LNG journal
The World's Leading LNG publication

44 pages essential LNG news!

November/December 2021

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Carbon-neutral LNG deliveries: A path forward for LNG trade

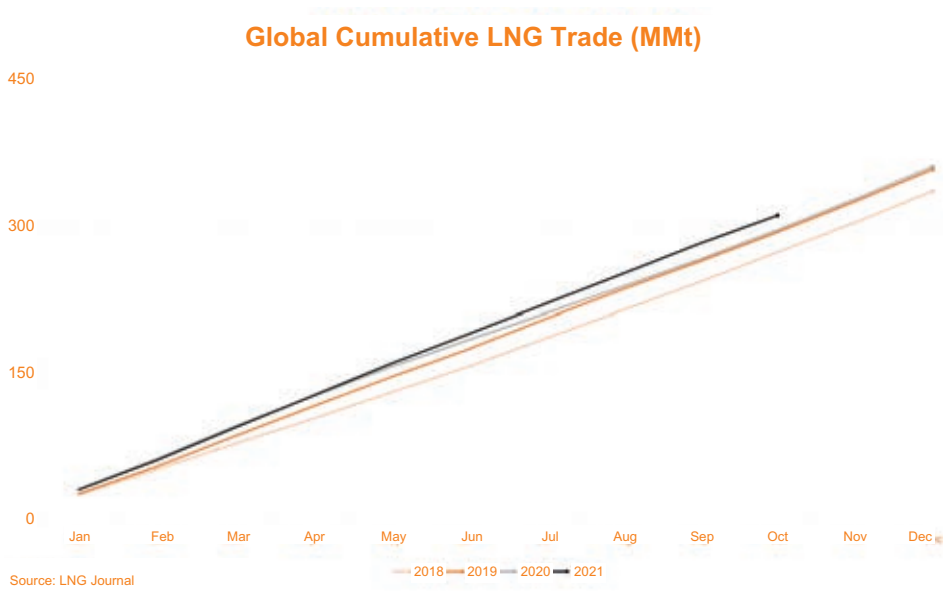
With the achievement of climate goals at risk, fossil fuels are coming under intense scrutiny for their carbon footprint. One of the LNG industry's solutions is carbon-neutral LNG deliveries, for which demand is increasing quickly, but which have yet to be uniformly adopted, our Markets Editor Alexander Wilk reports.

Between 31 October and 12 November this year, Glasgow will host what may well prove to be the most important UN Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP 26) since the Paris Agreement signed in 2015. Already a year late due to COVID-19, the COP Bureau of the UNFCCC is keen to incorporate the announced long term goals of an increasing number of countries to achieve net zero greenhouse gas (GHG) emissions over the coming decades.

According to the UNFCCC, national commitments to GHG emissions are currently likely to be insufficient to meet the goal set by the 2015 Paris Agreement of limiting global warming to no more than 2°C above pre-industrial levels. Without cutting GHG emissions by 45 percent by 2030 and achieving net-zero emissions by 2050, the 2°C-goal is at risk of being missed, according to the Intergovernmental Panel on Climate Change (IPCC), a United Nations body.

Earlier this year, the International Energy Agency (IEA) hosted its Net Zero Summit to take stock of the growing list of national and industry commitments to conform with the 2015 Paris Agreement and to focus on the actions necessary to implement those net-zero goals. In its special report *Net Zero by 2050: A Roadmap for the Global Energy Sector* published in May this year, the Agency concluded that for the world to stand a chance of achieving net-zero GHG emissions by 2050, additional investments in new oil and gas fields should cease immediately.

However, as we reported last month, market observers have highlighted several constraints on the IEA's call for a stop to new hydrocarbon investments. Among them were the need for



Source: LNG Journal

investment in clean energy and energy infrastructure to triple by 2030 as well as the general commercial unavailability of technologies that underpin roughly 50 percent of the IEA's projected GHG emissions reductions. Moreover, there remains the continued reliance of Asian nations on coal for power generation.

LNG as transition fuel

Global LNG demand growth has remained persistent even as pressure to cut back on the use of hydrocarbons increased and COVID-19 related measures resulted in economic slowdowns. LNG offtakes grew by 6.5 percent in 2019 and year-on-year growth has bounced back to almost 5 percent in October 2021 from full-year growth of 1 percent in 2020, our data show.

Alongside persistent demand growth, reliance on the spot and short-term market has accelerated as buyers have been scouring for additional supply ahead of winter this year. Part of the reason for that demand growth has been declining domestic gas production – for example in Indonesia, Argentina and Europe – amid growing electricity demand. In addition, a period of relatively low prices in 2020 helped to accelerate LNG penetration. An LNG buyer survey by consultants McKinsey & Company at the time found that more than half of respondents expected strong LNG demand growth of at least 11 percent by 2023 – provided prices remained below US$5/mmBtu. At the time of writing, LNG spot prices stood at around US$30/mmBtu, which may have slowed demand growth but certainly did not arrest it. This points to LNG as an important transition fuel whilst other fossil fuels – led by coal – will come under intense scrutiny in the context of climate goals.

Emissions scrutiny

However, alongside the prospect of a transition fuel, the emission intensity of LNG is equally a critical question for the industry. Notably, some of the world's largest LNG markets – China, Japan, South Korea and the European Union – have announced carbon-neutrality goals in 2020.

McKinsey & Company's buyer survey shows that 33 percent of respondents anticipate that emissions-intensity clauses will become more common in contracts going forward. The consultancy

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highlights that focus on this practice could lead to fewer prospects for LNG supply as the cost curve is adjusted according to carbon pricing.

Offsetting carbon

Based on our research and analysis, we estimate there have been 21 carbon neutral LNG deliveries since 2019, the bulk of which were destined for Asia. Asia is currently at the forefront of sourcing environmentally friendly LNG. Shell has been leading carbon-neutral LNG deliveries and has traded such cargoes to Asia since 2019, inter alia with Tokyo Gas, CNOOC Gas & Power and Taiwan's CPC. Nevertheless, large-scale portfolio players such as Cheniere, BP and ENI as well as developers of new LNG projects in the United States are also looking to expand, or get ready for, carbon-neutral LNG trade. Importantly, this work is targeted at arriving at common standards.

Building momentum

Cheniere and Shell have launched a partnership to offset the full lifecycle greenhouse gas emissions associated with the LNG cargo. The two companies thus aim to retire nature-based offsets to account for the estimated carbon dioxide equivalent (CO_2e) emissions produced through the entire value chain, meaning from production at the wellhead through to use by the end consumer. The term is used to bundle different greenhouse gases (GHG) in a common unit.

A statement by Cheniere suggests each party covers different parts of the value chain, with Cheniere responsible for offsetting the estimated CO_2e emissions attributable to upstream as well as liquefaction activities up to the FOB delivery point.

CE Tags

Cheniere also announced in February it would provide emissions tags (CE Tags) to all LNG cargoes produced at its Sabine Pass and Corpus Christi plants from 1H 2022. CE Tags are designed to enhance environmental transparency by quantifying the estimated GHG emissions of LNG cargoes from the wellhead to the cargo delivery point.

"We believe significantly enhanced data-driven emissions transparency will support Cheniere, our customers and our suppliers as we work to identify tangible opportunities to quantify and improve environmental performance," said Jack Fusco, Cheniere's President and Chief Executive Officer, in February. "We consider this announcement to be a critical first step for the industry. Cheniere will continuously work to improve the data incorporated in the CE Tags with the ultimate goal of providing dynamic GHG emissions data."

Project Canary

In April, NextDecade Corporation – the developer of the proposed Rio Grande LNG project in Brownsville, Texas – said it will have the greenhouse gas intensity of the LNG to be produced at Rio Grande assessed as part of a pilot programme. This programme underpins a substantial carbon capture and storage project developed by a NextDecade subsidiary. To that end, the firm is partnering with Project Canary, a Colorado-based B-Corp already working with several US gas producers to certify their supplies as responsibly sourced.

Fittingly, Canaries were traditionally used in coal mines to detect the presence of carbon monoxide, a practice that evolved into a popular idiom of an early warning to imminent danger.

Political pressure and buyer reluctance have already compelled a roster of around 50 US shale gas producers to implement certification of their production with Project Canary. Among those, Chesapeake Energy and EQT have announced contracts. The certification company is also in talks with several LNG suppliers in Europe and Asia. Routine and widespread implementation of carbon-reduction schemes in the US gas and LNG industry would be a welcome development given the continued rise in US LNG exports.

Growing demand

With higher CO_2e scrutiny pushed by public awareness and tighter regulations, demand for compliant LNG deliveries is likely to see accelerated growth.

"I think offering climate solutions to our customers is going to be a bigger and bigger portion of our business," Jack Fusco said during Cheniere's first-quarter earnings call, according to Reuters.

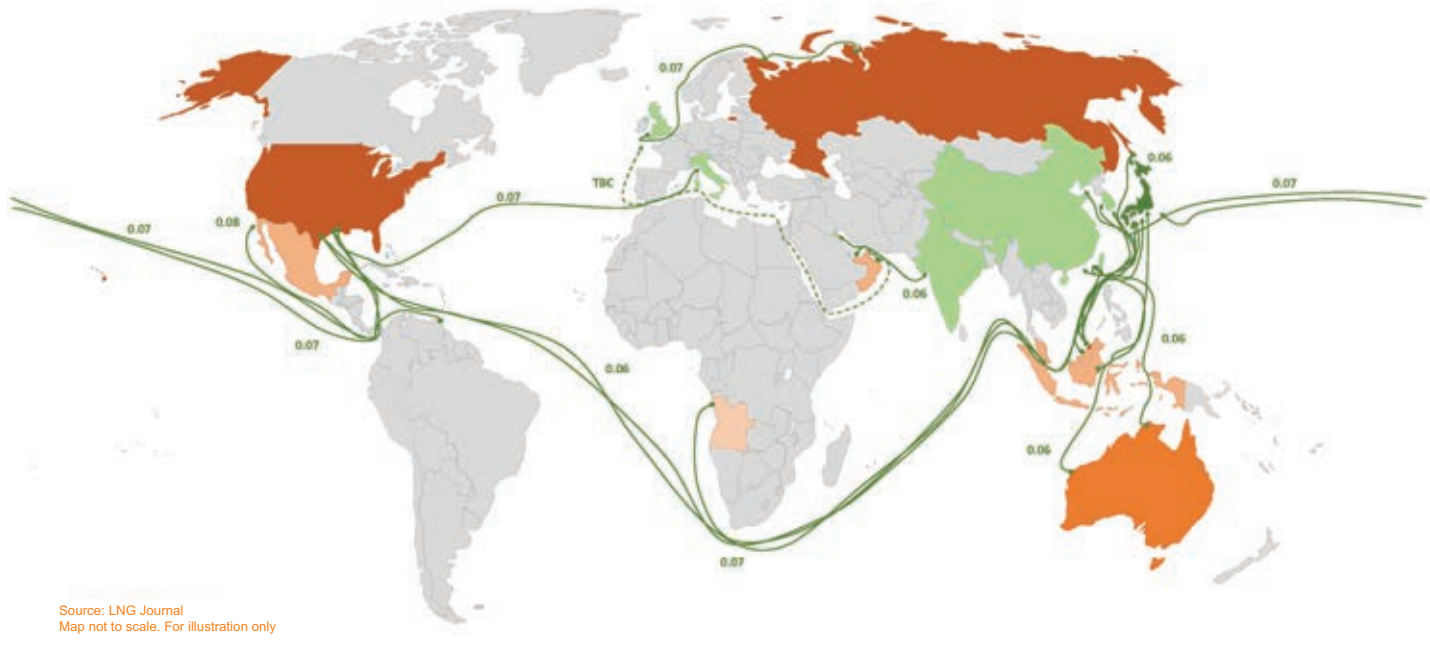
Notably, Singapore's Pavilion Energy imported the country's first carbon-neutral LNG cargo on 11 April. Pavilion also signed long-term LNG supply contracts with Qatar Petroleum and Chevron that mandate specific GHG data provision with each cargo. The two deals cover LNG supply of 2.3mtpa from 2023. Last year, Singapore imported 4.01mmt, according to our data and calculations. Roughly 1.21mmt were re-exported with the majority going to China.

Meanwhile, demand for such cargoes is also stirring in Europe.

Earlier this year, we reported on Shell receiving Europe's first carbon-neutral LNG delivery at the Dragon LNG terminal in Wales. The cargo was supplied

Carbon-neutral LNG Trades (MMt)

Estimates of trades since 2019 based on LNG Journal analysis & data



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by Gazprom's Yamal LNG contingent via a cargo transshipment involving the LNGCs Nikolay Zubov and LNG Megrez off Murmansk in February, according to LNG Journal data. As part of the deal, buyer and seller pooled their carbon credits to cover the full value chain, a Gazprom statement explained at the time. The Russian company and Shell are jointly offsetting the cargo's carbon footprint via the Verified Carbon Standard and the Climate, Community and Biodiversity carbon credit standards. This means that the gas shipment is specified to be carbon emissions neutral across its entire value chain, spanning field production, liquefaction, transportation and final consumption.

Shell calculated an average LNG cargo of 0.07mmt emits approximately 0.24mmt of CO2e across the value chain based on the conversion rate provided by the UK Department for Environment, Food and Rural Affairs (DEFRA). The company said high-quality nature-based carbon credits were used and will be retired to offset full lifecycle emissions (including methane) generated by the delivery to Dragon LNG.

Europe received its second caron-neutral LNG cargo in May via a Cheniere-Shell trade as part of the companies' long-term LNG Sale and Purchase Agreement. According to our data, the Shell-controlled Magdala arrived at the OLT Toscana terminal in western Italy on 5 April. The vessel carried a 0.07mmt cargo, which had been loaded at Sabine Pass LNG on 22 March. Cheniere's press release suggests the cargo was sold FOB.

Sharing credit

Shell hopes the receipt of the first batch of Russian 'green' LNG at Dragon LNG in Wales marks the beginning of carbon-neutral LNG deliveries to the United Kingdom's domestic market. "Carbon neutral LNG cargoes are another choice we are offering our customers as they seek to reduce their net carbon footprint well to wheel and also offer the same choice to their end customers. Using nature-based carbon credits to compensate for emissions that cannot be avoided or reduced is an important step as we find more ways to reduce emissions across the LNG value chain", said Steve Hill, Executive Vice President, Shell Energy.

No silver bullet

Considerable progress in the rigorous setting of standards notwithstanding, there has also been debate regarding the role and efficacy of offsets in meeting science-based targets, as highlighted by the Oxford Institute for Energy Studies (OIES). Notably, carbon markets supplied by offsets have been criticised for offering inconsistent climate benefits or as providing a relatively cheap way for operators to go 'net-zero'. Instead of investing in core operational competencies, the argument goes, these are merely substituted for and may even disincentivise core investments in operational efficiencies, renewable energy, technological innovations or the procurement of alternative, low-carbon inputs into supply chains.

Real, measurable and additional

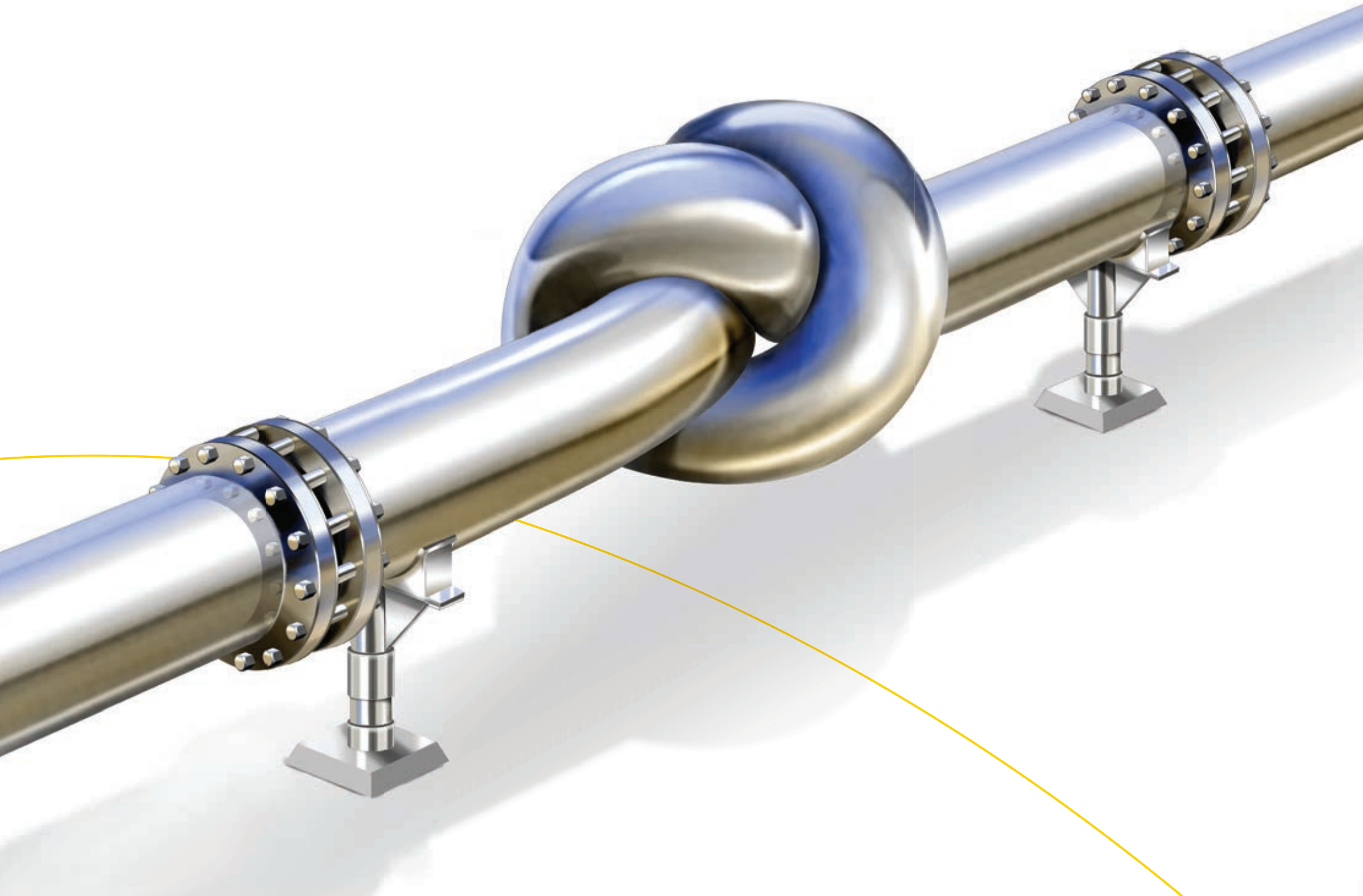
The OIES highlights that meaningful carbon offsets rely, among other things, on an ecosystem of minimum standards and certification to only recognise emission reductions that are 'real, measurable, and additional'. This will become increasingly important as the volume of traded CO2e emissions continues to expand.

This is important for carbon offsets to generate value as first project developers must be able to obtain investments, either directly from end-users or other financing sources, and second, the ultimate purchaser of a carbon offset needs to be able to legitimately claim the credit in the form of a verified GHG emission reduction.

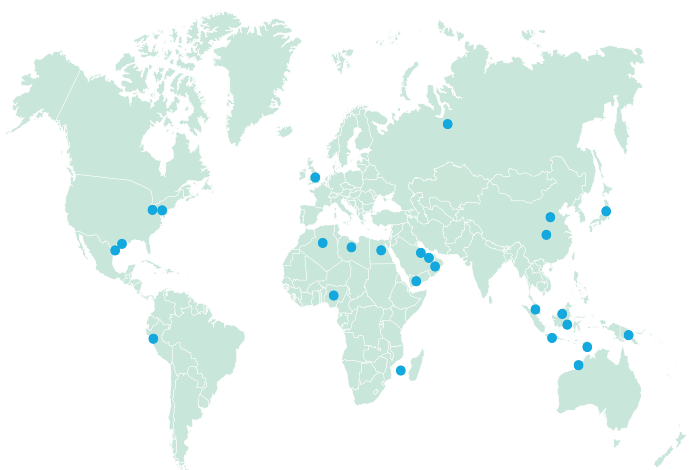
Although the use of industry averages to account for GHG emissions could be a useful starting point to structure carbon-neutral cargoes, it can mask wide differences in GHG upstream emission activity between participants. As noted by the OIES, 'methodologies for emission standards may take several years to establish for the different elements of each LNG value chain'. However, the Institute also argues that cargoes lacking value chain certification by accredited authorities, or those which fail to meet certain emission standards, will likely face increasing risk of being deemed of lower value. Buyers of such cargoes will either increasingly have to price-in the cost of acquiring higher levels of emission offsets post-delivery or not be able to receive such cargoes in certain jurisdictions at all.

Concluding thoughts

At this stage, it remains to be seen how the industry will adapt. Whilst the current share of CO2e-offset LNG cargoes is relatively small, it is growing fast amid public and regulatory pressures. Accordingly, there have been some recent attempts to address the requirement of greater transparency and a common standard. Importantly, the widespread introduction of carbon credits will impart a competitive advantage for the least carbon-intensive producers since their carbon offsetting will incur the least additional cost through credits. This, in turn, could throw the commercial viability of some LNG supply into doubt and highlights the importance of schemes such as Project Canary. Alternatively, as the OIES points out, this could lead to a problem of 'adverse selection' whereby less carbon-intensive suppliers report their carbon footprint more precisely whilst others rely on industry averages. ■



Using unproven LNG technology can really tie up production.



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ROITI calculator shines a fresh light on LNG Terminaling Services

Much about the European LNG regasification capacity remains a grey area hence ROITI Ltd is working on a digital solution, called 'Multi-Terminal Calculator'. Users of the new calculator will have designed tools to get access to tariff tables and fees for more than one LNG import terminal at a time, LNG Business analyst Victor Tenev told LNG Journal.

Europe's overall regasification capacity amounts to 179 million tons per annum (mtpa), based on 37 operating terminal. And more are to be built by the end of 2021 which are currently at planning stages. Spain, Europe's largest LNG importer receives 45 mtpa, followed by the UK with 38 mtpa but considering the ongoing construction of new import facilities, buyers need more transparency on free import capacity as well as prices.

Asked about the launch date of ROITI's multi-terminal calculator, Ventsislav Topuzov – CEO and co-Founder of ROITI Limited said:

"Within the software development lifecycle, our proposed "LNG-T Collection tool" is at the stage "requirements gathering" and 'software design'. We do not also exclude the possibility for pooling the resources and joining efforts with partners aimed at maximizing the end-product's value." Having looked into Europe's LNG receiving market, he assessed the value of bringing more transparency into the world of LNG terminaling servicing fees.

"The hard work on this has begun two months ago. We do not expect this software to be completed by the end of this year, the criteria to be met are quite challenging," he explained. Hence, the project status is 'in development' and planned to be competed be in the first half of 2022.

Users will not have to pay for using the ROITI calculator." There will be no fee; the LNG-T collection tool will be completely free of charge," Topuzov said, adding: "We will be relying on the clients while using it to cooperate by giving some information in order to enhance the system's functionality."

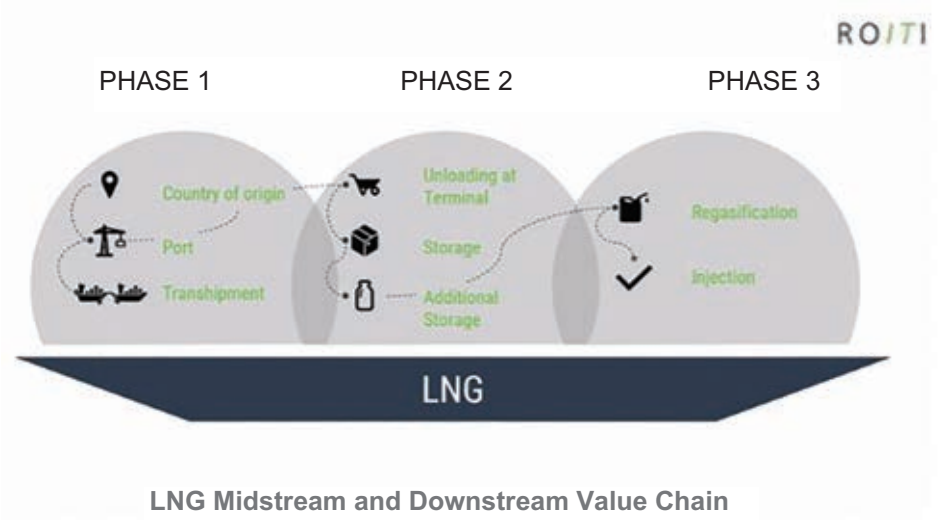
Geared towards bringing down the transaction cost

Asked about the participating LNG terminal operators, he said: "We have made a number of meaningful discussions with some of the most prominent regas terminal owners, including Fluxys and Enagas, following this, we will continue to extend our reach to the rest of the LNG import terminals in Europe."

Everything provided by participating LNG terminals will be collected in terms of prices, fees, penalties as well as the technical specs of the facilities. So far, the only one service which is uniform among all terminals is "bundled capacity – for Unloading, Storage and Regasification".

Once fully implemented, the tool will gather data from the LNG terminals that ROITI is working with. The system will be based on 'cost-benefit analysis' and the "comparative advantage theory" to give a simple answer to the question of LNG Shippers: "How much would cost me to unload, store, reload and regasify?" or "Considering the Terminaling services Tariff structure, where would be best for relocation the LNG?" or "Instead of holding the LNG at the Terminal, isn't it more reasonable to trade-off this for finding a better market conditions somewhere else in Europe?"

"We have made a number of meaningful discussions with some of the most prominent regas terminal owners, including Fluxys and Enagas, following this, we will continue to extend our reach to the rest of the LNG import terminals in Europe."



LNG Midstream and Downstream Value Chain

Terminal Operators are called upon to participate in ROITI's LNG-Collection tool to help create a more competitive, accessible, and transparent market environment. "Otherwise, commercial data on roughly 37 percent of the total EU send-out LNG capacity remain publicly unavailable," Tenev noted.

Not much has been done recently to tackle the information opacity and complexity, which according to the Council of European Energy Regulators is 'a potential barrier against new LNG Imports.' The GLE Transparency template (Gas Infrastructure Europe), implemented voluntarily, is helping in some way but the information available here is mostly about generic terminal characteristics rather than commercial information, notably regasification costs.

Most information about European regas capacity still remains a grey area. According to ROITI analysis, three are peculiarities that raise caveats to the European LNG trade:

- Lack of genuine level-playing field — A handful of import facilities (6 LNG regas terminals) are under an

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exemption regime. In the matter of data accessibility this would mean that all the commercial information regarding tariff and fee structure is not disclosed, but strictly confidential (e.g., basic services such as unloading, storage, regasification).

- Lack of service standardization — presently, there is a substantial tariff variation.
- Poor-quality information — all in all, the information published is not illuminating. On the contrary, it is rather incomplete and of questionable value regarding the usage of LNG Terminal services. In addition, there is a limited understandability since national legislation for some of the European LNG terminals is rarely translated.

"In the end, all this will open doors to more inefficiency, confusion, prolonged time frame for commercial information gathering, leading inevitably to market distortion," said Topuzov.

ROITI's new concept focuses on the LNG import terminal services, and more precisely on expenses incurred by the berthing/mooring process as well as the injection of regassified natural gas into the national grid. This involves tariff tables, fees, all fines, and penalty charges etc. The software empowers users to unify the energy management across the full spectrum of LNG import locations. By giving buyers and sellers an overview about the tariff structure, the system helps them optimize the deployment of LNG carriers and gas flow management.

"We are working on a design of our proposed digital solution, (e.g., the multi-Terminal Calculator," Tenev said. "In our framework, users would have the right tool designed to facilitate the entire process of acquiring information in a more versatile way in terms of having a good grasp on the tariff tables and fees for more than one Terminal. "This will help the LNG shipper by obtaining the necessary information at the right time with minimum effort along with more in-depth information in regard to other extrinsic value factors of holding the LNG at the Terminal – that is to say, boil-off gas rate and maximum duration of LNG storage, type of storage facilities, injection/withdrawal rate, types of capacity usage, market conditions and the capability of that LNG to reach a specific market with relatively beneficial pricing behavior," he explained.

As for the insufficient level of availability and transparency, ROITI's new calculator aims to give customers access to liquid LNG markets at a "completely different level." By overcoming visibility barriers will clearly favour LNG shipping companies and import terminal operators.

"The value added would make sense in paring down the notable differences between terminals, through which improving the flexibility for the sake of increasing the consumer's interest, to which I strongly believe all of us are determined for," Tenev concluded. ■

Authors

Ventsislav Topuzov

Ventsi is one of the founding partners at ROITI and has been serving as CEO ever since the inception of the company in 2013. Prior to founding ROITI, Ventsi worked 5 years for OpenLink in Berlin, Germany where he helped numerous clients on Endur implementation projects. His career in consulting within the energy sector started back in 2005 when he worked on a post-privatization restructuring project for a utility serving 1.1 million customers in Bulgaria.

Victor Tenev

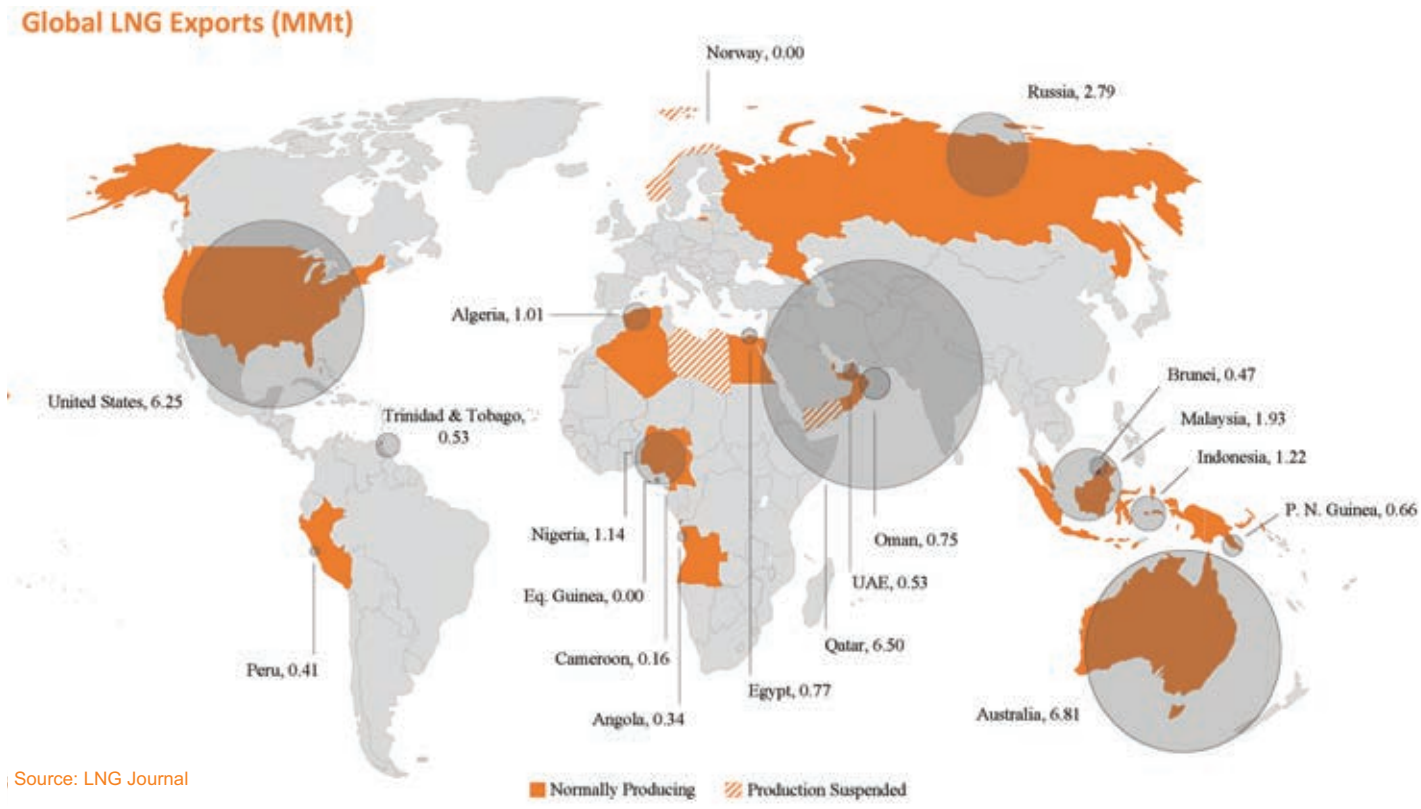
A former chief accountant, who has later earned his MScEcon degree in "Petroleum Economics, Energy and Finance", conferred by the University of Aberdeen and subsequently worked for Overgas Inc. Currently holds the position of LNG Business analyst at ROITI.

October trade enjoys robust month-on-month growth

Our October data show significant growth in monthly LNG flows underpinned by higher Russian, American, Egyptian and Malaysian LNG exports as well as resurgent European demand, our Markets Editor Alexander Wilk reports.

In October, our data showed global LNG trade had grown by 2.24mmt (7 percent) over the equivalent period in September. Shipped Middle Eastern volumes led global LNG export growth with a month-on-month increase of 1.25mmt as Egypt continued to ramp up exports with the help of strong demand in Turkey. Concurrently, Yamal LNG pivoted back to Europe whilst Malaysia captured more market share in Taiwan.

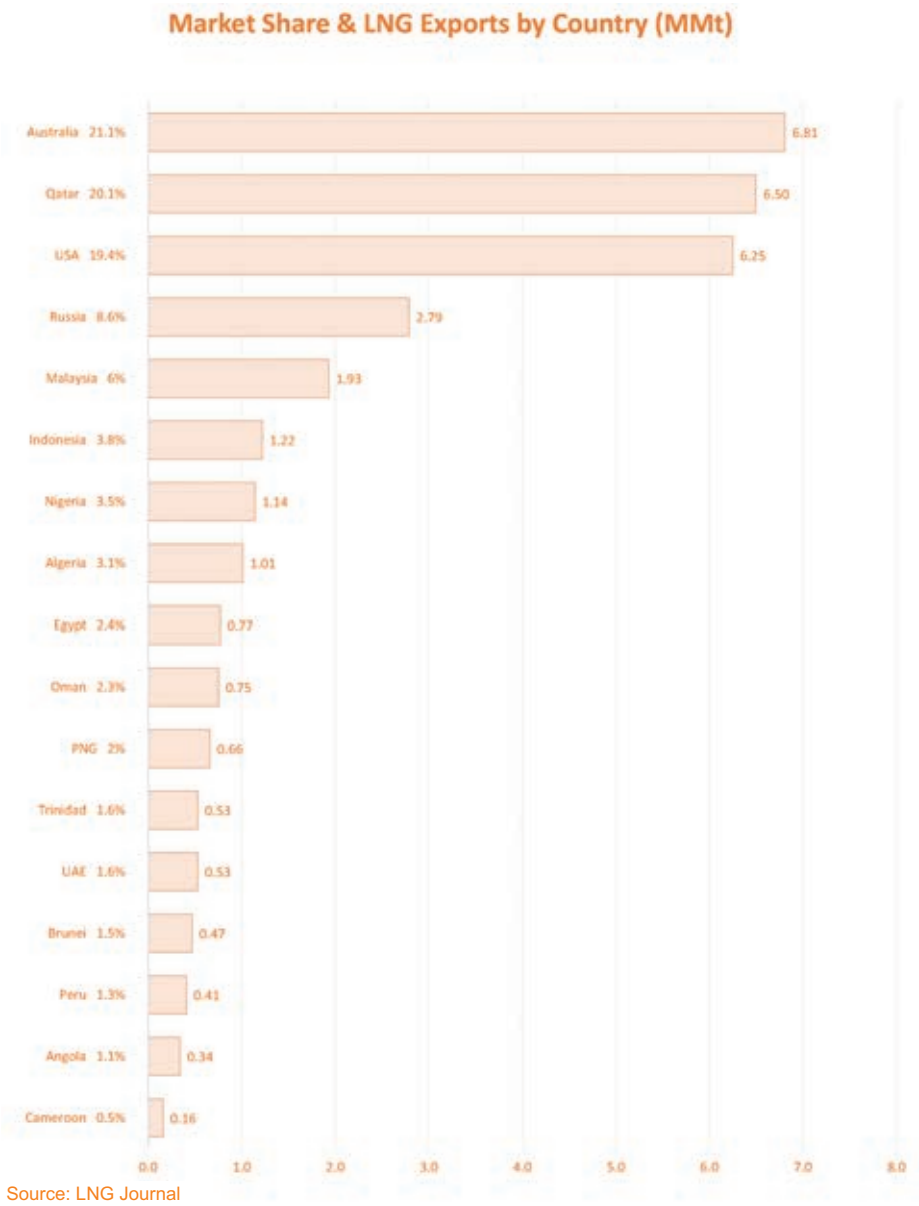
Meanwhile, global LNG demand was supported by the Atlantic Basin, with the fastest growth in Europe. Concurrently, Pacific and Middle Eastern saw more moderate increments in volume terms. Demand in the Pacific was mainly driven by South Korea whilst Pakistan was leading Middle Eastern imports.



