital to support the growth of its infrastructure business,” said Justin Bird, Chief Executive of Sempra Infrastructure.

“We remain committed to developing energy infrastructure projects with strong partners to continue growing our portfolio while advancing global decarbonization and energy security,” Bird added.

James Cunningham, a Partner at KKR, said the firm was pleased to proceed with the investment.

“Port Arthur LNG Phase 1 has continued its strong momentum and is on track to meet its objectives of helping to deliver energy security, economic growth and a near-term supply of reliable and cleaner energy,” added Cunningham.

Sempra Infrastructure reached a positive final investment decision for Port Arthur LNG Phase 1 in March 2023 and contracted US engineering firm Bechtel Energy to build the facility.

The company has additionally placed major long-lead time orders with equipment and technology companies Air Products and Baker Hughes.

The \$13 billion total estimated capital expenditures for the Port Arthur project are being financed with \$6.8Bln of non-recourse project-level debt and \$6.2Bln of project-level equity.

The company noted that 100 percent of current contractable capacity for Port Arthur Phase 1 had been secured with long-duration contracts and high-quality counterparties.

“The expected commercial operation dates for Train 1 and Train 2 are 2027 and 2028 respectively,” Sempra said.

Progress also continues at Energía Costa Azul LNG Phase 1 on the Pacific Coast of Mexico where construction at the Mexican export project remains on track to reach commercial operations by the summer of 2025.

The San Diego, California-based company is also pursuing a Phase 2 development project at the Cameron LNG export plant in Louisiana.

SVANEHOJ FRANCE, the tank control systems business, has been awarded contracts to update safety systems at the established Dabhol LNG import terminal on the West Coast of India and at the French Fos Cavaou LNG facility located east of Marseilles.

Svanehøj's tanks business has a long and distinguished track record since it was established at the French Channel port of

Calais in 1961 under the banner of the UK engineering company Whessoe plc.

At the time the company equipped its first gas carriers in the 1970s and its first LNG storage tank in 1983.

It was also the first company to provide a level, temperature, and density (LTD) gauge for floating storage and it was part of Finland's Wärtsilä from 2006 until it was acquired by Denmark's Svanehøj in 2022.

Svanehøj France now develops technologies that enhance the safety of LNG, liquefied petroleum gas and cryogenic and refrigerated storage on sea and land.

"Svanehøj's instrumentation and software solutions are installed to ensure that all hazardous aspects related to liquified gas storage are known and controllable," the company said.

"The systems proactively measure possible development or creation of stratification by monitoring the tanks. The product range includes tank level and density gauges, temperature transmitters, and control systems that operate accurately under cryogenic conditions," the company added.

Svanehøj France noted that as time progresses, ageing machinery becomes obsolete, prompting the recognition of the importance of upgrading safety instrumentation.

In response, the Dabhol terminal owned by the Konkan LNG subsidiary of GAIL India and the Fos Cavaou terminal operated by France's Elengy, a unit of GRTgaz within the utility and energy group Engie, partnered with Svanehøj France to renew the safety instrumentation for a combined three LNG tanks.

"We are reconnecting with liquefied gas terminals worldwide and have learnt that some could be in better shape," said Simon Dufour, an executive at Svanehøj France.

"Some only need spare parts, but some need new instrumentation installed. Without new instrumentation, it can result in dangerous situations and end up shutting down operations," Dufour explained.

The company said that the Fos Cavaou LNG terminal has already successfully retrofitted one tank with a new densitometer, replacing previous systems and improving functionality and reliability.

"Encouraged by this accomplishment and the cooperation with Svanehøj, Fos Cavaou plans to simultaneously replace

the densitometers in the remaining two tanks with delivery of instrumentation in October," said Svanehøj France.

Konkan LNG in India has embarked on a comprehensive plan to upgrade the Dabhol terminal with Svanehøj's valuable experience in safety instrumentation for LNG storage being leveraged.

"The project encompasses replacing various components while retaining the existing temperature probes, guaranteeing qualitative safety measures," Dufour said.

"As part of the upgrade, we will install three advanced servo-driven tank gauging systems, the LTDs, to improve reliability and efficiency. An LTD tank gauging system and two data acquisition systems will also be delivered," he added.

TELLURIAN Inc., the developer of the Driftwood liquefied natural gas export plant near Lake Charles in Louisiana, has signed an agreement for the supply of eight main refrigerant compression packages for the Phase One development of the Driftwood project.

The agreement with US LNG-equipment supplier Baker Hughes was signed at the Gastech energy conference in Singapore and secures a delivery schedule for eight LM6000PF+ gas turbines, main refrigerant compressors and control units required for Phase One construction.

Tellurian said the agreement supports its aim of having the Driftwood venture achieve initial LNG production in 2027.

The Driftwood project involves constructing 20 mid-scale processing Trains, each with 1.38 MTPA of capacity and built as five blocks of four Trains.

The Phase One development would include the first two of these blocks for 11 MTPA of output and two of three planned 235,000 cubic metres storage tanks and the first of three planned loading berths for LNG carriers.

Tellurian also signed an accord in April 2023 to sell the site of the Driftwood plant to institutional investors for \$1Bln and to lease back the site comprising 800 acres of land.

In its work for Tellurian, Baker Hughes said it was also on schedule to complete, by early next year, fabrication of the electric-powered, zero-emissions Integrated Compressor Line (ICL) packages and other turbo-machinery equipment following that award in 2022.

Tellurian's main contractor for the Driftwood construction is the US engineering company Bechtel Energy.

"Bechtel has done a tremendous job

preparing the site and has already completed the piling and compressor foundations for Plant 1 of Driftwood LNG," said Tellurian President and Chief Executive Octávio Simões.

"This agreement with Baker Hughes firms up our plans to secure the critical technology for Driftwood Phase One," he added.

"We value our continued, long-term relationship with Baker Hughes for delivering industry leading manufactured equipment and technology solutions to enhance our ability to deliver clean energy to the world," stated Simões.

Lorenzo Simonelli, Chairman and CEO of Baker Hughes, said the Tellurian agreement builds on the established collaboration between both companies.

"Leveraging our 30 years of experience in LNG and broad portfolio of technologies for the natural gas value chain, we are pleased to support Tellurian also for the Driftwood liquefaction plant with our gas technology solutions," stated Simonelli.

UK's Isle of Grain LNG facility on the Medway River in Kent, Europe's largest regasification terminal, has launched an auction for 9 million tonnes per annum of existing capacity.

Grain LNG said the 375 gigawatt hours per day (about 9 MTPA) was being offered in an auction process running from 14th September until 23rd November 2023.

"The auction will enable participants to bid for existing capacity, either individually or jointly, allowing them to leverage Grain LNG's unique scale and flexibility to maximise their value," said the company, a unit of National Grid Plc.

Located on the Isle of Grain about 43 miles (69 kilometres) southeast of London, the terminal is currently able to store and deliver enough gas to meet a large proportion of gas demand in London and the Southeast of England.

There is also an expansion project underway that will see LNG storage at the terminal increase in 2025 to around 1.2 million cubic metres.

"Grain LNG, has used the positive feedback received from the recent market consultation exercise and, following Ofgem (regulatory) approval, is offering three lots of capacity," Grain LNG explained.

"Each lot will consist of 42 berthing slots, 200,000 cubic metres of storage and 125GWh/d (about 3 MTPA) of regasification capacity from as early as January 2029.

The offer is specifically designed for parties who wish to acquire a substantial

stake in a major terminal in Northwest Europe, at a reduced cost and with shorter contract lengths when compared with new-build projects.

Grain LNG added that as the terminal's capacity already exists, parties involved will not be subjected to the final investment decisions and other approvals or potential delays that can arise from construction issues commonly associated with newbuild facilities.

"We continue to be encouraged by the high level of interest shown by potential customers at a time when world energy markets are influenced by the geopolitical situation," said Simon Culkin, Importation Terminal Manager at Grain LNG.

"It has allowed us to engage and shape our offering to best meet customer's needs, while optimising the best possible access to this strategically important asset," added Culkin.

"With the launch of this auction, Grain LNG reaffirms its dedication to the security of supply to the UK and Europe and its commitment to delivering reliable, efficient and flexible LNG solutions," Culkin stated.

In the 12 months to mid-2023 the UK terminal unloaded 111 LNG carrier volumes originating from multiple countries.

Cargoes received at the facility came from nations such as the US, Qatar, Angola, Algeria, Nigeria, Norway, Peru and Trinidad and Tobago.

Grain LNG is part of the National Grid Ventures subsidiary and operates outside of National Grid's core regulated businesses in the UK.

National Grid Ventures has a diverse portfolio including subsea electricity interconnectors, competitive transmission, wind and solar generation, battery storage as well as the Grain LNG storage and regasification facilities.

US NATURAL GAS production has remained at relatively high levels throughout 2023 despite a decline in US natural gas prices with growth driven by the Permian Basin where most of the natural gas is produced from associated gas produced from oil wells.

That's as the US benchmark Henry Hub spot price averaged \$2.41 per million British thermal units the first half of 2023 compared with an annual average of \$6.42 per MMBtu in 2022, according to the Short-Term Outlook published by the Energy Information Administration.

"We expect increased oil-drilling activity to continue to drive increased

natural gas production in the Permian Basin, although these increases will be offset by some small production declines in other large producing regions,” said the EIA Outlook.

“Dry natural gas production averaged more than 102 billion cubic feet per day in the first half of 2023, which is a 6 Bcf per increase compared with the same period in 2022. We expect dry natural gas production will average about 104 Bcf per day through the end of the forecast in 2024,” the EIA added.

The EIA forecasts a surge in natural gas production in the fourth quarter of 2024 as new pipeline capacity comes online and demand for liquefied natural gas feed gas increases as developers expect two new facilities to come online at the end of 2024.

US working natural gas inventories totaled 3,051 billion cubic feet (Bcf) at the end of July, 12 percent above the five-year (2018-2022) average and 22 percent above the same period last year.

“Net injections of natural gas into storage have exceeded the five-year average by 3 percent so far this refill season (April 1-October 31), in part due to high natural gas production,” the Outlook noted.

The EIA added that the increased surplus of natural gas storage inventories reduced natural gas prices throughout the first half of 2023 compared with 2022.

“We forecast working natural gas inventories to end the refill season at nearly 3.9 trillion cubic feet (Tcf) which is 7 percent, or 250 Bcf, higher than the five-year average,” the EIA said.

“We expect storage inventories to remain above the five-year average throughout 2024 as natural gas production remains high and natural gas consumption declines by 2 percent in 2024 compared with 2023,” the agency added.

The Outlook reported that hot temperatures during July, especially in the southern states, pushed US electricity demand to near record levels.

EIA estimates that US electricity sales to end-users in July 2023 totaled 388 billion kilowatt hours, which would equal the record level of electricity consumed in July and August 2022.

For all of 2023, the EIA forecast 2 percent fewer sales of electricity to end-users than in 2022.

US electricity sales in the forecast increase by 2 percent in 2024 based on expectations for a hotter summer next year and growing demand for electricity in the industrial sector.

The forecast natural gas generation share rises from 39 percent in 2022 to 42 percent this year due to low natural gas prices and net natural gas-fired generating capacity additions of 3 gigawatts.

“We forecast the share of natural gas-fired generation to fall back to 40 percent in 2024 due to significant amounts of new renewable energy capacity coming online and displacing natural gas,” the Outlook added.

“A new 1.1 GW nuclear reactor in Georgia came online in July, so we forecast a slight increase in the amount of US nuclear generation this year and a 2 percent increase in 2024, although the nuclear share of US generation remains at 19 percent,” stated the EIA.

In contrast, about 15 GW of coal-fired capacity is scheduled to retire by the end of 2023, so it forecasts that coal’s share will fall to 16 percent of total US generation this year and 15 percent in 2024, well below its generation share of 20 percent in 2022.

“Renewable energy capacity has been growing rapidly, and we expect this growth to continue because the electric power sector plans to add 27 gigawatts (GW) of new solar generating capacity by the end of 2023 and a further 31 GW in 2024,” the report said.

“This new capacity leads to our forecast that renewables, other than hydropower, will account for a 16 percent share of total US generation in 2023, up from 15 percent in 2022. That share grows to 18 percent in 2024,” it added.

In oil markets, the Brent crude oil spot price in the EIA forecast increases in the coming months, reflecting expectations of tightening balances in global oil markets.

The Brent crude oil spot price averaged \$80 per barrel in July, up \$5 a barrel from June.

“Crude oil prices increased primarily because of extended voluntary cuts to Saudi Arabia’s crude oil production and expectations of higher global demand,” said the Outlook.

“We expect the production cuts, combined with increasing demand, will cause global oil inventories to fall and to put upward pressure on oil prices through the end of this year,” the EIA said.

“The Brent price in our forecast averages \$86 a barrel in the second half of 2023 (2H23) and reaches \$88 a barrel in November and December and remains near that level in the first quarter of 2024,” the EIA added.

The Outlook estimates global oil inventories will transition from a period

of inventory builds in the first half of 2023 to inventory draws through the end of the year, placing upward pressure on global oil prices.

Global oil inventories increased by an average of 0.6 million barrels a day in the first half of 2023, and the EIA forecasts they will decrease by an average of 0.4 million barrels a day in the second half.

“The Brent price in our forecast averages \$86/b in 2024,” stated the EIA.

In our August Outlook, we now expect total US crude oil production to average 12.8 million barrels per day in 2023, an annual average increase of about 0.2 million barrels per day compared with the July Outlook.

“Our higher production outlook reflects the effect of higher well productivity in recent historical data from the Petroleum Supply Monthly, which we have extended into our current forecast for July and forward through 2023,” the EIA said.

VENTURE GLOBAL, the US liquefied natural gas export projects developer in the state of Louisiana, said long-term expansion would increase production from 70 million tonnes per annum to more than 100 MTPA of nameplate capacity.

The plans were explained at a ceremony at the Gastech energy conference in Singapore where Venture Global renewed a master supply deal with US LNG equipment-maker Baker Hughes.

The companies said they had expanded their equipment supply agreement for the delivery of additional liquefaction Train systems and power island systems for Venture Global’s future LNG export projects.

The expanded agreement was signed in the presence of Venture Global Chief Executive Michael Sabel and Baker Hughes Chairman and CEO Lorenzo Simonelli.

Venture Global’s one existing Calcasieu Pass facility in Louisiana comprises 18 small-scale modular liquefaction Trains each with 0.626 MTPA of capacity and configured in nine blocks for total nameplate output of 11.26 MTPA.

However, the company has three other projects with much higher production levels, including the CP2 plant to be built adjacent to Calcasieu Pass facility and are each expected to have nameplate capacity of around 20 MTPA.

The other two projects are Plaquemines LNG, currently under construction on the banks of the Mississippi River south of New Orleans, and Delta LNG.

Venture Global cargoes originating from its Calcasieu Pass project have been delivered to 24 countries and accounted for around 10 percent of the LNG exported from the US to Europe in 2022 and 2023.

“Venture Global has taken FID on both phases of its 20.0 MTPA nameplate Plaquemines LNG facility, which is on target to produce first LNG in 2024,” said CEO Sabel.

“By early September, Plaquemines LNG will have received the first four liquefaction Train modules (Blocks 1 and 2) and the roof will be raised on its third LNG storage tank,” he explained.

The company expects to commence construction of its CP2 LNG facility later this year following receipt of authorization from the Federal Energy Regulatory Commission.

“Baker Hughes, as a strategic LNG-equipment supplier to Venture Global, provided comprehensive LNG technology solutions to the Calcasieu Pass LNG facilities and will provide the same to the currently under-construction Plaquemines LNG facility,” added Venture Global.

Sabel said that the company was pleased to announce its long-term plan to expand LNG production both in and outside of Louisiana, building on the momentum of the first three projects.

The Sabel statement gave no indication where on the Gulf Coast or elsewhere new plants would be build or expansions made for the more than 30 MTPA of additional output in the long term plan.

“Now more than ever we are committed to our mission of delivering low-cost LNG at a larger scale to support the world’s growing demand for energy security, prosperity and environmental progress,” added Sabel.

“We are grateful for our continued partnership with Baker Hughes, a world leader in energy technology, and look forward to building on our successful collaboration in our upcoming projects,” he declared.

Baker Hughes CEO Simonelli said natural gas would continue to play a critical role in global energy.

“We are proud of our longstanding collaboration with Venture Global LNG and continue to support their plan to expand LNG production to address global energy demand,” explained Simonelli.

“Building on our positive track record for the Calcasieu Pass and Plaquemines LNG projects, we look forward to providing VG with our proven technology solutions to enable faster time to LNG,” he added. ■

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.

In addition to our own database, the information in these tables has been derived and cross-referenced from multiple sources, including GEM, IEEJ, IGU, GIE, GIIGNL and facility operators/ developers.

Comments, corrections or additional information would be most welcome. They should be sent to alexander@lngjournal.com

Conventional LNG Terminals

Country	Location (Project)	Owners	Start up	Nom. Capacity (MTPA)	Storage Tanks	Capacity
Belgium	Zeebrugge	Fluxys	1987	6.6	5	566,000
Canada	St. John (Canaport) LNG	Repsol	2009	7.1	3	480,000
Chile	Mejillones LNG	Tractebel Engie, Ameris Capital AGF	2010	1.5	1	187,000
	Quintero	ENAP, Metrogas, Enagas	2009	3.8	3	334,000
China	Beihai LNG	PipeChina	2013	6.0	4	640,000
	Caofeidian LNG	PetroChina	2012	10.0	8	1,280,000
	Caofeidian Xintian LNG	China Suntien Green Energy Corp.	2023	5.0	2	–
	Dalian LNG	PipeChina	2011	6.0	3	480,000
	Dongguan LNG	JOVO Energy	2010	1.5	2	160,000
	Fujian LNG	CNOOC	2008	6.3	6	960,000
	Guangdong Dapeng LNG	CNOOC	2006	6.8	4	640,000
	Hainan LNG	PipeChina	2020	3.0	2	320,000
	Hainan Transfer Station	PetroChina	2020	0.6	2	40,000
	Jiangsu LNG	PetroChina	2011	10.0	5	1,080,000
	Jieyang LNG	PipeChina	2018	4.2	3	480,000
	Nansha LNG	Guangzhou Gas	2023	1.0	2	160,000
	Pinghu LNG	Zhejiang Hangjiixin Clean Energy	2022	1.0	2	200,000
	Qidong LNG	Guanghui Energy	2009	4.0	5	620,000
	Qingdao LNG	Sinopec	2006	7.0	6	960,000
	Shanghai (Yangshan) LNG	CNOOC	2009	3.0	5	895,000
	Shanghai Peak Shaving	Shenergy	2008	1.5	5	320,000
	Shenzhen Peak Shaving	Hua'an	2012	0.8	1	80,000
	Shenzhen Diefu LNG	PipeChina	2018	4.0	4	640,000
	Tianjin - Nangang LNG	Sinopec	2018	6.0	4	640,000
	Tianjin LNG	PipeChina	2013	6.0	7	397,000
	Wenzhou LNG	Zhejiang Energy, Sinopec	2023	3.0	4	–
	Yancheng LNG	CNOOC	2022	3.0	4	880,000
	Zhejiang LNG	CNOOC	2018	6.0	6	960,000
	Zhoushan LNG	ENN	2019	5.0	4	640,000
	Zhuhai LNG	CNOOC	2014	3.4	3	480,000
Dominican Republic	Andres LNG	AES Andres	2003	1.9	1	160,000
France	Dunkerque Le Clijton	EDF, Fluxys, TotalEnergies	2016	9.5	3	600,000
	Fos-sur-Mer	TotalEnergies, Elengy	2010	9.2	4	410,000
	Montoir-de-Bretagne	Elengy	1980	8.0	3	360,000
Greece	Revithoussa	DESFA	2000	7.1	3	225,000
India	Cochin	Petronet	2013	5.0	2	368,000
	Dabhol	GAIL, NTPC	2007	5.0	3	480,000
	Dahej	Petronet	2004	17.5	6	932,000
	Ennore LNG	IndianOil LNG	2019	5.0	2	360,000
	Hazira	Shell, TotalEnergies	2005	5.0	2	320,000
	Mundra LNG	Adani, GSP	2019	5.0	2	320,000
Indonesia	Arun Conversion	Pertamina	2015	3.0	4	508,000
Italy	Panigaglia	Snam	1963	2.5	2	100,000
	Rovigo Adriatic LNG	QatarEnergy, ExxonMobil, Snam	2009	6.6	2	250,000
Jamaica	Montego Bay	New Fortress Energy	2020	0.5	7	7,000
Japan	Chita	JERA, Toho Gas	1977	24.0	14	1,560,000
	Fukuoka	Saibu Gas	1993	0.8	1	70,000
	Futtsu	JERA	1985	20.0	10	1,110,000
	Hachinohe	ENEOS	2015	1.6	2	280,000
	Hatsukaichi	Hiroshima Gas	1996	0.9	2	170,000
	Hibiki LNG	Saibu Gas, Kitakyushu Gas	2014	4.0	2	360,000
	Higashi-Ogishima	Tokyo Electric	1984	15.0	9	540,000
	Himeji	Kansai Electric, Osaka Gas	1979	12.9	15	1,360,000
	Hitachi LNG	JERA	2015	2.2	2	230,000
	Ishikari LNG	Hokkaido Gas	2012	1.4	1	180,000
	Joetsu LNG	JERA	2012	2.3	3	540,000
	Kagoshima	JERA	1996	0.2	1	86,000
	Kawagoe	Chubu Electric	1997	8.0	3	480,000
	Mizushima	Chugoku Electric, ENEOS	2006	1.7	2	320,000
	Nagasaki LNG	Saibu Gas	2003	0.1	1	35,000
	Nakagusuku LNG	Okinawa Electric	2012	0.7	2	280,000
	Negishi	TEPCO, JERA	1969	11.0	14	1,180,000
	Niigata	Tohoku Electric	1984	10.0	8	720,000
	Ogishima	JERA	1998	3.0	4	850,000

