

Even small islands need energy.



Gas and Heat has the more flexible solution for every need.

For the energy supply needs of the small islands Gas and Heat gives you the opportunity to choose the most flexible and ideal solution.

LNG4speed, in its 2 options **Ship-to-Truck**, **Truck-to-Ship**, is the ideal and flexible solution for breakbulk distributing LNG wherever you wish, without the needs of a terminal, letting the demand growing properly. If instead your demand is still there, **Small-Scale LNG terminal** with tailor made design (adaptable and scalable tanks storage design for matching the needs) is what you deserve. From custom-made design to the construction and installation of the plant, Gas and Heat is a reliable partner in all phases of the project.



Discover all our solutions



gasandheat.it



KONGSBERG

The path to a sustainable future starts with the right partners

For decades, we've helped a third of the world's fleet navigate complex challenges. Our deep understanding translates into solutions tailored to your specific needs. Partner with us and unlock a more sustainable future for your business. kongsberg.com/maritime

In this issue:

- Russian LNG in Europe - a tale of dependency, ambitions and constraints**
Persistent Russian LNG supply and European demand are two sides of the same coin whilst even the latest sanctions proposals do not promise a material change in the short-term
- ADNOC aims for FID on Ruwais LNG by June, plans to double production**
Abu Dhabi National Oil Company's natural gas arm (ADNOC Gas) has vowed to invest \$13 billion at home and abroad over the next five years
- April trade down following bumper trade in March**
Our April data showed significant LNG trade decrease globally as strong export growth March did not continue in April
- First PureMetrics commercial deployment on an LNGC**
Trafigura is to install Daphne Technology's first commercial patented PureMetrics software on an LNGC
- Wood Group wins more LNG contracts**
A concept study contract was recently awarded to Wood Australia Pty Ltd, a subsidiary of UK-based Wood Group
- Sublime invests in gas liquefaction demonstrator**
Liquefaction technology start-up Sublime Energie is set to launch a new demonstrator project to produce green fuel by 2025, as part of plans to accelerate the role of gas in the energy transition
- A round-up of latest events, company and industry news**
For the Record
- Tables of import and export LNG terminals and plants worldwide**

Russian LNG in Europe - a tale of dependency, ambitions and constraints

Persistent Russian LNG supply and European demand are two sides of the same coin whilst even the latest sanctions proposals do not promise a material change in the short-term, our Markets Editor Alexander Wilk reports.

Eager to expand market share, Novatek has run the Yamal LNG plant well above its nameplate capacity of 16.5 million tonnes per annum (mtpa) to export almost 21.0mmt last year. Since then, geographical obstacles in redirecting LNG flows towards Asia amidst the prevailing security crisis in the Red Sea have further underscored Europe's importance as Russia's prime LNG market.

Russia's LNG exports have been on an upward trend since the beginning of 2021, with total exports from Yamal LNG in the Arctic, Portovaya LNG in the Baltic and from Sakhalin-2 LNG in the Far East arriving at 2.95mmt in April 2024, up 0.24mmt from the 2.71mmt we recorded in April 2023 and up 0.06mmt from 2.89mmt in April 2022.

Russia's LNG exports to the European Union (EU) have recently

played a pivotal role in bringing about this trend. In line with Russia's net LNG export growth, the EU's LNG imports from Russia have also continued to trend upwards since the autumn of 2021. Imports in March this year amounted to 1.93mmt from Yamal LNG in the Arctic and Portovaya LNG in the Baltic after accounting for vessel load levels and in-transit boil off. This represents significant growth of 0.42mmt (28 percent) when compared to the 1.51mmt imported in March 2023 and 0.37mmt (24 percent) compared to March 2022. Although these shipments to the EU have since decreased to 1.53mmt in April, they remain significantly above their year-on-year equivalent of 1.27mmt.