Source: LNG Journal

Exports

Our October data show global exports grew robustly by 2.24mmt (7 percent) month-on-month. Export growth by volume was led by the Middle East, where overall shipped volumes were up 1.25mmt (12 percent) over September. Concurrently, Pacific Basin shipments were up by 0.69mmt (6 percent) month-on-month. Atlantic Basin exports also saw similar growth as October exports increased by 0.65mmt (6 percent). This, in turn, translated to global full-month exports of 32.27mmt in October compared to 30.03mmt in September. Accordingly, October's LNG shipments were also up 4.67mmt (17 percent) year-on-year.



Source: LNG Journal

Pacific Basin

Pacific exports reached 12.40mmt in October, exceeding September's volume of 11.71mmt by 0.69mmt (6 percent). Consequently, annualised capacity utilisation stood at 88 percent.

Australia

In contrast to overall export growth, the Basin's most significant exporter by installed capacity – Australia – decreased exports slightly by 0.14mmt from 6.95mmt in September to 6.81mmt in October. Our data indicated export growth of 0.11mmt (9 percent) at NWS LNG was leading the continent's onshore plants in October. NWS LNG exported 1.30mmt compared to the 1.19mmt recorded in September. Exports from Darwin LNG, meanwhile, increased by 0.09mmt (45 percent) from 0.20mmt to 0.29mmt. This was followed by Australia Pacific LNG, where at 0.76mmt shipments were up by 0.05mmt (7 percent) from 0.71mmt in September. Ichthys LNG and Gladstone LNG, meanwhile, grew exports only marginally by 0.01mmt (2 percent) to 0.74mmt and 0.53mmt in October from 0.73mmt and 0.52mmt in September, respectively. Queensland Curtis LNG kept shipments steady at 0.75mmt. Exports from the remaining Australian onshore plants, however – namely Gorgon LNG, Pluto LNG, and Wheatstone LNG – came in below their exports in September. Shipments from Gorgon LNG in particular trailed their September equivalents of 1.33mmt by 0.12mmt to reach only 1.21mmt by the end of the month. The remaining onshore plants showed an overall month-on-month reduction of 0.13mmt (-11 percent). Notably, Chevron had scheduled some maintenance for its Australian LNG assets during October, which the company reported complete by the end of the month.

Shell's Prelude FLNG barge also curtailed shipments showed exports of 0.13mmt, down 0.16mmt (-55 percent) from 0.29mmt in September. Our data and calculations indicated the facility operated at only around 41 percent of annualised capacity in October compared to 91 percent in September.

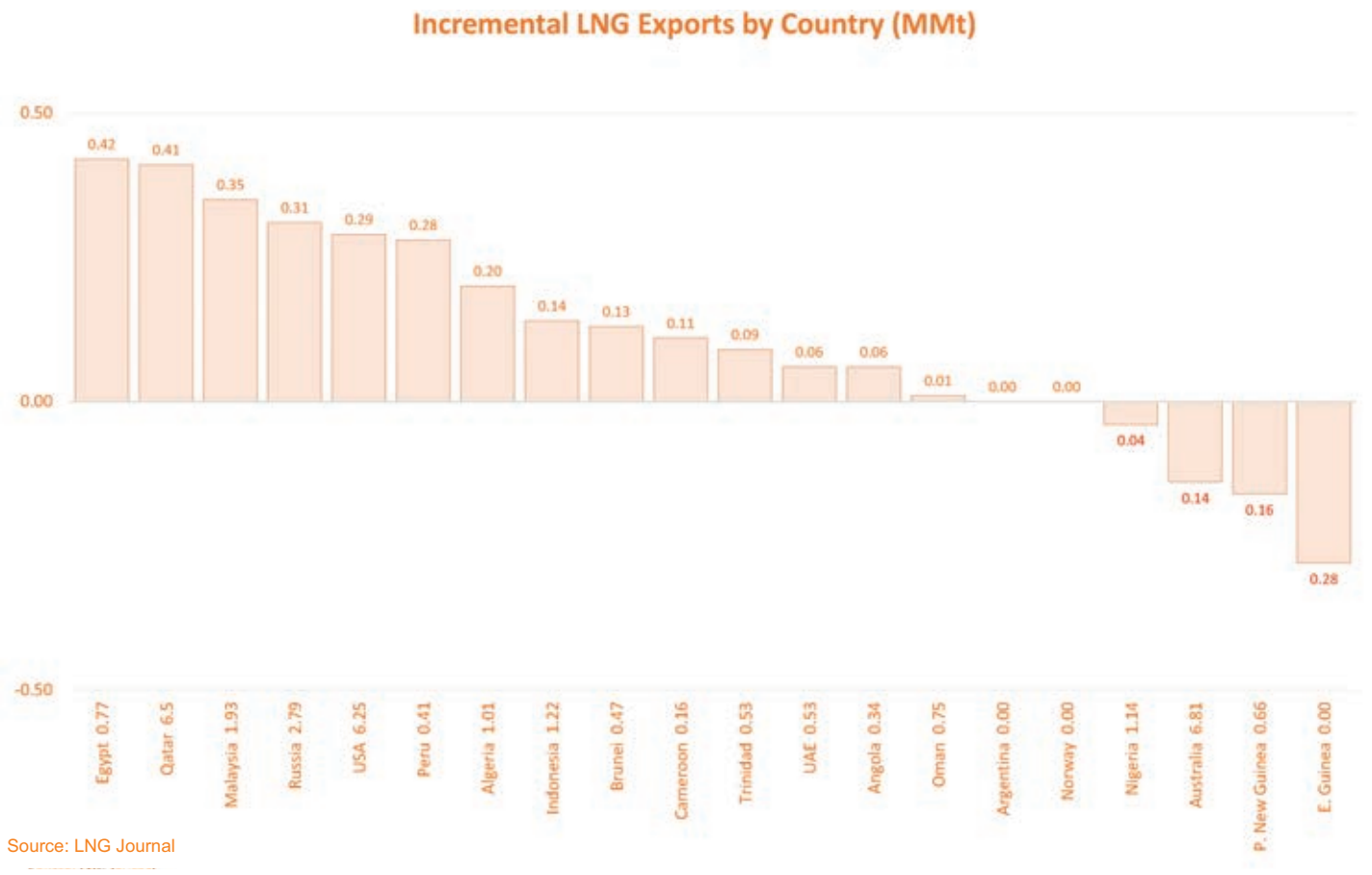
Southeast Asia

North of Australia, Papua New Guinea's PNG LNG saw month-on-month shipments decrease by 0.16mmt (-20 percent) to 0.66mmt in October compared to 0.82mmt in September. PNG LNG had benefitted from additional demand in Taiwan as well as China in September but could not hold on to that margin in

October. Export growth totalling 0.07mmt to Japan and South Korea could not compensate. Still, at 116 percent the plant continued to operate at above nameplate capacity.

In neighbouring Indonesia, however, the amount of LNG shipped had increased, up by 0.14mmt (13 percent) to 1.22mmt in October compared to the 1.08mmt recorded in September. In particular, the Donggi-Senoro plant had returned to the market in October, having exported no LNG in September due to maintenance. Concurrently, Bontang LNG increased shipments by 0.02mmt (4 percent) to 0.48mmt from 0.46mmt in September. The Tangguh LNG facility, however, reduced shipped LNG volumes by 0.08mmt (-13 percent) from 0.62mmt to 0.54mmt.

Meanwhile, Malaysia also saw monthly shipments increase by 0.35mmt (22 percent) from 1.58mmt in September to 1.93mmt in October. A relatively modest decrease in volume terms of 0.01mmt (-7 percent) to 0.13mmt at PFLNG Dua, as well as a more significant reduction of 0.07mmt (-54 percent) to 0.06mmt at PFLNG Satu, could only temper the concurrent boost to exports from Malaysia LNG by 0.43mmt (33 percent) to 1.74mmt. In a similar vein, Brunei had seen exports increase, with month-on-month shipments up 0.13mmt (38 percent) to 0.47mmt.



Source: LNG Journal

Russia & Peru

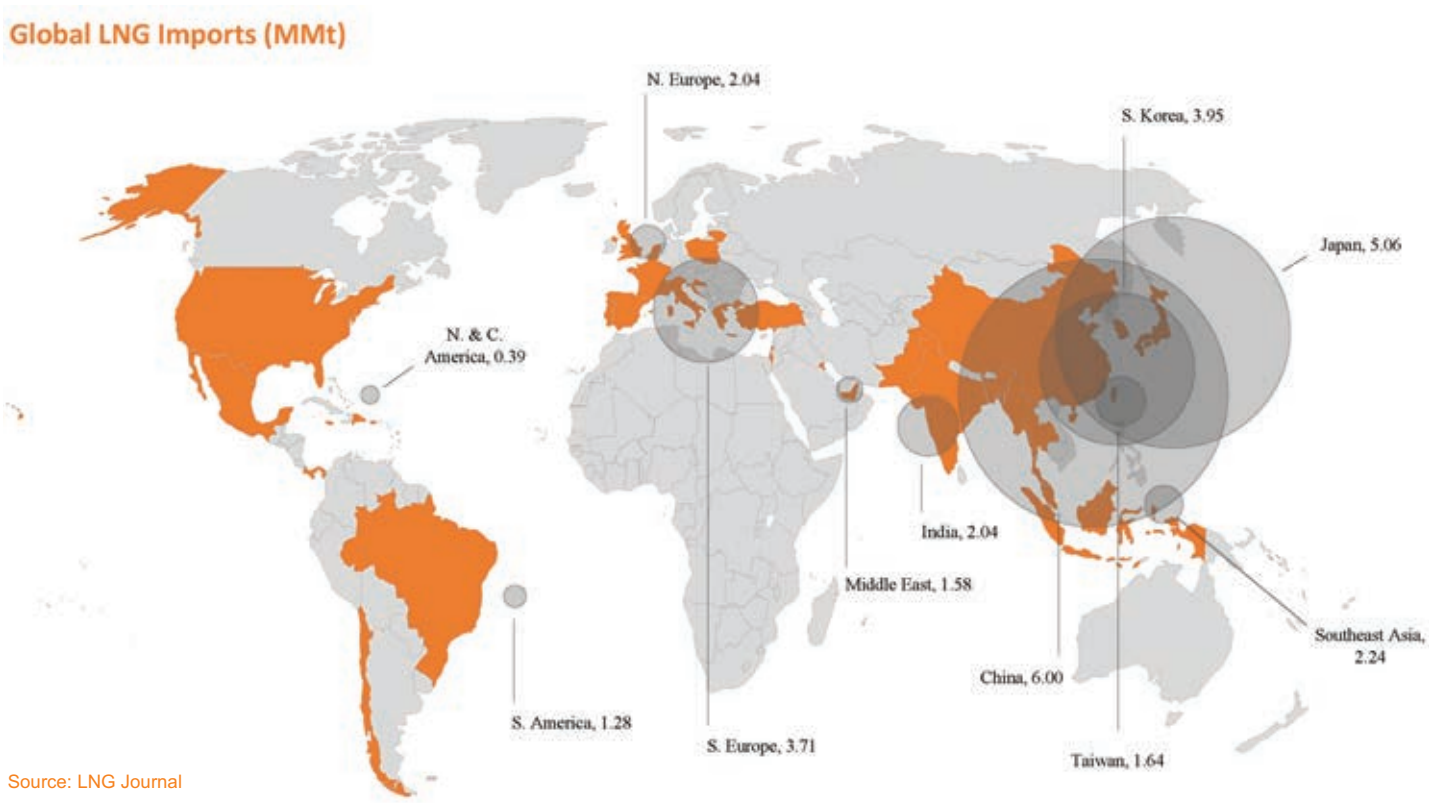
Elsewhere in the Pacific, Russia's Sakhalin-2 LNG grew shipments noticeably in October. The plant's exports amounted to 0.90mmt, up by 0.09mmt (11 percent) from 0.81mmt in September. The plant's October performance had been in large part due to more market share in Japan and Taiwan, which together imported 0.42mmt more from Sakhalin in October. This increase compensated for significantly fewer Sakhalin exports totalling 0.23mmt to South Korea and China. Meanwhile, Peru's Pampa Melchorita had continued export growth in October with shipments up by 0.28mmt (215 percent) to 0.41mmt from 0.13mmt in September.

Atlantic Basin

Alongside the Pacific, the Atlantic Basin's overall shipped LNG had increased by 0.65mmt (6 percent) month-on-month to 11.32mmt in October from 10.67mmt in September. This translated into annualised export capacity utilisation of 73 percent.

North Africa & Europe

The overall amount of LNG exported within the north-eastern part of the Atlantic – comprising the European Union, Russia and North Africa (and not including re-exports) – had seen a significant net increase of 0.42mmt (17 percent) month-on-month. Although the ongoing outage at Snøhvit LNG in Norway still weighed on the eastern Atlantic's overall exports, a significant net increase of 0.20mmt (25 percent) in Algeria contributed significantly to the net positive result for the North Africa-Europe region. Monthly shipments from Russia's Yamal LNG had also increased by 0.22mmt (13 percent) in October as a significant downturn in exports to China via the Northern Sea Route was compensated by higher shipments to the European Union. Accordingly, Yamal LNG's shipments to China were down 0.31mmt month-on-month (-45 percent) to reach only 0.38mmt in October compared to 0.69mmt in September. Notably, the Northern Sea Route only remains easily traversable during the warmer summer months. Whilst parts of the Yamal LNG-associated fleet are ice-capable, thicker ice reduces travel speed. Accordingly, Yamal LNG resorted to transshipments via Zeebrugge and the Suez Canal for exports to the Pacific Basin in the second half of October, our data show. Concurrently, net demand growth of 0.41mmt (65 percent) for Yamal LNG in Europe could be met along shorter and ice-free routes.



Source: LNG Journal

West Africa

Meanwhile, West African exports were down by 0.15mmt (-8 percent) as Equatorial Guinea, in particular, was not seen in the market in October, having exported 0.28mmt in September. The country's LNG plant at Punta Europa suffered an unspecified incident at one of its gas processing units on 26 September and subsequently suspended operations. Together with a slight reduction of 0.04mmt (-3 percent) to 1.14mmt in Nigeria, this represented an insurmountable hurdle for even robust export growth in Cameroon and Angola. The former grew shipped LNG volumes by 0.11mmt (220 percent) to 0.16mmt

whilst the latter expanded exports by 0.06mmt (21 percent) to 0.34mmt. Although West African exports also benefitted from higher European demand, this could not compensate for seasonal demand reductions in the Middle East and Southeast Asia.

Americas

Exports from the US Gulf Coast had seen significant net growth of 0.29mmt (4 percent) to 6.25mmt in October from 5.96mmt in September. Our data indicated the increase was mainly due to considerably higher exports of 0.28mmt (30 percent) to 1.21mmt by Freeport LNG, where a power outage caused by Tropical Storm Nicholas had hampered LNG production in September. Together with export growth totalling 0.20mmt at Cameron LNG and Elba Island LNG, this compensated for a combined export decrease of 0.19mmt (-5 percent) at Sabine Pass LNG, Corpus Christi LNG and Cove Point LNG. Whilst the Corpus Christi reduction was relatively minor at 0.02mmt, Sabine Pass and Cove Point each shipped roughly one cargo less in October. Whilst Sabine Pass exports were periodically hampered by bad weather, an expected shipment via the LNG Schneeweisschen from Cove Point was not carried out before the end of the month.

In South America, Atlantic LNG in Trinidad & Tobago had seen exports increase by 0.09mmt (20 percent) to 0.53mmt in October compared to the 0.44mmt we recorded in September. Atlantic LNG shipments continued their focus on Europe and the Atlantic side of South America whilst also expanding to the Far East, including Taiwan and Thailand, and away from the Caribbean.

Middle East

Exceeding even higher month-on-month Pacific and Atlantic Basin exports, shipments from Middle Eastern plants had grown by 0.90mmt (12 percent) from 7.65mmt in September to 8.55mmt in October. Accordingly, our data showed the Basin's overall utilisation of operational export capacity (i.e., excluding Yemen) to stand at 98 percent by the end of October.

As was already the case in September, month-on-month export growth in the region was underpinned by significantly higher exports from Egypt, where shipments by its Idku LNG plant were up 0.28mmt month-on-month. They thus had grown by 200 percent from 0.14mmt to 0.42mmt. Neighbouring Damietta SEGAS LNG, meanwhile, had increased exports by 0.14mmt (67 percent) to 0.35mmt at the time of writing. Overall, Egypt thus grew exports by 0.42mmt (120 percent) in October. Significant export growth to China, India and Turkey supported Egypt's October performance and compensated for a lack of exports to continental Europe.

Concurrently, Qatar saw significant month-on-month export growth of 0.41mmt (7 percent). Shipments to Kuwait and India had slumped and were down 0.99mmt (-80 percent). Shipments to China and South Korea were also down by 0.52mmt (-32 percent). This, however, was compensated by higher exports to Pakistan and Europe (the United Kingdom in particular) totalling 0.72mmt.

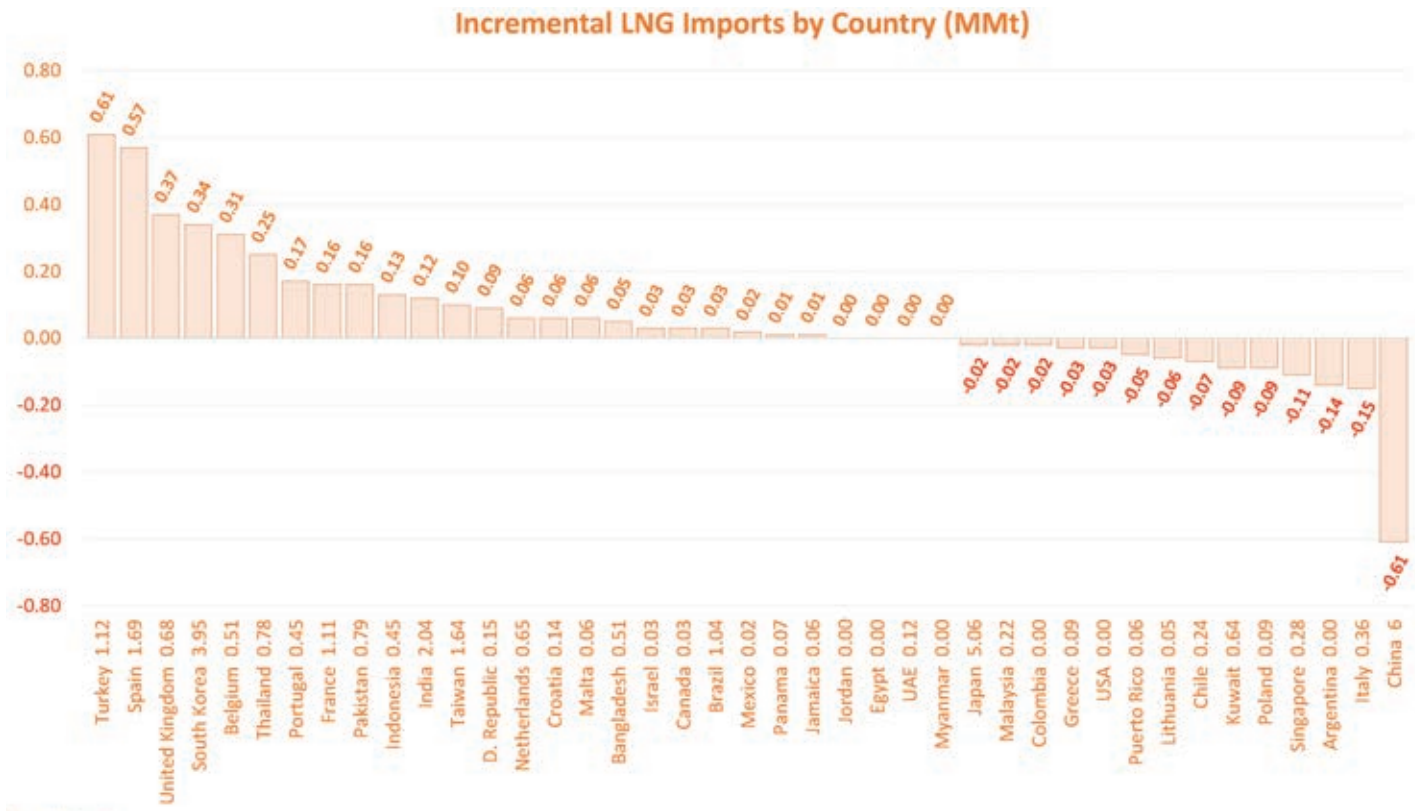
The country's fellow Persian Gulf producers in Oman and the UAE also saw overall monthly exports grow as they increased by 0.07mmt (6 percent). Higher exports to India, Japan and South Korea compensated for lower demand in China to constitute net growth for the month. Of the two Persian Gulf producers, Oman managed to increase exports by 0.01mmt (1 percent) to 0.75mmt in October. The UAE's Das Island plant, meanwhile, grew shipments by 0.06mmt (13 percent) to 0.53mmt.

Imports & Domestic Trade

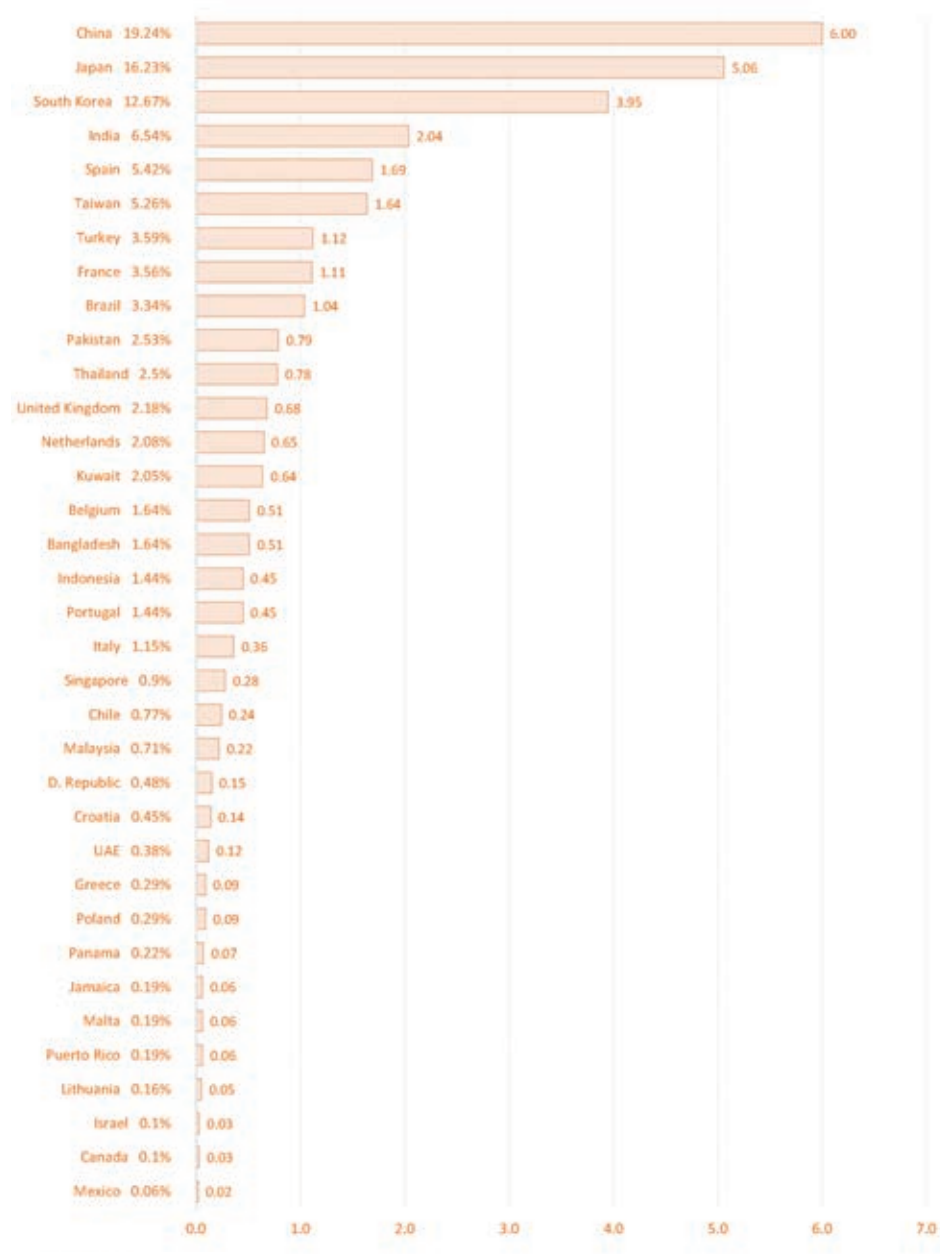
Global LNG imports equally saw a robust month-on-month increase in October, whereby the Atlantic Basin continued to lead demand growth with an increase of 1.97mmt (31 percent) whilst the Pacific Basin and the Middle East only showed comparatively modest increments of 0.16mmt (1 percent) and 0.10mmt (7 percent), respectively.

Pacific Basin

Month-on-month Pacific Basin imports had increased by 0.18mmt (1 percent) in October as China decreased offtakes by 0.61mmt (-9 percent) to 6.00mmt. This stood in stark contrast to South Korea's significant import increase of 0.34mmt (9 percent). Meanwhile, Japan, which had curtailed offtakes in September, kept



Source: LNG Journal



Source: LNG Journal

these broadly steady at 5.06mmt in October. India had also seen monthly demand increase by 0.12mmt (6 percent) to 2.04mmt in October. Elsewhere, in Southeast Asia, Malaysia's offtakes decreased by 0.02mmt to 0.22mmt (-8 percent), whilst at 0.45mmt Indonesia saw October demand increase by 0.13mmt (41 percent) from 0.32mmt in September. Finally, Taiwan added to Pacific demand growth with 0.10mmt (6 percent) more in imports in October, up from 1.54mmt in September.

In line with net Pacific demand growth, the roster of typically price-conscious Pacific buyers – including Bangladesh, Thailand, Chile, Mexico, Singapore and Myanmar – collectively saw imports net increase by 0.12mmt (7 percent) in October. This was primarily due to Thailand having imported 0.25mmt more alongside demand growth of 0.05mmt in Bangladesh and imports of 0.02mmt in Mexico. This growth, however, was tempered by the continued market absence of Myanmar. In addition, Chile curtailed imports by 0.07mmt (-23 percent) month-on-month to 0.24mmt from 0.31mmt in September. Singapore took in 0.11mmt less in October to reach 0.28mmt, a reduction of 28 percent from 0.39mmt in September.

Atlantic Basin

LNG imports in the Atlantic Basin received a boost by 1.97mmt (31 percent) to 8.41mmt in October from 6.44mmt in September, with annualised capacity utilisation at 37 percent.

A sharp increase in European offtakes was a primary factor in overall import growth – led by Turkey, Spain, the United Kingdom, Belgium and Portugal – which together had grown imports by 2.03mmt (84 percent) to 4.45mmt. Additionally, France, the Netherlands, Croatia and Malta showed more modest growth in volume terms of 0.34mmt (17 percent) in total. However, these increments were tempered by a South European offtake reduction totalling 0.18mmt (-29 percent) to 0.45mmt in Greece and Italy as well as a combined reduction of 0.09mmt (-31 percent) to 0.14mmt in Lithuania and Poland.

As to demand in the western Atlantic, importers in the Caribbean and South America – including Brazil, Jamaica, Puerto Rico and the Dominican Republic – saw monthly net LNG demand decrease by 0.07mmt (-5 percent) to 1.38mmt in October from 1.45mmt in September. Brazil remained the region's key importer in October, even as the country increased imports only moderately by 0.03mmt (3 percent) to 1.04mmt from 1.01mmt in September. October also saw demand growth in the Dominican Republic of 0.09mmt (150 percent) to 0.15mmt whilst Jamaica grew imports more moderately in volume terms by 0.01mmt (20 percent) to 0.06mmt. Panama also saw repeated demand for a single cargo, which constituted month-on-month growth of 0.01mmt (17 percent) to 0.07mmt. However, this growth was overshadowed by Argentina and Colombia exiting the market in October, having imported 0.14mmt and 0.02mmt in September, respectively. Moreover, Puerto Rico reduced imports by 0.05mmt (-46 percent) to 0.06mmt. Finally, there were no LNG imports in the United States or Canada.

Middle East

Meanwhile, Middle Eastern offtakes had increased by 0.10mmt (7 percent) to 1.58mmt in October from 1.48mmt in September. Whilst regional offtakes suffered from a slump in Kuwaiti imports by 0.09mmt (-12 percent) to 0.64mmt, Pakistan's Port Qasim terminal grew offtakes by 0.16mmt (25 percent) to 0.79mmt from 0.63mmt. Additionally, Israel's Hadera FSRU terminal was seen in the market with a 0.03mmt import. The facility had previously been absent since April. The UAE's Dubai FSRU, meanwhile, kept imports steady at 0.12mmt in October. Jordan's LNG terminal, however, continued its market absence. Accordingly, the Middle East's annualised import capacity utilisation stood at 33 percent in October. ■

Methane emissions in the spotlight

Contributing to the reduction of the thorny issue of methane slip and coinciding with the COP26 meeting in Glasgow, three Japanese companies have embarked upon a project to improve the situation. Technical Editor Ian Cochran reports.

Hitachi Zosen Corp, Mitsui OSK Lines (MOL) and Yanmar Power Technology (YPT) are involved in an initiative entitled 'Development of Methane Slip Reduction Technology from LNG Fuelled Vessels by Improving Catalysts and Engines'.

Hitachi Zosen was appointed the project's manager by the newly formed Japanese New Energy and Industrial Technology Development Organisation (NEDO) under the Green Innovation Fund.

As has been well documented, LNG fuel reduces CO2 emissions, but engines using gas can be prone to methane slip, where unburned fuel is expelled in the exhaust. Reducing methane slip is currently a pressing issue in engine design.

In this project, the partners aim to achieve a reduction in methane slip of more than 70% for LNG-fuelled vessels over a six-year period. During this period, the reduction will be achieved by combining methane oxidation catalysts and engine improvements.

YPT will also commission Namura Shipbuilding, together with Hitachi Zosen and MOL, to develop the technology and install the system on a coal carrier built at Namura and operated by MOL.

The partners said that they will work to establish the technology as soon as possible with a view to utilising carbon-recycled methane in future applications and reducing greenhouse gas emissions to zero by 2050.

IGU addresses emissions

The International Gas Union (IGU) has also joined the wider methane emissions debate saying that this issue will rise to new prominence.

One example is the US and EU's Global Methane Pledge. First announced in September, it was due to be formally launched at COP26.

It commits signatories to 'a collective goal of reducing global methane emissions by at least 30% from 2020 levels by 2030 and moving towards using best available inventory methodologies to quantify methane emissions, with a particular focus on high emission sources.'

Methane is the main component of natural gas (fossil or renewable), so is highly relevant to the global gas industry, however, renewable natural gas (biogas/biomethane) can also be an effective route for directly reducing methane emissions, the IGU explained.

Biogas production offsets methane emissions coming from other sectors, as well as CO2 emissions in energy, as it reduces fossil fuel consumption.

The IGU claimed that it has been a high profile advocate for continued quantification, documentation, and reduction of methane emissions amongst its members and beyond since at least 2016, when the IGU Group of Experts on Methane Emissions was first formed.

Mitigating methane emissions from operations is an opportunity to enhance the environmental and commercial case for gas even further. While safety was the primary initial motivating factor, the net result was a significant reduction of emissions throughout the global industry, the organisation said.

No two gas systems are the same around the world, and across the value chain – and while there can be significant, cost-effective reduction opportunities in some areas of the global energy system, others may be facing diminishing returns on reductions investment, if the baseline is already extremely low and near zero, for example.

Nevertheless, as the science and technology have been rapidly advancing and as environmental urgency strengthens, so has the industry's efforts to go above and beyond existing safety requirements. From individual targets to group initiatives, the gas industry has shown both commitment and action – often via voluntary and highly ambitious initiatives.

Some examples include: Global Methane Alliance targeting a 45% reduction by 2025; Oil and Gas Methane Partnership (OGMP) 2.0, aiming to promote tracking performance across operators; Methane Guiding Principles (MGP) collaboration between industry and supporting orgnisations; Oil & Gas Climate Initiative (OGCI), reaching its 2025 target to bring down methane emissions intensity to 0.25% early, and raising it to 0.2%.

The Global Methane Initiative is a broader organisation aimed at identifying and deploying practical and cost-effective methane mitigation technologies and methods across various sectors.

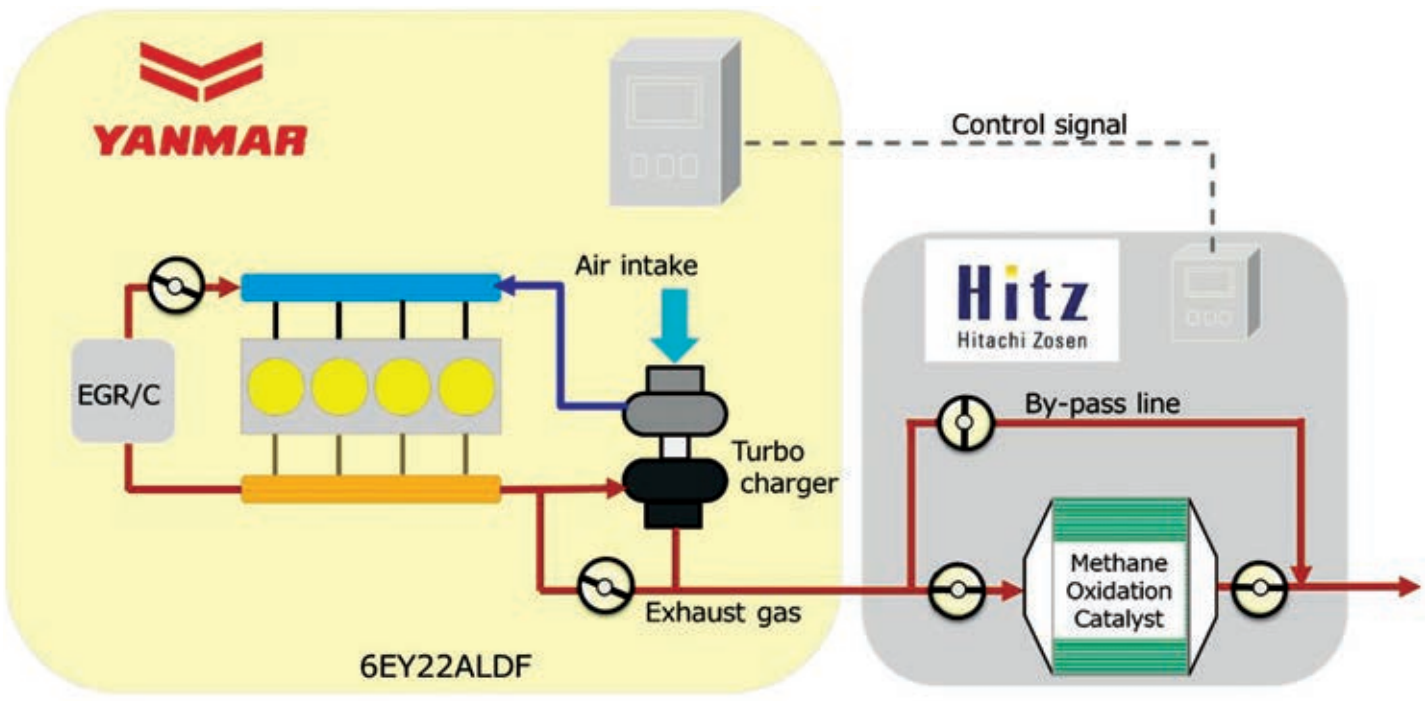
As Dr David Allen of the University of Texas said in the recent methane-emissions focused issue of the IGU GVG magazine, roughly 40% of global methane emissions occur naturally. The remaining 60% come from human activity, including energy systems, rice and other agriculture, livestock operations, landfills, waste treatment, and biomass burning.

The global gas industry contributes between 6% - 8% of the total atmospheric methane emissions, and about 13% of the man made portion. That is very significant, but often it seems that the gas industry is wrongly portrayed to be the only, or the main, source.

For example, the coal value chain emits about the same amount of methane, in addition to emitting more than double the CO2 and an order of magnitude more airborne pollutants when combusted. Agriculture is also a major source of methane emissions, and due to warming of the planet – some of the natural sources may be getting more significant (eg thawing permafrost).

So, the main goal of the global community should be achieving the maximum possible reductions in the shortest possible time – not unlike the Global Methane Pledge, which is a global, economy-wide goal. Economy-wide and outcome-oriented approaches to mitigating, including opportunities across sectors should be prioritised by policymakers, the IGU said.

In quantifying, documenting, and reducing gas sector emissions worldwide, what will help is a collective approach to achieving the greatest impact, including incentives for areas where operators are facing significant cost recovery challenges, and availability of capital for upfront investments – when they face liquidity barriers, the IGU said. ■



Methane slip reduction system

Permanent magnet machines popular with LNGCs

Yaskawa Environmental Energy/The Switch has supplied more than 100 permanent magnet machines (PMMs) for in-line shaft generators of various frame sizes since 2014. The Finnish-based company claimed to also have a large order backlog for large LNG and LPG carriers. Ian Cochran investigates.

"Using PMMs for electrical power generation is a game-changer in terms of greater efficiency, reliability and flexibility especially where slow steaming is a desired function," said Head of Product Line, Electric Machines, Jussi Puranen.

Shipboard electrical power generation has traditionally been performed by separate auxiliary gensets not connected to the main engine. One advantage of auxiliary gensets is that they don't require power electronics for frequency conversion when driven in constant-speed mode.