Conventional LNG Terminals (Continued)

Country	Location (Project)	Owners	Start up	Nom. Capacity (MTPA)	Storage Tanks	Storage Capacity
Japan (continued)	Oita	Kyushu Electric	1990	5.1	5	460,000
	Sakai	Kansai Electric	2006	6.4	4	420,000
	Sakaide	Shikoku Electric, Cosmo Oil, Shikoku-Gas	2010	1.2	1	180,000
	Senboku	Osaka Gas	1972	12.5	20	1,675,000
	Shin Sendai	Tohoku Electric	2016	1.0	2	320,000
	Sodegaura	JERA	1973	29.4	35	2,660,000
	Sodeshi Shimizu	Shizuoka Gas, ENEOS	1996	2.9	3	337,200
	Soma LNG	JAPEX	2018	1.5	2	460,000
	Tobata Ward	Kita-Kyushu LNG	1977	7.6	8	480,000
	Toyama LNG	Hokuriku Electric	2018	1.8	1	180,000
	Yanai	Chugoku Electric	1990	2.4	6	480,000
	Yokkaichi	Chubu Electric	1987	7.2	2	320,000
Kuwait	Al Zour LNG	KIPIC	2022	22.0	8	1,800,000
Malaysia	Pengerang LNG	Petronas	2017	3.5	2	400,000
Mexico	Energia Costa Azul	Sempra	2008	7.6	2	320,000
	Manzanillo	Samsung, KOGAS, Mitsui	2012	3.8	2	300,000
Netherlands	Maasvlakte Gate Terminal	Gasunie	2011	8.9	3	540,000
Panama	AES Costa Norte LNG	AES	2018	1.5	1	130,000
Philippines	PHLNG	AG&P	2023	5.0	1	137,512
	Batangas FSRU	First Gen Corp.	2023	3.5	1	162,400
Poland	Swinoujscie LNG	Polskie LNG	2015	3.6	2	320,000
Portugal	Sines	REN	2004	5.6	3	390,000
Puerto Rico	Penuelas	EcoElectrica	2000	1.4	1	160,000
Singapore	Singapore LNG	Singapore LNG Corp.	2013	11.0	4	800,000
South Korea	Boryeong	GS Energy	2017	10.8	6	1,200,000
	Gwangyang	POSCO Energy	2005	7.1	5	730,000
	Incheon	KOGAS	1996	54.4	23	3,480,000
	Pyeongtaek	KOGAS	1986	41.0	23	3,360,000
	Samcheok	KOGAS	2014	11.6	12	2,400,000
	Tongyeong	KOGAS	2002	26.6	17	2,600,000
	Jeju Island	KOGAS	2019	1.1	2	90,000
Spain	Bahia de Bizkaia LNG	BP, Enagás, EVE	2003	6.9	3	450,000
	Barcelona	Enagás	1969	12.6	6	760,000
	Cartagena	Enagás	1989	8.7	5	587,000
	Huelva	Enagás	1988	8.7	5	619,500
	Mugardos	Reganosa	2007	2.6	2	300,000
	Sagunto	Enagás	2006	6.4	4	600,000
	El Musel	Enagás	2023	5.8	2	300,000
Taiwan	Taichung	CPC	2009	7.0	6	960,000
	Yung-An	CPC	1990	10.5	6	690,000
Thailand	Map Ta Phut LNG	PTT	2011	19.0	6	940,000
Turkey	Izmir	BOTAS	2006	10.6	2	280,000
	Marmara Ereglisi	BOTAS	1994	4.2	3	255,000
UK	Dragon LNG	Shell, Ancala Partners	2009	6.5	2	320,000
	Isle of Grain	National Grid	2005	14.8	8	1,000,000
	South Hook LNG	QatarEnergy, ExxonMobil, TotalEnergies	2009	15.6	5	775,000
United States	Everett Marine Terminal	Constellation Energy	1971	5.1	2	155,000
Vietnam	Thi Vai LNG	PetroVietnam Gas	2023	1.0	1	180,000

FSRU Terminals

Country	Location (Project)	Owners	Start up
Argentina	Escobar GasPort	Excelerate/Enarsa	2011
	Bahia Blanca	YPF	2023
Bangladesh	Moheshkhali	Excelerate, PetroBangla	2018
	Cox's Bazar	Summit Power International, Excelerate Energy	2019
Brazil	Pecem, FSRU	Petrobras	2009
	Guanabara Bay FSRU	Petrobras	2009
	Salvador, Bahia FSRU	Petrobras	2013
	Porto Sergipe FSRU	Golar LNG/Stonepeak	2020
	Porto do Acu FSRU	GNA	2020
China	Tianjin FSRU	CNOOC, Hoegh, various	2013
Croatia	Hrvatska LNG	Hrvatska Elektroprivreda Plc, Plinacro Ltd	2021
Colombia	Cartagena FSRU	Promigas, Sociedad Portuaria El Cayao	2016
Egypt	Ain Sokhna, Suez	EGAS, BW Gas	2015
El Salvador	Acajutla	Energía del Pacífico	2022
Finland	Inkoo FSRU	Gasgrid Finland	2022
Germany	Wilhelmshaven FSRU	Uniper	2022
	Lubmin FSRU	Deutsche ReGas	2022
	Brunsbüttel	RWE	2023
Ghana	Tema LNG	Helios/GNPC	2021
Greece	Revithoussa FSU	DESFA	2022
Hong Kong, China	FSRU Bauhinia	CLP Power	2023
India	Dhamra	Adani, TotalEnergies	2023

Country	Location (Project)	Owners	Start up
India (contd)	Jaigarh (Mothballed)	H-Energy	2022
Indonesia	Lampung	Hoegh LNG, PGN LNG	2014
	Nusantara (Jakarta Bay)	Golar LNG, Pertamina	2012
	Benoa LNG	PT Pertagas Niaga	2016
	Amurang	Karadeniz	2020
	Jawa Satu FSRU	Pertamina	2021
Italy	Livorno	OLT Offshore LNG Toscana	2013
	Piombino	Snam	2023
Jamaica	Old Harbour	Golar FSRU, New Fortress	2019
Jordan	Aqaba, Jordan	Golar LNG	2015
Lithuania	Klaipeda	Klaipedos Nafta Hoegh LNG	2014
Malaysia	Malacca FSRU	Petronas	2012
Malta	FSU Armada Mediterrana	ElectroGas	2016
Myanmar	Thanlyin	CNTIC Vpower	2020
Netherlands	Eemshaven	Gasunie	2022
Pakistan	Port Qasim	Excelerate, Engro Corp	2015
	Port Qasim	BW-Mitsui, PGP Consortium	2017
Philippines	Batangas	AG&P International	2023
Russia	Kaliningrad FSRU	Gazprom	2020
Senegal	Dakar	KarMOL	2023
Turkey	Iskenderun & Saros FSRUs	BOTAS	2016 & 2023
	Aliaga (ETKI LNG)	Etki Liman	2017
UAE	Ruwais, Abu Dhabi	Gasco (UAE)	2016
	Jebel Ali Port, Dubai	DSA (UAE)	2010

Future LNG Import Projects

Country	Location/Project	Owners	Start up	Nom. Capacity (MTPA)	Storage Tanks	Capacity	Status
Albania	Port of Vlora FSRU	Excelerate Energy, ExxonMobil	–	3.5	–	–	Speculative
Antigua and Barbuda	Antigua Power LNG	Antigua Power Co Ltd, Eagle LNG Partners	2023	–	–	–	Speculative
Australia	Port Phillip Bay FSRU	Vopak	2024	–	–	–	Speculative
	Geelong FSRU	Viva Energy	2024	–	–	–	Speculative
	Adelaide FSRU	Venice Energy	2024	–	–	–	Speculative
	Port Kembla FSRU	Squadron Energy	2023	1.9	1	170,000	U. Construction
Bangladesh	Matarbari LNG	Petrobangla	2028	7.5	–	–	Speculative
	Payra FSRU	Excelerate Energy	2028	–	–	–	Speculative
Belgium	Zeebrugge Exp. I	Fluxys	2024	4.6	–	–	U. Construction
	Zeebrugge Exp. II	Fluxys	2026	1.3	–	–	U. Construction
Brazil	Tergás Rio Grande LNG	Grupo Cobra	2024	1.61	–	–	Speculative
	Geramar FSRU	–	2026	–	–	–	Speculative
	Porto Norte Fluminense FSRU	Porto Norte Fluminense SA	2027	5.64	–	–	Speculative
	Imetame LNG	Imetame	2025	–	–	–	Speculative
China	Penglai LNG	Shandong Penglai Baota Ina Natural Gas Co., Ltd.	2026	2.8	–	–	Proposed
	Wuhan LNG	Hubei Minsheng Petroleum Liquefied Gas Co., Ltd.	2035	1.86	–	–	Speculative
	Zhiwan Island LNG	Macau Gas Co.	–	5	–	–	Speculative
	Yueyang LNG	Yueyang LNG Co., Ltd.	2023	2	–	–	U. Construction
	Yangjiang LNG	Guangdong Yangjiang Hailing Bay LNG Co., Ltd.	2023	2.8	–	–	U. Construction
	Rudong LNG (Jiangsu Guoxin)	Jiangsu Guoxin LNG Co., Ltd.	2024	2.95	–	–	U. Construction
	Jiangyin LNG (Garson Gas)	Jiangsu Jiasheng Gas Co., Ltd.	2023	3	–	–	U. Construction
	Huizhou LNG	Guangdong Huizhou LNG Co., Ltd.	2023	4	–	–	U. Construction
	Longkou	PipeChina	2024	5	6	1,420,000	U. Construction
	Yingkou LNG	China Urban Rural Energy	2025	6.5	4	800,000	U. Construction
	Yancheng LNG Expansion	CNOOC	2023	3	–	1,620,000	U. Construction
	Yantai LNG	China Urban Rural Energy	–	5.9	5	1,000,000	U. Construction
	Zhangzhou LNG	PipeChina	2024	3	3	–	U. Construction
	Tianjin Binhai LNG	Beijing Gas	2023	5	10	–	U. Construction
Colombia	Buenaventura FSRU	Unidad de Planeación Minero Energética (UPME)	2024	–	–	–	Speculative
Cyprus	Vasilikos FSRU	DEFA	2023	0.6	–	–	U. Construction
Ecuador	Jambelí FSRU	Sycar LLC	2025	0.38	–	–	Proposed
Estonia	Paldiski LNG	Espa	2024	1.8	–	–	Proposed
France	Le Havre FSRU	TotalEnergies	2023	1.8	–	–	U. Construction
Germany	Stade LNG	Buss Group, Dow Chemical, Fluxys, Partners Group	2026	9.78	–	–	Proposed
	TES Wilhelmshaven LNG	Tree Energy Solutions	2025	11.76	–	–	Proposed
	Stade FSRU	German company Hanseatic Energy Hub	2023	3.5	–	–	U. Construction
Greece	Dioriga FSRU	Motor Oil	2024	1.91	–	–	Proposed
	Argo FSRU	Mediterranean Gas	2023	3.38	–	–	Proposed
	Thessaloniki FSRU	Edison, Hellenic Petroleum	2025	5.37	–	–	Proposed
	Alexandroupolis FSRU	GasTrade	2023	4.04	1	135,000	U. Construction
India	Jaigarh LNG	H-Energy	–	8	–	–	Speculative
	Kakinada FSU	H-Energy	2024	4	–	–	Speculative
	Kukrahati LNG	H-Energy	2024	3	–	180,000	Speculative
	Chhara LNG Terminal	Hindustan Petroleum	2025	5	–	–	U. Construction
	Karaikal LNG	AG&P	TBC	5	–	–	Speculative
Indonesia	Karimun Island LNG	Panbil Group	2024	–	–	–	Speculative
	Sengkang LNG	Energy World	–	2	–	–	U. Construction
Ireland	Mag Mell FSRU	Predator Oil & Gas	–	1.91	–	–	Speculative
Italy	Porto Torres FSRU	Snam	2023	0.5	–	–	Proposed
	Gioia Tauro LNG	Iren Group, Sorgenia	2026	8.6	–	–	Proposed
	Portovesme FSRU	Snam SpA	2024	–	–	–	Speculative
Morocco	Jorf Lasfar LNG	SIGER/ERGIS Group	2025	5.15	–	–	Speculative
Mozambique	Matola FSRU	Gigajoule, TotalEnergies, CTB, Matola Gas Co.	2025	0.5	–	–	Speculative
Myanmar	Mee Laung Gyaing FSRU	Supreme Group, ZHEFU Hydropower	2023	–	–	–	Speculative
	Ahlong LNG	TTCL	2024	–	–	–	Speculative
	Thilawa LNG	Eden Group, Marubeni Corp., Mitsui, Sumitomo Corp.	2026	–	–	–	Speculative
Pakistan	Tabeer Energy FSRU	Mitsubishi	–	5.7	–	–	Speculative
Philippines	Vires FSRU	Argo Group	–	3	–	–	Speculative
	Pagbilao Power	Energy World	–	3	2	260,000	U. Construction
Poland	Gdańsk FSRU	PGNiG	2028	8.82	–	–	Speculative
South Africa	Richards Bay FSRU	South Africa Department of Public Enterprises	2027	1	–	–	Speculative
South Korea	Dangjin LNG	POSCO	2027	3.5	–	–	Proposed
	Hanyang LNG	Hanyang Group	2024	–	–	–	Speculative
Sri Lanka	New Fortress Colombo LNG	New Fortress Energy	–	0.71	–	–	Speculative
Taiwan	Hsieh-Ho LNG	Taipower	2025	1.8	–	–	Proposed
	Taichung (TaiPower) LNG	Taipower	2025	3	–	–	Proposed
Thailand	Chana LNG	–	2028	2	–	–	Speculative
Vietnam	Hai Linh	Hai Linh Co. Ltd.	2020	3	3	219,000	Mothballed
	Mui Ke Ga FSRU	B.Grimm Power, Energy Capital Vietnam, Gunvor	2025	1.5	–	–	Proposed
	Son My LNG	AES, PetroVietnam	2026	3.6	–	–	Proposed
	Thai Binh FSRU	–	2026	0.5	–	–	Speculative
	South West FSRU	–	2030	1	–	–	Speculative
	Bac Lieu LNG	Delta Offshore Energy	–	2	–	–	Speculative
	Cat Hai FSRU	Chubu Electric, ExxonMobil, Government of Hai Phong, TEPCO	2030	3	–	–	Speculative
	Khanh Hoa LNG	Millenium Energy	2030	3	–	–	Speculative
	Long Son LNG	EVN	2025	4.4	–	–	Speculative
	Tien Lang FSRU	ExxonMobil, Chubu Electric Power, Tokyo Electric Power Co.	2026	–	–	–	Speculative
	Ca Na LNG	Novatek	2024	–	–	–	Speculative
	Chan May LNG	Chan May LNG	2024	–	–	–	Speculative
	Vung Ang LNG	KG Electric Power Corp., PECC2, Siemens	2026	–	–	–	Speculative
	Hai Lang LNG	T&T Group, Hanwa, KOGAS, KOSPO	2026	1.5	2	160,000	U. Construction

LNG Export Plants

Country	Location/Project	Shareholders	Start up	Liquefaction		Storage	
				Trains	Nom. capacity (MTPA)	No. of tanks	Capacity m³
UAE	Das Island	ADNOC, Mitsui, BP, TotalEnergies	1977/1994	3	5.7	3	240,000
Algeria	Arzew	Sonatrach	1964-2014	13	20.8	6	920,000
	Skikda	Sonatrach	1980/2013	4	7.9	5	308,000
Angola	Soyo	Sonangol, Chevron, BP, Eni, TotalEnergies	2012	1	5.2	2	370,000
Australia	NWS LNG	BP, Chevron, MIMI, Shell, Woodside Energy, CNOOC	1989-2004	5	16.3	6	520,000
	Darwin LNG	Santos, Eni, INPEX, JERA, Tokyo Gas	2006	1	3.7	1	188,000
	Australia Pacific LNG	ConocoPhillips, Origin, Sinopec	2016	2	9.0	2	320,000
	Gladstone LNG	Santos, Petronas, TotalEnergies, KOGAS	2015-2016	2	7.8	2	280,000
	Gorgon LNG	Chevron, Shell, ExxonMobil, Osaka Gas, Tokyo Gas, JERA	2016-2017	3	15.6	2	360,000
	Pluto LNG	Woodside Energy, Kansai Electric, Tokyo Gas	2012	1	4.9	2	240,000
	Queensland C. LNG	Shell, CNOOC	2014	2	4.5	2	280,000
	Wheatstone LNG	Chevron, KUFPEC, Woodside Petroleum, Kyushu Electric Power Co., PEW	2017	2	8.9	2	300,000
	Ichthys LNG	INPEX, TotalEnergies, CPC, Tokyo Gas, Osaka Gas, Kansai Electric, JERA, Toho Gas	2018	2	8.9	2	330,000
	Prelude FLNG	Shell, INPEX, CPC, KOGAS	2018	1	3.6	6	228,000
Brunei	Brunei LNG	Gov. of Brunei, Shell, Mitsubishi	1972-74	5	7.2	3	195,000
Cameroon	Cameroon FLNG	Golar LNG	2018	4	2.4	1	125,000
Egypt	Damietta	Eni, EGAS, EGPC	2004	1	5.0	2	300,000
	Idku	EGPC, EGAS, Shell, Petronas, TotalEnergies	2005	1	7.2	2	280,000
Equ. Guinea	EG LNG	Marathon, Sonagas, Marubeni	2007	1	3.4	2	272,000
Indonesia	Bontang (E-H)	Pertamina, VICO, JILCO, TotalEnergies	1990-1998	4	11.5	5	635,000
	Dongi-Senoro	Medco Energi, Pertamina, Mitsubishi	2015	1	2.0	1	170,000
	Tangguh	BP, Mitsubishi, Inpex, CNOOC, JX Nippon, KG Mitsui, LNG Japan	2008	2	7.6	2	340,000
Malaysia	Malaysia LNG	Petronas, Shell, Sarawak, Mitsubishi, Nippon Oil	1983-2016	9	29.3	6	445,000
	PFLNG Satu	Petronas	2016	1	1.2	4	177,000
	PFLNG Dua	Petronas	2020	1	1.5	4	177,000
Mozambique	Coral Sul FLNG	Eni, ExxonMobil, CNPC, GALP, KOGAS, ENH	2022	1	3.4	8	227,840
Nigeria	Bonny Island	NNPC, Shell, TotalEnergies, Eni	1999-2007	6	22.2	6	505,200
Norway	Snøhvit LNG	Equinor, TotalEnergies, Petoro, Neptune Energy, Wintershall DEA Norge	2007	1	4.2	2	250,000
Oman	Oman LNG	Oman Gov., Shell, TotalEnergies, Korea LNG, Mitsubishi, Mitsui, Partex O&G, Itochu Corp.	2000	3	10.4	4	480,000
Papua New Guinea	PNG LNG	ExxonMobil, Oil Search, Santos, JX Nippon Oil	2014	2	8.3	2	320,000
Peru	Pampa Melchorita	Hunt Oil, Shell, Marubeni, SK Group	2010	1	4.5	2	260,000
Qatar	Ras Laffan	QatarEnergy, Shell, ExxonMobil, TotalEnergies, ConocoPhillips et al.	1997-2010	14	77.4	18	2,340,000
Russia	Sakhalin-2 LNG	Gazprom, Sakhalin Energy, Mitsubishi, Mitsui	2009	2	9.6	2	200,000
	Yamal LNG	Novatek, TotalEnergies, CNPC, Silk Road Investment Fund	2017-2019	3	17.4	4	640,000
	Portovaya LNG	Gazprom	2022	1	1.5	-	-
Trinidad & Tobago	Atlantic LNG	BP, Shell, NGC	1999-2005	4	15.3	4	640,000
USA	Sabine Pass LNG	Cheniere	2016-2022	6	30.0	5	800,000
	Corpus Christi LNG	Cheniere	2019-2021	3	15.0	3	480,000
	Freeport LNG	Freeport LNG, JERA, Osaka Gas	2019-2020	3	15.5	3	480,000
	Cameron LNG	Sempra, TotalEnergies, Mitsui, Mitsubishi	2019	3	15.0	3	480,000
	Calcasieu Pass LNG	VentureGlobal	2022-2023	18	11.3	2	440,000
	Cove Point LNG	BHE GT&S, Dominion Energy, Brookfield Asset Management	2017	1	5.3	7	695,000
	Elba Island LNG	Kinder Morgan, EIG Energy, Blackstone	2019-2020	10	2.5	5	560,000
Yemen	Balhaf LNG (Mothballed)	TotalEnergies, Hunt Oil, SK Innovation, Hyundai, KOGAS, Yemen Gas Corp., GASSP	2009	2	6.7	2	320,000

