LNG journal
The World's Leading LNG publication
July/August 2022

Lake Charles LNG®
An Energy Transfer Project

SUPPLYING ENERGY GLOBALLY

Energy Transfer's fully permitted project will convert its existing Lake Charles LNG import and regasification terminal into an LNG export facility, providing a cost advantage over other proposed LNG projects on the Gulf Coast. The LNG export facility will benefit from abundant U.S. natural gas supply and proximity to major pipeline infrastructure, including Energy Transfer's vast pipeline network.

To date, Energy Transfer has announced several Sale and Purchase Agreements (SPAs) to supply LNG from its Lake Charles LNG export facility to buyers around the world. If sanctioned through an affirmative FID, the Lake Charles LNG project will have a total liquefaction capacity of 16.45 million tonnes per annum and incorporate best available technology for enhanced performance and efficiency.

energytransferlng.com

ENERGY TRANSFER®

LNG journal
The World's Leading LNG publication

42 pages essential LNG news!

July/August 2022

In this issue:

Interview:

Malaysia's PETRONAS focuses on capacity growth, asset decarbonisation and pricing flexibility

PETRONAS, Malaysia's national oil and gas company, is developing Sabah's first nearshore LNG facility set to produce an additional 2 million tons per annum (mtpa), with volumes largely designated for customers in Asia Pacific. "The project demonstrates our commitment to harness further value from our upstream assets through technological advancements that can unlock remote and costlier gas fields," Abang Yusuf Abang Puteh, PETRONAS' senior vice president of LNG Assets told our Markets Editor, Anja Karl.

Now more than ever, LNG is playing a key role in the global clean energy transition which drives the recent extremely strong demand for LNG and supports numerous projects around the world. Asked to pinpoint the main areas of growth, Mr Abang referred PETRONAS' customers in the Far East as well in the Atlantic Basin.

"The arbitrage between TTF and JKM is a cyclical process, but fact is that we are seeing greater LNG demand in Europe to reduce the reliance of Russian pipeline gas," he told *LNG Journal*. "But beyond pricing, our experience, geographical advantage, integrity as well as reliability of our assets, are key value propositions that customers value and appreciate."

View of Bintulu LNG at the Malay enclave Sarawak on Borneo Island

Pegaga – fresh feedgas for Bintulu LNG

As existing feedgas supply for PETRONAS' large Bintulu LNG complex matures, PETRONAS has set out plans to develop new upstream resources to maximise plant utilisation.

Abang Yusuf Abang Puteh, senior VP LNG Assets, PETRONAS

Pegaga is one of these fields. First gas was achieved in March 2022 and supply from Pegaga is currently feeding into the PETRONAS LNG Complex (PLC) in Bintulu, Sarawak where the gas is commingled with other sources of gas prior to liquefaction.

Earlier this year, some cargoes from Bintulu LNG, in Malaysia's central Sarawak region, had to be rescheduled due to maintenance activity involving one of the LNG production trains – but the affected train resumed operations at the end of March. "Energy security to our customers and stakeholders is of upmost importance to us," Mr. Abang said.

"As an integrated energy provider, we leverage our global assets as well as multiple LNG production modules at Bintulu. By including additional feed gas from the Pegaga field, we can further enhance our supply reliability," he explained.

Capacity in Canada due onstream by 2025

Customers in Asia are currently the mainstay of PETRONAS gas business – thanks to Malaysia's geographical proximity to key demand centres in China, Japan and South Korea. "Beyond Malaysia, our production capacity at LNG Canada is planned to come on stream by middle of this decade which strengthens the reliability of our global supply portfolio," Abang pointed out.

In 2021, PETRONAS introduced the Canada Alberta Energy Company index (AECO) based on the sale of a spot cargo to an end-customer in Northeast Asia, as well as a term deal with China NOC Gas and Power Trading & Marketing Ltd. (CNOOC). Around 2.2 mtpa of LNG will be supplied over a 10-year period, indexed to a combination of the Brent and AECO indices. The deal with CNOOC is valued at about $7 billion over the period.

The deal was "successful and receptive by the customers in JKTC," Abang commented, as both parties aspire to establish a transparent, stable, and highly liquid price index amidst the current volatility seen in LNG and oil prices.

LNG journal

The World's Leading LNG publication

Maritime Content Ltd
2 Prospect Road
St Albans AL1 2AX
United Kingdom
www.LNGjournal.com
+44 (0)20 7253 2700

Publisher
Stuart Fryer

Markets & Commissioning Editor
Anja Karl
anja@lngjournal.com

Markets Editor
Alexander Wilk
alexander@lngjournal.com

Technical Editor
Ian Cochran
Iancochran74@gmail.com

Fuelling Editor
Malcolm Ramsay
malcolmramsay@gmail.com

Advertising
David Jeffries, Only Media Ltd
Tel: +44 (0) 208 150 5293
djeffries@lngjournal.com

Subscriptions Sales Manager
Stephan Venter
venter@lngjournal.com

Subscriptions Renewals Manager & Customer Care
Gabi Weck
gabi@lngjournal.com

Production
Vivian Chee
chee@btconnect.com

Subscription

Print & online **£825/€930/US$1210**

Online only **£755/€835/US$1095**

See website for more details
www.lngjournal.com
hotline +44 (0)20 7253 2700

Printed by The Manson Group Ltd
Reynolds House, 8 Porters' Wood
Valley Road Industrial Estate
St Albans, Hertz AL3 6PZ, U.K.

The PFLNG Satu was first deployed at the Kanowit field off Sarawak, and then mobilized to the Kebabangan gas field off Sabah.

The AECO index has been developed by the Calgary-based commodity exchange ICE NGX as an alternative to other indices. It aims to give buyers a new pricing alternative for Asia-bound LNG from North America. AECO is backed by large gas reserves in the LNG Canada venture whereby trades are done on a real time basis, compared to the bellwether Henry Hub.

"With AECO's close proximity to JKTC markets, buyers are provided with a pricing alternative for Asia-bound LNG. Moreover, the index is backed by large gas reserves in Canada whereby trades are done on real time basis similar to Henry Hub index," Puteh explained. The LNG Canada export project in British Columbia, for instance, is currently under construction and scheduled to produce first LNG by middle of the decade. The massive project will supply 14 mtpa from the first two trains, with the potential to expand to four trains. Built at an estimated cost of C$40 billion, or US$31.4 billion, the LNG Canada venture is 40 percent owned by Shell, while PETRONAS owns a 25 percent stake through its subsidiary North Montney LNG Ltd Partnership. Other shareholders are PetroChina, Mitsubishi and KOGAS.

Focus on sustainability & green fuels

Striving to meet its ambitious Net Zero Carbon Emissions 2050 targets, PETRONAS has started to deliver carbon-neutral LNG. The credits used were certified under the Verified Carbon Standard program and to date, PETRONAS has completed 5 carbon neutral LNG deals with its long-term customers in China and Japan.

"We've set the target to reduce our Scope 1 and 2 GHG emissions from our assets, at 49.5 mill tCO2e by 2024, and this target now forms part of an overall phased approach toward our 2050 net zero carbon emissions goal," he said. Operational emissions will be mitigated, reduced or offset.

To that end, Bintulu LNG will be converted and gradually powered by hydroelectricity, starting from 2024, allowing for the decommissioning of old and inefficient gas turbines. By 2025, a Carbon Capture and Storage (CCS) unit will come onstream at offshore Sarawak Gas Field (Kasawari) with the potential to reduce emission by approximately 76 million tonnes.

To decarbonise marine transport, PETRONAS is applying gas burning of LNG ships at both our buyers and our own terminals (18 terminals) during loading and discharge as compared to using heavy bunker fuels. "We've upgraded our LNG vessels with Hull Performance Solution technology to cut bunker consumption, reducing about 18,000 tons of CO2 emission annually," Abang said. And to meet unique requirements from smaller customers in remote locations – far away from main power grids and pipelines – PETRONAS delivers LNG in ISO Tanks internationally, and in Malaysia via its Virtual Pipeline System solution.

Clean fuels are also in the offing: the Malaysian oil and gas major has teamed up with various partners to develop solutions in hydrogen, ammonia, Carbon Capture and Storage (CCS) as well as Carbon Capture Utilization and Storage (CCUS), offshore wind and LNG bunkering alliances. A study is also underway to develop high-carbon gas fields in Malaysia, utilising CCS technology, together with the Japanese companies JOGMEC and JX Nippon Oil. The aim is to set up a global alliance and collaboration for LNG bunkering at four locations in Japan.

"These efforts in capacity growth, asset decarbonisation as well as pricing flexibilities further strengthens PETRONAS' readiness to meet the growing demand for LNG and fulfil our customers' requirements as a one-stop-centre for lower carbon energy solutions", Abang concluded. ■

Close-up view of the Petronas LNG Complex near the town of Bintulu

Eastern Europe Looks to LNG for Energy Security

Eastern European EU Member States led by Lithuania seem ahead of the curve in substituting Russian pipeline gas with LNG. However, once winter approaches competition for available gas volumes is set to stiffen, writes our Markets Editor Alexander Wilk

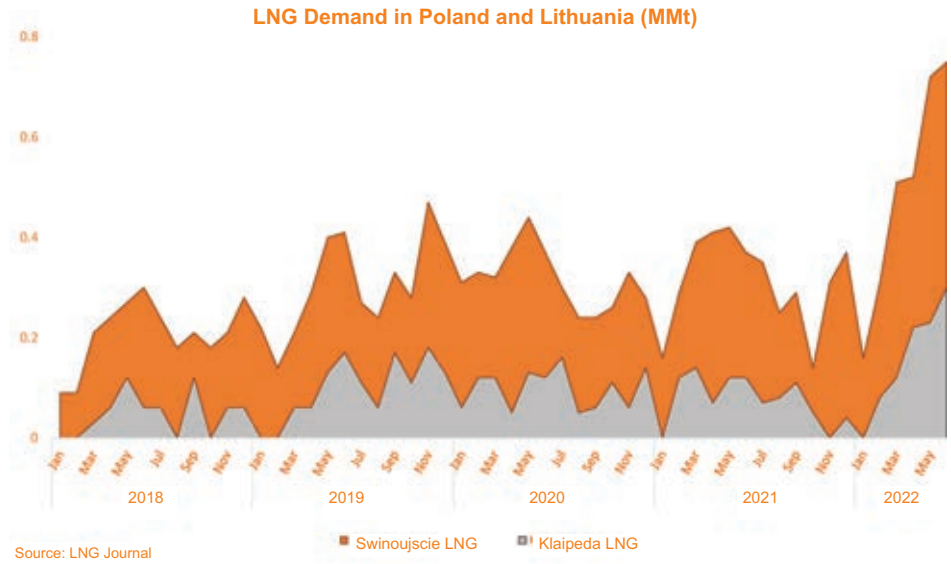
Poland and Lithuania have both drastically increased their LNG imports since the beginning of the year. Both countries stated they were keen to end their reliance on Russian pipeline gas imports. Even before Russia's invasion of Ukraine, Poland and Lithuania expressed their concern over reliance on Russian gas supplies. Things came to a head when Russian state-controlled gas conglomerate Gazprom – which enjoys a near monopoly on all Russian gas exports – said it would halt deliveries to Poland from 27 April following PGNiG's refusal to switch payment to roubles. Polish state-controlled PGNiG had a 10.2 billion cubic meter per year (bcm/y) contract with Gazprom.

Gazprom insisted on the switch from euros and dollars in response to European Union sanctions that restrict capital flows to Russia. The move would have required energy buyers to continue paying for Russian supplies in euros or dollars via special "K" type accounts at Gazprombank in Switzerland. The funds would then be converted by the Russian central bank – which is subject to EU sanctions – into roubles. Notably, payments would only be deemed complete once the funds had been converted to roubles.

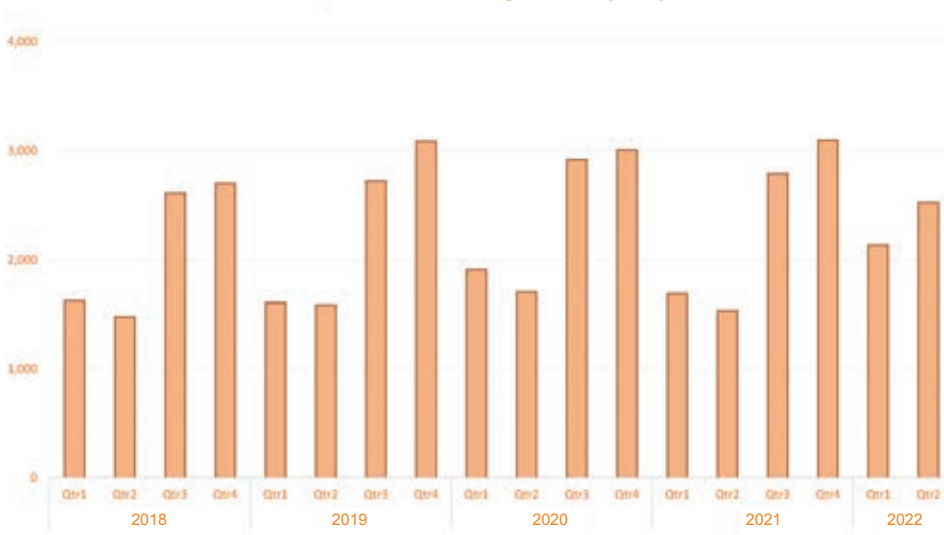
European gas flow data show Poland has seen a brisk build-up of gas stocks, which was partly facilitated by imports from Germany. Shortly after the rouble switch in late April, Gazprom spokesman Sergei Kupryanov also told Russian state news agency Tass that Poland had been buying Russian gas via third parties in Germany as opposed to directly from Russia, although this could not be verified through available data. Importantly, Poland has been banking on its PGNiG-operated LNG terminal at Swinoujscie. The 4.8 million tonnes per annum (mtpa) terminal has been operating at near capacity since March, with average utilisation between March and June up almost 43 percent year-on-year, our data show. In contrast, LNG imports via Swinoujscie grew by a distinctly more moderate five percent year-on-year for the same period in 2021.

Moreover, the Gas Interconnection Poland–Lithuania (GIPL) was commissioned on 1 May, which mainly integrated Lithuania's transmission system into the wider EU network and allows for bi-directional flows between the two countries. The commissioning of the pipeline effectively expands the LNG import capacity available to PGNiG as it can now receive LNG deliveries via Lithuania's Klaipeda FSRU. PGNiG received its first cargo via this route aboard the BP Gas Marketing-chartered Aristidis I on 6 May. The LNG carrier departed the Freeport LNG plant in Texas with a 0.08mmt cargo on 22 April, according to our data. A statement by PGNiG to mark the occasion suggests the cargo was shared by PGNiG and the Lithuanian terminal operator Klaipedos Nafta with a 86/14 split.

In a statement, PGNiG's Iwona Waksmundzka-Olejniczak, President of the PGNiG S.A. Management Board, said "I believe that the cooperation between the PGNiG Group and Klaip dos Nafta […] will not only further the two companies' business goals but will be a strong impulse for further integration of the gas markets of Poland and the Baltic States, increasing the region's energy security based on diversified gas fuel supplies".



Source: LNG Journal



Source: AGSI

Meanwhile, Polish gas storage levels have increased significantly for the time of year compared to previous years. Data by Gas Infrastructure Europe's AGSI tool and national storage systems operator GSP show Poland's available gas storage was around 97 percent full at the time of writing. A significant part of these reserve stocks was supplied by LNG, our data suggests.

Capacity expansion

The Swinoujscie terminal – officially named the President Lech Kaczy ski LNG Terminal – is currently Poland's only direct LNG receiving point. Operator Gaz System – formerly Polskie LNG – began constructing the plant in 2010 and commissioned it in 2016. The terminal has embarked on an expansion programme, which will see its storage capacity expanded by 180,000 cbm to 500,000 cbm in addition to a tripling in the number of SCV (Submerged Combustion Vaporisers) and a new jetty with a dedicated transmission pipe rack. The expansion is planned to be completed by end-2023, according to Gaz System.

With Swinoujscie LNG operating at capacity, however, PGNiG has been compelled to continue buying pipeline gas from its EU neighbours to feed into its underground gas storage. This mainly takes place via the compressor station at Mallnow, which connects the German transmission system to its Polish counterpart, transmission data shows.

Second Polish terminal in planning

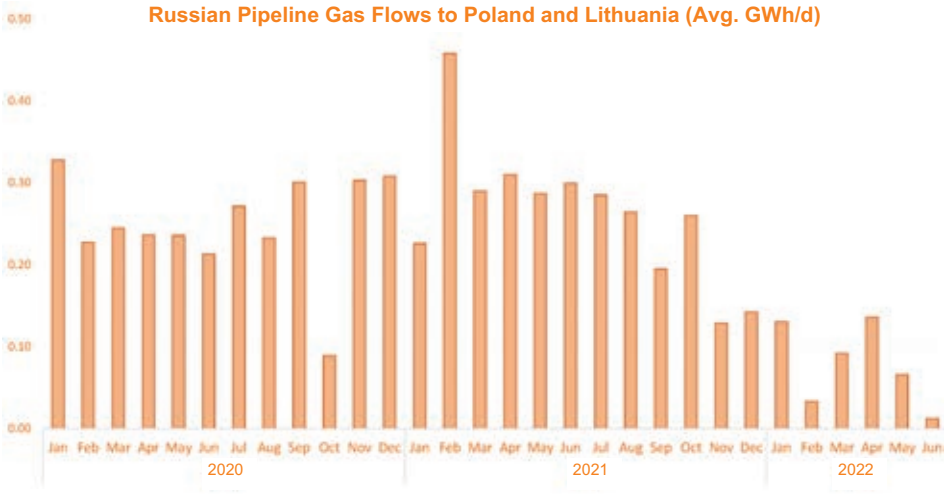
With the expansion of the Swinoujscie terminal underway, plans for a second Polish LNG terminal have also been tabled. According to Poland's Climate Minister Anna Moskwa in an interview with Polish news outlet Biznesalert in June, landlocked Czech Republic and Slovakia have expressed interest in an FSRU terminal on Poland's shores at Gdansk. The terminal is 'pencilled-in' for commissioning in 2026 and would roughly double Poland's current import capacity to 10mtpa. There is also an option for Slovakian and Czech operators to charter a second FSRU to be stationed at Gdansk, which would raise capacity to around 15mtpa.

In line with other EU member states, the Czech Republic and Slovakia are keen to drastically reduce their dependence on Russian pipeline gas. Slovakia will cover around 65 percent of its gas demand through piped Norwegian gas and transmissions from European LNG terminals, according to Slovakia's Economy Minister Richard Sulík.

Sulík, as cited by Polish TV station TVP, also said "we have lowered, from June 1, dependency on Russian gas by 65 percent. That was the maximum that could be achieved so far." The announced date of 1 June is the same as the one given by Gazprom for its reduction of supplies to the Netherlands, France and Italy.

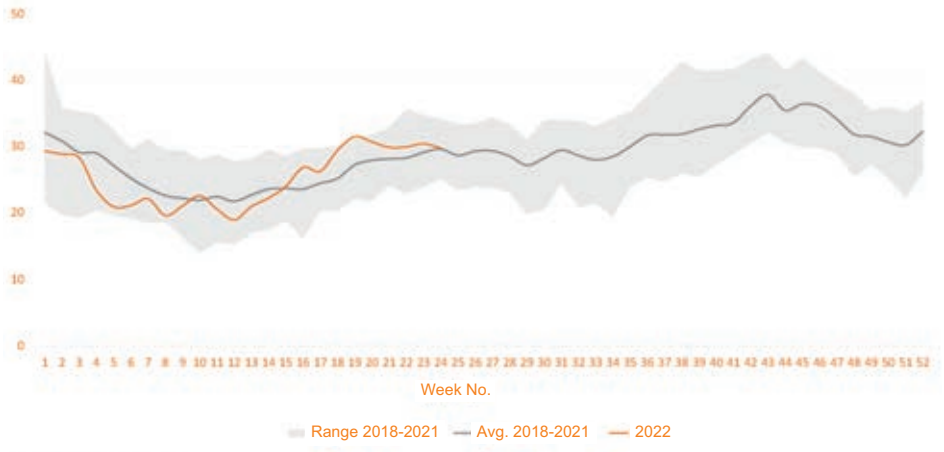
The Czech Republic, meanwhile, has stated its non-Russian gas supplies as well as available reserves are enough to see the country through until October. Meanwhile, it has launched a subsidy programme to help with the installation of household heat pumps, German news outlet Deutsche Welle reported. Heat pumps still require electricity, which is likely supplied through Czechia's existing coal-fired power capacity.

Russian Pipeline Gas Flows to Poland and Lithuania (Avg. GWh/d)



Source: ENTSOG TP

EU LNG Stock Levels ('000 m^3)



Source: GIE ALSI, LNG Journal

Lithuania

Concurrent to Poland's stark increase in LNG offtakes, Lithuania has seen imports jump even more by 78 percent for the period of March to June to date compared to its 2021 counterpart, according to our data. Imports had accumulated to roughly 0.80mmt since the beginning of March, taking into account the aforementioned cargo split between PGNiG and Klaipedos Nafta. In previous periods, imports via the Klaipeda FSRU remained broadly steady at round 0.43mmt.

The most significant source for Lithuania's LNG supply has historically been Norway's Snøhvit LNG plant, according to our data. The facility has supplied 2.36mmt to Lithuania since March 2018, followed by the United States with 2.09mmt.

Accordingly, the restart of the Norwegian plant in early June came at a crucial time after Lithuania announced in late May it was the first European country to discontinue Russian pipeline gas imports completely. The Equinor-controlled LNG carrier Arctic Voyager departed the Snohvit LNG project with the plant's first exports since its shutdown in 2020 and delivered that cargo to Klaipeda LNG.

At the end of January this year, operator Equinor had pushed the restart deadline back to mid-May. It announced another small delay as that deadline approached due to a minor technical fault on a compressor. Equinor's Gisle Ledel Johannessen told AFP on 27 May that the plant's cooldown process was underway but declined to specify a date for the first cargo loading.

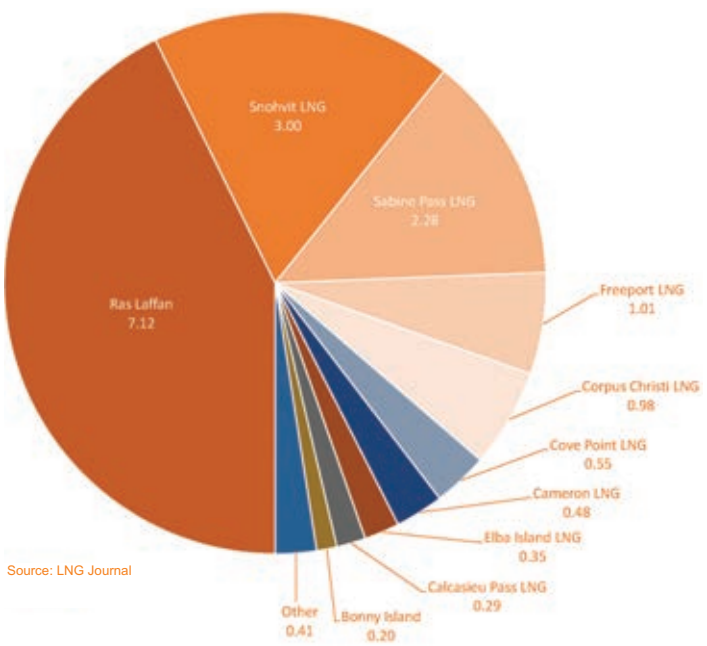
The Snøhvit LNG project was shut down after a fire in September 2020. Before the incident, the plant had seen scheduled maintenance in May and June as well as brief maintenance work on an outage and subsequent gas leak on 13 September, with the Equinor-controlled vessel Arctic Lady not completing a cargo loading on 16 September, our data show.

Risks

The return of Snøhvit LNG notwithstanding, available LNG supply has struggled to grow, according to our data at the time of writing. This is despite lower Far Eastern demand, which has freed up several cargoes for Chile, India and Kuwait. The effect of these freed-up cargoes was tempered by supply constraints elsewhere.

A significant constraint continues to be the recent fire-induced outage of Freeport LNG in the United States. Although Freeport LNG confirmed on Tuesday that no gas liquefaction and loading equipment was damaged in the fire on 8 June, it said it did not expect the Quintana, Texas, plant to be back in full production before 'late 2022' whilst an investigation into the underlying cause is underway.

Major LNG Suppliers to Poland and Lithuania (MMt)



Source: LNG Journal

Freeport LNG, however, was keen to highlight partial operations could resume 'in approximately 90 days' but without specifying available capacity.

Freeport LNG was producing flat out in May. Roughly 37 percent of its exports since September 2019 have been shipped to European buyers, with that share jumping to 66pct for the first five months this year. Some 0.75 million tons (mmt) of its output had been going to Europe in May, up 0.44mmt (141pct) from 0.31mmt in April and 0.16mmt (27pct) from 0.59mmt in March, according to our data.

Whilst only a minority share of Freeport LNG cargoes have been sent to either the Swinoujscie or Klaipeda terminals, that share has seen a significant increase. Moreover, the European Union's continued push towards complete gas market integration means LNG cargoes arriving on the shores of most EU member states could potentially supply Eastern European countries.

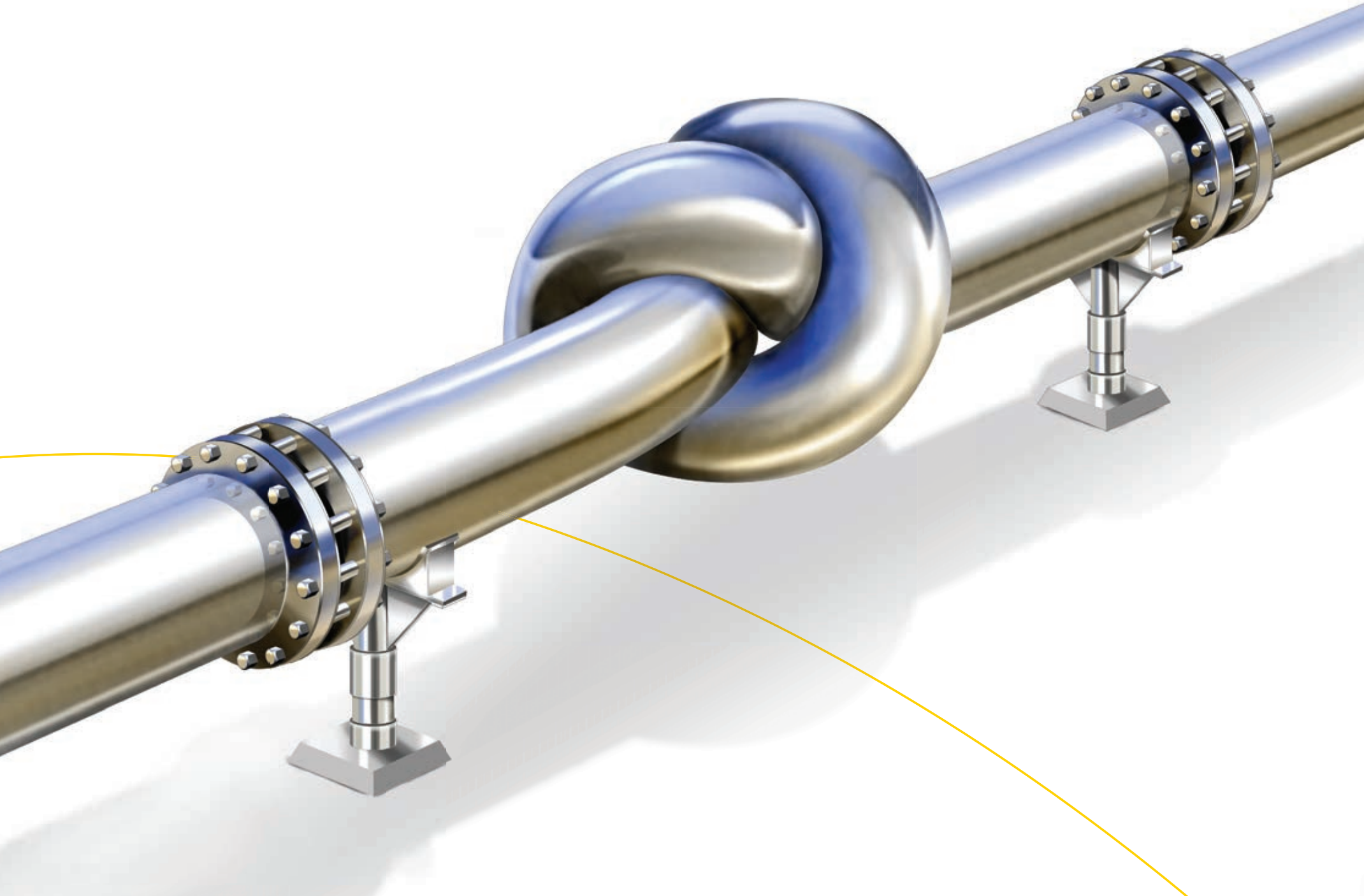
Meanwhile, our data show Salkhalin-2 scaled back exports starting in mid-May. As we reported in our monthly market report, Russia's LNG plant in the Far East decreased LNG exports by one cargo in May, a reduction of 6 percent. The plant's shipments amounted to 0.89mmt in May. Our preliminary June data shows that monthly reduction has continued as Sakhalin-2 exports were down by two cargoes totalling 0.15mmt (-17 percent) to 0.74mmt.

There are also signs that Europe's surging LNG imports in recent months may be starting to taper off somewhat as concern over storage levels on the continent ease. European LNG stocks have been growing with cargoes more often split to spread cargoes across different terminals.

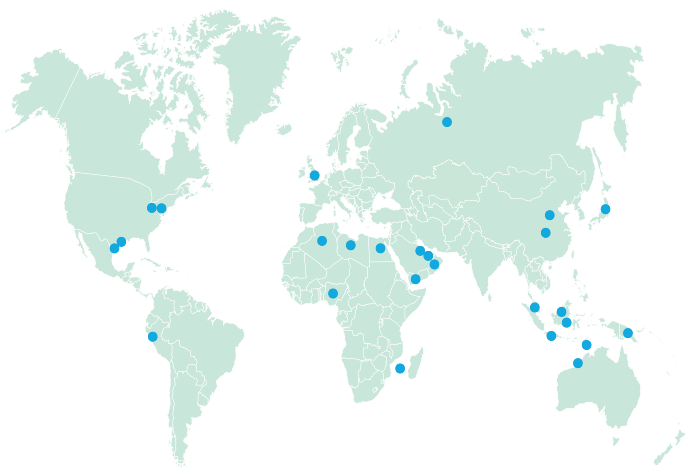
On the one hand, this indicates European utilities are attempting to heed their governments' warnings they must increase gas availability and increase stored volumes. On the other, it may result in higher competition for available cargoes as winter approaches. Notably, Germany has escalated its gas contingency plan to stage two, which means the issuance of an alert. In contrast to stage one, i.e. the early alert stage, stage two could have real ramifications for industry and consumers. Federal Economy Minister Habeck warned of a "false sense of security" at a recent press conference as current demand levels are not representative of winter. He called upon industry and consumers to reduce gas consumption as Gazprom began maintenance works on the Nordstream I pipeline, which further curtailed Russian gas flows into Europe. Habeck also pointed to missed opportunities for reducing gas dependency and energy efficiency during the past decade. As we have reported previously, Germany is now looking for a quick LNG solution, too, via the installation of FSRU capacity at Brunsbüttel and Wilhelmshaven, and potentially also at Stade, a small town near Hamburg.

Concluding thoughts

Poland and Lithuania are leading eastern European EU Member States in adopting strategies to turn away from Russian gas deliveries. Lithuania in particular seems ahead of the curve, having adopted a sceptical stance towards its Russian neighbour for its own political reasons years before the current gas crisis. That preparation now plays to its advantage. LNG has featured largely in both countries' strategies that so far have unfolded successfully. This contrasts significantly, for example, with Germany's struggle to find a sustainable solution. However, eastern European EU Member States are also likely going to continue to rely on pipeline gas imports from Germany whilst the latter's LNG plan would add to competition in a market with constrained supply. ■



Using unproven LNG technology can really tie up production.