However, they have higher specific fuel-oil consumption (SFOC) compared to the main engine, and they can't run on cheap heavy fuel oil (HFO) without additional equipment – meaning higher maintenance.

One of the best alternatives to supercharge energy efficiency in line with the IMO's goal to drastically reduce emissions from shipping is to use variable-speed shaft generators, where electric power is produced by the vessel's 2-stroke main engine.

These have typically been electrically excited synchronous generators (EESG), where the EESG is mechanically connected to the main shaft and electrically connected to the ship's grid.

Connection to the power grid is either through a frequency converter or direct, in which case only fixed speed is possible. The EESG system is also complex, requiring additional kit such as a brushless exciter or slip rings and an automatic voltage regulator (AVR) to supply rotor current.

Crucially, losses in the rotor winding reduce efficiency, while EESGs are also physically large with high rotating inertia.

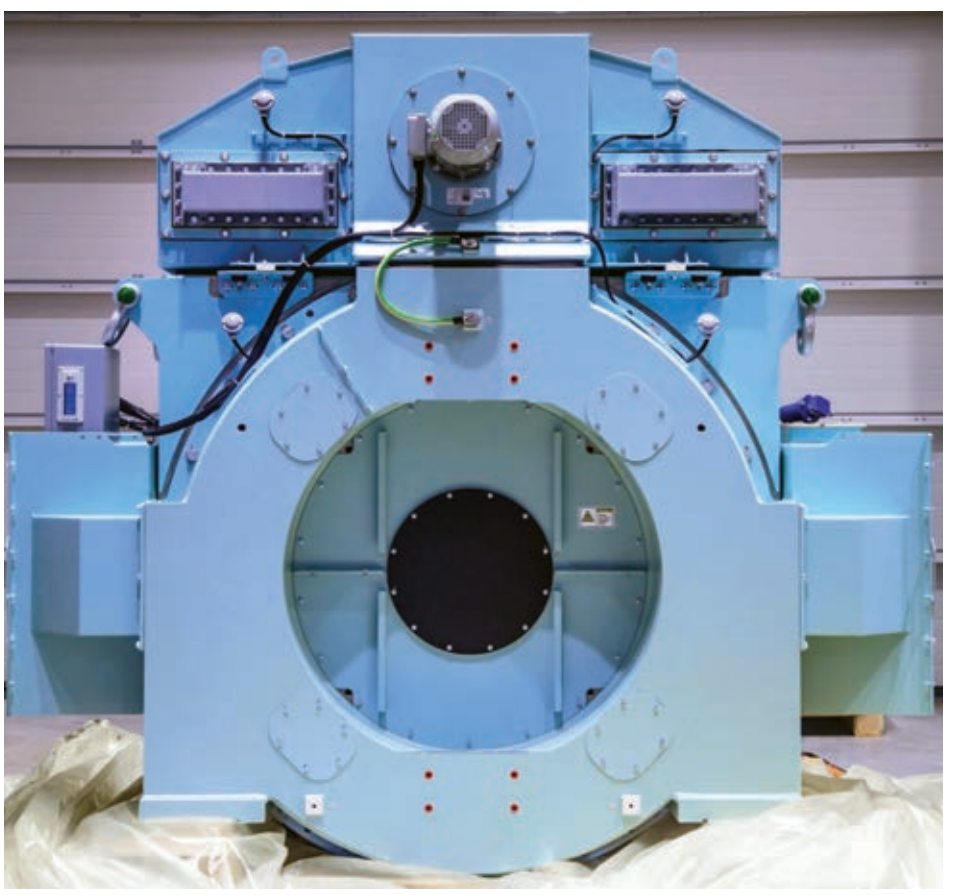
Step in PMM generators (PMG), which although invented a century ago have proven their worth and versatility in modern applications ranging from distributed power generation and wind turbines to elevators and hybrid cars.

Uptake in shipping has been quite slow, due to low awareness of their immense benefits but they're becoming increasingly popular.

Winning benefits

The company outlined why replacing direct-driven EESGs with PMMs provides the winning benefits of higher efficiency, reliability and flexibility.

No need for magnetisation - An EESG's magnetic field is produced with electromagnets that need external energy for magnetisation, lowering efficiency and increasing main-engine fuel burn.



PMM 1000M PM shaft generator

In contrast, PMGs feature strong Neodymium magnets that don't require external energy for magnetisation, resulting in 2%-3% higher efficiency across the entire operating range, meaning less fuel burn, lower emissions and overall reduced Opex.

Fuel burned in the main engine to produce electricity in EESGs often makes up more than 95% of overall generator lifetime costs, so this difference in efficiency can trigger huge lifetime savings.

Minimum components and maintenance - PMMs are much more compact and mechanically simpler in construction than EESGs, meaning greater long-term reliability and far less maintenance. There's no additional equipment needed, such as exciters, slip rings or AVRs to worry about that require maintenance and pose a risk of failure.

Dynamic performance - The third benefit is the PMM's extremely low inertia and weight, which is related to the simple rotor construction.

The EESG features a heavy solid-steel rotor with massive field poles and windings attached. In comparison, the PMG rotor is a hollow steel cylinder with magnets fixed on its surface.

This has direct positive effects on the dynamic performance of the whole shaft line, including torsional vibrations and design flexibility for the ship. They are lighter to handle and easier to accommodate, freeing up vital space, the company said.

Coupling a PMM with a frequency converter seamlessly gives the maximum amount of freedom in optimising engine and propeller efficiencies. Variable-speed operation combined with a controllable-pitch propeller results in the best overall efficiency since efficiency of both the main engine and propeller can be optimized separately depending on load conditions.

While the efficiency premium of PMM in geared, high-speed applications is typically only around 1% higher, compared to conventional machines, they have significantly better efficiency in partial load/slow-speed applications (also where induction [asynchronous] machines are used in shaft generators).

That's why they've become a standard choice in large LNG and LPG carriers that typically use in-line shaft generators.

Head of Product Line, Electric Machines, Jussi Puranen

"We've made it to over 100 in-line PMMs mostly for LNG and LPG carriers but also products tankers and car carriers, which is tremendous. People are starting to see what I call the 'magic' of permanent magnets and realising how it can accelerate the shift to enhanced performance and sustainability.

"We're targeting many more PMM-powered generators and direct-drive propulsion solutions in the coming years so the story will only get better," Puranen said.

In conversation with *LNG Journal,* he explained that all the projects have involved newbuildings and at the moment there is a boom in large newbuilding LNGC contracts.

"It usually makes more sense to build a completely new vessel with modern equipment installed. This will be a significantly better solution from a fuel consumption and greenhouse gas emissions point of view," he explained.

With LNGC average speeds of around 14.5 knots today, this so-called slow steaming is one of the most cost effective ways to reduce fuel consumption and emissions.

Since the propulsion power depends on the speed curve going from 19 knots to 14.5, this means an over 50% reduction in the necessary propulsion power.

This obviously has a huge impact on fuel consumption and emissions. "We have seen that reducing the vessel's design speed is becoming more and more common," he said. ■

Virtual pipelines to support LNG fuelled growth

Growth in floating liquefaction and regasification facilities will support a new wave of LNG fuelled infrastructure this decade, as operational efficiencies rapidly improve, according to engineering group Celeros Flow Technology

While virtual pipeline services have been in place in some remote locations for a number of years, the prohibitive cost of Floating Storage Regasification Units (FSRU) has limited the deployment to high-value projects or particular locations that can't be reached by other means.

Speaking to *LNG Journal*, Tommy Kassem, Chief Commercial Officer at Celeros Flow Technology, predicts that the use of FSRUs may be set to rise as industry begins to appreciate the importance of LNG in supporting global climate goals.

"Floating liquefaction and regasification facilities and the development of syngas and liquified hydrogen are all opening up new opportunities," Kassem explains, adding that the LNG sector has already proven "more resilient than other fossil fuel resources" in the aftermath of the global pandemic and key in supporting the energy transition.

Virtual pipeline systems

Indonesian oil and gas firm Pertamina is one of the energy players advancing the use of FSRU to create 'virtual' pipelines that connect regions that have until now struggled to receive gas.

"The key to gas development is infrastructure," Pertamina president director Nicke Widyawati commented, outlining plans to implement 469,000 new virtual pipelines in 2022.

This virtual pipeline system will involve a mixture of floating regasification units, combined with truck and rail delivery, and aims to meet gas demand in 41 cities, delivering nearly eight billion British thermal units per day to customers.

Through its subsidiary Perusahaan Gas Negara (PGN), Pertamina will collaborate with rail operator Kereta Api Indonesia (KAI) to expand gas uptake and reach a target of 22 percent share in the national energy mix by 2025. PGN now plans to conduct initial trials this year using KAI rail infrastructure.

In neighbouring Malaysia, state-owned energy group Petronas has likewise implemented ambitious plans to create a national virtual pipeline, via its regasification terminal in Pengerang, Johor state.

Adnan Zainal Abidin, CEO of Gas and New Energy at the firm, predicts that the VPS solution will drive natural gas demand growth across the country as the firm creates "a one-stop centre for off-grid customers, offering supply, loading facilities, and logistic services to meet the demand for cleaner energy nationwide".

In the first half of 2021, the firm announced it had completed a total of 180 VPS deliveries in Peninsular Malaysia, including nine LNG bunkering deliveries in the Straits of Malacca and its first LNG bunkering operation in Port Klang. The firm's VPS strategy involves a mix of floating vessels and trucks and is expected to support greater utilisation of gas by industries in hard to reach areas of Peninsular Malaysia. A pilot phase, launched last year, saw the first delivery of LNG to Continental Tyre Alor Setar Malaysia's manufacturing plant in Kedah state.

FSRU in Lampung

Azrul Osman Rani, managing director of Petronas downstream subsidiary PDB, states "we are excited to be the first LNG solution provider for industries in Peninsular Malaysia. As businesses continue to prioritise the sustainability agenda, our capabilities of on-road delivery will definitely be an advantage for companies that are looking to switch to a cleaner and cost-effective energy option."

Automation challenges

Despite the significant upside for cost and operational efficiency, careful roll-out will be key to success and Kassem of Celeros points out that the growing deployment of floating production and transportation facilities "presents challenges around maintenance, particularly on unmanned or normally unmanned platforms".

To tackle some of these challenges, Celeros has developed a Pig Stop and Bypass (PSB) mechanism, designed to avoid the need for repeated re-pressurisation in pipeline systems in remote locations.

"Generally, the pig launcher capacity is five to seven conventional pigs and is also capable of launching intelligent pigs. A Local Control Panel (LCP) for topside launchers provides the necessary control logic and status monitoring required to operate the MPL system [while] signals from the LCP are relayed to the control room," a spokesperson for the firm said.

Developed by Celeros' subsidiary brand GD Engineering, the system is integrated with an automated multiple pig launcher vessel. This allows multiple pigs to be preloaded and sequentially launched without the need to depressurize the vessel between pigging runs.

"The PSB therefore delivers benefits that include reduced maintenance time and costs, as well as improving safety in LNG operations," Kassem notes.

Tommy Kassem

Having joined Celeros in July this year, Kassem is keen to build on the firm's "longstanding legacy" and sees design innovation as a key component in the group's goal to add value for customers "at every step in the operational lifecycle". Bringing over 25 years of experience to the role, gained from a career spanning the energy industry, working with EPCs, end users, national and international companies, Kassem predicts that the need to monitor and maintain remote locations will become ever more important as new, complex LNG infrastructure develops and notes that as LNG facilities mature, "there may be a need to review or upgrade equipment: for example, in response to lower operating pressures, higher contamination levels or new regulations."

He notes that the firm also recently launched a new high-capacity filtration solution, which is more efficient at capturing contaminants and has a greater holding capacity, helping to improve operational efficiency, process efficiency and product quality, while reducing maintenance and operational costs.

Headquartered in Charlotte, North Carolina, Celeros comprises a portfolio of well-known brands, including: Clyde Union Pumps, M&J Valve, GD Engineering, Plenty, Copes Vulcan, Dollinger, OFM Services, Airpel and Vokes. The firm was spun-out from equipment manufacturing group SPX Flow last year. ■

There is new energy in the heart of the Mediterranean

OLT Offshore LNG Toscana is the company which manages the floating storage and regasification unit "FSRU Toscana". The Terminal is technologically innovative and well-advanced. It guarantees the maximum standards in terms of environmental sustainability and safety. "FSRU Toscana" is permanently moored off the Italian coast – between Livorno and Pisa – in the heart of the Mediterranean Sea. The Terminal has a maximum authorized regasification capacity of 3.75 billion Standard cubic meters per year and an LNG storage capacity of 137,100 cubic meters. New SSLNG service soon available.

oltoffshore.it

OLT Offshore LNG Toscana

For the Record

ABB, the Swiss-Swedish power systems company, said its turbocharging unit had won a contract to equip parts of the new propulsion systems for six liquefied natural gas carrier newbuilds ordered by four companies.

ABB Turbocharging will deliver its A200-L turbocharger brand for the engines of the vessels.

The Zurich-based company said its low-pressure, dual-fuel engine offered environmental benefits at reduced capital cost.

Its A200-L turbochargers will be used on the engines being supplied by MAN Energy Solutions, the Denmark-based subsidiary of the German engine-maker.

The MAN 5G70ME-C10.5-GA engines will be installed in six 174,000 cubic metres capacity LNG carriers ordered by four different shipowners, Korea Line Corp. and PAN Ocean of South Korea, Knutsen OAS of Norway and JP Morgan, the US-based bank and investment firm.

The newbuilds will be the subject of long-term charter agreements with Royal Dutch Shell.

ABB pointed out that the ME-GA is MAN's first low-pressure, dual-fuel, two-stroke engine and sits alongside MAN's well-established high-pressure M-Type Electronically Controlled-Gas Injection (ME-GI) engines.

The ME-GA, according to ABB and MAN, offers LNG carriers and other vessels an alternative way to cut greenhouse-gas emissions and minimize air pollution.

"Turbocharger performance is particularly important for dual-fuel engines. High turbocharging efficiency ensures that a high air-fuel ratio is maintained during high-load operations," said ABB Turbocharging.

"The A100/A200-L series is ABB's most advanced single-stage turbocharger technology for two-stroke engines, using the latest thermodynamic and aerodynamic expertise to pack the highest pressure ratios and efficiency currently available into a compact unit," it added.

ABB explained that the small footprint also translated into a lower cost of ownership as spare parts are smaller and more economical and the turbocharger itself is easier to handle for servicing.

"When engine designers and makers want reliable high performance to support new engine technologies, they look to ABB turbochargers," said Alexandros Karamitsos, Head of Global Sales Low-Speed Turbochargers, ABB.

"I am confident that shipowners will increasingly value our combination of technology leadership and global service coverage as incoming emission regulations encourage them to explore new fuels and engine concepts," stated Karamitsos.

AIR PRODUCTS has signed a $12-billion project financing and assets agreement for a gasification and power venture for Jazan Economic City with partners Saudi Arabia Oil Company (Aramco) and Saudi firm ACWA Power.

The venture was formed in 2018 to enhance the overall value of the Jazan refinery with the integrated gasification combined-cycle power to transform the Jazan Province by positioning Jazan for foreign direct investment.

"The consortium is expected to increase job opportunities and transfer the most advanced technologies in this field to the Kingdom, and enable Saudi talent to employ this technology for the first time," said a statement.

The US company, based in LeHigh Valley, Pennsylvania is also the leading supplier of LNG equipment for the majority of plants operating worldwide.

Recent Air Product orders have been for Qatar's LNG production expansion, Sempra Energy's Costa Azul LNG export terminal project in Mexico and the currently delayed Mozambique onshore project in Cabo Delgado province.

Air Products, Saudi Aramco and ACWA Power said they finalized a definitive agreement on asset transfer and to proceed with the air separation unit (ASU), gasification and power venture in Jazan.

Aramco via its subsidiary Saudi Aramco Power Company (SAPCO) has a 20 percent share in the venture, Air Products 46 percent, ACWA Power 25 percent and the US company's subsidiary Air Products Qudra 9 percent.

The venture is purchasing the ASUs, gasification, syngas clean-up, utilities and power assets from Aramco and will own operate the facility under a 25-year contract for a fixed monthly fee.

Aramco will supply feedstock to the venture and it will produce power, steam, hydrogen and other utilities for Aramco.

The venture serves Aramco's Jazan Refinery, a megaproject to process 400,000 barrels per day of the crude oil to produce the main products such as ultra-light sulphur diesel, gasoline and other products.

"With the completion of these definitive agreements, all parties under the joint venture expect asset transfer and funding to occur during the month of October 2021," the statement added.

"We are very proud to announce the finalization of the definitive agreements for this complex transaction and now move forward," said Air Products Chairman, President and Chief Executive Seifi Ghasemi.

"This is a perfect fit with our growth strategy. It is a value-creating investment for Air Products and leverages our core syngas purification and industrial gas production capabilities," stated Ghasemi.

"Most importantly, it is a privilege to further strengthen our relationship with Aramco, the world's largest company, and to partner with ACWA Power and Qudra Energy in this megaproject,' he added.

Mohammed Al Qahtani, Senior Vice President of Downstream Aramco, said he was very pleased to reach this significant agreement.

"Aramco originally built the world's largest integrated gasification combined cycle (IGCC) complex to employ gasification technology for the first time in the Kingdom and to keep pace with the development of the Kingdom's Southern Province industrially and economically," explained Al Qahtani.

"This venture is meant to be central to the self-sufficiency of our megaprojects at Jazan. We believe it will enhance the overall value of the refinery and the integrated gasification combined-cycle power and aid in transforming the province by positioning Jazan Economic City for additional foreign investment and private sector involvement," he added.

Al Qahtani noted that the Saudi Industrial Development Fund (SIDF) and 23 local and international lenders engaged in this transaction securing a total of $7.2Bln.

"The successful financial agreement is the largest of its kind in ACWA Power's history and highlights our continued firm commitment to the Kingdom's strategic goals for the energy sector," said Mohammad Abunayyan, Chairman of ACWA Power.

"A monumental shift is underway in Saudi Arabia's energy sector, and we are proud of our partnership and close collaboration with Aramco and Air Products towards diversifying the energy mix and increasing the efficiency of the sector," added Abunayyan.

CHART Industries, the US manufacturer of LNG liquefaction, storage and other cryogenic equipment serving the energy and industrial gas markets, has signed an accord with Canada-headquartered Ionada to pursue carbon-capture and sequestration (CCS) projects for the maritime and power sectors.

Ionada is a developer of exhaust-gas cleaning systems that reduce emissions in shipping and power plants. The accord with Chart will bring together Ionada's technology and Chart's expertise in carbon-dioxide storage and handling systems.

Atlanta, Georgia-based Chart is also a market leader in supplying US Gulf Coast large-scale LNG export projects, including Venture Global's Plaquemines plant on the banks of the Mississippi River, Cheniere Energy's Corpus Christi expansion in Texas and Tellurian's Driftwood venture in Louisiana.

The company is also developing New York-based New Fortress Energy's FastLNG production plans, while demand for Chart's LNG vehicle tanks, fuelling stations and trailers has increased worldwide.

In moving into the CCS sector Chart and Ionada envisage making use of the US company's onboard storage capabilities via its CO2 ISO containers or in engineered built-for-purpose type-C tanks and with the CO2 then offloaded at ports.

"Once offloaded, the CO2 can either be permanently stored in geological formations or put to beneficial use in CO2-consuming industries, such as the agricultural, industrial, energy or food and beverage sectors," the companies explained.

"We are thrilled to partner with Ionada to help improve the carbon footprint of the shipping industry," said Chart Chief Executive Jill Evanko.

"The solutions being developed with Ionada will greatly benefit the maritime sector and help ship owners reach greenhouse-gas emission targets set forth by the International Maritime Organization," added Evanko.

"This is also a great example of how our equipment is agnostic to the process itself

- it can work with various process solutions to offer the most flexibility to our end customers," stated the Chart CEO.

The IMO aims to reduce carbon intensity in international shipping by 40 percent by 2030, and to cut the total annual GHG emissions from international shipping by at least 50 percent by 2050 compared to 2008.

With cryogenic storage tank manufacturing sites all around the world, including the US, China, the Czech Republic, Italy and India, Chart said it was well positioned to supply CO2 storage and handling solutions to shipowners globally.

CHENIERE ENERGY, the largest US liquefied natural gas exporter from plants at Sabine Pass in Louisiana and Corpus Christi in Texas, has signed a sale and purchase agreement with ENN Group, the leading non-state energy company in China with LNG and growing city-gas assets.

The ENN LNG marketing unit based in Singapore will purchases 900,000 tonnes per annum of LNG from Cheniere Marketing on a free-on-board basis for a term of 13 years beginning in July 2022.

The purchase price for the LNG is indexed to the US benchmark Henry Hub price, plus a fixed liquefaction fee.

Acting as guarantor of the agreement will be the natural gas units in the ENN Group, which owns the Zhoushan LNG import terminal in the Zhejiang Free Trade Zone in eastern China.

"We are pleased to announce this long-term LNG contract with ENN, a major player in China's rapidly growing natural gas market, and we look forward to a successful, long-term relationship with ENN as a customer," said Jack Fusco, Cheniere's President and Chief Executive.

"This SPA underscores the strength of the global LNG market, particularly in China, and highlights Cheniere's role as a leading global supplier,' added Fusco.

The CEO noted that the deal further advanced Cheniere's commercial momentum in anticipation of the final investment decision expected in 2022 on expanding the Corpus Christi facility.

Wang Yusuo, Chairman of ENN Natural Gas, was embarked on the cleaner energy path with industry reforms and structural adjustment of energy consumption.

"It is expected that the two parties will seize the opportunity of this cooperation to establish a strategic relationship, to provide clients with high quality resources and services," said Wang.

ENN, whose shares are listed in Hong Kong, said in its latest earnings that first-half revenues had increased 30 percent to the equivalent of US$6.38Bln.

ENN now has a total of 239 city-gas franchises in 20 different regions and provinces in areas such as in Beijing, Fujian, Guangdong, Shanghai and Tianjin, with a connectable population of 117 million.

Since the start of 2021, ENN has acquired more exclusive operating rights in four more city-gas projects, the Ruyang Industrial area in Henan province, Lvsigang Town in Jiangsu province, the Lantang industrial new town in Guangdong province and the industrial area of Chizhou in Anhui province.

COPELOUZOS Group of Greece has signed contracts for the implementation of a gas-fired combined-cycle power plant planned for the eastern Greek port of Alexandroupolis where an offshore LNG import terminal is planned.

Copelouzos said the contracts were for the supply and the long-term maintenance of the main equipment for the 840-megawatts facility being developed along with Greece's Damco Energy SA and General Electric of the US.

The floating LNG terminal is a separate project from the onshore power plant and is being developed by Greek company Gastrade.

The Alexandroupolis LNG floating storage and regasification unit will have storage capacity of 170,000 cubic metres and regasification capacity of at least 5.5 billion cubic metres of natural gas per annum.

The FSRU will be moored in an offshore area about 17.6 kilometres southwest of the port of Alexandroupolis.

The floating unit will be connected to the Greek National Natural Gas Transmission grid through a pipeline system of a total length of 28km.

Copelouzos said that for its power plant project the company subsidiary Ilektroparagogi Alexandroupolis SA will be responsible for the implementation of the investment and construction will start before the end of 2021 and be completed by the spring of 2024.

Copelouzos added that the building of the gas-fired plant would strengthen the local economy as well as when operation start.

"During the construction 600 people are going to be employed, while it is estimated that 90 permanent job positions will be created during the whole lifetime of the project," explained Copelouzos.

"In addition, and in conjunction the other projects of the Copelouzos Group, the unit will make the area of Alexandroupolis an energy hub, a fact that will attract further investments and result in economic growth and prosperity of the greater area," it stated.

DOMINION Energy, the US utility and former operator of the Cove Point LNG export plant in Maryland, has signed a definitive agreement to sell Questar Pipelines to Southwest Gas Holdings in a transaction valued at $1.97 billion after a previous sale to Warren Buffet's Berkshire Hathaway Energy was cancelled.

The pipeline sales deal includes the assumption of $430 million of existing Questar debts.

Questar Pipelines consists of long-term contracted, transportation and underground storage assets in the states of Utah, Wyoming and Colorado, together with related services and processing entities.

The assets in the states are regulated by the Federal Energy Regulatory Commission.

Dominion had previously agreed to terminate the planned sale of Questar to the Warren Buffet company Berkshire Hathaway Energy as part of a package that also included other assets such as the operatorship of Cove Point LNG.

That decision was a result of ongoing uncertainty associated with achieving clearance for the Questar Pipelines portion of an overall assets deal because of Federal Trade Commission under antitrust laws.

Dominion, based in Richmond, Virginia, said the Questar transaction was expected to close in the fourth quarter of 2021, subject to regulatory approvals.

"We are pleased with the result of our sale process for these high-quality assets," said Robert M. Blue, Dominion Energy Chairman, President and Chief Executive.

"This transaction represents another significant step in our evolution as a company, allowing us to focus even more on fulfilling the energy needs of our utility customers and continuing growth of our clean-energy portfolio, including development of the largest offshore wind farm in North America," added Blue.

The first two pilot wind turbines are currently in operation for Dominion off the coast of Virginia and were the first installed in US federal waters. The final project is expected to include a huge cluster of more than 180 giant turbines.

Proceeds from the sale of Questar Pipelines will be used by Dominion Energy to reduce parent-level debt, including retiring the 364-day term loan that was entered into in July, which Dominion Energy previously used to repay the approximately $1.3Bln transaction deposit made by Berkshire Hathaway Energy.

"Proceeds from the sale of Questar Pipelines will also be used to support Dominion's robust regulated capital plan," said Dominion.

A July 2020 deal between Dominion and Berkshire Hathaway was valued at $9.7Bln and included gas transmission and gas storage assets as well as the Cove Point stake, which gave the Buffett company operatorship of the LNG export plant.

Cove Point produces around 5.2 million tonnes per annum from a single Train and has tolling agreements with Gas Authority of India and Sumitomo Corp. and Tokyo Gas of Japan.

While Berkshire Hathaway controls Cove Point LNG and is the operator, another 25 percent of the liquefaction and export plant is already owned by Brookfield Asset Management of Canada under a deal finalized in October 2019.

As part of the original transaction, Berkshire Hathaway also acquired 100 percent of Dominion's Carolina Gas Transmission and 50 percent of Iroquois Gas Transmission.

After the closing of the main parts of the transaction in late 2020 Dominion still retained a 50 percent passive stake in Cove Point.

Dominion has more than 7 million customers in 16 states and is supplying homes and businesses with electricity or natural gas.

ELENGER, the energy company in the Baltic state of Estonia, has taken delivery of the first of a Damen Shipyard-built liquefied natural gas bunkering vessel, the first LNG fuel supplier deployed in the Gulf of Finland to serve ships and shoreside small-scale customers.

The "Optimus" is 100-metres in length with 6,000 cubic metres of capacity in two type-C tanks.

The deployment of the ship involved multinational efforts from project

participants in China, Estonia, Russia, the Netherlands and France.

"Its introduction is expected to accelerate the wider adoption of LNG as a cleaner alternative fuel in the Baltic Sea by providing a mobile and efficient ship-to-ship distribution service for the first time," said Elenger.

The vessel loaded LNG in the port at Vysotsk island in Russia and headed to Tallinn in Estonia.

The bunkering vessel was built in China at the Damen Shipyard in Yichang City, located on the left bank of the Yangtze River.

The construction was overseen by French classification society Bureau Veritas.

Gas trials for the "Optimus" were completed in the Damen Verolme shipyard in the Dutch port of Rotterdam.

The owner of the "Optimus" is Estonian investment company Infortar and Elenger is the charterer.

"Optimus is designed to meet the requirements of ICE class 1A certification and to achieve green ship notation," said Elenger.

"A dual-fuel propulsion system is used for the management of the boil-off gas in combination with a gas boiler system, and the interior of the vessel features high-quality accommodation for her crew," added the company.

"With this first LNG bunkering vessel, Elenger has significantly expanded its LNG distribution business in the Baltic region," said the company.

It has been supplying one of the leading regional ferry companies, Tallink Group, for the past five years, refuelling its LNG-fuelled RoPax ferry "Megastar" using multiple specialist trucks.

The "Megastar "will be one of the first beneficiaries of the arrival of "Optimus", followed in spring 2022 by Tallink's new LNG-fuelled RoPax ferry "MyStar".

Ain Hanschmidt, Chief Executive of the Estonian-based owners, investment firm Infortar, said its strategy is to invest in safe and sustainable LNG supply for various maritime customers in the Gulf of Finland region.

The construction of the "Optimus" was supported by the European Union Connecting Europe Facility (CEF) funding programme and was co-financed by the leading financial services group in Finland, OP Financial Group.

ENI of Italy has achieved the start-up of the Cabaça North project offshore Angola as the southwest African nation has also just awarded nine onshore licences to 14 companies for blocks in the Congo River basin and a basin further to the south.

Milan-based Eni, which is also a shareholder in the Angola LNG project using associated gas from offshore oil fields, said it started production from Cabaça North in Block 15/06 of the Angolan deep offshore via the Armada Olombendo Floating Production Storage and Offloading (FPSO) vessel.

"The start-up of Cabaça North is yet another example of how Eni Angola keeps creating value on Block 15/06 through its infrastructure-led exploration strategy, generating a pipeline of fast-track subsea tie-backs," said Eni.

The Cabaça North development, with an expected peak production rate in the range of 15,000 barrels of oil equivalent per day, will increase and sustain the plateau of the Armada Olombendo, a zero-discharge, zero-process flaring FPSO with an overall capacity of 100,000 barrels equivalent per day.

This is the second start-up achieved by Eni in Angola in 2021 after the Cuica block early production was achieved in July 2021.

A third start-up is expected within the next few months, with the Ndungu field in the Western area of Block 15/06.

Block 15/06 is operated by Eni with a 36.84 percent share. Sonangol Exploration and Production (36.84 percent) and SSI Fifteen Limited (26.32 percent) compose the rest of the joint venture.

Angola is the second-largest oil producer in Sub-Saharan Africa and uses associated gas to produce LNG as a clean energy source at its liquefaction plant, operated by the main shareholder, the US major Chevron Corp.

The other shareholders with Chevron, Eni and Angola's state-owned Sonangol are BP of the UK and France's TotalEnergies.

The Angola LNG plant is located 350 kilometres north of the capital Luanda in Soyo, at the mouth of the Congo River, and is one of the world's most modern LNG processing facilities.

A pipeline network of over 500 kilometres delivers gas from offshore oil fields to the Soyo plant designed to process 1.1 billion cubic feet of natural gas per day and produce 5.2 million tonnes per annum of LNG.

In addition, Angola's energy regulator, the National Agency for Petroleum, Gas and Biofuels (ANPG), has awarded nine onshore exploration and production licences, mostly to domestic bidders.

The companies are mostly headquartered in the capital Luanda.

Three licences were awarded for the Lower Congo Onshore Basin in the north of the country and six licences for the Kwanza Onshore Basin further south.

There were 14 different bidders and all received stakes in at least one basin.

The companies in the list are Alfort Petroleum, Brite Oil and Gas Ltd, state-owned Sonangol Exploration and Production, Somoil, Africa-focused Intank Group with offices in the UK and the US, Monka Oil, Miti Energy, Upite Oil Co., Omega Risk Solutions, Prodoil, Angola Integrated Services, Grupo Simples, Prodiaman Oil Services and Service B.

The three Lower Congo Onshore Basin blocks and winners are:

Block Con 1 operator Somoil with a 40 percent stake; shareholders Intank Group (40 percent), Monka Oil (10 percent) and Omega Risk Solutions (10 percent).

Block Con 5 operator Miti Energy (50 percent); Prodoil (15 percent, Prodiaman Oil Services (11.67 percent), Upite Oil Co. (11.67 percent) and Service B (11.67 percent).

Block Con 6 operator Mineral One (35 percent); jointly with Somoil (35 percent), Angola Integrated Services (20 percent) and Prodoil (20 percent).

The six onshore Kwanza Onshore Basin winners are:

Block Kon 5 operator Miti Energy (60 percent); Sonangol E&P (20 percent), Monka Oil (10 percent) and Grupo Simples (10 percent).

Block Kon 6, operator Grupo Simples (50 percent); and with Miti Energy (50 percent).

Block Kon 8 operator Alfort (50 percent); with stakeholders Grupo Simple (20 percent), Miti Energy (20 percent) and Monka Oil (10 percent).

Block Kon 9 operator Angola Integrated Services (60 percent); Grupo Simples (10 percent) and Brite Oil and Gas Ltd (20 percent).

Block Kon 17 operator Miti Energy (60 percent); Brite Oil and Gas (20 percent) and Mineral One (20 percent).

Block Kon 20 operator Miti Energy 50 percent); with Brite Oil and Gas (50 percent).

FLUXYS Belgium, the gas transmission and Zeebrugge liquefied natural gas import terminal operator, posted increased first-half net profits as ship traffic remained strong and truck-trailer LNG loadings almost doubled.

While regulated turnover declined by around 2.2 percent to €277.9 million ($324.7M) versus €284.2M in the first half of 2020, the company's net profits rose by just over 4 percent to €38.3M compared with €36.6M in the prior-year period.

"The change in regulated turnover and net profit is mainly due to the evolution of the different components to be covered by the regulated tariffs," explained Fluxys.

Fluxys reported that shipping traffic at the LNG terminal remained strong, at a similar level to that of the busy first half of 2020.

"The number of large vessels that docked for trans-shipments was lower while significantly more small ships came to load LNG," said Fluxys.

The company noted that additional send-out capacity was fully booked.

"In early 2021, the LNG terminal successfully completed the open season for additional regasification capacity," said Fluxys.

"The offered capacity of approximately 10.5 GWh/h was fully booked. In the light of this success, the final investment decision was taken to build the necessary additional infrastructure at the terminal," the company stated.

Four extra truck-loading bays are now also under construction.

Fluxys said the first half of 2021 saw a sharp increase in demand for LNG as a low-carbon fuel for ships and trucks.

"The LNG terminal loaded a total of 3,200 LNG trailers, almost double the number loaded in the same period the previous year," said Fluxys.

"The number of loading operations is expected to increase to around 6,000 this year," it added.

Fluxys explained that taking into account the current utilisation rate, the existing truck-loading bays at the LNG terminal were gradually approaching their maximum capacity.

"As there is considerable market interest in booking even more loading slots in the future, four extra truck-loading bays are being built," said the company.

"They will ensure that the market can continue to rely on sufficient loading capacity to meet growing demand. The new truck-loading bays are scheduled to be commercially available in 2024," Fluxys declared.

The LNG terminal has also made available bio-LNG. The Zeebrugge

terminal has been officially certified to make bio-LNG available.

Bio-LNG is carbon-neutral and offers both truckers and shipping companies the opportunity to move towards full decarbonisation.

"In consultation with the market and the federal energy regulator CREG, a regulated service package is being developed to this end and we expect that customers will soon be able to book capacity for bio-LNG," stated Fluxys.

On the storage front, a tariff reduction was worked out in consultation with the market and CREG and the costs of storage services have been reduced by 30 percent since July 2021.

"The tariff reduction has no impact on Fluxys Belgium's results. In response to the evolving needs of the market, we have also developed a new commercial approach to storage, offering simplified products, greater flexibility and innovative sales mechanisms," said Fluxys.

Fluxys added that it had set itself the objective of halving its own greenhouse-gas emissions by 2025 compared with 2017 levels.

"The implementation of the various programmes launched to further cut emissions from the operation of our infrastructure has reached cruising speed and we are on schedule to meet the 2025 target," said the company.

Fluxys has also made the decision to build three additional regasifiers with seawater to increase the send-out capacity at the Zeebrugge terminal.

"Using the heat from seawater to regasify LNG will significantly reduce the terminal's energy consumption and emissions. Construction is scheduled to be completed in 2023," it said.

In the Fluxys gas transmission segment volumes were down. The volumes transported through the network were almost 10 percent lower than in the first half of 2020.

Border-to-border volumes fell by close to 22 percent to 98.5 terawatt hours and the volumes for consumption on the Belgian market rose by around 10 percent to approximately 108 TWh.

Transmission to distribution system operators increased by almost 22 percent (60 TWh), reflecting the lower temperatures. Offtake by directly connected industrial companies fell by around 5 percent (24 TWh).

There was a slight increase (0.2 percent) in transmission volumes for natural gas-fired power plants, taking these volumes to 24 TWh.

GASLOG Ltd, which controls an LNG carrier fleet of 35 vessels, has made its first major foray into the debt securities market to lower interest on financing since the merger in mid-2021 with a unit of giant US investment US fund BlackRock.

GasLog Ltd entered into a Note Purchase Agreement with the US investment funds, the Carlyle Group and EIG Global Energy Partners, for a $325 million credit facility.

The Notes carry an interest rate of 7.75 percent and are due in 2029.

Carlyle's global credit platform made the investment with capital primarily from its Infrastructure Credit Fund.

EIG extended its funding through various funds and accounts in the investment group's direct lending division.

"GasLog anticipates drawing down the Facility in March 2022. The proceeds of the facility will be used to refinance the company's 8.875 percent Senior Notes due in March 2022," said GasLog.

"Any remaining proceeds may be used to pay transaction costs and expenses incurred in connection with the private placement and/or general corporate purposes," added the company, whose corporate headquarters are in Hamilton, Bermuda and operational base is in the Greek port of Piraeus.