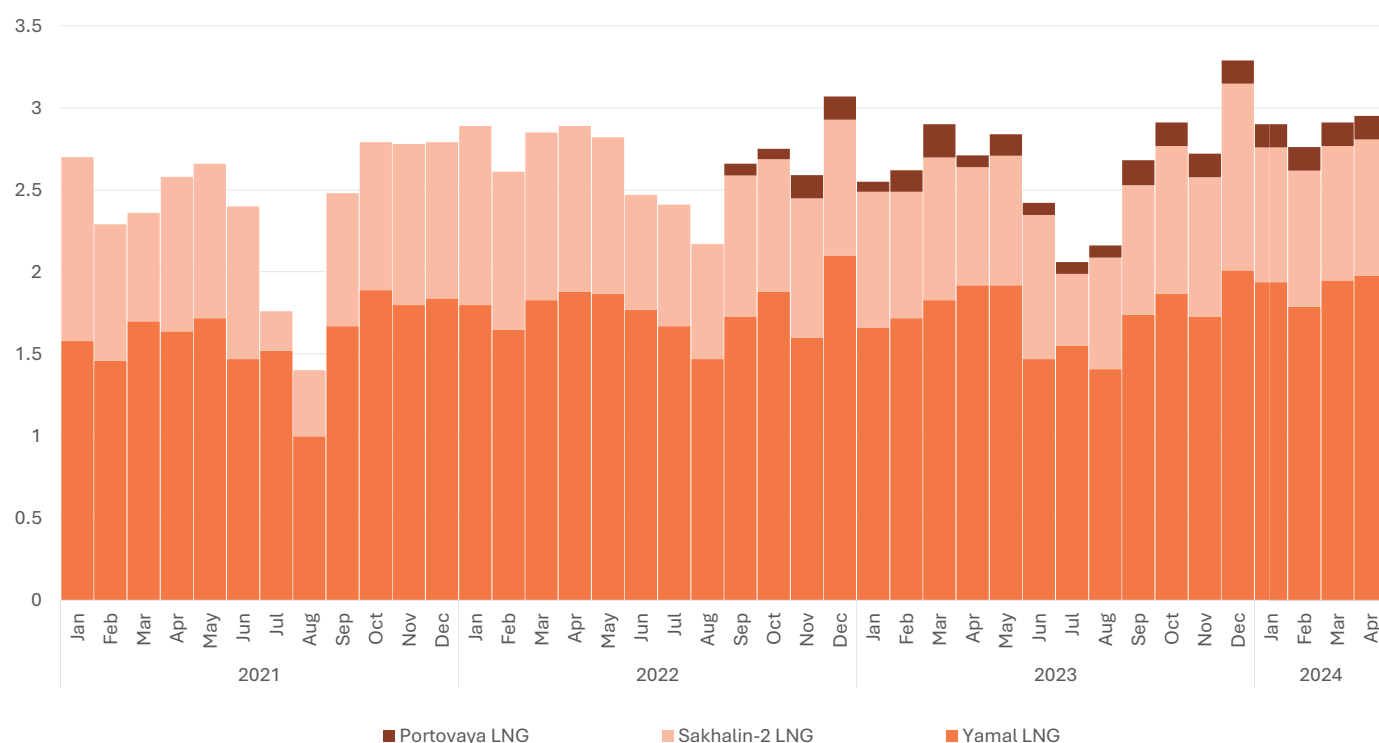
Russian LNG flows to the EU thus accounted for 23 percent of the block's total in March this year. This was up 5pp

from the 18 percent share of Russian LNG in March 2023 and up 3pp from the 20 percent share in March 2022. For April, however, EU market share retreated to 18 percent due to an overall European demand decrease.

These trade flows also meant that Yamal LNG in particular has been run well above its nameplate capacity of 16.5 mtpa, averaging 126 percent of annualised capacity utilisation each month since January 2022. In 2022, its output reached 21.25mmt whilst in 2023 it stood at 20.83mmt. Similarly, Gazprom's Portovaya LNG has run almost consistently with an annualised capacity utilisation of more than 112 percent since September last year, according to our data and calculations.

As these figures indicate, maintaining output and European market share is crucially important to the Russian LNG

Russian LNG Exports (MMt)



Source: LNG Journal, Spire Global AIS



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)20 8150 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@thedigitalship.com