If you're concerned about operational downtime, choose Air Products for LNG technology. Our plants are proven, reliable and efficient. Just look at our modularized Coil Wound Heat Exchanger. It's a safer and more dependable way to produce LNG. In fact, all our LNG trains passed their performance test the first time. And why not? After seven decades, we've earned a reputation for high-performance, cost-effective solutions. The map says it all. Our LNG process facilities span the globe and demonstrate industry leadership. That's why you can expect unmatched technical expertise, responsive service and zero worries about unplanned downtime. Call +1-610-481-4861 or visit us online.

tell me more
airproducts.com/LNG

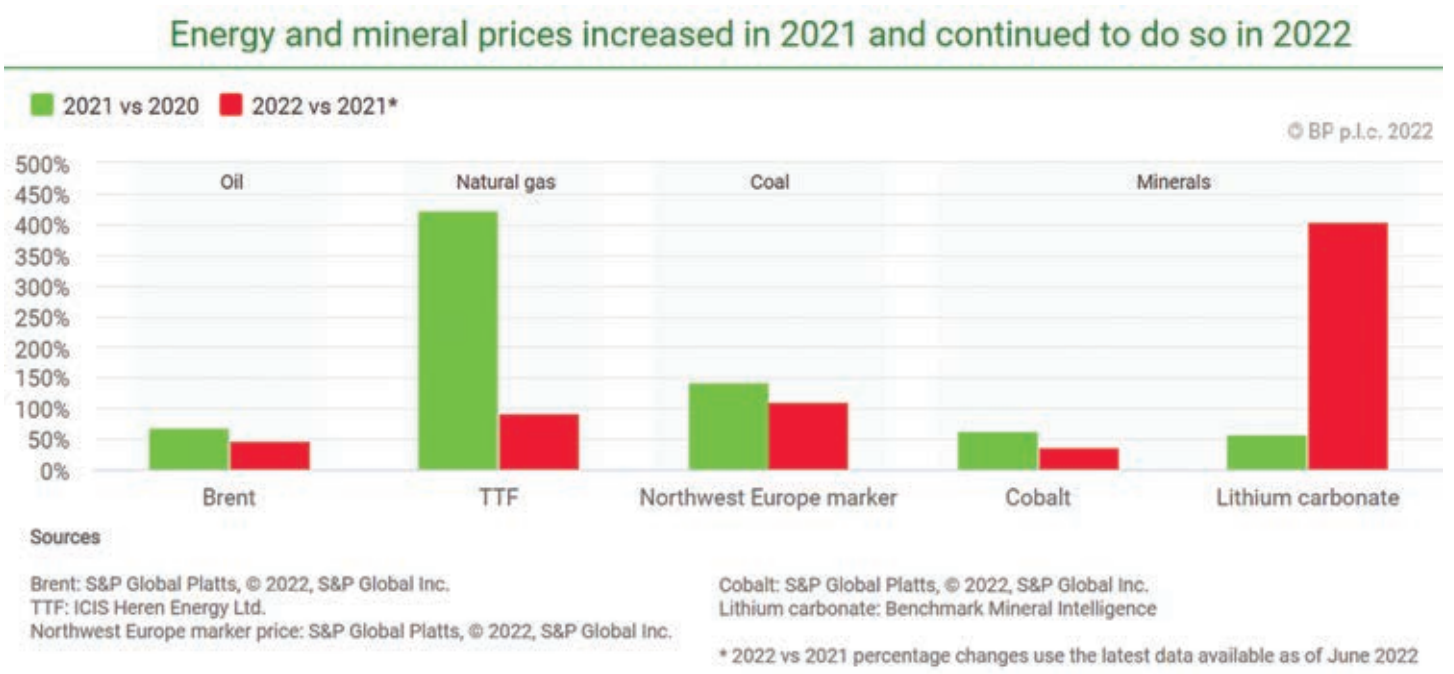
AIR PRODUCTS

World relies on fossil fuels again after Covid slump

A historic fall in the world's energy consumption and carbon emission during the Covid-19 pandemic was rapidly reversed last year, when oil, gas and coal staged a comeback. Findings in BP's Annual Statistical Review highlight the difficulty of achieving pledges made at the COP26 climate summit, as hydrocarbon consumption keeps rising despite a jump in prices; Anja Karl has more.

"This year's data show a sharp bounce back in global primary energy in 2021, increasing by almost 6 percent and more than reversing the sharp fall in energy consumption in 2020 as much of the world locked down. Primary energy use in 2021 is estimated to be more than 1 percent above its 2019 level," Spencer Dale, BP's chief economist said when presenting the 2022 edition of the company's Statistical Review of the World Energy.

Global natural gas demand grew 5.3 percent in 2021, recovering above pre-pandemic 2019 levels and crossing the 4 trillion cubic metres mark for the first time, the report stated, pointing at rising prices at the world's the major gas trading hub.



Europe's benchmark gas price, the Dutch Title Transfer Facility (TTF), averaged $16.02 per million British thermal units (MMBtu) while the Asian spot LNG cargo price, the Japan-Korea Marker, averaged $18.60 per MMBtu. Meanwhile, the US benchmark Henry Hub nearly doubled in value to be around $3.84 per MMBtu in 2021 – the highest annual level since 2014.

Though the gas market's share in relation to primary energy consumption in stayed unchanged from the previous year, at 24 percent, the supply of LNG – not pipeline gas – increased substantially.

Global LNG supply was up 5.6 percent, or by 26 billion cubic metres (Bcm), to 516 Bcm in 2021, its slowest rate of growth since 2015, other than in 2020. Shipments of LNG from the US increased by 34 Bcm, accounting for most of the new incremental supplies and more than offsetting declines from other Atlantic Basin LNG exporters.

In many ways, the sharp rebound in energy demand last year was "a sign of global success," driven by a rapid recovery in economic activity

China – which surpassed Japan as the world's largest LNG importer – accounted for close to 60 percent of global LNG demand growth in 2021. The country was one of the first to recover from the Covid-19 pandemic which propelled up energy demand and pushed up prices for oil, gas and coal in the Pacific Basin and beyond.

Pipeline gas vs LNG

Russian pipeline gas deliveries, or rather the lack of them, are causing fear and a flurry of precautionary measures throughout the European Union's member states. Back in 2021, Russian gas pipeline supply to Europe overall was steady at 167 Bcm, while exports to the EU decreased by 8.2 percent, or 12 Bcm, figures in the BP report show.

Algerian pipeline gas to Europe were the largest source of pipeline supply growth to the region, rising by 13 Bcm last year, followed by the former Soviet Republic of Azerbaijan, where increases were 6 Bcm.

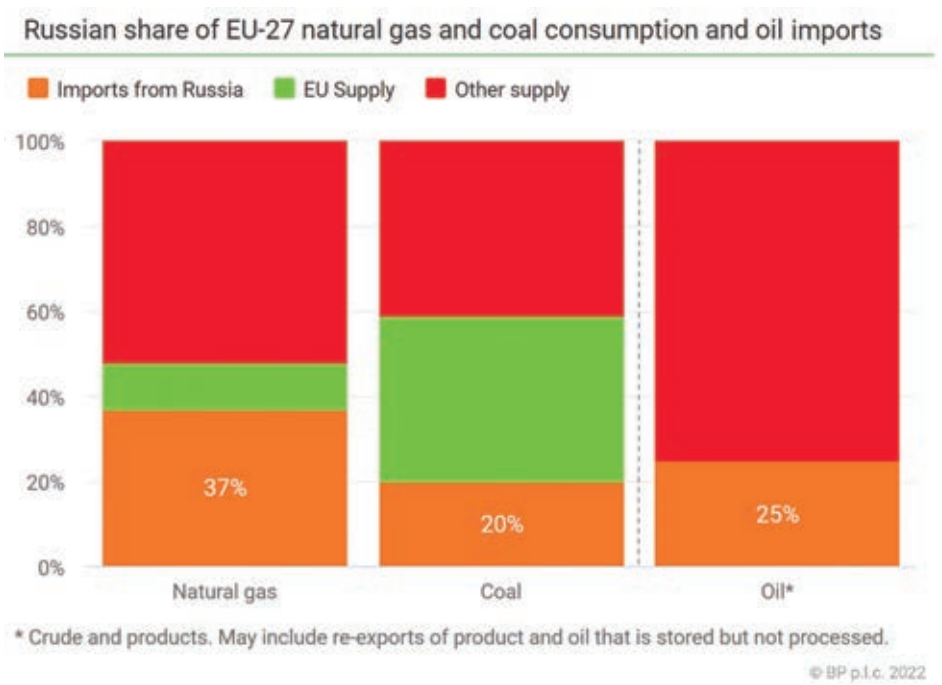
Analysts explained how global oil and gas prices had risen sharply in 2021, due to the rebound in demand as major economies lifted lockdowns and recovered from the pandemic.

But prices made another jump following Russia's invasion into Ukraine in the face of geopolitical uncertainty and concerns that state-owned Gazprom is using gas exports as a weapon, or as a means to retaliate against sanctions from the West.

Russian natural gas imports to Europe via pipeline and LNG accounted for almost 40 percent of total EU natural gas consumption in 2021. Oil import from Russia, meanwhile, made up 25 percent of total EU oil imports and Russian coal imports contributed 20 percent of total EU coal energy consumption in 2021, according to BP stats.

In many ways, the sharp rebound in energy demand last year was "a sign of global success," driven by a rapid recovery in economic activity. The widespread distribution of effective vaccines allowed for an easing in Covid-19 restrictions in many parts of the world and a return to our everyday lives, analyst commented.

"But it also highlights that the pronounced dip in carbon emissions in 2020 was only temporary," they continued. Carbon equivalent emissions from energy (including methane), industrial processes, and flaring increased by 5.7 percent last year, the report stated, highlighting the obvious effect on the world's climate and the need for a transformation of how energy is produced and consumed. ■



MINIMIZED OPERATING COSTS IN BOG MANAGEMENT

Burckhardt Compression offers a complete portfolio of compressor solutions for marine BOG management. Our compressor systems supply BOG to low- and high-pressure dual-fuel engines, which is the most efficient way to manage BOG. In addition, Burckhardt Compression has a global network of local service centers that enables us to offer local support with a quick response rate.
Learn more: burckhardtcompression.com/marine

Compressors for a Lifetime™

Burckhardt Compression

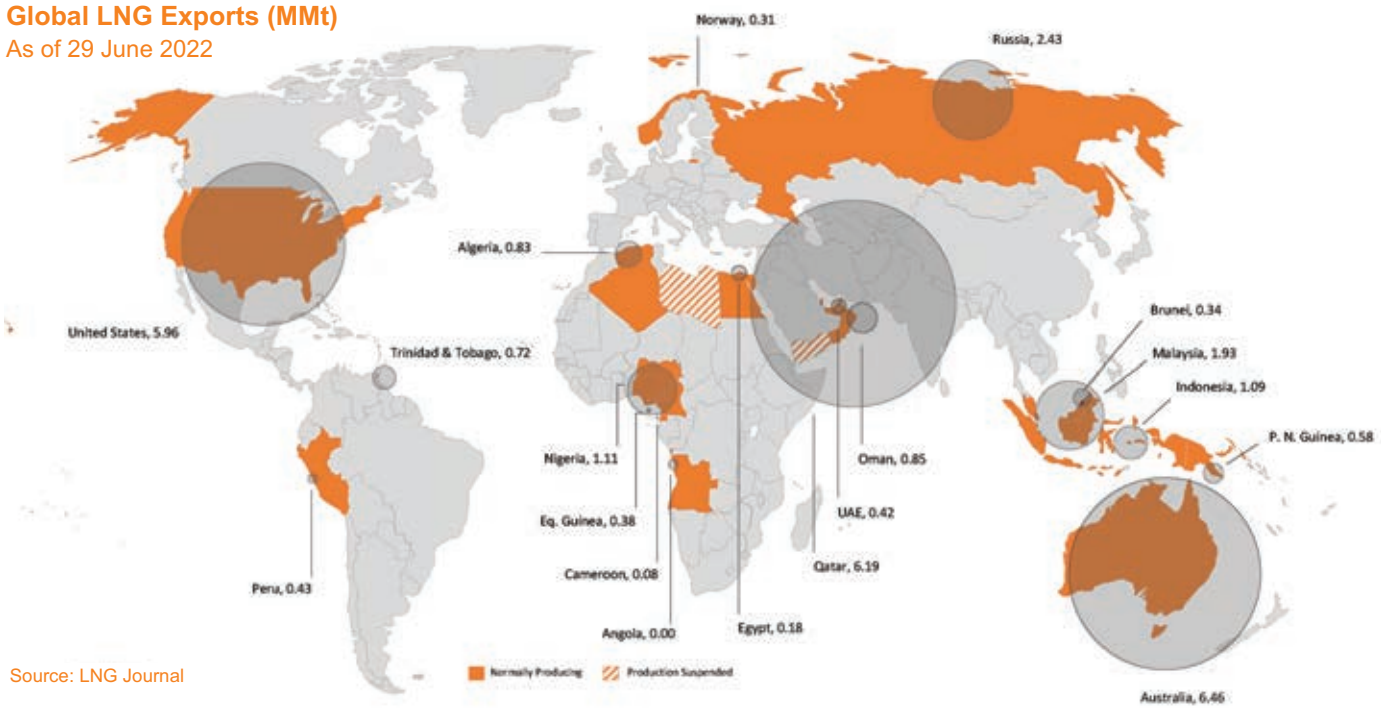
Freeport LNG outage weighs on trade in June

Our preliminary June data point to broadly steady monthly LNG flows as volumes still had to overcome the emergency shutdown of Freeport LNG, our Markets Editor Alexander Wilk reports.

On 29 June, our preliminary data showed global LNG trade for June to date at 30.29mmt had decreased marginally by 0.50mmt (-2 percent) compared to 30.79mmt for the equivalent period in May. However, the shipped amount was also slightly above the 29.92mmt exported by 29 June 2021. Export growth was led by the Pacific Basin whilst in the Atlantic Basin shipped volumes struggled to compensate for the outage at Freeport LNG despite a boost to exports at other US LNG plants and the market return of Snøhvit LNG. Whilst Qatar and the UAE also pushed additional cargoes into the market, they first had to overcome a significant export reduction in Egypt.

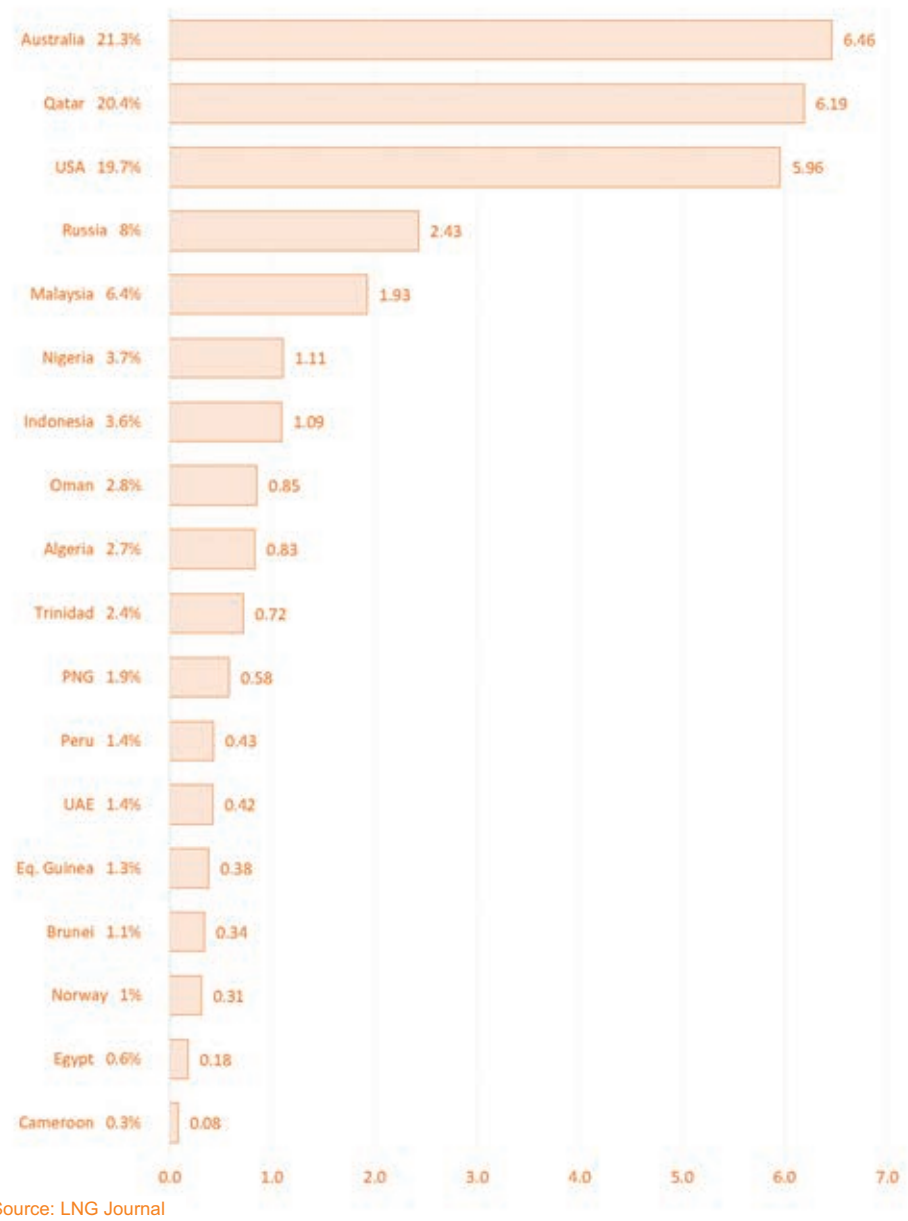
Concurrently, global LNG demand for the month up to 29 June was shaped to a large extent by the normally price sensitive roster of Southeast Asian buyers as well as demand growth in South America and the Middle East. In contrast, European offtakes retreated period-on-period alongside Chinese and South Korean demand in the Far East.

Global LNG Exports (MMt)
As of 29 June 2022



Source: LNG Journal

Market Share & LNG Exports by Country (MMt)
As of 29 June 2022



Source: LNG Journal

Exports

As of 29 June, global exports at 30.29mmt were broadly steady compared to 30.79mmt for the equivalent period in May. Whilst Atlantic Basin shipments were down by 0.74mmt (-6 percent) at the time of writing, Pacific Basin and Middle Eastern exports saw slight growth in June to date, up by 0.15mmt (1 percent) and 0.09mmt (1 percent), respectively. Based on current market visibility, there were still more than 2.00mmt worth of cargoes likely to be shipped before the end of June, which could mean eventual full-month net growth.

Pacific Basin

Pacific exports had reached 11.57mmt at the time of writing, coming in above their equivalent May volume of 11.42mmt by 0.15mmt (1 percent). Consequently, capacity utilisation for the period stood at 89 percent (adjusted to 29 days of operation).

Australia

The Basin's most significant exporter by installed capacity – Australia – increased exports during the first 29 days of the month by 0.24mmt (4 percent) from 6.22mmt in May to 6.46mmt in June. A surge in exports by 0.31mmt (30 percent) at NWS LNG was a leading factor. NWS LNG exported 1.34mmt compared to the 1.03mmt in May, which also meant the plant produced at full annualised nameplate capacity. Exports from Australia Pacific LNG also increased robustly by 0.15mmt (26 percent) from 0.58mmt to 0.73mmt. This was followed by Wheatstone LNG, where at 0.76mmt shipments had continued to grow by 0.14mmt (23 percent) from 0.62mmt in May. Pluto LNG had also increased exports by 0.13mmt (46 percent) to 0.41mmt and thereby produced above annualised nameplate capacity. Nevertheless, export reductions at Darwin LNG, Gladstone LNG, Gorgon LNG, Ichthys LNG and Queensland Curtis LNG amounted to 0.58mmt and thus tempered Australia's net export growth.

Shell's Prelude FLNG barge, meanwhile, continued to be seen in the market with four shipments totalling 0.29mmt. The facility thus managed to increase output by 0.09mmt (45 percent) from 0.20mmt for the equivalent May period. Following the four June shipments to date, annualised utilisation stood at 91 percent.

Southeast Asia

North of Australia, Papua New Guinea's PNG LNG saw shipments decrease marginally by 0.01mmt (-2 percent) to 0.58mmt in June compared to 0.59mmt in May. PNG LNG lost significant market share in China, but which was mostly compensated by additional exports to Japan at the time of writing. At 102 percent, however, the plant operated above nameplate capacity, our calculations show. This also suggests PNG LNG will see full-month growth in June.

In neighbouring Indonesia, the amount of LNG shipped also trailed that recorded during its equivalent May period slightly

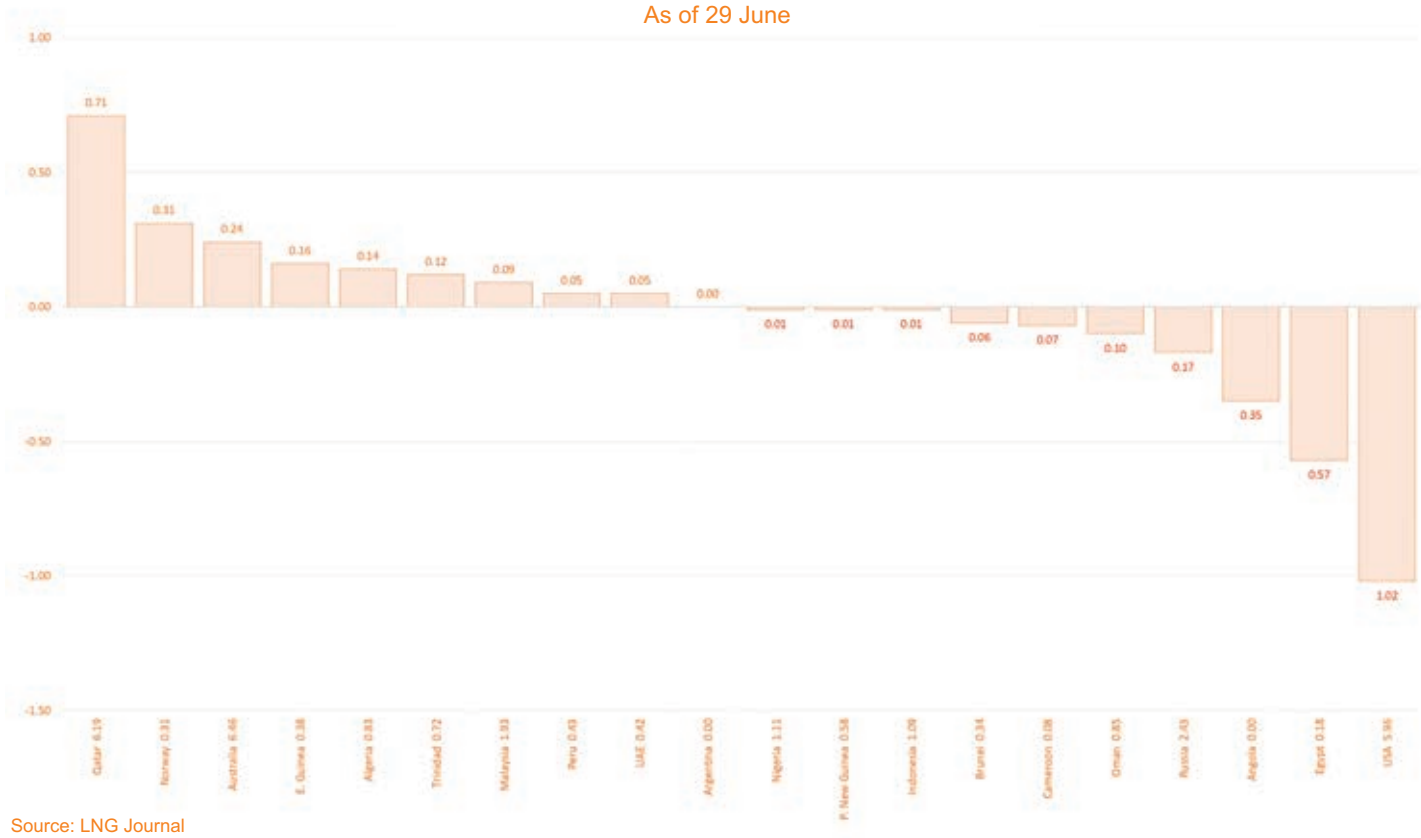
by 0.01mmt (-2 percent) from 1.10mmt to 1.09mmt on 29 June. Notably, the Donggi-Senoro plant once again maintained output at its full monthly capacity of 0.18mmt. The Tangguh LNG facility, however, had decreased shipped LNG volumes by 0.04mmt (-7 percent) from 0.59mmt to 0.55mmt. The Bontang plant, meanwhile, increased shipments by 0.03mmt (9 percent) from 0.33mmt to 0.36mmt during the preliminary reporting period up to 29 June.

In contrast, Malaysia saw a net increase in monthly shipments due to 0.10mmt (6 percent) growth at Malaysia LNG. Concurrently, Petronas' PFLNG Dua FLNG facility kept exports steady at 0.14mmt whilst PFLNG Satu showed a decrease of 0.01mmt (-17 percent) to 0.05mmt. Nevertheless, Malaysian LNG shipments were thus up by 0.09mmt (5 percent) to 1.93mmt on 29 June from 1.84mmt for the equivalent period in May. Concurrently, Brunei had also decreased LNG exports by 0.06mmt (-15 percent) to 0.34mmt from 0.40mmt.

Russia & Peru

Elsewhere in the Pacific, Russia's Sakhalin-2 plant equally shipped less LNG. The facility's exports amounted to 0.74mmt in June at the time of writing, down by 0.15mmt (-17 percent) from 0.89mmt for the equivalent period in May. The plant's June performance to date was due to significantly less market share in China and South Korea, which was only partially compensated by a slight increase in shipments to Japan and steady exports to Taiwan. Accordingly, the plant also did not operate above (adjusted) nameplate capacity as in previous months, with 29-day utilisation pegged at 93 percent at the time of writing. Meanwhile, Peru's Pampa Melchorita has surpassed its May performance during the first 29 days by 0.05mmt (15 percent) to 0.43mmt from 0.38mmt in May.

Incremental LNG Exports by Country (MMt)
As of 29 June



Source: LNG Journal

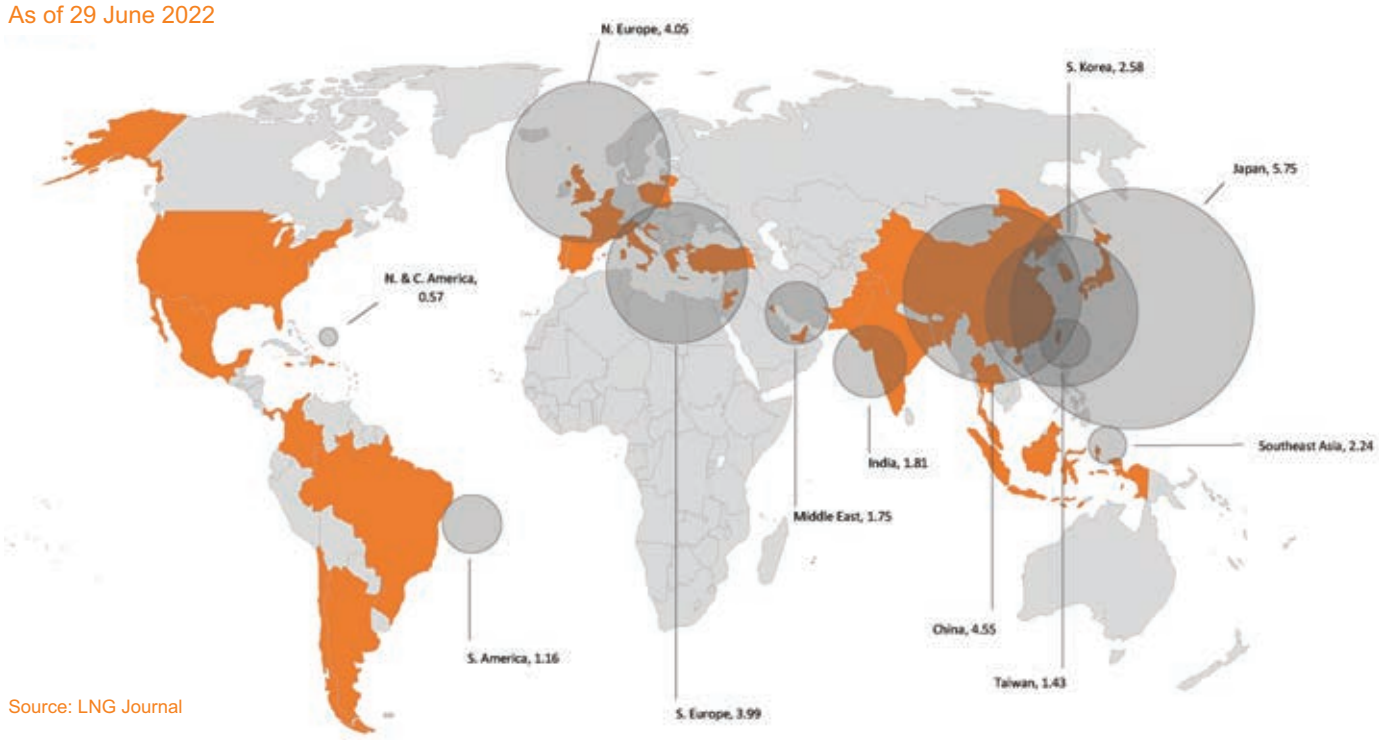
Atlantic Basin

In contrast to the Pacific, the Atlantic Basin's overall amount of shipped LNG at the time of writing had fallen behind that during the first 29 days in May, showing a significant gap of 0.74mmt (-6 percent) period-on-period at 11.08mmt as of 29 June compared to 11.82mmt on 29 May. This translated into annualised export capacity utilisation of 75 percent at the time of writing.

North Africa & Europe

At 2.83mmt, the overall amount of LNG exported within the north-eastern part of the Atlantic Basin – comprising the EEA, Russia and North Africa (and not including re-exports) – had surpassed the 2.40mmt recorded during the equivalent period in May by 0.43mmt (18 percent) at the time of writing. Notably, Snøhvit LNG in Norway had resumed LNG shipments and thus boosted the eastern Atlantic's overall exports. Our data showed the plant had exported 0.31mmt as of 29 June. Meanwhile, regional exports also benefitted from a notable increase of 0.14mmt (20 percent) in Algeria at the time of writing on 29 June. Whilst Skikda had kept LNG exports steady at 0.23mmt, output from Arzew was up 0.14mmt (30 percent) to 0.46mmt. Monthly shipments from Russia's Yamal LNG, however, had decreased slightly by 0.02mmt (-1 percent) as an increase in exports to China and the Far East via the Northern Sea Route could not compensate for fewer shipments to Europe.

Global LNG Imports (MMt)
As of 29 June 2022



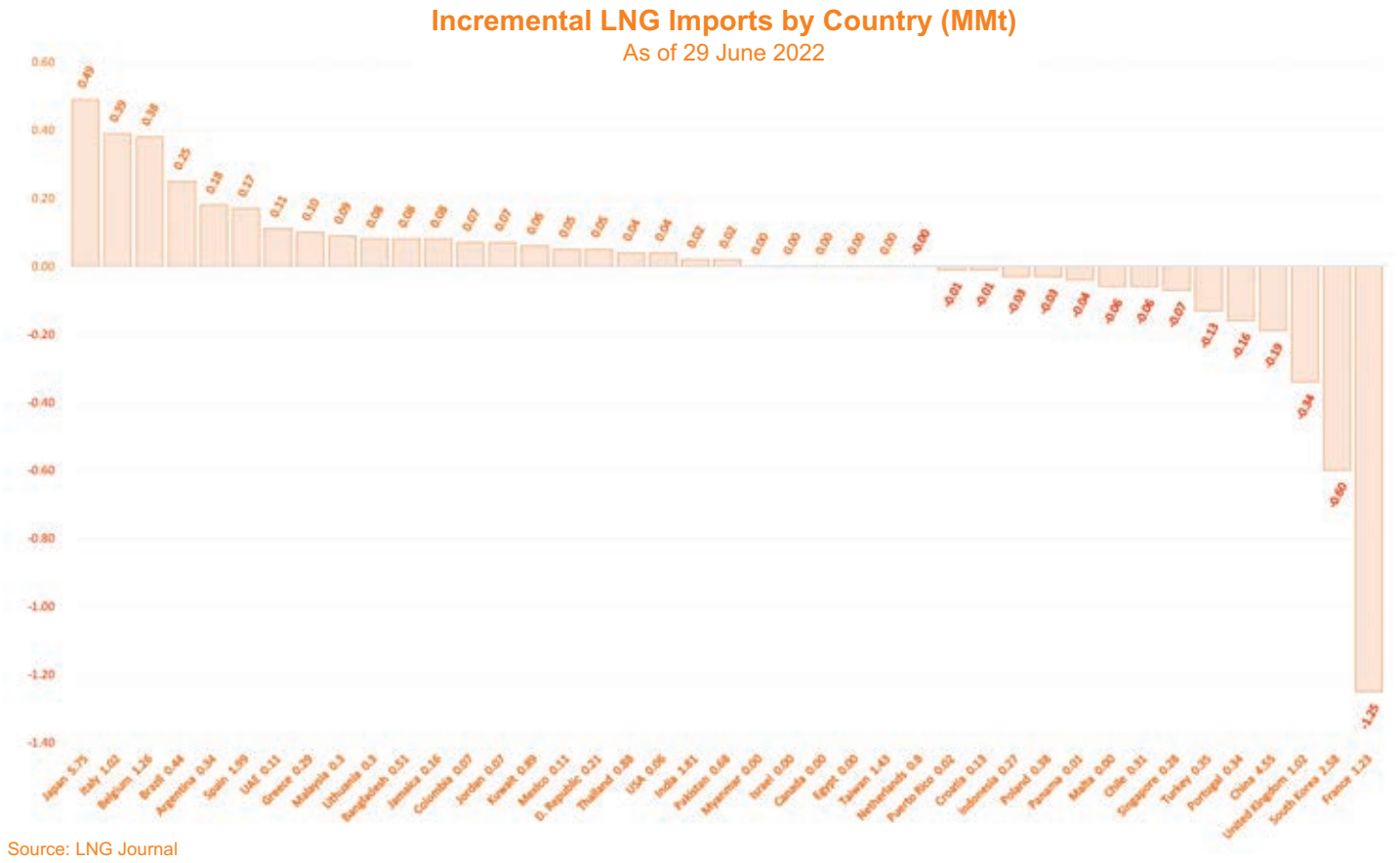
Source: LNG Journal

West Africa

Meanwhile, West African exports were down significantly by 0.27mmt (-15 percent) as of 29 June. West African exports were particularly affected by fewer exports to China and India. Nigeria had decreased shipments marginally by 0.01mmt (-1 percent) to 1.11mmt from 1.12mmt in May. Angola, however, was not seen in the market in June following exports of 0.35mmt in May due to maintenance. At the time of writing, we were expecting the plant to return to the market in July. Exports were also down in Cameroon, where we recorded a decrease in shipments by 0.07mmt (-47 percent) to 0.08mmt on 29 June from 0.15mmt during the equivalent May period. Accordingly, the region had only seen an increase in shipped LNG from Equatorial Guinea's EG LNG for the month at the time of writing. The facility had exported 0.38mmt by 29 June, up 0.16mmt (73 percent) over the amount shipped by 29 May.