LNG Export Projects U. Construction

Country	Project	Project Developers	Planned Start Up	Number of Trains	Capacity In MTPA
Canada	LNG Canada	Shell, Petronas, PetroChina, Mitsubishi	2025	2	14
	Woodfibre LNG	Pacific Energy Corp., Enbridge	2027	2	2.2
Indonesia	Sengkang LNG	Energy World	2023+	4	2
	Tangguh LNG T3	BP, MI Berau B.V., CNOOC, Nippon Oil Expl. et al	2023	1	3.8
Malaysia	ZLNG FLNG	Petronas	2027	1	2
Mauritania	Greater Tortue Ahmeyim FLNG	BP, Kosmos Energy	2023+	–	2.52
Mexico	Costa Azul Export	Sempra Energy, TotalEnergies	2024	1	3.25
Mozambique	Mozambique LNG Ph. I	TotalEnergies, Mitsui, ONGC, ENH, PTTEP, Bharat Petroleum, Oil India	2024+	2	–
Nigeria	Nigeria LNG Expansion	Nigeria LNG	2024	1	8
Qatar	Ras Laffan Expansion I	QatarEnergy	2026	4	33
	Ras Laffan Expansion II	QatarEnergy	2027	2	16
Russia	Ust Luga LNG	RusKhimAlyans	2024+	2	13
	Arctic LNG 2 T1	Novatek et al	2023+	1	6.6
United States	Golden Pass LNG T1-2	Golden Pass LNG	2024	2	12
	Golden Pass LNG T3	Golden Pass LNG	2025	1	6.03
	Corpus Christi LNG Stage 3	Cheniere Energy	2027	7	11.48
	Plaquemines LNG Ph. I	Venture Global	2024	1	10
	Plaquemines LNG Ph. II	Venture Global	2025	1	10

Future LNG Export Projects

Country	Project	Project Developers	Estimated Start Up	Number of Trains	Capacity In MTPA
Argentina	Vaca Muerta (YPF) LNG	YPF	2024+	–	5.37
Australia	Browse FLNG	Woodside Energy, Japan Australia LNG, Shell, BP, PetroChina	–	2	11.4
	Darwin LNG Life Extension	Santos, SK E&S, JERA, INPEX, Eni SpA, Tokyo Gas	2025	1	3.7
	Pluto LNG T2	Woodside Burrup Train 2A Pty Ltd., Global Infrastructure Partners	2026	1	5
Cameroon	Etinde FLNG	Perenco, Bowleven	2023+	–	1.3
Canada	Bear Head LNG	Bear Head LNG	2027	4	12
	Cedar FLNG	Haisla Nation, Pembina Pipeline Corp.	2027	–	3
	Energie Saguenay LNG	GNL Quebec	2026	2	11
	Ksi Lisims FLNG	Ksi Lisims LNG GP Ltd.	2027	–	12
	Placentia Bay FLNG	Horizon Maritime Services, LNG Newfoundland and Labrador Ltd.	2030	–	4
	Tilbury Island LNG T1	FortisBC	2026	1	0.9
	Tilbury Island LNG T2	FortisBC	2028	1	2.5
Equatorial Guinea	Fortuna FLNG	New Fortress Energy	–	1	–
Gabon	Boudji FLNG	Petronas	–	–	–
Guinea	Guinea LNG	West Africa LNG Group	2026+	1	–
Indonesia	Abadi FLNG	INPEX Masela Ltd.	2030	–	9.5
Israel	NewMed FLNG	NewMed Energy	2026	–	5
Mauritania	New Fortress Banda LNG	New Fortress Energy	2024	–	1.4
Mexico	Mexico Pacific LNG Ph. I	AECOM Capital, DKRW Energy	2025	2	9.4
	Mexico Pacific LNG Ph. II	AECOM Capital, DKRW Energy	2026+	1	4.7
	AMIGO LNG	Epsilon LNG, LNG Alliance	2026	1	4.2
	Vista Pacifico LNG	Sempra Energy	2025+	–	4
	Lakach FLNG	New Fortress Energy	–	1	1.4
	Altamira FLNG	New Fortress Energy	–	2	2.8
Mozambique	Rovuma LNG	Eni, ExxonMobil, CNPC, ENH, Galp, KOGAS	2025+	2	15.2
Nigeria	Brass LNG	Brass LNG Ltd.	–	2	10
	Greenville LNG	Greenville LNG	–	1	1.1
	UTM Offshore FLNG	UTM Offshore	2026	–	1.52
Papua New Guinea	Papua LNG	TotalEnergies, ExxonMobil, Papua New Guinea Gov., Santos	2027	2	5.4
	PNG LNG Expansion	ExxonMobil, Kumul Petroleum, Santos, JX Nippon O&G, MRDC	2025	1	2.6
Republic of the Congo	Congo FLNG	Eni Congo	2025	2	3
Russia	Yakutia LNG	A-Property, Globaltek, Zhejiang Energy	2027	–	18
	Far East LNG I	ExxonMobil, SODECO, ONGC, Rosneft	2027+	1	6.2
	Far East LNG II	ExxonMobil, SODECO, ONGC, Rosneft	2035	1	10
	Vladivostok LNG	Gazprom, INPEX, Itochu Corp., JAPEX, Marubeni Corp.	2025	3	1.5
	Arctic LNG II	Novatek	2027	–	19.8
	Obssky LNG	Novatek	2026	–	6.6
	Chernomorsky LNG	Gazprom	2025	–	1.5
	Arctic LNG III	OOO Arctic LNG 3	2032	–	19.8
	Kara LNG	Rosneft	2030	–	30
Tanzania	Tanzania LNG	Equinor, ExxonMobil, Ophir Energy, Pavilion Energy, Shell, TPDC	2027	2	10
United Arab Emirates	Ruwais (ex Fujairah) LNG	ADNOC	2027+	2	6
United States	Fourchon LNG	Energy World	–	1	2
	Alaska LNG	Alaska Gasline Development Corp.	2030	3	20.1
	Cameron LNG Expansion	Cameron LNG LLC	2026	1	6.75
	Commonwealth LNG	Commonwealth LNG	2026	6	9.3
	Corpus Christi LNG Midscale Expansion	Cheniere Energy	2031	2	3.28
	Delfin FLNG	Delfin LNG LLC	2026+	4	12
	Driftwood LNG T1-5	Tellurian	–	5	27.6
	Freeport LNG Expansion	Freeport LNG Dev.	2026	1	5.1
	Gulf LNG	KinderMorgan	–	2	10.86
	Lake Charles LNG	Energy Transfer	2026+	3	17.79
	Magnolia LNG	Glenfarne Group	–	4	8.8
	Port Arthur LNG Ph. I	PALNG Common Facilities Co., Port Arthur LNG, LLC	–	2	13.5
	Port Arthur LNG Ph. II	PALNG Common Facilities Co., Port Arthur LNG, LLC	–	2	13.5
	Texas LNG	Glenfarne Energy Transition	2027	2	4
	Rio Grande LNG Ph. I	NextDecade	2026	2	10.8
	Rio Grande LNG Ph. II	NextDecade	–	3	16.2
	Pointe LNG	Pointe LNG, Pointe Pipeline Co.	2026	3	6
	Repauno Works LNG	Delaware River Partners LLC	–	–	1.5
	Qilak LNG	Qilak Energy	2026	–	4
	CP2 LNG Ph. I	Venture Global	2026+	9	10
	CP2 LNG Ph. II	Venture Global	2027+	9	10
	Delta LNG Ph. I	Venture Global	2028+	–	10
	Delta LNG Ph. II	Venture Global	2029+	–	10
	West Delta LNG Deepwater Port	LNG21 Group	2026+	6	6.1
	Grand Isle FLNG	New Fortress Energy	2025+	–	2.8

World LNG Carrier Fleet

LNG Carrier	Capacity m ³	Registered Owner	Builder	Delivery	Flag	Power Plant	Cargo System	No. of Tanks	Original Project	Hull Number
Aamira	268,000	Nakilat SHI 1753 Inc.	Samsung	16/04/2010	M. Islnds	Diesel	TZ Mk. III	10	Qatargas IV	1753
Abadi	135,000	Tost Two (NBD) Sendirian Berhad	Mitsubishi	29/05/2002	Liberia	Steam	Moss	5	Lumut	2163
Adam LNG	162,000	Oman Shipping Co.	HHI	10/07/2014	M. Islnds	Diesel	TZ Mk. III Flex	4	Oman LNG	2584
Adamastos	170,800	Shin Doun Kisen Co. Ltd.	HHI	23/08/2021	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3109
Adriano Knutsen	180,000	Knutsen OAS Shipping	HHI	13/07/2019	Spain	ME-GI	TZ Mk. III Flex	4	Corpus Christi	2963
Al Aamriya	210,168	J5 Nakilat No.1 Ltd.	Daewoo	04/05/2008	M. Islnds	Diesel	GT NO 96	5	RasGas III	2249
Al Areesh	148,786	Al Areesh LLC	Daewoo	01/01/2007	Bahamas	Steam	GT NO 96	4	RasGas II	2239
Al Bahiya	210,100	Nakilat DSME 2286 Inc.	Daewoo	02/12/2009	M. Islnds	Diesel	GT NO 96	5	Qatargas IV	1726
Al Bidda	137,339	Mitsui O.S.K. Lines	Kawasaki	08/11/1999	M. Islnds	Steam	Moss	5	Qatargas I	1470
Al Daayen	148,853	Seaspirit Leasing	Daewoo	21/03/2007	Bahamas	Steam	GT NO 96	4	RasGas II	2240
Al Dafna	268,000	Nakilat SHI 1726 Inc.	Samsung	03/10/2009	M. Islnds	Diesel	TZ Mk. III	10	RasGas	1726
Al Deebel	145,000	Peninsula LNG Transport No. 3	Samsung	15/11/2005	Bahamas	Steam	TZ Mk. III	4	RasGas II	1442
Al Gattara	216,200	Overseas LNG H1 Corp.	HHI	06/11/2007	M. Islnds	Diesel	TZ Mk. III	4	Qatargas II	1791
Al Ghariya	210,150	Neptora Schiffsbetriebsgesellschaft	Daewoo	13/12/2007	Bahamas	Diesel	GT NO 96	4	Qatargas II	2248
Al Gharrafa	216,200	Overseas LNG H2 Corp.	HHI	11/01/2008	M. Islnds	Diesel	TZ Mk. III	5	Qatargas II	1792
Al Ghashamiya	217,591	Nakilat SHI 1696 Inc.	Samsung	29/04/2009	M. Islnds	Diesel	TZ Mk. III	10	Qatargas III	1696
Al Ghuwairiya	263,300	Nakilat Al Ghuwairiya Inc.	Daewoo	15/12/2008	M. Islnds	Diesel	GT NO 96	5	Qatargas II	2255
Al Hamla	216,200	Overseas LNG S2 Corp.	Samsung	15/02/2008	M. Islnds	Diesel	TZ Mk. III	4	Qatargas II	1606
Al Hamra	137,000	Al Hamra Ltd.	STX	24/11/1996	Liberia	Steam	Moss	4	Das Island	1332
Al Huwaila	217,000	Al Huwaila Inc.	Samsung	06/05/2008	Bahamas	Diesel	TZ Mk. III	10	RasGas III	1643
Al Jasra	137,227	Mitsui O.S.K. Lines	Mitsubishi	05/06/2000	M. Islnds	Steam	Moss	5	Qatargas I	2117
Al Jassasiya	145,700	Venice Maritime Inc.	Daewoo	21/05/2007	Greece	Steam	GT NO 96	4	RasGas II	2243
Al Karaana	210,100	Nakilat DSME 2284 Inc.	Daewoo	06/10/2009	M. Islnds	Diesel	GT NO 96	4	Qatargas III	2284
Al Kharaitiyat	216,300	Nakilat HHI 1909 Inc.	HHI	30/06/2009	M. Islnds	Diesel	TZ Mk. III	4	Qatargas III	1909
Al Kharsaah	217,000	Al Kharsaah Inc.	Samsung	12/06/2008	Bahamas	Diesel	TZ Mk. III	10	RasGas III	1644
Al Khattiya	210,150	Nakilat DSME 2283 Inc.	Daewoo	08/07/2009	M. Islnds	Diesel	GT NO 96	4	Qatargas IV	2283
Al Khaznah	135,496	Al Khaznah Inc.	Mitsui E&S	01/07/1994	Liberia	Steam	Moss	5	Das Island	1390
Al Khor	137,354	Mitsui O.S.K. Lines	Mitsubishi	15/11/1996	M. Islnds	Steam	Moss	5	Qatargas I	2089
Al Khuwair	217,000	Al Khuwair Inc.	Samsung	27/06/2008	Bahamas	Diesel	TZ Mk. III	10	RasGas III	1646
Al Mafyar	266,000	Nakilat SHI 1697 Inc.	Samsung	28/04/2009	M. Islnds	Diesel	TZ Mk. III	5	Qatargas III	1697
Al Marrouna	149,539	Seaspirit Leasing	Daewoo	19/09/2006	Bahamas	Steam	GT NO 96	4	RasGas II	2238
Al Mayeda	266,000	Nakilat SHI 1694 Inc.	Samsung	06/01/2009	M. Islnds	Diesel	TZ Mk. III	5	Qatargas III	1694
Al Nuaman	210,100	Nakilat DSME 2285 Inc.	Daewoo	06/12/2009	M. Islnds	Diesel	GT NO 96	4	Qatargas III	2286
Al Oraiq	210,200	J5 Nakilat No.3 Ltd.	Daewoo	13/06/2008	M. Islnds	Diesel	GT NO 96	18	RasGas III	2250
Al Rayyan	137,420	Mitsui O.S.K. Lines	Kawasaki	14/03/1997	M. Islnds	Steam	Moss	5	Qatargas I	1445
Al Rekayyat	216,293	Nakilat HHI 1910 Inc.	HHI	30/06/2009	M. Islnds	Diesel	TZ Mk. III	4	Qatargas III	1910
Al Ruwais	210,150	Neptana Schiffsbetriebsgesellschaft	Daewoo	09/08/2007	Bahamas	Diesel	GT NO 96	4	Qatargas II	2245
Al Sadd	210,200	Nakilat DSME 2265 Inc.	Daewoo	07/03/2009	M. Islnds	Diesel	GT NO 96	12	Qatargas III	2265
Al Safliya	210,150	Nausola Schiffsbetriebsgesellschaft	Daewoo	12/09/2007	Bahamas	Diesel	GT NO 96	5	Qatargas II	2246
Al Sahla	216,200	J5 Nakilat No.5 Ltd.	HHI	13/06/2008	M. Islnds	Diesel	TZ Mk. III	4	RasGas III	1863
Al Samriya	263,300	Nakilat Al Samriya Inc.	Daewoo	28/02/2009	M. Islnds	Diesel	GT NO 96	5	Qatargas II	2257
Al Shamal	217,000	Al Shamal Inc.	Samsung	28/04/2008	Bahamas	Diesel	TZ Mk. III	10	RasGas III	1645
Al Sheehaniya	210,100	Nakilat DSME 2264 Inc.	Daewoo	17/02/2009	M. Islnds	Diesel	GT NO 96	12	Qatargas III	2264
Al Thakhira	145,000	Peninsula LNG Transport No. 2	Samsung	22/08/2005	Bahamas	Steam	TZ Mk. III	4	RasGas II	1441
Al Thumama	216,200	J5 Nakilat No.2 Ltd.	HHI	27/02/2008	M. Islnds	Diesel	TZ Mk. III	4	RasGas III	1862
Al Utouriya	215,000	J5 Nakilat No.8 Ltd.	HHI	01/09/2008	M. Islnds	Diesel	TZ Mk. III	4	RasGas III	1875
Al Wajbah	137,308	Mitsui O.S.K. Lines	Mitsubishi	22/06/1997	M. Islnds	Steam	Moss	5	Qatargas I	2090
Al Wakrah	137,371	Mitsui O.S.K. Lines	Kawasaki	26/11/1998	M. Islnds	Steam	Moss	5	Qatargas I	1446
Al Zubarah	137,573	Mitsui O.S.K. Lines	Mitsui E&S	30/11/1996	M. Islnds	Steam	Moss	5	Qatargas I	1411
Alexandroupoli	153,000	Gas-Fifteen Ltd.	Hanjin (Busan)	01/06/2010	Greece	TFDE	TZ Mk. III	4	–	193
Alicante Knutsen	174,000	–	Hyundai Samho	01/09/2022	France	X-DF	TZ Mk. III Flex+	4	Portfolio	8093
Alto Acrux	147,798	Bahamas LNG Shipping	Mitsubishi	17/03/2008	Bahamas	Steam	Moss	4	Darwin LNG	2219
Amadi	154,800	Brunei Gas Carriers	HHI	16/07/2015	Brunei	–	TZ Mk. III	4	Lumut	2607
Amali	148,000	BGC SPV NBD	Daewoo	01/08/2011	Brunei	–	GT NO 96	4	Lumut	2277
Amani	154,800	Brunei Gas Carriers	HHI	13/10/2014	Brunei	–	TZ Mk. III	4	Lumut	H2606
Amberjack LNG	174,000	LNGShips	HHI	17/04/2020	Malta	X-DF	TZ Mk. III Flex	–	–	3021
Amur River	149,700	Seacrown Maritime	HHI	01/11/2007	M. Islnds	Steam	TZ Mk. III	4	Sakhalin II	1734
Arctic Aurora	155,000	Fareastern Shipping	HHI	04/07/2014	Malta	Diesel/Gas-Electric	TZ Mk. III	4	Snøhvit LNG	2580
Arctic Discoverer	142,612	Northern LNG Transport II Company S.A.	Mitsui E&S	12/02/2006	Bahamas	–	Moss	4	Hammerfest	1564
Arctic Lady	147,200	Leif Hoegh (UK) Ltd.	Mitsubishi	12/04/2006	Norway	Steam	Moss	4	Hammerfest	2185