Subscription

Print & online **£900/€1020/US\$1320**

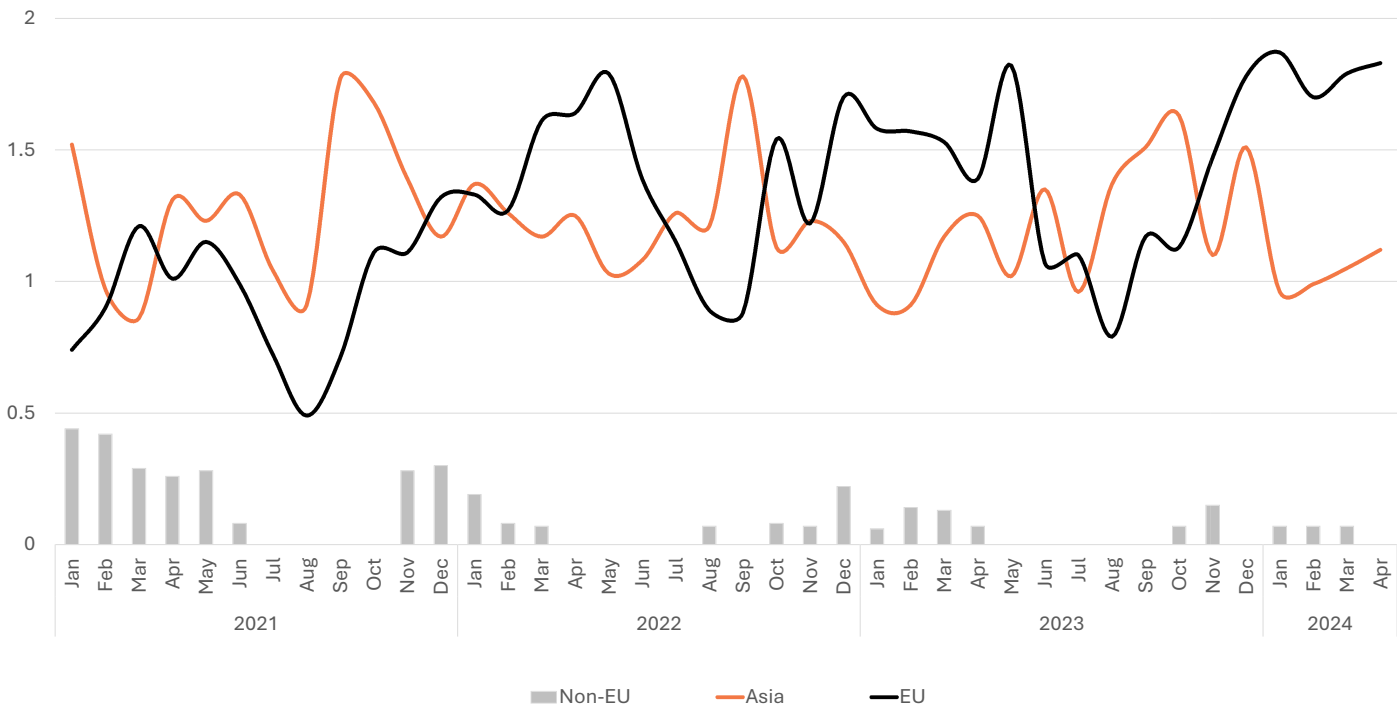
Online only **£830/€920/US\$1190**

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

No part of this publication may be reproduced or stored in any form by any mechanical, electronic, photocopying, recording or other means without the prior written consent of the publisher. Whilst the information and articles in LNG journal are published in good faith and every effort is made to check accuracy, readers should verify facts and statements direct with official sources before acting on them as the publisher can accept no responsibility in this respect. Any opinions expressed in this magazine should not be construed as those of the publisher.

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

Russian LNG Destinations (MMt)



Source: LNG Journal, Spire Global AIS

industry. We have reported previously that Gazprom’s FSRU offshore Kaliningrad had begun reloading LNG it previously bunkered at Portovaya LNG onto the Cool Rover via ship-to-ship (STS) transfers. There were two such STS operations and the Cool Rover delivered both cargoes to Spain, namely Huelva and Bilbao, according to our data. Normally, Portovaya LNG is ‘served’ by the ice-class LNGCs Velikiy Novgorod and Pskov as the Portovaya region usually experiences ice conditions up to the beginning of April, data by the Finnish Meteorological Institute shows. However, the Velikiy Novgorod was in repair in China, so the non-ice-going Cool Rover was apparently chartered as a stand-in, which necessitated the somewhat convoluted cargo flow via the Kaliningrad FSRU. Notably, the Velikiy Novgorod remained en route to Russian territory at the end of April, which meant the Cool Rover remained in operation at Portovaya.

Meanwhile, Russian LNG exports to Asia in general have decreased considerably over the past winter, even as output by Sakhalin-2 LNG increased by 0.36mmt from 3.28mmt between November 2022 and February 2023 to 3.64mmt during the same period for 2023 and 2024.