GasLog completed a merger in June 2021 with BlackRock's Global Energy and Power Infrastructure division and de-listed its common shares from the New York Stock Exchange.

The GasLog's ownership structure has three main shareholders in parent GasLog Ltd and subsidiary GasLog Partners LP.

The Greek Livanos family owns 55 percent, the Monaco-based Onassis Foundation holds 12 percent and BlackRock Global Energy and Power infrastructure fund (GEPIF) owns 45 percent.

The GasLog Ltd, whose Chairman remains Peter G. Livanos, has an LNG fleet comprising 20 vessels, 12 dual-fuel, seven tri-fuel, diesel electric (TFDE) and one steam-turbine carrier.

GASLOG PARTNERS, the Greek LNG shipping company with a fleet of 15 vessels, reported a third-quarter increase in revenues and profits as global demand gathered pace.

The Partnership said income jumped 11 percent to $80.53M from $72.8M in the same quarter to the end of September in 2020.

Quarterly profit, adjusted profit and adjusted gross earnings (EBITDA) amounted to $26.5M (up 123 percent year-on-year), $24.7M (up 92 percent) and $57.3M (up 22 percent) respectively.

"I am pleased to report a strong operational and financial quarter for the Partnership," said Paolo Enoizi, Chief Executive.

"Our fleet performed with nearly 100 percent uptime, while our revenues and cash flows improved significantly from the second quarter," added Enoizi.

The New York Stock Exchange-listed limited partnership controlled by the GasLog parent company also extended the charter of the 155,000 cubic metres capacity carrier "GasLog Santiago" commodities firm Trafigura.

Under the agreement, Trafigura's Maritime Logistics unit would use the 2013-built tri-fuel, diesel-electric (TFDE) vessel for additional 12 months after the current charter ends in December 2021.

During the third quarter, GasLog Partners repaid $36.1M of debt, bringing the total amount of debt retired in the first nine months of 2021 to $90.9M.

"Our capital allocation priorities for 2022 remain focused on reducing our leverage and improving the cash break-even of our fleet," stated the CEO.

At the end of October GasLog Partners said it completed the sale and lease-back of the "GasLog Shanghai", with 155,000 cubic metres capacity, to China Development Bank Leasing.

"The completion of the transaction released $20.1M of incremental net liquidity (net sale proceeds less debt prepayment) to the Partnership, while the vessel remains on its charter with a subsidiary of Gunvor Group," the company said

The company also reported that spot rates for TFDE LNG carriers averaged $58,000 per day in the third quarter, a 38 percent increase over the $42,000 per day average in the third quarter of 2020.

Headline spot rates for steam turbine propulsion vessels averaged $41,000 per day in the third quarter, 46 percent higher than the average of $28,000 per day in the same period of 2020.

GasLog noted that headline spot rates in the third quarter benefited from LNG demand growth from Asia as well as longer than average wait times at the Panama Canal.

GasLog reported that as of the end of October London-based brokers Clarksons assessed headline spot rates for TFDE and Steam LNG carriers at $160,000 per day and $112,500 per day, respectively.

"Forward assessments for LNG carrier spot rates indicate rising spot rates through the remainder of the year and expectations for rates to remain above mid-cycle through the first quarter of 2022," said GasLog.

GASUM, the state-owned Finnish company and the largest Nordic LNG supplier and developer, has opened a new natural gas filling station in Trondheim in Norway as it continues to build out the network linking towns, regions and nations with clean fuel outlets for vehicles.

"The station has an ideal location in the middle of a logistic hub for heavy-duty traffic. It integrates Gasum's gas filling station network in the Oslo region together with northern parts of Sweden such as Östersund and Umea," said Gasum.

The Gasum facility offers LNG and compressed natural gas (CNG) in response to the growing demand for low-emission fuels in Norway.

The exact location of Gasum filling station is Østre Rosten 108, 7075 Tiller. The station is public and is open to all trucking companies seeking vehicle fill-ups.

"The new station is ready to serve both logistic companies operating in the region and long-haul traffic from Oslo through Trondheim all the way to Sweden," explained Gasum.

"The station is located in the Heggstadmoen logistic hub and is an integral part of Gasum's expanding Nordic gas filling station network," said the company.

"In its current state, the network of stations already enables the market growth of gas in the heavy-duty segment," it added.

The new gas filling station is part of a cooperation agreement between Gasum and the Norwegian retail chain Coop.

It will also be used to supply Coop with renewable biogas for its transport partners and help reduce emissions from heavy-duty trucks.

"We are very excited to see our joint efforts with Coop be realized, and the station open and supplying the area's logistic actors with biogas and natural gas," said John Melby, Director Traffic Norway at Gasum.

"By expanding the Nordic gas filling station network, we can also provide new opportunities for local companies to substantially lower their emissions," he explained.

"This is Gasum's northernmost gas station in Norway and, as such, will open new routes for companies driving on gas," stated Melby.

HOEGH LNG Partners, the US affiliate of Höegh LNG Holdings now partnered with the infrastructure unit of US investment bank Morgan Stanley, has reorganized part of its finances on a floating storage and regasification unit deployed in Indonesia and the subject of a dispute with the former charterer.

Höegh LNG Partners has entered an accord for the commercial tranche of the loan on the Indonesian floating terminal, "PGN FSRU Lampung", to allow for more time to conclude an overall refinancing.

"The lenders have agreed to defer the maturity date of the commercial tranche from September 29, 2021 until January 14, 2022," said Höegh LNG Partners.

"Subject to commitment letters and a term-sheet for a refinancing of the commercial tranche being in place by December 29, 2021, the maturity date will automatically be further deferred to March 29, 2022," it added.

Höegh LNG Partners said that notwithstanding the outcome of previously announced notice of arbitration served by the charterer on August 2, 2021, both parties have been continuing to perform their respective obligations under the lease and maintenance agreement for the "PGN FSRU Lampung".

Indonesian state-owned gas company, PT Perusahaan Gas Negara (PGN), a unit of national oil and gas company Pertamina, is the charterer in question and has entered the arbitration process.

The vessel is the subject of a 20-year charter deal with PGN and is deployed off the southeast coast of Sumatra.

Hoegh LNG Partners received a letter at the end of July from PGN saying it would start arbitration to "declare the charter null and void, and/or to terminate the charter, and/or seek damages" because of dissatisfaction over some issues.

The partnership has maintained that based on an initial legal review, it believed the charterer's position was without merit.

In the meantime, the "PNG FSRU Lampung" has continued to operate pursuant to the terms of the charter.

"No assurance can be given at this time as to the outcome of the dispute with the charterer of the 'PGN FSRU Lampung', or of the aforementioned discussions with lenders," said the partnership.

Separately from the Indonesian issues, Höegh LNG Partners earlier in September entered into an agreement with US terminal developer New Fortress Energy for the charter of another FSRU.

The 'Höegh Gallant' will serve the Old Harbour facility in Jamaica, where New Fortress has existing import operations.

The partnership's "Höegh Gallant" has been chartered for a period of 10 years from the fourth quarter of 2021 to New Fortress, which also has LNG-for-power projects in nations such as Mexico, Nicaragua, El Salvador, Jamaica in Brazil, as well as mostly recently in the Asian country of Sri Lanka.

The LNG fleet controlled by Höegh LNG Partners consists of five vessels that operate under long-term charters.

The vessels in addition to the "PGN FSRU Lampung" and the "Höegh Gallant" are the "Höegh Grace", the "Cape Ann" and the "Neptune".

On the "PGN FSRU Lampung" loan, the partnership said the commercial tranche would continue to be amortized at its current rate and there would be a gradual step-up in the interest margin with up to 235 basis points increase.

"As a condition for the deferred maturity date, no shareholder loans may be repaid and no dividends may be paid to the partnership by the subsidiary borrowing under the Lampung Facility, PT Hoegh LNG Lampung," it explained.

"As a consequence, no cash flow from the 'PGN FSRU Lampung' will be available for the partnership prior to the deferred maturity date, though this limitation does not prohibit the partnership from paying the current distributions to preferred and common unitholders," added the company.

As previously disclosed, the export credit tranche of the Lampung facility matures in 2026, but may be called if the commercial tranche is not refinanced at its maturity date and in accordance with the terms of the Lampung facility financing.

"The partnership is considering various options and expects that the terms of any refinancing, if the partnership is successful in finalizing such refinancing, are likely to be less favorable than the terms of the existing Lampung facility," it said.

HILCORP ENERGY of the US, a major operator on Alaska's North Slope after the departure of UK major BP from the state, is now set to take over operations of the largest natural gas field run by ExxonMobil Corp. and which would underpin any future Alaska LNG export project.

ExxonMobil has agreed to transfer the operatorship for the Point Thomson field on the North Slope to Hilcorp.

Point Thomson, located on state land east of Prudhoe Bay, is a large reservoir of natural gas and gas condensate from where feed gas would come for any Alaska liquefaction and export venture.

"ExxonMobil will maintain its 60 percent ownership stake in the field," said an ExxonMobil spokesman.

"ExxonMobil remains committed to Point Thomson and will continue to have a leadership role in exploring all options to monetize its gas resources," he stated.

The US major will also maintain its ownership stake in Prudhoe Bay and the trans-Alaska pipeline.

The current owner of the Alaska LNG project is Alaska Gasline Development Corp. (AGDC), the state-run body and whose LNG plans have been dormant because of their high development costs.

However, it stirred in October 2021 amid the LNG price surge by releasing a consultancy report detailing the environmental benefits achieved by building the export plant utilizing North Slope natural gas to replace high-emissions coal in Asia.

"Alaska has some of the world's strictest environmental laws, and Alaska natural gas should be a key component of any realistic energy roadmap," said Alaska Governor Mike Dunleavy at the time.

AGDC has all its regulatory permits covering three liquefaction Trains with 20 million tonnes per annum of capacity, two 240,000 cubic metres capacity storage tanks as well as a 807-mile natural gas pipeline from Prudhoe Bay to Nikiski on the Kenai Peninsula.

AGDC President Frank Richards said the justification for Alaska LNG was still a "compelling" one.

Hilcorp is a relatively new oil and gas player, though already has a large profile in Alaska after it became the main oilfield operator in the state from buying BP's Alaska oil and gas assets for $5.6 billion in 2020.

The company was founded in 1989 and has operations in eight other US states including Colorado, Louisiana, New Mexico, Pennsylvania and Texas.

Hilcorp has operated in Alaska since 2012 and in addition to being the main oil operator it is now the largest natural gas supplier in the state.

HOEGH LNG Holdings is seeking a new Chief Executive and President after Sveinung J. S. Støhle said he was stepping down after 15 years in charge.

Höegh said Støhle gave notice that he intended to resign from his positions in the Höegh group to pursue an alternative career opportunity based outside of Norway.

"The board has started the process of identifying a permanent successor and has appointed Mr. Thor Jørgen Guttormsen to act as interim President and CEO from November while the Board conducts its search," said a Höegh statement.

Støhle is also leaving his post as CEO of Höegh LNG Partners and the board of the Partnership was seeking a successor for the CEO position.

The Partnership appointed Håvard Furu, the current Chief Financial Officer, to also act as interim CEO.

Morten W. Høegh, Chairman of Höegh LNG Holdings, said he wished to express his regret at Støhle's decision after he had built the company up into the leading provider of floating storage and regasification units (FSRUs) in the industry.

"When Sveinung joined us in 2005 our LNG activities consisted of a small fleet of LNG carriers and Höegh LNG had not yet been established as a separate company," explained Morten W. Høegh.

"Sveinung led our entry into floating regas through the ordering of the SRV vessels, and subsequently through the substantial investment program of eight FSRUs and the creation of two stock-listed public entities," added the Chairman.

"On a personal note, I have enjoyed tremendously the close working relationship with Sveinung based on trust and mutual support over all these years. We wish him all the best in his new endeavours," stated the Chairman.

Støhle said it had been pleasure and a privilege to have been in charge of the Höegh LNG group's development.

"I have worked with the most talented LNG team in the industry for the past 15 years," said Støhle.

"Höegh LNG is the clear leader in the FSRU business with strong growth prospects, and I am very proud of the accomplishments we have achieved together. I would like to thank Morten, the board and the entire team, and wish everyone well in the future," stated Støhle.

Chairman Morten W. Høegh, and

Johan Pfeiffer, Deputy Chairman, said they were very pleased that Thor Jørgen Guttormsen had accepted to take over as interim President and CEO.

"The board and shareholders have confidence he will ensure stability and progress in the period until a new CEO is in place," said their joint statement.

"Under new private ownership, with renewed energy and focus, Höegh LNG will continue the journey," they added.

Höegh shareholders approved an offer in March 2021 by a joint venture formed by Morgan Stanley Infrastructure Partners (MSIP) and Leif Höegh & Co., a family-owned shareholding for a takeover.

Leif Höegh Co. allied with MSIP to make the move and to turn the Höegh LNG firm into a private company.

Höegh rival GasLog Ltd, the Greek-based LNG shipping fleet owner, also agreed to a merger earlier in 2021 with a unit of US fund giant BlackRock.

GasLog entered into a merger agreement with BlackRock's Global Energy & Power Infrastructure (GEPIF), part of the New York-based firm focused on long-term infrastructure investments in the energy and power sectors.

The deal involves the acquisition of around 45 percent of GasLog Ltd's outstanding common shares by BlackRock.

Then most recently Teekay LNG Partners became the latest fleet owner to be targeted by a US investment fund with Stonepeak Infrastructure Partners setting up a deal worth $6.2 billion to acquire the Bermuda-based shipping line.

JGC HOLDINGS Corp., the leading Japanese LNG and energy engineering firm, has appointed the former executive at KBR of the US, Farhan Mujib, as President of JGC Corp, the overseas engineering, procurement and construction business.

"The appointment of Farhan Mujib as the President and Representative Director of JGC Corp. is effective January 1, 2022, and was decided at a board meeting on October 12," said a statement.

The company added that the current JGC Corp. President Yutaka Yamazaki would continue to serve as a director of parent company JGC Holdings and of JGC Corp.

Mujib had joined JGC Corp. in May 2020 as the company's new Senior Executive Vice President for JGC's EPC unit after working for Houston, Texas-based KBR for 31 years.

"Since joining JGC, Mr. Mujib has been a key member of the senior leadership team based in Yokohama, Japan," stated the company.

"As we continue to respect prized JGC Group values of taking on challenges, creating solutions, integrating our resources and delivering results, the firm leadership of Mr Mujib will further reinforce global management," said JGC.

"Drawing on insight from previous executive positions in this industry in the US, Mr. Mujib will apply extensive experience and knowledge of EPC projects and a wide professional network of clients and contractors," added the company.

JGC's current LNG work includes the LNG Canada project being constructed by Royal Dutch Shell and partners in British Columbia and the Coral South floating LNG venture offshore Mozambique for Italian energy company Eni.

Before joining JGC, Mujib worked at KBR 31 years. His last role at KBR was President of Hydrocarbons Delivery Solutions.

In 2016, Mujib became President of Engineering & Construction (E&C) Americas. Prior to that, he was KBR's Executive Vice President of Commercial from 2015 to 2016, and also acted as Executive Sponsor for major projects.

He joined Brown & Root (currently KBR), in 1989, and had held a series of roles with increasing responsibilities in the field of project management.

In his formative years, Mujib first gained a B.S. (Civil Engineering) at the University of Engineering and Technology in Lahore, Pakistan, and then gained a masters in engineering from the Asian Institute of Technology in Bangkok, Thailand.

He subsequently pursued his education in Australia, gaining an MBA from Macquarie University in Sydney and also became a Fellow of the Institution of Engineers in Australia.

JERA Co. Inc., the largest Japanese utility and liquefied natural gas importer, has decided to acquire a 27 percent stake in Aboitiz Power Corp. for $1.58 billion to partner with the major utility in the Philippines as the Asian nation builds out LNG and gas-fired power projects.

Aboitiz Power, listed on the Philippines Stock Exchange, is the holding company for the Aboitiz Group's investments in power generation, distribution and retail electricity services.

The company is one of the largest power producers in the Philippines with a balanced portfolio of assets located across the country and owns distribution utilities that operate in areas in Luzon, Visayas and Mindanao, including the second-biggest and third-biggest private utilities in the country.

"JERA and Aboitiz Power are exploring a number of areas of collaboration including the potential joint development of power projects including LNG-to-Power and collaboration on new generation technologies," said a statement.

"JERA has also signed a memorandum of understanding with Aboitiz Power to collaborate in fuel sourcing and management of the LNG required for potential LNG power plants which can supplement intermittent renewable energy," stated JERA.

JERA as the largest Japanese LNG buyer has 35 million tonnes per annum of volumes and controls a fleet of 20 LNG carriers.

The company is Japan's biggest fossil-fuel generator being owned jointly by Tokyo Electric Power Co. and Chubu Electric, the two largest power companies.

The joint venture company currently operates and provides fuel for a total of 26 power plants in Japan and imports LNG into 11 of Japan's network of 37 terminals.

The move by JERA in the Philippines followed the announcement in September 2021 that with partner Tokyo Gas, the company had sold a combined 50 percent stake in a Mexican-based company operating five gas-fired power plants, including one close to the Gulf of Mexico LNG import terminal at Altamira.

The Mexican company, MT Falcon Holdings, owns the natural gas combined-cycle power plants located in northeast Mexico and Tokyo Gas and JERA have sold their respective 30 percent and 20 percent stakes.

Each power plant has had long-term power purchasing agreement with Mexico's state-owned Federal Electricity Commission.

Both JERA and Tokyo Gas entered into sale and purchase agreements with Actis GP LLP, a London-based private equity firm with investments in global energy infrastructure.

The JERA asset sale to Actis GP is expected to be completed by the end of March 2022.

JERA said on its Aboitiz acquisition that the power group aims to expand power generation capacity to 9.2 gigawatts and achieve a 50:50 clean energy and thermal capacity mix by 2030 to meet the increasing demand for electricity in the future, while promoting renewable energy in the Philippines.

"At the same time, JERA is working to eliminate CO2 emissions from its domestic and overseas businesses by 2050 under its 'JERA Zero CO2 Emissions 2050' objective," said the Japanese company.

The Philippines is experiencing rapid economic growth and electricity demand is expected to grow at an annual average rate of 4.2 percent until 2030, making the development of electric power infrastructure an urgent priority.

The Philippines, like Japan, has limited energy resources and is therefore reliant on imports.

"We have had a very good relationship with the Aboitiz family for many years, since Tokyo Electric Power Company joined the power business in the Philippines through TeaM Energy Corp. in 2007," said Satoshi Onoda, President of JERA.

"In cooperation with Aboitiz Power, JERA will contribute to further development in the Philippines by both supporting the stable supply of energy in the country and contributing to an expeditious, cost-competitive roll-out of clean and renewable energy while taking into consideration the unique circumstances of the country," added Onoda.

JERA Co. has sold up its stakes in two companies that operate cogeneration and gas-fired power plants at two industrial estates in the suburbs of the Thai capital Bangkok as it reorganizes its portfolio.

JERA has found a buyer for its stakes in the Lat Krabang Industrial Estate and Bangpoo Industrial Estate power facilities as they no longer fit the profile of ventures it wants to be involved in.

JERA said it had concluded an agreement to sell the stakes in the gas-fired combined cycle power generation companies to a unit of Eastern Power Group, listed on the Stock Exchange of Thailand.

The Tokyo-based company is selling 23.80 percent of the Lat Krabang project company comprising 120-megawatts of electric power and steam generation capacity

It is additionally selling its 19.04 percent shareholding in Bangpoo Co., the operator of a 240MW plant, also on the outskirts of the capital Bangkok.

Both of the Thai plants have been in operation since 2016. JERA said completion of the sales are expected before the end of 2021.

"JERA will continue to renew its portfolio going forward, selling assets and reinvesting the proceeds as it optimizes its asset allocation for compatibility with a changing business environment and seeks to expand earnings," said a statement.

KINETREX Energy, a company acquired by US pipeline giant and LNG stakeholder Kinder Morgan Inc., has started the construction of three renewable natural gas production facilities to make RNG from waste in the state of Indiana.

The three sites are located at the Twin Bridges Landfill in Danville, the Prairie View Landfill in Wyatt and the Liberty Landfill in Monticello.

Upon completion, they are expected to produce a total of 3.5 billion cubic feet each year of RNG, derived from sources such as organic waste in landfills, wastewater treatment plants and agricultural operations.

By capturing methane produced from the decomposition of organic waste, the RNG production process also reduces or eliminates greenhouse gas emissions.

Kinder Morgan said commercial operations are expected to begin in the fall of 2022, pending required permits and certifications.

The Kinder Morgan Kinetrex unit expects to invest $146 million to construct the RNG facilities, which it will operate to process gas purchased from Wabash Valley Power Alliance (WVPA) Waste Management, owner of the landfills.

WVPA is a not-for-profit electric generation and transmission cooperative based in Indianapolis.

The G&T provides wholesale electricity to 23 retail electric distribution cooperatives in Indiana, Illinois and Missouri.

Collectively, these cooperatives supply electricity to more than 321,000 homes, schools, farms and businesses.

Kinetrex, also based in Indianapolis and which was an affiliate of the Parallel 49 equity fund before being acquired by Kinder Morgan in July 2021, also has an interest in the largest RNG facility in Indiana.

"Once operational next year, total annual RNG production from the for sites is estimated to be over four billion cubic feet," said KMI.

Houston, Texas-based KMI, which owns an interest in or operates 83,000 miles of US pipelines carrying natural gas oil and other products and 144 terminals, is now participating in what will be a small but very "green" part of its business.

KMI's US pipeline and storage assets are spread throughout the US and the company is a key supplier of LNG feed gas to exporters of clean energy to Asia as well as being a main stakeholder in the Elba Island LNG export plant in Georgia.

KMI's Indiana RNG will be sold pursuant to long-term contracts to Kinetrex's vehicle transportation customers located throughout the eastern half of the US.

"We are pleased to join WVPA, which has a long history in the landfill gas space, on this initiative to bring additional renewable fuels and low-carbon solutions to the marketplace," said Aaron Johnson, KMI President of Renewable Natural Gas.

"We expect these facilities will produce renewable fuels that will ultimately replace approximately 28 million gallons of traditional diesel each year, lowering GHG emissions by about 280,000 tons," added Johnson.

"The opportunity to work with Kinetrex has truly created a win-win for our membership," said WVP Alliance Executive Vice President of Engineering and Operations Brian Fitzgerald.

"As a result of this project, Kinetrex becomes a cooperative member and WVPA's involvement affords the production of alternative energy resources that will benefit our environment," added Fitzgerald.

KOSMOS ENERGY, the US-based shareholder in the floating liquefied natural gas joint venture offshore the West African nations of Mauritania and Senegal, has acquired bigger shareholdings in oil and gas fields offshore Ghana from Occidental Petroleum of the US for $550 million.

Kosmos, a specialist in Atlantic Margin exploration and production and based in Dallas, Texas, said it acquired an additional 18 percent interest in the Jubilee field and an additional 11 percent stake in the Tweneboa, Enyenra and Ntomme (TEN) oil and gas fields offshore of Ghana.

Ghana National Petroleum Corp. (GNPC) is also acquiring stakes in the same fields from Occidental for $200M and will be the main partner of Kosmos.

The new Kosmos focus on Ghana comes as FLNG projects being developed with UK major BP offshore Mauritania and Senegal in West Africa continue to progress and are centred on the Greater Tortue-Ahmeyim gas fields. The first Mauritania-Senegal FLNG production facility is scheduled to have first gas in early 2023.

"This is a compelling transaction for Kosmos that accelerates our strategic delivery and is expected to provide long-term sustainable cash flow from the Ghana fields where we have a deep understanding of the value and future upside," explained Andrew G. Inglis, Chairman and Chief Executive of Kosmos.

"We expect the additional Ghana interests to generate around $1 billion of incremental free cash flow by the end of 2026 at $65 Brent with upside given current prices. We plan to use the additional cash flow from these assets to reduce absolute debt levels and fund our growth in LNG," stated the Kosmos CEO.

Kosmos already produces oil and gas in Ghana averaging around 22,400 barrels of oil per day and per and natural gas offtake to the government of Ghana has increased to around 110 million standard cubic feet per day earlier in 2021.

This transaction with Occidental increases the Kosmos stake in the Jubilee field to 42.1 percent and in the TEN fields to 28.1 percent. The transaction is subject to a 30-day pre-emption period.

"The transaction creates a simplified and aligned partnership in both the Jubilee and TEN fields, with both Kosmos and GNPC increasing their ownership," said Inglis.

"The partnership is committed to investing in both fields to maximize the value of the assets and reduce the carbon intensity of operations for the benefit of all stakeholders," explained the CEO.

Ghana while being an oil and gas producer suffers natural gas shortages because of a lack of infrastructure and the nation's Tema FLNG import terminal project start-up has been delayed several times in 2021. Kosmos is not involved in the Tema gas import venture.

Using Kosmos year-end 2020 reserves report, prepared by independent reserve auditor Ryder Scott, estimated 2P reserves being acquired as part of the Occidental transaction were about 104 million barrels of oil equivalent at year-end 2020.

"Prior to closing the transaction, OXY resolved certain historical tax claims related to the sold interests," noted Kosmos, listed on the New York Stock Exchange as well as the London Stock Exchange.

The Government of Ghana has approved the deal, which closed on October 13, 2021.

"To fund the transaction, Barclays and Standard Chartered Bank have provided Kosmos with a $400M bridge loan, which the company expects to refinance with the proceeds from a future senior notes offering," said Kosmos.

Other Kosmos operations are offshore Equatorial Guinea and the Gulf of Mexico.

LNG CANADA, the project led by Royal Dutch Shell and the largest private sector investment in Canada's history, has announced that construction is more than 50 percent completed.

"There's a popular saying: 'Believe you can and you're halfway there'," said the LNG Canada consortium in a statement.

Construction began three years ago at the British Columbia liquefaction and export plant site at Kitimat, 640 kilometres north of Vancouver.

Shell and its four partners, Mitsubishi Corp. of Japan, Malaysian energy company Petronas, Chinese major PetroChina and Korea Gas Corp., agreed in October 2018 to invest C$40 billion (US$30.2Bln) on the brownfield site that had been an energy products terminal before being acquired by Shell in 2011.

The initial two Trains will produce 14 million tonnes per annum of LNG. There is the possibility of expanding the facility to include up to four processing units in the future.

The engineering, procurement and construction contractors are JGC Corp of Japan and Fluor Corp. of the US.

Among the plant innovations are energy-efficient natural gas turbines and renewable electricity from local utility BC Hydro, meaning the plant will emit less than half the greenhouse-gas emissions of the average LNG facility currently in operation.

In addition to the construction costs of the plant, a US$5-billion pipeline of 670km is being built by Canada's TC Energy to bring the feed-gas from the Montney natural gas basin to the Kitimat liquefaction and export facility on the Pacific Coast.

LNG Canada said it believes it can "set the benchmark" for economically, environmentally and socially responsible LNG development.

"Believing we can achieve our goals and objectives gave us a great start. And now, quite literally, we are halfway there, a little more, in fact," added the statement.

"Three years after our joint venture participants reached a successful final investment decision, we're moving swiftly towards commissioning and start-up, and to fulfilling our promise of delivering a world-class LNG facility in Kitimat, in the traditional territory of the Haisla Nation, benefitting British Columbians and Canadians for decades to come," declared LNG Canada.

However, LNG Canada again mentioned an ongoing dispute with the pipeline construction company TC Energy.

"It hasn't always been easy. The Covid-19 pandemic has created challenges for everyone, at home and abroad. And we remain very concerned about cost and schedules increases disclosed by TC Energy to complete its Coastal GasLink pipeline that will connect to our facility," explained LNG Canada.

"But with support from First Nations, local communities and businesses, and working with all levels of government, LNG Canada has continued to reach major milestones, safely and on schedule," it added.

The company said the plant site has seen an LNG tank roof-raising and the arrival of its main cryogenic heat exchanger and two pre-cooler units.

"This was our first opportunity to receive critical infrastructure at our new material offloading facility," said the company.

LNG Canada said that to date its contractors and sub-contractors have awarded C$3.5Bln in contracts and procurement to business in BC.

Of this amount, over C$2.7Bln has been awarded to First Nations-owned businesses and local area businesses.

"Thousands of Canadians, most of them from BC, are presently working on the LNG Canada project," the company noted.

In the coming weeks and months, activities will increase as more critical infrastructure arrives.

"The transformation of our site in Kitimat will accelerate as we move through the next stages of project completion and ever closer to shipping our first cargo of low-carbon, made-in-BC LNG," the company declared.

MEXICO-PACIFIC Ltd (MPL) LNG project company based in Houston has joined with LNG engineering firm Bechtel Inc. on developing a Mexican liquefaction and export facility on the Pacific Coast using US natural gas as the feed gas and processing technology from ConocoPhillips.

The Mexican LNG export plant is proposed for near Puerto Libertad in the northwest state of Sonora and would have just over 14 million tonnes per annum of output.

MPL said it had signed a collaboration agreement with ConocoPhillips LNG Licensing and Bechtel, which would be working with Spanish engineering company Techint SA.

MPL had previously arranged to engage KBR as the engineering company, but Bechtel has taken over and would still use the KBR-suggested ConocoPhillips Optimized Cascade liquefaction technology for the mid-scale facility. ConocoPhillips has also taken on an advisory role for the project.

"We are honored to partner with this world-class LNG team," said Douglas Shanda, MPL's Chief Executive and President.

MPL is a venture comprising the development company, DKRW Energy Sonora Holdings, and Aecom Capital, a New York-based equity fund that invests in energy and infrastructure projects.

The project site is contained within 1,100 coastal acres on the shore of the Gulf of California adjacent to Puerto Libertad and the harbour depths are in excess of 20 metres and capable of accommodating the largest LNG carriers.

The US Department of Energy approved MPL's application in September 2018 to export 1.7 billion cubic feet per day via existing cross-border natural gas pipelines to be liquefied at the Puerto Libertad plant.

The pipelines include the Kinder Morgan Sierrita Gas Pipeline, which extends to the US-Mexico border near Sasabe in Arizona.

MPL said the collaborative relationship brings together LNG industry market leaders in technology, design, construction and in the operations of LNG facilities.

"ConocoPhillips is pleased to support MPL and Bechtel in designing LNG Trains for the MPL LNG Project based on the high efficiency OCP Pro™ technology that includes our latest low-carbon design and operating features," said Mike Culligan, manager of ConocoPhillips LNG Technology and Licensing.

Tom Mathiasmeier, president of Global Gas, Power and LNG at ConocoPhillips said the MPL project represented an excellent opportunity for ConocoPhillips to work closely with a West Coast North American LNG developer.

"The project will provide carbon-advantaged gas feedstock from our growing Permian Basin gas supply and assist MPL in developing a commercial strategy," added Mathiasmeier.

MISC GROUP, the Malaysian shipping company, completed its first liquefied natural gas bunkering operation in US waters off Port Canaveral in Florida for one of the LNG-powered oil tankers owned by subsidiary AET.

MISC said that working in coordination with bunkering vessel owner Shell, the AET Aframax tanker "Pacific Ruby" was successfully re-fuelled.

The transfer of 600 metric tons of marine LNG onto the 113,305 deadweight petroleum tanker was made from the Shell-operated "Q-LNG 4000" bunker barge and was safely and successfully completed within three hours.

"The operation was coordinated by AET and Shell NA LNG while 'Pacific Ruby' was on its way from Houston bound for Rotterdam in the Netherlands," said MISC.

"AET's Commercial and Operations Teams out of Houston both commercially and operationally managed the full process with Shell and the crew of 'Pacific Ruby' ensuring efficiency and safety for this first vessel bunkering in the US," said a statement.

"This bunkering milestone also represents further progress in AET's commitment to reduce the environmental impact of shipping by using lower-emission fuels worldwide," added the company.

"It also represents another example of the rapid expansion of LNG bunkering facilities in the US and globally, allowing LNG supply for transatlantic tanker routes between Europe and the US," it added.

LNG emits about 25 percent less carbon-dioxide than conventional marine fuels in providing the same amount of propulsion power.

AET has invested in 11 LNG dual-fuel vessels, three Aframax tankers already in operations in the Atlantic Basin, one Aframax to be delivered for operations in the Pacific in the fourth quarter of 2021 and two dynamic positioning shuttle tankers (DPSTs) operating in the North Sea and the Barents Sea.

Another five dual-fuel AET Very Large Crude Carriers with LNG capability are at the newbuilding stage and are scheduled to be delivered in 2022 and 2023.

The bunkering barge, the "Q-4000", arrived at Port Canaveral in March 2021 to make the port the first bunkering port for the cruise industry as well as passing ships.

The vessel is a ship-to-ship articulated tug and bunker barge (ATB) and is designed, engineered and US-certified to provide safe transfers between vessels.

It has a carrying capacity of up to 4,000 cubic metres of LNG. It is 324 feet in length and is attached to a 128ft-long tug.

The US-owned and operated vessel was constructed at VT Halter Marine Inc. shipyards in Pascagoula, Mississippi, and is crewed by US mariners.

NOVATEK, the Arctic LNG II project developer, hosted a forum for contractors and suppliers, attended by more than 160 companies, to keep the venture on track for a 2024 start-up and to expand cooperation at the Novatek LNG Construction Centre at Belokamenk in the Murmansk region of northern Russia.

The forum aimed to foster experience-sharing and broader opportunities for Russian equipment manufacturers to ensure the successful implementation of Novatek's second large-scale LNG project in the Arctic after the existing Yamal plant..

All three liquefaction Trains at the Arctic LNG II plant were scheduled to come on stream in a two-year time span from 2023.

The start of the first Train is planned for 2023, the second for 2024 and the third Train for 2025.

Representatives of 153 suppliers and contractors, nine Novatek subsidiaries and joint ventures as well as members of local and national government attended the forum.

Speakers included senior executives of Novatek and many other companies as well as the Russian Deputy Minister of Industry and Trade Mikhail Ivanov and Murmansk Region Governor Andrey Chibis.

The modules constructed in China for the first liquefaction Train for the project arrived in September 2021 at the Novatek-Murmansk assembly site from the Wison shipyard at Zhoushan in the eastern Chinese province of Zhejiang.

These modules were then handed over to the Arctic LNG project engineering, procurement and construction contractors comprising Technip Energies, Italy's Saipem and Russian company NIPIGAS.

"This is the forum's third edition and it is the first time that we have hosted it

at the LNG Construction Centre in Belokamenka," noted Leonid Mikhelson, Novatek's Chief Executive.

"In these meetings, we discuss in detail the execution of our LNG project with Russian equipment manufacturers, engineering companies and contractors," explained Mikhelson.

"One of our paramount tasks is to gain a significant share of the global LNG market. This can be achieved by maximizing import substitution and local content in equipment manufacturing for large-scale LNG projects, which reduces capital expenditures and makes Russian LNG more competitive," stated the CEO.

"Our joint efforts with the support by the Government will allow building up a new LNG sector of Russia's industry," he declared, hinting that other projects could be developed.

The Arctic LNG II joint venture will produce 19.8 million tonnes per annum of LNG as well as gas concentrate from the principal feed-gas resources, the Utrenneye gas fields, adding to Novatek's existing Yamal LNG facility's annual output of 17.5 MTPA.

Technip is mainly responsible for the EPC of the three liquefaction Trains and associated topsides, which are being manufactured on a modular basis in Russian and Chinese fabrication yards.

Arctic LNG II involves the installation of three gravity-based structures in the Gulf of Ob in Western Siberia and related LNG storage facilities of a combined 687,000 cubic metres capacity.

Novatek holds 60 percent of the Arctic LNG II project and four other 10 percent stakes are shared between various shareholders.

The 10 percent holdings belong to French major TotalEnergies, which is also a shareholder in the Novatek company, China National Petroleum Corp., China National Offshore Oil Corp. and a Japanese investor group comprising Mitsui & Co. and the government institution, the Japan Oil, Gas and Metals National Corp.

PETRONAS, the Malaysian oil and gas company and leading floating LNG plant operator, has announced a 50th cargo lifting from the "PFLNG Satu" production hull, the first in the world to operate over a stranded gas field.

The cargo was successfully loaded onto the 150,200 cubic metres capacity carrier "Seri Cemara" and was scheduled to be delivered on October 7 to the Yung-An import terminal in Taiwan.

The "PFLNG Satu" produced its first cargo in 2017 from the Kanowit gas field, offshore Sarawak, the Malaysian state on the island of Borneo.

The FLNG vessel is currently deployed over the Kebabangan gas field, offshore the Malaysian state of Sabah.

When it produced its first cargo there in 2019, the vessel became the first floating liquefaction plant to produce LNG over two different gas fields.

"We are proud to celebrate this event attests to the world-class reliability of our first FLNG facility and more importantly, the commitment of our workforce to provide an uninterrupted supply of LNG to our customers," said Petronas Vice President of LNG Assets, Abang Yusuf Abang Puteh.

"This achievement showcases our leadership in the LNG industry, where we continue to benefit from our first-mover advantage to monetise remote and stranded gas fields with FLNG solutions," he stated.

Abang Yusuf noted that despite operating in a challenging environment heightened by the Covid-19 pandemic, the "PFLNG Satu" had produced and exported nearly 3.18 million tonnes of LNG from the Kebabangan and Kanowit gas fields.

The "PFLNG Satu" is designed to operate at water depths of up to 200 metres with a production capacity of 1.2 MTPA of LNG.