- Meets the IMO MEPC76 regulations requirements
- Integrates with any Shaft Power Meters
- 100% engine power remains accessible if needed

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Arctic Princess	147,200	R.B. Quadrangle Leasing	Mitsubishi	13/01/2006	Norway	Steam	Moss	4	Hammerfest	2184
Arctic Voyager	142,759	Lloyds TSB Equipment Leasing (No.1)	Kawasaki	14/07/2006	Bahamas	Steam	Moss	4	Hammerfest	1532
Aristarchos	174,000	Dias Gas Carrier Corp.	HHI	15/06/2021	Malta	X-DF	TZ Mk. III Flex	4	–	3107
Aristidis I	174,000	Atrotos Gas Carrier Corp.	HHI	04/01/2021	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3106
Aristos I	174,000	Xiang Ch25 HK International	HHI	13/11/2020	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3105
Arkat	148,000	BGC SPV NBD	Daewoo	18/02/2011	Brunei	–	GT NO 96	4	Lumut	2273
Arrow Spirit	154,982	Luster Maritime S.A. et al	Koyo Dockyard	08/02/2008	Panama	Steam	TZ Mk. III	4	Portfolio	2258
Aseem	155,003	India LNG Transport Company No.3 S.A.	Samsung	16/11/2009	Malta	Diesel	TZ Mk. III	4	RasGas	1686
Asia Endeavour	154,948	Chevron Global Tech Services Co.	Samsung	17/06/2015	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Gorgon	1942
Asia Energy	154,948	Chevron Global Tech Services Co.	Samsung	03/10/2014	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Gorgon	1921
Asia Excellence	154,948	Chevron Global Tech Services Co.	Samsung	20/01/2015	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Gorgon	1941
Asia Integrity	154,948	Chevron Global Tech Services Co.	Samsung	27/02/2017	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Wheatstone	2069
Asia Venture	154,948	Chevron Global Tech Services Co.	Samsung	06/07/2017	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Wheatstone	2070
Asia Vision	154,948	Chevron Global Tech Services Co.	Samsung	11/07/2014	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Gorgon	1920
Asklipios	174,000	Sea 199 Leasing Co Ltd.	HHI	29/09/2021	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3110
Asterix I	174,000	Sea 335 Leasing Co Ltd	HHI	12/02/2023	Greece	X-DF	TZ Mk. III Flex	4	Portfolio	3111
Attalos	170,800	Sea 200 Leasing Co. Ltd.	HHI	13/08/2021	Malta	X-DF	TZ Mk. III Flex	4	–	3108
Barcelona Knutsen	173,400	Norspan LNG V AS	Daewoo	21/01/2010	Spain	Diesel/Gas-Electric	GT NO 96	4	Portfolio	2267
Beidou Star	172,000	Mitsui O.S.K. Lines	Hudong Zhonghua	14/09/2015	H.K., China	Diesel	GT NO 96	4	PNG LNG	H1672A
Berge Arzew	138,088	Sonatrach Berge Arzew Corp.	Daewoo	29/07/2004	Bahamas	Steam	GT NO 96	4	Arzew	2217
Bilbao Knutsen	138,000	Norspan LNG AS	Izar	29/01/2004	Spain	Steam	GT NO 96	4	Portfolio	321
Bishu Maru	164,700	"K" Line - Kawasaki Kisen Kaisha	Kawasaki	12/12/2017	Panama	TFDE	Moss	4	Wheatstone	1713
Bonito LNG	174,000	LNGShips	HHI	19/05/2020	Malta	–	TZ Mk. III Flex	–	–	3022
Boris Davydov	172,410	Arctic LNG 4 Ltd.	Daewoo	23/12/2018	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2428
Boris Vilkitsky	172,410	Arctic LNG 1 Ltd.	Daewoo	04/06/2017	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2421
British Achiever	173,644	BP	Daewoo	06/11/2018	U.K.	ME-GI	GT NO 96 GW	4	Freeport	2442
British Contributor	173,644	BP	Daewoo	16/12/2018	U.K.	ME-GI	GT NO 96 GW	4	Freeport	2443
British Listener	173,644	BP	Daewoo	31/01/2019	U.K.	ME-GI	GT NO 96 GW	4	Freeport	2444
British Mentor	173,644	BP	Daewoo	15/03/2019	U.K.	ME-GI	GT NO 96 GW	4	Freeport	2445
British Partner	173,400	BP	Daewoo	18/06/2018	U.K.	ME-GI	GT NO 96 GW	4	Freeport	2441
British Sponsor	173,644	BP	Daewoo	01/05/2019	U.K.	ME-GI	GT NO 96 GW	4	Freeport	2446
Broog	137,529	Mitsui O.S.K. Lines	Mitsui E&S	27/04/1998	M. Islnds	Steam	Moss	5	Qatargas I	1412
Bu Samra	266,000	Nakilat Bu Samra Inc.	Samsung	06/12/2008	M. Islnds	–	TZ Mk. III	5	Qatargas II	1677
Bushu Maru	180,000	Mitsui O.S.K. Lines	Mitsubishi	08/07/2019	Bahamas	Reheat Steam Turbine	TZ Mk. III Flex	4	Sabine Pass	2327
BW Boston	138,059	Partrederiet BW Gas GDF Suez EMT DA	Daewoo	23/01/2003	Norway	Steam	GT NO 96	4	Atlantic LNG	2207
BW Brussels	162,400	Ines LNG	Daewoo	03/08/2009	Singapore	Diesel/Gas-Electric	GT NO 96	4	Balhaf	2259
BW Cassia	174,000	MP-SGP Pte Ltd	Daewoo	02/10/2022	Singapore	ME-GI	–	4	–	2510
BW Enn Snow Lotus	174,000	BW LNG II Pte Ltd	Daewoo	11/09/2022	Singapore	ME-GI	–	4	–	2509
BW Everett	138,028	BW Gas SLNG	Daewoo	16/06/2003	Singapore	Steam	GT NO 96	4	Atlantic LNG	2212
BW Helios	174,000	Selene Navigation Pte Ltd.	Daewoo	25/05/2021	Singapore	ME-GI	GT NO 96 GW	4	–	2497
BW Lesmes	174,000	BW Gas AS	Daewoo	26/03/2021	Singapore	ME-GI	GT NO 96 GW	4	Portfolio	2496
BW Lilac	173,400	BW Maritime	Daewoo	17/03/2018	Malta	ME-GI	GT NO 96 GW	4	–	2436
BW Magna	173,000	BW Group	Daewoo	11/03/2019	Singapore	ME-GI	GT NO 96	4	–	2488
BW Magnolia	173,400	Helen Navigation Pte Ltd.	Daewoo	28/02/2020	Singapore	–	GT NO 96 GW	–	–	2490
BW Pavilion Aranda	173,400	BW Group	Daewoo	10/09/2019	Singapore	ME-GI	GT NO 96 GW	4	Portfolio	2489
BW Pavilion Aranthera	173,400	BW Diamond LNG Pte Ltd	Daewoo	04/07/2020	Singapore	–	GT NO 96 GW	–	–	2491
BW Pavilion Leeara	158,629	BW LPG FPSOI	HHI	01/06/2015	Singapore	Diesel/Gas-Electric	TZ Mk. III Flex	4	Portfolio	2572
BW Pavilion Vanda	155,000	BW LPG FPSOI	HHI	12/02/2015	Singapore	–	TZ Mk. III Flex	4	Portfolio	2571
BW Tatiana	135,269	Shell Tankers Singapore	Mitsubishi	27/12/2002	Panama	Steam	Moss	5	Atlantic LNG	2173
BW Tulip	173,400	BW Maritime	Daewoo	01/12/2017	Singapore	ME-GI	GT NO 96 GW	4	–	2435
Cadiz Knutsen	138,826	Norspan LNG II AS	Navantia	13/04/2004	Spain	Steam	GT NO 96	4	Portfolio	103
Cape Ann	145,130	SRV Joint Gas Two Ltd.	Samsung	25/04/2010	Norway	Diesel/Gas-Electric	TZ Mk. III	4	Jaigarh LNG	1689
Castillo de Caldelas	176,300	Empresa Naviera Elcano	Imabari Shipbuilding	13/06/2018	Malta	ME-GI	TZ Mk. III Flex	–	Portfolio	8188
Castillo De Merida	176,300	Empresa Naviera Elcano	Imabari Shipbuilding	31/03/2018	Malta	ME-GI	TZ Mk. III Flex	4	Portfolio	8177
Castillo de Santisteban	170,000	Naviera Trans Gas AIE	STX	20/06/2010	Malta	Diesel Electric	GT NO 96	4	Portfolio	3008
Castillo de Villalba	138,000	Empresa Naviera Elcano	Navantia Cadiz	29/09/2003	Spain	Steam	GT NO 96	4	Portfolio	87
Celsius Canberra	180,000	Xiang CH27 HK International	Samsung	–	M. Islnds	X-DF	TZ Mk. III Flex	–	US Portfolio	2298
Celsius Carolina	180,000	Oriental Fleet LNG 03 Ltd.	Samsung	13/08/2021	M. Islnds	X-DF	TZ Mk. III Flex	4	US Portfolio	2314
Celsius Charlotte	180,000	Xiang CH28 HK International	Samsung	14/06/2021	M. Islnds	X-DF	TZ Mk. III Flex	4	US Portfolio	2313
Celsius Copenhagen	180,000	Greenheart Gas Shipco I LLC	Samsung	01/11/2020	M. Islnds	X-DF	TZ Mk. III Flex	4	Portfolio	2297
Celsius Geneva	176,400	Xiang H14 International	Samsung	15/07/2023	M. Islnds	ME-GI	TZ Mk. III Flex	4	Portfolio	2459
CESI Beihai	174,000	COSCO Shipping Energy Transportation Co.	Hudong Zhonghua	12/06/2017	H.K., China	–	GT NO 96	4	APLNG	1717A

CESI Gladstone	174,000	China Shipping Co.	Hudong Zhonghua	31/10/2016	H.K., China	–	GT NO 96	4	APLNG	1715A
CESI LianYungAng	174,000	COSCO Shipping Energy Transportation Co.	Hudong Zhonghua	07/06/2018	H.K., China	Diesel-Electric	GT NO 96	4	APLNG	1720A
CESI Qingdao	174,000	China Shipping Co.	Hudong Zhonghua	04/02/2017	H.K., China	–	GT NO 96	4	APLNG	1716A
CESI Tianjin	174,000	COSCO Shipping Energy Transportation Co.	Hudong Zhonghua	17/07/2017	H.K., China	TFDE	GT NO 96	4	APLNG	1718A
CESI Wenzhou	174,000	COSCO Shipping Energy Transportation Co.	Hudong Zhonghua	04/02/2018	H.K., China	Diesel-Electric	GT NO 96	4	APLNG	1719A
Cheikh Bouamama	75,558	Skikda LNG Transport Corp.	Universal SB	19/07/2008	Bahamas	Steam	TZ Mk. III	4	Arzew/Skikda	88
Cheikh el Mokrani	75,759	Mediterranean LNG Transport Corp.	Japan Marine United	10/06/2007	Bahamas	Steam	TZ Mk. III	4	Skikda	55
Christophe De Margerie	170,000	DY Shipping Limited	Daewoo	09/11/2016	Panama	Diesel/Gas-Electric	GT NO 96 GW	–	Yamal	2418
Clean Cajun	180,000	Platia Shipping Ltd.	HHI	01/05/2022	Malta	X-DF	Membrane	4	–	3137
Clean Copano	180,000	Psili Shipping Ltd	HHI	30/07/2022	Malta	X-DF	Membrane	4	–	3138
Clean Energy	149,700	Pegasus Shipholding	HHI	02/03/2007	M. Islnds	Steam	TZ Mk. III	4	Portfolio	1748
Clean Horizon	162,000	Dynagas	HHI	10/04/2015	Malta	Diesel/Gas-Electric	TZ Mk. III Flex	4	Portfolio	2566
Clean Ocean	162,000	Dynagas	HHI	21/05/2014	M. Islnds	Diesel/Gas-Electric	TZ Mk. III Flex	4	Sabine Pass	2558
Clean Planet	162,000	Dynacom Tankers Management	HHI	29/08/2014	M. Islnds	Diesel Electric	TZ Mk. III Flex	4	Yamal	H2565
Clean Vision	162,000	Olinda	HHI	11/08/2015	Malta	Diesel/Gas-Electric	TZ Mk. III Flex	4	Portfolio	2567
CNTIC VPower Energy	127,500	Shell Tankers Australia	Mitsubishi	01/01/1992	Liberia	Steam	Moss	4	North West Shelf	2041
Cobia LNG	174,000	Cardiff LNG ETA Owning LLC	HHI	28/02/2021	Malta	X-DF	TZ Mk. III Flex	4	–	3038
Condor LNG	145,000	Cardiff LNG FI Owning Ltd	Samsung	28/08/2006	Greece	Steam	TZ Mk. III	4	Idku	1555
Cool Discoverer	174,000	Serendipity Maritime Ltd.	HHI	28/09/2020	Malta	X-DF	TZ Mk. III Flex	–	–	S970
Cool Explorer	160,000	Thenamaris Ships Management Inc.	Samsung	01/01/2015	Malta	–	TZ Mk. III Flex	4	Spot	2049
Cool Racer	174,000	Eloquent Shipping Ltd	HHI	10/02/2021	Malta	X-DF	TZ Mk. III Flex	4	–	3126
Cool Rider	155,000	RBSSAF (19) Ltd.	HHI	02/05/2007	Malta	–	TZ Mk. III	4	Portfolio	1777
Cool Rover	155,000	RBSSAF (19) Ltd.	HHI	20/06/2008	Malta	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	1779
Cool Runner	160,000	Thenamaris Ships Management Inc.	Samsung	27/03/2014	Malta	Diesel Electric	TZ Mk. III Flex	4	Wheatstone	H2046
Cool Voyager	160,000	Energy Shipping & Trading	Samsung	31/10/2013	Malta	TFDE	TZ Mk. III Flex	4	Wheatstone	–
Corcovado LNG	160,162	Drytank	Daewoo	03/04/2014	Malta	Diesel Electric	GT NO 96 L03	4	Spot	H2297
Cubal	160,276	Mint LNG IV	Samsung	12/01/2012	Bahamas	–	TZ Mk. III	4	Soyo	1813
Cygnus Passage	145,400	Cygnus LNG Shipping	Mitsubishi	06/01/2009	Bahamas	Steam	Moss	4	Sakhalin II	2235
Dapeng Moon	147,200	Yue Gang LNG Ship Management Co.	Hudong Zhonghua	17/07/2008	H.K., China	Steam	GT NO 96	4	Pluto	1309
Dapeng Princess	79,960	–	Hudong Zhonghua	19/02/2023	Singapore	DFDE	GTT 96	4	–	H1837A
Dapeng Star	147,210	Yue Peng LNG Shipping Co.	Hudong Zhonghua	04/11/2009	H.K., China	Steam	GT NO 96	4	Pluto	1379
Dapeng Sun	147,200	Yue Peng LNG Shipping Co.	Hudong Zhonghua	03/04/2008	H.K., China	Steam	GT NO 96	4	North West Shelf	1308
Diamond Gas Crystal	174,000	Diamond LNG Shipping 5 Pte Ltd.	Hyundai Samho	28/06/2021	Singapore	X-DF	TZ Mk. III Flex	4	–	8030
Diamond Gas Metropolis	174,000	Diamond LNG Shipping 4 Ltd.	HHI	03/11/2020	Bahamas	–	TZ Mk. III Flex	4	–	8029
Diamond Gas Orchid	165,000	NYK Line	Mitsubishi	02/06/2018	Bahamas	STaGE	Sayaringo	4	Cameron	2325
Diamond Gas Rose	165,000	NYK Line	Mitsubishi	02/08/2018	Bahamas	STaGE	Sayaringo	4	Cameron	2325
Diamond Gas Sakura	165,000	Tokyo Gas	Japan Marine United	17/05/2019	Singapore	STaGE	Sayaringo	4	Cameron	2332
Diamond Gas Victoria	174,000	Diamond LNG Shipping 6 Pte Ltd.	Hyundai Samho	30/06/2021	Singapore	X-DF	TZ Mk. III Flex	4	–	8031
Disha	136,025	India LNG Transport Company No.1 Ltd.	Daewoo	25/12/2003	Malta	Gas Turbine	GT NO 96	4	RasGas	2210
Doha	137,262	Mitsui O.S.K. Lines	Mitsubishi	03/06/1999	M. Islnds	Steam	Moss	5	Qatargas I	2091
Dorado LNG	174,000	Hai Kuo Shipping 2052G Ltd.	Samsung	25/12/2020	Malta	X-DF	TZ Mk. III Flex	–	–	2276
Duhail	210,150	Nauranto Schiffsbetriebsgesellschaft	Daewoo	04/12/2007	Bahamas	Diesel	GT NO 96	4	Qatargas II	2247
Dukhan	137,661	Qatar LNG Transport	Mitsui E&S	29/09/2004	Liberia	Steam	Moss	5	Qatargas II	1561
East Energy	122,255	Bonny Gas Transport	STX	11/08/1982	Bermuda	Steam	Membrane	4	NLNG	26B
Eduard Toll	172,410	Teekay Corp.	Daewoo	22/09/2017	Bahamas	TFDE - Azipod	GT NO 96 GW	4	Yamal	2423
Ejnan	145,000	Peninsula LNG Transport No. 3	Samsung	16/01/2007	Bahamas	Steam	TZ Mk. III	4	RasGas II	1594
Ekaputra 1	136,400	Cometco Shipping Inc.	Mitsubishi	01/01/1989	Indonesia	Steam	Moss	5	Bontang	2011
Elisa Aquila	174,000	Caroline 82 SASU	Hyundai Samho	04/03/2022	France	X-DF	TZ Mk. III Flex	4	Portfolio	S917
Elisa Larus	174,000	Caroline 77 SASU	Hyundai Samho	18/05/2020	France	X-DF	TZ Mk. III Flex	4	Portfolio	S970
Energos Grand	145,700	Golar Grand Corp.	Daewoo	01/01/2006	M. Islnds	Steam	GT NO 96	4	Gorgon	2226
Energy Advance	147,624	Tokyo LNG Tanker Co. & . Toho LNG Shipping Co	Kawasaki	20/03/2005	Japan	Steam	Moss	4	Portfolio	1521
Energy Atlantic	156,000	Alpha Tankers	STX	28/09/2015	Malta	TFDE	GT NO 96 L03	4	Sabine Pass	1670
Energy Confidence	153,000	Tokyo LNG Tanker Co. & NYK	Kawasaki	20/04/2009	Japan	Steam	Moss	4	Darwin LNG	1611
Energy Endeavour	173,400	Rossini Navigation SA	Daewoo	01/01/2021	M. Islnds	ME-GI	GT NO 96 GW	–	–	2484
Energy Fidelity	174,000	–	Hyundai Samho	13/04/2023	M. Islnds	X-DF	–	4	–	8105
Energy Frontier	147,599	Tokyo LNG Tanker Co.	Kawasaki	01/09/2003	Japan	Steam	Moss	4	Sakhalin II	1520
Energy Glory	165,000	NYK Line	Japan Marine United	21/03/2019	Japan	TFDE	TZ Mk. III Flex+	4	Cove Point	5071
Energy Horizon	177,000	Tokyo LNG Tanker Co. & NYK	Kawasaki	31/08/2011	Japan	Steam	Moss	4	Pluto	1664
Energy Innovator	165,000	Tokyo Gas	Japan Marine United	22/06/2019	Japan	TFDE	TZ Mk. III Flex+	4	Cove Point	5072
Energy Integrity	173,400	Mozart Navigation SA	Daewoo	14/05/2021	M. Islnds	ME-GI	GT NO 96 GW	4	–	2485
Energy Intelligence	173,400	Strauss Navigation SA	Daewoo	30/06/2021	M. Islnds	ME-GI	GT NO 96 GW	4	–	2500