Americas

Predictably, June exports from the US Gulf Coast were down significantly following the outage at Freeport LNG during the second week of the month. US LNG exports were down 1.02mmt (-15 percent) to 5.96mmt during the reporting period up to 29 June from 6.98mmt for the equivalent period in May. Freeport had exported 0.34mmt before the outbreak of a



Source: LNG Journal

fire on 8 June, which led to the shut-down of the plant. In May, the plant had exported 1.36mmt during the first 29 days of the month, which meant Freeport exports were down 1.02mmt (-75 percent) at the time of writing. Apart from curtailed exports by Freeport LNG, shipments were also down by 0.71mmt (-26 percent) to 1.99mmt at Sabine Pass LNG. Our current data indicate the decrease was mainly due to considerably lower exports to southern Europe. These significant US export reductions were only partially compensated by the market return of Elba Island LNG with exports of 0.23mmt. Cameron LNG and Corpus Christi LNG also increased shipments by 0.36mmt (40 percent) and 0.07mmt (6 percent), respectively. The continued ramp-up in exports at Calcasieu Pass LNG by 0.13mmt (28 percent) also helped.

In South America, Atlantic LNG in Trinidad & Tobago continued to see export growth, with shipments up by 0.12mmt (20 percent) to 0.72mmt at the time of writing on 29 June compared to 0.60mmt for the equivalent period in May. Atlantic LNG shipments continued their focus on Europe whilst also increasing shipments to Asia.

Middle East

Shipments from Middle Eastern plants as of 29 June were also ahead of their May counterparts. Exports were up slightly by 0.09mmt (1 percent) from 7.55mmt on 29 May to 7.64mmt on 29 June. Accordingly, our data showed the Basin's overall utilisation of operational export capacity (i.e., excluding Yemen) to stand at 90 percent at the time of writing.

Importantly, exports by Qatar, which had curtailed shipments by more than 1.00mmt around this time in May, returned to growth. The increase of 0.71mmt (13 percent) to 6.19mmt as of 29 June was mainly due to significant growth in shipments to Asia, namely India, China and Thailand. Overall, exports to Asia were up by 0.44mmt (14 percent). Concurrently, at 0.76mmt, Middle Eastern imports of Qatari gas were ahead of their counterparts on 29 May by 0.07mmt (10 percent) at the time of writing, led by 0.11mmt exported to Dubai in the UAE. Exports to Pakistan were also up by 0.08mmt (20 percent) to 0.49mmt. Kuwait, however, had decreased offtakes from Qatar by 0.12mmt (-43 percent) to 0.16mmt. Meanwhile, Qatar had shipped significantly less to Europe as of 29 June. Exports to North Europe were down by 0.61mmt (-43 percent) as Belgium and the United Kingdom slashed imports. As such, a comparatively modest increase in demand for Qatari LNG in South Europe by 0.07mmt (47 percent) could not compensate.

The country's fellow Persian Gulf producers in Oman and the UAE had seen an overall export decrease of 0.05mmt (-4 percent) from 1.32mmt to 1.27mmt at the time of writing on 29 June. This reduction was down to Oman, which had decreased exports by 0.10mmt (-11 percent) to 0.85mmt from 0.95mmt. Meanwhile, the UAE's Das Island plant had increased shipments by 0.05mmt (14 percent) to 0.42mmt from 0.37mmt.

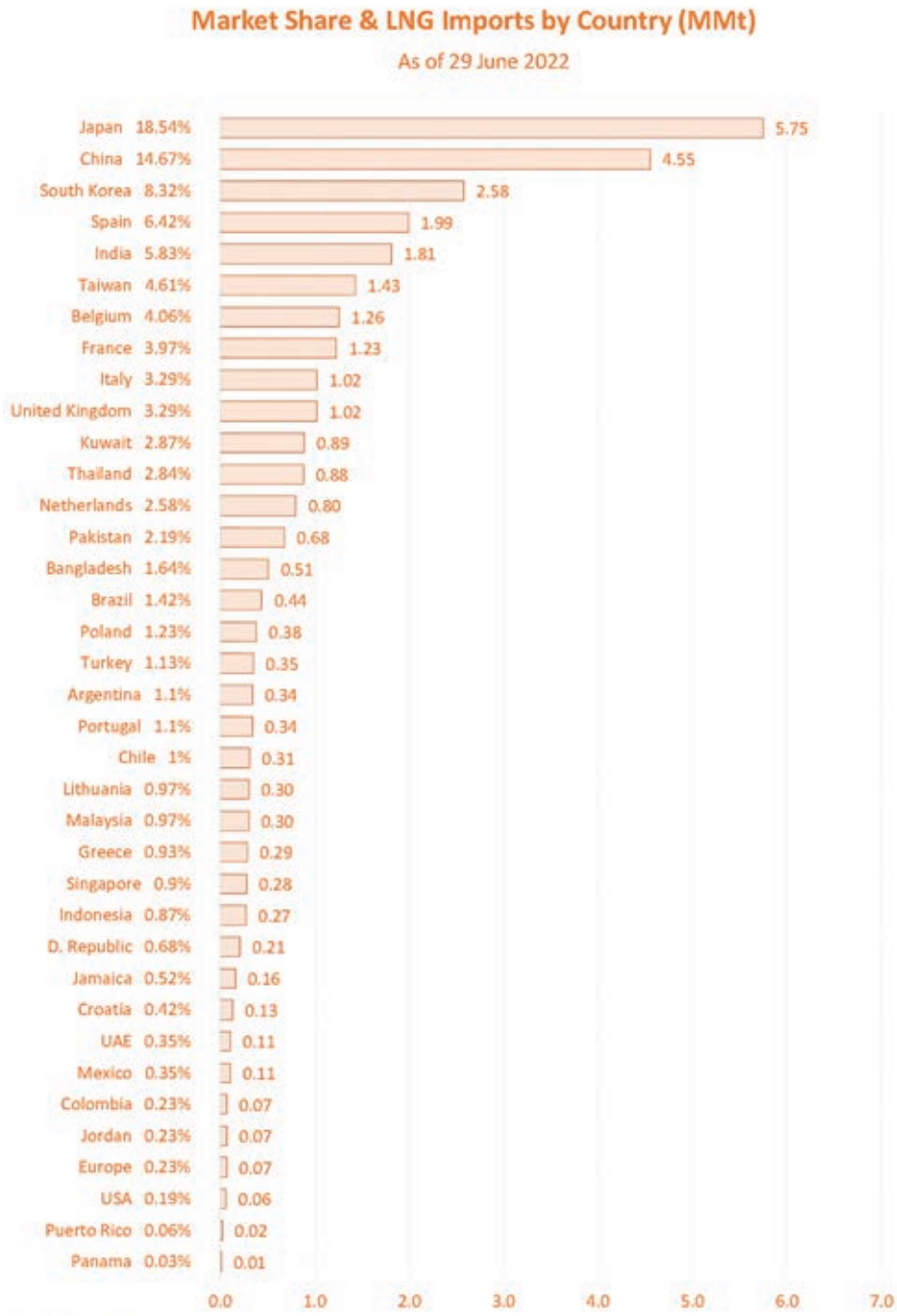
Egypt had also seen shipped LNG volumes trail their May counterparts for the period to date on 29 June. Shipments by the country's Idku LNG plant were down 0.30mmt. They had decreased by 79 percent from 0.38mmt to 0.08mmt. Neighbouring Damietta LNG, meanwhile, had reduced exports by 0.27mmt (-73 percent) to 0.10mmt from 0.37mmt. Overall, Egypt had thus decreased exports by 0.57mmt (-76 percent) to 0.18mmt by the time of writing in June from 0.75mmt during the equivalent period in May.

Imports & Domestic Trade

Global LNG imports were down marginally by 0.09mmt (-0.3 percent) for the period up to 29 June compared to their equivalent up to 29 May. Significantly higher seasonal imports in the Middle East could only partially compensate for absent demand growth in the Pacific and Atlantic Basins.

Pacific Basin

Period-on-period Pacific Basin imports had decreased slightly by 0.17mmt (-1 percent) at the time of writing in June as China and South Korea in particular



Source: LNG Journal

had decreased offtakes by 0.79mmt (-10 percent) to 7.13mmt overall. This reduction was only partially compensated by increases elsewhere in the Pacific. Our data at the time of writing showed demand growth in the Pacific Basin was limited to an overall period-on-period increase of 0.60mmt (8 percent) to 7.86mmt in Japan, Malaysia and India. Notably, demand growth in Japan took the lion's share with 0.49mmt (9 percent) to 5.75mmt whilst the increase in India was marginal at 0.02mmt (1 percent) to 1.81mmt. Meanwhile, Taiwan had kept offtakes steady at 1.43mmt whilst Indonesia saw a reduction of 0.03mmt (-7 percent) to 0.27mmt.

In contrast to the Pacific's net demand increase, the roster of smaller Pacific buyers in volume terms – including Bangladesh, Thailand, Chile, Mexico, Singapore and Myanmar – had collectively seen imports increase slightly by 0.04mmt (2 percent) by the time of writing on 29 June. This was primarily due to Bangladesh increasing imports during the first 29 days of the month by 0.08mmt (19 percent) alongside an increase of 0.05mmt (83 percent) in Mexico and 0.04mmt (5 percent) in Thailand. Accordingly, net growth for this subset of importers was only tempered by decreases of 0.07mmt (-20 percent) and 0.06mmt (-16 percent) in Chile and Singapore, respectively, whilst we continued to see a lack of LNG demand in Myanmar.

Atlantic Basin

In line with the trend in the Pacific, LNG imports in the Atlantic Basin were down by 0.19mmt (-2 percent) to 10.47mmt as of 29 June from 10.66mmt during the equivalent period in May, with capacity utilisation at 53 percent.

Weaker European demand was a significant factor in the Basin's overall demand decrease. Although several European importers – led by France, Turkey and Poland – collectively grew their imports by 1.12mmt (30 percent) to 4.86mmt, this was negated by demand curtailments totalling 1.98mmt (-36 percent) elsewhere in Europe, led by France, the United Kingdom and Portugal. Accordingly, Europe saw significant negative demand growth of 0.86mmt in the first 29 days of June compared to its 29-day counterpart in May.

This left the bulk of regional period-on-period demand growth to the western Atlantic. Importers in the Caribbean and South America – including Brazil, Argentina, Jamaica, Colombia and the Dominican Republic – saw their combined LNG demand jump by 0.63mmt (106 percent) to 1.22mmt at the time of writing in June from 0.59mmt during the equivalent period in May. Brazil retained the position of top regional importer in June to date, as the country increased offtakes by 0.25mmt (132 percent) to 0.44mmt. Argentina had also grown imports by 0.18mmt (112 percent) to 0.34mmt. At 0.44mmt overall, the month up to 29 June also saw an almost doubling in demand in the Dominican Republic, Jamaica and Colombia compared to the first 29 days in May. Finally, LNG demand had also continued in the United States with an import of 0.06mmt in June, up 0.04mmt (200 percent) from May, whilst Canada had not imported LNG in June at the time of writing.

Middle East

Meanwhile, Middle Eastern LNG demand received another boost during the first 29 days of June. Offtakes were up by 0.26mmt (17 percent) to 1.75mmt from 1.49mmt in May. Regional offtake levels benefitted from continued demand growth in Kuwait to 0.89mmt (7 percent) after the country took in 0.83mm in the first 29 days of May. Meanwhile, demand at Pakistan's Port Qasim facility had increased more moderately by 0.02mmt (3 percent) at the time of writing. Moreover, Dubai's FSRU was again seen in the market with imports amounting to 0.11mmt, which also applied to Jordan's LNG terminal as it took in a rare cargo of 0.07mmt. Accordingly, the Middle East's annualised import capacity utilisation stood at 42 percent at the time of writing. ■

Black & Veatch moves to standard modular offerings

The phrase 'dash for gas' was coined a few decades ago but it rings as true today as it did all those years ago, due to rush to replace Russian gas since the February invasion of the Ukraine. This has led to all of the LNG stakeholders, including governments, to rethink the methodology of bringing the gas to market.

Technical Editor Ian Cochran spoke with US-based engineering company Black & Veatch's (B&V) Principal Process Engineer and LNG Systems Leader, Justin Ellrich; Javid Talib, Vice President Client Account Executive and Director FLNG Project Development; plus Associate Vice President and Project Director, Brett Baker, who gave their take on today's LNG market.

Today's increase in interest was being driven by the supply of pipeline gas to Europe being significantly affected this year, moving many European countries to consider additional and fast-track investments into LNG infrastructure, together with changing expectations for more aggressive schedules.

B&V expected that these developments will lead to a greater flow of LNG to Europe, which will undoubtedly challenge the dynamics of global LNG supply, competition and trade.

While the company has gained experience with several liquefaction technologies down the years, today its licensed PRICO® liquefaction process is one of the leading choices for many small and mid-scale applications, they claimed.

B&V's proprietary technologies for LNG liquefaction and liquids recovery from natural gas have been applied across several dozen projects, which is leading to a standardised modular offering based on the experience gained.

Addressing FLNGs, they explained that today there are only five in commercial operation, two of which are fitted with B&V's PRICO® based topsides design. Three more are under construction or start-up of which one includes B&V topsides design with PRICO® technology.

In addition, there are seven publicly announced FLNGs in various stages of development from conceptual phase to FEED, six of which have B&V topsides designs specified.

"Our team has emphasised simplicity and cost-efficient methods to address concerns from some NOC/IOCs that these vessels are overly complex and costly. With our simple, proven, and space-efficient liquefaction technology and our ability to arrange the topsides in a compact and lightweight configuration, our 2.4-2.6 mill tonnes per annum capacity FLNG conversion solutions have been under $550 per TPA CAPEX. A lower dollars per tonne has also been possible for newbuild FLNG integrated solutions, specifically with larger production capacities," they said.

B&V and Samsung Heavy Industries (SHI) are jointly offering newbuilding completely integrated FLNG solutions with multiple trains of up to 6 mill tonnes per annum using the PRICO® SMR liquefaction technology on a single 180,000- 240,000 cu m storage vessel, air-cooled or water-cooled, complete from concept to commercial operations.

Integrated solution

The company is currently working with SHI to deliver an integrated solution for the Canadian Haisla Nation Kitimat floating LNG export project. "Our team is responsible for the topside process plant, which includes performance guarantees for the PRICO® liquefaction technology. SHI is responsible for the hull and LNG containment system, along with the integration of topsides while fabricating the topsides modules, designed by B&V," they said.

"The partnership between B&V and SHI brings an integrated solution to the market place that provides our clients with a single interface for consistent and efficient communication throughout the project," they added.

As for future clean energy applications, certain LNG infrastructure has the potential for conversion to ammonia servicing and B&V has published an e-book describing the concepts and the early feasibility studies undertaken.

Modifying and adapting existing LNG infrastructure around hydrogen and ammonia are being progressed as part of the developing green hydrogen economy. By reusing cold energy (a byproduct of re-gasifying LNG at the terminal) for part of the hydrogen cooling load, producers can gain energy-efficient, cost-effective production of liquid hydrogen.

In conjunction with B&V's expertise in LNG liquefaction, producers can also lower the power consumption of the initial cooling steps of the hydrogen liquefaction process, as the scale grows.

'Golar Hilli Episeyo' - Complete topsides design including PRICO® liquefaction on world's first conversion FLNG, which is in continuous commercial operation since its start-up in April, 2018 without any interruption.

Interest in carbon capture and storage (CCS) is also increasing in the LNG space. "Our clients are constantly innovating and looking for creative solutions to reduce their carbon footprint and convert emissions to valuable products. We're fortunate to have the comprehensive experience in this space that our clients need and are able to develop highly efficient, cost-competitive designs that produce very low emissions.

"The leading option for carbon capture at LNG facilities involves recovering the acid gas vent, which contains the CO2 inherent in the natural gas feed or pre-separating carbon from the feed gas for sequestration," they explained.

Small-scale projects

B&V also sees strong interest in small-scale LNG projects, as the market adjusts to economic and geopolitical events worldwide. "With so much uncertainty in the world, we have intentionally developed bespoke and standardised modular solutions so our clients can make informed choices about the LNG projects they're working to develop," they said.

Small-scale LNG solutions were described as a 'sweet spot' for fast-to-market results, with remote installation capabilities and truckable modules and skids.

While B&V offers multiple liquefaction technologies for small-scale projects, its PRICO® technology continues to be the strongest element of the company's portfolio in this market sector.

Modernising ageing peak shaver infrastructure and providing more reliable storage and backup for power plants or LDCs, are common applications for this technology, as is use for ISO container export or local transportation fuel, including marine bunkering.

B&V can trace its history back for more than 50 years. In the LNG industry's early days, the focus was on base load export projects and peak shaving units.

In the past 15 years, distributed LNG for local distribution and vehicle applications, mid-scale LNG plant developments and floating developments have been increasing.

"We have been active in the development of both onshore export facilities and offshore liquefaction on both fixed and floating structures. Most notable are the world's first LNG barge project for Exmar and the world's first LNGC conversion to a liquefaction plant for Golar.

"Black & Veatch typically provides not only the liquefaction technology but also serves as the engineer on entire gas processing facilities and supporting units – we have pipeline-to-tank capability," they concluded. ■

Real time LNG composition measurement during processing and custody transfer

Raman spectroscopy is now claimed to offer a more efficient means of accurately measuring LNG composition and concentration. Technical Editor, Ian Cochran reports.

Throughout the supply chain, gas producers require accurate real-time composition measurement for in-process sampling, or during transport for custody transfer.

LNG is comprised of methane with heavier components, such as ethane, propane, butane, plus trace elements, including sulphur compounds and aromatics. Data on the composition and concentration of the elements in the mixture can enable producers to increase the process' understanding and efficiency, improve quality and establish the value of the product.

Real-time measurement needs begin when natural gas is converted into liquid form using one or more compressor trains for liquefaction and purification. Rundown lines then transfer LNG streams to storage tanks. By measuring the composition in the rundown, LNG producers can better understand the product that is going into their tanks. This data enables them to predict how the LNG will age and better plan shipments by pipeline, train, and rail.

Although there are established techniques for this type of measurement, these systems typically require samples to be taken for testing, with results delayed for 20 mins, or longer. As a result, Raman spectroscopy is quickly gaining traction as an efficient, reliable, and economical alternative that can produce accurate, real-time results, the company claimed.

Since its discovery in the 1920s, this system has revolutionised process analysis with its non-destructive mode of operation and capability to measure sample composition. It is a laser-based optical analysis technique used to measure compositions through the vibrational properties of molecules.

Advancements in the stability and portability of solid-state Raman systems and technological improvements in lasers, optics and detectors, have made the technique faster and more accessible for real-time inline analysis, compared to previous years.

As a result, Raman is now increasingly being used as a measurement solution for LNG composition and concentration. When applied to inline processes, this system can provide results in seconds.

"Raman in the analysis of LNG composition is an important development," claimed Martin Mendez, lead research and development engineer at Analytical Solutions and Products (ASaP), an Amsterdam-based system integrator of LNG analysis and sampling measurement systems. "The use of Raman spectroscopy for LNG analysis is relatively new, and it has already proven to be a highly accurate, efficient, and usable compositional measurement tool."

Samples are collected using a 785 nm excitation laser and a contact BallProbe that produces a unique spectral fingerprint that identifies the LNG's chemical composition and molecular structure. The spectral peaks' distribution describes the molecule's composition, while the signal intensity correlates linearly with concentration.

With fewer steps involved in measurement, the uncertainty is reduced hence the measuring is much closer to the truth.

Commercialisation

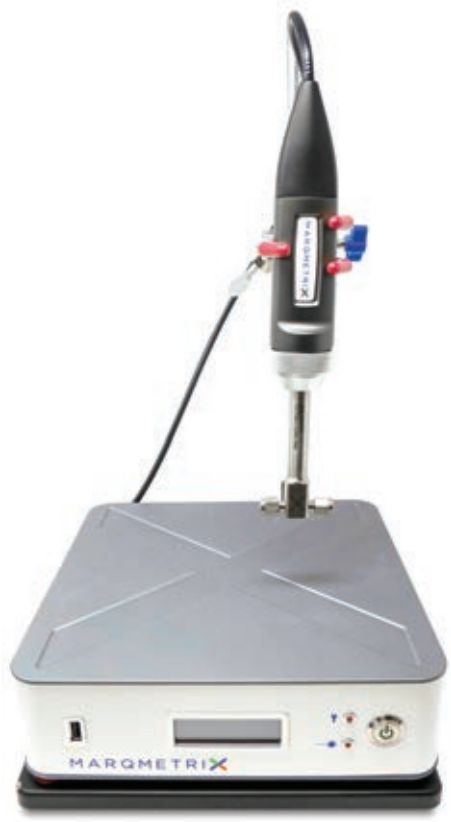
For commercial instrumentation, ASaP works with Seattle-based MarqMetrix, which was founded in 2012 by scientists from the University of Washington. This company specialises in compositional analysis utilising Raman spectroscopy and pioneered the system's advancements for use in the energy sector.

MarqMetrix has engineered its 'all in one' (AIO) system to produce identical and repeatable results from unit to unit in a package 80% smaller than previous Raman instruments. As each device is almost an exact copy, common mathematical models can be applied to produce consistent results. Previously, Raman systems were less reliable, as each unit required its own mathematical model and frequent recalibration for every installation.

AIO works with a wide range of contact probes suitable for LNG applications. The company's BallProbe is available in Hastelloy C-276 - a nickel molybdenum-chromium superalloy to withstand extreme physical and chemical environments. The probe's spherical sapphire lens can effectively withstand direct contact with the sample even in extreme cold and hot environments (-160 deg-350 deg C), high pressure (> 400 bar) and harsh corrosive conditions.

A significant advantage of this system is not having to take gas samples offline for measurement. Traditional techniques like GC require an injection system to add a sample gas to a chromatography column that allows the components to separate, and a detector to sense when a component is exiting the system. But first, the LNG must be converted from liquid to gaseous state without partial vaporisation before a reliable measurement can be made.

With a Raman system, no consumables are required for testing. "The contact probe is placed directly into the LNG without having to manipulate the gas, take if offline, or introduce a carrier gas," Mendez added. "With fewer steps involved in measurement, the uncertainty is reduced hence the measuring is much closer to the truth."



The AIO system works with a wide array of contact probes suitable for LNG applications.

Raman's direct LNG measurement produces readings every few seconds, compared to every three to five mins, or longer with traditional techniques.

"You want the real-time information, whenever possible," Mendez said. "When it comes to a custody transfer, for example, it is ideal to take as many representative samples throughout the entire offloading process to a tank or ship as possible."

Although the MarqMetrix Raman equipment can be used to identify the LNG components within around 15 mins of unboxing, quantifying the concentrations of each component first requires creating a predictive model.

As a result, ASaP establishes the equipment's accuracy at one of its three analytical testing sites by comparing it against measurements produced by traditional GC equipment, with LNG supplied from a nearby filling station.

"With the availability of easy-to-use commercial instrumentation, the threshold to work with Raman spectroscopy has now become approachable and workable for LNG applications," Mendez concluded. ■

New demands drive innovation in LNG ship design

High bunker prices and ongoing volatility in global fuel supply chains is driving naval architects to expand the number of fuel options available on newbuild vessels, according to ship design group Deltamarin. Fuelling Editor Malcolm Ramsay has more.

Unprecedented price fluctuations for LNG over the last three years have added pressure on bunkering infrastructure and led designers to keep options open when planning for the future, adding contingency fuelling systems.

"What we have seen recently are considerations for triple fuel ships (LNG+HFO w. scrubbers) in some projects but so far LNG is not abandoned despite high bunker cost," Esa Jokioinen, Sales and Marketing director at Deltamarin tells *LNG Journal*. "Newbuilds are designed for a 20-30 year lifetime so LNG still remains as the main alternative to HFO."

With over 30 years' experience in ship design and construction support services, Deltamarin offer services throughout the vessel lifecycle and has seen interest in novel fuel types and bunkering solutions grow sharply as uncertainty over availability and cost of fuel has increased.

Jokioinen notes that "in general, LNG and other alternative fuels consist of about 80% of the projects we are working on" compared to around 20% for traditional fuel, "whereas five years ago the relationship was more or less opposite", adding that "we are currently working on several designs with LNG and also ammonia and methanol."

Larger tank sizes

As well as a drive for greater flexibility in fuel choices, Deltamarin also reports a shift in design priorities due to growth in vessel size, with the success of LNG creating many new challenges as ever larger and larger ships attempt to dock and refuel.

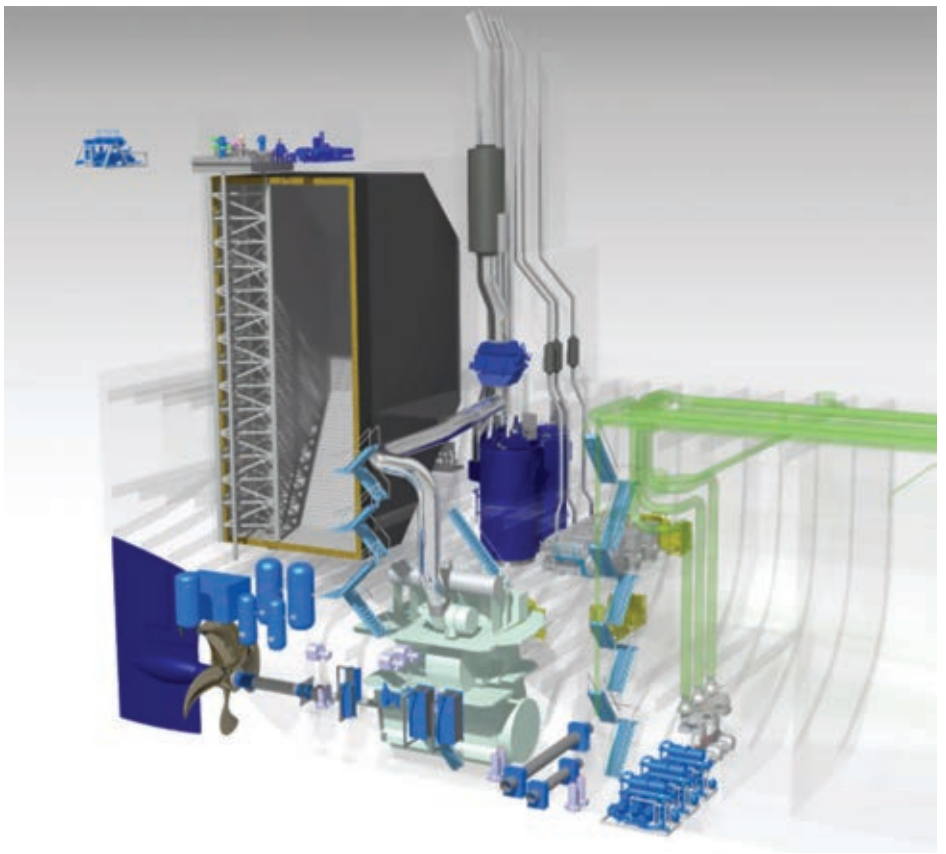
Juuso Reunamo, Project Engineer for Machinery at Deltamarin, explains that "for LNG in fuel applications, we have seen LNG tank sizes growing over the years, as LNG has been selected for vessels operating longer routes and/or with extended bunkering intervals."

This expansion of vessel requirements has meant that LNG has gone from being a small-scale fuel, used in tugboats or light craft operating within a harbour, to the fuel of choice for some of the largest ships on the sea. This rapid change of scope is putting increased pressure on many bunkering hubs as the volumes of fuel required have grown exponentially.

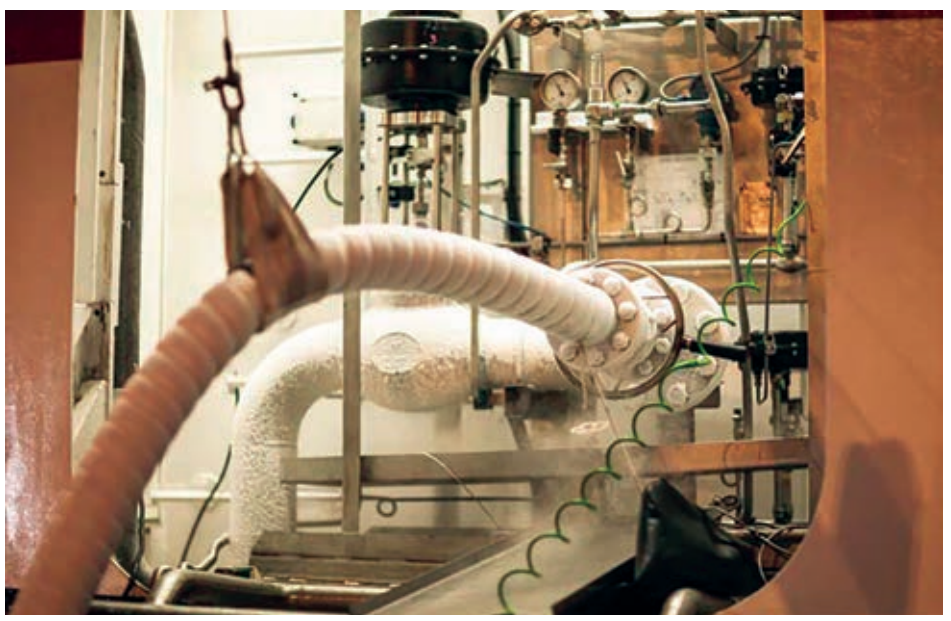
Demand pressure has been further exacerbated in recent months as supply chain issues have caused massive backlogs at ports around the world, increasing the pressure on operators to ensure a quick turnaround and to refuel quickly.

"Larger tanks typically also create challenges for bunkering as operators want to keep bunkering operations as short as possible and this can mean for example Truck-to-Ship bunkering is no longer seen as feasible in some locations," Reunamo adds.

The situation is further compounded in Europe where demand for LNG and gas more generally has been impacted by the war in Ukraine. For many existing LNG import ports in Europe, the landside demand for gas may ultimately create new competition pressure on bunkering activity should storage run dry.



LNG vessel design schematic



LNG Hose

"With the reduction in Russian gas exports, seaborne cargoes can now be regarded as the key tool for balancing supply and demand in Europe. It is LNG that will mainly determine how much gas is stored in the region's reservoirs ahead of another winter heating season," Yakov Grabar, gas market analyst at Gazprom, states.

Jokioinen also predicts that demand for LNG will remain high, stating that "In today's world it is really difficult to predict when the prices would start to come down " but notes that "the really big benefit of LNG (DF) in the longer term is that it provides several possible paths to "carbon neutral" or "zero carbon" operation through various liquid and gaseous bio and e-fuels and for many of our clients this is an important factor."

These pressures are driving new considerations for ship design that aim to favour rapid bunkering and greater flexibility to ensure that ships can refuel as efficiently as possible.

"While some of the ships are limited by hose size and handling of the hose, design is also concentrating on pre-bunker and after-bunkering operations and how to reduce the time spent on these," Reunamo comments.

Part of China Merchants Group, Deltamarin employs around 400 experts in Finland, Poland, China and Croatia. The group is headquartered in Turku, Finland

Slow Steaming

One solution to maximise available bunkering time may be to consider more refuelling at sea, reducing pressure on infrastructure in ports and allowing more time for operations to be completed. While ship-to-ship bunkering is relatively well-established for LNG vessels a new approach may be to refuel during periods of low speed or 'slow steaming'.

As emissions targets become ever more stringent shipping lines are increasingly looking to reduce speed of cargo ships for certain portions of their journey, in order to cut down fuel consumption and carbon emissions. This might result in a container ship travelling at a speed of around 12-19 knots, instead of the usual 20-24 knots, and where these sections of slow steaming are within range of bunker vessels then refuelling could, in theory, take place.

"Every now and then we are also discussing bunkering during slow steaming but until today we have not seen safe practice for this but this would be definitely interesting to see in future." Reunamo concludes. ■

HIGH STANDARD VALVES

FOR NON-STANDARD CONDITIONS.

WWW.ZWICK-ARMATUREN.DE

TRI-SHARK

METAL SEATED CONTROL VALVE

ZERO LEAKAGE

ZWICK
ARMATUREN GMBH

For the Record

ALASKA Governor Mike Dunleavy has just concluded a trade mission to Japan where he met executives of leading energy companies and utilities as well as government ministries about the Japanese companies procuring long-term Alaskan LNG supplies.

The meetings came at a time when Japan is looking in the medium term and long-term for more oil and gas amid sanctions against Russia for the Ukraine conflict.