Petronas is the only global energy company that owns and operates two FLNG facilities, the other being the "PFLNG Dua" and a third is being planned.

The "PFLNG Dua" is deployed over the Rotan gas field, located 140 kilometres off Kota Kinabalu in Sabah state.

The Malaysian company is now assessing front-end engineering and design tenders for its third FLNG production hull.

The "PFLNG Tiga" project, with "Tiga" being the Malaysian word for three, will have a production capacity of around 2 MTPA, slightly more than the other two vessels.

PTT Group, the national energy company of Thailand, has started a joint venture with Tokyo Gas to help with fuel switching in the southeast Asian nation, including small-scale truck deliveries of liquefied natural gas.

PTT and Tokyo Gas said they aimed to be at the forefront of fuel conversion in Thailand from liquefied petroleum gas (LPG) and heavy oil to LNG.

The Japanese utility's subsidiary Tokyo Gas Engineering Solutions (TGES) has set up the joint venture with the PTT unit, Siam Management Holdings Company (SMH).

The joint company is called Optec Co Ltd and PTT's SMH unit will own 51 percent and TGES 49 percent.

The Tokyo Gas existing LNG portfolio currently amounts to around 14 million tonnes per annum and the utility controls a fleet of 10 ships to deliver to its four import terminals in Japan, three around Tokyo Bay and one at Hitachi in Ibaraki Prefecture.

Thailand is opening up its own LNG import market, handing out six LNG import licences to other power and industrial operators .

PTT has additionally completed several expansions at the Thai import terminal at Map Ta Phut with the most recent from 10.7 MTPA capacity to 11.5 MTPA.

A second regasification terminal adjacent to Map Ta Phut and called Nong Fab LNG is expected to be completed in 2022 with total additional regasification capacity of 7.5 MTPA.

The new Optec busines of PTT and Tokyo Gas is aimed at providing efficiency technology solutions and systems, including on-site energy services with combined heat and power system and fuel conversion such as LNG truck supplies for industry, small power producers and utilities in Thailand.

"Optec will aim for business expansion in collaboration with PTT's wide customer base and brand power in Thailand along with TGES's technical. and marketing knowledge of fuel conversion and energy management based on worldwide abundant experiences," they explained.

"In addition to fuel supply, such as LNG deliveries by truck for industrial customers, Optec will specifically implement more advanced energy services with a combination of installation combined heat and power system, solar as well as biomass power and thermal generation system," they stated.

QATAR ENERGY has ordered four new liquefied natural gas carriers from the Chinese Hudong-Zhonghua Shipbuilding Group of Shanghai as it begins to put in place the shipping requirements for massive expansion plans.

The four carriers are the first batch of orders in Qatar Petroleum's LNG shipbuilding programme, which will cater for future LNG fleet requirements for the North Field expansion projects as well as for existing vessel replacement requirements.

This order is also the first ever placed by Qatar Petroleum or any of its affiliates with a Chinese shipyard for LNG carriers.

It is also the first in connection with an agreement to reserve ship construction capacity that was executed in April 2020 with Hudong-Zhonghua, a subsidiary of China State Shipbuilding Corp. (CSSC).

The Qataris had been expected at the time to centre most of their carrier building in South Korea but surprisingly chose China over the Koreans for the first tranche of berth reservations.

The value of this April 2020 agreement had the potential to be well in excess of $3.0Bln and would be an initial booking to build at least 16 or up to 20 ships in China.

"We continue to push forward with our LNG expansion projects, and today's announcement is yet another step in our journey," said Saad Sherida Al-Kaabi, President and Chief Executive of Qatar Petroleum.

"I am especially pleased with the signing of this order as it marks our first ever new LNG carrier to be built in the People's Republic of China," added Al-Kaabi.

The Qataris declared that they were confident in Hudong's capabilities to execute this order, worth in excess of 2.8 billion Qatari Riyals ($764M), to the highest safety and technical standards.

"I would like to take this opportunity to thank Hudong's team for all the hard work to bring this order to fruition during these challenging times," Al-Kaabi continued.

"I would also like to thank the leadership of our esteemed partner, CSSC, for their valuable support to this effort in line with our mutual desire to further strengthen the excellent relations between China and Qatar," stated the CEO.

The North Field expansion projects will increase Qatar's LNG production capacity from 77 million tonnes per annum to 126 MTPA with the carrier fleet programme alongside, which could amount to 80 vessels, including the replacement of older ships in the current fleet.

The scope of the first phase of the expansion at the Ras Laffan production complex involves an additional four Trains, each with 8.0 MTPA of output.

Qatar has the southern portion of the North Field in Gulf waters and the other part is under the jurisdiction of neighbouring Iran.

The main South Korean shipbuilders Samsung Heavy Industries, Hyundai Heavy Industries and Daewoo Shipbuilding & Marine Engineering, won all the first big round of Qatari orders and Ras Laffan came on stream.

Between 2004 and 2007, Qatar ordered 45 LNG carriers from the Korean yards when Daewoo built 19 vessels, Samsung constructed 18 vessels and Hyundai received orders for eight ships.

SANTOS, the Australian liquefied natural gas operator of plants in Queensland and the Northern Territory, has hailed the judicial review decision to uphold the approval of the Narrabri Gas project to supply New South Wales.

"Santos welcomes the judicial review decision of the NSW Land and Environment Court on the Narrabri Gas Project, upholding the decision of the NSW Independent Planning Commission," said Santos.

The Adelaide-based company said it looked forward to getting on its work in regional New South Wales to create jobs, drive investment and bring long-term energy security to the state at competitive prices.

Narrabri gas project is a coal-seam gas venture located near the state border with Queensland, which exports CSG to Asia as LNG.

Santos itself is operator of the Gladstone LNG export plant in Queensland as well as being a stakeholder in Darwin LNG and in the and the Papua New Guinea plant, operated by ExxonMobil.

Santos Chief Executive Kevin Gallagher said while the legal process had pushed the timelines for the project back 12 months, Santos was committed to bringing much needed domestic natural gas to NSW, including the city of Sydney.

"We are seeing play out in real time around the world what happens if you do not have domestic energy security," said Gallagher.

"On the east coast of Australia, regulators continue to warn about an increasingly tight market in the future," added Gallagher.

"A shortage of supply means only one thing and that is higher prices for NSW households and businesses. If gas was currently being imported into NSW from the international spot market via an import terminal it would cost NSW customers more than five times the cost of gas from Narrabri," stated the CEO.

The Narrabri venture is based on developing the CSG in the northwest of NSW with up to 850 wells and which Santos has always promised would be much less expensive the gas brought in from other Australian states or as imported LNG.

"It's why we have committed 100 percent of the gas from the Narrabri Project to the domestic market. Following the NSW government's 'Future of Gas Statement in July', Narrabri will be the only source of local gas for the state," explained Gallagher.

"This decision now allows us to get on with the appraisal drilling phase of the project and create jobs, drive investment and attract new businesses to the region, building a better future for the people of Narrabri," he declared.

Narrabri Gas will provide up to half of NSW's natural gas demand where more than one million family homes and 33,000 businesses rely on natural gas as a source of energy.

"With the commercial and industrial sector currently making up almost 50 per cent of total gas consumption in NSW, reliable and competitively-priced natural gas is essential for a strong NSW economy," said Santos.

SEMPRA Energy's utility subsidiary Southern California Gas Co. (SoCalGas), based in Los Angeles, has agreed to pay around $1.1 billion in three settlement agreements stemming from the methane leak in 2015 at the SoCalGas Aliso Canyon natural gas storage facility.

"The first agreement is subject to obtaining roughly 97 percent participation among approximately 36,000 individual plaintiffs and court approval of the settlement allocation process, among other conditions," said San Diego-based Sempra, also owner of the Cameron LNG plant in Louisiana.

"The second and third agreements involve settlement with a class estimated to include at least 23,000 properties and the dismissal of the named plaintiffs in a putative business class action, both of which are subject to court approval," explained Sempra.

In addition to operating the Cameron liquefaction plant at Hackberry on the Gulf Coast, Sempra is also transforming its Costa Azul LNG terminal on the Pacific Coast of Mexico into an export plant.

The Aliso Canyon storage settlement comes as Sempra is in the midst of a restructuring.

The Cameron and Costa Azul plants and various power and pipeline assets in Mexico and elsewhere will be grouped into a new Sempra North American LNG and gas platform called Sempra Infrastructure Partners.

"These Aliso Canyon agreements will help the community and our company work toward putting this difficult chapter behind us," said Scott Drury, Chief Executive of SoCalGas.

"In the years since the leak, SoCalGas has worked alongside regulators, technical experts, and our neighbors to enhance safety at all our underground storage facilities," added Drury.

"As a result, our storage facilities operate by what regulators and experts have called some of the most rigorous safety standards in the country," he stated.

A court in 2019 approved a separate $119.5M settlement between SoCalGas and various state agencies in relation to the leak.

The Los Angeles City Council in May 2021 urged California Governor Gavin Newsom to initiate an accelerated plan to close the storage facility.

State regulators had cleared SoCalGas to resume injections at Aliso Canyon in mid-2017.

However, SoCalGas has stated that the Aliso Canyon storage continues to play a vital role in the resiliency of California's energy system, supporting intermittent solar and wind supply.

California has set a goal of achieving a fossil-free power generation mix by 2045 and is building out more solar and wind power as well as emission-free buildings while promoting electric automobiles.

The Democratic Party-run state has always rejected large-scale LNG imports or transfers, though continues to suffer major natural gas, power and water shortages blamed on planning policies dictated over the years by environmental activists.

The US Department of Energy granted a request in September 2021 by the California Independent System Operator to make available additional natural gas-fired generation to mitigate electricity supply risks.

The California natural gas prices in both the north and the south of the state have always been higher than the currently elevated US Henry Hub benchmark natural gas price.

So far in California, LNG has only been welcomed as a fuel for the trucking and public transportation sectors and is mostly provided by companies such as Clean Energy Fuels, based in the state's Newport Beach.

The clean fuel is also used for truck transportation at ports for heavy municipal trucks and buses in some cities.

SENEX ENERGY, the Australian coal-seam gas producer, received an offer of A$815 million (US$605M) from POSCO International Corp., the South Korea industrial company, seeking to secure LNG imports.

The offer from POSCO International, the trading arm of the South Korean steel-making company, has already been improved several times after initial approaches.

The current POSCO offer represents a 15 percent premium over Senex's share close on October 15 and nearly 38 percent over its close at the start of September.

A POSCO statement said the company was pursuing an acquisition of Senex as part of its efforts to secure natural gas reserves for energy security.

Senex is looking to more than triple its annual output to 9.8 million barrels of oil equivalent (1.6 billion cubic metres of natural gas) by June 2025, which will help it meet a 15-year agreement to supply the Gladstone LNG plant in Queensland, operated by Australian energy company Santos.

Among the other shareholders in Gladstone LNG is Korea Gas Corp., South Korea's state energy company and operator of four LNG import terminals.

Senex, based in Brisbane in Queensland, has been a rapidly growing gas producer supplying Australia's East Coast market, where prices have more than doubled over the past six years following the start of three LNG export plants.

The Senex assets are centred on the onshore Surat Basin one of the main coal-seam gas (CSG) resources that supply three LNG plants and domestic gas markets.

The other two LNG plants apart from the Gladstone facility, all located on Curtis Island, are the Shell-operated Queensland Curtis LNG plant and the ConocoPhillips-run Australia Pacific LNG facility.

POSCO International, which is listed on the Korean Stock Exchange, submitted a revised non-binding and indicative proposal to acquire 100 percent of Senex for a cash offer price of A$4.40 per share.

This followed the submission of two prior non-binding proposals on 30 July 2021 (offer price: A$4.00 per share) and 27 August 2021 (offer price: A$4.20 per share).

Senex on September 15 granted POSCO a period of exclusivity to complete their due diligence enquiries and further advance the proposal.

"Following further discussions between the parties, Senex has now agreed to extend POSCO International's exclusivity period to 5 November 2021, in order to provide POSCO International with additional time to assess a further revised proposal at a price higher than A$4.40 per share," said Senex.

POSCO has indicated that if a transaction proceeds, it is likely to be implemented by way of an off-market takeover offer which would be subject to a 50.1 percent minimum acceptance condition and approval by the Australian Foreign Investment Review Board (FIRB).

"The Senex Board believes it is in the best interests of its shareholders to continue to engage with POSCO International and will assess any proposal received on its merits," added Senex.

Senex has appointed the banks Macquarie Capital and Rothschild & Co. as financial advisors and Clayton Utz as a legal advisor.

SINOPEC, whose formal title is China Petroleum and Chemical Corp., has been given the go-ahead by the state planning body to build another onshore LNG import terminal at Longkou in Shandong province at a cost of 8.3 billion Chinese yuan ($1.28Bln) and taking the size of nation's network to 24 facilities.

Longkou LNG will comprise four LNG storage tanks with each having capacity of 220,000 cubic metres and other infrastructure to handle the largest vessels.

Shipments of LNG to the current network of Chinese regasification facilities hit another record in 2020 when 67.13MT received, an increase of 11.5 percent from 2019.

If the current 2021 Chinese import trend continues the annual total would be just under 80MT, surpassing the current global No. 1 importer Japan.

"In order to further enhance the natural gas supply and storage capacity of Shandong Province and its surrounding areas, promote economic and social development and energy structure optimization in the Bohai Rim, and improve the quality of the atmospheric environment, it is agreed to build the Sinopec Longkou LNG project," said the China's National Development and Reform Commission (NDRC).

The project company referred to by the NDRC is called Sinopec Yantai Longkou LNG Co., Ltd.

The NDRC explained that the project would be located in the Longkou Port Area near Yantai City in Shandong.

"Sinopec must actively follow international market developments, further implement long-term purchase and sale agreements and LNG resources, control gas source costs, and take necessary measures to ensure the safety and stability of natural gas imports, and contribute to national energy security," said the NDRC, citing some of the main conditions of approval.

The approval will allow Longkou LNG to import 6.5 million tonnes for annum.

"The total investment of the project is 8,304.02 million yuan, of which the construction investment is 78.56 million yuan, the interest during the construction period is 445.91 million yuan, and the initial working capital is 12.45 million yuan," explained the NDRC.

"The capital accounts for 30 percent of the total investment and is funded by the project unit's own funds. The rest is settled through bank loans," it added.

The NDRC noted that after the Longkou terminal comes on line, the price of gasification services will be set by the Shandong Provincial Price Authority, and the price will be determined for not more than five years.

"The project unit shall strive to reduce the project investment cost and gasification cost, optimize the market structure, and improve the overall competitiveness of the project," stated the NDRC.

The NDRC also urged the developers to take all necessary steps during the project construction and operation to "attach great importance to safety" and to have strong management.

Additionally Longkou LNG was urged to pursue an environmentally sound pathway.

"The project unit shall, in accordance with the environmental impact assessment report, safety report and its approval requirements, earnestly implement ecological protection and safety measures in project design, construction and operations," declared the NDRC.

The state body concluded that the Longkou Port Area had been listed as an important port site for the national coastal LNG import efforts and it was, therefore, "necessary to synchronize the supporting export trunk pipeline" to the national supply grid and make sure it was completed at the same time as the terminal .

"The above-mentioned Longkou Port Area LNG terminal's external pipeline and interconnection project are national trunk pipelines and should be transferred to the National Pipeline Network Group in a timely manner," stated the NDRC.

STENA POWER and LNG Solutions has completed successful model testing of the receiving terminal technology ordered for Delta Offshore Energy's LNG-to-power project in Vietnam.

Singapore-based Delta Offshore is using Stena's jetty-less LNG transfer and regasification system for the venture planned for Bac Lieu province in Vietnam's Mekong Delta.

Stena's Jetty-less Floating Terminal (JFT) and Self-Installing Regas Platform (SRP) will enable LNG imports to assist in providing 3,200 megawatts of gas-fired power for Bac Lieu's economic development.

A technology license agreement had previously reached between Stena Power in August 2020 for Delta Offshore to use the proprietary technology.

"Scale-model testing of the JFT, the Floating Storage Unit (FSU) and an LNG carrier was completed at the Maritime Research Institute Netherlands (MARIN) to verify and calibrate Stena's computer simulations and research, ahead of construction and deployment of the assets to waters off Bac Lieu province," explained the Stena Power and LNG unit, based in Grimstad, Norway.

The jettyless terminal solutions contains all the required equipment, systems and safety features normally installed on a fixed jetty.

It can also be adapted for all LNG carriers from small-scale distribution or bunker vessels to the largest existing LNG carriers.

"Large-scale models (up to 10m in length) were created in a scale of 1:30 to obtain test results with the highest possible accuracy," said the company.

"A number of various tests were performed by engineers from both Stena and MARIN to simulate critical wave, wind and current conditions specific to local conditions in Vietnam, including 100-year cyclonic and monsoon events," it added.

Knut-Erik Johansen, Engineering Manager, Stena Power and LNG, said he was delighted to have successfully verified the performance of the technology.

"The model testing was carried out over six weeks in MARIN's large and highly reputable offshore basin to assist us to finalise design, better understand performance limits in a variety of localized wave conditions, and ultimately produce safe and effective operational procedures," added Johansen.

The first phase of the Bac Lieu project alone will see investments of around $1 billion in Vietnam's power sector with construction expected in four distinct phases through to 2026.

The Vietnamese government has also line up several other LNG-for-Power projects with import facilities, including a 4,000MW plant in the northern port city of Haiphong and another in Ninh Thuan province, south of Cam Ranh Bay.

"The oil and gas industry, particularly offshore, has developed and evolved through innovation and change," said Bobby Quintos, Managing Director of Delta Offshore.

"We have a more modular system that can easily be scaled up without having to go to drydock or shipyards. If you are not innovating in this industry, you are falling behind," added Quintos.

Bureau Veritas, the French maritime classification society, has recently also issued an Approval In Principle for the complete LNG receiving facilities engineered by Stena for the Bac Lieu project.

TEEKAY LNG Partners has become the latest fleet owner to be targeted by a US investment fund with Stonepeak Infrastructure Partners setting up a deal worth $6.2 billion to acquire the Bermuda-based shipping line, which has a large portfolio of vessels under charter contracts and part ownership of a Middle East LNG import terminal.

Stonepeak offered $17 per unit, which represents a premium of 8.3 percent on the previous closing price of Teekay LNG's common units.

Excluding Teekay's debt, the deal is for $1.5 billion and the companies expect to close the transaction by the end of 2021.

Shares of Teekay LNG, which were up almost 48 percent this year, surged an additional 9.53 percent to $17.19 on the New York Stock Exchange after announcement, giving it a market capitalization of $1.49Bln.

The transaction is in the form of an agreement and plan of merger.

"Under the merger agreement, investment vehicles managed by Stonepeak will acquire all the issued and outstanding common units representing limited partner units in Teekay LNG," said the statement.

"These include approximately 36.0 million common units owned by Teekay Corp., 100 percent of Teekay's ownership in Teekay LNG's general partner, with an economic ownership interest equivalent to 1.6 million Teekay LNG common units, for $17.00 per common unit and representing an enterprise value of $6.2Bln," explained the statement.

Teekay LNG is one of the world's largest independent owners and operators of LNG carriers, providing LNG and liquefied petroleum gas (LPG) shipping services.

The fleet is primarily under long-term contracts through its interests in 47 LNG carriers, 21 mid-size LPG carriers and seven multi-gas carriers.

Teekay LNG's ownership interests in these vessels range from 20 percent to 100 percent.

Teekay is the latest LNG fleet owner to be the subject of a takeover or merger with New York-based fund and banking interests.

Höegh LNG Partners, the US affiliate of Höegh LNG Holdings, is now partnered with the infrastructure unit of US investment bank Morgan Stanley.

The LNG fleet controlled by Höegh LNG Partners consists of five vessels, mostly floating storage and regasification units that operate under long-term charters.

Höegh's and Teekay's rival GasLog Ltd, the Greek-based LNG shipping fleet owner with 35 vessels operating, agreed a merger earlier in 2021 with a unit of US fund giant BlackRock.

GasLog entered into a merger agreement with BlackRock's Global Energy & Power Infrastructure (GEPIF), part of the New York-based firm focused on long-term infrastructure investments in the energy and power sectors.

The deal involved the acquisition of around 45 percent of GasLog Ltd's outstanding common shares by BlackRock.

In addition to its fleet, Teekay LNG owns a 30 percent interest in an LNG regasification terminal in Bahrain.

Teekay LNG was set up as a publicly traded master limited partnership by parent Teekay Corp. as part of its strategy to expand its operations in the LNG and LPG shipping sectors.

"This is a transformative transaction for Teekay LNG that will enable existing unitholders to realize an attractive valuation and immediate liquidity on closing," said Mark Kremin, President and Chief Executive of Teekay Gas Group Ltd.

"Under Stonepeak's ownership, we expect Teekay LNG to have improved access to competitively priced capital for both fleet renewal and potential future growth in the next phase of our development, which has not been available through the public equity capital markets for many years," added Cremin.

James Wyper, Senior Managing Director at Stonepeak, said the firm had long recognized the growing global demand for LNG and importance of natural gas as a bridge fuel, particularly as the world continues to shift toward cleaner sources of energy.

"Through this transaction, we have an exciting opportunity to invest in a critical energy transition infrastructure business in the form of Teekay LNG's high-quality, modern fleet of vessels and stable long-term customer contracts," added Wyper.

Diary of events

2021
The 21st World LNG Summit and Awards
30 November - 3rd December 2021
Rome Cavalieri Hotel, Italy
https://www.worldlngsummit.com

2022
28th World Gas Conference
23 - 27 May 2022
Daegu, Korea
https://www.wgc2022.org

TOTALENERGIES of France said it benefited from a leading position in liquefied natural gas to generate $4.8 billion in adjusted third-quarter net income versus $848 million in the 2020 quarter while cash flow amounted to $8.4Bln.

TotalEnergies, which has stakes in Arctic, Australian and African LNG, sold 30.4 million tonnes of LNG cargoes in the first nine months of 2021 versus 28.3MT in the prior-year period, a rise of 7 percent.

"Hydrocarbon production for LNG increased by 6 percent compared to the previous quarter, in particular due to the end of planned maintenance at Ichthys in Australia," said the Paris-based company in reference to its joint venture near Darwin with Japan's Inpex Corp.

Sales of LNG by TotalEnergies came to 10MT in the third quarter, an increase of 24 percent from the 8.1MT of sales recorded in the same three months of 2020.

"The Integrated Gas Renewables & Power segment generated adjusted net income of $1.6Bln and cash flow of $1.7Bln, both new record highs, thanks to an outperformance of its trading activities, which leveraged its integrated worldwide LNG portfolio," stated TotaEnergies.

"The global economic recovery, notably in Asia, drove all energy prices sharply higher in the third quarter due to the interconnection of energy systems," explained Chairman and Chief Executive Patrick Pouyanné.

"Natural gas prices in Asia and Europe, up more than 85 percent from the previous quarter, reached unprecedented levels, and oil prices gained, continuing their steady year-long rise," added the CEO.

TotalEnergies said its average LNG selling price increased by 38 percent in the past quarter compared with the previous quarter, benefiting on a lagged basis from the increase in the oil and gas price indexes on long-term contracts.

The company's average LNG prices came to $9.10 per million British thermal units compared with $6.59 per MMBtu in the previous quarter and $3.57 per MMBtu in the year-ago quarter.

TotalEnergies reported adjusted net operating income for the Integrated Gas Renewables and Power division of $1.61Bln in the third quarter, a 5.6-fold increase from a year ago.

"This was thanks to the surge in LNG prices and the strong performance of gas and electricity trading activities,' said the company.

Overall hydrocarbon production was 2,814 thousand barrels of oil equivalent per day (kboe/d) in the third quarter 2021, up 4 percent year-on-year.

TotalEnergies said the increase came from project start-ups and ramp-ups, including North Russkoye in Russia and Iara field in Brazil and the resumption of production in Libya.

This rise was offset by the continued "unplanned downtime" at the Hammerfest LNG export plant in Norway following the September 2020 fire. The facility is expected to re-start in early 2022.

TRELLEBORG of Sweden, a maker of liquefied natural gas transfer and mooring equipment, has received certification from the Petroleum and Explosives Safety Organization of India as the Asian nation moves to develop more LNG terminals on the East and West Coasts with highest-grade safety standards.

Trelleborg said its marine Quick Release Hook mooring systems received the certificate from the body that sets the rules for equipment containing electrical systems at new or upgraded LNG facilities in the country.

The certification signifies Trelleborg is now the largest accredited docking and mooring equipment manufacturer in the region.

"We set out on a 12-month initiative with our certification agent and support from key supply chain partners, to record technical documentation regarding all electrical systems and enclosures needed to be assessed for hazardous area operation suitability," said Richard Hepworth, President of Trelleborg's marine and infrastructure operations.

"As a result, we are delighted that Trelleborg Quick Release Hook mooring systems are now certified for use in the Indian market, and are therefore fully compliant with Indian laws and regulations that govern the operation of LNG facilities," added Hepworth.

"As the largest accredited docking and mooring equipment manufacturer, customers in the region requiring Quick Release Hooks can be confident that our equipment is certified and meets all safety standards," he stated.

Hepworth noted that the accreditation means that engineering companies and LNG terminal owners in India can avoid unforeseen budget overruns and schedule delays due to compliance issues.

Safety is paramount across the oil and gas industry with a particular focus in the LNG sector.

Transportation of combustible materials must be managed carefully to avoid the release of gases or vapors into the environment, which can potentially result in explosions, serious injury to personnel and damage to equipment and assets in the surrounding area.

"Trelleborg applies this philosophy at every interface across the LNG transfer chain," said the company.

"Building on decades of experience in the LNG industry, Trelleborg is an experienced and reliable partner to optimize the business model of any LNG transfer operation and support safe, efficient and cost-effective performance," it added.

"With standards and guidelines for equipment utilized in port operations

developed by industry bodies in many countries and regions, it is vital that operators ensure their terminals meet the highest safety standards anywhere in the world," Trelleborg declared.

TSAKOS ENERGY Navigation (TEN), the Greek shipping company with a small LNG fleet of three vessels, has ordered four LNG-powered Aframaz tankers from a South Korean shipyard as first-half earnings resulted in a loss.

TEN said in its statement that following the successful delivery of four vessels with long-term charters to a US oil major, in September of 2021 the company signed newbuilding contracts for the construction of four, or to up to six, dual-fuelled LNG-powered Aframax oil tankers against long-term employment to a major.

South Korea's Daehan Shipbuilding, a subsidiary of Daewoo Shipbuilding and Marine Engineering, said it had obtained the Greek contract.

"Assuming all six are built, the expected gross revenues from these contracts could be approximately $350M," said Athens-based TEN, which is listed on the New York Stock Exchange.

TEN reported a second-quarter net loss of $19.66 million compared with a profit $31.48M in the prior-year quarter and a first-half loss of $24.48M versus a profit of $186.0M in the first six months of 2020.

"With the majority of the vessels able to capture the anticipated upside, TEN is poised to be a primary beneficiary of the tanker upturn and continue to offer investors a mix of secured income, upside potential and dividend payments," said George Saroglou, Chief Operating Officer.

TEN's LNG carriers are the 174,045 cubic metres capacity vessel "Maria Energy", the 174,000 cubic metres capacity "Tenergy" and the 150,000 cubic metres capacity "Neo Energy".

The rest of the fleet comprises 36 oil tankers and 23 clean-product carriers.

In its earnings, TEN said the overall voyage revenues for the whole fleet in the second quarter dropped to $136.41M. compared with $190.77M in the second three months of 2020.

"As Covid restrictions are lifted around the globe, the pent-up consumer demand of prior months raises hopes that oil demand could surpass 100 million barrels per day, helped, as in prior years, by Chinese and Indian imports, especially for their strategic petroleum reserves," said TEN in its market analysis.

"There are also signs that product trade carriage is beginning to revive," it added.

TEN noted that its long-term strategy was to seek opportunities to maintain a young and modern fleet profile and it continues to dispose of older vessels and replace them with new generation tankers with long-term charters.

"In the first months of 2021, we experienced the worst tanker market in recent memory," said TEN.

"However, the tried and tested balanced employment policy of the company assisted to somewhat absorb the pressure. Capitalizing on our strong cash balance and access to capital, management continued the countercyclical investment strategy with the ordering of the LNG-powered tankers for our top-tier clients," said TEN.

TEN said that as a result of its balanced strategy, it managed to contain the net loss before a non-cash loss of $5.8M on the sale of three vessels.

The sale included the disposal of two Suezmax crude tankers, a transaction that generated $44.7M in proceeds and released $16.6M of cash after related loan prepayments.

"Despite the prolonged weak market, gross revenues in the first half of 2021 amounted to $275.4M and the daily time charter equivalent rate per vessel, for the same period, averaged $17,701 per day," said TEN.

"Fleet utilization during the first half of 2021 was at 92.3 percent as a total of eight vessels underwent dry-docking, four of which ahead of schedule in preparation for the anticipated market upturn," it added.

WOODSIDE, the Western Australian operator of two LNG plants and oil and gas assets, more than doubled quarterly sales revenue to US$1.53 billion as prices jumped and even as the company executed significant scheduled maintenance activities at both the North West Shelf plant and Pluto LNG.

The US$1.53 billion of revenue compared with the US$699 million recorded in the prior-year quarter to the end of September and was 19 percent higher than the previous 2021 quarter.

LNG sales alone totalled US$1.22Bln versus US$462M in the same three months of 2020. The average realised price increased to $59 per barrel of oil equivalent, up 28 percent from the previous quarter.

For cargoes. Woodside's average realised LNG price in the third quarter was US$9.80 per million British thermal units compared with $3.9 per MMBtu in the same three months of 2020 and $7.10 per MMBtu in the previous quarter of 2021.

The Perth-based company also entered into a merger commitment deed with BHP Group to combine BHP's oil and gas portfolio with Woodside's.

Woodside additionally gave a notice to proceed with engineering to US company Bechtel for Train II at Pluto LNG.

Other quarterly highlights included the completion of the drilling of the first well for the Sangomar Field Development Phase 1 offshore Senegal in West Africa.

The earnings statement noted that overseas, the Sangomar development was 38 percent complete at the end of the quarter and remained on track for targeted first oil in 2023.

Meg O'Neill, who has now been formally named Chief Executive after fulfilling the interim role on the departure of Peter Coleman, said the company benefited from stronger average realised LNG prices.

"Revenue from LNG sales during the period was 27 percent higher than the second quarter despite production being impacted by planned maintenance activities," added O'Neill.

"Our portfolio realised LNG price was $57 per barrel of oil equivalent and our strong realised oil price of $80 per barrel reflects continued demand for Vincent crude in oil blending markets," stated the CEO.

"We expect in the fourth quarter to see the benefit of stronger pricing on our realised prices, reflecting the oil price lag in many of our contracts and recent increases in gas hub prices," O'Neill said.

Woodside added that during the quarter during the fourth quarter of 2021 six equity LNG spot cargoes were sold and the company expected to that about 17 percent of produced LNG at the two plants would be sold on a spot basis in the fourth quarter.

"The agreement to pursue a proposed merger of Woodside and BHP's petroleum business is progressing as planned," said O'Neill.

"Execution of a share sale agreement and an integration and transition service agreement is expected in November, in advance of targeted completion in the second quarter of 2022 following all approvals," she added. ■

LNG Import Terminals

Explanatory Notes

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

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

Country	Location (Project)	Owners	Start up	Storage Tanks	Storage Capacity
Belgium	Zeebrugge	Fluxys	1987	4	380,000
Canada	Canaport Saint John	Irving Oil, Repsol	2009	3	480,000
Chile	Quintero	ENAP, Metrogas, Enagas	2009	3	334,000
	Mejillones	Engie, Ameris Capital AGF	2010	1	175,000
China	Beihai LNG, Guangxi	Sinopec	2015	4	640,000
	Dalian	PetroChina	2011	3	480,000
	Dapeng ND Guangdong	CNOOC	2018	4	640,000
	Dongguan, Guangdong	Jovo Group	2013	2	160 000
	Fujian LNG (Xiuyu)	CNOOC, Fujian I&D Corp.	2008	2	640,000
	Guangdong	CNOOC,BP	2006	3	480,000
	Haikou, Hainan LNG	CNOOC	2014	3	480,000
	Ningbo, Zheijang	CNOOC, Zhejiang Energy	2012	3	480,000
	Qidong, Jiangsu	Guanghui Energy	2018	1	60,000
	Qingdao, Shandong	Sinopec	2014	3	480,000
	Rudong	PetroChina	2011	3	530,000
	Shanghai	CNOOC, Shenergy Group	2009	3	495,000
	Shanghai, Mengtougou	Shanghai Gas	2008	3	120 000
	Shenzen, Diefu	CNOOC	2016	2	320,000
	Tangshan, Hebei	PetroChina	2013	3	480,000
	Tianjin North	Sinopec	2017	2	320,000
	Yuedong, Guangdong	CNOOC	2016	2	320,000
	Zhoushan Zhejiang	Enn Group	2018	2	320,000
	Zhuhai, Gaolan	CNOOC	2013	3	480,000
Dominican Republic	Punta Caucedo	AES Andres	2003	1	160 000
Finland	Pori	Gasum Skangas	2016	1	30,000
	Tornio	Gasum Skangas	2018	1	30,000
France	Fos Tonkin	Elengy	1972	3	150,000
	Montoir-de-Bretagne	Elengy	1980	3	360,000
	Fos Cavaou	Engie, Total	2010	3	330,000
	Dunkirk LNG	EDF, Fluxys, Total	2016	3	570,000
Gibraltar	Gasnor	Shell	2018	1	5,000
Greece	Revithoussa	DEPA	2000	3	225,000
India	Dabhol	GAIL, NTPC (Ratnagiri Gas & Power)	2009	3	480,000
	Dahej	Petronet LNG	2004	4	592,000
	Hazira	Shell India, Total	2005	2	320,000
	Kochi, Kerala	Petronet LNG	2013	2	320,000
	Mundra	Gujarat State Petroleum, Adani Group	2018	2	320,000
	Kamarajar (Ennore), Tamil Nadu	Indian Oil, DFC, ICICI Bank	2019	2	360,000
Indonesia	Arun	Pertamina	2015	5	507,000
Italy	Panigaglia	Snam	1969	2	100,000
	Porto Levante (offshore GBS)	ExxonMobil, Qatar Petroleum, Edison Gas	2009	2	250,000
Jamaica	Montego Bay	New Fortress	2018	1	7,000
Japan	Negishi	Tokyo Gas	1969	14	1,180,000
	Sodegaura	Tokyo Gas JERA Co. Inc	1973	35	2,660,000
	Ohgishima	Tokyo Gas	1998	4	850,000
	Higashi-Ohgishima	JERA Co. Inc.	1984	9	540,000
	Futtsu	JERA Co. Inc.	1985	10	1,360,000
	Yokkaichi LNG	JERA Co. Inc.	1988	4	320,000
	Kawagoe	JERA Co. Inc.	1997	6	840,000
	Yokkaichi Works	Toho Gas	1991	2	160,000
	Chita LNG Joint	Toho Gas, Chubu Electric	1978	4	300,000
	Chita LNG	Toho Gas, Chubu Electric	1983	7	640,000
	Chita - Midorihama	Toho Gas	2001	3	600,000
	Senboku I	Osaka Gas	1972	4	180,000
	Senboku II	Osaka Gas	1977	18	1,585,000
	Himeji	Osaka Gas	1984	8	740,000
	Himeji LNG	Kansai Electric	1979	7	520,000
	Yanai	Chugoku Electric	1990	6	480,000
	Niigata	Nihonkai LNG, Tohoku Electric	1984	8	720,000
	Oita	Oita Gas, Kyushu Electric	1990	5	460,000
	Tobata	Kitakyushu LNG	1977	8	480,000
	Fukuoka	Saibu Gas	1993	2	70,000
	Sodeshi	Shizuoka Gas	1996	3	337,200
	Hatsukaichi	Hiroshima Gas	1996	2	170,000
	Kagoshima	Nippon Gas	1996	2	136,000
	Shin-Minato	Sendai City Gas	1997	1	80,000
	Nagasaki	Saibu Gas	2003	1	36,000
	Sakai	Kansai Electric, Cosmo OII	2006	3	420,000
	Mizushima	Nippon Oil, Chugoku Electric	2006	2	320,000

LNG Import Terminals (continued)