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Energy Liberty	165,000	Mitsui O.S.K. Lines	Japan Marine United	11/10/2018	Japan	TFDE	TZ Mk. III Flex+	4	Cove Point	5070
Energy Navigator	145,000	Tokyo LNG Tanker Co.	Kawasaki	22/05/2008	Japan	Steam	Moss	4	Sakhalin II	1600
Energy Pacific	173,400	Ravel Navigation SA	Daewoo	24/08/2020	M. Islnds	ME-GI	GT NO 96 GW	–	–	2483
Energy Progress	147,558	Jovial Shipping Navigation	Kawasaki	24/11/2006	Japan	Steam	Moss	4	Darwin LNG	1540
Energy Spirit	74,100	GDF Armateur 2	STX	23/01/2004	Singapore	Diesel/Gas-Electric	CS1	4	Portfolio	32M
Energy Universe	166,571	Tokyo LNG Tanker Co.	Japan Marine United	03/08/2019	Panama	TFDE	TZ Mk. III Flex	4	Cove Point	5073
Enshu Maru	164,700	Mitsui O.S.K. Lines	Kawasaki	12/08/2018	Panama	Reheat Steam Turbine	Moss	4	Wheatstone	1720
Esshu Maru	153,000	Mitsui O.S.K. Lines	Mitsubishi	16/12/2014	Bahamas	–	Sayaendo	4	Portfolio	–
Etyfa Prometheas	135,269	Shell Bermuda (Overseas) Ltd.	Mitsubishi	02/10/2002	Singapore	Steam	Moss	5	Peru LNG	2172
Excalibur	138,034	Exmar Excalibur Shipping Co.	Daewoo	22/05/2002	Belgium	Steam	GT NO 96	4	Portfolio	2206
Extremadura Knutsen	174,000	Caroline 86 SASU	Hyundai Samho	17/02/2023	France	X-DF	Mark III Flex	4	Portfolio	8096
Fedor Litke	172,410	Arctic LNG 2 Ltd.	Daewoo	18/05/2017	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2422
Ferrol Knutsen	174,000	Caroline 85 SASU	Hyundai Samho	01/01/2023	France	X-DF	Mark III Flex	4	Portfolio	8095
Flex Amber	174,000	Bund 10 Holding Ltd	HHI	17/10/2020	M. Islnds	X-DF	TZ Mk. III Flex	–	Wheatstone	8011
Flex Artemis	174,000	Flex LNG Rreliance Ltd.	Daewoo	20/08/2020	M. Islnds	ME-GI	NO-96-GW+FRS	–	Portfolio	2479
Flex Aurora	174,000	Flex LNG Aurora Ltd.	HHI	25/06/2020	M. Islnds	X-DF	TZ Mk. III Flex	–	Portfolio	8010
Flex Constellation	173,400	Frontline	Daewoo	10/06/2019	M. Islnds	ME-GI	NO-96-GW+PRS	4	Portfolio	H2470
Flex Courageous	173,400	Frontline	Daewoo	27/08/2019	M. Islnds	ME-GI	NO-96-GW+PRS	4	–	2471
Flex Endeavour	172,400	Flex LNG	Daewoo	14/01/2018	M. Islnds	ME-GI	NO-96-GW+PRS	4	Corpus Christi LNG	2447
Flex Enterprise	172,400	Flex LNG	Daewoo	01/01/2018	M. Islnds	ME-GI	NO-96-GW+PRS	4	Wheatstone	2448
Flex Freedom	173,400	Flex Freedom Ltd.	Daewoo	01/01/2021	M. Islnds	ME-GI	NO-96-GW+FRS	–	–	2492
Flex Rainbow	174,000	Flex LNG	Samsung	14/06/2018	M. Islnds	ME-GI	TZ Mk. III Flex	4	Portfolio	2108
Flex Ranger	174,101	Flex LNG	Samsung	24/06/2018	M. Islnds	ME-GI	TZ Mk. III Flex	4	–	2107
Flex Resolute	173,400	Flex LNG Resolute Ltd.	HHI	04/09/2020	M. Islnds	ME-GI	NO-96-GW+FRS	4	Portfolio	2480
Flex Vigilant	174,000	Flex Vigilant Ltd.	HHI	31/05/2021	M. Islnds	X-DF	TZ Mk. III Flex	4	Portfolio	8013
Flex Volunteer	174,000	Flex Volunteer Ltd.	HHI	20/01/2021	M. Islnds	X-DF	TZ Mk. III Flex	4	Portfolio	8012
Fraiha	210,100	J5 Nakilat No.6 Ltd.	Daewoo	20/08/2008	M. Islnds	Diesel	GT NO 96	18	RasGas III	2252
Fuji LNG	149,172	Aletheia Owning Co.	Kawasaki	31/03/2004	Malta	Steam	Moss	4	Sabine Pass	1527
Fuwairit	138,200	Camartina Shipping Co.	Samsung	13/01/2004	Bahamas	Steam	TZ Mk. III	4	RasGas II	1406
Gail Bhuwan	180,000	Primavera Montana SA	Daewoo	10/02/2021	Cyprus	X-DF	GT NO 96 GW	4	Portfolio	2499
GasLog Galveston	174,000	Gas-Thirty Three Ltd.	Samsung	05/01/2021	Bermuda	X-DF	TZ Mk. III Flex+	4	US Portfolio	2301
GasLog Geneva	174,000	GasLog	Samsung	04/10/2016	Bermuda	TFDE	TZ Mk. III Flex	4	Portfolio	2102
GasLog Genoa	174,000	GasLog	Samsung	31/03/2018	Bermuda	X-DF	TZ Mk. III Flex	4	Portfolio	2130
GasLog Georgetown	174,000	Gas-Thirty Two Ltd.	Samsung	16/11/2020	Bermuda	–	TZ Mk. III Flex+	4	Portfolio	2300
GasLog Gibraltar	174,000	Gas-Fourteen Ltd.	Samsung	04/11/2016	Bermuda	TFDE	TZ Mk. III Flex	4	Portfolio	2103
GasLog Gladstone	174,000	GasLog	Samsung	14/03/2019	Bermuda	X-DF	TZ Mk. III Flex+	4	Portfolio	2131
GasLog Glasgow	174,000	GasLog	Samsung	25/07/2016	Bermuda	TFDE	TZ Mk. III Flex	4	Portfolio	2073
GasLog Greece	174,000	GasLog	Samsung	29/03/2016	Bermuda	TFDE	TZ Mk. III Flex	4	Portfolio	2072
GasLog Hong Kong	174,000	GasLog	HHI	25/03/2018	Bermuda	X-DF	TZ Mk. III Flex	4	Portfolio	2801
GasLog Houston	174,000	GasLog	HHI	01/12/2018	Bermuda	X-DF	TZ Mk. III Flex	4	GoM	2800
GasLog Salem	155,000	GasLog	Samsung	06/05/2015	Bermuda	TFDE	TZ Mk. III	4	Portfolio	2044
GasLog Santiago	155,000	Gas-Four Ltd.	Samsung	28/03/2013	Bermuda	TFDE	TZ Mk. III	4	Portfolio	1947
GasLog Saratoga	155,000	GasLog	Samsung	19/12/2014	Bermuda	TFDE	TZ Mk. III	4	Spot	2043
GasLog Savannah	155,000	Gas-One Ltd.	Samsung	31/05/2010	Bermuda	TFDE	TZ Mk. III	4	Portfolio	1641
GasLog Seattle	155,000	Gas-Seven Ltd.	Samsung	28/10/2013	Bermuda	TFDE	TZ Mk. III	4	Portfolio	2041
GasLog Shanghai	155,000	Gas-Three Ltd.	Samsung	05/02/2013	Bermuda	TFDE	TZ Mk. III	4	Portfolio	1946
GasLog Singapore	155,000	Gas-Two Ltd.	Samsung	06/08/2010	Bermuda	TFDE	TZ Mk. III	4	Portfolio	1642
GasLog Skagen	155,000	Gas-Six Ltd.	Samsung	01/08/2013	Bermuda	TFDE	TZ Mk. III	4	Portfolio	2017
GasLog Sydney	155,000	Gas-Five Ltd.	Samsung	06/06/2013	Bermuda	–	TZ Mk. III	4	Portfolio	2016
GasLog Wales	180,000	GasLog	Samsung	11/05/2020	Bermuda	X-DF	TZ Mk. III Flex+	4	Portfolio	2274
GasLog Warsaw	180,000	GasLog	Samsung	31/07/2019	Greece	X-DF	TZ Mk. III Flex+	4	Portfolio	2212
GasLog Wellington	176,400	GAS-Thirty Four Ltd.	Samsung	15/06/2021	Bermuda	X-DF	TZ Mk. III Flex+	4	US Portfolio	2311
GasLog Westminster	180,000	Gas-Thirty Ltd.	Samsung	15/07/2020	Bermuda	X-DF	TZ Mk. III Flex	–	Portfolio	2262
GasLog Winchester	176,400	Gas-Thirty Five Ltd.	Samsung	24/08/2021	Bermuda	X-DF	TZ Mk. III Flex+	4	US Portfolio	2312
GasLog Windsor	180,000	GasLog	Samsung	02/04/2020	Bermuda	X-DF	TZ Mk. III Flex	4	Portfolio	2213
Georgiy Brusilov	172,410	Arctic LNG 3 Ltd.	Daewoo	11/11/2018	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2427
Georgiy Ushakov	172,652	Teekay Corp.	Daewoo	16/09/2019	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2433
Ghasha	137,000	Ghasha Inc.	Mitsui E&S	01/06/1995	Liberia	Steam	Moss	5	Das Island	1392
Gigira Laitebo	177,419	Cleopatra LNG Shipping Co.	HHI	09/02/2010	Bahamas	–	TZ Mk. III	4	RasGas	1876
Global Energy	173,400	–	Daewoo	22/05/2020	M. Islnds	ME-GI	GT NO 96 GW	–	Portfolio	2478
Global Sea Spirit	169,932	Global Sea Spirit Inc	Daewoo	20/10/2021	M. Islnds	ME-GI	GT NO 96 GW	4	US Portfolio	2502
Global Sealine	174,000	Jackar Shiptrade SA	Daewoo	27/12/2021	M. Islnds	ME-GI	–	–	US Portfolio	2503
Global Star	173,400	Hai Kuo Shipping 2119G Ltd.	Daewoo	06/01/2021	M. Islnds	ME-GI	GT NO 96 GW	4	Portfolio	2487
Golar Arctic	140,648	Golar LNG 2216 Corp.	Daewoo	16/10/2003	M. Islnds	Steam	GT NO 96	4	Jamaica LNG	2216
Golar Bear	160,000	Golar LNG	Samsung	15/09/2014	M. Islnds	Diesel/Gas-Electric	TZ Mk. III Flex	4	Spot	2027

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Golar Celsius	160,000	Golar Hull M2026 Corp.	Samsung	08/10/2013	M. Islnds	Diesel/Gas-Electric	TZ Mk. III Flex	4	Spot	2026
Golar Crystal	159,800	Golar LNG	Samsung	22/09/2014	M. Islnds	–	TZ Mk. III Flex	4	Portfolio	2022
Golar Glacier	162,000	Golar LNG	Hyundai Samho	10/11/2014	M. Islnds	TFDE	TZ Mk. III Flex	4	Spot	–
Golar Kelvin	162,000	Golar LNG	Hyundai Samho	12/01/2015	M. Islnds	–	TZ Mk. III Flex	4	Spot	S659
Golar Maria	145,700	Golar LNG 2234 LLC	Daewoo	16/06/2006	M. Islnds	Steam	GT NO 96	4	Spot	2234
Golden Isaia	145,000	Lloyds TSB Leasing No.8 Ltd.	Samsung	26/02/2007	Indonesia	Steam	TZ Mk. III	4	Punta Europa	1585
Grace Acacia	149,700	Algawin Shipping Inc.	HHI	13/02/2007	Bahamas	Steam	TZ Mk. III	4	Spot	1728
Grace Barleria	149,700	NYK LNG Shipmanagement	HHI	05/04/2007	Japan	–	TZ Mk. III	4	Portfolio	1729
Grace Cosmos	150,000	Algahunt Shipping Inc.	HHI	13/02/2008	Bahamas	Steam	TZ Mk. III	4	Portfolio	1730
Grace Dahlia	177,000	NYK Line	Kawasaki	16/09/2013	Japan	Steam	Moss	4	Spot	1665
Grace Emilia	174,000	Akizuki Maritima SA	Hyundai Samho	31/10/2021	Bahamas	X-DF	TZ Mk. III	4	Portfolio	8032
Grace Freesia	174,000	Okusankichi Maritima SA	Hyundai Samho	27/03/2022	Bahamas	X-DF	–	4	Portfolio	8033
Grand Aniva	145,000	NYK-SCF LNG Shipping No. 1	Mitsubishi	04/01/2008	Cyprus	Steam	Moss	4	Sakhalin II	2230
Grand Elena	145,580	NYK-SCF LNG Shipping No. 1	Mitsubishi	17/10/2007	Cyprus	Steam	Moss	4	Sakhalin II	2229
Grand Mereya	147,000	Ice Gas LNG Shipping Co.	Mitsui E&S	16/03/2008	Cyprus	Steam	Moss	4	Sakhalin II	1681
Grazyna Gesicka	174,000	Knutsen OAS Shipping c/o SNC Diderot Financement 33	HHI	02/05/2023	France	X-DF	–	4	Portfolio	3244
Gui Ying	170,701	Fortune Power Shipping Ltd.	Hudong Zhonghua	08/10/2021	Singapore	X-DF	GT NO 96 L03+	4	–	H1828A
Hanjin Muscat	138,366	Pluto Lease Corp.	Hanjin (Busan)	30/07/1999	South Korea	Steam	GT NO 96	4	Oman LNG	54
Hanjin Pyeongtaek	130,636	Hanjin Shipping Co.	Hanjin (Busan)	26/09/1995	South Korea	Steam	GT NO 96	4	Bontang	16
Hanjin Ras Laffan	138,214	KSH International	Hanjin (Busan)	20/07/2000	South Korea	Steam	GT NO 96	4	RasGas I	62
Hanjin Sur	138,333	KSG International	Hanjin (Busan)	27/02/2000	South Korea	Steam	GT NO 96	4	Oman LNG	61
Hellas Athina	170,520	Kronos Shipping LLC	Hyundai Samho	01/09/2021	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	8040
Hellas Diana	174,000	Zeus Shipping LLC	Hyundai Samho	31/03/2021	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	8039
Hoegh Gandria	160,000	Golar Hull M2021 Corp.	Samsung	13/09/2013	M. Islnds	Diesel/Gas-Electric	TZ Mk. III Flex	4	Spot	2021
HongKong Energy	138,000	Chevron LNG Shipping Co.	Daewoo	20/02/2004	M. Islnds	Steam	GT NO 96	4	North West Shelf	2214
Huelva Knutsen	174,000	Sea 201 Leasing Co Ltd	Hyundai Samho	13/10/2022	Norway	X-DF	TZ Mk. III Flex+	4	Portfolio	8094
Hyundai Aquapia	137,415	H&S Shipping	HHI	04/05/2000	M. Islnds	Steam	Moss	4	Oman LNG	1156
Hyundai Cosmopia	137,415	H&B Shipping	HHI	08/02/2000	M. Islnds	Steam	Moss	4	RasGas I	1074
Hyundai Ecopia	149,745	KLT 1 International	HHI	30/11/2008	Panama	–	TZ Mk. III	4	Balhaf	1903
Hyundai Greenpia	125,000	Hyundai Merchant Marine	HHI	01/05/1996	South Korea	Steam	Moss	4	MLNG	853
Hyundai Oceanpia	135,000	H&T Shipping	HHI	19/06/2000	M. Islnds	Steam	Moss	4	Oman LNG	1157
Hyundai Peacepia	174,000	Hyundai LNG Shipping	Daewoo	08/06/2017	Panama	ME-GI	GT NO 96 GW	4	Sabine Pass	2452
Hyundai Princepia	174,000	Hyundai LNG Shipping	Daewoo	11/05/2017	Panama	ME-GI	GT NO 96 GW	4	Sabine Pass	2451
Hyundai Technopia	137,415	H&K Shipping	HHI	31/07/1999	M. Islnds	Steam	Moss	4	RasGas I	1073
Hyundai Utopia	125,182	Hyundai Merchant Marine	HHI	01/06/1994	South Korea	Steam	Moss	4	Donggi Senoro	760
Iberica Knutsen	138,000	Norspan LNG III AS	Daewoo	08/08/2006	Norway	Ultra Steam Turbine	GT NO 96	4	Portfolio	2236
Ibra LNG	147,000	SNC Corentin	Samsung	19/07/2006	Panama	Steam	TZ Mk. III	4	Oman LNG	1573
Ibri LNG	147,569	Dune LNG Carrier	Mitsubishi	01/07/2006	Panama	Steam	Moss	4	Oman LNG	2215
Isabella	169,932	Kasimia Marine Co.	Daewoo	22/07/2021	Greece	ME-GI	GT NO 96 GW	4	–	2495
Ish	137,000	Ish Inc.	Mitsubishi	10/11/1995	Liberia	Steam	Moss	5	Das Island	2067
John A Angelicoussis	174,000	Varta Shipping Ltd	Daewoo	31/03/2022	Greece	ME-GI	–	4	–	2508
K. Acacia	138,017	Horizon Maritime Shipholding	Daewoo	31/12/1999	South Korea	Steam	GT NO 96	4	Oman LNG	2203
K. Freesia	138,015	Meridian Maritime Shipholding	Daewoo	20/08/2000	South Korea	Steam	GT NO 96	4	RasGas I	2204
K. Jasmine	145,878	Kolt JV No. 1	Daewoo	09/05/2008	Panama	Steam	GT NO 96	4	Sakhalin II	2260
K. Mugungwha	151,812	Kolt JV No. 2	Daewoo	20/11/2008	Panama	Steam	GT NO 96	4	Oman LNG	2261
Kinisis	173,400	Chandris Group	Daewoo	01/10/2018	Liberia	ME-GI	GT NO 96 GW	4	Portfolio	2464
Kita LNG	147,895	Cardiff LNG	Daewoo	29/05/2014	Malta	Diesel Electric	GT NO 96 L03	4	Spot	H2298
Kmarin Diamond	155,000	RBSSAF (19) Ltd.	Hyundai Samho	28/07/2008	U.K.	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	S297
Kool Baltic	170,200	Sovcomflot	STX	03/01/2015	Liberia	Diesel Electric	GT NO 96 GW	4	Portfolio	1912
Kool Blizzard	160,000	Golar LNG	Samsung	12/01/2015	M. Islnds	Diesel/Gas-Electric	TZ Mk. III Flex	4	Spot	2047
Kool Boreas	170,200	Sovcomflot	STX	23/04/2015	Liberia	Diesel Electric	GT NO 96 GW	4	Portfolio	1913
Kool Firn	174,000	Heliconia Maritime SA	HHI	18/09/2020	Liberia	DFDS	TZ Mk. III Flex	4	Portfolio	8007
Kool Frost	160,000	Golar LNG	Samsung	01/10/2014	M. Islnds	Diesel/Gas-Electric	TZ Mk. III Flex	4	Portfolio	2055
Kool Ice	160,000	Golar LNG	Samsung	31/01/2015	M. Islnds	Diesel Electric	TZ Mk. III Flex	4	Spot	2048
Kool Orca	174,000	Headliner Maritime SA	HHI	15/01/2021	Liberia	X-DF	NO-96-GW+PRS	4	Portfolio	8008
KPS LNG Anatolia	154,472	GDF Armateur 2	STX	21/11/2006	Liberia	Diesel/Gas-Electric	CS1	4	Portfolio	32N
Kumul	170,000	Mitsui O.S.K. Lines	Hudong Zhonghua	05/12/2015	H.K., China	Diesel	GT NO 96	4	PNG LNG	1673A
Kun Lun	174,400	–	Hudong Zhonghua	05/04/2023	China	X-DF	–	4	Portfolio	H1833A
La Mancha Knutsen	176,300	Norspan LNG IX	HHI	21/09/2016	Spain	ME-GI	TZ Mk. III Flex	4	Portfolio	2733
La Seine	174,000	Xiang CH16 HK International	HHI	29/02/2020	Malta	X-DF	TZ Mk. III Flex	–	Portfolio	3020
Lagenda Serenity	79,960	Kawasaki Kisen Kaisha	Hudong Zhonghua	10/06/2022	Singapore	LP-DF	–	3	Malaysia LNG	H1789A
Lagenda Suria	79,960	Silk LNG Transport No 1 Pte Ltd	Hudong Zhonghua	27/05/2022	Singapore	LP-DF	–	3	Malaysia LNG	H1788A
Lalla Fatma N'Soumer	145,000	Algerian Nippon Gas Transport Corp.	Kawasaki	18/10/2004	Bahamas	Steam	Moss	4	Arzew	1534
Lech Kaczynski	174,000	SNC Martin	HHI	09/12/2022	France	X-DF	–	4	Portfolio	3243