"Alaska and Japan have a trade partnership going back over fifty years to the first LNG export from Nikiski to Japan," said Governor Dunleavy at the end of the trip.

"The natural gas of the Cook Inlet literally turned the lights on in cities across Japan and powered the economic engine that lifted that nation's post-war society into a critically powerful western ally," explained the Governor.

"There appears to be, due to the shift across the world away from older fuel sources, and the simultaneous need for supplies that are not risked due to political instability, a role that Alaska natural gas could play," stated Dunleavy.

Dunleavy was accompanied by members of the Alaska Gasline Development Corp. (AGDC), the state company running the LNG project, and they met major Japanese global players in LNG.

It was the Governor's second foreign trip during his administration; and the first was also to Japan in 2019, marking the 50th anniversary of the first LNG shipment from the first US LNG export plant at Nikiski to Tokyo.

Dunleavy and the Alaska delegation held meeting with representatives of the Japan Energy Resource Agency, the Japanese Ministry of Economy, Trade, and Industry (METI), the Japan Oil, Gas and Metals National Corp.

They additionally met with the Japan Bank for International Cooperation (JBIC), along with Tokyo Gas and TOYO Engineering, trading house Mitsubishi Corp., engineers Chiyoda Corp., well as oil and gas major INPEX and shipping company Mitsui Osk Lines.

Dunleavy had said in February 2022 that a new analysis of the Alaska LNG export project came up with gas pricing that would by lower than some other US projects and financing could be underpinned by Federal loan guarantees.

He said the Alaska LNG project is well positioned for Alaska to realize the decades-old dream of bringing our natural gas off the North Slope for the benefit of Alaskans and worldwide markets.

The project would build an 800-mile pipeline to transport natural gas from the North Slope to Southcentral Alaska for export.

The AGDC released the report by energy consultants Wood Mackenzie for interested parties to access.

The report analyses reduced project construction costs, a new project finance structure and an estimated reduced natural gas purchase cost amounting to a reduction in LNG pricing.

The strong LNG demand is expected to create a gap in supply starting in 2028, which new projects are required to fill and Alaska LNG is competing to fill the supply gap.

Alaska has ample gas supply. The North Slope Basin in Alaska holds more than 45 trillion cubic feet (Tcf) of combined contingent natural gas resource and reserves, an estimated 299 Tcf of undiscovered, technically recoverable conventional natural gas resource, and an additional 100 Tcf of unconventional resources.

AVENIR LNG has helped organize the first LNG fuel delivery in the German Baltic Sea Port of Lübeck, supplying the TT-Line ferry company's new RoPax vessel "Nils Holgersson", which carriers vehicles, passengers and cargo.

Avenir said that to execute the operation it teamed up with Liquind 24/7 GmbH, a leading German LNG infrastructure provide, and Landwärme GmbH, one of Europe's leading biomethane traders.

The fuel delivered to the "Nils Holgersson" in the bunkering operation was 10 percent BioLNG, made from waste.

Avenir is a joint venture owned by London-based Stolt-Nielsen and shipping company partners Höegh LNG and Golar LNG Ltd and is listed on the Oslo over-the-counter market.

The company said the first bunkering of the supply agreement was the start of a long-term cooperation between Avenir LNG and TT-Line for the supply of LNG and BioLNG to two new RoPax ferries that will transport passengers and cargo between Baltic Sea ports in Sweden, Germany, and Poland.

Avenir noted that population in the in the port of the region would be immediately benefitting from the environmental advantages of these vessels being powered with LNG with much reduced emissions.

"We are excited about this successful first delivery of LNG to TT-Line in Lübeck," said Peter Mackey, Chief Executive of Avenir LNG.

"The fact that 10 percent of the delivery was Bio-LNG underlines the commitment of all parties involved to reducing emissions of shipping even further through the development of a suitable small-scale LNG infrastructure," Mackey explained.

"Avenir is committed to the deployment of bunker vessels and the construction of new terminals, to improve the availability of environmentally friendly fuels for our customers across the marine, industry and logistics segments," stated the Avenir CEO.

Christian Schneider, Managing Director of Liquidind 24/7, said the effective execution of this bunkering operation showed effective cooperation between different small-scale LNG frontrunners.

"Furthermore, the operation showed the logistical and technical capabilities that Liquidind 24/7 has developed in the past few years as a leading alternative fuel infrastructure provider in the German market," added Schneider.

Landwärme's CEO Zoltan Elek said that despite existing regulatory barriers BioLNG was the most viable solution for quickly reducing emissions in maritime transport.

"It helps guarantee energy security, as well as independence on the path to carbon neutrality," added Elek.

CHART Industries, the US LNG and industrial gases equipment-maker, has completed the acquisition of Fronti Fabrications Inc., a specialist in engineering, machining and welding for the cryogenic and gas sectors.

"With over 20 years of experience in liquefaction, heat exchangers and cold boxes, Fronti adds a known team to expand Chart's cold-box manufacturing capacity and capability, including work currently underway on Chart hydrogen and helium liquefiers," said Chart.

Chart noted that Fronti, which was purchased for $20 million, also supplies newbuild pressure vessels and performs repairs with certification to the code of the American Society of Mechanical Engineers.

Chart, based in Atlanta, Georgia said the acquisition would benefit the company's growing order base in the "Big LNG" and the small-scale sector in the US and elsewhere.

"Given our continued demand for 'Big LNG', small-scale LNG and hydrogen-helium liquefaction, having more than one United States cold-box fabrication facility (in addition to our New Iberia, Louisiana location) adds agility and capacity to further improve our delivery lead-time," said Chart.

The company added that the acquisition of Fronti, based in Pennsylvania, prepares the ground for the anticipated increase in LNG and gas equipment demand in the coming years.

Chart's recent orders from Gulf Coast LNG export projects include providing equipment for Venture Global's Plaquemines Phase 1 project for 10 million tonnes per annum of LNG at a Louisiana site on the Mississippi River south of New Orleans.

Cheniere Energy's Corpus Christi plant expansion in Texas has also booked Chart content for additional mid-scale production Trains.

Additionally Chart said the Tellurian Driftwood project in Louisiana is anticipated to include over $350M of Chart content.

"The combination of Fronti's vacuum cold-box fabrication experience and its facility in a key geographic location for cryogenics immediately allows us to optimize our manufacturing under the 'One Chart flex manufacturing' umbrella," said Chart.

The company explained that this increased Chart's under-roof cold-box fabrication capabilities by around 25 percent as well as providing additional capacity for battery assembly, perlite cold-box fabrication, and specialized vessel capabilities to serve global customers.

Chart said it would also use the location for repair and services staging as it was convenient for the US industrial gas customers base.

"The acquisition of Fronti brings another cryogenic industry partner into the Chart portfolio, expands our cold-box manufacturing capability and capacity, and creates the foundation for our mid-Atlantic (Allentown, Pennsylvania) flexible manufacturing location," explained Jill Evanko, Chart's Chief Executive and President.

"We are also very excited to have Joe Fronti and the entire Fronti team continue with the business and work even closer with our existing teams on the heart and

soul of LNG, hydrogen and helium liquefaction equipment," declared Evanko.

Joe Fronti, President of Fronti Fabrications, said it was an honor to join the Chart team.

"We have been combining Fronti's cryogenic fabrication skills and project capabilities for over 50 years and are excited to continue to take our helium and hydrogen liquefaction work to the next level as a part of Chart," stated Fronti.

"I look forward to not only continuing to grow our cold-box project base but also having our Allentown, Pennsylvania location become a key part of Chart's flexible manufacturing footprint," he added.

In its continuing process of value-added expansion, Chart also completed the acquisition in May 2022 of a Swedish company CSC Cryogenic Service Center AB, to increase fuel and service offerings in the European Union.

Chart said its strong original equipment installed base and forecast growth in the Nordic region would benefit from the localized support in Sweden after the takeover for around $4m.

The company sees CSC Cryogenic broadening its repair and service capabilities for mobile equipment, in particular trailers, as well as ISO containers, stationary and transportable tanks, flowmeters and LNG fuelling stations.

CHEVRON Corp. is increasing its LNG trading role after signing cargo supply agreements with the largest US exporter Cheniere Energy and newcomer Venture Global with one plant in operation in Louisiana and three others under development in the state.

Venture Global said Chevron had signed two long-term Sales and Purchase Agreements (SPAs) for the purchase of 2 million tonnes per annum for 20 years.

Cheniere Energy confirmed that Chevron would also be buying another 2 MTPA from Cheniere units, Sabine Pass Liquefaction and Cheniere Marketing in two separate SPAs.

Chevron is itself one of the leading global LNG exporters with the operatorships of the Gorgon and Wheatstone export facilities in Western Australia and the Angola LNG plant in southwest Africa.

Under the Venture Global accords for Louisiana LNG cargoes, Chevron will purchase 1 MTPA from the Plaquemines LNG facility being built on the banks of the Mississippi and a further 1 MTPA from the CP2 project planned for next to the existing Calcasieu Pass plant near Lake Charles.

Plaquemines LNG has been under full construction since August of 2021 and the construction of CP2 LNG is expected to commence in 2023.

"Venture Global is delighted to begin a long-term LNG agreement with Chevron, one of the world's premier integrated energy companies," said Venture Global CEO Michael Sabel.

"This is an outstanding addition to our growing customer portfolio at CP2. Our innovative and proven approach for the deployment of LNG Trains enables us to deliver energy to our customers faster and at the lowest cost," added Sabel.

Colin Parfitt, Chevron Vice President for Midstream, said the Venture Global deal allows Chevron to deliver affordable, reliable, and ever cleaner energy to meet long-term demand.

"This is part of Chevron's strategy to connect and strengthen relationships across the natural gas value chain - from natural gas production and lower carbon initiatives, to transportation, marketing and delivery," added Parfitt.

Venture Global is developing an additional 50 MTPA of production capacity in Louisiana from three plants, also including the Delta LNG project.

Cheniere said that its two SPAs with Chevron are for 1 MTPA on a free-on-board basis from Sabine Pass in Louisiana.

"Deliveries under the SPA will begin in 2026, reach the full 1.0 MTPA during 2027 and continue until mid-2042," explained Cheniere.

"Under the second SPA, Chevron has agreed to purchase about 1.0 MTPA from Cheniere Marketing on an FOB basis with deliveries beginning in 2027 and continuing for around 15 years," added Cheniere.

"The Cheniere Marketing SPA is subject to Cheniere making a positive final investment decision to construct additional liquefaction capacity at the Corpus Christi LNG export facility beyond the seven-Train Corpus Christi Stage III Project," explained Houston, Texas-based Cheniere.

Cheniere added that the purchase price for the LNG under the SPAs was indexed to the Henry Hub price, plus a fixed liquefaction fee.

"We are pleased to welcome Chevron, one of the world's premier integrated energy companies, as a valued long-term LNG offtaker," said Anatol Feygin, Cheniere's Executive Vice President and Chief Commercial Officer.

"These long-term SPAs underscore the growing demand for reliable, cleaner burning LNG supply beyond 2040 and further support investment in additional LNG capacity beyond our Corpus Christi Stage III Project," added Feygin.

CHINESE liquefied natural gas imports last month dropped by more than 28 percent and the fall was partially offset by a 26 percent year-on-year increase in pipeline gas imports from nations such as Turkmenistan and Russia.

LNG deliveries to the Chinese network of 22 regasification terminals came to 4.93 million tonnes, or around 72 cargoes, down 28.1 percent from the 6.85MT, or 101 cargoes, received in May 2021, according to the General Administration of Customs.

Imports of cargoes had tumbled by 33.4 percent in April 2022 to their lowest monthly total in over two years of 4.34MT, down from the April 2021 total of 6.52MT.

LNG shipments during the first five months of the 2022 from January to May amounted to 26.49MT, a drop of 19.6 percent from the 32.75MT logged in the first five months of 2021.

The data showed that pipeline gas imports in May were 4.15MT, which was 26 percent higher than the 3.27MT reported in May 2021.

Imports of pipeline gas in the January to May period increased by 11.3 percent to 18.42MT.

Lockdowns in cities like Shanghai because of rising Covid-19 cases curbed economic and industrial activity as well as fuel demand, though China has been slowly ending all the measures.

The Chinese receive varying volumes of pipeline gas through links from the former Asian republics of Turkmenistan, Kazakhstan and Uzbekistan, as well as from Russia as part of Gazprom's "Power of Siberia" project.

Uzbekistan has restarted gas exports to China after temporarily halting them at the beginning of 2022 to meet its own increasing domestic demand.

The Central Asia-China pipeline originates in Turkmenistan and passes through Uzbekistan and Kazakhstan.

The Central Asia-China gas pipeline, which is 3,665 kilometres (2.277 miles) in length, starts at Gedaim on the Turkmenistan-Uzbekistan border and terminates at Horgos in the Xinjiang region of China before joining with the Chinese grid.

Turkmenistan was China's largest supplier of gas by pipeline in the period from January to May.

Russian natural gas company Gazprom said on June 17 that it had signed a technical agreement with China National Petroleum Corp. on the Far East route for a new gas pipeline carrying Chinese supplies.

The document contained the main technical parameters for the cross-border section of the gas pipeline, including the underwater crossing of the Ussuri border river in the Russian Far East.

Under the previously revealed terms of the new deal, the Russians will provide 35.5MT of gas per annum to China, with 7.4MT flowing through the new Far East pipeline and the remaining 28.2MT flowing through the "Power of Siberia" pipeline.

The total reserves of natural gas in Turkmenistan are estimated at 50 trillion cubic metres and Russia had doubled its own natural gas imports from Turkmenistan in 2021 due to the very low prices there.

The current Russian contract is for 10 Bcm per annum and the volumes received last year enabled Russia's Gazprom to boost its exports to Europe, which are now slowly declining amid Western sanctions over the war in Ukraine.

COSMO Energy Group of Japan has received government backing for its latest exploration and production venture offshore Abu Dhabi in the United Arab Emirates as the Japanese continue to underwrite projects related to oil and gas and LNG as well as other commodities.

Cosmo Energy said it had reached an agreement with the government agency, Japan Oil, Gas and Metals National Corp. (Jogmec), to receive equity financing for Cosmo E&P Albahriya Limited, a wholly-owned subsidiary of Cosmo and leading the offshore Block 4 exploration project.

Cosmo was awarded the Offshore Block 4 exploration rights in the second Abu Dhabi Block Bid Round in the UAE.

The company said that Cosmo Albahriya was newly incorporated to operate this project and signed the exploration concession agreement with the Supreme Council for Financial and Economic Affairs and Abu Dhabi National Oil Company (Adnoc).

Cosmo added that Jogmec would now provide equity financing to Cosmo Albahriya in return for up to 49 percent of the share capital.

Cosmo will retain the majority stake in Cosmo Albahriya which will continue to be the concession operator.

Japan is also still active in Adnoc LNG which in the 1976 became the first LNG production company in the Arabian Gulf on Das Island.

Japanese trading house Mitsui & Co. is

a shareholder along with BP of the UK, TotalEnergies and Adnoc.

As well as producing LNG for export, it supplies one billion standard cubic feet of gas per day to the UAE's national grid.

Adnoc LNG has modernized its commercial approach, adopting a new business model that serves utilities, portfolio players and traders around the world rather having long-term contracts to one nation like Japan.

Cosmo's other affiliate, Abu Dhabi Oil Co. Ltd, has been dedicated to crude oil development and production of the Mubarraz concession area for more than half a century.

"As the concession area lies adjacent to Offshore Block 4, Cosmo looks forward to developing Offshore Block 4 in a cost-effective and environment-friendly manner by potentially utilizing existing infrastructure," explained the company.

"The Offshore Block 4 exploration concession has the potential to benefit from synergies and reinforce the cost-competitiveness of Cosmo's upstream activities in Abu Dhabi, and can contribute to the stable crude supply to Japan from Abu Dhabi," stated Cosmo.

"This partnership will further expand the bilateral relationship between the UAE and Japan," it added.

Jogmec said that its approval of the equity financing application from Cosmo was made in accordance with Jogmec's technical, economic and business-environment criteria and with the consent from the Minister of Economy, Trade and Industry (METI).

CROWLEY Maritime, a leading US shipping line in Central America and the Caribbean, has inaugurated an LNG unloading terminal and supply depot in Peñuelas for small-scale users in the US territory of Puerto Rico where clean energy needs are increasing.

The Crowley facility will receive 10,000-gallon units of LNG in ISO containers delivered by its cargo ships, mostly from Florida, and then distributed by road tanker trucks to customers.

The company said that upon arrival at the customer's site, the LNG is regasified and used for power generation and energy needs.

The inaugural event at the Peñuelas LNG terminal was hosted by Crowley Chairman and Chief Executive Tom Crowley and attended by executives and officials, including Puerto Rico Governor Pedro Pierluisi and Puerto Rico's Resident Commissioner in Washington D.C., Jenniffer González-Colon.

The facility will significantly increase Crowley's service capabilities in Puerto Rico where it currently delivers more than 94 million gallons of LNG annually.

When operating at full distribution capacity, the Crowley LNG will help power an aggregate of 120 megawatts of cleaner energy, replacing diesel and fuel oil, and helping to reduce emissions.

"We continue to expand our capacity and investment in Puerto Rico with the opening of this special facility, which enhances Crowley's LNG capabilities across diverse industries," said Tom Crowley.

"Our LNG solutions allow industrial and commercial clients to plan, monitor and produce their own energy while protecting their business from potential threats such as power outages or natural disasters," explained the CEO.

Crowley said the company had been fostering strong and transparent relationships with government and business leaders in Puerto Rico and allowing the company to play a pivotal role in supplying cost-efficient, sustainable LNG to the island's leading sectors.

"As Puerto Rico moves forward on its quest to transform its dated and fragile electric generation system into a first-class energy network, the use of alternative and transitional fuels like LNG will be critical," said Puerto Rico Governor Pierluisi.

"Crowley's new LNG loading terminal in Peñuelas will foster much needed new economic activity for municipalities in the island, and it will also position Puerto Rico's industrial and commercial sector on a fast-track path toward economic growth by providing reliable and environmentally friendlier energy solutions," added Pierluisi.

"My administration is pleased to join in today's milestone celebration, which further solidifies Crowley's long history of serving the Puerto Rico market," stated the Governor.

ELIXIR ENERGY, the Australian company whose main asset is its 100 percent-owned Nomgon IX coal-seam gas production sharing contract in the South Gobi region of Mongolia with possibilities for LNG production for fuel or pipeline supplies for power, has updated its operational plans.

The company said it had recently finished drilling the Bulag-Suuj-1S exploration well on the Nomgon region located near Mongolia's southern border with China.

"This well logged 21 metres of coal. This discovery has opened up a potential new CSG bearing sub-basin in the PSC area," stated Elixir.

An appraisal well, Bulag-Suuj-2S, is now following up on this discovery well, at a location some four kilometres away and a second rig has now been deployed by drilling contractor Top Diamond Drilling LLC.

Elixir added that the 2022 2D seismic acquisition programme has been successfully completed, on time and on budget, with 322 kilometres acquired.

"The data obtained is currently being processed and interpreted and will feed into the Company's future drilling plans," said the company.

The company's extended pilot production programme is advancing in parallel to the exploration and appraisal drilling.

"Experienced Mongolian contractor Monbag LLC has been hired to construct the civil works and this will commence shortly," said Elixir.

"The spudding of the first of the two production wells by drilling sub-contractor Major Drilling is expected by around the end of August 2022," it added.

Elixir's Managing Director Neil Young said that as the Mongolian summer advanced operational efforts were moving into top gear.

"We now have three rigs working in our PSC, pursuing a range of exploration and appraisal targets," said Young.

"A fourth rig will join the programme shortly as we move to start up our extended pilot production test," he explained.

Elixir commenced Mongolia's CSG exploration in 2019 and since then it says all the geological ingredients required for success have been confirmed.

"Exploration has been highly capital efficient, the indigenous service sector has expanded and other small-cap operators have entered the market," it added in a recent presentation where it drew parallels with the Australian state of Queensland's emergence as a major LNG supplier to Asia.

The company believes the history of Queensland CSG-to-LNG experience could be repeated in Mongolia.

Elixer said the coal thickness was "exceptional in places" in Mongolia at 50-90 metres compared with a maximum of 30 metres in Queensland.

The company said it had a "highly experienced" CSG team which it has taken from Australia to Mongolia.

"Mongolia needs new pipeline infrastructure, but costing $100 million not $10 billion," it said.

It added that the gas content in the Mongolian CSG is 5 to 15 cubic metres versus 7-14 cubic metres in production areas in the Australian state.

Elixir noted that cost of capital was generally lower in Australia, but for Chinese national oil companies Mongolia is seen as a low sovereign risk.

EQUINOR, the Norwegian oil and gas major and main pipeline natural gas supplier to Europe amid diminishing Russian deliveries from Gazprom, will be an even bigger LNG trader with additional volumes to be supplied by the largest US LNG exporter Cheniere Energy.

Under a planned 15-year agreement Equinor will purchase around 1.75 million tonnes of LNG per annum from Houston-based Cheniere from 2026.

"This new Sales and Purchase Agreement (SPA) will add new volumes to Equinor's already significant gas portfolio of pipeline gas and LNG," stated Equinor.

The Norwegian company also disclosed that the expansion at Corpus Christi to add 10 MTPA to the current nameplate capacity of 13.5 MTPA will likely be followed by another boost in output.

"With global energy demand growing and increased focus on energy security, the LNG market is expected to grow significantly. US LNG can supply the European markets as well as cover demand in other markets," explained Equinor.

The Stavanger, Norway-based oil and gas major has recently shipped the first cargo from the repaired Hammerfest in Northern Norway to re-established seaborne LNG supply link Europe.

It was the first cargo to leave the Hammerfest liquefaction and export plant since the September 2020 fire.

Once the Hammerfest is ramped up to full production of 4.8 MTPA, a ship will leave the facility on Melkøya island every five or six days and over the year will deliver 5 percent of Norway's natural gas exports while the other 95 percent is delivered by pipelines.

Norway's role as a key supplier to Europe has taken on more importance because of the Russian invasion of Ukraine and Western sanctions against Russian oil and gas.

The Hammerfest project gave Europe its first large-scale LNG supply when it came on stream in 2007, though the facility was originally planned and built to supply the US before the shale-gas boom.

"I am very pleased that we have entered into a long-term agreement with Cheniere, the largest US producer of LNG," said Helge Haugane, Equinor's senior vice president Gas & Power.

SUPPLYING ENERGY GLOBALLY

Energy Transfer is developing a world-class LNG export facility utilizing its existing import and regasification terminal. The Lake Charles LNG project is fully permitted and is the only remaining brownfield project on the U.S. Gulf Coast.

The Lake Charles LNG project provides cost advantages over other LNG projects on the Gulf Coast due to the benefit of using existing LNG infrastructure as part of the conversion plans. The LNG export facility will also benefit from a direct connection to Energy Transfer's vast pipeline network that will provide unparalleled access to abundant natural gas supply.

If sanctioned through an affirmative FID, the Lake Charles LNG project will have a total liquefaction capacity of 16.45 million tonnes per annum and incorporate best available technology for enhanced performance and efficiency.

energytransferlng.com

Lake Charles LNG®
An Energy Transfer Project

"Based on our production in Norway, Equinor is the second-largest supplier of pipeline gas to Europe. The new LNG agreement is a major building block in Equinor's ambition to further strengthen our global gas position by adding more LNG to the portfolio," Haugane explained.

"LNG will play a crucial role in providing energy security. By increasing our position in this segment, we will be even better positioned as a long-term reliable supplier of energy' he stated.

Under the SPA, Equinor has agreed to purchase the volumes from Cheniere Marketing on a free-on-board basis whereby the Norwegians send their own ships.

Equinor said the deliveries under the SPA would start in the second half of 2026 and reach the full 1.75 MTPA in the second half of 2027.

"Half of the volume, or about 900,000 tonnes, is subject to Cheniere making a positive final investment decision to construct additional liquefaction capacity at the Corpus Christi LNG Terminal beyond the seven-Train Corpus Christi Stage III Project," stated Equinor.

This suggests that the Cheniere, which operates the Sabine Pass plant in Louisiana with 27 MTPA of production, is planning yet another expansion at the Texas facility.

EQUINOR and the UK's Centrica, owner of the British Gas utility, have signed a deal for the delivery of more Norwegian pipeline natural gas over the next three winters and the accord will slightly lessen the need for more LNG deliveries to UK terminals.

"The supply agreement will provide further energy security for the UK over the coming three winters," said a statement.

The new supply agreement adds around 1 billion cubic metres per annum to Equinor's existing bilateral contract with Centrica and brings the total volume under the contract above 10 Bcm per year.

In addition to importing Norwegian gas by pipeline, Centrica also receives LNG cargoes from several sources at the Isle of Grain LNG import terminal located southeast of London.

The Equinor-Centrica deal was signed as the National Balancing Point wholesale market price rebounded on June 16 to a seasonal high of the equivalent of $31.15 per million British thermal units on supply concerns.

The statement added that with the UK currently importing around a third of its gas requirements from Norway, the announcement underlines the strategic importance of the Norwegian relationship to UK energy security.

"In a period with a challenging geopolitical and macroeconomic environment with strong demand for natural gas, we at Equinor are doing what we can to export as much gas as possible to the market," says Equinor's senior vice president Gas & Power, Helge Haugane.

"Equinor is proud to be a long-term, reliable energy partner with both Centrica and the UK, and I am very happy that through this agreement we are able to contribute to the UK securing further energy supply for the coming winters," stated Haugane.

Chris O'Shea, Centrica's Chief Executive, said the agreement was good news for the country and for British Gas customers.

"At a time when energy security is paramount, I'm delighted that we are able to do our bit to ease the pressure and provide some more certainty ahead of what may be a difficult winter," added O'Shea.

"As Britain's biggest energy supplier, through British Gas, we take our responsibility to securing supplies for over 8 million domestic and business customers very seriously," he stated.

Equinor every year typically supplies 20-22 Bcm of natural gas to the UK which covers over 25 percent of UK gas demand.

GAIL INDIA plans to enter the small-scale LNG production market to cater for off-grid locations and the transportation and bunkering sectors with prospects of expansion while also seeking long-term LNG import agreements.

As a first step, GAIL said it had placed an order for two small-scale liquefaction skids capable of producing LNG on a pilot basis. It explained that liquefaction would be achieved through proprietary mobile liquefaction skids.

GAIL stated that these small-scale plants will help in the distribution of natural gas through liquefaction in new city-gas distribution areas, liquefaction of gas at isolated fields and will eventually when expanded support the setting-up of LNG fuelling stations and bunkering for ships.

"GAIL will be first in the country to introduce portable and scalable liquefaction units," said the New Delhi-based company.

"The project is envisaged to provide a thrust to the Government of India's focused initiatives to increase the share of natural gas in the primary energy basket," stated GAIL.

"Further, GAIL is also having discussions on manufacturing liquefaction skids in India," it added.

Analysts note that India has huge potential for small-scale LNG growth in fuel and bunkering, given the intense shipping traffic along its coastline and the nationwide public transportation sector.

GAIL is the nation's main natural gas pipeline operator and a leading LNG importer with US volumes from Cove Point in Maryland and also contracted from Russia's Gazprom.

In his most recent earnings statement GAIL Chairman and Chief Executive Manoj Jain said he would like to increase the company's imported LNG volumes.

"We would like 1 million tonnes per annum of long-term supplies to begin with and we are looking at a 10-year deal with supplies from January 2023," stated CEO Jain.

Quarterly revenues from operations in LNG, natural gas pipelines, city gas and liquefied petroleum gas (LPG) amounted to 26,968 crore rupees ($3.47 billion) to the end of March 2022, up from 15,549 ($2.04Bln) in the same three months of March 2021.

Annual revenues jumped to 91,646.82 ($11.81Bln) compared with 56,737 ($7.31Bln) in the previous fiscal year.

GAIL has six subsidiaries including GAIL Global USA Inc., which looks after its Cove Point LNG interests.

The company also runs an LNG trading business based in Singapore.

Other assets include a majority stake in Konkan LNG, the ownership company of India's Dabhol LNG import terminal, located south of Mumbai, and with 5 million tonnes per annum of capacity.

It additionally has a founding stakes in Petronet LNG and over a dozen other joint ventures and associated business, mainly in India.

INEOS GROUP, the UK multinational chemicals company with ethane trading links to the US Gulf Coast, has signed an accord with Sempra Infrastructure to secure future cargoes from the planned Port Arthur LNG export project in Texas or the expansion of the existing Cameron LNG plant at Hackberry in Louisiana.

Ineos said that building on its position exporting ethane from the US, it was now entering the LNG market.

The London-headquartered company has signed a Heads of Agreement with Sempra, the California-based utility and LNG plants and projects owner in the US and Mexico.

The Sempra Infrastructure units will provide 1.4 million tonnes of per annum of LNG from the US Gulf Coast for 20 years.

"Ineos Energy Trading will market the LNG into global markets as well as supply its own industrial needs in Europe," explained the company controlled by the UK energy and chemicals entrepreneur, Sir Jim Ratcliffe.

"The agreement comes at a critical time for energy markets and will provide much needed security of supply," added Ineos.

Under the agreement if it is finalized, the LNG will be delivered on a free-on-board basis from either the proposed Port Arthur plant or Cameron LNG.

The company said it regarded itself as a first mover among European corporates as it secures competitive sources of energy to meet its own needs and those of its customers throughout the energy transition.

"Ineos intends to build partnerships with other industrial users of energy in Europe to help them access the same competitive sources of energy. It is the first market entrant to operate in this way in many years," it declared.

Brian Gilvary, Chairman of the INEOS Energy unit, said the agreement represented a major step forward in the Ineos Energy strategy at a time of significant transformation in the energy industry.

"Our entry into the global LNG market opens new opportunities to supply affordable, clean and reliable energy to the market. Long-term supply from INEOS Energy will help alleviate the structural energy issues in Europe," he declared.

Sempra's Port Arthur LNG development envisages producing 13.5 MTPA of LNG and is a fully permitted venture to be located at a 3,000-acre site in Jefferson County in Texas.

In addition, Sempra Infrastructure has signed an HOA with the Cameron LNG partners for the development of the proposed 6.75-MTPA Cameron LNG Phase 2 expansion.

David Bucknall, Chief Executive of Ineos Energy, said the company was delighted to begin a strategic relationship with Sempra Infrastructure.

"This agreement is an important part of our strategy as we build a network of liquefaction, shipping, and regasification capacity to deliver affordable, cleaner and reliable energy to our businesses and customers in Europe and around the world," added Bucknall.

Justin Bird, CEO of Sempra Infrastructure, said Ineos was one of

Europe's largest end-users of natural gas and the company looked forward to building a long-term relationship.

"This HOA demonstrates our ongoing momentum in advancing our next generation of LNG export facilities with an eye toward supplying US natural gas to some of the world's leading energy and manufacturing companies," added Bird.

JAPANESE liquefied natural gas imports increased for a second successive month in May as they rose by 16.3 percent and Russian deliveries were twice as much as those from the US.

Shipments of LNG to Japan amounted to 5.76 million tonnes last month, or 85 cargoes, compared with 4.95MT, or 73 cargoes, in May 2021, according to the preliminary trade figures from the Japanese Ministry of Finance.

Japanese LNG deliveries to the network of 37 terminals around the main islands had been 5.57MT in April, or 82 cargoes, compared with 4.97MT, or 73 cargoes, in April 2021.

LNG costs for the nation last month surged year-on-year by 155 percent to 601.40Bln yen ($4.47Bln) compared with 236.15 Bln yen ($1.76Bln) in May 2021.

The effect on the balance of payments was even more severe as the Japanese yen has dropped to a 24-year low against the dollar, meaning dollar-based commodities like energy are more expensive when converted back into yen.

The country lost the No. 1 LNG import position in 2021 to China, though in certain weeks in May and June Japan has been the biggest North Asia importer as China reduced shipments amid Covid-19 lockdowns.

Shipments to Chinese terminals in 2021 had amounted to 78.93MT which was 18.3 percent more than in 2020.

Japan's 2021 cargo deliveries were 74.31MT, down 0.2 percent on 2020 and 4.62MT less that the Chinese total for 2021.

Thermal coal shipments also increased in May to 8.54MT at the nation's coal terminals, a rise of 7.1 percent year-on-year.

On a fiscal year basis, Japanese LNG imports had dropped in the April 2021 to March 2022 period by 6.4 percent to 71.46MT versus 76.35Mt in the previous fiscal year, according to Ministry statistics.

During May 2022 shipments of LNG from Russia declined by 5.4 percent to 559,000 tonnes, though were higher than April's 396,000 tonnes of deliveries. The shipments come from the Gazprom-run Sakhalin plant in the Russian Far East.

They were also more than double the amount of shipments imported from the US, which dropped by more than 51 percent to 267,000 tonnes.

Imports from the US had dropped in April by 12 percent to 344,000 tonnes as the Russian invasion caused Asia-bound shipments to be re-directed to Europe.

Middle East cargo deliveries from nations like Qatar were down by 16 percent last month to 545,000 tonnes.

Shipments of LNG to Japan in May from Asian countries surged by 56.7 percent to 1.36MT, though were down on the 1.49MT received in April 2022.

The balance of imports in May 2022 came from Australia, African nations and the spot market.

That segment of the imports was higher at 3.03MT versus the 2.30MT received in May 2021 and up on the 2.95MT delivered in April.