Country	Location (Project)	Owners	Start up	Storage Tanks	Storage Capacity
	Sakaide	Shikoku Electric, Cosmo Oil	2011	1	180,000
Japan (continued)	Ishikari LNG	Hokkaido Gas, Hokkaido Electric	2012	2	380,000
	Okinawa	Okinawa Electric Power	2012	2	280,000
	Naoetsu	Inpex	2013	2	360,000
	Joetsu	JERA Co. Inc.	2011	3	540,000
	Hachinohe LNG	Nippon Oil	2015	2	280,000
	Hitachi LNG	Tokyo Gas	2015	1	230,000
	Soma Fukushima	Japan Petroleum Exploration	2017	1	225,000
Korea	Boryyeong	GS Energy, SK E&S	2017	3	200,000
	Incheon	Kogas	1996	20	2,880,000
	Kwangyang	POSCO SK E&S	2005	4	530,000
	Pyeong-Taek	Kogas	1986	23	3,360,000
	Samcheok	Kogas	2014	3	600,000
	Tong-Yeong	Kogas	2002	17	2,620,000
	Jeju	Kogas	2019	2	90,000
Kuwait	Al Zour LNG	KIPIC	2021	8	1,800,000
Malaysia	Pengerang Johor	Petronas Gas	2017	2	400,000
Mexico	Altamira	Vopak, Enagas	2006	2	300,000
	Energia Costa Azul	Sempra LNG	2008	2	320,000
	Manzanillo	Samsung, Kogas, Mitsui	2012	2	300,000
Netherlands	Gate LNG	Gasunie, Royal Vopak	2011	3	540,000
Panama	Costa Norte	AES	2018	1	130,000
Phillipines	Pagbilao LNG	Energy World Corp.	2017	1	130,000
Poland	Swinoujscie	Baltic Gaz System	2015	2	320,000
Portugal	Sines	REN Atlantico	2004	3	390,000
Puerto Rico	Penuelas	EcoElectrica	2000	1	160,000
Singapore	Singapore	Singapore Energy Authority	2013	3	540,000
Spain	Barcelona	Enagas	1969	8	840,000
	Huelva	Enagas	1988	5	610,000
	Cartagena	Enagas	1989	5	587,000
	Bilbao	Enagas, EVE	2003	3	450,000
	Sagunto	GNF, Osaka Gas, Oman Oil	2006	4	600,000
	Mugardos, El Ferrol	Reganosa, Sonatrach, Sojitz Corp.	2006	2	300,000
	El Musel, Gijón,	Enagas	2013	2	300,000
Sweden	Lysekil	Gasum	2014	1	30,000
	Nynashamn	AGA Gas	2011	1	20,000
Taiwan	Yung-An	CPC	1990	6	690,000
	Tai-Chung	CPC	2009	5	800,000
Thailand	Map Ta Phut	PTT LNG	2011	2	320,000
Turkey	Marmara Ereglisi	Botas	1994	3	255,000
	Izmir	EgeGaz	2006	2	280,000
USA	Everett	Suez LNG NA	1971	2	155,000
	Lake Charles	Shell, ETE	1982	4	425,000
	Freeport	Freeport LNG Development	2008	2	320,000
	Golden Pass, TX	Qatar Petroleum, ExxonMobil	2010	5	775,000
	Pascagoula, MS	Gulf LNG, Kinder	2012	2	320,000
UK	Isle of Grain	National Grid	2005	8	1,000,000
	South Hook	ExxonMobil, Qatar Petroleum,Total	2009	5	775,000
	Dragon LNG, Milford Haven	Shell, Petronas	2009	2	310,000

LNG Import Terminal Projects

Country	Location/Project	Owners/Project Developers	Start up	Storage Tanks	Storage Capacity
China	Shenzhen	CNPC Yudean Power	2021	2	120,000
	Tianjin (Nangang)	Beijing Energy	2022	10	2,000,000
	Yangjiang	CNPC Yudean Power	2023	2	120,000
	Zhangzhou Fujian	CNOOC	2022	2	160,000
India	Dhamra Odisha	Indian Oil, Adani, GAIL	2020	2	320,000
	Jaigarh	Hiranandani Group	2021	2	320,000
	Kodinar	Hindustan Petroleum Corp.	2022	1	160,000
Japan	Himuka	Diagas Group-Osaka Gas	2022	1	65,000

LNG FSRU Import Facilities

Country	Location (Project)	Owners	Start up
Argentina	Escobar GasPort	Excelerate/Enarsa	2011
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
Ghana	Tema LNG	Helios/GNPC	2021
Indonesia	Lampung	Hoegh LNG, PGN LNG	2014
	Nusantara (Jakarta Bay)	Golar LNG, Pertimana	2012
	Benoa LNG	PT Pertagas Niaga	2016
	Amurang	Karadeniz	2020
	Jawa Satu FSRU	Pertamina	2021
Israel	Hadera Gateway	Israel Electric	2013
Italy	Livorno	OLT Offshore LNG Toscana	2013
Jamaica	Old Harbour	Golar FSRU, New Fortress	2019
Jordan	Aqaba, Jordan	Golar LNG	2015
Kuwait	Mina Al-Ahmadi	KPC	2009
Lithuania	Klaipeda	Klaipedos Nafta Hoegh LNG	2014
Malaysia	Malacca FSRU	Petronas	2012
Malta	FSU Armada Mediterrana	ElectroGas	2016
Myanmar	Thanlyin	CNTIC Vpower	2020
Pakistan	Port Qasim	Excelerate, Engro Corp	2015
	Port Qasim	BW-Mitsui, PGP Consortium	2017
Russia	Kaliningrad FSRU	Gazprom	2020
Turkey	Aliaga FSRU, Turquoise FLNG	Etki LNG	2016
	Dortyol FSRU Terminal	Botas	2018
UAE	Ruwais, Abu Dhabi	Gasco (UAE)	2016
	Jebel Ali Port, Dubai	DSA (UAE)	2010

LNG Export Projects

Country	Location/Project	Project Developers	Planned Start Up	Number of Trains	Capacity In MTPA
AUSTRALIA	Pluto LNG expansion	Woodside	2021+	2	10.0
CANADA	Bear Head LNG, Nova Scotia	LNG Ltd.	2024	4	8.0
	Goldboro LNG, Nova Scotia	Pieridae Energy	2024	2	10.0
	Kitimat LNG, BC	Woodside, Chevron	2024	2	10.0
	LNG Canada, BC	Shell, Mitsubishi, Kogas, PetroChina, Petronas	2024	2	12.0
	Kwispaa FLNG, Vancouver	Steelhead LNG	2024	4	12.0
	Vancouver Tilbury	WesPac Midstream	2021	1	3.25
	Woodfibre LNG, Squamish	Pacific Oil & Gas Co	2020	2	2.1
INDONESIA	Sengkang LNG	Energy World Corp.	2021+	4	2.0
MALAYSIA	Rotan FLNG (Sabah)	Petronas, Murphy Oil	2021	1	1.5
MOZAMBIQUE	Area 1 Onshore	Anadarko Petroleum and partners	2023+	2	10.0
	Area 4 Onshore	Eni and partners	2023+	2	10.0
	Area 4 FLNG	Eni and partners	2022	1	3.4
NIGERIA	NLNG Train 7	NNPC, Shell, Eni, Total	2022+	1	7.0
PAPUA NEW GUINEA	Elk-Antelope LNG	Total, ExxonMobil Oil Search, Petromin	Studies		
RUSSIA	Sakhalin II expansion	Gazprom, Shell, Mitsui, Mitsubishi	2021	studies	
	Vladisvostok LNG	Gazprom, Itochu, various	2023+	2	10.0
	Arctic LNG II Siberia	Novatek, Total	2023	3	19.8
USA	Alaska LNG Nikiski	Alaska Gasline Development Corp.	2023+	3	20.0
	Annova LNG, Brownsville	Exelon Corp.	2023+	6	6.0
	Commonwealth LNG, Louisiana	Commonwealth LNG LLP	2023+	8	9.0
	Delfin LNG, Louisiana	Delfin	2023+	3	9.0
	Driftwood LNG, Louisiana	Tellurian, Total and others	2023	6	27.6
	Galveston Bay LNG	NextDecade	2023+	6	27.0
	Golden Pass, Texas	Qatar Petroleum, ExxonMobil	2024	3	15.6
	Jacksonville, St John's River	Eagle LNG, Ferus Natural Gas Fuels	2021+	small	TBC
	Jordan Cove, Coos Bay	Pembina Corp.	2024	2	7.8
	Lake Charles, Louisiana	Shell, ETE	2024	3	15.0
	Magnolia LNG	Louisiana LNG Ltd.	2023+	4	8.0
	Port Arthur LNG	Sempra	2023+	2	10.0
	Rio Grande LNG	NextDecade	2023+	6	27.0
	Sabine Pass LNG, Louisiana	Cheniere	2016-19	1	4.5
	Texas LNG Brownsville	Chandra, Meyer, Samsung, others	2023+	2	4.0
	VG LNG (Cameron Parish)	Venture Global	2022	5	12.0
	VG LNG (Plaquemines)	Venture Global	2022	10	20.0
	VG LNG (Delta-Plaquemines)	Venture Global	2024	36	22.5

LNG Exporters

Country	Location/Project	Shareholders	Start up	Liquefaction		Storage	
				Trains	capacity (nominal) mtpa	No. of tanks	Total capacity m³
ABU DHABI (UAE)	Das Island (Adgas)	ADNOC, Mitsui, BP, Total	1977	2	3.2	3	240,000
			1994	1	2.5		
ALGERIA	Arzew	Sonatrach GL4Z	1964	3	1.1	3	35,000
	Arzew	Sonatrach GL1Z	1978	6	7.8	3	300,000
	Arzew	Sonatrach GL2Z	1980	6	8.0	3	300,000
	Arzew	Sonatrach	2014	1	4.7		
	Skikda	Sonatrach GL1K II	1980	3	3.0	5	308,000
	Skikda	Sonatrach (rebuild)	2013	1	4.5		
ANGOLA	Soyo	Sonangol, Chevron, BP, ENI, Total	2012	1	5.2	2	370,000
AUSTRALIA	Karratha	NWS Woodside, Shell, BHP	1989	2	5.0	4	260,000
		(BP, Chevron	1992	1	2.5	1	130,000
		(Mistubishi/Mitsui)	2004	1	4.4	1	130,000
		NWS partners	2008	1	4.4	1	130,000
	Darwin	Darwin (Bayu Undan) ConocoPhillips, Santos, Eni, Inpex, TEPCO, Tokyo Gas	2006	1	3.5	1	188,000
	Australia Pacific LNG	ConocoPhillips, Origin Energy, Sinopec	2016	2	7.5	2	320,000
	Gladstone LNG	Santos, Petronas, Total, Kogas	2015	2	7.8	2	280,000
	Gorgon LNG	Chevron, Shell, ExxonMobil	2016	3	15.6	2	360,000
	Pluto LNG	Woodside, Tokyo Gas, Kansei	2012	1	4.8	2	240,000
	QCLNG	Shell, CNOOC	2014	2	8.0	2	280,000
	Wheatstone LNG	Chevron, Woodside, Kuwait (KUFPEC), Jera, Kyushu	2017	2	8.9	2	300,000
	Ichthys LNG	Inpex Corp., Total	2018	2	8.9	2	330,000
	Prelude FLNG	Shell, Inpex, Kogas CPC	2019	1	3.5		
BRUNEI	Lumut	Brunei/Shell/Mitsubishi/Total	1972-74	5	7.2	3	176,000
CAMEROON	Hilli Episeyo FLNG	Kribi Perenco	2018	1	1.2	1	125,000
EGYPT	Damietta	Union Fenosa, EGPC, EGAS	2004	1	5.0	2	300,000
	Idku	EGPC, EGAS, Shell, Total, Petronas	2005	2	7.2	2	280,000
EQ.GUINEA	Bioko Island	Marathon, Sonagas, Mitsui, Marubeni	2007	1	3.4	2	272,000
INDONESIA	Bontang I	Pertamina, VICO, JILCO, Total	1977	2	5.2	5	635,000
	Bontang II		1983	2	5.2		
	Bontang III		1989	1	2.8		
	Bontang IV		1993	1	2.8		
	Bontang V		1997	1	2.8		
	Bontang VI		1999	1	3.0		
	Sulawesi LNG	Medco Energi, Pertamina, Mitsubishi	2015	1	2.0	1	170,000
	Tangguh	BP, MI Berau, CNOOC, Nippon, LNG Japan	2008	2	7.6	2	340,000
MALAYSIA	Bintulu (MLNG Satu)	Petronas, Sarawak, Mitsubishi	1983	3	8.1	4	260,000
	Bintulu (MLNG Dua)	Petronas, Shell, Sarawak, Mitsubishi	1995	3	7.8	1	65,000
	Bintulu (MLNG Tiga)	Petronas, Shell, Sarawak, Mitsubishi, Nippon Oil	2003	2	6.8	1	120,000
	Bintulu Train 9	Petronas	2016	1	3.6		
	Kanowit FLNG	Petronas	2016	1	1.2		
NIGERIA	Bonny Island	NNPC, Shell, Total, Eni	1999	2	6.4	2	168,400
		Nigeria LNG (formed by above)	2002	1	3.2	1	84,200
		Nigeria LNG	2006	2	8.2		
		Nigeria LNG	2008	1	4.1	1	84,200
NORWAY	Snøhvit/Melkoya	Equinor, Total, Petoro	2007	1	4.2	2	280,000
OMAN	Oman LNG	Oman Govt., Shell, Total, Korea LNG Mitsubishi, Mitsui, Partex and Itochu	2000	2	7.1	2	240,000
		Oman Govt.,Oman LNG Union Fenosa, Osaka Gas, & Itochu	2006	1	3.7	2	240,000
PAPUA NEW GUINEA	PNG LNG	ExxonMobil, Oil Search, Santos, JX Nippon Oil	2014	2	6.9	2	320,000
PERU	Peru LNG	Hunt Oil, Shell, Marubeni, SK Group	2010	1	4.4	2	260,000
QATAR	Qatargas 1-T1&2	QP, ExxonMobil, Total, Marubeni, Mitsui	1997	2	6.4	4	340,000
	Qatargas 1-T3	QP, ExxonMobil, Total, Marubeni, Mitsui	1999	1	3.1		
	Qatargas II-T1	QP, ExxonMobil	2009	1	7.8		
	Qatargas II-T2	QP, ExxonMobil, Total	2009	1	7.8	8	1,160,000
	Qatargas III-T1	QP, ConocoPhillips, Mitsui	2010	1	7.8		
	Qatargas IV-TI	QP, Shell	2010	1	7.8		
	RasGas I- T1&2	QP, ExxonMobil, Kogas, Itochu, LNG Japan	1999	2	6.6		
	RasGas II- T3	QP, ExxonMobil	2004	1	4.7		
	RasGas II- T4	QP, ExxonMobil	2005	1	4.7	6	840,000
	RasGas II- T5	QP, ExxonMobil	2007	1	4.7		
	Rasgas III – T6	QP, ExxonMobil	2009	1	7.8		
	Rasgas III – T7	QP, ExxonMobil	2010	1	7.8		
RUSSIA	Sakhalin Island	(Sakhalin Energy) Gazprom, Shell, Mitsui, Mitsubishi	2009	2	9.6	2	200,000
	Yamal LNG Siberia	Novatek, Total, CNPC, Silk Fund	2017	3	16.5	4	640,000
TRINIDAD & TOBAGO	Point Fortin Train 1	BP, Shell, CIC, NGC	1999	1	3.0	2	204,000
	Train 2	BP, Shell	2002	1	3.3	1	160,000
	Train 3	BP, Shell	2003	1	3.3	1	160,000
	Train 4	BP, Shell, NGC	2005	1	5.2	1	160,000
USA	Cheniere Sabine Pass	Cheniere Energy	2016	5	22.5	5	800,000
	Cove Point LNG	Dominion Energy	2017	1	5.3	7	695,000
	Cheniere Corpus Christi	Texas Cheniere	2018	3	15.0	3	480,000
	Cameron Hackberry	Sempra, Total, Mitsui, Mitsubishi	2019	2	9.8	3	480,000
	Elba Island Georgia	Kinder Morgan, EIG Energy	2019	10	2.5	5	535,000
	Freeport LNG,Texas	Freeport LNG	2019	2	10.2	3	483,000
YEMEN	Bal-Haf	Yemen LNG, Total, Yemen Gas, Hunt Oil, SK Group, Hyundai	2009	2	6.7	2	320,000

World LNG Carrier Fleet

LNG Carrier	Capacity m³	Registered Owner	Builder	Delivery	Flag	Power Plant	Cargo System	No. of Tanks	Original Project	Hull Number
Aamira	268,000	Nakilat SHI 1753 Inc.	Samsung	Apr-10	Marshall Is.	Diesel	TZ Mk. III	10	Qatargas IV	1753
Abadi	135,000	BGC One Nbd Sdn Bhd.	Mitsubishi	May-02	Brunei	Steam	Moss	5	Lumut	–
Adam LNG	162,000	Adam Maritime Transportation	HHI	Jul-14	Marshall Is.	Diesel	Membrane	4	Oman LNG	–
Adamastos	170,800	Shin Doun Kisen Co. Ltd.	HHI	Aug-21	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3109
Adriano Knutsen	180,000	Hai Feng 1717 Ltd.	HHI	Jul-19	Spain	ME-GI	TZ Mk. III Flex Plus	4	Corpus Christi	2963
Al Aamriya	210,168	J5 Nakilat No. 1 Ltd.	Daewoo	May-08	Marshall Is.	Diesel	GT NO 96	5	RasGas III	–
Al Areesh	148,786	Al Areesh LLC	Daewoo	Jan-07	Bahamas	Steam	GT NO 96	4	RasGas II	–
Al Bahiya	210,100	Nakilat DSME 2286 Inc.	Daewoo	Dec-09	Marshall Is.	Diesel	TZ Mk. III	5	Qatargas IV	–
Al Biddah	137,339	Mitsui/Nippon/Kawasaki/Iino	Kawasaki	Nov-99	Japan	Steam	Moss	5	Qatargas I	–
Al Daayen	148,853	Al Daayen LLC	Daewoo	Mar-07	Bahamas	Steam	GT NO 96	4	RasGas II	–
Al Dafna	268,000	Nakilat SHI 1726 Inc.	Samsung	Oct-09	Marshall Is.	Diesel	GT NO 96	10	RasGas	1726
Al Deebel	145,000	Peninsula LNG Transport No. 3	Samsung	Nov-05	Bahamas	Steam	TZ Mk. III	4	RasGas II	–
Al Gattara	216,200	Overseas LNG H1 Corp.	HHI	Nov-07	Marshall Is.	Diesel	TZ Mk. III	4	Qatargas II	–
Al Ghariya	210,150	Julia Neptora	Daewoo	Dec-07	Bahamas	Diesel	GT NO 96	4	Qatargas II	–
Al Gharrafa	216,200	Overseas LNG H2 Corp.	HHI	Jan-08	Marshall Is.	Diesel	TZ Mk. III	5	Qatargas II	–
Al Ghashamiya	217,591	Nakilat SHI 1696 Inc.	Samsung	Apr-09	Marshall Is.	Diesel	TZ Mk. III	10	Qatargas III	–
Al Ghuwairiya	263,300	Nakilat Al Ghuwairiya Inc.	Daewoo	Dec-08	Marshall Is.	Diesel	GT NO 96	5	Qatargas II	–
Al Hamla	216,200	Overseas LNG S2 Corp.	Samsung	Feb-08	Marshall Is.	Diesel	TZ Mk. III	4	Qatargas II	–
Al Hamra	137,000	Al Hamra Ltd.	STX	Nov-96	Liberia	Steam	Moss	4	Das Island	–
Al Huwaila	217,000	Al Huwaila Inc.	Samsung	May-08	Bahamas	Diesel	TZ Mk. III	10	RasGas III	–
Al Jasra	137,227	Mitsui/Nippon/Kawasaki/Iino	Mitsubishi	Jun-00	Japan	Steam	Moss	5	Qatargas I	–
Al Jassasiya	145,700	Venice Maritime	Daewoo	May-07	Greece	Steam	GT NO 96	4	RasGas II	–
Al Karaana	210,100	Nakilat DSME 2284 Inc.	Daewoo	Oct-09	Marshall Is.	Diesel	GT NO 96	4	Qatargas III	–
Al Kharaitiyat	216,300	Nakilat HHI 1909 Inc.	HHI	Jun-09	Marshall Is.	Diesel	TZ Mk. III	4	Qatargas III	–
Al Kharsaah	217,000	Al Kharsaah Inc.	Samsung	Jun-08	Bahamas	Diesel	TZ Mk. III	10	RasGas III	–
Al Khattiya	210,150	Nakilat DSME 2283 Inc.	Daewoo	Jul-09	Marshall Is.	Diesel	GT NO 96	4	Qatargas IV	–
Al Khaznah	135,496	Al Khaznah Inc.	Mitsui E&S	Jul-94	Liberia	Steam	Moss	5	Das Island	–
Al Khor	137,354	Mitsui/Nippon/Kawasaki/Iino	Mitsubishi	Nov-96	Japan	Steam	Moss	5	Qatargas I	–
Al Khuwair	217,000	Al Khuwair Inc.	Samsung	Jun-08	Bahamas	Diesel	TZ Mk. III	10	RasGas III	–
Al Mafyar	266,000	Nakilat SHI 1697 Inc.	Samsung	Apr-09	Marshall Is.	Diesel	TZ Mk. III	5	Qatargas III	–
Al Marrouna	149,539	Al Marrouna LLC	Daewoo	Sep-06	Bahamas	Steam	GT NO 96	4	RasGas II	–
Al Mayeda	266,000	Nakilat SHI 1694 Inc.	Samsung	Jan-09	Marshall Is.	Diesel	TZ Mk. III	5	Qatargas III	–
Al Nuaman	210,100	Nakilat DSME 2285 Inc.	Daewoo	Dec-09	Marshall Is.	Diesel	GT NO 96	4	Qatargas III	–
Al Oraiq	210,200	J5 Nakilat No. 3 Ltd.	Daewoo	Jun-08	Marshall Is.	Diesel	GT NO 96	18	RasGas III	–
Al Rayyan	137,420	Mitsui/Nippon/Kawasaki/Iino	Kawasaki	Mar-97	Japan	Steam	Moss	5	Qatargas I	–
Al Rekayyat	216,293	Nakilat HHI 1910 Inc.	HHI	Jun-09	Marshall Is.	Diesel	TZ Mk. III	4	Qatargas III	–
Al Ruwais	210,150	Alexandra Neptana	Daewoo	Aug-07	Bahamas	Diesel	GT NO 96	4	Qatargas II	–
Al Sadd	210,200	Nakilat DSME 2265 Inc.	Daewoo	Mar-09	Marshall Is.	Diesel	GT NO 96	12	Qatargas III	–
Al Safliya	210,150	Britta Nausola	Daewoo	Sep-07	Bahamas	Diesel	GT NO 96	5	Qatargas II	–
Al Sahla	216,200	J5 Nakilat No. 5 Ltd.	HHI	Jun-08	Marshall Is.	Diesel	TZ Mk. III	4	RasGas III	–
Al Samriya	263,300	Nakilat Al Samriya Inc.	Daewoo	Feb-09	Marshall Is.	Diesel	GT NO 96	5	Qatargas II	–
Al Shamal	217,000	Al Shamal Inc.	Samsung	Apr-08	Bahamas	Diesel	TZ Mk. III	10	RasGas III	–
Al Sheehaniya	210,100	Nakilat DSME 2264 Inc.	Daewoo	Feb-09	Marshall Is.	Diesel	GT NO 96	12	Qatargas III	–
Al Thakhira	145,000	Peninsula LNG Transport No. 2	Samsung	Aug-05	Bahamas	Steam	TZ Mk. III	4	RasGas II	–
Al Thumama	216,200	J5 Nakliat No. 2 Ltd.	HHI	Feb-08	Marshall Is.	Diesel	TZ Mk. III	4	RasGas III	–
Al Utouriya	215,000	J5 Nakilat No. 8 Ltd.	HHI	Sep-08	Marshall Is.	Diesel	TZ Mk. III	4	RasGas III	–
Al Wajbah	137,308	Mitsui/Nippon/Kawasaki/Iino	Mitsubishi	Jun-97	Japan	Steam	Moss	5	Qatargas I	–
Al Wakrah	137,371	Mitsui/Nippon/Kawasaki/Iino	Kawasaki	Nov-98	Japan	Steam	Moss	5	Qatargas I	–
Al Zubarah	137,573	Mitsui/Nippon/Kawasaki/Iino	Mitsui E&S	Nov-96	Japan	Steam	Moss	5	Qatargas I	–
Alto Acrux	147,798	Bahamas LNG Transport Ltd.	Mitsubishi	Mar-08	Bahamas	Steam	Moss	4	Darwin LNG	–
Amadi	154,800	BGC Four Nbd Sdn Bhd.	HHI	Jul-15	Brunei	DFDE	Membrane	4	Lumut	2607
Amali	148,000	BGC Spv Nbd Sdn Bhd.	Daewoo	Aug-11	Brunei	DFDE	GT NO 96	4	Lumut	–
Amani	154,800	BGC Three Nbd Sdn Bhd.	HHI	Oct-14	Brunei	DFDE	Membrane	4	Lumut	–
Amberjack LNG	174,000	Xiang Ch17 HK International	HHI	Apr-20	Malta	X-DF	TZ MK. III Flex	4	Portfolio	3021
Amur River	149,700	Seacrown Maritime Ltd.	HHI	Nov-07	Marshall Is.	Steam	TZ Mk. III	4	Sakhalin II	–
Arctic Aurora	155,000	Fareastern Shipping Ltd.	HHI	Jul-14	Malta	Diesel/Gas-Electric	TZ Mk. III	4	Snøhvit LNG	–
Arctic Discoverer	142,612	Northern LNG Trans Co. I Ltd.	Mitsui E&S	Feb-06	Bahamas	Steam	Moss	4	Hammerfest	–
Arctic Lady	147,200	Barents Leasing Ltd.	Mitsubishi	Apr-06	Norway	Steam	Moss	4	Hammerfest	–
Arctic Princess	147,200	Rb-Quadrangle Leasing Ltd.	Mitsubishi	Jan-06	Norway	Steam	Moss	4	Hammerfest	–
Arctic Spirit	89,800	Arctic Spirit LLC	Ishikawajima	Dec-93	Bahamas	Steam	IHI SPB	4	Atlantic LNG	–
Arctic Voyager	142,759	Northern LNG Trans Co. II Ltd.	Kawasaki	Jul-06	Bahamas	Steam	Moss	4	Hammerfest	–
Aristarchos	174,000	Dias Gas Carrier Corp.	HHI	Jun-21	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3107
Aristidis I	174,000	Atrotos Gas Carrier Corp.	HHI	Jan-21	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3106
Aristos I	174,000	Xiang Ch25 HK International	HHI	Nov-20	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3105
Arkat	148,000	BGC Spv Nbd Sdn Bhd.	Daewoo	Feb-11	Brunei	DFDE	GT NO 96	4	Lumut	–
Arwa Spirit	165,500	Membrane Shipping Ltd.	Samsung	Aug-08	Marshall Is.	Diesel/Gas-Electric	TZ Mk. III	4	Balhaf	–
Aseem	155,003	India LNG Transport Co. No. 3	Samsung	Nov-09	Malta	Diesel	TZ Mk. III	4	RasGas	–

Asia Endeavour	160,000	Chevron Transport Corp. Ltd.	Samsung	Jun-15	Bahamas	Diesel/Gas-Electric	TZ MK. III	4	Gorgon	1942
Asia Energy	154,800	Chevron Transport Corp. Ltd.	Samsung	Oct-14	Bahamas	DFDE	TZ MK. III	4	Gorgon	–
Asia Excellence	160,000	Chevron Transport Corp. Ltd.	Samsung	Feb-15	Bahamas	DFDE	TZ MK. III	4	Gorgon	1941
Asia Integrity	160,000	Chevron Transport Corp. Ltd.	Samsung	Feb-17	Bahamas	DFDE	TZ Mk. III	4	Wheatstone	2069
Asia Venture	160,000	Chevron Transport Corp. Ltd.	Samsung	Jul-17	Bahamas	Diesel/Gas-Electric	TZ Mk. III Flex	4	Wheatstone	2070
Asia Vision	154,800	Chevron Transport Corp. Ltd.	Samsung	Jul-14	Bahamas	Diesel/Gas-Electric	TZ MK. III	4	Gorgon	–
Attalos	170,800	Sea 200 Leasing Co. Ltd.	HHI	Aug-21	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3108
Barcelona Knutsen	173,400	Norspan LNG V AS	Daewoo	Jan-10	Spain	Diesel/Gas-Electric	GT NO 96	4	Portfolio	–
Beidou Star	172,000	Capricorn LNG Shipping Ltd.	Hudong Zhonghua	Sep-15	Hong Kong	Diesel	TZ MK. III	4	PNG LNG	H1672A
Berge Arzew	138,088	Berge Arzew/Sonatrach Berge	Daewoo	Jul-04	Bahamas	Steam	GT NO 96	4	Arzew	–
Bilbao Knutsen	138,000	Norspan LNG AS	Izar	Jan-04	Spain	Steam	GT NO 96	4	Portfolio	–
Bishu Maru	164,700	Trans Pacific Shipping 3 SA	Kawasaki	Dec-17	Panama	TFDE	Moss	4	Wheatstone	1713
Bonito LNG	174,000	Xiang Ch18 HK International	HHI	May-20	Malta	X-DF	TZ MK. III Flex	4	Portfolio	3022
Boris Davydov	172,410	Hai Kuo Shipping 1605 Ltd.	Daewoo	Dec-18	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2428
Boris Vilkitsky	172,410	Hai Kuo Shipping 1601 Ltd.	Daewoo	Jun-17	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2421
British Achiever	173,644	Ngoti No. 20 Spc B SA	Daewoo	Nov-18	Isle of Man	ME-GI	GT NO 96	4	Freeport	2442
British Contributor	173,644	Hai Kuo Shipping 1533 Ltd.	Daewoo	Dec-18	Isle of Man	ME-GI	GT NO 96	4	Freeport	2443
British Listener	173,644	Hai Kuo Shipping 1535 Ltd.	Daewoo	Jan-19	Isle of Man	ME-GI	GT NO 96	4	Freeport	2444
British Mentor	173,644	Ngoti No. 20 Spc C SA	Daewoo	Mar-19	Isle of Man	ME-GI	GT NO 96	4	Freeport	2445
British Partner	173,400	Ngoti No. 20 Spc A SA	Daewoo	Jun-18	Isle of Man	ME-GI	GT NO 96	4	Freeport	2441
British Sapphire	155,000	Sg Leasing Gems Ltd.	HHI	Jun-08	Isle of Man	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	–
British Sponsor	173,644	Ngoti No. 20 Spc D SA	Daewoo	May-19	Isle of Man	ME-GI	GT NO 96	4	Freeport	2446
Broog	137,529	Mitsui/Nippon/Kawasaki/Iino	Mitsui E&S	Apr-98	Japan	Steam	Moss	5	Qatargas I	–
Bu Samra	266,000	Nakilat Bu Samra Inc.	Samsung	Dec-08	Marshall Is.	DRL	TZ Mk. III	5	Qatargas II	–
Bushu Maru	180,000	Trans Pacific Shipping 6 Ltd.	Mitsubishi	Jul-19	Bahamas	Reheat Steam Turbine	TZ MK. III Flex	4	Sabine Pass	2327
BW Boston	138,059	BW Gas Global LNG DA	Daewoo	Jan-03	Norway	Steam	GT NO 96	4	Atlantic LNG	–
BW Brussels	162,400	BW LNG IV Pte Ltd.	Daewoo	Aug-09	Singapore	Diesel/Gas-Electric	GT NO 96	4	Balhaf	–
BW Everett	138,028	Everett LNG Pte Ltd.	Daewoo	Jun-03	Singapore	Steam	GT NO 96	4	Atlantic LNG	–
BW Helios	174,000	Selene Navigation Pte Ltd.	Daewoo	May-21	Bermuda	ME-GI	Membrane	4	Portfolio	2497
BW Lesmes	174,000	BW Gas AS	Daewoo	Mar-21	Bermuda	ME-GI	Membrane	4	Portfolio	2496
BW Lilac	173,400	Helianthus Navigation Corp.	Daewoo	Mar-18	Malta	ME-GI	GT NO 96	4	Portfolio	2436
BW Magna	173,000	BW FSRU III Pte Ltd.	Daewoo	Mar-19	Sinapore	DFDE	TZ MK. III Flex	4	Portfolio	2488
BW Magnolia	173,400	Helen Navigation Pte Ltd.	Daewoo	Feb-20	Singapore	ME-GI	GT NO 96	4	Portfolio	2490
BW Paris	162,400	BW FSRU IV Pte Ltd.	Daewoo	Jul-09	Sinapore	Diesel/Gas-Electric	GT NO 96	4	Balhaf	–
BW Pavilion Aranda	173,400	BW Diamond LNG Pte Ltd.	Daewoo	Sep-19	Singapore	ME-GI	TZ MK. III Flex	4	Portfolio	2489
BW Pavilion Aranthera	173,400	BW Diamond LNG Pte Ltd.	Daewoo	Jul-20	Singapore	ME-GI	GT NO 96	4	Portfolio	2491
BW Pavilion Leeara	158,629	BW Pavilion Leeara Pte Ltd.	HHI	Jun-15	Singapore	Diesel/Gas-Electric	Membrane	4	Portfolio	2572
BW Pavilion Vanda	155,000	BW Pavilion Vanda Pte Ltd.	HHI	Feb-15	Singapore	DFDE	Membrane	4	Portfolio	2571
BW Tatiana	135,269	FSRU Development Pte Ltd.	Mitsubishi	Dec-02	Marshall Is.	Steam	Moss	5	Atlantic LNG	–
BW Tulip	173,400	BW LNG I Pte Ltd.	Daewoo	Dec-17	Singapore	ME-GI	GT NO 96	4	Portfolio	2435
Cadiz Knutsen	138,826	Norspan LNG II As	Navantia	Apr-04	Spain	Steam	GT NO 96	4	Portfolio	–
Cape Ann	145,130	SRV Joint Gas Two Ltd.	Samsung	Apr-10	Norway	Diesel/Gas-Electric	TZ Mk. III	4	Jaigarh LNG	–
Castillo De Caldelas	176,300	La Arena Nav SA	Imabari Shipbuilding	Jun-18	Malta	ME-GI	TZ Mk. III Flex	4	Portfolio	8188
Castillo de Merida	176,300	San Isidro LNG I BV	Imabari Shipbuilding	Mar-18	Malta	ME-GI	TZ MK. III Flex	4	Portfolio	8177
Castillo de Santisteban	170,000	Trans Gas Naviera Aie	STX	Jun-10	Malta	Diesel Electric	GT NO 96	4	Portfolio	–
Castillo de Villalba	138,000	Trans Gas Naviera Aie	Navantia Cadiz	Sep-03	Spain	Steam	GT NO 96	4	Portfolio	–
Catalunya Spirit	138,000	Teekay Gas III SL	Izar	Jun-03	Spain	Steam	GT NO 96	4	Atlantic LNG	–
Celsius Canberra	180,000	Xiang CH27 HK Int.	Samsung	Jan-21	Marshall Is.	X-DF	Membrane	4	Portfolio	2298
Celsius Carolina	180,000	Oriental Fleet LNG 03 Ltd.	Samsung	Aug-21	Marshall Is.	X-DF	Membrane	4	Portfolio	2314
Celsius Charlotte	180,000	Xiang CH28 HK International Ship Lease Co Ltd	Samsung	Jun-21	Marshall Is.	X-DF	Membrane	4	Portfolio	2313
Celsius Copenhagen	180,000	Greenheart Gas Shipco I LLC	Samsung	Nov-20	Marshall Is.	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2297
CESI Beihai	174,000	China Energy Aspiration LNG	Hudong Zhonghua	Jun-17	Hong Kong	TFDE	GT NO 96	4	APLNG	1717A
CESI Gladstone	174,000	China Energy Aspiration LNG	Hudong Zhonghua	Oct-16	Hong Kong	TFDE	GT NO 96	4	APLNG	1715A
CESI LianYungAng	174,000	China Energy Glory LNG	Hudong Zhonghua	Jun-18	Hong Kong	TFDE	GT NO 97	4	APLNG	1720A
CESI Qingdao	174,000	China Energy Hope LNG	Hudong Zhonghua	Feb-17	Hong Kong	TFDE	GT NO 96	4	APLNG	1716A
CESI Tianjin	174,000	China Energy Pioneer LNG	Hudong Zhonghua	Jul-17	Hong Kong	TFDE	GT NO 96	4	APLNG	1718A
CESI Wenzhou	174,000	China Energy Peace LNG	Hudong Zhonghua	Feb-18	Hong Kong	Diesel-Electric	GT NO 96	4	APLNG	1719A
Cheikh Bouamama	75,558	Skikda LNG Trans Corp.	Universal SB	Jul-08	Bahamas	Steam	TZ Mk. III	4	Arzew/Skikda	–
Cheikh El Mokrani	75,759	Mediterranean LNG Transport	Japan Marine United	Jun-07	Bahamas	Steam	TZ Mk. III	4	Skikda	–
Christophe de Margerie	170,000	Zelitiko Shipping Co. Ltd.	Daewoo	Nov-16	Cyprus	Diesel/Gas-Electric	GT NO 96 GW	4	Yamal	2418
Clean Energy	149,700	Pegasus Shipholding SA	HHI	Mar-07	Marshall Is.	Steam	TZ Mk. III	4	Portfolio	–
Clean Horizon	162,000	Sea 43 Leasing Co Ltd.	HHI	Apr-15	Malta	Diesel/Gas-Electric	Membrane	4	Portfolio	2566
Clean Ocean	162,000	Cdbl Ocean Ltd.	HHI	May-14	Marshall Is.	Diesel/Gas-Electric	Membrane	4	Sabine Pass	–
Clean Planet	162,000	Cdbl Planet Ltd.	HHI	Aug-14	Marshall Is.	Diesel Electric	Membrane	4	Yamal	–
Clean Vision	162,000	Sea 44 Leasing Co. Ltd.	HHI	Aug-15	Malta	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	2567
CNTIC VPower Global	28,260	CNTIC VPower LNG Logistics	COSCO (Dalian) Shipyard Co.	Apr-20	Hong Kong	Diesel/Gas-Electric	GT NO 96	4	Portfolio	603
Cobia LNG	174,000	Cardiff LNG ETA Owning LLC	HHI	Feb-21	Malta	X-DF	NO-96-GW+PRS	4	Portfolio	3038
Cool Discoverer	174,000	Serendipity Maritime Ltd.	HHI	Sep-20	Malta	X-DF	TZ MK. III Flex	4	Portfolio	S970
Cool Explorer	160,000	Safe Port Marine Ltd.	Samsung	Jan-15	Malta	DFDE	TZ Mk. III	4	Spot	2049
Cool Racer	174,000	Eloquent Shipping	Samsung	Feb-21	Malta	X-DF	NO-96-GW+PRS	4	Portfolio	3126