Seasonality in relation to the usability of the Northern Sea Route is an important factor, our data indicates. However, the ongoing security crisis in the Red Sea and in the Gulf of Aden area, where Houthi forces in Yemen are threatening shipping lanes, is another. Cargo flows from Yamal or Portovaya

LNG to buyers in the Pacific have had to take the route past the Cape of Good Hope in South Africa, which adds considerable journey time compared to a Suez Canal transit.

EU Sanctions

Our data highlights that European reliance on Russian LNG persists. However, the EU in particular continues to grapple with finding an effective sanctions regime. Existing EU sanctions on Russian energy production and trade encompass a ban on imports of Russian oil, coal and liquefied propane, a price cap related to the maritime transport of Russian oil as well as various bans on investments, technology transfers and gas storage provisions. However, they have hitherto not included LNG.

They also extend to the closure of EU ports to Russian vessels and a port access ban for vessels engaged in ship-to-ship transfers whilst being suspected of breaching the sanctions. Vessels engaged in Russia trade have switched flags in the past to avoid being caught by the EU’s sanction regime.

The European Union has struggled to conceive let alone impose a sanctions regime targeting Member States’ LNG trade with Russia. The frantic efforts by Germany and others highlight the extent to which Europe’s major economies rely on gas supplies. In the context of their immediate energy needs, the source of supply seemed secondary despite European policy makers’ rhetoric. Although some have disavowed LNG imports from Russia, several European importers continue to take Russian LNG,

presumably out of economic necessity. Moreover, EU gas market rules stipulate that once a gas delivery has entered the block’s interconnected pipeline systems, it can be freely traded. This may well mean that even countries formally opposed to Russian gas may still end up using it.

Nevertheless, pressure among European Union Member States has been rising to address the ongoing imports of Russian gas into the trade block. In particular, the focus ahead of the 14th sanction package had been on LNG imports from Russia’s Yamal and Portovaya LNG plants.

Speaking ahead of a meeting of EU foreign ministers at the Foreign Affairs Council in Luxembourg on 22 April, Swedish Foreign Minister Tobias Billstrom said that “adopting the 14th sanctions package is one of the most important things” Member States have left to do to enhance the EU’s sanctions regime. Specifically, he and his colleagues would “see to it that we [...] include the import ban on liquefied natural gas.” Billstrom also stated that “measures to curb Russia’s shadow fleet” will be required to lend additional teeth to the 14th package.

To what extent the 14th package will ultimately serve to curb Russian LNG exports remains to be seen. Quoting two unnamed EU diplomats, political and policy news outlet Politico reported a few days after the Foreign Affairs Council meeting that the Commission’s proposal born out of the conference would not encompass direct Russian LNG exports to Europe but only transshipments and reloads at EU ports. If this turns out to be

the case, it would constitute a considerably downgrade from the drastic sanctions reform advocated by Swedish Foreign Minister Tobias Billstrom.

Going it alone

Russian government policy has pushed for significant LNG capacity expansion for more than a decade. Yet, its worldwide market share has struggled to materially increase even as new capacity such as Yamal’s last train and Portovaya LNG came onstream because these expansions happened too slowly to outpace global market growth, according to our data. The efforts – and achievements – by Russian LNG champion Novatek in patenting its ‘Arctic cascade’ and ‘Arctic mix’ technologies alongside broader efforts to internalise LNG technology developments have not been able to significantly accelerate that growth.

Previously, Russian government ambitions had aimed for 100mtpa of installed LNG capacity by 2030 and 140mtpa by 2035. However, actual capacity additions may well fall short by more than 60mtpa. According to a Rystad analysis, although Russia’s LNG projects are likely to proceed due to government support and incentives, they are likely to miss their capacity and production targets. The research firm’s forecast predicts only 36.3 mtpa by 2026, assuming full capacity utilisation. This would be up only relatively modestly from its expected Russian LNG output of 34mmt this year – but which

Novatek, Russia’s top LNG producer, has halted production at its Arctic LNG 2 project, mainly due to a shortage of ice-capable gas tankers

itself relies on Arctic LNG 2 ramping up output as now scheduled after it had already suffered from delays.