Thermal coal shipments to Japanese ports in the fiscal year to the end of March 2022 had increased by 8.8 percent to 114.46MT, outpacing the LNG volumes of 71.46MT during the same period.

The almost parity levels between thermal coal imports and LNG shipments disappeared in 2021 with thermal coal deliveries moving well ahead.

Nuclear power generation in Japan is still well down. Nine reactors from a total of 16 plants with 50-plus reactors are operating from those that have gained the regulatory safety agreements.

JERA Co. Inc, Japan's largest buyer of liquefied natural gas, has successfully bid in a public auction conducted by general electricity transmission and distribution companies to supply additional power to the nation for July and August, including from two reprieved gas-fired power stations built in the 1970s for regasified LNG.

The public auction was held to secure additional power supply capacity (kW) and electricity supply volume (kWh) as a measure to address summer supply and demand, based on discussions at the power and gas sub-committee of Japan's powerful Ministry of Economy, Trade, and Industry.

The Tokyo auction offered additional power supply capacity of 1.2 gigawatts for capacity action and an electricity supply volume of 1 terawatt hours for the kWh auction, for the period from July 1 through August 31 2022.

JERA was selected as a successful bidder in the kW auction for the power supply capacity of Anegasaki Thermal Power Station Unit 5 and Chita Thermal Power Station Unit 5, both of which are under long-term planned shutdown.

"Going forward, preparations will be made to resume operation of both units," stated JERA.

JERA is the largest corporate LNG buyer in the world with annual volumes of around 35 million tonnes and controls a fleet of 20 LNG carriers.

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

The 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.

Among the reprieved power stations fired by regasified LNG the Anegasaki Kaigan unit has been in operation in Ichihara City in Chiba Prefecture since April 1977 and has been in long-term shutdown mode since March 2022.

The facility has a conventional gas system and 600 megawatts of output.

The second plant continuing to operate in July and August is the Kitahama-machi plant in Chita in Aichi Prefecture, which has been operating since 1978 and has a 700 MW gas-fired system.

The Chita facility has been in long-term planned shutdown since April 2022.

"JERA was selected as a successful bidder in the kWh auction for approximately 80 GWh of electricity supply and will strive to supply the electricity through the electricity market," said the company.

"JERA continues to make every effort to secure a stable supply of energy with the understanding and cooperation of local communities and other stakeholders," it stated.

MOZAMBIQUE was producing LNG for the first time from the "Coral-Sul FLNG" production vessel project operated by Italy's Eni in the Rovuma Basin and with liquefaction capacity for annual output of 3.4 million tonne per annum.

Eni, as upstream operator of the Area 4 licence resources in the Coral South reservoir, said the joint venture had safely achieved the introduction of hydrocarbons and was proceeding as planned.

The "Coral-Sul FLNG" vessel was constructed at Samsung Heavy Industries shipyard in Geoje in South Korea and is the first floating LNG facility ever deployed in the deep waters of East Africa.

The other partners of Eni in the FLNG project are US major ExxonMobil Corp., Chinese major China National Petroleum Corp., Galp Energia of Portugal, Korea Gas Corp. and Mozambique's Empresa Nacional de Hidrocarbonetos (ENH), the state energy company.

"Following the introduction of gas to the plant, the 'Coral Sul FLNG' will now be ready to achieve its first LNG cargo in the second half of 2022, adding Mozambique to the list of LNG-producing countries," stated Eni.

"The introduction of the first gas came after the safe and timely conclusion of the offshore commissioning activities," added Milan-based Eni.

The FLNG arrived at the final operating site offshore Mozambique in early January 2022 and mooring and connections to six underwater production wells were finalized in March and May 2022.

"While performing the FLNG construction activities in Korea, several significant activities were undertaken in Mozambique, with support from the Mozambican authorities, including the ultra-deep waters (2,000 metres) drilling and completion and offshore installation campaigns involving the highest technological and operational skills," explained Eni.

The Italian company added that the "Coral-Sul FLNG" had been implemented with an energy optimization approach.

"These include zero flaring during normal operations, the use of thermal efficient aero-derivative gas turbines for refrigerant compressors and generation, use of Dry Low nitrogen-oxide (NOx) technology to reduce emissions, and waste-heat recovery systems for the process," said Eni.

The "Coral Sul FLNG" vessel is 432 metres long and 66 metres wide, weighs around 220,000 tons and has the capacity to accommodate up to 350 people in its eight-story living quarters module.

The facility is located at a water-depth of around 2,000 metres and is kept in position by means of 20 mooring lines.

The offshore engineering contract was led by Italian subsea specialist Saipem and it moored the vessel about 50 kilometres from the Mozambique coast and around 250 kilometres northeast of Pemba in Cabo Delgado province.

This is near where French major TotalEnergies is building the onshore LNG export plant using separate Area 1 resources from the Rovuma Basin.

While the Mozambique FLNG venture has forged ahead, the envisaged onshore LNG project is well behind schedule and as recently delayed again by security issues.

However, TotalEnergies has pledged to restart Mozambique's onshore LNG construction before the end of 2022.

"My objective is that we will restart in 2022," stated Patrick Pouyanné, Chairman and Chief Executive of TotalEnergies, during a visit to the capital Maputo earlier in 2022.

He was referring to the building of the liquefaction plant on the Afungi Peninsula in Cabo Delgado, which had been closed since April 26, 2021, when TotalEnergies declared "force majeure" because of attacks nearby claimed by an Islamist extremist group.

Patrick Pouyanné said a lot of progress had been made on security in a very short period of time.

TotalEnergies had already delayed first LNG production at the liquefaction plant by two years to 2026.

Peace-keeping efforts have been led in Cabo Delgado by troops from Rwanda and the member states of the Southern African Development Community (SADC) and their security forces.

Eni noted that it has been present in Mozambique since 2006 and said that during 2011 and 2014, the company discovered super-giant natural gas resources in the Rovuma Basin, in the Coral and Mamba complex and the Agulha reservoir, holding an estimated 2,400 billion cubic metres of gas in place.

Eni also holds exploration rights to offshore blocks A5-B, Z5-C and Z5-D in the Angoche and Zambezi basins.

NEW FORTRESS Energy Inc., the US LNG-for-power company, has sold its stake in the Porto de Sergipe Power Plant in northeast Brazil along with its joint venture partner for around $1.3 billion.

NFE, which has LNG assets in South America and the Caribbean and production projects planned in the US and Africa, has signed a definitive share purchase agreement with partner Ebrasil Energia Ltd to sell the plant to Brazilian power company Eneva SA.

"Located in Barra dos Coqueiros, the 1,593 megawatts Sergipe Power Plant plays a critical role in Brazil's energy security, providing low-cost, dispatchable power to balance the significant seasonal hydroelectric power that comprises a majority of the region's electric capacity," explained NFE.

As part of the transaction, Eneva has agreed to acquire, directly and indirectly, 100 percent of the shares of Centrais Elétricas de Sergipe Participações SA (Celsepar), which owns 100 percent of the equity interests of the Sergipe Power Plant

Eneva also takes over the equity of Centrais Elétricas Barra dos Coqueiros (Cebarra), which owns 1.7 gigawatts of expansion rights adjacent to the Sergipe Power Plant, for a total implied enterprise value of around US$2.16Bln.

As part of the transaction, Eneva will be assuming the current debt of Centrais Elétricas de Sergipe, the 100 percent owned subsidiary of Celsepar.

"We look forward to maintaining a long-term relationship with Eneva and the CELSE Power Plant," said Wes Edens, Chairman and Chief Executive of NFE.

"Eneva is one of Brazil's leading power companies and a highly capable long-term owner and operator of this critical power asset for northeast Brazil," added Edens.

"NFE will continue to operate the 'Golar Nanook', a floating storage and regasification unit that remains chartered to Celse for the next 20 years," stated the NFE CEO.

Pedro Zinner, CEO of Eneva, said Celse would play a critical role for Eneva's strategy going forward.

"With multiple options embedded and a significant Thermal Power Plant pipeline to be developed it will allow Eneva to focus on what it does best, developing new business opportunities in Brazil having the access to gas as a cornerstone," stated Zinner.

"This can be the beginning of a very fruitful and long-lasting relationship between two companies which have complementary roles in the gas value chain," added the Eneva CEO.

The agreement is subject to closing conditions, including approval by Eneva's shareholders, the Brazilian antitrust agency and the receipt of necessary consents.

The transaction was expected to close in the second half of 2022.

"Accounting for NFE's 50 percent ownership of Celsepar, the transaction is projected to generate proceeds to NFE of approximately $550 million following the paydown of certain debt and other liabilities and net of transaction expenses," said NFE.

The power plant sell-off comes as NFE pursues various projects worldwide, including LNG production offshore Louisiana on the US Gulf Coast.

NFE has applied for permits to construct a natural gas export deepwater port, known as New Fortress Energy Louisiana FLNG.

The project will be located in Federal waters about 16 nautical miles off the southeast coast of Grand Isle, Louisiana, in a water depth of 30 metres.

NFE said that the deepwater port would allow for the export of about 145 billion cubic feet of natural gas per year, equivalent to 2.8 million tonnes per annum of LNG.

This is NFE's first effort to deploy its "Fast LNG" designs offshore the US.

NFE's "Fast LNG" design pairs modular, midsize liquefaction technology with jack-up rigs or similar floating infrastructure.

While analysts note that NFE equipment would enable a much lower cost and faster deployment schedule than floating liquefaction vessels, the industry has still to be fully persuaded that the NFE technology will easily pass safety and operational tests.

Under the NFE plan, a permanently moored floating storage unit (FSU) would serve as an LNG storage facility alongside the floating liquefaction infrastructure, which can be deployed anywhere where there is abundant and stranded natural gas.

Subject to the receipt of all required permits and approvals, NFE targets beginning operations offshore Louisiana in the first quarter of 2023.

NFE and Italian energy company Eni are also advancing a "Fast LNG" project in the Republic of Congo in West Africa.

The company is additionally continuing to advance LNG-for-power projects in nations like Mexico, Nicaragua as well as in the Caribbean and in Sri Lanka in Asia.

PAKISTAN said it was seeking a third long-term liquefied natural gas supply contract with Qatar possibly involving deferred payments as the Asian nation adjusts to higher global gas prices and record spot cargo values.

Qatar's Minister of State for Energy Affairs, Saad Sherida Al-Kaabi who is also Chief Executive of QatarEnergy, met two visiting Pakistani minister last week in Doha.

They were Pakistan's Defence Minister and the Special Envoy of the Prime Minister, Khawaja Muhammad Asif, and Minister of State for Petroleum Musadik Masood Malik.

A statement from the Petroleum Ministry's office said the discussions in Qatar had covered the enhancement of cooperation in the field of energy between Qatar and Pakistan.

Petroleum Minister Malik said the Pakistani government and Qatar were exploring different "innovative" pricing and supply strategies.

"Deferred payment would be enormously beneficial for Pakistan in the way of cash flows, but that is not the only discussion that we are having," explained Malik in a statement back in Pakistan.

Pakistan already has two long-term supply deals with Qatar. The first was signed in 2016 for five cargoes a month, and the second in 2021, under which Pakistan currently gets three monthly shipments.

However, Pakistan's main cities are suffering power outages as energy procurement is more intermittent because of higher natural gas prices to supply the expanded gas-fired power infrastructure.

Pakistan was looking to secure a new five-year or 10-year LNG supply deal for three monthly cargoes, as well as an additional cargo under an existing deal.

Pakistan imported 8.19 million tonnes of LNG last year, an increase of 10.5 percent on the previous year.

Despite its single-digit volumes, Pakistan is still the sixth-largest LNG importer with plenty of scope for expanding its current two floating facilities at Port Qasim, located to the east of Karachi.

It is behind China, Japan, South Korea, India and Taiwan in the importing ranking and ahead of Thailand.

The biggest supplier last year was Qatar with 5.24MT of deliveries and with other suppliers such as the US, Egypt, Angola and the United Arab Emirates supplying volumes of around 500,000 tonnes each.

The Pakistani government's fuel discussions with Qatar come at a time when it is awaiting the release of funds from the International Monetary Fund to help replenish foreign exchange reserves.

SCANDINAVIAN Biogas, a Swedish producer of BioLNG has signed a long-term supply agreement with German filling station owner Alternoil GmbH, which has 40 LNG stations in its network.

The Swedish BioLNG is to be included in the fuel brand "Reefuel" distributed on the German transportation market. Biogas can be made from sewage and household, agricultural or industrial organic waste.

The agreed volumes in the Scandinavian Biogas-Alternoil will be an initial 8,000 tonnes per annum and the supply would then be increased in 2024 to 11,500 tonnes (160 gigawatt hours) per annum through 2030.

The Swedish firm said the volumes corresponded to over 1 terawatt hour of energy and the order was worth 2.7 billion Swedish crowns ($267 million).

The agreement also includes the optionality to increase volumes up to 2 TWh corresponding to 4.7Bln ($464M).

The estimate is based on agreed annual volumes, current energy prices and the price of carbon emissions reduction benefits.

"The 'Reefuel' brand is a unique fuel in Europe that contributes to the decarbonisation of heavy goods transport," said the Scandinavian Biogas statement.

"The climate-friendly fuel is produced from biomethane rendered by certified biological waste processes and green hydrogen generated by wind energy," it added.

The company said market demand for BioLNG was expected to grow significantly and Scandinavian Biogas was well positioned for a market share.

"I am very excited to announce this breakthrough agreement with Alternoil, one of the leading distributors in driving the transition to a carbon-neutral transportation sector," said Matti Vikkula, Chief Executive of Scandinavian Biogas.

"This agreement is also a major milestone for Scandinavian Biogas in our ambition to deliver on our business plan of achieving an annual capacity of at least 700 GWh by 2024," stated Villula.

Scandinavian Biogas said it would supply BioLNG from production facilities in Sweden and Norway to Alternoil´s filling stations.

Alternoil plans to increase the number of stations in its network to 60 stations by the end of 2022.

"We are very impressed with Scandinavian Biogas and their proven expertise in creating efficient Bio-LNG production facilities," said Jürgen Muhle, Chairman of Avanca Group, a company focused on sustainable energy logistics and owner of Alternoil.

"We see huge potential in using discarded food and other waste to create carbon-neutral transportation fuel. 'Reefuel' can be used in any LNG-fuelled truck and contributes significantly to the decarbonisation of heavy-duty transport," added Muhle.

SHELL has taken a final investment decision to proceed with the Crux natural gas field joint venture offshore Western Australia to provide more feed gas for the "Prelude" floating LNG export plant.

The project has its key regulatory approvals. These include a production licence by the National Offshore Petroleum Titles Administrator.

The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) has also accepted the Crux offshore project proposal.

"Prelude" FLNG only returned to service in April 2022 after resolving some safety issues.

The Australian NOPSEMA body had ordered the closure of the "Prelude" plant in December 2021 after the latest in a series of incidents in an electrical utility on board.

The Shell-operated FLNG vessel is moored 400 kilometres north of the town of Broome on Western Australia's Kimberley coast and has 3.6 million tonnes per annum of capacity.

Australian regulators had ordered a deeper safety probe by Shell and this meant Shell had to halt the offloading of LNG cargoes from "Prelude" while the unreliable power shutdown issues were investigated.

Resources from the Crux gas field will mean "Prelude" FLNG receiving up to 550 million standard cubic feet of gas per day.

The Crux project is a joint venture between Shell Australia and its partner, local company SGH Energy.

"This project forms an important part of Shell's integrated gas portfolio," said Wael Sawan, Integrated Gas, Renewables and Energy Solutions Director at Shell.

"Natural gas from Crux will play a key role in helping Asian customers move from coal to gas as a cleaner-burning fuel," added Sawan.

"The project will also boost our customers' security of supply, which is becoming an ever more significant consideration for global consumers," he stated.

Shell Australia Chairman Tony Nunan added that developing the Crux project reinforces the company's commitment to Australia, including boosting the regional economy, creating jobs and providing training opportunities.

"The use of Prelude's existing infrastructure enables significantly reduced development costs, making Crux competitive and commercially attractive," added Noonan.

The Crux development will consist of a platform operated remotely from "Prelude". Field construction will start in 2022 and first gas is expected in 2027.

Shell said five wells would be drilled initially, and an export pipeline will connect the platform to "Prelude", which is deployed around 160km to the southwest of the Crux field.

SONATRACH, the Algerian energy company and LNG exporter, is on track to make $50 billion record earnings this year and the North African nation also attended talks in late June on the 4,000-kilometre Trans-Saharan Gas Pipeline (TSGP) from Nigeria via Algeria to bring African natural gas to Europe.

Sonatrach Group Chief Executive Toufik Hakkar gave an update on the company's activities and profit and investment forecasts during a speech in the port city of Oran.

Hakkar spoke in front of Algerian President Abdelmadjid Tebboune, who in reply praised Sonatrach and described the company as "one of the powerful levers of the national sovereignty".

The CEO noted that the value of energy exports last year had reached $35.4Bln, an increase of 75 percent compared with 2020.

Hakkar said current market conditions would see LNG exports rising by 13 percent while pipeline natural gas exports to Spain and Italy would also rise.

Sonatrach shipped 11.8 million tonnes of LNG cargoes last year from its two plants at Arzew and Skikda. These included 4.31MT to Turkey, 3.39MT to France, 1.55MT to Spain and almost 1MT to Italy.

Spain and Italy also received substantial amounts of pipeline gas in the direct South-North pipeline links to both countries under the Mediterranean.

CEO Hakkar added that prices of Algeria's Sahara Blend of crude from the oil fields of southern Algeria had risen by 68 percent to the end of May 2022 compared with the same period of 2021.

"Regarding new discoveries, 35 new discoveries of hydrocarbons have been recorded during the period from 2020 to 2022, including 34 discoveries under our own efforts, with a total volume of 307 million tonnes of oil equivalent (TOE)," added Hakkar.

"Project investments had reached more than $7 billion for the ventures under construction and which will contribute to production of 20 million TOE/year, in addition to $5Bln invested in projects that have come on stream since 2020, contributing to production of 10 million TOE/year," stated the CEO.

Algeria's Minister of Energy and Mines, Mohamed Arkab, attended tripartite talks this week in Abudja in Nigeria with his counterparts from Nigeria and Niger, Timipre Sylva and Mahamane Sani Mahamadou respectively, to discuss the Trans-Saharan Gas Pipeline.

"We are laying the first milestones of this project with the start of technical studies and we expect moves towards construction as soon as possible," stated Arkab.

"It was also agreed to continue consultations through the technical teams that have now been established and other technical and financial studies as well as a feasibility study are under way to achieve the realization of the TSGP," explained the Algerian minister.

The three ministers agreed to organize the next tripartite meeting in a short period, at the latest at the end of July, in Algeria.

TANZANIA in East Africa has signed a framework agreement with Norwegian energy major Equinor and UK-based Shell to intensify studies on a new LNG export project.

Tanzanian Energy Minister January Makamba said the signing of the preliminary accord would help pave the way towards a final investment decision by 2025 for Tanzania to become an LNG exporter from a plant in the south of the country and to transform the economy.

"We have never reached this stage of natural gas development in the history of our country," said Makamba at a signing ceremony in the capital Dodoma.

"This project will significantly change our economy," stated the minister.

"Tanzania's geographical positioning makes it easy to transport the natural gas to other countries, which are looking for new sources of energy," Makamba explained.

Tanzania's President Samia Suluhu Hassan, also present, welcomed the preliminary agreement.

"We have reached a good stage of discussions about the LNG project, but much work is still waiting for us to talk and make it competitive," she said.

Jared Kuehl, a Shell vice president and Country Chairman for Tanzania, said his company was pleased to move forward on the venture.

"We believe Tanzania has advantages because it is strategically located and has the opportunity to deliver a competitive and investable project," added Kuehl.

Equinor, which had in 2021 booked a $982 million write-down on the project having decided it would not be sufficiently profitably, said in a statement it was too early to say whether it would reverse that write-down as a result of the latest accord.

Equinor and Shell, along with US major ExxonMobil and Pavilion Energy of Singapore, had previously discussed building the LNG export plant in the southern Lindi region.

Equinor has the operatorship of Tanzania's Block 2, in which ExxonMobil also holds a stake and which is estimated to hold more than 20 trillion cubic feet of feed gas.

Equinor aims to work on the LNG project with Shell, which operates Block 1 and Block 4, with 16 Tcf in estimated recoverable gas.

Tanzania already uses some of its natural gas discoveries for power generation and to run manufacturing plants. It also plans to build a fertiliser plant.

The government has put the country's total estimated recoverable gas at 57.54 Tcf.

Equinor country manager for Tanzania, Unni Fjaer, said the deal had been a long time in the making.

"We had many delays but through the resolve of the government, we kept engaging and discussing and we believe Tanzanian gas presents a huge opportunity," she declared.

TARGA Resources Corp., one of the largest US independent midstream infrastructure companies, has agreed to acquire Lucid Energy, a natural gas gathering and processing services company in the Delaware Basin from US asset managers for $3.55 billion in cash and the transaction will be completed in the third quarter.

Targa is buying the Delaware Basin assets from Riverstone Holdings and Goldman Sachs Asset Management and the deal is the latest in a stream of mergers and acquisitions activity for US shale and energy assets.

A statement said privately-held Lucid's Delaware Basin footprint overlays some of the most economic crude oil and natural gas producing acreage in North America.

Current rig activity supports over 20 years of drilling inventory on Lucid's more than 600,000 dedicated acres, which are further supplemented by significant volumes subject to minimum volume commitments.

"Lucid's assets are anchored by long-term, fixed-fee contracts and acreage dedications from a diverse set of high-quality customers. Approximately 70 percent of current system volumes are sourced from investment-grade producers," added the statement.

"Targa has available liquidity, including cash on hand, its existing $2.75Bln revolving credit facility, and committed debt financing to fund the acquisition," explained the statement.

Lucid also has about 1.4 billion cubic feet per day of cryogenic natural gas processing capacity in service or under construction located primarily in Eddy and Lea counties of New Mexico.

"The strength of Targa's standalone financial position has afforded us the flexibility to consider attractive opportunities to grow our business through acquisitions," said Matt Meloy, Chief Executive of Targa.

"Lucid's management team has developed an attractive position in the Delaware Basin and we look forward to continuing to provide value added services to the producer customers," explained Meloy.

"This is an exciting acquisition that aligns with our integrated strategy as we are expanding and diversifying our Permian Basin footprint with Lucid's complementary presence at an attractive investment multiple that we expect will further enhance the creation of shareholder value," stated the Targa CEO.

Targa's standalone 2022 financial and operational outlook has continued to improve given the strength of commodity markets and producer activity levels.

The company now estimates full year standalone adjusted earnings to be between $2.675Bln and $2.775Bln.

The Targa updated financial expectations assume natural gas liquids composite prices average $1.05 per gallon, crude oil prices average $100 per barrel and Waha natural gas prices average $6.00 per million British thermal units for the remainder of 2022.

"This acquisition further supports our already strong cash flow profile and ability to return an increasing amount of capital to our shareholders through common dividend increases and common share repurchases," added Meloy.

Mike Latchem, CEO of Lucid Energy, said that over the past several years, Lucid had firmly established itself as a leading midstream processor in the Delaware Basin.

"On behalf of Lucid, I want to express our gratitude to our sponsors, Riverstone and Goldman Sachs, whose partnership was instrumental in building the platform and helping to position the company for its next chapter of success," added Latchem.

Analysts said that since the joint acquisition of Lucid in 2018 by Riverstone and Goldman Sachs Lucid has "significantly grown volumes" and earnings as a highly sought-after midstream operator.

"We are pleased to have partnered with Lucid and Riverstone over the last several years, as the company has continued its growth as a leading gas gathering and processing platform in the Delaware Basin," said Scott Lebovitz, Partner and Co-Head of the Infrastructure investing business within Goldman Sachs Asset Management.

"We believe Mike and the team have done a great job of expanding customer relationships with high-quality producers in the basin while continuing their commitment to the environment, safety and the communities they serve," added Lebovitz.

TGE MARINE Gas Engineering GmbH, the leading provider of liquefied gas systems for cargo-handling and tanks, has won a contract for a 12,000 cubic metres capacity LNG bunkering barge.

The cargo was awarded by Fincantieri Bay Shipbuilding located in Surgeon Bay in the US state of Wisconsin.

The work will be carried out on behalf of US-based shipping company Crowley Maritime, based in Jacksonville, Florida, and after delivery the vessel will operate under a long-term charter with Shell North America LNG.

Scope of the contract includes the design and supply of the cargo-handling system, including two 6,000 cubic metres capacity bilobe Type-C tanks designed to transport LNG.

"The cargo-handling system will enable the barge to load LNG from a supply terminal and transfer the LNG to the clients´ vessels using a ship-to-ship transfer system," explained TGE.

"During transit the cargo can be kept in its liquid state at ambient pressure through the use of a chiller unit," the company added.

The company says its design expertise is based on extensive engineering experience within the small-scale LNG carrier, bunker vessel, FSRU and fuel-gas system markets.

The 12,000 cubic metres LNG bunkering barge will be the largest of its kind built in the United States when delivered and is expected to start operations along the US East Coast in 2024.

"The maritime transport sector is quickly moving towards decarbonisation and compared to traditional fuels LNG offers a great opportunity to reduce carbon emissions," stated TGE.

"The use of LNG as a fuel within the maritime industry has seen significant growth over the last years with around 30 percent of the worldwide order book currently based on LNG as fuel," added TGE.

The TGE company is based in Bonn, Germany, and has an operational office in Shanghai, China.

It has so far delivered more than 250 projects to a variety of renowned ship owners and shipyards.

Fincantieri Bay Shipbuilding is a full service shipyard for the Great Lakes area specializing in construction, repair, conversion and sustainment of commercial vessels, including articulated tug barge units, barges, dredges, ferries, platform support vessels and other specialty ships.

US Department of Energy figures showed that European nations had solidified their places in the top six of destinations while Sempra's Cameron LNG plant shipped the most expensive cargoes and Venture Global's Calcasieu Pass plant ramped up supplies to an array of countries.

The switch from supplying Asia resulted in only a handful of cargoes each being shipped to Japan and China.

The DoE data just published for April 2022 showed 107 US cargoes were delivered versus 114 in the previous month and 92 shipments in April 2021.

The total number of US cargoes delivered worldwide since March 2016 now amounts to 3,447 shipments, or 11,097.2 billion cubic feet of natural gas.

A further 1,008 ISO containers of LNG have been shipped to nations in the Caribbean and Latin America from ports in Florida.

The month of March had been a record one for ISO deliveries from Florida to the Caribbean because of a surge in containers sent to Jamaica, though ISO exports were slightly lower in April.

The average price at the export points of the six US export plants listed in the April data came to $8.81 per million British thermal units versus $8.06 per MMBtu in the previous month, according to the DoE March LNG report.

The Sabine Pass plant remained the volume leader in April 2022 with six Trains on stream and supplying 39 cargoes, followed by Cameron LNG 25, Corpus Christi 17, Freeport LNG 15, Cove Point eight and Elba Island three.

The Venture Global Calcasieu Pass plant is still ramping up and shipped seven cargoes in April, though no pricing data was released. There were four Calcasieu Pass cargoes delivered to Europe, with one each for Italy, Spain, France and Poland.

Another Calcasieu Pass shipment went to Panama, another to Argentina and the final April cargo went to China.

Shipments from the Cameron LNG in Louisiana, operated by utility company Sempra, cost the most for April 2022.

Shipments from the Cameron facility averaged $12.33 per MMBtu versus $9.76 per MMBtu in March 2022 and for the 12 months-to-date the Louisiana plant's shipments fetched an average of $8.62 per MMBtu from the point of export.

The average price at the export point for the six plants combined was $9.94 per MMBtu for April versus $8.81 per MMBtu for the previous month and $8.42 per MMBtu for the year to date.

The average prices for each of the five other plants (from the export point) from highest to lowest in April 2022 were: Corpus Christi in Texas $10.48 per MMBtu ($9.81 March, 2022); Cove Point (Maryland) $9.32 per MMBtu ($8.57, March); Freeport LNG (Texas) $9.07 per MMBtu ($8.42, March); Sabine Pass (Louisiana) $8.80 ($7.92, March); and Elba Island $7.93 per MMBtu ($10.12, March).

The top five countries of destination, representing 54.1 percent of total US LNG exports in April 2022, were France (56.3 Bcf - 21 cargoes), Spain (40.3 Bcf - 13 cargoes), UK (36.3 - 10), the Netherlands (28.4 Bcf - seven cargoes) and Poland (17.3 Bcf - five cargoes).

The list of the Top 10 countries of destination overall since 2016 through April 2022 showed three Asian nations, South Korea, Japan and China still filling the top three spots.

The top 10 recipients of US LNG by overall numbers of cargoes at the end of April 2022 were: 1) South Korea 435 cargoes. 2) Japan 318. 3) China 263; 4) Spain 256. 5) UK 209. 6) Brazil 200 (includes split cargoes) 7) France 188; 8-equal) Mexico 162. 8-equal) India 162 and 10) Turkey 159.

Other vessel-borne delivery price data showed that imported shipments to the US territory of Puerto Rico cost an average of $10.33 per MMBtu in April, up from $9.59 per MMBtu in the previous month.

US LNG had been received in vessels by 42 different countries through March 2022. This includes ISO containers carried by cargo ships.

Diary of events

Gastech Exhibition and Conference 2022
5-8 September
Fiera Milano, Italy
https://www.canadagaslng.com

22nd World LNG Summit & Awards
29 November - 2 December
Athens, Greece
https://www.worldlngsummit.com

The US sends regular ISO containers to the Caribbean nations such as Jamaica, Barbados, the Bahamas, Haiti, Antigua and Barbuda and to Nicaragua in Latin America.

In April 2022, Jamaica received a record amount of LNG in containers.

A total of 35 containers were delivered in April compared with 41 in the previous month. The recipients were the Bahamas 15, Jamaica 14, Haiti three, Antigua and Barbuda three and Barbados none.

The Caribbean volumes during the month were in containers shipped by American LNG Marketing and Eagle LNG Partners from the Florida ports of Fort Lauderdale and Miami.

VENTURE GLOBAL LNG, owner of the newest US export plant at Calcasieu Pass in Louisiana and with three other projects in development, has signed two long-term supply agreements with a German utility with cargo deliveries starting in 2026.

The utility EnBW, based in Stuttgart and with 5.5 million customers, has signed Sales and Purchase Agreements (SPAs) for 1.5 million tonnes per annum LNG from two of Venture Global's projects, the Plaquemines venture on the Mississippi River and the CP2 project near the existing Calcasieu Pass plant.

EnBW has agreed to purchase 750,000 tonnes per annum from Plaquemines and the same volumes from CP2 LNG for 20 years.

The German company is the seventh European buyer of Venture Global volumes after deals previously signed by the Polish Oil and Gas Company, BP of the UK, Shell, Repsol of Spain, Edison of Italy and Galp Energia of Portugal.

"Venture Global is thrilled to welcome EnBW as a long-term customer for both our Plaquemines and CP2 LNG facilities," said Michael Sabel, Chief Executive of Venture Global.

"This is the first direct binding offtake agreement for long-term US LNG signed by a German company, an important step that manifests Germany's strategy to diversify its energy mix," added Sabel.

"Our company is honored to become a major provider of LNG to Germany, providing security of supply on a competitive, long-term basis," he stated.

Georg Stamatelopoulos, Chief Operating Officer for Generation and Trading at EnBW, said he looked forward to a long-term LNG partnership with Venture Global.

"We have expanded our LNG activities step by step in recent years. Liquefied natural gas plays a key role in the diversification of our fuels for electricity and heat generation. It opens up the possibility of new sources to secure Germany's gas supply," said Stamatelopoulos.

Venture Global has signed deals around the world for its intended 60 MTPA of capacity at the four plants and one of the latest was a 20-year agreement signed with an Asian buyer, Malaysian energy company Petronas.

The Arlington, Virginia-based US company will supply Petronas with 1 MTPA of LNG from Plaquemines, located south of New Orleans and which will have exports of 20 MTPA.

The Malaysian company is also a substantial exporter of LNG in its own right from the Bintulu onshore plant in Sarawak and from several floating LNG facilities deployed over gas fields in Malaysian waters.

In addition to producing and trading LNG cargoes, Petronas is also a growing participant alongside Singapore in the LNG bunkering business for LNG-powered shipping.

Other Venture Global LNG supply deals have been with ExxonMobil Corp., New Fortress Energy and China National Offshore Oil Corp.

In addition to the on stream Calcasieu Pass plant in Cameron Parish in Louisiana and the CP2 and Plaquemines projects, Venture Global is developing a fourth plant on the banks of the Mississippi River called Delta LNG.

WOODSIDE Energy, the Australian LNG plant operator and oil and gas company with offshore assets in Senegal and others in Canada and Trinidad after merging with BHP Petroleum, said a joint industry venture in Australia pushes frontier of robotics for offshore inspection.

Woodside said it collaborated with industry to create a state-of-the-art offshore caisson-cleaning and inspection tool (CCAIT system) that allows safe and cost-effective remote inspection of critical equipment on its offshore platforms.

The one-of-a-kind system was designed, developed and deployed in less than 12 months via a collaboration led by Woodside Energy and incorporating expertise from energy and engineering firms Nexxis, Monadelphous, Woma and Fugro who have offices in Perth in Western Australia.

The CCAIT system incorporates a human-sized robot, designed to inspect the inside of caissons and vertical carbon steel pipes of up to 70 metres long and up to 1.2 metres wide.