Cool Runner	160,000	Priority Maritime Corp.	Samsung	Mar-14	Malta	Diesel Electric	TZ Mk. III	4	Wheatstone	–
Cool Voyager	160,000	Energy Shipping & Trading SA	Samsung	Oct-13	Malta	TFDE	TZ Mk. III	4	Wheatstone	–
Coral Encanto	30,000	Maxluck Plus Ltd.	Ningbo Xinle	Jul-20	Marshall Is.	DFDE	Cylinders	2	Portfolio	XL-157
Corcovado LNG	160,162	Oceanus LNG Alpha LLC	Daewoo	Apr-14	Malta	Diesel Electric	GT NO 96	4	Spot	–
Creole Spirit	173,400	Hai Jiao 1601 Ltd.	Daewoo	Feb-16	Bahamas	ME-GI	GT NO 96	4	Sabine Pass	2407
Cubal	160,276	Mint LNG IV Ltd.	Samsung	Jan-12	Bahamas	DFDE	TZ Mk. III	4	Soyo	–
Cygnus Passage	145,400	Cygnus LNG Shipping Ltd.	Mitsubishi	Jan-09	Bahamas	Steam	Moss	4	Sakhalin II	–
Dapeng Moon	147,200	Yue Gang LNG Shipping Co. Ltd.	Hudong Zhonghua	Jul-08	Hong Kong	Steam	TZ MK. III	4	Pluto	–
Dapeng Star	147,210	Yue Yang LNG Shipping Co. Ltd.	Hudong Zhonghua	Nov-09	Hong Kong	Steam	TZ MK. III	4	Pluto	–
Dapeng Sun	147,200	Yue Peng LNG Shipping Co. Ltd.	Hudong Zhonghua	Apr-08	Hong Kong	Steam	GT NO 96	4	North West Shelf	–
Diamond Gas Crystal	174,000	Diamond LNG Shipping 5 Pte Ltd.	Hyundai Samho	Jul-21	Singapore	X-DF	Membrane	4	Portfolio	8030
Diamond Gas Metropolis	174,000	Diamond LNG Shipping 4 Ltd.	HHI	Nov-20	Bahamas	X-DF	TZ Mk. III Flex	4	Portfolio	8029
Diamond Gas Orchid	165,000	Diamond LNG Shipping 1 Pte Ltd.	Mitsubishi	Jun-18	Bahamas	STaGE	Sayaringo	4	Cameron	2325
Diamond Gas Rose	165,000	Diamond LNG Shipping 2 Pte Ltd.	Mitsubishi	Aug-18	Bahamas	STaGE	Sayaringo	4	Cameron	2325
Diamond Gas Sakura	165,000	Diamond LNG Shipping 3 Pte Ltd.	Japan Marine United	May-19	Bahamas	STaGE	Sayaringo	4	Cameron	2332
Diamond Gas Victoria	174,000	Diamond LNG Shipping 6 Pte Ltd.	Hyundai Samho	Jun-21	Bahamas	X-DF	Membrane	4	Portfolio	8031
Disha	136,025	India LNG Transport Co. No. 1	Daewoo	Dec-03	Malta	Gas Turbine	GT NO 96	4	RasGas	–
Doha	137,262	Mitsui/Nippon/Kawasaki/Iino	Mitsubishi	Jun-99	Japan	Steam	Moss	5	Qatargas I	–
Dorado LNG	174,000	Cardiff LNG Epsilon Owning LLC	Samsung	Dec-20	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	2276
Duhail	210,150	Gabriela Nauranto	Daewoo	Dec-07	Bahamas	Diesel	GT NO 96	4	Qatargas II	–
Dukhan	137,661	LNG Water Lily Shipping Corp.	Mitsui E&S	Sep-04	Liberia	Steam	Moss	5	Qatargas II	–
East Energy	122,255	Sinokor Maritime Co. Ltd.	STX	Aug-82	South Korea	Steam	Membrane	4	NLNG	–
Eduard Toll	172,410	TC LNG Explorer I LLC	Daewoo	Sep-17	Bahamas	TFDE - Azipod	GT NO 96 GW	4	Yamal	2423
Ejnan	145,000	Peninsula LNG Transport No. 4	Samsung	Jan-07	Bahamas	Steam	TZ Mk. III	4	RasGas II	–
Ekaputra	136,400	Hikmah Sarana Bahari Pt.	Mitsubishi	Jan-89	Indonesia	Steam	Moss	5	Bontang	–
Elisa Larus	174,000	Caroline 77 Sasu	Hyundai Samho	May-20	France	X-DF	TZ Mk. III Flex Plus	4	Portfolio	S970
Energy Advance	147,624	Tokyo LNG Tanker/Toho LNG	Kawasaki	Mar-05	Japan	Steam	Moss	4	Portfolio	–
Energy Atlantic	156,000	Spectacle Shipping & Trading	STX	Sep-15	Malta	TFDE	Moss	4	Sabine Pass	1670
Energy Confidence	153,000	Tokyo LNG Tanker/Nippon Yusen	Kawasaki	Apr-09	Japan	Steam	Moss	4	Darwin LNG	–
Energy Endeavour	173,400	Rossini Navigation SA	Daewoo	Jan-21	Marshall Is.	ME-GI	TZ Mk. III Flex	4	TBC	2484
Energy Frontier	147,599	Tokyo LNG Tanker Co. Ltd.	Kawasaki	Sep-03	Japan	Steam	Moss	4	Sakhalin II	–
Energy Glory	165,000	Tokyo LNG Tanker/Nippon Yusen	Japan Marine United	Mar-19	Japan	TFDE	TZ Mk. III Flex Plus	4	Cove Point	5071
Energy Horizon	177,000	Tokyo LNG Tanker/Nippon Yusen	Kawasaki	Aug-11	Japan	Steam	Moss	4	Pluto	–
Energy Innovator	165,000	Tokyo LNG Tanker/Mitsui OSK	Japan Marine United	Jun-19	Japan	TFDE	TZ Mk. III Flex Plus	4	Cove Point	5072
Energy Integrity	173,400	Mozart Navigation SA	Daewoo	May-21	Marshall Is.	ME-GI	TZ Mk. III Flex	4	Portfolio	2485
Energy Intelligence	173,400	Strauss Navigation SA	Daewoo	Jun-21	Marshall Is.	ME-GI	Membrane	4	Portfolio	2500
Energy Liberty	165,000	Tokyo LNG Tanker/Mitsui OSK	Japan Marine United	Oct-18	Japan	TFDE	TZ Mk. III Flex Plus	4	Cove Point	5070
Energy Navigator	145,000	Tokyo LNG Tanker/Mitsui OSK	Kawasaki	May-08	Japan	Steam	Moss	4	Sakhalin II	–
Energy Pacific	173,400	Ravel Navigation SA	Daewoo	Aug-20	Marshall Is.	ME-GI	TZ Mk. III Flex	4	Portfolio	2483
Energy Progress	147,558	Jovial Shipping Navigation SA	Kawasaki	Nov-06	Bahamas	Steam	Moss	4	Darwin LNG	–
Energy Universe	166,571	Lusby Shipping SA	Japan Marine United	Aug-19	Panama	TFDE	TZ Mk. III Flex	4	Cove Point	5073
Enshu Maru	164,700	Trans Pacific Shipping 4 SA	Kawasaki	Aug-18	Panama	Reheat Steam Turbine	Moss	4	Wheatstone	1720
Esshu Maru	153,000	Trans Pacific Shipping 2 Ltd.	Mitsubishi	Dec-14	Bahamas	Steam	Sayaendo	4	Portfolio	–
Etyfa Prometheas	135,269	Enlink Trading FZE	Mitsubishi	Oct-02	Cyprus	Steam	Moss	5	Portfolio	–
Excalibur	138,034	Solaia Shipping LLC	Daewoo	May-02	Belgium	Steam	GT NO 96	4	Portfolio	–
Fedor Litke	172,410	Hai Kuo Shipping 1602 Ltd.	Daewoo	May-17	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2422
Flex Amber	174,000	Bund 10 Holding Ltd.	HHI	Oct-20	Marshall Is.	X-DF	TZ Mk. III Flex	4	Portfolio	8011
Flex Artemis	174,000	Flex LNG Reliance Ltd.	Daewoo	Aug-20	Marshall Is.	ME-GI	NO-96-GW+FRS	4	Portfolio	2479
Flex Aurora	174,000	Flex LNG Aurora Ltd.	HHI	Jun-20	Marshall Is.	X-DF	TZ Mk. III Flex	4	Portfolio	8010
Flex Constellation	173,400	Flex LNG Constellation Ltd.	Daewoo	Jun-19	Marshall Is.	ME-GI	NO-96-GW+PRS	4	Portfolio	H2470
Flex Courageous	173,400	Flex LNG Courageous Ltd.	Daewoo	Aug-19	Marshall Is.	ME-GI	NO-96-GW+PRS	4	Portfolio	2471
Flex Endeavour	172,400	Triple H No. 3 Ltd.	Daewoo	Jan-18	Malta	ME-GI	NO-96-GW+PRS	4	Portfolio	2447
Flex Enterprise	172,400	Triple H No. 4 Ltd.	Daewoo	Jan-18	Malta	ME-GI	NO-96-GW+PRS	4	Portfolio	2448
Flex Freedom	173,400	Flex Freedom Ltd.	HHI	Jan-21	Marshall Is.	ME-GI	NO-96-GW+FRS	4	Portfolio	2492
Flex Rainbow	174,000	Xiang Ch13 HK International	Samsung	Jun-18	Marshall Is.	ME-GI	TZ Mk. III Flex	4	Spot	2108
Flex Ranger	174,101	Flex LNG Ranger Ltd.	Samsung	Jun-18	Marshall Is.	ME-GI	TZ Mk. III Flex	4	Portfolio	2107
Flex Resolute	173,400	Flex LNG Resolute Ltd.	HHI	Sep-20	Marshall Is.	ME-GI	NO-96-GW+FRS	4	Portfolio	2480
Flex Vigilant	174,000	Flex Vigilant Ltd.	HHI	May-21	Liberia	X-DF	TZ Mk. III Flex	4	Portfolio	8013
Flex Volunteer	170,520	Flex Volunteer Ltd.	HHI	Feb-21	Marshall Is.	X-DF	TZ Mk. III Flex	4	Portfolio	8012
Fraiha	210,100	J5 Nakilat No. 6 Ltd.	Daewoo	Aug-08	Marshall Is.	Diesel	GT NO 96	18	RasGas III	–
Fuji LNG	149,172	Aletheia Owning Co Ltd.	Kawasaki	Mar-04	Malta	Steam	Moss	4	Sabine Pass	–
Fuwairit	138,200	Camartina Shipping Co.	Samsung	Jan-04	Bahamas	Steam	TZ Mk. III	4	RasGas II	–
Gail Bhuwan	180,000	Primavera Montana SA	Daewoo	Feb-21	Marshall Is.	X-DF	Membrane	4	Portfolio	2499
Galicia Spirit	140,624	Teekay Gas II SL	Daewoo	Jul-04	Spain	Steam	GT NO 96	4	Portfolio	–
Gaslog Chelsea	153,000	Gas-Fifteen Ltd.	Hanjin (Busan)	Jun-10	Bermuda	Diesel/Gas-Electric	Sayaendo	4	Portfolio	–
GasLog Galveston	174,000	Gas-Thirty Three Ltd.	Samsung	Jan-21	Bermuda	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2301
Gaslog Geneva	174,000	Gas-Thirteen Ltd.	Samsung	Oct-16	Bermuda	TFDE	TZ Mk. III	4	Portfolio	2102
Gaslog Genoa	174,000	Gas-Twenty Two Ltd.	Samsung	Mar-18	Bermuda	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2130
GasLog Georgetown	174,000	Ceres Shipping Ltd.	Samsung	Nov-20	Bermuda	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2300
Gaslog Gibraltar	174,000	Gas-Fourteen Ltd.	Samsung	Nov-16	Bermuda	TFDE	TZ Mk. III	4	Portfolio	2103
Gaslog Gladstone	174,000	Gas-Twenty Three Ltd.	Samsung	Mar-19	Bermuda	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2131

Gaslog Glasgow	174,000	Gas-Twelve Ltd.	Samsung	Jul-16	Bermuda	TFDE	TZ Mk. III	4	Portfolio	2073
Gaslog Greece	174,000	Gas-Eleven Ltd.	Samsung	Mar-16	Bermuda	TFDE	TZ Mk. III	4	Portfolio	2072
Gaslog Hong Kong	174,000	Gas-Twenty Five Ltd.	HHI	Mar-18	Bermuda	X-DF	TZ Mk. III Flex	4	Portfolio	2801
Gaslog Houston	174,000	Gas-Twenty Four Ltd.	HHI	Dec-18	Bermuda	X-DF	TZ Mk. III Flex	4	GoM	2800
Gaslog Salem	155,000	Gas-Ten Ltd.	Samsung	May-15	Bermuda	Diesel/Gas-Electric	Membrane	4	Portfolio	2044
Gaslog Santiago	155,000	Gas-Four Ltd.	Samsung	Mar-13	Bermuda	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	–
Gaslog Saratoga	155,000	Gas-Nine Ltd.	Samsung	Dec-14	Bermuda	Diesel/Gas-Electric	Membrane	4	Spot	–
Gaslog Savannah	155,000	Gas-One Ltd.	Samsung	May-10	Bermuda	Diesel	TZ Mk. III	4	Portfolio	–
Gaslog Seattle	155,000	Gas-Seven Ltd.	Samsung	Oct-13	Bermuda	TFDE	TZ Mk. III	4	Portfolio	–
Gaslog Shanghai	155,000	Gas-Three Ltd.	Samsung	Feb-13	Bermuda	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	–
Gaslog Singapore	155,000	Gas-Two Ltd.	Samsung	Aug-10	Bermuda	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	–
GasLog Skagen	155,000	Gas-Six Ltd.	Samsung	Aug-13	Bermuda	TFDE	TZ Mk. III	4	Portfolio	–
Gaslog Sydney	155,000	Gas-Five Ltd.	Samsung	Jun-13	Bermuda	DFDE	TZ Mk. III	4	Portfolio	–
Gaslog Wales	180,000	Gas-Thirty One Ltd.	Samsung	May-20	Bermuda	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2274
Gaslog Warsaw	180,000	GasLog Hellas-1 ENE	Samsung	Jul-19	Greece	X-DF	TZ Mk. III Flex Plus	4	Spot	2212
GasLog Wellington	176,400	GAS-Thirty Four Ltd.	Samsung	Jun-21	Bermuda	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2311
Gaslog Westminster	180,000	Gas-Thirty Ltd.	Samsung	Jul-20	Bermuda	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2262
Gaslog Winchester	176,400	GAS-thirty five Ltd.	Samsung	Aug-21	Bermuda	X-DF	Membrane	4	Portfolio	2312
Gaslog Windsor	180,000	Gas-Twenty Eight Ltd.	Samsung	Apr-20	Bermuda	X-DF	TZ MK. V	4	Portfolio	2213
Gemmata	135,269	National Australia Finance	Mitsubishi	Feb-04	Singapore	Steam	Moss	5	Peru LNG	–
Georgiy Brusilov	172,410	Hai Kuo Shipping 1801 Pte Ltd.	Daewoo	Nov-18	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2427
Georgiy Ushakov	172,652	DY Tankers Ltd.	Daewoo	Sep-19	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2433
Ghasha	137,000	Ghasha Inc.	Mitsui E&S	Jun-95	Liberia	Steam	Moss	5	Das Island	–
Gigira Laitebo	177,419	Cleopatra LNG Shipping Co. Ltd.	HHI	Feb-10	Bahamas	DFDE	TZ Mk. III	4	RasGas	–
Global Energy	74,100	Global Energy Armateur SNC	STX	Jan-04	France	Diesel/Gas-Electric	CS1	4	Portfolio	–
Global Energy	74,100	Global Energy International	STX	Jan-04	Marshall Is.	Diesel/Gas-Electric	CS1	4	Portfolio	–
Global Sea Spirit	169,932	Global Sea Spirit Inc	Daewoo	Oct-21	Greece	ME-GI	TZ Mk. III	4	Portfolio	2502
Global Star	173,400	Global Star Inc.	Daewoo	Jan-21	Marshall Is.	ME-GI	TZ Mk. III Flex	4	Portfolio	2487
Golar Arctic	140,648	Golar LNG 2216 Corp.	Daewoo	Oct-03	Marshall Is.	Steam	GT NO 96	4	Jamaica LNG	–
Golar Bear	160,000	Cool Bear Shipping Ltd.	Samsung	Sep-14	Marshall Is.	Diesel/Gas-Electric	TZ Mk. III	4	Spot	–
Golar Celsius	160,000	Noble Celsius Shipping Ltd.	Samsung	Oct-13	Marshall Is.	Diesel/Gas-Electric	TZ Mk. III	4	Spot	–
Golar Crystal	159,800	Oriental Fleet LNG 01 Ltd.	Samsung	Sep-14	Marshall Is.	TFDE	Membrane	4	Spot	–
Golar Frost	160,000	Golar LNG NB12 Corp.	Samsung	Oct-14	Marshall Is.	Diesel/Gas-Electric	Membrane	4	Portfolio	–
Golar Glacier	162,000	Hai Jiao 1401 Ltd.	Hyundai Samho	Nov-14	Marshall Is.	TFDE	Membrane	4	Spot	–
Golar Grand	145,700	Golar Grand Corp.	Daewoo	Jan-06	Marshall Is.	Steam	GT NO 96	4	Gorgon	–
Golar Ice	160,000	Hai Jiao 1406 Ltd.	Samsung	Jan-15	Marshall Is.	Diesel Electric	Membrane	4	Spot	2048
Golar Kelvin	162,000	Hai Jiao 1405 Ltd.	Hyundai Samho	Jan-15	Marshall Is.	DFDE	Membrane	4	Spot	S659
Golar Maria	145,700	Golar LNG 2234 LLC	Daewoo	Jun-06	Marshall Is.	Steam	GT NO 96	4	Spot	–
Golar Mazo	135,255	Faraway Maritime Shipping	Mitsubishi	Dec-99	Liberia	Steam	Moss	5	Bontang	–
Golar Penguin	160,000	Oriental Fleet LNG 02 Ltd.	Samsung	Sep-14	Marshall Is.	TFDE	Membrane	4	Spot	–
Golar Seal	160,000	Compass Shipping 1 Corp. Ltd.	Samsung	Sep-13	Marshall Is.	Diesel/Gas-Electric	TZ Mk. III	4	Spot	–
Golar Snow	160,000	Hai Jiao 1402 Ltd.	Samsung	Jan-15	Marshall Is.	Diesel/Gas-Electric	Membrane	4	Spot	2047
Grace Acacia	149,700	Algawin Shipping Inc.	HHI	Feb-07	Bahamas	Steam	TZ Mk. III	4	Spot	–
Grace Barleria	149,700	NYK Line	HHI	Apr-07	Japan	Steam	TZ Mk. III	4	Portfolio	–
Grace Cosmos	150,000	Algahunt Shipping Inc.	HHI	Feb-08	Bahamas	Steam	TZ Mk. III	4	Portfolio	–
Grace Dahlia	177,000	NYK Line	Kawasaki	Sep-13	Japan	Steam	Moss	4	Spot	–
Grace Emilia	174,000	Akizuki Maritima SA	Hyundai Samho	Oct-21	Bahamas	X-DF	TZ Mk. III Flex	4	Portfolio	8032
Grand Aniva	145,000	NYK-SCF LNG Shpg No. 2 Ltd.	Mitsubishi	Jan-08	Cyprus	Steam	Moss	4	Sakhalin II	–
Grand Elena	145,580	NYK-SCF LNG Shpg No. 1 Ltd.	Mitsubishi	Oct-07	Cyprus	Steam	Moss	4	Sakhalin II	–
Grand Mereya	147,000	Ice Gas LNG Shipping Co. Ltd.	Mitsui E&S	Mar-08	Cyprus	Steam	Moss	4	Sakhalin II	–
Gui Ying	170,701	Fortune Power Shipping Ltd.	Hudong Zhonghua	Oct-21	Singapore	X-DF	Membrane	4	Portfolio	H1828A
Hanjin Muscat	138,366	H-Line Shipping Co. Ltd.	Hanjin (Busan)	Jul-99	South Korea	Steam	GT NO 96	4	Oman LNG	–
Hanjin Pyeongtaek	130,636	H-Line Shipping Co. Ltd.	Hanjin (Busan)	Sep-95	South Korea	Steam	GT NO 96	4	Bontang	–
Hanjin Ras Laffan	138,214	H-Line Shipping Co. Ltd.	Hanjin (Busan)	Jul-00	South Korea	Steam	GT NO 96	4	RasGas I	–
Hanjin Sur	138,333	H-Line Shipping Co. Ltd.	Hanjin (Busan)	Feb-00	South Korea	Steam	GT NO 96	4	Oman LNG	–
Hellas Athina	170,520	Kronos Shipping LLC	Hyundai Samho	Sep-21	Malta	X-DF	Membrane	4	Portfolio	8040
Hellas Diana	174,000	Zeus Shipping LLC	Hyundai Samho	Mar-21	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	8039
Hispania Spirit	145,500	Teekay Gas Naviera SL	Daewoo	Aug-02	Spain	Steam	GT NO 96	4	Peru LNG	–
Hoegh Giant	165,000	Hoegh LNG Giant Ltd.	HHI	Jan-17	Marshall Is.	Diesel/Gas-Electric	TZ MK. III Flex	4	Portfolio	2552
Hongkong Energy	138,000	Ocean Trinity Sh No. 27 SA	Daewoo	Feb-04	Marshall Is.	Steam	GT NO 96	4	North West Shelf	–
Hyundai Aquapia	137,415	Hyundai LNG Shipping Co. Ltd.	HHI	May-00	South Korea	Steam	Moss	4	Oman LNG	–
Hyundai Cosmopia	137,415	Hyundai LNG Shipping Co. Ltd.	HHI	Feb-00	South Korea	Steam	Moss	4	RasGas I	–
Hyundai Ecopia	149,745	KLT 1 International SA	HHI	Nov-08	Panama	Steam	TZ Mk. III	4	Balhaf	–
Hyundai Greenpia	125,000	Hyundai LNG Shipping Co. Ltd.	HHI	May-96	South Korea	Steam	Moss	4	MLNG	–
Hyundai Oceanpia	135,000	Hyundai LNG Shipping Co. Ltd.	HHI	Jun-00	South Korea	Steam	Moss	4	Oman LNG	–
Hyundai Peacepia	174,000	HIb SA	Daewoo	Jun-17	Panama	ME-GI	TZ Mk. III Flex	4	Sabine Pass	2452
Hyundai Princepia	174,000	HIa SA	Daewoo	May-17	Panama	ME-GI	TZ Mk. III Flex	4	Sabine Pass	2451
Hyundai Technopia	137,415	Hyundai LNG Shipping Co. Ltd.	HHI	Jul-99	South Korea	Steam	Moss	4	RasGas I	–
Hyundai Utopia	125,182	Hyundai LNG Shipping Co. Ltd.	HHI	Jun-94	South Korea	Steam	Moss	4	Donggi Senoro	–
Iberica Knutsen	138,000	Norspan LNG III AS	Daewoo	Aug-06	Norway	Ultra Steam Turbine	GT NO 96	4	Portfolio	–
Ibra LNG	147,000	Areej LNG Carrier SA	Samsung	Jul-06	Panama	Steam	TZ Mk. III	4	Oman LNG	–
Ibri LNG	147,569	Dune LNG Carrier SA	Mitsubishi	Jul-06	Panama	Steam	Moss	4	Oman LNG	–

Isabella	169,932	Kasimia Marine Co.	Daewoo	Jul-21	Greece	ME–GI	Membrane	4	Portfolio	2495
Ish	137,000	Ish Inc.	Mitsubishi	Nov-95	Liberia	Steam	Moss	5	Das Island	–
K. Acacia	138,017	Korea Line LNG Co. Ltd.	Daewoo	Dec-99	South Korea	Steam	GT NO 96	4	Oman LNG	–
K. Freesia	138,015	Korea Line LNG Co. Ltd.	Daewoo	Aug-00	South Korea	Steam	GT NO 96	4	RasGas I	–
K. Jasmine	145,878	Kolt JV No. 1 SA	Daewoo	May-08	Panama	Steam	TZ MK. III	4	Sakhalin II	–
K. Mugungwha	151,812	Kolt JV No. 2 SA	Daewoo	Nov-08	Panama	Steam	TZ MK. III	4	Oman LNG	–
Kinisis	173,400	Danae Gas Shipping Inc.	Daewoo	Oct-18	Liberia	ME-GI	TZ Mk. III Flex	4	Portfolio	2464
Kita LNG	147,895	Oceanus LNG Beta LLC	Daewoo	May-14	Malta	Diesel Electric	GT NO 96	4	Spot	–
Kmarin Diamond	155,000	Sg Leasing Gems Ltd.	Hyundai Samho	Jul-08	Isle of Man	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	–
Kmarin Emerald	155,000	Sg Leasing Gems Ltd.	HHI	May-07	Isle of Man	DFDE	TZ Mk. III	4	Portfolio	–
Kumul	170,000	Gemini LNG Shipping Ltd.	Hudong Zhonghua	Dec-15	Hong Kong	Diesel	TZ MK. III	4	PNG LNG	1673A
La Mancha Knutsen	176,300	Norspan LNG IX AS	HHI	Sep-16	Spain	ME-GI	Membrane	4	Portfolio	2733
La Seine	174,000	Xiang Ch16 HK International	HHI	Feb-20	Malta	X-DF	TZ MK. III Flex	4	Portfolio	3020
Lalla Fatma N'Soumer	145,000	Algeria Nippon Gas	Kawasaki	Oct-04	Bahamas	Steam	Moss	4	Arzew	–
Lena River	155,000	Solana Holding Ltd.	HHI	Sep-13	Marshall Is.	DFDE	TZ Mk. III	4	Portfolio	–
Lijmiliya	263,300	Nakilat Lijmiliya Inc.	Daewoo	Dec-08	Marshall Is.	Diesel	GT NO 96	5	Qatargas II	–
LNG Abalamabie	162,000	Bonny Gas Transport Ltd.	Samsung	Jul-16	Bermuda	DFDE	TZ Mk. III	4	NLNG	2079
LNG Abuja II	162,000	Bonny Gas Transport Ltd.	Samsung	Mar-16	Bermuda	DFDE	TZ Mk. III	4	NLNG	2078
LNG Adamawa	141,000	Bonny Gas Transport Ltd.	HHI	Apr-05	Bermuda	Steam	Moss	4	NLNG	–
LNG Adventure	170,520	NYK	Samsung	Apr-21	France	X-DF	Membrane	4	Portfolio	2302
LNG Akwa Ibom	141,000	Bonny Gas Transport Ltd.	HHI	Oct-04	Bermuda	Steam	Moss	4	NLNG	–
LNG Alliance	154,472	NYK Armateur	STX	Mar-07	France	Diesel/Gas-Electric	CS1	4	Portfolio	–
LNG Aquarius	126,300	Hanochem Shipping Pt.	General Dynamics	Jan-77	Indonesia	Steam	Moss	5	Bontang	–
LNG Barka	155,982	Lloyds TSB General Leasing 3	Kawasaki	Dec-08	Bahamas	Steam	Moss	4	Oman LNG	–
LNG Bayelsa	137,500	Bonny Gas Transport Ltd.	HHI	Mar-03	Bermuda	Steam	Moss	4	NLNG	–
LNG Benue	145,952	BW Gas LNG Carriers Pte Ltd.	Daewoo	Apr-06	Bermuda	Steam	GT NO 96	4	NLNG	–
LNG Bonny Ii	174,000	Bonny Gas Transport Ltd.	HHI	Dec-15	Bermuda	Diesel/Gas-Electric	TZ Mk. III	4	NLNG	2636
LNG Borno	149,600	Okra Shipping No. 1	Samsung	Aug-07	Bermuda	Steam	TZ Mk. III	4	NLNG	–
LNG Cross River	141,000	Bonny Gas Transport Ltd.	HHI	Aug-05	Bermuda	Steam	Moss	4	NLNG	–
LNG Dream	145,000	OJV Cayman 1 Ltd.	Kawasaki	Sep-06	Bahamas	Steam	Moss	4	North West Shelf	–
LNG Dubhe	174,000	Arctic Red LNG Shipping Ltd.	Hudong Zhonghua	Nov-19	Hong Kong	ME-GI	GTT NO96 L03+	4	Yamal	1810A
LNG Ebisu	147,546	LNG Ebisu Shipping Corp.	Kawasaki	Jul-08	Bahamas	Steam	Moss	4	Pluto	–
LNG Enterprise	170,520	Hanovre Financement 20 SASU	Samsung	Oct-21	France	X-DF	Membrane	4	Portfolio	2360
LNG Enugu	145,926	BW Gas LNG Carriers Pte Ltd.	Daewoo	Oct-05	Bermuda	Steam	GT NO 96	4	NLNG	–
LNG Finima II	162,000	Bonny Gas Transport Ltd.	Samsung	Dec-15	Bermuda	DFDE	TZ Mk. III	4	NLNG	2076
LNG Fukurokuju	164,700	LNG Fukurokuju Shipping Corp. .	Kawasaki	Jul-16	Bahamas	Steam	Moss	4	APLNG	1712
LNG Imo	148,452	Bergesen LNG XI Pte Ltd.	Daewoo	Jun-08	Bermuda	Steam	GT NO 96	4	NLNG	–
LNG Jamal	135,333	Jamal Shipholding SA	Mitsubishi	Oct-00	Japan	Steam	Moss	5	Oman LNG	–
LNG Juno	180,000	Mog-X LNG Shipholding SA	Mitsubishi	Oct-18	Bahamas	STaGE	Moss	4	Freeport	2323
LNG Jupiter	153,000	Lloyds TSB Equipment No. 7 Ltd.	Kawasaki	Jul-09	Bahamas	Steam	Moss	4	PNG LNG	–
LNG Jurojin	160,000	LNG Jurojin Shipping Corp. .	Mitsubishi	Nov-15	Bahamas	Steam	Moss	4	Portfolio	2299
LNG Kano	148,565	Bergesen LNG IX Pte Ltd.	Daewoo	Jan-07	Bermuda	Steam	TZ MK. III	4	NLNG	–
LNG Kolt	153,595	KLT 5 International SA	Hanjin (Busan)	Dec-08	Panama	Steam	TZ Mk. III	4	Portfolio	–
LNG Lagos II	174,000	Bonny Gas Transport Ltd.	HHI	Jan-16	Bermuda	DFDE	TZ Mk. III	4	NLNG	2637
LNG Lerici	65,000	Portovenere & Lerici Pte Ltd.	Sestri Ponente	Apr-98	Singapore	Steam	GT NO 96	4	Malaysia LNG	–
LNG Lokoja	148,471	Bergesen LNG VIII Pte Ltd.	Daewoo	Nov-06	Bermuda	Steam	GT NO 96	4	NLNG	–
LNG Maleo	127,544	Nippon/Mitsui/Kawasaki	Mitsui E&S	Jan-89	Japan	Steam	Moss	4	North West Shelf	–
LNG Mars	155,693	Osaka Gas Int. & Mitsui OSK	Mitsubishi	Oct-16	Japan	Steam	Moss	4	PNG LNG	2296
LNG Megrez	174,000	Arctic Indigo LNG Shipping Ltd.	Hudong Zhonghua	Nov-20	Hong Kong	ME-GI	GTT NO96 L03+	4	Yamal	1813A
LNG Merak	174,000	Arctic Yellow LNG Shipping Ltd.	Hudong Zhonghua	Jan-20	Hong Kong	ME-GI	GTT NO96 L03+	4	Yamal	1811A
LNG Ogun	149,000	Okra Shipping No. 2	Samsung	Jul-07	Bermuda	Steam	TZ Mk. III	4	NLNG	–
LNG Ondo	148,478	Bergesen LNG X Pte Ltd.	Daewoo	Sep-07	Bermuda	Steam	TZ MK. III	4	NLNG	–
LNG Oyo	145,842	BW Gas LNG Carriers Pte Ltd.	Daewoo	Jan-06	Bermuda	Steam	GT NO 96	4	NLNG	–
LNG Phecda	174,000	Arctic Orange LNG Shipping Ltd.	Hudong Zhonghua	Sep-20	Hong Kong	ME-GI	GTT NO96 L03+	4	Yamal	1812A
LNG Pioneer	138,121	M&S Shipping 3 SA	Daewoo	Jul-05	Bahamas	Steam	GT NO 96	4	Das Island	–
LNG Port-Harcourt II	162,000	Bonny Gas Transport Ltd.	Samsung	Dec-15	Bermuda	DFDE	TZ Mk. III	4	NLNG	–
LNG Portovenere	65,000	Portovenere & Lerici Pte Ltd.	Sestri Ponente	Apr-97	Singapore	Steam	GT NO 96	4	Portfolio	–
LNG River Niger	141,000	Bonny Gas Transport Ltd.	HHI	Jul-06	Bermuda	Steam	Moss	4	NLNG	–
LNG River Orashi	145,914	BW Gas LNG Carriers Pte Ltd.	Daewoo	Nov-04	Bermuda	Steam	GT NO 96	4	NLNG	–
LNG Rivers	137,200	Bonny Gas Transport Ltd.	HHI	Jun-02	Bermuda	Steam	Moss	4	NLNG	–
LNG Rosenrot	176,523	Fair Wind Navigation SA	Daewoo	Jan-21	Marshall Is.	X-DF	Membrane	4	Portfolio	2498
LNG Sakura	177,000	LNG Sakura Shipping Corp.	Kawasaki	Feb-18	Bahamas	TFDE	Moss	4	Freeport	1731
LNG Saturn	155,300	Mog-IX LNG Shipholding SA	Mitsubishi	Feb-16	Bahamas	Ultra Steam Turbine	Moss	4	Gorgon	2311
LNG Schneeweisschen	180,000	LNG Rose Shipping Corp.	Daewoo	Sep-18	Panama	TFDE	TZ Mk. III Flex	4	Freeport	2462
LNG Sokoto	137,425	Bonny Gas Transport Ltd.	HHI	Sep-02	Bermuda	Steam	Moss	4	NLNG	–
LNG Unity	154,472	Global LNG Armateur SAS	STX	Nov-06	France	Diesel/Gas-Electric	CS1	4	Portfolio	–
LNG Venus	153,000	Osaka Gas Int. & Mitsui OSK	Mitsubishi	Nov-14	Japan	Steam	Sayaendo	4	North West Shelf	–
LNG Vesta	127,386	Europe LNGT Co. Ltd.	Mitsubishi	Jun-94	Liberia	Steam	Moss	4	Portfolio	–
LNGShips Athena	170,618	Cardiff LNG Iota Owning LLC	HHI	Mar-21	Malta	X-DF	Membrane	4	Portfolio	112
LNGShips Empress	170,520	Cardiff LNG Kappa Owning LLC	Samsung	Mar-21	Malta	X-DF	Membrane	4	Portfolio	2380
LNGShips Manhattan	174,000	Cardiff LNG Theta Owning LLC	HHI	May-21	Malta	X-DF-HPSCR	NO-96-GW+PRS	4	Portfolio	3039
Lobito	160,276	Mint LNG III Ltd.	Samsung	Nov-11	Bahamas	DFDE	TZ Mk. III	4	Soyo	–