Lena River	155,000	Solana Holdings	HHI	24/09/2013	M. Islnds	–	TZ Mk. III	4	Portfolio	H2557
Lerici	65,000	LNG Shipping S.p.A.	Sestri Ponente	03/04/1998	Singapore	Steam	GT NO 96	4	Portfolio	5911
Lijmiliya	263,300	Nakilat Lijmiliya Inc.	Daewoo	11/12/2008	M. Islnds	Diesel	GT NO 96	5	Qatargas II	2256
LNG Abalamabie	162,000	Bonny Gas Transport	Samsung	23/07/2016	Bermuda	–	TZ Mk. III Flex	4	NLNG	2079
LNG Abuja II	162,000	Bonny Gas Transport	Samsung	02/03/2016	Bermuda	–	TZ Mk. III Flex	4	NLNG	2078
LNG Adamawa	141,000	Bonny Gas Transport	HHI	25/04/2005	Bermuda	Steam	Moss	4	NLNG	1470
LNG Adventure	174,000	Diderot Financement 28 SNC	Samsung	31/03/2021	France	X-DF	TZ Mk. III Flex	4	–	2302
LNG Akwa Ibom	141,000	Bonny Gas Transport	HHI	11/10/2004	Bermuda	Steam	Moss	4	NLNG	1469
LNG Alliance	154,472	NYK Armateur	STX	30/03/2007	France	Diesel/Gas-Electric	CS1	4	Portfolio	32P
LNG Aquarius	126,300	P.T. Hanochem Shipping	General Dynamics	01/01/1977	Indonesia	Steam	Moss	5	Bontang	41
LNG Barka	155,982	Lloyd's TSB General Leasing (No. 3)	Kawasaki	29/12/2008	Bahamas	Steam	Moss	4	Oman LNG	1591
LNG Bayelsa	137,500	Bonny Gas Transport	HHI	08/03/2003	Bermuda	–	Moss	4	NLNG	1429
LNG Benue	145,952	BW Gas LNG Carriers	Daewoo	05/04/2006	Bermuda	Steam	GT NO 96	4	NLNG	2224
LNG Bonny II	174,000	Nigeria LNG	HHI	02/12/2015	Bermuda	Diesel/Gas-Electric	TZ Mk. III Flex	4	NLNG	2636
LNG Borno	149,600	Okra Shipping No. 1	Samsung	16/08/2007	Bermuda	Steam	TZ Mk. III	4	NLNG	1563
LNG Cross River	141,000	Bonny Gas Transport	HHI	22/08/2005	Bermuda	Steam	Moss	4	NLNG	1471
LNG Dream	145,000	Osaka Gas Consortium	Kawasaki	02/09/2006	Bahamas	Steam	Moss	4	North West Shelf	1545
LNG Dubhe	174,000	Mitsui O.S.K. Lines	Hudong Zhonghua	07/11/2019	H.K., China	ME-GI	GT NO 96 L03+	4	Yamal	1810A
LNG Ebisu	147,546	LNG Ebisu Shipping Corp.	Kawasaki	12/07/2008	Bahamas	–	Moss	4	Pluto	1588
LNG Endeavour	170,520	Fortune Great Shipping Ltd.	Samsung	20/10/2021	France	X-DF	TZ Mk. III Flex	4	Portfolio	2355
LNG Endurance	174,000	DuPlessis Bail SNC	Samsung	01/12/2021	France	X-DF	TZ Mk. III Flex	4	Portfolio	2370
LNG Enterprise	170,520	Hanovre Financement 20 SASU	Samsung	03/10/2021	France	–	TZ Mk. III Flex	4	–	2360
LNG Enugu	145,926	BW Gas LNG Carriers	Daewoo	05/10/2005	Bermuda	Steam	GT NO 96	4	NLNG	2222
LNG Finima II	162,000	Bonny Gas Transport	Samsung	02/12/2015	Bermuda	–	TZ Mk. III Flex	4	NLNG	2076
LNG Fukurokuju	164,700	Mitsui O.S.K. Lines	Kawasaki	18/07/2016	Bahamas	–	Moss	4	APLNG	1712
LNG Harmony	174,000	Jupiter 5 Ltd.	HHI	21/07/2023	Liberia	X-DF	TZ Mk. III Flex	4	Portfolio	3190
LNG Imo	148,452	Bergesen LNG XI Ltd.	Daewoo	25/06/2008	Bermuda	–	GT NO 96	4	NLNG	2232
LNG Jamal	135,333	Osaka Gas Consortium	Mitsubishi	31/10/2000	Japan	Steam	Moss	5	Oman LNG	2157
LNG Juno	180,000	Mitsui O.S.K. Lines	Mitsubishi	18/10/2018	Bahamas	STaGE	Moss	–	Freeport	2323
LNG Jupiter	153,000	Osaka Gas Consortium	Kawasaki	01/07/2009	Bahamas	Steam	Moss	4	PNG LNG	1592
LNG Jurojin	160,000	LNG Jurojin Shipping Corp.	Mitsubishi	30/11/2015	Bahamas	–	Moss	4	Portfolio	2299
LNG Kano	148,565	Bergesen LNG IX Ltd.	Daewoo	26/01/2007	Bermuda	Steam	GT NO 96	4	NLNG	2230
LNG Kolt	153,595	KLT 5 International	Hanjin (Busan)	24/12/2008	Panama	Steam	TZ Mk. III	4	Portfolio	192
LNG Lagos II	174,000	Nigeria LNG	HHI	22/01/2016	Bermuda	–	TZ Mk. III Flex	4	NLNG	2637
LNG Lokoja	148,471	Bergesen LNG VIII Ltd.	Daewoo	28/11/2006	Bermuda	Steam	GT NO 96	4	NLNG	2229
LNG Maleo	127,544	Mitsui O.S.K. Lines	Mitsui E&S	01/01/1989	Japan	Steam	Moss	4	North West Shelf	1351
LNG Mars	155,693	Osaka Gas Consortium	Mitsubishi	14/10/2016	Japan	Steam	Moss	4	PNG LNG	2296
LNG Megrez	174,000	Mitsui O.S.K. Lines	Hudong Zhonghua	01/11/2020	H.K., China	ME-GI	GT NO 96 L03+	4	Yamal	1813A
LNG Merak	174,000	Mitsui O.S.K. Lines	Hudong Zhonghua	08/01/2020	H.K., China	ME-GI	GT NO 96 L03+	4	Yamal	1811A
LNG Ogun	149,000	Okra Shipping No. 1	Samsung	07/07/2007	Bermuda	Steam	TZ Mk. III	4	NLNG	1564
LNG Ondo	148,478	Bergesen LNG X Ltd.	Daewoo	21/09/2007	Bermuda	Steam	GT NO 96	4	NLNG	2231
LNG Oyo	145,842	BW Gas LNG Carriers	Daewoo	06/01/2006	Bermuda	Steam	GT NO 96	4	NLNG	2223
LNG Phecda	174,000	Mitsui O.S.K. Lines	Hudong Zhonghua	02/09/2020	H.K., China	ME-GI	GT NO 96 L03+	4	Yamal	1812A
LNG Port Harcourt II	162,000	Bonny Gas Transport	Samsung	14/12/2015	Bermuda	–	TZ Mk. III Flex	4	NLNG	2077
LNG Prima Carrier	137,000	Pacific Eurus Shipping	Mitsubishi	14/03/2006	Indonesia	Steam	Moss	4	Das Island	2187
LNG Prosperity	174,000	Hai Kuo Shipping 2001G Ltd (c/o Oceonix Services)	HHI	07/01/2023	Liberia	X-DF	TZ Mk. III Flex+	4	Portfolio	3188
LNG River Niger	141,000	Bonny Gas Transport	HHI	06/07/2006	Bermuda	Steam	Moss	4	NLNG	1472
LNG River Orashi	145,914	BW Gas LNG Carriers	Daewoo	04/11/2004	Bermuda	Steam	GT NO 96	4	NLNG	2221
LNG Rivers	137,200	Bonny Gas Transport	HHI	20/06/2002	Bermuda	–	Moss	4	NLNG	1295
LNG Rosenrot	176,523	Fair Wind Navigation SA	Daewoo	25/01/2021	M. Islnds	X-DF	GT NO 96 GW	4	Portfolio	2498
LNG Sakura	177,000	Mitsui O.S.K. Lines	Kawasaki	26/02/2018	Bahamas	TFDE	Moss	–	Freeport	1731
LNG Saturn	155,300	Mitsui O.S.K. Lines	Mitsubishi	03/02/2016	Bahamas	Ultra Steam Turbine	Moss	4	Gorgon	2311
LNG Schneeweisschen	180,000	Mitsui O.S.K. Lines	Daewoo	01/09/2018	Panama	TFDE	GT NO 96 GW	–	Freeport	2462
LNG Sokoto	137,425	Bonny Gas Transport	HHI	28/09/2002	Bermuda	–	Moss	4	NLNG	1296
LNG Venus	153,000	Mitsui O.S.K. Lines	Mitsubishi	14/11/2014	Japan	–	Sayaendo	4	North West Shelf	2295
LNG Vesta	127,386	Tokyo LNG Tanker Co.	Mitsubishi	30/06/1994	Japan	Steam	Moss	4	–	2061
LNGShips Athena	170,618	Cardiff LNG Iota Owning LLC	HHI	29/03/2021	Malta	X-DF	TZ Mk. III Flex	4	QCLNG	112
LNGShips Empress	174,000	Cardiff LNG Kappa Owning LLC	Samsung	31/03/2021	Malta	X-DF	TZ Mk. III Flex	4	QCLNG	2380
LNGShips Manhattan	174,000	Cardiff LNG Theta Owning LLC	HHI	07/05/2021	Malta	X-DF-HPSCR	NO-96-GW+PRS	4	QCLNG	3039
Lobito	160,276	Mint LNG III	Samsung	08/11/2011	Bahamas	–	TZ Mk. III	4	Soyo	1812
Lusail	145,000	Peninsula LNG Transport No. 1	Samsung	02/05/2005	Bahamas	–	TZ Mk. III	4	RasGas II	1440
Macoma	145,400	Teekay LNG Partners	Daewoo	16/09/2017	Bahamas	ME-GI	GT NO 96 GW	4	Portfolio	2417
Magdala	173,400	Teekay Corp.	Daewoo	13/02/2018	Bahamas	ME-GI	GT NO 96 GW	4	Portfolio	2453
Malaga Knutsen	174,000	Millenaire Financement 17 SASU	Hyundai Samho	29/07/2022	France	X-DF	TZ Mk. III Flex+	4	Portfolio	8092

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Malanje	160,276	Mint LNG II	Samsung	05/10/2011	Bahamas	–	TZ Mk. III	4	Soyo	1811
Maran Gas Achilles	174,000	Maran Gas Maritime	Hyundai Samho	21/01/2016	Greece	–	TZ Mk. III Flex	4	Portfolio	S689
Maran Gas Agamemnon	174,000	Maran Gas Maritime	Hyundai Samho	11/05/2016	Greece	–	TZ Mk. III Flex	4	Portfolio	S690
Maran Gas Alexandria	161,870	Maran Gas Maritime	Hyundai Samho	02/10/2015	Greece	–	TZ Mk. III Flex	4	QCLNG	S627
Maran Gas Amorgos	169,932	Vero Maritime Inc	Daewoo	19/11/2021	Greece	ME-GI	GT NO 96	4	–	2506
Maran Gas Amphipolis	174,000	Maran Gas Maritime	Daewoo	01/08/2016	Greece	–	GT NO 96 L03	4	Portfolio	2412
Maran Gas Andros	173,400	Maran Gas Maritime	Daewoo	01/11/2019	Greece	ME-GI	GT NO 96 GW	4	Freeport	2467
Maran Gas Apollonia	161,870	Maran Gas Maritime	Hyundai Samho	08/01/2014	Greece	Diesel Electric	TZ Mk. III Flex	4	Punta Europa	S624
Maran Gas Asclepius	145,000	Sea Satin Corp.	Daewoo	29/07/2005	Greece	Steam	GT NO 96	4	RasGas II	H2227
Maran Gas Chios	170,000	Maran Gas Maritime	Daewoo	26/03/2019	Greece	ME-GI	GT NO 96 GW	4	–	2456
Maran Gas Coronis	145,700	Jopica Shipping Company	Daewoo	27/07/2007	Greece	Steam	GT NO 96	4	RasGas II	2244
Maran Gas Delphi	159,800	Maran Gas Maritime	Daewoo	06/02/2014	Greece	Diesel Electric	GT NO 96 L03	4	Portfolio	2296
Maran Gas Efessos	159,800	Maran Gas Maritime	Daewoo	12/06/2014	Greece	–	GT NO 96 L03	4	Portfolio	H-2291
Maran Gas Hector	174,000	Maran Gas Maritime	Hyundai Samho	08/11/2016	Greece	Diesel/Gas-Electric	TZ Mk. III Flex	–	Portfolio	S691
Maran Gas Hydra	173,400	Maran Gas Maritime	Daewoo	14/02/2019	Greece	ME-GI	GT NO 96 GW	4	Sabine Pass	2459
Maran Gas Ithaca	174,000	Arona Maritime Inc.	Daewoo	26/10/2021	Greece	X-DF	GT NO 96 GW	4	–	2507
Maran Gas Kalymnos	169,932	Hai Kuo Shipping 2028G Ltd	Daewoo	15/09/2021	Greece	ME-GI	Membrane	4	–	2504
Maran Gas Leto	174,000	Maran Gas Maritime	Hyundai Samho	29/03/2016	Greece	–	TZ Mk. III	4	Portfolio	S688
Maran Gas Lindos	161,870	Maran Gas Maritime	Daewoo	02/07/2015	Greece	–	GT NO 96 L03	4	Punta Europa	2292
Maran Gas Mystras	155,900	Maran Gas Maritime	Daewoo	03/08/2015	Greece	–	GT NO 96 L03	4	QCLNG	2405
Maran Gas Olympias	174,000	Maran Gas Maritime	Daewoo	04/02/2017	Greece	ME-GI	GT NO 96 L03	–	Portfolio	2415
Maran Gas Pericles	173,400	Maran Gas Maritime	Hyundai Samho	24/08/2016	Greece	–	TZ Mk. III Flex	4	Portfolio	S734
Maran Gas Posidonia	161,870	Maran Gas Maritime	Hyundai Samho	27/05/2014	Greece	–	TZ Mk. III Flex	4	Punta Europa	S625
Maran Gas Psara	173,595	Highseas Shiptrade Co.	Daewoo	07/05/2020	Greece	ME-GI	GT NO 96 GW	4	Portfolio	2469
Maran Gas Roxana	174,000	Maran Gas Maritime	Daewoo	12/01/2017	Greece	ME-GI	GT NO 96 L03	4	Portfolio	2413
Maran Gas Sparta	159,800	Maran Gas Maritime	Hyundai Samho	22/04/2015	Greece	–	TZ Mk. III Flex	4	QCLNG	S626
Maran Gas Spetses	173,400	Maran Gas Maritime	Daewoo	03/07/2018	Greece	ME-GI	GT NO 96 GW	4	GoM	2458
Maran Gas Troy	155,000	Maran Gas Maritime	Daewoo	24/09/2015	Greece	–	GT NO 96 L03	4	–	2406
Maran Gas Ulysses	173,400	Maran Gas Maritime	Hyundai Samho	23/01/2017	Greece	Diesel/Gas-Electric	TZ Mk. III Flex	–	Portfolio	S735
Maran Gas Vergina	174,000	Santa Lucia Enterprises Inc.	Daewoo	07/12/2016	Greece	ME-GI	GT NO 96	–	Portfolio	2414
Maria Energy	174,000	Tsakos Energy Navigation	HHI	01/09/2016	Liberia	Diesel/Gas-Electric	TZ Mk. III Flex	4	–	2612
Marshal Vasilevskiy	170,520	Gazprom	HHI	10/01/2019	Russia	Diesel/Gas-Electric	TZ Mk. III Flex	4	Kaliningrad LNG	2854
Marvel Crane	177,000	NYK Line	Mitsubishi	28/03/2019	Singapore	STaGE	Moss	–	Cameron	2321
Marvel Eagle	155,000	Mitsui O.S.K. Lines	Kawasaki	19/10/2018	Panama	Reheat Steam Turbine	Moss	–	Cameron	1728
Marvel Falcon	174,000	Mitsui O.S.K. Lines	Samsung	20/04/2018	Singapore	TFDE	TZ Mk. III Flex	4	Cameron	2148
Marvel Hawk	177,000	Mitsui O.S.K. Lines	Samsung	01/12/2018	Singapore	TFDE	TZ Mk. III Flex	4	Cameron	2149
Marvel Heron	177,000	Mitsui O.S.K. Lines	Mitsubishi	28/09/2019	Panama	STaGE	Moss	–	Cameron	2322
Marvel Kite	177,000	Mitsui O.S.K. Lines	Samsung	31/01/2019	Singapore	TFDE	TZ Mk. III	4	Cameron	2150
Marvel Pelican	156,265	Mitsui O.S.K. Lines	Kawasaki	13/12/2019	Panama	Reheat Steam Turbine	Moss	4	Cameron	1729
Marvel Swan	174,000	MIF I NO 20 K/S	Samsung	08/04/2021	Denmark	X-DF	TZ Mk. III Flex	4	–	2310
Megara	173,400	Teekay LNG Partners	Daewoo	19/07/2018	Bahamas	ME-GI	GT NO 96 GW	4	Portfolio	2455
Mekaines	266,000	Nakilat SHI 1695 Inc.	Samsung	03/04/2009	M. Islnds	–	TZ Mk. III	5	Qatargas III	1695
Merchant	138,000	Sea Breeze Leasing	Samsung	23/07/2003	M. Islnds	Steam	TZ Mk. III	4	Portfolio	1381
Mesaimeer	216,312	Nakilat HHI 1908 Inc.	HHI	12/03/2009	M. Islnds	Diesel	TZ Mk. III	4	Qatargas III	1908
Methane Alison Victoria	145,000	Lloyds TSB Leasing No.8 Ltd.	Samsung	27/04/2007	Bermuda	Steam	TZ Mk. III	4	Punta Europa	1587
Methane Becki Anne	170,000	Methane Services (Shell)	Samsung	14/09/2010	Bermuda	–	TZ Mk. III	4	Singapore	1858
Methane Heather Sally	145,000	Lloyds TSB Leasing No.8 Ltd.	Samsung	08/01/2007	Bermuda	Steam	TZ Mk. III	4	Punta Europa	1586
Methane Jane Elizabeth	145,000	British Gas Asia Pacific	Samsung	05/06/2006	Bermuda	Steam	TZ Mk. III	4	Idku	1554
Methane Julia Louise	170,000	Methane Services (Shell)	Samsung	19/04/2010	Bermuda	–	TZ Mk. III	9	Singapore	1745
Methane Mickie Harper	170,000	Methane Services (Shell)	Samsung	28/12/2010	Panama	Diesel/Gas-Electric	TZ Mk. III	4	Singapore	1859
Methane Nile Eagle	145,000	Egypt LNG Shipping	Samsung	05/12/2007	Bermuda	Steam	TZ Mk. III	4	Idku	1588
Methane Patricia Camila	170,000	Methane Services (Shell)	Samsung	29/10/2010	Panama	–	TZ Mk. III	4	Singapore	1746
Methane Princess	138,000	Golar LNG	Daewoo	29/08/2003	M. Islnds	Steam	GT NO 96	4	Portfolio	2215
Methane Rita Andrea	145,000	British Gas Asia Pacific	Samsung	07/04/2006	Bermuda	Steam	TZ Mk. III	4	Idku	1553
Milaha Qatar	145,500	Qatar Shipping Co.	Samsung	15/04/2006	Malta	Steam	TZ Mk. III	4	RasGas II	1562
Milaha Ras Laffan	138,270	Milaha Ras Laffan GmbH & Co. KG	Samsung	06/04/2004	Malta	Steam	TZ Mk. III	4	RasGas II	1425
Min Lu	147,100	Minlu LNG Shipping Co.	Hudong Zhonghua	29/08/2009	H.K., China	–	GT NO 96	4	Tangguh	1378
Min Rong	145,000	Min Rong LNG Shipping Co.	Hudong Zhonghua	24/02/2009	H.K., China	–	GT NO 96	4	Tangguh	1320
Minerva Amorgos	170,520	Vitamin Shipping SA	Samsung	21/09/2022	Malta	X-DF	TZ Mk. III Flex+	4	–	2332
Minerva Chios	170,520	Peninsula Shipping SA	Samsung	02/08/2021	Malta	X-DF	TZ Mk. III Flex+	4	–	2305
Minerva Kalymnos	174,000	Koje Shipping SA	Samsung	28/02/2021	Malta	X-DF	TZ Mk. III Flex+	4	–	2304
Minerva Limnos	173,400	Roland Shipping SA	Daewoo	30/06/2021	Malta	ME-GI	TZ Mk. III Flex+	4	–	2482
Minerva Psara	173,400	Wimbledon Shipping SA	Daewoo	04/01/2021	Malta	–	GT NO 96 GW	4	–	2481
MOL Hestia	173,400	LNG Harmonia Shipping Corp	Daewoo	26/07/2021	M. Islnds	X-DF	GT NO 96 GW	4	–	2505
Mozah	266,000	Nakilat Haloul Inc.	Samsung	11/08/2009	M. Islnds	Diesel	TZ Mk. III	5	Qatargas II	1675