These structures are used on offshore platforms to house critical equipment such as firewater and seawater lift pumps.

In response to possible Covid-19 supply chain risks, a local solution was sought, inspiring the local industry collaboration.

Woodside said the CCAIT system was remotely controlled from a safe location on an offshore platform by skilled technicians.

The tool is lowered inside the caisson via a tether and winch arrangement.

Wheels are then extended to centralise the tool within the caisson, and probe arms extend to enable ultrasound inspection.

A series of high-definition cameras stream video back to the technicians, with the data used by the asset team to define the forward plan.

"The CCAIT system removes the costs of mobilising tools from international locations, including the cost of delay in fractured supply chains. These can represent up to 50 percent of the total cost of an inspection campaign," explained Woodside Executive Vice President Technical Services Daniel Kalms.

"It was incredible to see the team, including Woodside graduate robotics engineers, write software to dramatically improve the performance and usability of the tool. The project team was made up of people from local companies who came together and designed, procured, fabricated, tested, and validated a robotic solution during the height of a pandemic in under a year," stated Kalms.

Chris Heron, a coatings subject matter expert from Woodside's major maintenance partner Monadelphous of Australia, said building a bespoke Ultra High-Pressure cleaning solution that can quickly remove marine growth to allow inspection without damaging the protective coatings was challenging and rewarding.

"We drew from our local supplier expertise and relationships to test the latest technology onshore and successfully lead the offshore deployment," added Heron.

Nexxis Technology Chief Executive Jason de Silveira said Woodside's decision to partner with a local company demonstrated the strong sovereign capability of Australia's advanced manufacturing sector.

"This collaboration highlights local capability and supports small to medium enterprises, creating jobs in the advanced manufacturing sector and pushing the frontier of robotics globally," added De Silveira. ■

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	2000	2	7.1	2	240,000
		Mitsubishi, Mitsui, Partex and Itochu					
		Oman Govt.,Oman LNG Union Fenosa, Osaka Gas, & Itochu	2006	1	3.7	2	240,000
PAPUA NEW GUINEA	PNG LNG	ExxonMobil, Oil Search, Santos, JX Nippon Oil	2014	2	6.9	2	320,000
PERU	Peru LNG	Hunt Oil, Shell, Marubeni, SK Group	2010	1	4.4	2	260,000
QATAR	Qatargas 1-T1&2	QP, ExxonMobil, Total, Marubeni, Mitsui	1997	2	6.4	4	340,000
	Qatargas 1-T3	QP, ExxonMobil, Total, Marubeni, Mitsui	1999	1	3.1		
	Qatargas II-T1	QP, ExxonMobil	2009	1	7.8		
	Qatargas II-T2	QP, ExxonMobil, Total	2009	1	7.8	8	1,160,000
	Qatargas III-T1	QP, ConocoPhillips, Mitsui	2010	1	7.8		
	Qatargas IV-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
	Calcasieu Pass LNG	Venture Global	2022	18	11	2	400,000
YEMEN	Bal-Haf	Yemen LNG, Total, Yemen Gas, Hunt Oil, SK Group, Hyundai	2009	2	6.7	2	320,000

Gastech | Gastech Hydrogen

EXHIBITION & CONFERENCE
FIERA MILANO, ITALY 5-8 SEPTEMBER 2022

Co-Hosts

Baker Hughes · TELLURIAN · Chevron · eni

Visitor registration is now open

In a time of unprecedented change, join us at Gastech Milan 2022!

As the global energy landscape undertakes a rapid transformation, being present at Gastech 2022 will be critical in securing the position of your business in our new energy future.

Access the latest industry knowledge, technical expertise, products, solutions, and services.

Register for your complimentary visitor pass
register.gastechevent.com

Scan the QR code

@gastechevent #Gastech

Under the patronage of: Ministero dell'Ambiente e della Tutela del Territorio e del Mare · Farnesina

Supported by: ITA Italian Trade Agency · Assorisorse

Host Region: Regione Lombardia

Host City: Comune di Milano

Host Venue: Fiera Milano

Organised by: dmg events

World LNG Carrier Fleet

LNG Carrier	Capacity m^3	Registered Owner	Builder	Delivery	Flag	Power Plant	Cargo System	No. of Tanks	Original Project	Hull Number
Aamira	268,000	Nakilat SHI 1753 Inc.	Samsung	Apr-10	M. Islnds.	Diesel	TZ Mk. III	10	Qatargas IV	1753
Abadi	135,000	Tost Two (NBD) Sendirian Berhad	Mitsubishi	May-02	Brunei	Steam	Moss	5	Lumut	2163
Adam LNG	162,000	Oman Shipping Co.	HHI	Jul-14	Malta	Diesel	TZ Mk. III Flex	4	Oman LNG	2584
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	Knutsen OAS Shipping	HHI	Jul-19	Spain	ME-GI	TZ Mk. III Flex	4	Corpus Christi	2963
Al Aamriya	210,168	J5 Nakilat No.1 Ltd.	Daewoo	May-08	M. Islnds.	Diesel	GT NO 96	5	RasGas III	2249
Al Areesh	148,786	Al Areesh LLC	Daewoo	Jan-07	Bahamas	Steam	GT NO 96	4	RasGas II	2239
Al Bahiya	210,100	Nakilat DSME 2286 Inc.	Daewoo	Dec-09	M. Islnds.	Diesel	GT NO 96	5	Qatargas IV	1726
Al Bidda	137,339	Mitsui O.S.K. Lines	Kawasaki	Nov-99	Japan	Steam	Moss	5	Qatargas I	1470
Al Daayen	148,853	Seaspirit Leasing	Daewoo	Mar-07	Bahamas	Steam	GT NO 96	4	RasGas II	2240
Al Dafna	268,000	Nakilat SHI 1726 Inc.	Samsung	Oct-09	M. Islnds.	Diesel	TZ Mk. III	10	RasGas	1726
Al Deebel	145,000	Peninsula LNG Transport No. 3	Samsung	Nov-05	Bahamas	Steam	TZ Mk. III	4	RasGas II	1442
Al Gattara	216,200	Overseas LNG H1 Corp.	HHI	Nov-07	M. Islnds.	Diesel	TZ Mk. III	4	Qatargas II	1791
Al Ghariya	210,150	Neptora Schiffsbetriebsgesellschaft mbH & Company ts Julia KG	Daewoo	Dec-07	Bahamas	Diesel	GT NO 96	4	Qatargas II	2248
Al Gharrafa	216,200	Overseas LNG H2 Corp.	HHI	Jan-08	M. Islnds.	Diesel	TZ Mk. III	5	Qatargas II	1792
Al Ghashamiya	217,591	Nakilat SHI 1696 Inc.	Samsung	Apr-09	M. Islnds.	Diesel	TZ Mk. III	10	Qatargas III	1696
Al Ghuwairiya	263,300	Nakilat Al Ghuwairiya Inc.	Daewoo	Dec-08	M. Islnds.	Diesel	GT NO 96	5	Qatargas II	2255
Al Hamla	216,200	Overseas LNG S2 Corp.	Samsung	Feb-08	M. Islnds.	Diesel	TZ Mk. III	4	Qatargas II	1606
Al Hamra	137,000	Al Hamra Ltd.	STX	Nov-96	Liberia	Steam	Moss	4	Das Island	1332
Al Huwaila	217,000	Al Huwaila Inc.	Samsung	May-08	Bahamas	Diesel	TZ Mk. III	10	RasGas III	1643
Al Jasra	137,227	Mitsui O.S.K. Lines	Mitsubishi	Jun-00	Japan	Steam	Moss	5	Qatargas I	2117
Al Jassasiya	145,700	Venice Maritime Inc.	Daewoo	May-07	Bermuda	Steam	GT NO 96	4	RasGas II	2243
Al Karaana	210,100	Nakilat DSME 2284 Inc.	Daewoo	Oct-09	M. Islnds.	Diesel	GT NO 96	4	Qatargas III	2284
Al Kharaitiyat	216,300	Nakilat HHI 1909 Inc.	HHI	Jun-09	M. Islnds.	Diesel	TZ Mk. III	4	Qatargas III	1909
Al Kharsaah	217,000	Al Kharsaah Inc.	Samsung	Jun-08	Bahamas	Diesel	TZ Mk. III	10	RasGas III	1644
Al Khattiya	210,150	Nakilat DSME 2283 Inc.	Daewoo	Jul-09	M. Islnds.	Diesel	GT NO 96	4	Qatargas IV	2283
Al Khaznah	135,496	Al Khaznah Inc.	Mitsui E&S	Jul-94	Liberia	Steam	Moss	5	Das Island	1390
Al Khor	137,354	Mitsui O.S.K. Lines	Mitsubishi	Nov-96	Japan	Steam	Moss	5	Qatargas I	2089
Al Khuwair	217,000	Al Khuwair Inc.	Samsung	Jun-08	Bahamas	Diesel	TZ Mk. III	10	RasGas III	1646
Al Mafyar	266,000	Nakilat SHI 1697 Inc.	Samsung	Apr-09	M. Islnds.	Diesel	TZ Mk. III	5	Qatargas III	1697
Al Marrouna	149,539	Seaspirit Leasing	Daewoo	Sep-06	Bahamas	Steam	GT NO 96	4	RasGas II	2238
Al Mayeda	266,000	Nakilat SHI 1694 Inc.	Samsung	Jan-09	M. Islnds.	Diesel	TZ Mk. III	5	Qatargas III	1694
Al Nuaman	210,100	Nakilat DSME 2285 Inc.	Daewoo	Dec-09	M. Islnds.	Diesel	GT NO 96	4	Qatargas III	2286
Al Oraiq	210,200	J5 Nakilat No.3 Ltd.	Daewoo	Jun-08	M. Islnds.	Diesel	GT NO 96	18	RasGas III	2250
Al Rayyan	137,420	Mitsui O.S.K. Lines	Kawasaki	Mar-97	Japan	Steam	Moss	5	Qatargas I	1445
Al Rekayyat	216,293	Nakilat HHI 1910 Inc.	HHI	Jun-09	M. Islnds.	Diesel	TZ Mk. III	4	Qatargas III	1910
Al Ruwais	210,150	Neptana Schiffsbetriebsgesellschaft mbH & Company ts Alexandra KG	Daewoo	Aug-07	Bahamas	Diesel	GT NO 96	4	Qatargas II	2245
Al Sadd	210,200	Nakilat DSME 2265 Inc.	Daewoo	Mar-09	M. Islnds.	Diesel	GT NO 96	12	Qatargas III	2265
Al Safliya	210,150	Nausola Schiffsbetriebsgesellschaft mbH & Company ts Britta KG	Daewoo	Sep-07	Bahamas	Diesel	GT NO 96	5	Qatargas II	2246
Al Sahla	216,200	J5 Nakilat No.5 Ltd.	HHI	Jun-08	M. Islnds.	Diesel	TZ Mk. III	4	RasGas III	1863
Al Samriya	263,300	Nakilat Al Samriya Inc.	Daewoo	Feb-09	M. Islnds.	Diesel	GT NO 96	5	Qatargas II	2257
Al Shamal	217,000	Al Shamal Inc.	Samsung	Apr-08	Bahamas	Diesel	TZ Mk. III	10	RasGas III	1645
Al Sheehaniya	210,100	Nakilat DSME 2264 Inc.	Daewoo	Feb-09	M. Islnds.	Diesel	GT NO 96	12	Qatargas III	2264
Al Thakhira	145,000	Peninsula LNG Transport No. 2	Samsung	Aug-05	Bahamas	Steam	TZ Mk. III	4	RasGas II	1441
Al Thumama	216,200	J5 Nakilat No.2 Ltd.	HHI	Feb-08	M. Islnds.	Diesel	TZ Mk. III	4	RasGas III	1862
Al Utouriya	215,000	J5 Nakilat No.8 Ltd.	HHI	Sep-08	M. Islnds.	Diesel	TZ Mk. III	4	RasGas III	1875
Al Wajbah	137,308	Mitsui O.S.K. Lines	Mitsubishi	Jun-97	Japan	Steam	Moss	5	Qatargas I	2090
Al Wakrah	137,371	Mitsui O.S.K. Lines	Kawasaki	Nov-98	Japan	Steam	Moss	5	Qatargas I	1446
Al Zubarah	137,573	Mitsui O.S.K. Lines	Mitsui E&S	Nov-96	Japan	Steam	Moss	5	Qatargas I	1411
Alto Acrux	147,798	Bahamas LNG Shipping	Mitsubishi	Mar-08	Bahamas	Steam	Moss	4	Darwin LNG	2219
Amadi	154,800	Brunei Gas Carriers	HHI	Jul-15	Brunei	Steam	TZ Mk. III	4	Lumut	2607
Amali	148,000	BGC SPV NBD	Daewoo	Aug-11	Brunei	Steam	GT NO 96	4	Lumut	2277
Amani	154,800	Brunei Gas Carriers	HHI	Oct-14	Brunei	Steam	TZ Mk. III	4	Lumut	H2606
Amberjack LNG	174,000	LNGShips	HHI	Apr-20	Malta	X-DF	TZ MK. III Flex	–	Portfolio	3021
Amur River	149,700	Seacrown Maritime	HHI	Nov-07	M. Islnds.	Steam	TZ Mk. III	4	Sakhalin II	1734
Arctic Aurora	155,000	Fareastern Shipping	HHI	Jul-14	M. Islnds.	Diesel/Gas-Electric	TZ Mk. III	4	Snøhvit LNG	2580
Arctic Discoverer	142,612	Northern LNG Transport II Company S.A.	Mitsui E&S	Feb-06	Bahamas	–	Moss	4	Hammerfest	1564
Arctic Lady	147,200	Leif Hoegh (UK) Ltd.	Mitsubishi	Apr-06	Norway	Steam	Moss	4	Hammerfest	2185
Arctic Princess	147,200	R.B. Quadrangle Leasing	Mitsubishi	Jan-06	Norway	Steam	Moss	4	Hammerfest	2184
Arctic Spirit	89,800	Artic Spirit LLC	Ishikawajima	Dec-93	Liberia	Steam	IHI SPB	4	Atlantic LNG	3016
Arctic Voyager	142,759	Lloyds TSB Equipment Leasing (No.1)	Kawasaki	Jul-06	Bahamas	Steam	Moss	4	Hammerfest	1532
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	Daewoo	Feb-11	Brunei	–	GT NO 96	4	Lumut	2273
Aseem	155,003	India LNG Transport Company No.3 S.A.	Samsung	Nov-09	Malta	Diesel	TZ Mk. III	4	RasGas	1686
Asia Endeavour	154,948	Chevron Global Technology Services Co.	Samsung	Jun-15	Bahamas	Diesel/Gas-Electric	TZ MK. III	4	Gorgon	1942
Asia Energy	154,948	Chevron Global Technology Services Co.	Samsung	Oct-14	Bahamas	Diesel/Gas-Electric	TZ MK. III	4	Gorgon	1921
Asia Excellence	154,948	Chevron Global Technology Services Co.	Samsung	Jan-15	Bahamas	Diesel/Gas-Electric	TZ MK. III	4	Gorgon	1941
Asia Integrity	154,948	Chevron Global Technology Services Co.	Samsung	Feb-17	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Wheatstone	2069
Asia Venture	154,948	Chevron Global Technology Services Co.	Samsung	Jul-17	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Wheatstone	2070
Asia Vision	154,948	Chevron Global Technology Services Co.	Samsung	Jul-14	Bahamas	Diesel/Gas-Electric	TZ MK. III	4	Gorgon	1920
Asklipios	170,816	Sea 199 Leasing Co Ltd.	HHI	Sep-21	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3110
Attalos	170,800	Sea 200 Leasing Co. Ltd.	HHI	Aug-21	Malta	X-DF	TZ Mk. III Flex	4	–	3108
Barcelona Knutsen	173,400	Norspan LNG V AS	Daewoo	Jan-10	Spain	Diesel/Gas-Electric	GT NO 96	4	Portfolio	2267
Beidou Star	172,000	Mitsui O.S.K. Lines	Hudong Zhonghua	Sep-15	H.K., China	Diesel	GT NO 96	4	PNG LNG	H1672A
Berge Arzew	138,088	Sonatrach Berge Arzew Corp.	Daewoo	Jul-04	Norway	Steam	GT NO 96	4	Arzew	2217
Bilbao Knutsen	138,000	Norspan LNG AS	Izar	Jan-04	Spain	Steam	GT NO 96	4	Portfolio	321
Bishu Maru	164,700	"K" Line - Kawasaki Kisen Kaisha	Kawasaki	Dec-17	Panama	TFDE	Moss	4	Wheatstone	1713
Bonito LNG	174,000	LNGShips	HHI	May-20	Malta	X-DF	TZ MK. III Flex	4	–	3022
Boris Davydov	172,410	Arctic LNG 4 Ltd.	Daewoo	Dec-18	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2428
Boris Vilkitsky	172,410	Arctic LNG 1 Ltd.	Daewoo	Jun-17	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2421
British Achiever	173,644	BP	Daewoo	Nov-18	Isle of Man	ME-GI	GT NO 96 GW	4	Freeport	2442
British Contributor	173,644	BP	Daewoo	Dec-18	Isle of Man	ME-GI	GT NO 96 GW	4	Freeport	2443
British Listener	173,644	BP	Daewoo	Jan-19	Isle of Man	ME-GI	GT NO 96 GW	4	Freeport	2444
British Mentor	173,644	BP	Daewoo	Mar-19	Isle of Man	ME-GI	GT NO 96 GW	4	Freeport	2445
British Partner	173,400	BP	Daewoo	Jun-18	Isle of Man	ME-GI	GT NO 96 GW	4	Freeport	2441
British Sapphire	155,000	RBSSAF (19) Ltd.	HHI	Jun-08	Isle of Man	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	1779
British Sponsor	173,644	BP	Daewoo	May-19	Isle of Man	ME-GI	GT NO 96 GW	4	Freeport	2446
Broog	137,529	Mitsui O.S.K. Lines	Mitsui E&S	Apr-98	Japan	Steam	Moss	5	Qatargas I	1412
Bu Samra	266,000	Nakilat Bu Samra Inc.	Samsung	Dec-08	M. Islnds.	–	TZ Mk. III	5	Qatargas II	1677
Bushu Maru	180,000	Mitsui O.S.K. Lines	Mitsubishi	Jul-19	Bahamas	Reheat Steam Turbine	TZ MK. III Flex	4	Sabine Pass	2327
BW Boston	138,059	Partrederiet BW Gas GDF Suez EMT DA	Daewoo	Jan-03	Norway	Steam	GT NO 96	4	Atlantic LNG	2207
BW Brussels	162,400	Ines LNG	Daewoo	Aug-09	Bermuda	Diesel/Gas-Electric	GT NO 96	4	Balhaf	2259
BW Everett	138,028	BW Gas SLNG	Daewoo	Jun-03	Norway	Steam	GT NO 96	4	Atlantic LNG	2212
BW Helios	174,000	Selene Navigation Pte Ltd.	Daewoo	May-21	Bermuda	ME-GI	GT NO 96 GW	4	–	2497
BW Lesmes	174,000	BW Gas AS	Daewoo	Mar-21	Bermuda	ME-GI	GT NO 96 GW	4	–	2496
BW Lilac	173,400	BW Maritime	Daewoo	Mar-18	Isle of Man	ME-GI	GT NO 96 GW	4	–	2436
BW Magna	173,000	BW Group	Daewoo	Mar-19	Singapore	ME-GI	GT NO 96	4	–	2488
BW Magnolia	173,400	Helen Navigation Pte Ltd.	Daewoo	Feb-20	Singapore	ME-GI	GT NO 96 GW	–	–	2490
BW Paris	162,400	SNC Elias	Daewoo	Jul-09	Bermuda	Diesel/Gas-Electric	GT NO 96	4	Balhaf	2258
BW Pavilion Aranda	173,400	BW Group	Daewoo	Sep-19	Singapore	ME-GI	GT NO 96 GW	4	Portfolio	2489
BW Pavilion Aranthera	173,400	BW Diamond LNG Pte Ltd.	Daewoo	Jul-20	Singapore	ME-GI	GT NO 96 GW	4	Portfolio	2491
BW Pavilion Leeara	158,629	BW LPG FPSOI	HHI	Jun-15	Singapore	Diesel/Gas-Electric	TZ Mk. III Flex	4	Portfolio	2572
BW Pavilion Vanda	155,000	BW LPG FPSOI	HHI	Feb-15	Singapore	DFDS	TZ Mk. III Flex	4	Portfolio	2571
BW Tatiana	135,269	Shell Tankers Singapore	Mitsubishi	Dec-02	Singapore	Steam	Moss	5	Atlantic LNG	2173
BW Tulip	173,400	BW Maritime	Daewoo	Dec-17	Singapore	ME-GI	GT NO 96 GW	4	–	2435
Cadiz Knutsen	138,826	Norspan LNG II AS	Navantia	Apr-04	Spain	Steam	GT NO 96	4	Portfolio	103
Cape Ann	145,130	SRV Joint Gas Two Ltd.	Samsung	Apr-10	Norway	Diesel/Gas-Electric	TZ Mk. III	4	Jaigarh LNG	1689
Castillo de Caldelas	176,300	Empresa Naviera Elcano	Imabari Shipbuilding	Jun-18	Malta	ME-GI	TZ Mk. III Flex	–	Portfolio	8188
Castillo De Merida	176,300	Empresa Naviera Elcano	Imabari Shipbuilding	Mar-18	Spain	ME-GI	TZ MK. III Flex	4	Portfolio	8177
Castillo de Santisteban	170,000	Naviera Trans Gas AIE	STX	Jun-10	Malta	Diesel Electric	GT NO 96	4	Portfolio	3008
Castillo de Villalba	138,000	Empresa Naviera Elcano	Navantia Cadiz	Sep-03	Spain	Steam	GT NO 96	4	Portfolio	87
Catalunya Spirit	138,000	Teekay Shipping Spain S.L.	Izar	Jun-03	Spain	Steam	GT NO 96	4	Atlantic LNG	319
Celsius Canberra	180,000	Xiang CH27 HK International	Samsung	Jan-21	Marshall Isl.	X-DF	TZ Mk. III Flex	4	US Portfolio	2298
Celsius Carolina	180,000	Oriental Fleet LNG 03 Ltd.	Samsung	Aug-21	Marshall Isl.	X-DF	TZ Mk. III Flex	4	US Portfolio	2314
Celsius Charlotte	180,000	Xiang CH28 HK International	Samsung	Jun-21	Marshall Isl.	X-DF	TZ Mk. III Flex	4	US Portfolio	2313
Celsius Copenhagen	180,000	Greenheart Gas Shipco I LLC	Samsung	Nov-20	Bermuda	X-DF	TZ Mk. III Flex	4	Portfolio	2297
CESI Beihai	174,000	COSCO Shipping Energy Transportation Co.	Hudong Zhonghua	Jun-17	H.K., China	DFDS	GT NO 96	4	APLNG	1717A
CESI Gladstone	174,000	China Shipping Co.	Hudong Zhonghua	Oct-16	H.K., China	–	GT NO 96	4	APLNG	1715A
CESI LianYungAng	174,000	COSCO Shipping Energy Transportation Co.	Hudong Zhonghua	Jun-18	H.K., China	Diesel-Electric	GT NO 96	4	APLNG	1720A
CESI Qingdao	174,000	China Shipping Co.	Hudong Zhonghua	Feb-17	H.K., China	DFDS	GT NO 96	4	APLNG	1716A
CESI Tianjin	174,000	COSCO Shipping Energy Transportation Co.	Hudong Zhonghua	Jul-17	China	TFDE	GT NO 96	4	APLNG	1718A
CESI Wenzhou	174,000	COSCO Shipping Energy	Hudong Zhonghua	Feb-18	China	Diesel-Electric	GT NO 96	4	APLNG	1719A

		Transportation Co.								
Cheikh Bouamama	75,558	Skikda LNG Transport Corp.	Universal SB	Jul-08	Liberia	Steam	TZ Mk. III	4	Arzew/Skikda	88
Cheikh el Mokrani	75,759	Mediterranean LNG Transport Corp.	Japan Marine United	Jun-07	Liberia	Steam	TZ Mk. III	4	Skikda	55
Christophe De Margerie	170,000	DY Shipping Limited	Daewoo	Nov-16	Russia	Diesel/Gas-Electric	GT NO 96 GW	–	Yamal	2418
Clean Cajun	180,000	Platia Shipping Ltd.	HHI	May-22	Panama	X-DF	Membrane	4	–	3137
Clean Energy	149,700	Pegasus Shipholding	HHI	Mar-07	M. Islnds.	Steam	TZ Mk. III	4	Portfolio	1748
Clean Horizon	162,000	Dynagas	HHI	Apr-15	Malta	Diesel/Gas-Electric	TZ Mk. III Flex	4	Portfolio	2566
Clean Ocean	162,000	Dynagas	HHI	May-14	M. Islnds.	Diesel/Gas-Electric	TZ Mk. III Flex	4	Sabine Pass	2558
Clean Planet	162,000	Dynacom Tankers Management	HHI	Aug-14	M. Islnds.	Diesel Electric	TZ Mk. III Flex	4	Yamal	H2565
Clean Vision	162,000	Olinda	HHI	Aug-15	Malta	Diesel/Gas-Electric	TZ Mk. III Flex	4	Portfolio	2567
CNTIC VPower Energy	127,500	Shell Tankers Australia	Mitsubishi	Jan-92	Bermuda	Steam	Moss	4	North West Shelf	2041
Cobia LNG	174,000	Cardiff LNG ETA Owning LLC	HHI	Feb-21	Malta	X-DF	TZ Mk. III Flex	4	–	3038
Cool Discoverer	174,000	Serendipity Maritime Ltd.	HHI	Sep-20	Greece	X-DF	TZ MK. III Flex	4	Portfolio	S970
Cool Explorer	160,000	Thenamaris Ships Management Inc.	Samsung	Jan-15	Malta	DFDS	TZ Mk. III Flex	4	Spot	2049
Cool Racer	174,000	Eloquent Shipping Ltd.	HHI	Feb-21	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3126
Cool Runner	160,000	Thenamaris Ships Management Inc.	Samsung	Mar-14	Malta	Diesel Electric	TZ Mk. III Flex	4	Wheatstone	H2046
Cool Voyager	160,000	Energy Shipping & Trading	Samsung	Oct-13	Malta	TFDE	TZ Mk. III Flex	4	Wheatstone	–
Corcovado LNG	160,162	Drytank	Daewoo	Apr-14	Malta	Diesel Electric	GT NO 96 L03	4	Spot	H2297
Creole Spirit	173,400	Teekay LNG Partners	Daewoo	Feb-16	Bahamas	ME-GI	GT NO 96 GW	–	Sabine Pass	2407
Cubal	160,276	Mint LNG IV	Samsung	Jan-12	Bahamas	–	TZ Mk. III	4	Soyo	1813
Cygnus Passage	145,400	Cygnus LNG Shipping	Mitsubishi	Jan-09	Panama	Steam	Moss	4	Sakhalin II	2235
Dapeng Moon	147,200	Yue Gang LNG Ship Management Co.	Hudong Zhonghua	Jul-08	H.K., China	Steam	GT NO 96	4	Pluto	1309
Dapeng Star	147,210	Yue Peng LNG Shipping Co.	Hudong Zhonghua	Nov-09	H.K., China	Steam	GT NO 96	4	Pluto	1379
Dapeng Sun	147,200	Yue Peng LNG Shipping Co.	Hudong Zhonghua	Apr-08	H.K., China	Steam	GT NO 96	4	North West Shelf	1308
Diamond Gas Crystal	174,000	Diamond LNG Shipping 5 Pte Ltd.	Hyundai Samho	Jun-21	Singapore	X-DF	TZ Mk. III Flex	4	–	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	NYK Line	Mitsubishi	Jun-18	Japan	STaGE	Sayaringo	4	Cameron	2325
Diamond Gas Rose	165,000	NYK Line	Mitsubishi	Aug-18	Bahamas	STaGE	Sayaringo	4	Cameron	2325
Diamond Gas Sakura	165,000	Tokyo Gas	Japan Marine United	May-19	Panama	STaGE	Sayaringo	4	Cameron	2332
Diamond Gas Victoria	174,000	Diamond LNG Shipping 6 Pte Ltd.	Hyundai Samho	Jun-21	Bahamas	X-DF	TZ MK. III Flex	4	–	8031
Disha	136,025	India LNG Transport Company No.1 Ltd.	Daewoo	Dec-03	Malta	Gas Turbine	GT NO 96	4	RasGas	2210
Doha	137,262	Mitsui O.S.K. Lines	Mitsubishi	Jun-99	Japan	Steam	Moss	5	Qatargas I	2091
Dorado LNG	174,000	Hai Kuo Shipping 2052G Ltd.	Samsung	Dec-20	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	2276
Duhail	210,150	Nauranto Schiffsbetriebsgesellschaft mbH & Company ts Gabriela KG	Daewoo	Dec-07	Bahamas	Diesel	GT NO 96	4	Qatargas II	2247
Dukhan	137,661	Qatar LNG Transport	Mitsui E&S	Sep-04	Liberia	Steam	Moss	5	Qatargas II	1561
East Energy	122,255	Bonny Gas Transport	STX	Aug-82	Bermuda	Steam	Membrane	4	NLNG	26B
Eduard Toll	172,410	Teekay Corp.	Daewoo	Sep-17	Bahamas	TFDE - Azipod	GT NO 96 GW	4	Yamal	2423
Ejnan	145,000	Peninsula LNG Transport No. 3	Samsung	Jan-07	Bahamas	Steam	TZ Mk. III	4	RasGas II	1594
Ekaputra 1	136,400	Cometco Shipping Inc.	Mitsubishi	Jan-89	Liberia	Steam	Moss	5	Bontang	2011
Elisa Aquila	174,000	Caroline 82 SASU	Hyundai Samho	04/03/2022	France	X-DF	TZ Mk. III Flex	4	Portfolio	S917
Elisa Larus	174,000	Caroline 77 SASU	Hyundai Samho	May-20	France	X-DF	TZ Mk. III Flex	4	Portfolio	S970
Energy Advance	147,624	Tokyo LNG Tanker Co. & Toho LNG Shipping Co.	Kawasaki	Mar-05	Japan	Steam	Moss	4	Portfolio	1521
Energy Atlantic	156,000	Alpha Tankers	STX	Sep-15	Greece	TFDE	GT NO 96 L03	4	Sabine Pass	1670
Energy Confidence	153,000	Tokyo LNG Tanker Co. & NYK	Kawasaki	Apr-09	Japan	Steam	Moss	4	Darwin LNG	1611
Energy Endeavour	173,400	Rossini Navigation SA	Daewoo	Jan-21	M. Islnds.	ME-GI	GT NO 96 GW	–	–	2484
Energy Frontier	147,599	Tokyo LNG Tanker Co.	Kawasaki	Sep-03	Japan	Steam	Moss	4	Sakhalin II	1520
Energy Glory	165,000	NYK Line	Japan Marine United	Mar-19	Japan	TFDE	TZ Mk. III Flex+	4	Cove Point	5071
Energy Horizon	177,000	Tokyo LNG Tanker Co. & NYK	Kawasaki	Aug-11	Japan	Steam	Moss	4	Pluto	1664
Energy Innovator	165,000	Tokyo Gas	Japan Marine United	Jun-19	Panama	TFDE	TZ Mk. III Flex+	4	Cove Point	5072
Energy Integrity	173,400	Mozart Navigation SA	Daewoo	May-21	M. Islnds.	ME-GI	GT NO 96 GW	4	–	2485
Energy Intelligence	173,400	Strauss Navigation SA	Daewoo	Jun-21	M. Islnds.	ME-GI	GT NO 96 GW	4	–	2500
Energy Liberty	165,000	Mitsui O.S.K. Lines	Japan Marine United	Oct-18	Japan	TFDE	TZ Mk. III Flex+	4	Cove Point	5070
Energy Navigator	145,000	Tokyo LNG Tanker Co.	Kawasaki	May-08	Japan	Steam	Moss	4	Sakhalin II	1600
Energy Pacific	173,400	Ravel Navigation SA	Daewoo	Aug-20	M. Islnds.	ME-GI	GT NO 96 GW	4	Portfolio	2483
Energy Progress	147,558	Jovial Shipping Navigation	Kawasaki	Nov-06	Bahamas	Steam	Moss	4	Darwin LNG	1540
Energy Universe	166,571	Tokyo LNG Tanker Co.	Japan Marine United	Aug-19	Panama	TFDE	TZ Mk. III Flex	4	Cove Point	5073
Enshu Maru	164,700	Mitsui O.S.K. Lines	Kawasaki	Aug-18	Panama	Reheat Steam Turbine	Moss	4	Wheatstone	1720
Esshu Maru	153,000	Mitsui O.S.K. Lines	Mitsubishi	Dec-14	Bahamas	–	Sayaendo	4	Portfolio	–
Etyfa Prometheas	135,269	Shell Bermuda (Overseas) Ltd.	Mitsubishi	Oct-02	Singapore	Steam	Moss	5	Peru LNG	2172
Excalibur	138,034	Exmar Excalibur Shipping Co.	Daewoo	May-02	Belgium	Steam	GT NO 96	4	Portfolio	2206
Fedor Litke	172,410	Arctic LNG 2 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	M. Islnds.	X-DF	TZ Mk. III Flex	4	Portfolio	8011
Flex Artemis	174,000	Flex LNG Rreliance Ltd.	Daewoo	Aug-20	M. Islnds.	ME-GI	NO-96-GW+FRS	4	Portfolio	2479
Flex Aurora	174,000	Flex LNG Aurora Ltd.	HHI	Jun-20	M. Islnds.	X-DF	TZ Mk. III Flex	4	Portfolio	8010
Flex Constellation	173,400	Frontline	Daewoo	Jun-19	M. Islnds.	ME-GI	NO-96-GW+PRS	4	Portfolio	H2470
Flex Courageous	173,400	Frontline	Daewoo	Aug-19	M. Islnds.	ME-GI	NO-96-GW+PRS	4	–	2471
Flex Endeavour	172,400	Flex LNG	Daewoo	Jan-18	U.K.	ME-GI	NO-96-GW+PRS	4	–	2447