Lusail	145,000	Peninsula LNG Transport No. 1	Samsung	May-05	Bahamas	Steam	TZ Mk. III	4	RasGas II	–
Macoma	145,400	Compass Shipping 9 Corp. Ltd.	Daewoo	Sep-17	Bahamas	ME-GI	GT NO 96	4	Portfolio	2417
Madrid Spirit	138,000	Teekay Gas IV SL	Navantia	Dec-04	Spain	Steam	GT NO 96	4	Atlantic LNG	–
Magdala	173,400	Hai Jiao 1606 Ltd.	Daewoo	Feb-18	Bahamas	ME-GI	GT NO 96	4	Portfolio	2453
Magellan Spirit	165,500	Magellan Spirit Aps	Samsung	Apr-09	Denmark	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	–
Malanje	160,276	Mint LNG II Ltd.	Samsung	Oct-11	Bahamas	DFDE	TZ Mk. III	4	Soyo	–
Maran Gas Achilles	174,000	Adonis Investment Corp.	Hyundai Samho	Jan-16	Greece	DFDE	TZ Mk. III	4	Portfolio	S689
Maran Gas Agamemnon	174,000	Doris Navigation Inc.	Hyundai Samho	May-16	Greece	DFDE	TZ Mk. III	4	Portfolio	S690
Maran Gas Alexandria	161,870	Greenmare Navigation Corp.	Hyundai Samho	Oct-15	Greece	DFDE	Membrane	4	QCLNG	S627
Maran Gas Amphipolis	174,000	Nestor Navigation Corp.	Daewoo	Aug-16	Greece	DFDE	Membrane	4	Portfolio	2412
Maran Gas Andros	173,400	Crusandel Marine Co.	Daewoo	Nov-19	Greece	ME-GI	GT NO 96	4	Freeport	2467
Maran Gas Apollonia	161,870	Ilida Shipping Co. Ltd.	Hyundai Samho	Jan-14	Greece	Diesel Electric	TZ Mk. III	4	Punta Europa	–
Maran Gas Asclepius	145,000	Sea Satin Corp.	Daewoo	Jul-05	Greece	Steam	GT NO 96	4	RasGas II	–
Maran Gas Chios	170,000	Pleione Inc.	Daewoo	Mar-19	Greece	ME-GI	TZ Mk. III Flex	4	Portfolio	2456
Maran Gas Coronis	145,700	Jopica Shipping Co.	Daewoo	Jul-07	Greece	Steam	TZ MK. III	4	RasGas II	–
Maran Gas Delphi	159,800	Ada Shipholding Inc.	Daewoo	Feb-14	Greece	Diesel Electric	TZ Mk. III	4	Portfolio	–
Maran Gas Efessos	159,800	Acrogiali Shipping & Trading	Daewoo	Jun-14	Greece	DFDE	Membrane	4	Portfolio	–
Maran Gas Hector	174,000	Dylan Corp.	Hyundai Samho	Nov-16	Greece	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	S691
Maran Gas Hydra	173,400	Hai Jiao 1802 Ltd.	Daewoo	Feb-19	Greece	ME-GI	GT NO 96	4	Sabine Pass	2459
Maran Gas Leto	174,000	Cherise Maritime Ltd.	Hyundai Samho	Mar-16	Greece	DFDE	TZ Mk. III	4	Portfolio	S688
Maran Gas Lindos	161,870	Olivia International Shpg Corp.	Daewoo	Jul-15	Greece	DFDE	Membrane	4	Punta Europa	2292
Maran Gas Mystras	155,900	Blueskies Shipping Co. Ltd.	Daewoo	Aug-15	Greece	DFDE	Membrane	4	QCLNG	2405
Maran Gas Olympias	174,000	Cygnus Enterprises Inc.	Daewoo	Feb-17	Greece	ME-GI	GT NO 96	4	Portfolio	2415
Maran Gas Pericles	173,400	Anguilla Navigation Corp.	Hyundai Samho	Aug-16	Greece	DFDE	TZ Mk. III	4	Portfolio	S734
Maran Gas Posidonia	161,870	Felicite Navigation Inc.	Hyundai Samho	May-14	Greece	DFDE	Membrane	4	Punta Europa	–
Maran Gas Psara	173,595	Highseas Shiptrade Co.	Daewoo	May-20	Greece	ME-GI	GT NO96	4	Portfolio	2469
Maran Gas Roxana	174,000	Elisa International Ltd.	Daewoo	Jan-17	Greece	ME-GI	TZ Mk. III	4	Portfolio	2413
Maran Gas Sparta	159,800	Lettuce Maritime Corp.	Hyundai Samho	Apr-15	Greece	DFDE	Membrane	4	QCLNG	S626
Maran Gas Spetses	173,400	Hai Jiao 1801 Ltd.	Daewoo	Jul-18	Greece	ME-GI	TZ Mk. III Flex	4	GoM	2458
Maran Gas Troy	155,000	Helianthus Navigation Corp. .	Daewoo	Sep-15	Greece	DFDE	Membrane	4	Portfolio	2406
Maran Gas Ulysses	173,400	Ariel Sails Navigation SA	Hyundai Samho	Jan-17	Greece	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	S735
Maran Gas Vergina	174,000	Santa Lucia Enterprises Inc.	Daewoo	Dec-16	Greece	ME-GI	GT NO 96	4	Portfolio	2414
Maria Energy	174,000	Canyon Trading Corp.	HHI	Sep-16	Liberia	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	2612
Marib Spirit	165,500	Membrane Shipping Ltd.	Samsung	Apr-08	Marshall Is.	Diesel/Gas-Electric	TZ Mk. III	4	Balhaf	–
Marshal Vasilevskiy	170,000	Gazprom Flot LLC	HHI	Jan-19	Russian Fed.	Diesel/Gas-Electric	Membrane	4	Kaliningrad LNG	2854
Marvel Crane	177,000	Rosewood Shipping Pte Ltd.	Mitsubishi	Mar-19	Singapore	STaGE	Moss	4	Cameron	2321
Marvel Eagle	155,000	Mevius Lines SA	Kawasaki	Oct-18	Panama	Reheat Steam Turbine	Moss	4	Cameron	1728
Marvel Falcon	174,000	Tea Tree Shipping Pte Ltd.	Samsung	Apr-18	Singapore	TFDE	TZ Mk. III Flex	4	Cameron	2148
Marvel Hawk	177,000	Comet Arrow Gas Transport	Samsung	Dec-18	Singapore	TFDE	TZ Mk. III Flex	4	Cameron	2149
Marvel Heron	177,000	Heron Gas Shipping SA	Mitsubishi	Sep-19	Panama	STaGE	Moss	4	Cameron	2322
Marvel Kite	177,000	Comet Gyro Gas Transport Pte	Samsung	Jan-19	Singapore	TFDE	TZ Mk. III Flex	4	Cameron	2150
Marvel Pelican	156,265	Pelican Gas Shipping SA	Kawasaki	Dec-19	Panama	Reheat Steam Turbine	Moss	4	Cameron	1729
Marvel Swan	174,000	MIF I NO 20 K/S	Samsung	Apr-21	Denmark	X-DF	Membrane	4	Portfolio	2310
Megara	173,400	Hai Jiao 1607 Ltd.	Daewoo	Jul-18	Bahamas	ME-GI	GT NO 96	4	Portfolio	2455
Mekaines	266,000	Nakilat SHI 1695 Inc.	Samsung	Apr-09	Marshall Is.	DRL	TZ Mk. III	5	Qatargas III	–
Merchant	138,000	Ocean Tiger Shipping Ltd.	Samsung	Jul-03	Marshall Is.	Steam	TZ Mk. III	4	Portfolio	–
Meridian Spirit	165,500	Meridian Spirit Aps	Samsung	Jan-10	Denmark	Diesel/Gas-Electric	TZ Mk. III	4	Hammerfest	–
Mesaimeer	216,312	Nakilat HHI 1908 Inc.	HHI	Mar-09	Marshall Is.	Diesel	TZ Mk. III	4	Qatargas III	–
Methane Alison Victoria	145,000	Gas-Nineteen Ltd.	Samsung	Apr-07	Bermuda	Steam	TZ Mk. III	4	Punta Europa	–
Methane Becki Anne	170,000	Gas-Twenty Seven Ltd.	Samsung	Sep-10	Bermuda	TFDE	TZ Mk. III	4	Singapore	–
Methane Heather Sally	145,000	Gas-Twenty One Ltd.	Samsung	Jan-07	Bermuda	Steam	TZ Mk. III	4	Punta Europa	–
Methane Jane Elizabeth	145,000	Gas-Seventeen Ltd.	Samsung	Jun-06	Bermuda	Steam	TZ Mk. III	4	Idku	–
Methane Julia Louise	170,000	Southern Route Maritime SA	Samsung	Apr-10	Bermuda	TFDE	TZ Mk. III	9	Singapore	–
Methane Kari Elin	138,267	Lombard Corporate December 1	Samsung	May-04	Bermuda	Steam	TZ Mk. III	4	Singapore	–
Methane Lydon Volney	145,000	Gas-Eighteen Ltd.	Samsung	Aug-06	Bermuda	Steam	TZ Mk. III	4	Idku	–
Methane Mickie Harper	170,000	Methane Services Ltd.	Samsung	Dec-10	Bermuda	Diesel/Gas-Electric	TZ Mk. III	4	Singapore	–
Methane Nile Eagle	145,000	Egypt LNG Shipping Ltd.	Samsung	Dec-07	Bermuda	Steam	TZ Mk. III	4	Idku	–
Methane Patricia Camila	170,000	Methane Services Ltd.	Samsung	Oct-10	Bermuda	TFDE	TZ Mk. III	4	Singapore	–
Methane Princess	138,000	Methane Services Ltd.	Daewoo	Aug-03	Bermuda	Steam	GT NO 96	4	Portfolio	–
Methane Rita Andrea	145,000	Gas-Sixteen Ltd.	Samsung	Apr-06	Bermuda	Steam	TZ Mk. III	4	Idku	–
Methane Shirley Elisabeth	145,000	Gas-Twenty Ltd.	Samsung	Feb-07	Bermuda	Steam	TZ Mk. III	4	Punta Europa	–
Methane Spirit	165,500	Methane Spirit LLC	Samsung	Feb-08	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Atlantic LNG	–
Milaha Qatar	145,500	Milaha Qatar GmbH & Co. KG	Samsung	Apr-06	Malta	Steam	TZ Mk. III	4	RasGas II	–
Milaha Ras Laffan	138,270	Milaha Ras Laffan GmbH & Co.	Samsung	Apr-04	Malta	Steam	TZ Mk. III	4	RasGas II	–
Min Lu	147,100	Min Lu LNG Shipping Co. Ltd.	Hudong Zhonghua	Aug-09	Hong Kong	Steam	GT NO 96	4	Tangguh	–
Min Rong	145,000	Min Rong LNG Shipping Co. Ltd.	Hudong Zhonghua	Feb-09	Hong Kong	Steam	GT NO 96	4	Tangguh	–
Minerva Chios	170,520	Peninsula Shipping SA	Samsung	Aug-21	Greece	X-DF	Membrane	4	Portfolio	2305
Minerva Kalymnos	174,000	Koje Shipping SA	Samsung	Feb-21	Malta	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2304
Minerva Limnos	173,400	Roland Shipping SA	Daewoo	Jun-21	Greece	ME-GI	Membrane	4	Portfolio	2482
Minerva Psara	173,400	Wimbledon Shipping	Daewoo	Jan-21	Malta	ME-GI	TZ Mk. III Flex Plus	4	Portfolio	2481
MOL Hestia	173,400	LNG Harmonia Shipping Corp.	Daewoo	Jul-21	Marshall Is.	X-DF	Membrane	4	Portfolio	2505
Mozah	266,000	Nakilat Haloul Inc.	Samsung	Aug-09	Marshall Is.	Diesel	TZ Mk. III	5	Qatargas II	–

Mraweh	137,000	Mraweh Ltd.	STX	Apr-96	Liberia	Steam	Moss	4	Das Island	–
Mu Lan	174,400	Fortune Great Shipping Ltd.	Hudong Zhonghua	Aug-21	Liberia	X-DF	TZ Mk. III	4	Portfolio	1827A
Mubaraz	137,000	Mubaraz Ltd.	STX	Dec-95	Liberia	Steam	Moss	4	Das Island	–
Murex	173,400	Hai Jiao 1605 Ltd.	Daewoo	Jul-17	Bahamas	ME-GI	GT NO 96	4	Portfolio	2416
Murwab	210,100	J5 Nakilat No. 4 Ltd.	Daewoo	Jun-08	Marshall Is.	Diesel	GT NO 96	18	RasGas III	–
Myrina	173,400	Xiang Ch1 HK International	Daewoo	May-18	Bahamas	ME-GI	GT NO 96	4	Portfolio	2454
Neo Energy	150,000	Sea Optima SA	HHI	Jan-07	Liberia	Steam	Moss	4	Portfolio	–
Neptune	145,130	SRV Joint Gas Ltd.	Samsung	Nov-09	Norway	DFDE	TZ Mk. III	4	Portfolio	–
Nikolay Urvantsev	172,658	Dy Maritime Ltd.	Daewoo	Jul-19	Hong Kong	ME-GI	GT NO 96 GW	4	Yamal	2432
Nikolay Yevgenov	172,410	TC LNG Explorer III LLC	Daewoo	Apr-19	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2430
Nikolay Zubov	172,410	Hai Kuo Shipping 1606 Ltd.	Daewoo	Nov-18	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2429
Nizwa LNG	147,684	Oryx LNG Carrier SA	Kawasaki	Dec-05	Panama	Steam	Moss	4	Oman LNG	–
Nohshu Maru	180,000	Trans Pacific Shipping 5 Ltd.	Mitsubishi	Feb-19	Bahamas	Reheat Steam Turbine	Moss	4	Portfolio	2326
Northwest Sanderling	127,525	BHP/BP/Chevron/Japan & Others	Mitsubishi	Jan-89	Australia	Steam	Moss	4	North West Shelf	–
Northwest Sandpiper	125,042	BHP/BP/Chevron/Japan & Others	Mitsui E&S	Jan-93	Australia	Steam	Moss	4	North West Shelf	–
Northwest Snipe	127,500	BHP/BP/Chevron/Japan & Others	Mitsui E&S	Jan-90	Australia	Steam	Moss	4	North West Shelf	–
Northwest Stormpetrel	127,500	BHP/BP/Chevron/Japan & Others	Mitsubishi	Dec-94	Australia	Steam	Moss	4	North West Shelf	–
Oak Spirit	173,400	Sea 64 Leasing Co Ltd.	Daewoo	Mar-16	Bahamas	ME-GI	GT NO 96	4	Sabine Pass	2408
Ob River	149,700	Lance Shipping SA	HHI	May-07	Marshall Is.	Steam	TZ Mk. III	4	Sakhalin II	–
Oceanic Breeze	155,300	Oceanic Breeze LNG Transport	Mitsubishi	Apr-18	Marshall Is.	Reheat Steam Turbine	Moss	4	Ichthys	2310
Onaiza	210,150	Nakilat DSME 2266 Inc.	Daewoo	Apr-09	Marshall Is.	Diesel	GT NO 96	12	Qatargas III	–
Ougarta	170,000	Hyproc Shipping Co.	HHI	Mar-17	Algeria	DFDE	TZ Mk. III Flex	4	Arzew	2814
Pacific Arcadia	145,400	Bahamas LNG Shipping Ltd.	Mitsubishi	Oct-14	Bahamas	Steam	Moss	4	PNG LNG	–
Pacific Breeze	180,000	Pacific Breeze LNG Transport	Kawasaki	Mar-18	Marshall Is.	TFDE	Moss	4	Ichthys	1718
Pacific Enlighten	145,400	Pacific Hope Shipping Ltd.	Mitsubishi	Mar-09	Bahamas	Steam	Moss	4	North West Shelf	–
Pacific Eurus	137,000	Pacific Eurus Shipping	Mitsubishi	Mar-06	Bahamas	Steam	Moss	4	Das Island	–
Pacific Mimosa	155,300	Kaede Shipholding SA	Mitsubishi	Mar-18	Japan	Reheat Steam Turbine	Moss	4	Wheatstone	2316
Pacific Notus	137,006	Pacific LNG Shipping	Mitsubishi	Sep-03	Bahamas	Steam	Moss	5	Darwin LNG	–
Palu LNG	159,800	Oceanus LNG Gamma LLC	Daewoo	Nov-14	Malta	TFDE	GT NO 96	4	Spot	–
Pan Africa	174,000	Pan Africa LNG Transportation	Hudong Zhonghua	Jan-19	Hong Kong	TFDE	GT NO 96	4	QCLNG	1666A
Pan Americas	174,000	Pan Americas LNG Trans	Hudong Zhonghua	Jan-18	Hong Kong	TFDE	GT NO 96	4	QCLNG	H1664A
Pan Asia	174,000	Pan Asia LNG Transportation	Hudong Zhonghua	Sep-17	Hong Kong	TFDE	GT NO 96	4	QCLNG	1663A
Pan Europe	174,000	Pan Europe LNG Transportation	Hudong Zhonghua	Jul-18	Hong Kong	TFDE	GT NO 96	4	QCLNG	H1665A
Papua	170,000	Aquarius LNG Shipping Ltd.	Hudong Zhonghua	Nov-14	Hong Kong	DFDE	TZ MK. III	4	PNG LNG	H1670A
Patris	174,000	Artemis Gas 1 Shipping Inc.	Daewoo	Jan-18	Liberia	ME-GI	GT NO 96	4	Freeport	2460
Pearl LNG	174,000	Cardiff LNG Delta Owning LLC	HHI	Aug-20	Malta	X-DF	NO-96-GW+PRS	4	Portfolio	2275
Point Fortin	154,200	Los Halillos Shipping Co. SA	Koyo Dockyard	Jan-10	Panama	Steam	TZ Mk. III	4	Portfolio	–
Polar Spirit	89,800	Polar Spirit LLC	Ishikawajima	Jun-93	Bahamas	Steam	IHI SPB	4	Atlantic LNG	–
Portovyy	138,107	Global LNG Ltd.	Daewoo	Aug-03	Malta	Steam	GT NO 96	4	Portfolio	–
Prachi	162,000	India LNG Transport Co. No. 4	HHI	Nov-16	Singapore	Diesel/Gas-Electric	TZ Mk. III	4	Gorgon	2633
Prism Agility	180,000	HHI ENS1 Shipholding SA	HHI	May-19	Panama	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2937
Prism Brilliance	180,000	HHI ENS2 Shipholding SA	HHI	May-19	Panama	X-DF	TZ Mk. III Flex Plus	4	Portfolio	2938
Pskov	170,200	Scalpay Shipping Ltd.	STX	Sep-14	Liberia	DFDE	GT NO 96	4	Portfolio	–
Puteri Delima	130,400	Puteri Delima Sdn Bhd.	STX	Jan-95	Malaysia	Steam	GT NO 96	4	MLNG II	–
Puteri Delima Satu	137,100	Puteri Delima Satu L Pte Ltd.	Mitsui E&S	Oct-02	Malaysia	Steam	GT NO 96	4	MLNG III	–
Puteri Firus Satu	137,100	Puteri Firus Satu	Mitsubishi	Aug-04	Malaysia	Steam	GT NO 96	4	MLNG III	–
Puteri Intan	137,100	Puteri Intan Sdn Bhd.	STX	Aug-94	Malaysia	Steam	GT NO 96	4	MLNG II	–
Puteri Intan Satu	137,100	Puteri Intan Satu L Pte Ltd.	Mitsubishi	Aug-02	Malaysia	Steam	GT NO 96	4	MLNG III	–
Puteri Mutiara Satu	137,100	Puteri Mutiara Satu	Mitsui E&S	Apr-05	Malaysia	Steam	GT NO 96	4	MLNG III	–
Puteri Nilam	130,400	Puteri Nilam Sdn Bhd.	STX	Jul-95	Malaysia	Steam	GT NO 96	4	MLNG II	–
Puteri Nilam Satu	137,100	Puteri Nilam Satu L Pte Ltd.	Mitsubishi	Jul-03	Malaysia	Steam	GT NO 96	4	MLNG III	–
Puteri Zamrud	130,400	MISC Bhd.	STX	Jun-96	Malaysia	Steam	GT NO 96	4	MLNG II	–
Puteri Zamrud Satu	137,100	Puteri Zamrud Satu L Pvt Ltd.	Mitsui E&S	Feb-04	Malaysia	Steam	GT NO 96	4	MLNG III	–
Qogir	174,000	Xiang Ch15 HK International	Samsung	Jun-20	Malta	X-DF	TZ MK. III Flex	4	Portfolio	2271
Raahi	138,076	India LNG Transport Co. No. 2	Daewoo	Oct-04	Malta	Steam	GT NO 96	4	RasGas	–
Ramdane Abane	126,130	Hyproc Shipping Co.	STX	Jun-81	Algeria	Steam	GT NO 85	5	Arzew	–
Rasheeda	266,000	Nakilat SHI 1754 Inc.	Samsung	Aug-10	Marshall Is.	Diesel	TZ Mk. III	10	Qatargas IV	–
Rias Baixas Knutsen	180,000	Knutsen OAS Espana SL	HHI	Sep-19	Spain	ME-GI	TZ Mk. III Flex Plus	4	Corpus Christi	2964
Ribera Del Duero Knutsen	173,400	Norspan LNG VIII AS	Daewoo	Dec-10	Norway	DFDE	GT NO 96	4	Portfolio	–
Rioja Knutsen	170,000	Norspan LNG X As	HHI	Dec-16	Spain	ME-GI	TZ Mk. III	4	Portfolio	2734
Rudolf Samoylovich	172,410	TC LNG Explorer II LLC	Daewoo	Aug-18	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2425
Saga Dawn	45,000	Saga LNG Shipping Pte Ltd.	China Merchants H.I.	Aug-19	Singapore	Diesel/Gas-Electric	TZ MK. III Flex	4	Portfolio	18801
Salalah LNG	147,000	Tiwi LNG Carrier SA	Samsung	Dec-05	Panama	Steam	TZ Mk. III	4	Oman LNG	–
SCF Barents	174,000	Heliconia Maritime SA	HHI	Sep-20	Liberia	DFDS	TZ Mk. III Flex	4	Portfolio	8007
SCF La Perouse	174,000	Albus Shipping Ltd.	HHI	Feb-20	Liberia	X-DF	NO-96-GW+PRS	4	Portfolio	8006
SCF Melampus	170,200	Pabbay Shipping Ltd.	STX	Jan-15	Liberia	Diesel Electric	Membrane	4	Portfolio	1912
SCF Mitre	170,200	Ensay Shipping Ltd.	STX	Apr-15	Liberia	Diesel Electric	Membrane	4	Portfolio	1913
SCF Timmerman	174,000	Headliner Maritime SA	HHI	Jan-21	Liberia	X-DF	NO-96-GW+PRS	4	Portfolio	8008
Sean Spirit	174,162	HHI Hull No. S856 LLC	Hyundai Samho	Dec-18	Bahamas	ME-GI	TZ Mk. III Flex	4	Freeport	S856
Seishu Maru	138,000	Trans Pacific Shipping 1 Ltd.	Mitsubishi	Sep-14	Bahamas	Steam	Moss	4	PNG LNG	–
Senshu Maru	127,167	Nippon/Mitsui/Kawasaki	Mitsui E&S	Feb-84	Japan	Steam	Moss	5	Bontang	–
Seri Alam	145,572	MISC Bhd.	Samsung	Jul-05	Malaysia	Steam	Moss Seri-C	4	Bintulu	–

Seri Amanah	145,709	MISC Bhd.	Samsung	Mar-06	Malaysia	Steam	TZ Mk. III	4	Bintulu	–
Seri Anggun	145,731	MISC Bhd.	Samsung	Oct-06	Malaysia	Steam	TZ Mk. III	4	North West Shelf	–
Seri Angkasa	145,130	MISC Bhd.	Samsung	Dec-06	Malaysia	Steam	TZ Mk. III	4	Bintulu	–
Seri Ayu	145,894	MISC Bhd.	Samsung	Oct-07	Malaysia	Steam	TZ Mk. III	4	Bintulu	–
Seri Bakti	152,944	MISC Bhd.	Mitsubishi	Apr-07	Malaysia	Steam	TZ MK. III	4	Gladstone	–
Seri Balhaf	152,000	MISC Bhd.	Mitsubishi	Jan-09	Malaysia	Steam	TZ MK. III	4	Bontang	–
Seri Balqis	152,000	MISC Bhd.	Mitsubishi	Mar-09	Malaysia	Steam	TZ MK. III	4	NLNG	–
Seri Begawan	152,900	MISC Bhd.	Mitsubishi	Nov-07	Malaysia	Steam	TZ MK. III	4	Bintulu	–
Seri Bijaksana	152,300	MISC Bhd.	Mitsubishi	Apr-08	Malaysia	Steam	TZ MK. III	4	Bintulu	–
Seri Camar	150,000	Seri Camar L Pte Ltd.	HHI	Feb-18	Malaysia	Ultra Steam Turbine	Moss	4	Pacific Northwest	2732
Seri Camellia	159,800	Seri Camellia L Pte Ltd.	HHI	Sep-16	Malaysia	Steam	Moss Seri-C	4	Pacific Northwest	2729
Seri Cemara	150,200	Seri Cemara L Pte Ltd.	HHI	Apr-18	Malaysia	Reheat Steam Turbine	Moss	4	Portfolio	2735
Seri Cempaka	162,000	Seri Cempaka L Pte Ltd.	HHI	Aug-17	Malaysia	Steam	Moss Seri-C	4	Pacific Northwest	2731
Seri Cenderawasih	162,000	Seri Cenderawasih L Pvt Ltd.	HHI	Feb-17	Malaysia	Steam	Moss Seri-C	4	Pacific Northwest	2730
Sestao Knutsen	136,947	Norspan LNG IV AS	Navantia Cadiz	Oct-07	Spain	Steam	TZ MK. III	4	Portfolio	–
Sevilla Knutsen	173,400	Norspan LNG VI AS	Daewoo	May-10	Spain	Diesel/Gas-Electric	GT NO 96	4	Portfolio	–
Shagra	268,000	Nakilat SHI 1751 Inc.	Samsung	Nov-09	Marshall Is.	Diesel	TZ Mk. III	10	Qatargas IV	–
Shahamah	135,496	Shahamah Inc.	Kawasaki	Oct-94	Liberia	Steam	Moss	5	Das Island	–
Shen Hai	147,200	Shanghai LNG Shipping Co. Ltd.	Hudong Zhonghua	Dec-12	Hong Kong	Steam	TZ MK. III	4	Bintulu	–
Shinshu Maru	180,000	Trans Pacific Shipping 7 Ltd.	Kawasaki	Feb-19	Bahamas	DERST	Moss	4	Freeport	1734
Simaisma	145,889	Greenwell Corp.	Daewoo	Jul-06	Greece	Steam	GT NO 96	8	RasGas II	–
Singapore Energy	138,000	KSF Global No. 6 SA	Samsung	Feb-03	Marshall Is.	Steam	TZ Mk. III	4	Portfolio	–
SK Audace	174,000	Milestone LNG Transport SA	Samsung	Aug-17	Panama	X-DF	TZ Mk. III	4	Portfolio	2080
SK Resolute	180,000	Great Shale LNG Transport SA	Samsung	Nov-17	Panama	X-DF	TZ Mk. III	4	Ichthys	2081
SK Serenity	174,000	Shikc 1 Shipholding SA	Samsung	Feb-18	Panama	TFDE	KC-1	4	Sabine Pass	2153
SK Spica	174,117	Shikc 2 Shipholding SA	Samsung	Mar-18	Panama	TFDE	KC-1	4	Sabine Pass	2154
SK Splendor	138,370	SK Shipping Co. Ltd. -Krs	Samsung	May-00	South Korea	Steam	TZ Mk. III	4	Oman LNG	–
SK Stellar	138,375	Stellar Shipholding SA	Samsung	Dec-00	Panama	Steam	TZ Mk. III	4	RasGas I	–
SK Summit	138,003	SK Shipping Co. Ltd. -Krs	Daewoo	Aug-99	South Korea	Steam	GT NO 96	4	RasGas I	–
SK Sunrise	138,306	Methane Navigation SA	Samsung	Aug-03	Panama	Steam	TZ Mk. III	4	RasGas II	–
SK Supreme	138,225	SK Shipping Co. Ltd. -Krs	Samsung	Feb-00	South Korea	Steam	TZ Mk. III	4	RasGas I	–
SM Eagle	174,000	SMKLC LNG1 SA	Daewoo	May-17	Panama	ME-GI	TZ Mk. III Flex	4	Sabine Pass	2449
SM Seahawk	174,000	SMKLC LNG2 SA	Daewoo	Jun-17	Panama	ME-GI	TZ Mk. III Flex	4	Sabine Pass	2450
Sohar LNG	137,248	Energy Spring LNG Carrier SA	Mitsubishi	Oct-01	Panama	Steam	Moss	5	Oman LNG	–
Sohshu Maru	177,000	Trans Pacific Shipping 8 Ltd.	Kawasaki	Jul-19	Bahamas	DERST	Moss	4	Freeport	1735
Solaris	155,000	Gas-Eight Ltd.	Samsung	Jul-14	Bermuda	Diesel/Gas-Electric	Membrane	4	Spot	–
Sonangol Benguela	160,500	Sonangol Benguela Ltd.	Daewoo	Dec-11	Bahamas	Steam	GT NO 96	4	Soyo	–
Sonangol Etosha	160,500	Sonangol Etosha Ltd.	Daewoo	Sep-11	Bahamas	Steam	GT NO 96	4	Soyo	–
Sonangol Sambizanga	160,500	Sonangol Sambizanga Ltd.	Daewoo	Aug-11	Bahamas	Steam	GT NO 96	4	Soyo	–
Southern Cross	172,000	Aries LNG Shipping Ltd.	Hudong Zhonghua	Jul-15	Hong Kong	DRL	TZ Mk. III	4	PNG LNG	H1671A
Soyo	160,276	Mint LNG I Ltd.	Samsung	Aug-11	Bahamas	DFDE	TZ Mk. III	4	Soyo	–
Spirit Of Hela	177,000	Nefertiti LNG Shipping Co. Ltd.	Hyundai Samho	Nov-10	Bahamas	Diesel Electric	TZ Mk. III	4	PNG LNG	–
Stena Blue SKy	145,700	Blue Shipping KB	Daewoo	Aug-06	U.K.	Steam	GT NO 96	4	Spot	–
Stena Clear Sky	171,800	Clear Sky KB	Daewoo	May-11	U.K.	Diesel/Gas-Electric	GT NO 96	4	Portfolio	–
Stena Crystal SKy	171,800	Crystal Sky KB	Daewoo	May-11	U.K.	Diesel/Gas-Electric	GT NO 96	4	Portfolio	–
Symphonic Breeze	145,394	Reborn Maritime SA	Kawasaki	Dec-07	Bahamas	Steam	Moss	4	Portfolio	–
Taitar No. 1	145,000	NIMIC No. 1 SA	Mitsubishi	Oct-09	Panama	Steam	Moss	4	RasGas	–
Taitar No. 2	145,000	NIMIC No. 2 SA	Kawasaki	Dec-09	Panama	Steam	Moss	4	RasGas	–
Taitar No. 3	145,000	NIMIC No. 3 SA	Mitsubishi	Dec-09	Panama	Steam	Moss	4	RasGas	–
Taitar No. 4	147,000	NIMIC No. 4 SA	Kawasaki	Aug-10	Panama	Steam	Moss	4	RasGas	–
Tangguh Batur	145,700	LNG North-South Shipping Co.	Daewoo	Dec-08	Singapore	Steam	TZ MK. III	4	Tangguh	–
Tangguh Foja	155,000	Ocean1919 Shipping No. 1 SA	Samsung	Nov-08	Panama	DFDE	TZ Mk. III	4	Tangguh	–
Tangguh Hiri	155,000	Tangguh Hiri Finance Ltd.	HHI	Dec-08	Bahamas	DFDE	TZ Mk. III	4	Tangguh	–
Tangguh Jaya	155,000	Ocean1919 Shipping No. 2 SA	Samsung	Dec-08	Panama	DFDE	TZ Mk. III	4	Tangguh	–
Tangguh Palung	155,000	Ocean1919 Shipping No. 3 SA	Samsung	Mar-09	Panama	DFDE	TZ Mk. III	4	Tangguh	–
Tangguh Sago	155,000	Tangguh Sago Finance Ltd.	Hyundai Samho	Dec-08	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Tangguh	–
Tangguh Towuti	145,700	LNG East-West Ship Singapore	Daewoo	Oct-08	Singapore	Steam	TZ MK. III	4	Tangguh	–
Tembek	216,200	Overseas LNG S1 Corp.	Samsung	Nov-07	Marshall Is.	Diesel	TZ Mk. III	4	Qatargas II	–
Tessala	170,000	Hyproc Shipping Co.	HHI	Feb-17	Algeria	Diesel/Gas-Electric	TZ Mk. III Flex	4	Arzew	2813
Torben Spirit	173,400	Sea 168 Leasing Co. Ltd.	Daewoo	Nov-16	Bahamas	ME-GI	GT NO 96	4	Portfolio	2411
Trader	138,000	Lloyds Industrial Leasing	Samsung	Nov-02	Isle of Man	Steam	TZ Mk. III	4	Portfolio	–
Traiano Knutsen	180,000	Hai Kuo Shipping 1901 G Ltd.	HHI	Jul-20	Norway	ME-GI	TZ Mk. III Flex Plus	4	Portfolio	3086
Trinity Arrow	154,982	Cypress/Luster/Los Halillos	Koyo Dockyard	Feb-08	Panama	Steam	TZ Mk. III	4	Portfolio	–
Trinity Glory	154,000	Cypress/Luster/Los Halillos	Koyo Dockyard	Nov-08	Panama	Steam	TZ Mk. III	4	Bontang	–
Tristar Ruby	155,000	Sg Leasing Gems Ltd.	HHI	Apr-08	Liberia	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	–
Umm Al Amad	210,200	J5 Nakilat No. 7 Ltd.	Daewoo	Sep-08	Marshall Is.	Diesel	GT NO 96	18	RasGas III	–
Umm Al Ashtan	137,000	Umm Al Ashtan Ltd.	STX	May-97	Liberia	Steam	Moss	4	Das Island	–
Umm Bab	145,000	Sea Trade International	Daewoo	Nov-05	Greece	Steam	GT NO 96	4	RasGas II	–
Umm Slal	266,000	Shi Hull No. 1676 Inc.	Samsung	Nov-08	Marshall Is.	DFDE	TZ Mk. III	5	Qatargas II	–
Valencia Knutsen	173,400	Norspan LNG VII AS	Daewoo	Sep-10	Spain	DFDE	GT NO 96	4	Portfolio	–
Velikiy Novgorod	170,200	Boreray Shipping Ltd.	STX	Dec-13	Liberia	DFDE	GT NO 96	4	Portfolio	–
Vivit Americas LNG	180,000	Cardiff LNG Zeta Owning LLC	HHI	Oct-20	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3037

Vladimir Rusanov	174,000	DY Maritime Ltd.	Daewoo	Jan-18	Hong Kong	ME-GI	GT NO 96 GW	4	Yamal	2424
Vladimir Vize	172,000	Dy Maritime Ltd.	Daewoo	Sep-18	Hong Kong	ME-GI	GT NO 96 GW	4	Yamal	2426
Vladimir Voronin	172,652	TC LNG Explorer IV LLC	Daewoo	Jul-19	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2431
Wilforce	155,900	Compass Shipping 84 Corp. Ltd.	Daewoo	Sep-13	Norway	DFDE	GT NO 96	4	Portfolio	–
Wilpride	155,900	Compass Shipping 85 Corp. Ltd.	Daewoo	Nov-13	Norway	DFDE	GT NO 96	4	Portfolio	–
Woodside Chaney	174,000	Lamkos Seaways Ltd.	Daewoo	Jul-19	Greece	ME-GI	TZ MK. III Flex	4	Portfolio	2457
Woodside Charles Allen	173,400	Newberry Shiptrade Ltd.	Daewoo	Oct-20	Greece	ME-GI	Membrane	4	Portfolio	2486
Woodside Donaldson	165,500	Malt Singapore Pte Ltd.	Samsung	Oct-09	Singapore	Diesel/Gas-Electric	TZ Mk. III	4	Pluto	–
Woodside Goode	159,800	Armour Co. Ltd.	Daewoo	Nov-13	Greece	Diesel Electric	GT NO 96	4	RasGas	–
Woodside Rees Withers	173,400	Franklin Navigation Co.	Daewoo	Oct-19	Greece	ME-GI	GT NO 96	4	Portfolio	2466
Woodside Rogers	159,800	Margie Seaway Corp.	Daewoo	Jul-13	Greece	Diesel/Gas-Electric	GT NO 96	4	Pluto	–
Yakov Gakkel	172,658	TC LNG Explorer VI LLC	Daewoo	Nov-19	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2434
Yamal Spirit	174,000	Xiang Ch2 HK International	Hyundai Samho	Jan-19	Bahamas	ME-GI	TZ Mk. III Flex	4	Freeport	S857
Yari LNG	159,800	Oceanus LNG Delta LLC	Daewoo	Nov-14	Malta	TFDE	GT NO 96	4	Portfolio	–
Yenisei River	155,000	Navajo Marine Ltd.	HHI	Jul-13	Marshall Is.	DFDE	TZ Mk. III	4	Yamal	–
YK Sovereign	127,125	SK Shipping Co. Ltd. -Krs	HHI	Dec-94	South Korea	Steam	Moss	4	MLNG	–
Zarga	268,000	Nakilat SHI 1752 Inc.	Samsung	Jan-10	Marshall Is.	DRL	TZ Mk. III	5	Qatargas IV	–
Zekreet	137,482	Mitsui/Nippon/Kawasaki/Iino	Mitsui E&S	Dec-98	Japan	Steam	Moss	5	Qatargas I	–

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 Schiffahrts 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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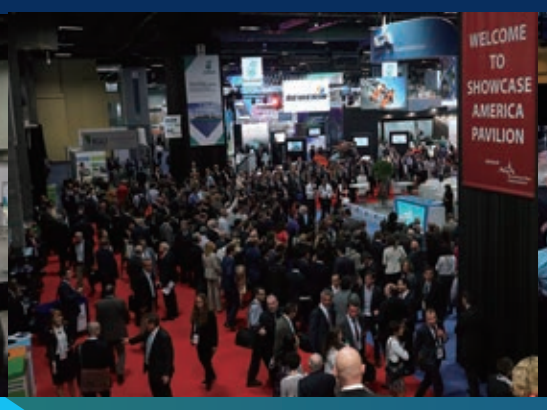

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