Mraweh	137,000	Mraweh Ltd.	STX	30/04/1996	Liberia	Steam	Moss	4	Das Island	1331
Mu Lan	174,400	Fortune Great Shipping Ltd.	Hudong Zhonghua	31/08/2021	Liberia	X-DF	GT NO 96 L03+	4	–	1827A
Mubaraz	137,000	Mubaraz Ltd.	STX	14/12/1995	Liberia	Steam	Moss	4	Das Island	1330
Murex	173,400	Teekay LNG Partners	Daewoo	18/07/2017	Bahamas	ME-GI	GT NO 96 GW	4	Portfolio	2416
Murwab	210,100	J5 Nakilat No. 4 Ltd.	Daewoo	30/06/2008	M. Islnds	Diesel	GT NO 96	18	RasGas III	251
Myrina	173,400	Teekay Corp.	Daewoo	10/05/2018	Bahamas	ME-GI	GT NO 96 GW	4	Portfolio	2454
Neo Energy	150,000	Sea Optima	HHI	01/01/2007	Liberia	Steam	TZ Mk. III	4	Portfolio	1754
Neptune	145,130	SRV Joint Gas Ltd.	Samsung	30/11/2009	Norway	–	TZ Mk. III	4	Portfolio	1688
New Apex	174,000	POS Maritime AF SA	Samsung	26/01/2023	Panama	X-DF	–	4	Portfolio	2426
NFE Penguin	160,000	Golar LNG	Samsung	15/09/2014	M. Islnds	–	TZ Mk. III Flex	4	Spot	2023
Nikolay Urvantsev	172,658	China Shipping Development Co.	Daewoo	31/07/2019	H.K., China	ME-GI	GT NO 96 GW	4	Yamal	2432
Nikolay Yevgenov	172,410	Teekay Corp.	Daewoo	19/04/2019	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2430
Nikolay Zubov	172,410	Arctic LNG 5 Ltd.	Daewoo	20/11/2018	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2429
Nizwa LNG	147,684	Oryx LNG Carrier	Kawasaki	19/12/2005	Panama	Steam	Moss	4	Oman LNG	1562
Nohshu Maru	180,000	Mitsui O.S.K. Lines	Mitsubishi	27/02/2019	Bahamas	Reheat Steam Turbine	Moss	4	–	2326
Northwest Sanderling	127,525	Shell Tankers Australia	Mitsubishi	01/01/1989	Australia	Steam	Moss	4	North West Shelf	1996
Northwest Sandpiper	125,042	Shell Tankers Australia	Mitsui E&S	01/01/1993	Australia	Steam	Moss	4	North West Shelf	1370
Northwest Snipe	127,500	International Gas Transportation Co., Ltd.	Mitsui E&S	01/01/1990	Australia	Steam	Moss	4	North West Shelf	1352
Northwest Stormpetrel	127,500	Shell Tankers Australia	Mitsubishi	11/12/1994	Australia	Steam	Moss	4	North West Shelf	2074
Ob River	149,700	Lance Shipping	HHI	29/05/2007	M. Islnds	Steam	TZ Mk. III	4	Sakhalin II	1719
Oceanic Breeze	155,300	"K" Line - Kawasaki Kisen Kaisha	Mitsubishi	21/04/2018	M. Islnds	Reheat Steam Turbine	Moss	4	Ichthys	2310
Onaiza	210,150	Nakilat DSME 2266 Inc.	Daewoo	30/04/2009	M. Islnds	Diesel	GT NO 96	12	Qatargas III	2266
Orion Bohemia	174,000	SNC Cantica Lease	HHI	24/11/2022	Malta	X-DF	TZ Mk. III Flex+	4	Portfolio	3187
Orion Jessica	174,000	–	HHI	23/06/2023	Malta	X-DF	–	4	Portfolio	3189
Orion Monet	174,000	Jupiter 3 Ltd	Samsung	01/04/2022	Malta	X-DF	–	4	–	2319
Orion Sea	170,852	Meridian 23 Ltd.	Samsung	04/01/2022	Malta	X-DF	–	4	–	2336
Orion Sun	174,000	Meridian 24 Ltd.	Samsung	01/07/2022	Malta	X-DF	–	4	Portfolio	2337
Ougarta	170,000	Hyproc Shipping Co.	HHI	31/03/2017	Algeria	–	TZ Mk. III Flex	4	Arzew	2814
Pacific Arcadia	145,400	Bahamas LNG Shipping	Mitsubishi	20/10/2014	Bahamas	–	Moss	4	PNG LNG	MHISB 2289
Pacific Breeze	180,000	"K" Line - Kawasaki Kisen Kaisha	Kawasaki	10/03/2018	M. Islnds	TFDE	Moss	4	Ichthys	1718
Pacific Enlighten	145,400	Pacific Hope Shipping	Mitsubishi	16/03/2009	Bahamas	Steam	Moss	4	North West Shelf	2236
Pacific Mimosa	155,300	NYK Line	Mitsubishi	31/03/2018	Japan	Reheat Steam Turbine	Moss	–	Wheatstone	2316
Pacific Notus	137,006	Pacific LNG Shipping	Mitsubishi	08/09/2003	Bahamas	Steam	Moss	5	Darwin LNG	2176
Palu LNG	159,800	Cardiff LNG	Daewoo	06/11/2014	Malta	TFDE	GT NO 96 L03	4	Spot	2400
Pan Africa	174,000	Teekay LNG Partners	Hudong Zhonghua	12/01/2019	H.K., China	TFDE	GT NO 96	4	QCLNG	1666A
Pan Americas	174,000	Teekay LNG Partners	Hudong Zhonghua	15/01/2018	H.K., China	TFDE	GT NO 96	4	QCLNG	H1664A
Pan Asia	174,000	Teekay LNG Partners	Hudong Zhonghua	22/09/2017	H.K., China	TFDE	GT NO 96	4	QCLNG	1663A
Pan Europe	174,000	Teekay LNG Partners	Hudong Zhonghua	12/07/2018	H.K., China	TFDE	GT NO 96	4	QCLNG	H1665A
Papua	170,000	Mitsui O.S.K. Lines	Hudong Zhonghua	27/11/2014	H.K., China	–	GT NO 96	4	PNG LNG	H1670A
Patris	174,000	Chandris Group	Daewoo	01/01/2018	Liberia	ME-GI	GT NO 96 GW	4	Freeport	2460
Pearl LNG	174,000	Cardiff LNG Delta Owning LLC	Samsung	01/08/2020	Malta	X-DF	NO-96-GW+PRS	–	Portfolio	2275
Pioneer Spirit	138,121	M & S Shipping 3 S.A.	Daewoo	29/07/2005	Singapore	Steam	GT NO 96	4	Das Island	2219
Point Fortin	154,200	Los Halillos Shipping Co.	Koyo Dockyard	12/01/2010	Panama	Steam	TZ Mk. III	4	Portfolio	2263
Portovenere	65,000	LNG Shipping S.p.A.	Sestri Ponente	21/04/1997	Singapore	Steam	GT NO 96	4	Portfolio	5910
Portovyy	138,107	Monteriggioni Inc.	Daewoo	20/08/2003	Russia	Steam	GT NO 96	4	Portfolio	2213
Prachi	162,000	India LNG Transport Company No. 4 Ltd.	HHI	30/11/2016	Singapore	Diesel/Gas-Electric	TZ Mk. III Flex	–	Gorgon	2633
Prima Concord	138,267	BG Group	Samsung	24/05/2004	Indonesia	Steam	TZ Mk. III	4	Singapore	1428
Prism Agility	180,000	SK Shipping	HHI	17/05/2019	Panama	X-DF	TZ Mk. III Flex	4	Portfolio	2937
Prism Brilliance	180,000	SK Shipping	HHI	31/05/2019	Panama	X-DF	TZ Mk. III Flex	4	Portfolio	2938
Prism Courage	176,462	Millenaire Financement 12 SASU	HHI	19/10/2021	Panama	X-DF	TZ Mk. III Flex	4	–	2939
Prism Diversity	180,000	HHIENS4 Shipholding SA	HHI	21/06/2022	Panama	X-DF	–	4	–	3145
Pskov	170,200	Sovcomflot	STX	01/09/2014	Liberia	–	GT NO 96	4	Portfolio	1911
Puteri Delima	130,400	Puteri Delima S.Bhd.	STX	12/01/1995	Malaysia	Steam	GT NO 96	4	MLNG II	30F
Puteri Delima Satu	137,100	MISC	Mitsui E&S	31/10/2002	Malaysia	Steam	GT NO 96	4	MLNG III	1506
Puteri Firus Satu	137,100	Puteri Firus S.Bhd.	Mitsubishi	23/08/2004	Malaysia	Steam	GT NO 96	4	MLNG III	2177
Puteri Intan	137,100	Puteri Intan S.Bhd.	STX	24/08/1994	Malaysia	Steam	GT NO 96	4	MLNG II	30E
Puteri Mutiara Satu	137,100	MISC	Mitsui E&S	06/04/2005	Malaysia	Steam	GT NO 96	4	MLNG III	1562
Puteri Nilam	130,400	Puteri Nilam S.Bhd.	STX	17/07/1995	Malaysia	Steam	GT NO 96	4	MLNG II	30G
Puteri Nilam Satu	137,100	Puteri Nilam S.Bhd.	Mitsubishi	30/07/2003	Malaysia	Steam	GT NO 96	4	MLNG III	2169
Puteri Zamrud	130,400	Puteri Zamrud S.Bhd.	STX	02/06/1996	Malaysia	Steam	GT NO 96	4	MLNG II	30H
Puteri Zamrud Satu	137,100	MISC	Mitsui E&S	04/02/2004	Malaysia	–	GT NO 96	4	MLNG III	1507
Qogir	174,000	LNGShips	Samsung	01/06/2020	Malta	X-DF	TZ Mk. III Flex	–	Portfolio	2271

- Meets the IMO MEPC76 regulations requirements
- Integrates with any Shaft Power Meters
- 100% engine power remains accessible if needed

Kyma Shaft Power Limitation System

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Raahi	138,076	India LNG Transport Company No.2 Ltd.	Daewoo	18/10/2004	Malta	Steam	GT NO 96	4	RasGas	2211
Rasheeda	266,000	Nakilat SHI 1754 Inc.	Samsung	12/08/2010	M. Islnds	Diesel	TZ Mk. III	10	Qatargas IV	1754
Rias Baixas Knutsen	180,000	Knutsen OAS Shipping	HHI	04/09/2019	Spain	ME-GI	TZ Mk. III Flex	4	Corpus Christi	2964
Ribera del Duero Knutsen	173,400	Norspan LNG VIII AS	Daewoo	02/12/2010	Norway	–	GT NO 96	4	Portfolio	2275
Rioja Knutsen	170,000	Norspan LNG X	HHI	02/12/2016	Spain	ME-GI	TZ Mk. III Flex	4	Portfolio	2734
Rudolf Samoylovich	172,410	Teekay Corp.	Daewoo	22/08/2018	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2425
Salalah LNG	147,000	Tiwi LNG Carrier S.A.	Samsung	14/12/2005	Panama	Steam	TZ Mk. III	4	Oman LNG	1536
Santander Knutsen	174,000	Sea 194 Leasing Co Ltd.	Hyundai Samho	16/06/2022	Norway	X-DF	TZ Mk. III Flex+	4	Portfolio	8091
SCF La Perouse	174,000	Albus Shipping Ltd.	HHI	10/02/2020	Liberia	X-DF	NO-96-GW+PRS	4	Portfolio	8006
Seapeak Arctic	89,800	Artic Spirit LLC	Ishikawajima	17/12/1993	Saint Kitts & Nevis	Steam	IHI SPB	4	Atlantic LNG	3016
Seapeak Arwa	165,500	Membrane Shipping	Samsung	13/08/2008	M. Islnds	Diesel/Gas-Electric	TZ Mk. III	4	Balhaf	1625
Seapeak Catalunya	138,000	Teekay Shipping Spain S.L.	Izar	19/06/2003	Spain	Steam	GT NO 96	4	Atlantic LNG	319
Seapeak Creole	173,400	Teekay LNG Partners	Daewoo	18/02/2016	Bahamas	ME-GI	GT NO 96 GW	–	Sabine Pass	2407
Seapeak Galicia	140,624	Teekay Gas II	Daewoo	01/07/2004	Spain	Steam	GT NO 96	4	Portfolio	2209
Seapeak Glasgow	174,162	Teekay LNG Partners	Hyundai Samho	10/12/2018	Bahamas	ME-GI	TZ Mk. III Flex	–	Freeport	S856
Seapeak Hispania	145,500	Teekay Gas Naviera SL	Daewoo	21/08/2002	Spain	Steam	GT NO 96	4	Peru LNG	2205
Seapeak Madrid	138,000	Teekay Shipping Spain S.L.	Navantia	30/12/2004	Spain	Steam	GT NO 96	4	Atlantic LNG	105
Seapeak Magellan	165,500	Magellan Spirit ApS	Samsung	10/04/2009	Denmark	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	1626
Seapeak Marib	165,500	Membrane Shipping	Samsung	10/04/2008	M. Islnds	Diesel/Gas-Electric	TZ Mk. III	4	Balhaf	1608
Seapeak Meridian	165,500	Meridian Spirit Aps	Samsung	15/01/2010	Denmark	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	1633
Seapeak Methane	165,500	Malt Singapore Pvt. Ltd.	Samsung	13/02/2008	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Atlantic LNG	1607
Seapeak Oak	173,400	Teekay LNG Partners	Daewoo	03/03/2016	Bahamas	ME-GI	GT NO 96 GW	–	Sabine Pass	2408
Seapeak Polar	89,800	Polar Spirit LLC	Ishikawajima	04/06/1993	Bahamas	Steam	IHI SPB	4	Atlantic LNG	3015
Seapeak Vancouver	173,400	Teekay LNG Partners	Daewoo	02/11/2016	Bahamas	ME-GI	GT NO 96 GW	–	Portfolio	2411
Seapeak Yamal	174,000	Teekay LNG Partners	Hyundai Samho	31/01/2019	Bahamas	ME-GI	TZ Mk. III Flex	–	Freeport	S857
Seishu Maru	138,000	Mitsui O.S.K. Lines	Mitsubishi	09/09/2014	Bahamas	–	Moss	4	PNG LNG	2297
Seri Alam	145,572	MISC	Samsung	22/07/2005	Malaysia	–	TZ Mk. III	4	Bintulu	1502
Seri Amanah	145,709	MISC	Samsung	15/03/2006	Malaysia	Steam	TZ Mk. III	4	Bintulu	1503
Seri Anggun	145,731	MISC	Samsung	30/10/2006	Malaysia	Steam	TZ Mk. III	4	North West Shelf	1589
Seri Angkasa	145,130	MISC	Samsung	23/12/2006	Malaysia	Steam	TZ Mk. III	4	Bintulu	1590
Seri Ayu	145,894	MISC	Samsung	01/10/2007	Malaysia	Steam	TZ Mk. III	4	Bintulu	1591
Seri Bakti	152,944	MISC	Mitsubishi	14/04/2007	Malaysia	Steam	GT NO 96	4	Gladstone	2220
Seri Balhaf	152,000	MISC	Mitsubishi	01/01/2009	Malaysia	Steam	GT NO 96	4	Bontang	2223
Seri Balqis	152,000	MISC	Mitsubishi	02/03/2009	Malaysia	Steam	GT NO 96	4	NLNG	2224
Seri Begawan	152,900	MISC	Mitsubishi	14/11/2007	Malaysia	Steam	GT NO 96	4	Bintulu	2221
Seri Bijaksana	152,300	MISC	Mitsubishi	28/04/2008	Malaysia	Steam	GT NO 96	4	Bintulu	2222
Seri Camar	150,000	MISC	HHI	13/02/2018	Malaysia	Ultra Steam Turbine	Moss	4	Pacific Northwest	2732
Seri Camellia	159,800	MISC	HHI	30/09/2016	Malaysia	–	TZ Mk. III Flex	4	Pacific Northwest	2729
Seri Cemara	150,200	MISC	HHI	09/04/2018	Malaysia	Reheat Steam Turbine	Moss	4	Portfolio	2735
Seri Cempaka	162,000	MISC	HHI	01/08/2017	Malaysia	–	TZ Mk. III Flex	4	Pacific Northwest	2731
Seri Cenderawasih	162,000	MISC	HHI	08/02/2017	Malaysia	–	Moss	4	Pacific Northwest	2730
Seri Damai	174,000	Polaris LNG One Pte Ltd	Samsung	03/02/2023	Singapore	X-DF	Mark III Flex Plus	4	Portfolio	2364
Seri Daya	174,000	Polaris LNG Two Pte Ltd	Samsung	02/04/2023	Singapore	X-DF	Mark III Flex Plus	4	Portfolio	2365
Sestao Knutsen	136,947	Norspan LNG IV AS	Navantia Cadiz	11/10/2007	Spain	Steam	GT NO 96	4	Portfolio	331
Sevilla Knutsen	173,400	Norspan LNG VI AS	Daewoo	31/05/2010	Spain	Diesel/Gas-Electric	GT NO 96	4	Portfolio	2269
Shagra	268,000	Nakilat SHI 1751 Inc.	Samsung	23/11/2009	M. Islnds	Diesel	TZ Mk. III	10	Qatargas IV	1751
Shahamah	135,496	Shahamah Inc.	Kawasaki	01/10/1994	Liberia	Steam	Moss	5	Das Island	1438
Shandong Juniper	135,269	Shell Bermuda (Overseas) Ltd.	Mitsubishi	05/02/2004	Singapore	Steam	Moss	5	Peru LNG	2183
Shaolin	174,400	United Prosperity LNG Shipping Co Ltd	Hudong Zhonghua	31/10/2022	H.K., China	X-DF	–	4	Portfolio	H1831A
Shen Hai	147,200	Shanghai LNG Shipping Co.	Hudong Zhonghua	10/12/2012	H.K., China	Steam	GT NO 96	4	Bintulu	H1621A
Shinshu Maru	180,000	Mitsui O.S.K. Lines	Kawasaki	15/02/2019	Bahamas	DERST (aka STaGE)	Moss	4	Freeport	1734
Simaisma	145,889	Greenwell Corporation	Daewoo	24/07/2006	Greece	Steam	GT NO 96	8	RasGas II	2235
Singapore Energy	138,000	Sea Breeze Leasing	Samsung	21/02/2003	M. Islnds	Steam	TZ Mk. III	4	Portfolio	1416
SK Audace	174,000	Milestone LNG Transport	Samsung	03/08/2017	Panama	–	TZ Mk. III Flex	4	Portfolio	2080
SK Resolute	180,000	Milestone LNG Transport	Samsung	01/11/2017	Panama	X-DF	TZ Mk. III Flex	4	Ichthys	2081
SK Serenity	174,000	SK Shipping	Samsung	14/02/2018	South Korea	TFDE	KC-1	4	Sabine Pass	2153
SK Spica	174,117	SK Shipping	Samsung	12/03/2018	Panama	TFDE	KC-1	–	Sabine Pass	2154
SK Splendor	138,370	Optima Leasing	Samsung	01/05/2000	South Korea	Steam	TZ Mk. III	4	Oman LNG	1258
SK Stellar	138,375	Stellar Shipholding	Samsung	31/12/2000	South Korea	Steam	TZ Mk. III	4	RasGas I	1259
SK Summit	138,003	Omnia Enterprises	Daewoo	04/08/1999	South Korea	Steam	GT NO 96	4	RasGas I	2202
SK Sunrise	138,306	Methane Navigation S.A.	Samsung	27/08/2003	Panama	Steam	TZ Mk. III	4	RasGas II	1405
SK Supreme	138,225	SK Shipping Co Ltd	Samsung	05/02/2000	South Korea	Steam	TZ Mk. III	4	RasGas I	1207
SM Albatross	174,000	SMKLC LNG3 SA	HHI	25/07/2022	Panama	X-DF	TZ Mk. III Flex+	4	Portfolio	3185