Flex Enterprise	172,400	Flex LNG	Daewoo	Jan-18	U.K.	ME-GI	NO-96-GW+PRS	4	Portfolio	2448
Flex Freedom	173,400	Flex Freedom Ltd.	Daewoo	Jan-21	M. Islnds.	ME-GI	NO-96-GW+FRS	4	Portfolio	2492
Flex Rainbow	174,000	Flex LNG	Samsung	Jun-18	Isle of Man	ME-GI	TZ Mk. III Flex	4	–	2108
Flex Ranger	174,101	Flex LNG	Samsung	Jun-18	Isle of Man	ME-GI	TZ Mk. III Flex	4	–	2107
Flex Resolute	173,400	Flex LNG Resolute Ltd.	HHI	Sep-20	M. Islnds.	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	174,000	Flex Volunteer Ltd.	HHI	Jan-21	M. Islnds.	X-DF	TZ Mk. III Flex	4	–	8012
Fraiha	210,100	J5 Nakilat No.6 Ltd.	Daewoo	Aug-08	M. Islnds.	Diesel	GT NO 96	18	RasGas III	2252
Fuji LNG	149,172	Aletheia Owning Co.	Kawasaki	Mar-04	Malta	Steam	Moss	4	Sabine Pass	1527
Fuwairit	138,200	Camartina Shipping Co.	Samsung	Jan-04	Bahamas	Steam	TZ Mk. III	4	RasGas II	1406
Gail Bhuwan	180,000	Primavera Montana SA	Daewoo	Feb-21	M. Islnds.	X-DF	GT NO 96 GW	4	Portfolio	2499
GasLog Chelsea	153,000	Gas-Fifteen Ltd.	Hanjin (Busan)	Jun-10	Bermuda	TFDE	TZ Mk. III	4	–	193
GasLog Galveston	174,000	Gas-Thirty Three Ltd.	Samsung	Jan-21	Bermuda	X-DF	TZ Mk. III Flex+	4	US Portfolio	2301
GasLog Geneva	174,000	GasLog	Samsung	Oct-16	Bermuda	TFDE	TZ Mk. III Flex	4	Portfolio	2102
GasLog Genoa	174,000	GasLog	Samsung	Mar-18	Bermuda	X-DF	TZ Mk. III Flex	4	Portfolio	2130
GasLog Georgetown	174,000	Gas-Thirty Two Ltd.	Samsung	Nov-20	Bermuda	–	TZ Mk. III Flex+	4	Portfolio	2300
GasLog Gibraltar	174,000	Gas-Fourteen Ltd.	Samsung	Nov-16	Bermuda	TFDE	TZ Mk. III Flex	4	Portfolio	2103
GasLog Gladstone	174,000	GasLog	Samsung	Mar-19	Bermuda	X-DF	TZ Mk. III Flex+	4	Portfolio	2131
GasLog Glasgow	174,000	GasLog	Samsung	Jul-16	Bermuda	TFDE	TZ Mk. III Flex	4	Portfolio	2073
GasLog Greece	174,000	GasLog	Samsung	Mar-16	Bermuda	TFDE	TZ Mk. III Flex	4	Portfolio	2072
GasLog Hong Kong	174,000	GasLog	HHI	Mar-18	Bermuda	X-DF	TZ Mk. III Flex	4	Portfolio	2801
GasLog Houston	174,000	GasLog	HHI	Dec-18	Bermuda	X-DF	TZ Mk. III Flex	4	GoM	2800
GasLog Salem	155,000	GasLog	Samsung	May-15	Bermuda	TFDE	TZ Mk. III	4	Portfolio	2044
GasLog Santiago	155,000	Gas-Four Ltd.	Samsung	Mar-13	Bermuda	TFDE	TZ Mk. III	4	Portfolio	1947
GasLog Saratoga	155,000	GasLog	Samsung	Dec-14	Bermuda	TFDE	TZ Mk. III	4	Spot	2043
GasLog Savannah	155,000	Gas-One Ltd.	Samsung	May-10	Liberia	TFDE	TZ Mk. III	4	Portfolio	1641
GasLog Seattle	155,000	Gas-Seven Ltd.	Samsung	Oct-13	Bermuda	TFDE	TZ Mk. III	4	Portfolio	2041
GasLog Shanghai	155,000	Gas-Three Ltd.	Samsung	Feb-13	Bermuda	TFDE	TZ Mk. III	4	Portfolio	1946
GasLog Singapore	155,000	Gas-Two Ltd.	Samsung	Aug-10	Liberia	TFDE	TZ Mk. III	4	Portfolio	1642
GasLog Skagen	155,000	Gas-Six Ltd.	Samsung	Aug-13	Bermuda	TFDE	TZ Mk. III	4	Portfolio	2017
GasLog Sydney	155,000	Gas-Five Ltd.	Samsung	Jun-13	Bermuda	–	TZ Mk. III	4	Portfolio	2016
GasLog Wales	180,000	GasLog	Samsung	May-20	Bermuda	X-DF	TZ Mk. III Flex+	4	Portfolio	2274
GasLog Warsaw	180,000	GasLog	Samsung	Jul-19	Bermuda	X-DF	TZ Mk. III Flex+	4	Portfolio	2212
GasLog Wellington	176,400	GAS-Thirty Four Ltd.	Samsung	Jun-21	Bermuda	X-DF	TZ Mk. III Flex+	4	US Portfolio	2311
GasLog Westminster	180,000	Gas-Thirty Ltd.	Samsung	Jul-20	MAlta	X-DF	TZ Mk. III Flex	4	Portfolio	2262
GasLog Winchester	176,400	Gas-Thirty Five Ltd.	Samsung	Aug-21	Bermuda	X-DF	TZ Mk. III Flex+	4	US Portfolio	2312
GasLog Windsor	180,000	GasLog	Samsung	Apr-20	Bermuda	X-DF	TZ Mk. III Flex	4	Portfolio	2213
Georgiy Brusilov	172,410	Arctic LNG 3 Ltd.	Daewoo	Nov-18	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2427
Georgiy Ushakov	172,652	Teekay Corp.	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	1392
Gigira Laitebo	177,419	Cleopatra LNG Shipping Co.	HHI	Feb-10	Bahamas	–	TZ Mk. III	4	RasGas	1876
Global Energy	74,100	GDF Armateur 2	STX	Jan-04	France	Diesel/Gas-Electric	CS1	4	Portfolio	32M
Global Energy	173,400	Hai Kuo Shipping 2118G Ltd.	Daewoo	May-20	Greece	ME-GI	GT NO 96 GW	4	Portfolio	2478
Global Sea Spirit	169,932	Global Sea Spirit Inc	Daewoo	Oct-21	Greece	ME-GI	–	4	US Portfolio	2502
Global Star	173,400	Hai Kuo Shipping 2119G Ltd.	Daewoo	Jan-21	M. Islnds.	ME-GI	GT NO 96 GW	4	Portfolio	2487
Golar Arctic	140,648	Golar LNG 2216 Corp.	Daewoo	Oct-03	Singapore	Steam	GT NO 96	4	Jamaica LNG	2216
Golar Bear	160,000	Golar LNG	Samsung	Sep-14	M. Islnds.	Diesel/Gas-Electric	TZ Mk. III Flex	4	Spot	2027
Golar Celsius	160,000	Golar Hull M2026 Corp.	Samsung	Oct-13	M. Islnds.	Diesel/Gas-Electric	TZ Mk. III Flex	4	Spot	2026
Golar Crystal	159,800	Golar LNG	Samsung	Sep-14	M. Islnds.	–	TZ Mk. III Flex	4	Spot	2022
Golar Frost	160,000	Golar LNG	Samsung	Oct-14	M. Islnds.	Diesel/Gas-Electric	TZ Mk. III Flex	4	Portfolio	2055
Golar Glacier	162,000	Golar LNG	Hyundai Samho	Nov-14	M. Islnds.	TFDE	TZ Mk. III Flex	4	Spot	–
Golar Ice	160,000	Golar LNG	Samsung	Jan-15	Bermuda	Diesel Electric	TZ Mk. III Flex	4	Spot	2048
Golar Kelvin	162,000	Golar LNG	Hyundai Samho	Jan-15	M. Islnds.	DFDS	TZ Mk. III Flex	4	Spot	S659
Golar Maria	145,700	Golar LNG 2234 LLC	Daewoo	Jun-06	M. Islnds.	Steam	GT NO 96	4	Spot	2234
Golar Penguin	160,000	Golar LNG	Samsung	Sep-14	M. Islnds.	–	TZ Mk. III Flex	4	Spot	2023
Golar Seal	160,000	Golar Hull M2021 Corp.	Samsung	Sep-13	M. Islnds.	Diesel/Gas-Electric	TZ Mk. III Flex	4	Spot	2021
Golar Snow	160,000	Golar LNG	Samsung	Jan-15	Bermuda	Diesel/Gas-Electric	TZ Mk. III Flex	4	Spot	2047
Grace Acacia	149,700	Algawin Shipping Inc.	HHI	Feb-07	Bahamas	Steam	TZ Mk. III	4	Spot	1728
Grace Barleria	149,700	NYK LNG Shipmanagement	HHI	Apr-07	Bahamas	–	TZ Mk. III	4	Portfolio	1729
Grace Cosmos	150,000	Algahunt Shipping Inc.	HHI	Feb-08	Bahamas	Steam	TZ Mk. III	4	Portfolio	1730
Grace Dahlia	177,000	NYK Line	Kawasaki	Sep-13	Japan	Steam	Moss	4	Spot	1665
Grace Emilia	174,000	Akizuki Maritima SA	Hyundai Samho	Oct-21	Bahamas	X-DF	–	4	Portfolio	8032
Grace Freesia	174,000	Okusankichi Maritima SA	Hyundai Samho	27/03/2022	Bahamas	X-DF	–	4	Portfolio	8033
Grand Aniva	145,000	NYK-SCF LNG Shipping No. 1	Mitsubishi	Jan-08	Cyprus	Steam	Moss	4	Sakhalin II	2230
Grand Elena	145,580	NYK-SCF LNG Shipping No. 1	Mitsubishi	Oct-07	Cyprus	Steam	Moss	4	Sakhalin II	2229
Grand Mereya	147,000	Ice Gas LNG Shipping Co.	Mitsui E&S	Mar-08	Cyprus	Steam	Moss	4	Sakhalin II	1681
Gui Ying	170,701	Fortune Power Shipping Ltd.	Hudong Zhonghua	Oct-21	Singapore	X-DF	GT NO 96 L03+	4	Portfolio	H1828A
Hanjin Muscat	138,366	Pluto Lease Corp.	Hanjin (Busan)	Jul-99	Panama	Steam	GT NO 96	4	Oman LNG	54
Hanjin Pyeongtaek	130,636	Hanjin Shipping Co.	Hanjin (Busan)	Sep-95	Panama	Steam	GT NO 96	4	Bontang	16

Hanjin Ras Laffan	138,214	KSH International	Hanjin (Busan)	Jul-00	Panama	Steam	GT NO 96	4	RasGas I	62
Hanjin Sur	138,333	KSG International	Hanjin (Busan)	Feb-00	Panama	Steam	GT NO 96	4	Oman LNG	61
Hellas Athina	170,520	Kronos Shipping LLC	Hyundai Samho	Sep-21	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	8040
Hellas Diana	174,000	Zeus Shipping LLC	Hyundai Samho	Mar-21	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	8039
HongKong Energy	138,000	Chevron LNG Shipping Co.	Daewoo	Feb-04	Australia	Steam	GT NO 96	4	North West Shelf	2214
Hyundai Aquapia	137,415	H&S Shipping	HHI	May-00	Panama	Steam	Moss	4	Oman LNG	1156
Hyundai Cosmopia	137,415	H&B Shipping	HHI	Feb-00	Panama	Steam	Moss	4	RasGas I	1074
Hyundai Ecopia	149,745	KLT 1 International	HHI	Nov-08	Panama	–	TZ Mk. III	4	Balhaf	1903
Hyundai Greenpia	125,000	Hyundai Merchant Marine	HHI	May-96	Panama	Steam	Moss	4	MLNG	853
Hyundai Oceanpia	135,000	H&T Shipping	HHI	Jun-00	Panama	Steam	Moss	4	Oman LNG	1157
Hyundai Peacepia	174,000	Hyundai LNG Shipping	Daewoo	Jun-17	Panama	ME-GI	GT NO 96 GW	4	Sabine Pass	2452
Hyundai Princepia	174,000	Hyundai LNG Shipping	Daewoo	May-17	Panama	ME-GI	GT NO 96 GW	4	Sabine Pass	2451
Hyundai Technopia	137,415	H&K Shipping	HHI	Jul-99	Panama	Steam	Moss	4	RasGas I	1073
Hyundai Utopia	125,182	Hyundai Merchant Marine	HHI	Jun-94	Panama	Steam	Moss	4	Donggi Senoro	760
Iberica Knutsen	138,000	Norspan LNG III AS	Daewoo	Aug-06	Norway	Ultra Steam Turbine	GT NO 96	4	Portfolio	2236
Ibra LNG	147,000	SNC Corentin	Samsung	Jul-06	Panama	Steam	TZ Mk. III	4	Oman LNG	1573
Ibri LNG	147,569	Dune LNG Carrier	Mitsubishi	Jul-06	Panama	Steam	Moss	4	Oman LNG	2215
Isabella	169,932	Kasimia Marine Co.	Daewoo	Jul-21	Greece	ME-GI	GT NO 96 GW	4	–	2495
Ish	137,000	Ish Inc.	Mitsubishi	Nov-95	Liberia	Steam	Moss	5	Das Island	2067
John A. Angelicoussis	174,000	Varta Shipping Ltd	Daewoo	Mar-22	Greece	ME-GI	–	4	–	2508
K. Acacia	138,017	Horizon Maritime Shipholding	Daewoo	Dec-99	Panama	Steam	GT NO 96	4	Oman LNG	2203
K. Freesia	138,015	Meridian Maritime Shipholding	Daewoo	Aug-00	Panama	Steam	GT NO 96	4	RasGas I	2204
K. Jasmine	145,878	Kolt JV No. 1	Daewoo	May-08	Panama	Steam	GT NO 96	4	Sakhalin II	2260
K. Mugungwha	151,812	Kolt JV No. 2	Daewoo	Nov-08	Panama	Steam	GT NO 96	4	Oman LNG	2261
KARMOL LNGT Powership Asia	127,500	BHP Consortium	Kawasaki	Jan-91	Bermuda	Steam	Moss	4	North West Shelf	1410
Kinisis	173,400	Chandris Group	Daewoo	Oct-18	Greece	ME-GI	GT NO 96 GW	4	Portfolio	2464
Kita LNG	147,895	Cardiff LNG	Daewoo	May-14	Malta	Diesel Electric	GT NO 96 L03	4	Spot	H2298
Kmarin Diamond	155,000	RBSSAF (19) Ltd.	Hyundai Samho	Jul-08	Isle of Man	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	S297
Kmarin Emerald	155,000	RBSSAF (19) Ltd.	HHI	May-07	Isle of Man	–	TZ Mk. III	4	Portfolio	1777
Kool Baltic	170,200	Sovcomflot	STX	Jan-15	Liberia	Diesel Electric	GT NO 96 GW	4	Portfolio	1912
Kool Boreas	170,200	Sovcomflot	STX	Apr-15	Liberia	Diesel Electric	GT NO 96 GW	4	Portfolio	1913
Kool Firn	174,000	Heliconia Maritime SA	HHI	Sep-20	Liberia	DFDS	TZ Mk. III Flex	4	Portfolio	8007
Kool Orca	174,000	Headliner Maritime SA	HHI	Jan-21	Liberia	X-DF	NO-96-GW+PRS	4	Portfolio	8008
Kumul	170,000	Mitsui O.S.K. Lines	Hudong Zhonghua	Dec-15	H.K., China	Diesel	GT NO 96	4	PNG LNG	1673A
La Mancha Knutsen	176,300	Norspan LNG IX	HHI	Sep-16	Spain	ME-GI	TZ Mk. III Flex	4	Portfolio	2733
La Seine	174,000	Xiang CH16 HK International	HHI	Feb-20	Malta	X-DF	TZ MK. III Flex	4	Portfolio	3020
Lagenda Serenity	79,960	Kawasaki Kisen Kaisha	Hudong Zhonghua	Jun-22	Panama	LP-DF	–	3	–	H1789A
Lagenda Suria	79,960	Silk LNG Transport No 1 Pte Ltd	Hudong Zhonghua	May-22	Singapore	LP-DF	–	3	Malaysia LNG	H1788A
Lalla Fatma N'Soumer	145,000	Algerian Nippon Gas Transport Corp.	Kawasaki	Oct-04	Bahamas	Steam	Moss	4	Arzew	1534
Lena River	155,000	Solana Holdings	HHI	Sep-13	M. Islnds.	–	TZ Mk. III	4	Portfolio	H2557
Lijmiliya	263,300	Nakilat Lijmiliya Inc.	Daewoo	Dec-08	M. Islnds.	Diesel	GT NO 96	5	Qatargas II	2256
LNG Abalamabie	162,000	Bonny Gas Transport	Samsung	Jul-16	Bermuda	DFDS	TZ Mk. III Flex	4	NLNG	2079
LNG Abuja II	162,000	Bonny Gas Transport	Samsung	Mar-16	Bermuda	–	TZ Mk. III Flex	4	NLNG	2078
LNG Adamawa	141,000	Bonny Gas Transport	HHI	Apr-05	Bermuda	Steam	Moss	4	NLNG	1470
LNG Adventure	174,000	Diderot Financement 28 SNC	Samsung	Mar-21	M. Islnds.	X-DF	TZ Mk. III Flex	4	Portfolio	2302
LNG Akwa Ibom	141,000	Bonny Gas Transport	HHI	Oct-04	Bermuda	Steam	Moss	4	NLNG	1469
LNG Alliance	154,472	NYK Armateur	STX	Mar-07	France	Diesel/Gas-Electric	CS1	4	Portfolio	32P
LNG Aquarius	126,300	P.T. Hanochem Shipping	General Dynamics	Jan-77	Indonesia	Steam	Moss	5	Bontang	41
LNG Barka	155,982	Lloyd's TSB General Leasing (No. 3)	Kawasaki	Dec-08	Bahamas	Steam	Moss	4	Oman LNG	1591
LNG Bayelsa	137,500	Bonny Gas Transport	HHI	Mar-03	Bermuda	–	Moss	4	NLNG	1429
LNG Benue	145,952	BW Gas LNG Carriers	Daewoo	Apr-06	Bermuda	Steam	GT NO 96	4	NLNG	2224
LNG Bonny II	174,000	Nigeria LNG	HHI	Dec-15	Bermuda	Diesel/Gas-Electric	TZ Mk. III Flex	4	NLNG	2636
LNG Borno	149,600	Okra Shipping No. 1	Samsung	Aug-07	Bermuda	Steam	TZ Mk. III	4	NLNG	1563
LNG Cross River	141,000	Bonny Gas Transport	HHI	Aug-05	Bermuda	Steam	Moss	4	NLNG	1471
LNG Dream	145,000	Osaka Gas Consortium	Kawasaki	Sep-06	Bahamas	Steam	Moss	4	North West Shelf	1545
LNG Dubhe	174,000	Mitsui O.S.K. Lines	Hudong Zhonghua	Nov-19	Panama	ME-GI	GT NO 96 L03+	4	Yamal	1810A
LNG Ebisu	147,546	LNG Ebisu Shipping Corp.	Kawasaki	Jul-08	Bahamas	–	Moss	4	Pluto	1588
LNG Endeavour	170,520	Fortune Great Shipping Ltd.	Samsung	Oct-21	France	X-DF	TZ Mk. III Flex	4	Portfolio	2355
LNG Endurance	170,520	DuPlessis Bail SNC	Samsung	Dec-21	France	X-DF	TZ Mk. III Flex	4	Portfolio	2307
LNG Enterprise	170,520	Hanovre Financement 20 SASU	Samsung	Oct-21	France	X-DF	TZ Mk. III Flex	4	Portfolio	2360
LNG Enugu	145,926	BW Gas LNG Carriers	Daewoo	Oct-05	Bermuda	Steam	GT NO 96	4	NLNG	2222
LNG Finima II	162,000	Bonny Gas Transport	Samsung	Dec-15	Bermuda	–	TZ Mk. III Flex	4	NLNG	2076
LNG Fukurokuju	164,700	Mitsui O.S.K. Lines	Kawasaki	Jul-16	Panama	Steam	Moss	4	APLNG	1712
LNG Imo	148,452	Bergesen LNG XI Ltd.	Daewoo	Jun-08	Bermuda	–	GT NO 96	4	NLNG	2232
LNG Jamal	135,333	Osaka Gas Consortium	Mitsubishi	Oct-00	Japan	Steam	Moss	5	Oman LNG	2157
LNG Juno	180,000	Mitsui O.S.K. Lines	Mitsubishi	Oct-18	Japan	STaGE	Moss	–	Freeport	2323
LNG Jupiter	153,000	Osaka Gas Consortium	Kawasaki	Jul-09	Panama	Steam	Moss	4	PNG LNG	1592
LNG Jurojin	160,000	LNG Jurojin Shipping Corp.	Mitsubishi	Nov-15	Bahamas	Steam	Moss	4	Portfolio	2299

LNG Kano	148,565	Bergesen LNG IX Ltd.	Daewoo	Jan-07	Bermuda	Steam	GT NO 96	4	NLNG	2230
LNG Kolt	153,595	KLT 5 International	Hanjin (Busan)	Dec-08	Panama	Steam	TZ Mk. III	4	Portfolio	192
LNG Lagos II	174,000	Nigeria LNG	HHI	Jan-16	Bermuda	DFDS	TZ Mk. III Flex	4	NLNG	2637
LNG Lerici	65,000	LNG Shipping S.p.A.	Sestri Ponente	Apr-98	Italy	Steam	GT NO 96	4	Portfolio	5911
LNG Lokoja	148,471	Bergesen LNG VIII Ltd.	Daewoo	Nov-06	Bermuda	Steam	GT NO 96	4	NLNG	2229
LNG Maleo	127,544	Mitsui O.S.K. Lines	Mitsui E&S	Jan-89	Japan	Steam	Moss	4	North West Shelf	1351
LNG Mars	155,693	Osaka Gas Consortium	Mitsubishi	Oct-16	Japan	Steam	Moss	4	PNG LNG	2296
LNG Megrez	174,000	Mitsui O.S.K. Lines	Hudong Zhonghua	Nov-20	Panama	ME-GI	GT NO 96 L03+	4	Yamal	1813A
LNG Merak	174,000	Mitsui O.S.K. Lines	Hudong Zhonghua	Jan-20	Panama	ME-GI	GT NO 96 L03+	4	Yamal	1811A
LNG Ogun	149,000	Okra Shipping No. 1	Samsung	Jul-07	Bermuda	Steam	TZ Mk. III	4	NLNG	1564
LNG Ondo	148,478	Bergesen LNG X Ltd.	Daewoo	Sep-07	Bermuda	Steam	GT NO 96	4	NLNG	2231
LNG Oyo	145,842	BW Gas LNG Carriers	Daewoo	Jan-06	Bermuda	Steam	GT NO 96	4	NLNG	2223
LNG Phecda	174,000	Mitsui O.S.K. Lines	Hudong Zhonghua	Sep-20	Panama	ME-GI	GT NO 96 L03+	4	Yamal	1812A
LNG Pioneer	138,121	M & S Shipping 3 S.A.	Daewoo	Jul-05	Bahamas	Steam	GT NO 96	4	Das Island	2219
LNG Port Harcourt II	162,000	Bonny Gas Transport	Samsung	Dec-15	Bermuda	–	TZ Mk. III Flex	4	NLNG	2077
LNG Prima Carrier	137,000	Pacific Eurus Shipping	Mitsubishi	Mar-06	Bahamas	Steam	Moss	4	Das Island	2187
LNG River Niger	141,000	Bonny Gas Transport	HHI	Jul-06	Bermuda	Steam	Moss	4	NLNG	1472
LNG River Orashi	145,914	BW Gas LNG Carriers	Daewoo	Nov-04	Bermuda	Steam	GT NO 96	4	NLNG	2221
LNG Rivers	137,200	Bonny Gas Transport	HHI	Jun-02	Bermuda	–	Moss	4	NLNG	1295
LNG Rosenrot	176,523	Fair Wind Navigation SA	Daewoo	Jan-21	M. Islnds.	X-DF	GT NO 96 GW	4	Portfolio	2498
LNG Sakura	177,000	Mitsui O.S.K. Lines	Kawasaki	Feb-18	Bahamas	TFDE	Moss	–	Freeport	1731
LNG Saturn	155,300	Mitsui O.S.K. Lines	Mitsubishi	Feb-16	Bahamas	Ultra Steam Turbine	Moss	4	Gorgon	2311
LNG Schneeweisschen	180,000	Mitsui O.S.K. Lines	Daewoo	Sep-18	Bermuda	TFDE	GT NO 96 GW	–	Freeport	2462
LNG Sokoto	137,425	Bonny Gas Transport	HHI	Sep-02	Bermuda	–	Moss	4	NLNG	1296
LNG Unity	154,472	GDF Armateur 2	STX	Nov-06	France	Diesel/Gas-Electric	CS1	4	Portfolio	32N
LNG Venus	153,000	Mitsui O.S.K. Lines	Mitsubishi	Nov-14	Japan	–	Sayaendo	4	North West Shelf	2295
LNG Vesta	127,386	Tokyo LNG Tanker Co.	Mitsubishi	Jun-94	Japan	Steam	Moss	4	–	2061
LNGShips Athena	170,618	Cardiff LNG Iota Owning LLC	HHI	Mar-21	Malta	X-DF	TZ Mk. III Flex	4	–	112
LNGShips Empress	174,000	Cardiff LNG Kappa Owning LLC	Samsung	Mar-21	Malta	X-DF	TZ Mk. III Flex	4	QCLNG	2380
LNGShips Manhattan	174,000	Cardiff LNG Theta Owning LLC	HHI	May-21	Malta	X-DF-HPSCR	NO-96-GW+PRS	4	QCLNG	3039
Lobito	160,276	Mint LNG III	Samsung	Nov-11	Bahamas	–	TZ Mk. III	4	Soyo	1812
Lusail	145,000	Peninsula LNG Transport No. 1	Samsung	May-05	Bermuda	–	TZ Mk. III	4	RasGas II	1440
Macoma	145,400	Teekay LNG Partners	Daewoo	Sep-17	Bahamas	ME-GI	GT NO 96 GW	4	Portfolio	2417
Madrid Spirit	138,000	Teekay Shipping Spain S.L.	Navantia	Dec-04	Spain	Steam	GT NO 96	4	Atlantic LNG	105
Magdala	173,400	Teekay Corp.	Daewoo	Feb-18	Bahamas	ME-GI	GT NO 96 GW	4	Portfolio	2453
Malanje	160,276	Mint LNG II	Samsung	Oct-11	Bahamas	–	TZ Mk. III	4	Soyo	1811
Maran Gas Achilles	174,000	Maran Gas Maritime	Hyundai Samho	Jan-16	Greece	DFDS	TZ Mk. III Flex	4	Portfolio	S689
Maran Gas Agamemnon	174,000	Maran Gas Maritime	Hyundai Samho	May-16	Greece	DFDS	TZ Mk. III Flex	4	Portfolio	S690
Maran Gas Amorgos	169,932	Vero Maritime Inc	Daewoo	19/11/2021	Greece	ME-GI	GT NO 96	4	–	2506
Maran Gas Alexandria	161,870	Maran Gas Maritime	Hyundai Samho	Oct-15	Greece	–	TZ Mk. III Flex	4	QCLNG	S627
Maran Gas Amphipolis	174,000	Maran Gas Maritime	Daewoo	Aug-16	Greece	–	GT NO 96 L03	4	Portfolio	2412
Maran Gas Andros	173,400	Maran Gas Maritime	Daewoo	Nov-19	Greece	ME-GI	GT NO 96 GW	4	Freeport	2467
Maran Gas Apollonia	161,870	Maran Gas Maritime	Hyundai Samho	Jan-14	Greece	Diesel Electric	TZ Mk. III Flex	4	Punta Europa	S624
Maran Gas Asclepius	145,000	Sea Satin Corp.	Daewoo	Jul-05	Greece	Steam	GT NO 96	4	RasGas II	H2227
Maran Gas Chios	170,000	Maran Gas Maritime	Daewoo	Mar-19	Greece	ME-GI	GT NO 96 GW	4	–	2456
Maran Gas Coronis	145,700	Jopica Shipping Company	Daewoo	Jul-07	Greece	Steam	GT NO 96	4	RasGas II	2244
Maran Gas Delphi	159,800	Maran Gas Maritime	Daewoo	Feb-14	Greece	Diesel Electric	GT NO 96 L03	4	Portfolio	2296
Maran Gas Efessos	159,800	Maran Gas Maritime	Daewoo	Jun-14	Greece	–	GT NO 96 L03	4	Portfolio	H-2291
Maran Gas Hector	174,000	Maran Gas Maritime	Hyundai Samho	Nov-16	Greece	Diesel/Gas-Electric	TZ Mk. III Flex	–	Portfolio	S691
Maran Gas Hydra	173,400	Maran Gas Maritime	Daewoo	Feb-19	Greece	ME-GI	GT NO 96 GW	4	Sabine Pass	2459
Maran Gas Ithaca	174,000	Arona Maritime Inc.	Daewoo	Oct-21	Greece	X-DF	TZ Mk. III Flex	4	Portfolio	2507
Maran Gas Kalymnos	169,932	Hai Kuo Shipping 2028G Ltd	Daewoo	Sep-21	Greece	ME-GI	Membrane	4	–	2504
Maran Gas Leto	174,000	Maran Gas Maritime	Hyundai Samho	Mar-16	Greece	DFDS	TZ Mk. III	4	Portfolio	S688
Maran Gas Lindos	161,870	Maran Gas Maritime	Daewoo	Jul-15	Greece	DFDS	GT NO 96 L03	4	Punta Europa	2292
Maran Gas Mystras	155,900	Maran Gas Maritime	Daewoo	Aug-15	Greece	DFDS	GT NO 96 L03	4	QCLNG	2405
Maran Gas Olympias	174,000	Maran Gas Maritime	Daewoo	Feb-17	Greece	ME-GI	GT NO 96 L03	–	Portfolio	2415
Maran Gas Pericles	173,400	Maran Gas Maritime	Hyundai Samho	Aug-16	Greece	DFDS	TZ Mk. III Flex	4	Portfolio	S734
Maran Gas Posidonia	161,870	Maran Gas Maritime	Hyundai Samho	May-14	Greece	–	TZ Mk. III Flex	4	Punta Europa	S625
Maran Gas Psara	173,595	Highseas Shiptrade Co.	Daewoo	May-20	Greece	ME-GI	GT NO 96 GW	4	Portfolio	2469
Maran Gas Roxana	174,000	Maran Gas Maritime	Daewoo	Jan-17	Greece	ME-GI	GT NO 96 L03	4	Portfolio	2413
Maran Gas Sparta	159,800	Maran Gas Maritime	Hyundai Samho	Apr-15	Greece	–	TZ Mk. III Flex	4	QCLNG	S626
Maran Gas Spetses	173,400	Maran Gas Maritime	Daewoo	Jul-18	Greece	ME-GI	GT NO 96 GW	4	GoM	2458
Maran Gas Troy	155,000	Maran Gas Maritime	Daewoo	Sep-15	Greece	DFDS	GT NO 96 L03	4	–	2406
Maran Gas Ulysses	173,400	Maran Gas Maritime	Hyundai Samho	Jan-17	Greece	Diesel/Gas-Electric	TZ Mk. III Flex	–	Portfolio	S735
Maran Gas Vergina	174,000	Santa Lucia Enterprises Inc.	Daewoo	Dec-16	Greece	ME-GI	GT NO 96	–	Portfolio	2414
Maria Energy	174,000	Tsakos Energy Navigation	HHI	Sep-16	Greece	Diesel/Gas-Electric	TZ Mk. III Flex	4	–	2612
Marib Spirit	165,500	Membrane Shipping	Samsung	Apr-08	M. Islnds.	Diesel/Gas-Electric	TZ Mk. III	4	Balhaf	1608
Marshal Vasilevskiy	170,000	Gazprom	HHI	Jan-19	Russia	Diesel/Gas-Electric	TZ Mk. III Flex	4	Kaliningrad LNG	2854
Marvel Crane	177,000	NYK Line	Mitsubishi	Mar-19	Japan	STaGE	Moss	–	Cameron	2321

Marvel Eagle	155,000	Mitsui O.S.K. Lines	Kawasaki	Oct-18	Panama	Reheat Steam Turbine	Moss	–	Cameron	1728
Marvel Falcon	174,000	Mitsui O.S.K. Lines	Samsung	Apr-18	Singapore	TFDE	TZ Mk. III Flex	4	Cameron	2148
Marvel Hawk	177,000	Mitsui O.S.K. Lines	Samsung	Dec-18	Japan	TFDE	TZ Mk. III Flex	4	Cameron	2149
Marvel Heron	177,000	Mitsui O.S.K. Lines	Mitsubishi	Sep-19	Japan	STaGE	Moss	–	Cameron	2322
Marvel Kite	177,000	Mitsui O.S.K. Lines	Samsung	Jan-19	Japan	TFDE	TZ Mk. III	4	Cameron	2150
Marvel Pelican	156,265	Mitsui O.S.K. Lines	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	TZ MK. III Flex	4	–	2310
Megara	173,400	Teekay LNG Partners	Daewoo	Jul-18	Bahamas	ME-GI	GT NO 96 GW	4	Portfolio	2455
Mekaines	266,000	Nakilat SHI 1695 Inc.	Samsung	Apr-09	M. Islnds.	–	TZ Mk. III	5	Qatargas III	1695
Merchant	138,000	Sea Breeze Leasing	Samsung	Jul-03	Isle of Man	Steam	TZ Mk. III	4	Portfolio	1381
Meridian Spirit	165,500	Meridian Spirit Aps	Samsung	Jan-10	Denmark	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	1633
Mesaimeer	216,312	Nakilat HHI 1908 Inc.	HHI	Mar-09	M. Islnds.	Diesel	TZ Mk. III	4	Qatargas III	1908
Methane Alison Victoria	145,000	Lloyds TSB Leasing No.8 Ltd.	Samsung	Apr-07	Bahamas	Steam	TZ Mk. III	4	Punta Europa	1587
Methane Becki Anne	170,000	Methane Services (Shell)	Samsung	Sep-10	Bermuda	–	TZ Mk. III	4	Singapore	1858
Methane Heather Sally	145,000	Lloyds TSB Leasing No.8 Ltd.	Samsung	Jan-07	Bahamas	Steam	TZ Mk. III	4	Punta Europa	1586
Methane Jane Elizabeth	145,000	British Gas Asia Pacific	Samsung	Jun-06	Bermuda	Steam	TZ Mk. III	4	Idku	1554
Methane Julia Louise	170,000	Methane Services (Shell)	Samsung	Apr-10	Bermuda	–	TZ Mk. III	9	Singapore	1745
Methane Lydon Volney	145,000	BG Group	Samsung	Aug-06	Bermuda	Steam	TZ Mk. III	4	Idku	1555
Methane Mickie Harper	170,000	Methane Services (Shell)	Samsung	Dec-10	Bermuda	Diesel/Gas-Electric	TZ Mk. III	4	Singapore	1859
Methane Nile Eagle	145,000	Egypt LNG Shipping	Samsung	Dec-07	Bermuda	Steam	TZ Mk. III	4	Idku	1588
Methane Patricia Camila	170,000	Methane Services (Shell)	Samsung	Oct-10	Bermuda	–	TZ Mk. III	4	Singapore	1746
Methane Princess	138,000	Golar LNG	Daewoo	Aug-03	U.K.	Steam	GT NO 96	4	Portfolio	2215
Methane Rita Andrea	145,000	British Gas Asia Pacific	Samsung	Apr-06	Bermuda	Steam	TZ Mk. III	4	Idku	1553
Methane Shirley Elisabeth	145,000	Lloyds TSB Leasing No.8 Ltd.	Samsung	Feb-07	Bermuda	Steam	TZ Mk. III	4	Punta Europa	1585
Methane Spirit	165,500	Malt Singapore Pvt. Ltd.	Samsung	Feb-08	M. Islnds.	Diesel/Gas-Electric	TZ Mk. III	4	Atlantic LNG	1607
Milaha Qatar	145,500	Qatar Shipping Co.	Samsung	Apr-06	Malta	Steam	TZ Mk. III	4	RasGas II	1562
Milaha Ras Laffan	138,270	Milaha Ras Laffan GmbH & Co. KG	Samsung	Apr-04	Malta	Steam	TZ Mk. III	4	RasGas II	1425
Min Lu	147,100	Minlu LNG Shipping Co.	Hudong Zhonghua	Aug-09	H.K., China	–	GT NO 96	4	Tangguh	1378
Min Rong	145,000	Min Rong LNG Shipping Co.	Hudong Zhonghua	Feb-09	H.K., China	–	GT NO 96	4	Tangguh	1320
Minerva Chios	170,520	Peninsula Shipping SA	Samsung	Aug-21	Greece	X-DF	TZ Mk. III Flex+	4	–	2305
Minerva Kalymnos	174,000	Koje Shipping SA	Samsung	Feb-21	Malta	X-DF	GT NO 96 GW	4	–	2304
Minerva Limnos	173,400	Roland Shipping SA	Daewoo	Jun-21	Greece	ME-GI	GT NO 96 GW	4	Portfolio	2482
Minerva Psara	173,400	Wimbledon Shipping SA	Daewoo	Jan-21	Malta	–	GT NO 96 GW	4	–	2481
MOL Hestia	173,400	LNG Harmonia Shipping Corp	Daewoo	Jul-21	M. Islnds.	X-DF	GT NO 96 GW	4	–	2505
Mozah	266,000	Nakilat Haloul Inc.	Samsung	Aug-09	M. Islnds.	Diesel	TZ Mk. III	5	Qatargas II	1675
Mraweh	137,000	Mraweh Ltd.	STX	Apr-96	Liberia	Steam	Moss	4	Das Island	1331
Mu Lan	174,400	Fortune Great Shipping Ltd.	Hudong Zhonghua	Aug-21	Liberia	X-DF	GT NO 96 L03+	4	Portfolio	1827A
Mubaraz	137,000	Mubaraz Ltd.	STX	Dec-95	Liberia	Steam	Moss	4	Das Island	1330
Murex	173,400	Teekay LNG Partners	Daewoo	Jul-17	Bahamas	ME-GI	GT NO 96 GW	4	Portfolio	2416
Murwab	210,100	J5 Nakilat No. 4 Ltd.	Daewoo	Jun-08	M. Islnds.	Diesel	GT NO 96	18	RasGas III	251
Myrina	173,400	Teekay Corp.	Daewoo	May-18	Bahamas	ME-GI	GT NO 96 GW	4	Portfolio	2454
Neo Energy	150,000	Sea Optima	HHI	Jan-07	Liberia	Steam	TZ Mk. III	4	Portfolio	1754
Neptune	145,130	SRV Joint Gas Ltd.	Samsung	Nov-09	Norway	–	TZ Mk. III	4	Portfolio	1688
NFE Grand	145,700	Golar Grand Corp.	Daewoo	Jan-06	M. Islnds.	Steam	GT NO 96	4	Gorgon	2226
Nikolay Urvantsev	172,658	China Shipping Development Co.	Daewoo	Jul-19	H.K., China	ME-GI	GT NO 96 GW	4	Yamal	2432
Nikolay Yevgenov	172,410	Teekay Corp.	Daewoo	Apr-19	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2430
Nikolay Zubov	172,410	Arctic LNG 5 Ltd.	Daewoo	Nov-18	Cyprus	TFDE - Azipod	GT NO 96 GW	4	Yamal	2429
Nizwa LNG	147,684	Oryx LNG Carrier	Kawasaki	Dec-05	Panama	Steam	Moss	4	Oman LNG	1562
Nohshu Maru	180,000	Mitsui O.S.K. Lines	Mitsubishi	Feb-19	Bahamas	Reheat Steam Turbine	Moss	4	–	2326
Northwest Sanderling	127,525	Shell Tankers Australia	Mitsubishi	Jan-89	Australia	Steam	Moss	4	North West Shelf	1996
Northwest Sandpiper	125,042	Shell Tankers Australia	Mitsui E&S	Jan-93	Australia	Steam	Moss	4	North West Shelf	1370
Northwest Snipe	127,500	International Gas Transportation Co., Ltd.	Mitsui E&S	Jan-90	Australia	Steam	Moss	4	North West Shelf	1352
Northwest Stormpetrel	127,500	Shell Tankers Australia	Mitsubishi	Dec-94	Australia	Steam	Moss	4	North West Shelf	2074
Oak Spirit	173,400	Teekay LNG Partners	Daewoo	Mar-16	Bahamas	ME-GI	GT NO 96 GW	–	Sabine Pass	2408
Ob River	149,700	Lance Shipping	HHI	May-07	M. Islnds.	Steam	TZ Mk. III	4	Sakhalin II	1719
Oceanic Breeze	155,300	"K" Line - Kawasaki Kisen Kaisha	Mitsubishi	Apr-18	Japan	Reheat Steam Turbine	Moss	4	Ichthys	2310
Onaiza	210,150	Nakilat DSME 2266 Inc.	Daewoo	Apr-09	M. Islnds.	Diesel	GT NO 96	12	Qatargas III	2266
Orion Sea	170,852	Meridian 23 Ltd.	Samsung	Jan-22	Liberia	X-DF	TZ Mk. III	4	Portfolio	2336
Orion Star	174,000	Jupiter 3 Ltd	Samsung	Apr-22	Liberia	–	–	4	–	2319
Ougarta	170,000	Hyproc Shipping Co.	HHI	Mar-17	Algeria	DFDS	TZ Mk. III Flex	4	Arzew	2814
Pacific Arcadia	145,400	Bahamas LNG Shipping	Mitsubishi	Oct-14	Bahamas	–	Moss	4	PNG LNG	MHISB 2289
Pacific Breeze	180,000	"K" Line - Kawasaki Kisen Kaisha	Kawasaki	Mar-18	Japan	TFDE	Moss	4	Ichthys	1718
Pacific Enlighten	145,400	Pacific Hope Shipping	Mitsubishi	Mar-09	Panama	Steam	Moss	4	North West Shelf	2236
Pacific Mimosa	155,300	NYK Line	Mitsubishi	Mar-18	Japan	Reheat Steam Turbine	Moss	–	Wheatstone	2316
Pacific Notus	137,006	Pacific LNG Shipping	Mitsubishi	Sep-03	Bahamas	Steam	Moss	5	Darwin LNG	2176
Palu LNG	159,800	Cardiff LNG	Daewoo	Nov-14	Malta	TFDE	GT NO 96 L03	4	Spot	2400
Pan Africa	174,000	Teekay LNG Partners	Hudong Zhonghua	Jan-19	H.K., China	TFDE	GT NO 96	4	QCLNG	1666A
Pan Americas	174,000	Teekay LNG Partners	Hudong Zhonghua	Jan-18	H.K., China	TFDE	GT NO 96	4	QCLNG	H1664A

Pan Asia	174,000	Teekay LNG Partners	Hudong Zhonghua	Sep-17	H.K., China	TFDE	GT NO 96	4	QCLNG	1663A
Pan Europe	174,000	Teekay LNG Partners	Hudong Zhonghua	Jul-18	H.K., China	TFDE	GT NO 96	4	QCLNG	H1665A
Papua	170,000	Mitsui O.S.K. Lines	Hudong Zhonghua	Nov-14	H.K., China	–	GT NO 96	4	PNG LNG	H1670A
Patris	174,000	Chandris Group	Daewoo	Jan-18	Liberia	ME-GI	GT NO 96 GW	4	Freeport	2460
Pearl LNG	174,000	CardiffF LNG Delta Owning LLC	Samsung	Aug-20	Malta	X-DF	NO-96-GW+PRS	4	Portfolio	2275
Point Fortin	154,200	Los Halillos Shipping Co.	Koyo Dockyard	Jan-10	Panama	Steam	TZ Mk. III	4	Portfolio	2263
Portovenere	65,000	LNG Shipping S.p.A.	Sestri Ponente	Apr-97	Italy	Steam	GT NO 96	4	Portfolio	5910
Portovyy	138,107	Monteriggioni Inc.	Daewoo	Aug-03	Belgium	Steam	GT NO 96	4	Portfolio	2213
Prachi	162,000	India LNG Transport Company No. 4 Ltd.	HHI	Nov-16	Singapore	Diesel/Gas-Electric	TZ Mk. III Flex	–	Gorgon	2633
Prima Concord	138,267	BG Group	Samsung	May-04	Bermuda	Steam	TZ Mk. III	4	Singapore	1428
Prism Agility	180,000	SK Shipping	HHI	May-19	Panama	X-DF	TZ Mk. III Flex	4	Portfolio	2937
Prism Brilliance	180,000	SK Shipping	HHI	May-19	Panama	X-DF	TZ Mk. III Flex	4	Portfolio	2938
Prism Courage	176,462	Millenaire Financement 12 SASU	HHI	Oct-21	Panama	X-DF	TZ Mk. III Flex	4	Portfolio	2939
Pskov	170,200	Sovcomflot	STX	Sep-14	Liberia	–	GT NO 96	4	Portfolio	1911
Puteri Delima	130,400	Puteri Delima S.Bhd.	STX	Jan-95	Malaysia	Steam	GT NO 96	4	MLNG II	30F
Puteri Delima Satu	137,100	MISC	Mitsui E&S	Oct-02	Malaysia	Steam	GT NO 96	4	MLNG III	1506
Puteri Firus Satu	137,100	Puteri Firus S.Bhd.	Mitsubishi	Aug-04	Malaysia	Steam	GT NO 96	4	MLNG III	2177
Puteri Intan	137,100	Puteri Intan S.Bhd.	STX	Aug-94	Malaysia	Steam	GT NO 96	4	MLNG II	30E
Puteri Intan Satu	137,100	MISC	Mitsubishi	Aug-02	Malaysia	Steam	GT NO 96	4	MLNG III	2165
Puteri Mutiara Satu	137,100	MISC	Mitsui E&S	Apr-05	Malaysia	Steam	GT NO 96	4	MLNG III	1562
Puteri Nilam	130,400	Puteri Nilam S.Bhd.	STX	Jul-95	Malaysia	Steam	GT NO 96	4	MLNG II	30G
Puteri Nilam Satu	137,100	Puteri Nilam S.Bhd.	Mitsubishi	Jul-03	Malaysia	Steam	GT NO 96	4	MLNG III	2169
Puteri Zamrud	130,400	Puteri Zamrud S.Bhd.	STX	Jun-96	Malaysia	Steam	GT NO 96	4	MLNG II	30H
Puteri Zamrud Satu	137,100	MISC	Mitsui E&S	Feb-04	Malaysia	–	GT NO 96	4	MLNG III	1507
Qogir	174,000	LNGShips	Samsung	Jun-20	Malta	X-DF	TZ MK. III Flex	–	Portfolio	2271
Raahi	138,076	India LNG Transport Company No.2 Ltd.	Daewoo	Oct-04	Malta	Steam	GT NO 96	4	RasGas	2211
Rasheeda	266,000	Nakilat SHI 1754 Inc.	Samsung	Aug-10	M. Islnds.	Diesel	TZ Mk. III	10	Qatargas IV	1754
Rias Baixas Knutsen	180,000	Knutsen OAS Shipping	HHI	Sep-19	Norway	ME-GI	TZ Mk. III Flex	4	Corpus Christi	2964
Ribera del Duero Knutsen	173,400	Norspan LNG VIII AS	Daewoo	Dec-10	Norway	–	GT NO 96	4	Portfolio	2275
Rioja Knutsen	170,000	Norspan LNG X	HHI	Dec-16	Norway	ME-GI	TZ Mk. III Flex	4	Portfolio	2734
Rudolf Samoylovich	172,410	Teekay Corp.	Daewoo	Aug-18	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2425
Salalah LNG	147,000	Tiwi LNG Carrier S.A.	Samsung	Dec-05	Panama	Steam	TZ Mk. III	4	Oman LNG	1536
Santander Knutsen	174,000	Sea 194 Leasing Co Ltd.	Hyundai Samho	Jun-22	Norway	X-DF	TZ Mk. III Flex+	4	Portfolio	8091
SCF La Perouse	174,000	Albus Shipping Ltd.	HHI	Feb-20	Liberia	X-DF	NO-96-GW+PRS	4	Portfolio	8006
Sean Spirit	174,162	Teekay LNG Partners	Hyundai Samho	Dec-18	Bermuda	ME-GI	TZ Mk. III Flex	–	Freeport	S856
Seapeak Arwa	165,500	Membrane Shipping	Samsung	Aug-08	M. Islnds.	Diesel/Gas-Electric	TZ Mk. III	4	Balhaf	1625
Seapeak Galicia	140,624	Teekay Gas II	Daewoo	Jul-07	Liberia	Steam	GT NO 96	4	Portfolio	2209
Seapeak Hispania	145,500	Teekay Gas Naviera SL	Daewoo	Aug-02	Spain	Steam	GT NO 96	4	Peru LNG	2205
Seapeak Magellan	165,500	Magellan Spirit ApS	Samsung	Apr-09	Denmark	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	1626
Seapeak Polar	89,800	Polar Spirit LLC	Ishikawajima	Jun-93	Liberia	Steam	IHI SPB	4	Atlantic LNG	3015
Seapeak Vancouver	173,400	Teekay LNG Partners	Daewoo	Nov-16	Bahamas	ME-GI	GT NO 96 GW	–	Portfolio	2411
Seishu Maru	138,000	Mitsui O.S.K. Lines	Mitsubishi	Sep-14	Bahamas	–	Moss	4	PNG LNG	2297
Seri Alam	145,572	MISC	Samsung	Jul-05	Malaysia	–	TZ Mk. III	4	Bintulu	1502
Seri Amanah	145,709	MISC	Samsung	Mar-06	Malaysia	Steam	TZ Mk. III	4	Bintulu	1503
Seri Anggun	145,731	MISC	Samsung	Oct-06	Malaysia	Steam	TZ Mk. III	4	North West Shelf	1589
Seri Angkasa	145,130	MISC	Samsung	Dec-06	Malaysia	Steam	TZ Mk. III	4	Bintulu	1590
Seri Ayu	145,894	MISC	Samsung	Oct-07	Malaysia	Steam	TZ Mk. III	4	Bintulu	1591
Seri Bakti	152,944	MISC	Mitsubishi	Apr-07	Malaysia	Steam	GT NO 96	4	Gladstone	2220
Seri Balhaf	152,000	MISC	Mitsubishi	Jan-09	Malaysia	Steam	GT NO 96	4	Bontang	2223
Seri Balqis	152,000	MISC	Mitsubishi	Mar-09	Malaysia	Steam	GT NO 96	4	NLNG	2224
Seri Begawan	152,900	MISC	Mitsubishi	Nov-07	Malaysia	Steam	GT NO 96	4	Bintulu	2221
Seri Bijaksana	152,300	MISC	Mitsubishi	Apr-08	Malaysia	Steam	GT NO 96	4	Bintulu	2222
Seri Camar	150,000	MISC	HHI	Feb-18	Malaysia	Ultra Steam Turbine	Moss	4	Pacific Northwest	2732
Seri Camellia	159,800	MISC	HHI	Sep-16	Malaysia	Ultra Steam Turbine	TZ MK. III Flex	4	Pacific Northwest	2729
Seri Cemara	150,200	MISC	HHI	Apr-18	Malaysia	Ultra Steam Turbine	Moss	4	Portfolio	2735
Seri Cempaka	162,000	MISC	HHI	Aug-17	Malaysia	Ultra Steam Turbine	TZ MK. III Flex	4	Pacific Northwest	2731
Seri Cenderawasih	162,000	MISC	HHI	Feb-17	Malaysia	Ultra Steam Turbine	Moss	4	Pacific Northwest	2730
Sestao Knutsen	136,947	Norspan LNG IV AS	Navantia Cadiz	Oct-07	Spain	Steam	GT NO 96	4	Portfolio	331
Sevilla Knutsen	173,400	Norspan LNG VI AS	Daewoo	May-10	Spain	Diesel/Gas-Electric	GT NO 96	4	Portfolio	2269
Shagra	268,000	Nakilat SHI 1751 Inc.	Samsung	Nov-09	M. Islnds.	Diesel	TZ Mk. III	10	Qatargas IV	1751
Shahamah	135,496	Shahamah Inc.	Kawasaki	Oct-94	Liberia	Steam	Moss	5	Das Island	1438
Shandong Juniper	135,269	Shell Bermuda (Overseas) Ltd.	Mitsubishi	Feb-04	Singapore	Steam	Moss	5	Peru LNG	2183
Shen Hai	147,200	Shanghai LNG Shipping Co.	Hudong Zhonghua	Dec-12	H.K., China	Steam	GT NO 96	4	Bintulu	H1621A
Shinshu Maru	180,000	Mitsui O.S.K. Lines	Kawasaki	Feb-19	Japan	DERST (aka STaGE)	Moss	4	Freeport	1734
Simaisma	145,889	Greenwell Corporation	Daewoo	Jul-06	Bermuda	Steam	GT NO 96	8	RasGas II	2235
Singapore Energy	138,000	Sea Breeze Leasing	Samsung	Feb-03	Isle of Man	Steam	TZ Mk. III	4	Portfolio	1416
SK Audace	174,000	Milestone LNG Transport	Samsung	Aug-17	Panama	X-DF	TZ Mk. III Flex	4	Portfolio	2080
SK Resolute	180,000	Milestone LNG Transport	Samsung	Nov-17	Panama	X-DF	TZ Mk. III Flex	4	Ichthys	2081

SK Serenity	174,000	SK Shipping	Samsung	Feb-18	South Korea	TFDE	KC-1	4	Sabine Pass	2153
SK Spica	174,117	SK Shipping	Samsung	Mar-18	South Korea	TFDE	KC-1	–	Sabine Pass	2154
SK Splendor	138,370	Optima Leasing	Samsung	May-00	Panama	Steam	TZ Mk. III	4	Oman LNG	1258
SK Stellar	138,375	Stellar Shipholding	Samsung	Dec-00	Panama	Steam	TZ Mk. III	4	RasGas I	1259
SK Summit	138,003	Omnia Enterprises	Daewoo	Aug-99	Panama	Steam	GT NO 96	4	RasGas I	2202
SK Sunrise	138,306	Methane Navigation S.A.	Samsung	Aug-03	Panama	Steam	TZ Mk. III	4	RasGas II	1405
SK Supreme	138,225	Celeste Maritime	Samsung	Feb-00	Panama	Steam	TZ Mk. III	4	RasGas I	1207
SM Eagle	174,000	Korea Line Corp.	Daewoo	May-17	Panama	ME-GI	GT NO 96 GW	4	Sabine Pass	2449
SM Seahawk	174,000	Korea Line Corp.	Daewoo	Jun-17	Panama	ME-GI	GT NO 96 GW	4	Sabine Pass	2450
Sohar LNG	137,248	Energy Spring LNG Carriers	Mitsubishi	Oct-01	Malta	Steam	Moss	5	Oman LNG	2162
Sohshu Maru	177,000	Mitsui O.S.K. Lines	Kawasaki	Jul-19	Japan	DERST (aka STaGE)	Moss	4	Freeport	1735
Solaris	155,000	GasLog	Samsung	Jul-14	Bermuda	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	2042
Sonangol Benguela	160,500	Sonangol Benguela Ltd.	Daewoo	Dec-11	Bahamas	–	GT NO 96	4	Soyo	2282
Sonangol Etosha	160,500	Sonangol Etosha Ltd.	Daewoo	Sep-11	Bahamas	–	GT NO 96	4	Soyo	2281
Sonangol Sambizanga	160,500	Sonangol Sambizanga Ltd.	Daewoo	Aug-11	Bahamas	–	GT NO 96	4	Soyo	2280
Southern Cross	172,000	Mitsui O.S.K. Lines	Hudong Zhonghua	Jul-15	H.K., China	ME-GI	GT NO 96	4	PNG LNG	H1671A
Soyo	160,276	Mint LNG I	Samsung	Aug-11	Bahamas	–	TZ Mk. III	4	Soyo	1810
Spirit of Hela	177,000	Nefertiti LNG Shipping Co.	Hyundai Samho	Nov-10	Bahamas	Diesel Electric	TZ Mk. III	4	PNG LNG	S324
Stena Blue Sky	145,700	Blue Sky LNG	Daewoo	Aug-06	Panama	Steam	GT NO 96	4	Spot	2233
Stena Clear Sky	171,800	Clear Sky LNG Shipping	Daewoo	May-11	U.K.	Diesel/Gas-Electric	GT NO 96	4	Portfolio	2278
Stena Crystal Sky	171,800	Stena Drilling Cyprus	Daewoo	May-11	U.K.	Diesel/Gas-Electric	GT NO 96	4	Portfolio	2268
Symphonic Breeze	145,394	Reborn Maritime	Kawasaki	Dec-07	Bahamas	Steam	Moss	4	Portfolio	H1587
Taitar No 1	145,000	NiMic No 1 S.A.	Mitsubishi	Oct-09	Panama	–	Moss	4	RasGas	2241
Taitar No 2	145,000	NiMic No 2 S.A.	Kawasaki	Dec-09	Panama	–	Moss	4	RasGas	1625
Taitar No 3	145,000	NiMic No 3 S.A.	Mitsubishi	Dec-09	Panama	–	Moss	4	RasGas	2242
Taitar No 4	147,000	NiMic No 4 S.A.	Kawasaki	Aug-10	Panama	–	Moss	4	RasGas	1626
Tangguh Batur	145,700	LNG North-South Shipping Co.	Daewoo	Dec-08	Singapore	Steam	GT NO 96	4	Tangguh	2242
Tangguh Foja	155,000	Ocean 1919 Shipping No. 1	Samsung	Nov-08	Panama	–	TZ Mk. III	4	Tangguh	1619
Tangguh Hiri	155,000	Tangguh Hiri Finance Ltd.	HHI	Dec-08	Isle of Man	–	TZ Mk. III	4	Tangguh	1780
Tangguh Jaya	155,000	Ocean 1919 Shipping No. 2	Samsung	Dec-08	Panama	–	TZ Mk. III	4	Tangguh	1620
Tangguh Palung	155,000	Ocean 1919 Shipping No. 3	Samsung	Mar-09	Panama	–	TZ Mk. III	4	Tangguh	1634
Tangguh Sago	155,000	Teekay Shipping (Canada) Limited	Hyundai Samho	Dec-08	Bahamas	Diesel/Gas-Electric	TZ Mk. III	4	Tangguh	S298
Tangguh Towuti	145,700	LNG East-West Shipping Co.	Daewoo	Oct-08	Singapore	Steam	GT NO 96	4	Tangguh	2241
Tembek	216,200	Overseas LNG S1 Corp.	Samsung	Nov-07	M. Islnds.	Diesel	TZ Mk. III	4	Qatargas II	1605
Tenergy	170,520	Briety Shipping Inc	HHI	Jan-22	Greece	X-DF	TZ Mk. III	4	Portfolio	3157
Tessala	170,000	Hyproc Shipping Co.	HHI	Feb-17	Algeria	Diesel/Gas-Electric	TZ Mk. III Flex	–	Arzew	2813
Trader	138,000	K Line LNG Shipping (UK) Ltd.	Samsung	Nov-02	Isle of Man	Steam	TZ Mk. III	4	Portfolio	1380
Traiano Knutsen	180,000	Hai Kuo Shipping 1901 G Ltd.	HHI	Jul-20	Belgium	ME-GI	TZ Mk. III Flex	4	Portfolio	3086
Trinity Arrow	154,982	Luster Maritime S.A. & Cypress Maritime Panama & Los Halillos Shipping Co.	Koyo Dockyard	Feb-08	Panama	Steam	TZ Mk. III	4	Portfolio	2258
Trinity Glory	154,000	Cypress Maritime Consortium	Koyo Dockyard	Nov-08	Panama	Steam	TZ Mk. III	4	Bontang	2260
Tristar Ruby	155,000	RBSSAF (19) Ltd.	HHI	Apr-08	Isle of Man	Diesel/Gas-Electric	TZ Mk. III	4	Portfolio	1778
Umm Al Amad	210,200	J5 Nakilat No. 7 Ltd.	Daewoo	Sep-08	M. Islnds.	Diesel	GT NO 96	18	RasGas III	2253
Umm Al Ashtan	137,000	Umm Al Ashtan Ltd.	STX	May-97	Liberia	Steam	Moss	4	Das Island	1333
Umm Bab	145,000	Sea Trade International Inc.	Daewoo	Nov-05	Greece	Steam	GT NO 96	4	RasGas II	2228
Umm Slal	266,000	Nakilat Umm Slal Inc.	Samsung	Nov-08	M. Islnds.	–	TZ Mk. III	5	Qatargas II	1676
Valencia Knutsen	173,400	Norspan LNG VII AS	Daewoo	Sep-10	Spain	–	GT NO 96	4	Portfolio	2274
Velikiy Novgorod	170,200	Sovcomflot	STX	Dec-13	Liberia	–	GT NO 96	4	Portfolio	1910
Vivit Americas LNG	174,000	Cardiff LNG Zeta Owning LLC	HHI	Oct-20	Malta	X-DF	TZ Mk. III Flex	4	Portfolio	3037
Vivit City LNG	174,103	Kaiser SA	Hyundai Samho	Dec-21	Liberia	X-DF	TZ Mk. III Flex	4	Portfolio	8025
Vladimir Rusanov	174,000	Mitsui O.S.K. Lines	Daewoo	Jan-18	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2424
Vladimir Vize	172,000	China Shipping Development Co.	Daewoo	Sep-18	H.K., China	ME-GI	GT NO 96 GW	4	Yamal	2426
Vladimir Voronin	172,652	Teekay Corp.	Daewoo	Jul-19	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2431
WilForce	155,900	Wilforce LLC	Daewoo	Sep-13	Norway	–	GT NO 96	4	–	H2289
WilPride	155,900	Wilpride LLC	Daewoo	Nov-13	Norway	–	GT NO 96	4	–	H2290
Woodside Chaney	174,000	Maran Gas Maritime	Daewoo	Jul-19	Greece	ME-GI	GT NO 96 GW	4	Portfolio	2457
Woodside Charles Allen	173,400	Hai Kuo Shipping 2027G Ltd.	Daewoo	Oct-20	Greece	ME-GI	GT NO 96 GW	4	Portfolio	2486
Woodside Donaldson	165,500	Malt Singapore Pvt. Ltd.	Samsung	Oct-09	Singapore	Diesel/Gas-Electric	TZ Mk. III	4	Pluto	1632
Woodside Goode	159,800	Armour Company Ltd.	Daewoo	Nov-13	Greece	Diesel Electric	GT NO 96 GW	4	RasGas	H2295
Woodside Rees Withers	173,400	Maran Gas Maritime	Daewoo	Oct-19	Greece	ME-GI	GT NO 96 GW	4	–	2466
Woodside Rogers	159,800	Margie Seaway Corp.	Daewoo	Jul-13	Greece	Diesel/Gas-Electric	GT NO 96 GW	4	Pluto	H2288
Yakov Gakkel	172,658	DSME Hull No.2434 LLC	Daewoo	Nov-19	Bahamas	ME-GI	GT NO 96 GW	4	Yamal	2434
Yamal Spirit	174,000	Teekay LNG Partners	Hyundai Samho	Jan-19	Bermuda	ME-GI	TZ Mk. III Flex	–	Freeport	S857
Yari LNG	159,800	Cardiff LNG	Daewoo	Nov-14	Malta	TFDE	GT NO 96 L03	4	Spot	2401
Yenisei River	155,000	Navajo Marine	HHI	Jul-13	M. Islnds.	–	TZ Mk. III	4	Yamal	2556
Yiannis	169,932	Onerato Marine SA	Daewoo	Sep-21	Greece	ME-GI	GT NO 96 GW	4	Portfolio	2501
YK Sovereign	127,125	SK Shipping	HHI	Dec-94	Panama	Steam	Moss	4	MLNG	761
Zarga	268,000	Nakilat SHI 1752 Inc.	Samsung	Jan-10	M. Islnds.	–	TZ Mk. III	5	Qatargas IV	1752
Zekreet	137,482	Mitsui O.S.K. Lines	Mitsui E&S	Dec-98	Japan	Steam	Moss	5	Qatargas I	1432

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

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

CLEAN & SUSTAINABLE

COOLER BY DESIGN®

Chart is at the forefront of the transition to a low carbon future through technology, equipment and services delivering hydrogen, LNG and biogas for energy and transportation. Our carbon capture technology also removes harmful pollutants including SOx, NOx and mercury.

www.ChartIndustries.com
LNG@ChartIndustries.com

CHART®
Cooler By Design.®

Fast Solution for all your LNG Storage & Transport needs.

Factory-built 1,200+ m³ LNG Tanks

On-site / Factory-Built Storage Tanks, Intermodal ISO Tank-Containers, Tank Trailers, Ship / Barge Cargo Tanks, Railroad Tank Wagons, & more..

Corban Energy Group (CEG), based in New Jersey, USA, has been creating hightly engineered products for the natural gas supply chain in the Americas, Europe, and Africa. With its global network of engineers and its manufacturing facilities optimized for building large tanks, CEG has provided unmatched quality and value in LNG equipment for producers, suppliers, and end-users.

Call or e-mail us to find out how your company can benefit from our comprehensive natural gas products and services today.

www.CorbanEnergyGroup.com

CORBAN ENERGY GROUP

Your Solution for LNG/LPG

T. **201.509.8555** info@corbanenergygroup.com

418 Falmouth Avenue, Elmwood Park, NJ 07407, USA