SM Bluebird	174,000	SMKLC LNG4 SA	HHI	30/09/2022	Panama	X-DF	TZ Mk. III Flex+	4	Portfolio	3186
SM Eagle	174,000	Korea Line Corp.	Daewoo	04/05/2017	Panama	ME-GI	GT NO 96 GW	4	Sabine Pass	2449
SM Golden Eagle	174,000	–	HHI	23/08/2023	Panama	X-DF	–	4	Portfolio	3191
SM Seahawk	174,000	Korea Line Corp.	Daewoo	05/06/2017	Panama	ME-GI	GT NO 96 GW	4	Sabine Pass	2450
Sohar LNG	137,248	Energy Spring LNG Carriers	Mitsubishi	29/10/2001	Panama	Steam	Moss	5	Oman LNG	2162
Sohshu Maru	177,000	Mitsui O.S.K. Lines	Kawasaki	24/07/2019	Bahamas	DERST (aka STaGE)	Moss	4	Freeport	1735
Solaris	155,000	GasLog	Samsung	19/07/2014	Bermuda	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	2042
Sonangol Benguela	160,500	Sonangol Benguela Ltd.	Daewoo	08/12/2011	Bahamas	–	GT NO 96	4	Soyo	2282
Sonangol Etosha	160,500	Sonangol Etosha Ltd.	Daewoo	17/09/2011	Bahamas	–	GT NO 96	4	Soyo	2281
Sonangol Sambizanga	160,500	Sonangol Sambizanga Ltd.	Daewoo	10/08/2011	Bahamas	–	GT NO 96	4	Soyo	2280
Southern Cross	172,000	Mitsui O.S.K. Lines	Hudong Zhonghua	07/07/2015	H.K., China	–	GT NO 96	4	PNG LNG	H1671A
Soyo	160,276	Mint LNG I	Samsung	01/08/2011	Bahamas	–	TZ Mk. III	4	Soyo	1810
Spirit of Hela	177,000	Nefertiti LNG Shipping Co.	Hyundai Samho	05/11/2010	Bahamas	Diesel Electric	TZ Mk. III	4	PNG LNG	S324
Stena Blue Sky	145,700	Blue Sky LNG	Daewoo	01/08/2006	U.K.	Steam	GT NO 96	4	Spot	2233
Stena Clear Sky	171,800	Clear Sky LNG Shipping	Daewoo	31/05/2011	U.K.	Diesel/Gas-Electric	GT NO 96	4	Portfolio	2278
Stena Crystal Sky	171,800	Stena Drilling Cyprus	Daewoo	27/05/2011	U.K.	Diesel/Gas-Electric	GT NO 96	4	Portfolio	2268
Symphonic Breeze	145,394	Reborn Maritime	Kawasaki	14/12/2007	Bahamas	Steam	Moss	4	Portfolio	H1587
Taitar No 1	145,000	NiMic No 1 S.A.	Mitsubishi	08/10/2009	Panama	–	Moss	4	RasGas	2241
Taitar No 2	145,000	NiMic No 2 S.A.	Kawasaki	18/12/2009	Panama	–	Moss	4	RasGas	1625
Taitar No 3	145,000	NiMic No 3 S.A.	Mitsubishi	16/12/2009	Panama	–	Moss	4	RasGas	2242
Taitar No 4	147,000	NiMic No 4 S.A.	Kawasaki	04/08/2010	Panama	–	Moss	4	RasGas	1626
Tangguh Batur	145,700	LNG North-South Shipping Co.	Daewoo	15/12/2008	Singapore	Steam	GT NO 96	4	Tangguh	2242
Tangguh Foja	155,000	Ocean 1919 Shipping No. 1	Samsung	25/11/2008	Panama	–	TZ Mk. III	4	Tangguh	1619
Tangguh Hiri	155,000	Tangguh Hiri Finance Ltd.	HHI	05/12/2008	Bahamas	–	TZ Mk. III	4	Tangguh	1780
Tangguh Jaya	155,000	Ocean 1919 Shipping No. 2	Samsung	31/12/2008	Panama	–	TZ Mk. III	4	Tangguh	1620
Tangguh Palung	155,000	Ocean 1919 Shipping No. 3	Samsung	09/03/2009	Panama	–	TZ Mk. III	4	Tangguh	1634
Tangguh Sago	155,000	Teekay Shipping (Canada) Limited	Hyundai Samho	28/12/2008	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Tangguh	S298
Tangguh Towuti	145,700	LNG East-West Shipping Co.	Daewoo	15/10/2008	Singapore	Steam	GT NO 96	4	Tangguh	2241
Tembek	216,200	Overseas LNG S1 Corp.	Samsung	19/11/2007	M. Islnds	Diesel	TZ Mk. III	4	Qatargas II	1605
Tenergy	170,520	Briety Shipping Inc	HHI	21/01/2022	Greece	X-DF	TZ Mk. III	4	–	3157
Tessala	170,000	Hyproc Shipping Co.	HHI	07/02/2017	Algeria	Diesel/Gas-Electric	TZ Mk. III Flex	–	Arzew	2813
Trader II	138,000	K Line LNG Shipping (UK) Ltd	Samsung	07/11/2002	U.K.	Steam	TZ Mk. III	4	Portfolio	1380
Trader III	137,100	MISC	Mitsubishi	09/08/2002	Liberia	Steam	GT NO 96	4	MLNG III	2165
Traiano Knutsen	180,000	Hai Kuo Shipping 1901 G Ltd.	HHI	01/07/2020	Norway	ME-GI	TZ Mk. III Flex	4	–	3086
Trinity Glory	154,000	Cypress Maritime Consortium	Koyo Dockyard	26/11/2008	Panama	Steam	TZ Mk. III	4	Bontang	2260
Tristar Ruby	155,000	RBSSAF (19) Ltd.	HHI	14/04/2008	Liberia	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	1778
Umm Al Amad	210,200	J5 Nakilat No. 7 Ltd.	Daewoo	12/09/2008	M. Islnds	Diesel	GT NO 96	18	RasGas III	2253
Umm Al Ashtan	137,000	Umm Al Ashtan Ltd.	STX	29/05/1997	Liberia	Steam	Moss	4	Das Island	1333
Umm Bab	145,000	Sea Trade International Inc.	Daewoo	01/11/2005	Greece	Steam	GT NO 96	4	RasGas II	2228
Umm Slal	266,000	Nakilat Umm Slal Inc.	Samsung	26/11/2008	M. Islnds	–	TZ Mk. III	5	Qatargas II	1676
Valencia Knutsen	173,400	Norspan LNG VII AS	Daewoo	30/09/2010	Spain	–	GT NO 96	4	Portfolio	2274
Velikiy Novgorod	170,200	Sovcomflot	STX	20/12/2013	Liberia	–	GT NO 96	4	Portfolio	1910
Vivit Americas LNG	174,000	Cardiff LNG Zeta Owning LLC	HHI	17/10/2020	Malta	X-DF	TZ Mk. III Flex	–	Portfolio	3037
Vivit Arabia LNG	174,000	Kaiser 2 SA	Hyundai Samho	10/06/2022	Liberia	X-DF	TZ Mk. III Flex	4	Portfolio	8026
Vivit City LNG	174,103	Kaiser SA	Hyundai Samho	06/12/2021	Liberia	X-DF	TZ Mk. III Flex	4	Portfolio	8025
Vladimir Rusanov	174,000	Mitsui O.S.K. Lines	Daewoo	01/01/2018	H.K., China	ME-GI	GT NO 96 GW	4	Yamal	2424
Vladimir Vize	172,000	China Shipping Development Co.	Daewoo	30/09/2018	H.K., China	ME-GI	GT NO 96 GW	4	Yamal	2426
Vladimir Voronin	172,652	Teekay Corp.	Daewoo	19/07/2019	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2431
WilForce	155,900	Wilforce LLC	Daewoo	18/09/2013	Malta	–	GT NO 96	4	–	H2289
WilPride	155,900	Wilpride LLC	Daewoo	29/11/2013	Malta	–	GT NO 96	4	–	H2290
Woodside Chaney	174,000	Maran Gas Maritime	Daewoo	02/07/2019	Greece	ME-GI	GT NO 96 GW	4	Portfolio	2457
Woodside Charles Allen	173,400	Hai Kuo Shipping 2027G Ltd.	Daewoo	31/10/2020	Greece	ME-GI	GT NO 96 GW	–	–	2486
Woodside Donaldson	165,500	Malt Singapore Pvt. Ltd.	Samsung	19/10/2009	Singapore	Diesel/Gas-Electric	TZ Mk. III	4	Pluto	1632
Woodside Goode	159,800	Armour Company Ltd.	Daewoo	04/11/2013	Greece	Diesel Electric	GT NO 96 GW	4	RasGas	H2295
Woodside Rees Withers	173,400	Maran Gas Maritime	Daewoo	01/10/2019	Greece	ME-GI	GT NO 96 GW	4	–	2466
Woodside Rogers	159,800	Margie Seaway Corp.	Daewoo	01/07/2013	Greece	Diesel/Gas-Electric	GT NO 96 GW	4	Pluto	H2288
Wudang	174,400	United Glory LNG Shipping Co Ltd	Hudong Zhonghua	07/10/2022	H.K., China	X-DF	–	4	Portfolio	H1832A
Yakov Gakkel	172,658	DSME Hull No.2434 LLC	Daewoo	12/11/2019	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2434
Yari LNG	159,800	Cardiff LNG	Daewoo	03/11/2014	Malta	TFDE	GT NO 96 L03	4	Spot	2401
Yenisei River	155,000	Navajo Marine	HHI	31/07/2013	M. Islnds	–	TZ Mk. III	4	Yamal	2556
Yiannis	169,932	Onerato Marine SA	Daewoo	29/09/2021	Greece	ME-GI	GT NO 96 GW	4	–	2501
YK Sovereign	127,125	SK Shipping	HHI	01/12/1994	South Korea	Steam	Moss	4	MLNG	761
Zarga	268,000	Nakilat SHI 1752 Inc.	Samsung	23/01/2010	M. Islnds	–	TZ Mk. III	5	Qatargas IV	1752
Zekreet	137,482	Mitsui O.S.K. Lines	Mitsui E&S	01/12/1998	M. Islnds	Steam	Moss	5	Qatargas I	1432

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Fleet – LNG Bunkering

Name	Built	Capacity	Registered Owner	Builder	Flag	Engine Type	Cargo System	No. of tanks	Project
Seagas	Sep-74	170	Linde Gas AB	Havyard Leirvik	Sweden	Diesel	Cylinder	1	Stockholm Viking Line
Coral Methane	Apr-09	7,551	Coral Methane Shipping BV	AVIC Dingheng	Netherlands	Gas-Diesel	Cylinder	4	Portfolio
Oizmendi	Jul-09	600	Itsas Gas Bunker Supply SL	Astilleros Zamakona	Spain	Diesel	Cylinder	2	Huelva
Green Zeebrugge	Feb-17	5,000	LNG Link Investment AS	Hanjin Heavy Industries	Belgium	Diesel/Gas-Electric	Cylinder	2	Zeebrugge
Cardissa	Jun-17	6,500	Shell Western LNG BV	STX	Netherlands	Diesel/Gas-Electric	Cylinder	1	Portfolio
Coralius	Aug-17	5,800	Sirius Veder Gas AB	Bodewes Shipyards	Sweden	DFDE	Cylinder	4	Portfolio
Kairos	Oct-18	7,500	Uranos Vermogensverwaltung	Hyundai Mipo	Cyprus	Gas-Diesel	Type C	4	Portfolio
Bunker Breeze	Oct-18	6,050	Molucas Naviera AIE	Astilleros Zamakona	Spain	Gas-Diesel	Cylinder	4	Algeciras
LNG London	Apr-19	3,000	LNG Shipping S.A.	Severnav S.A.	Belgium	LNGPac	Cylinder	6	ARA
SM Jeju LNG 1	Sep-19	7,500	Jeju LNG 1 S.A.	Samsung	Panama	Diesel/Gas-Electric	KC-1	1	Portfolio
SM Jeju LNG 2	Jan-20	7,500	Jeju LNG 2 S.A.	Samsung	Panama	Diesel/Gas-Electric	KC-1	1	Portfolio
Gas Agility	Apr-20	18,600	Emerald Green Maritime Ltd.	Hudong Zhonghua	Malta	DFDE	TZ Mk III Flex	2	Rotterdam
Kaguya	Sep-20	3,469	Central LNG Shipping Japan	Kawasaki	Japan	Gas-Diesel	Cylinder	1	JERA TPS
Avenir Advantage	Oct-20	7,500	Avenir L Pte Ltd.	Keppel Nantong	Malta	Gas-Diesel	Type C	2	Portfolio
Avenir Accolade	Nov-20	7,500	Stolt-Nielsen Gas Ltd.	Keppel Nantong	Malta	Gas-Diesel	Type C	2	Portfolio
FueLNG Bellina	Nov-20	7,500	FueLNG Pte Ltd.	Kappel Nantong	Singapore	Diesel/Gas-Electric	Cylinder	2	Portfolio
Dalian No. 1	Dec-20	8,330	Xinao Marine Shipping Co. Ltd.	Dalian Yard	China	Gas-Diesel	Cylinder	2	Portfolio
Marine Vicky	Jan-20	9,900	Sinanju Tankers Pte. Ltd.	Keppel Nantong	Singapore	Gas-Diesel	TBC	TBC	Portfolio
Imperial Gas 92	Oct-17	3,800	Imperial Logistics International BV & Co. KG	Centromost	Germany	Diesel	Cylinder	TBC	Portfolio
Imperial Gas 93	Nov-17	3,800	Imperial Logistics International BV & Co. KG	Centromost	Germany	Diesel	Cylinder	TBC	Portfolio

Fleet – Small-scale/Multipurpose

Name	Built	Capacity	Registered Owner	Builder	Flag	Engine Type	Cargo System	No. of tanks	Project
Akebono Maru	Jun-11	3,500	Chuo Kaiun K.K.	Higaki	Japan	Diesel	Cylinders	2	Japan coastal trade
Aman Sendai	May-97	18,928	Asia LNG Transport	NKK	Malaysia	Steam	TZ Mk. III	3	Malaysia LNG
Coral Acropora	Dec-12	6,573	Coral Acropora Shipping	AVIC Dingheng	Netherlands	Gas-Diesel	Cylinders	4	Portfolio
Coral Actinia	Jan-13	6,573	Coral Actinia Shipping	AVIC Dingheng	Netherlands	Gas-Diesel	Cylinders	4	Portfolio
Coral Alicia	Dec-12	6,573	Coral Alicia Shipping	AVIC Dingheng	Netherlands	Gas-Diesel	Cylinders	4	Portfolio
Coral Anthelia	May-13	6,500	Coral Anthelia Shipping	AVIC Dingheng	Netherlands	Gas-Diesel	Cylinders	4	Portfolio
Coral Energice	Feb-18	18,000	Anthony Veder Chartering	Neptun Werft	Netherlands	Gas-Diesel	TZ MK. III Flex	2	Portfolio
Coral Energy	Dec-12	15,600	Anthony Veder Rederijzaken	Meyer Werft	Netherlands	Gas-Diesel	IMO Type C	3	Portfolio
Coral Favia	Jul-10	10,000	Somargas II Pvt. Ltd.	Wuzhou Shipbuilding	Singapore	Diesel	Cylinders	2	Baltic portfolio
Coral Fraseri	Jan-10	10,000	Innovation Shipping Co.	Wuzhou Shipbuilding	Singapore	Diesel	Cylinders	2	Portfolio
Coral Fungia	Jan-11	10,000	Somargas II Pvt. Ltd.	Wuzhou Shipbuilding	Singapore	Diesel	Cylinders	2	Baltic portfolio
Coral Furcata	Nov-11	10,000	Conception Shipping Company	Wuzhou Shipbuilding	Singapore	Diesel	Cylinders	2	Portfolio
Hai Yang Shi You 301	Apr-15	30,000	COSL	Jiangnan Shipyard	China	Gas-Diesel	Membrane	4	Hainan LNG shuttle
Kakurei Maru	Nov-08	2,536	Tsurumi Sunmarine Co.	Higaki	Japan	Diesel	Cylinders	2	Japan coastal trade
Kakuyu Maru	Nov-13	2,538	Tsurumi Sunmarine Co.	Kawasaki	Japan	Diesel	Cylinders	1	Japan coastal trade
Lucia Ambition	Dec-93	18,927	Asia LNG Transport	NKK	Malaysia	Steam	TZ Mk. III	3	Malaysia-Hainan
North Pioneer	Nov-05	2,500	Japan Liquid & Gas Transport Co. & Japan Railway Agency	Shin Kurushima	Japan	Diesel	Cylinders	2	Japan coastal trade
Pioneer Knutsen	Mar-04	1,100	Knutsen Kyst LNG K/S	Bijlsma Lemmer B.V. Scheepswerf	Norway	LNG-Diesel	Cylinders	2	Norway coastal trade
Ravenna Knutsen	Feb-21	30,000	Norspan LNG 14 AS	Hyundai Mipo	Spain	X-DF	Cylinders	3	Italy coastal trade
Seoul Gas	Jul-98	4,365	Chemgas Schifffahrts GmbH & Co. mt Oste KG	Severnav Shipbuilding	Liberia	Diesel	Cylinders	2	S. Korea-China
Shinju Maru No. 1	Aug-03	2,538	JRTT & NS United Coastal Tankers	Kawasaki	Japan	Diesel	Cylinders	2	Japan coastal trade
Shinju Maru No. 2	Oct-08	2,536	Chuo Kaiun K.K.	Higaki	Japan	Diesel	Cylinders	2	Japan coastal trade
Sun Arrows	Sep-07	19,531	Maple LNG Transport Inc.	Kawasaki	Bahamas	Diesel	Moss	3	Malaysia LNG
Surya Aki	Feb-96	19,538	MCGC International Limited & Hiroshima Gas Co.	Kawasaki	Bahamas	Steam	Moss	3	Thanlyin LNG
Triputra	Dec-00	23,097	Nusantara Shipping	NKK	Indonesia	Steam	TZ Mk. III	3	Pertamina Portfolio
Unikum Spirit	Jun-11	12,000	DHJS Hull No.2007-001 LLC	AVIC Dingheng	Singapore	Diesel	Cylinders	2	Kuantan
Vision Spirit	Sep-11	12,000	I.M. Skaugen Marine Services	AVIC Dingheng	Singapore	Diesel	Cylinders	2	Portfolio

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