Novatek, Russia’s top LNG producer, has halted production at its Arctic LNG

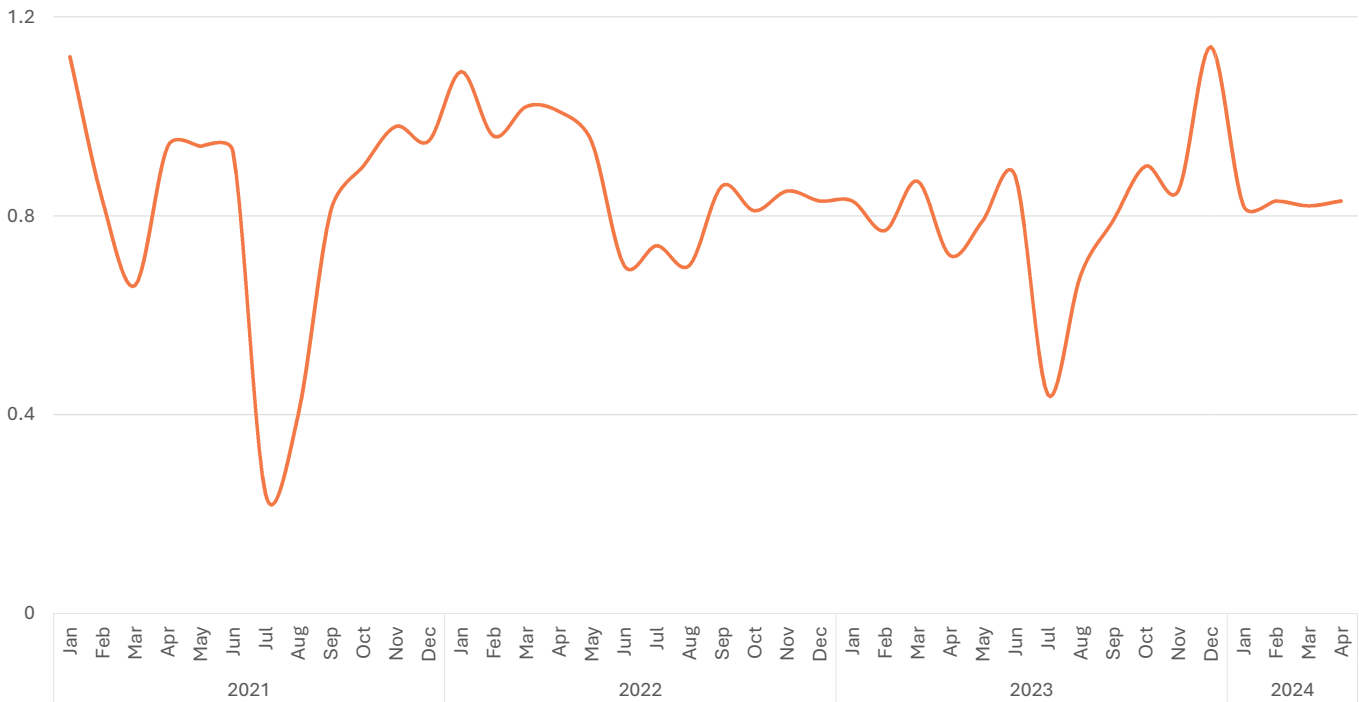
2 project, mainly due to a shortage of ice-capable gas tankers. The project, originally scheduled to start commercial deliveries in early 2023, suffered from a freezing of foreign shareholders’ participation and Novatek’s subsequent declaration of force majeure. With its single, nominally operational train shut-in until at least June 2024, the project’s progress has remained suspended.

Given the successful installation of Train 1 regardless of existing sanction regimes, the main challenge now lies in the scarcity of specialist tankers capable of transporting LNG through thick sea ice. Only three suitable tankers have been built so far, with delays in additional tanker construction, according to reporting by Reuters.

Ongoing saga

This is not to say that Novatek has been deterred. On the one hand, the struggle of Arctic LNG 2 to finally enter the market full-scale is indicative of one of the biggest challenges facing the Russian LNG sector: the dependency on Western companies both in the technology and

Sakhalin-2 LNG Exports (MMt)



Source: LNG Journal, Spire Global AIS

infrastructure sphere. However, on the other, recent investigations by Norwegian news outlet High North News (HNN) and the Investigative Reporting Project Italy highlight the limits of existing sanctions by Western states including the U.S. in delivering on their declared goal of curbing Russia’s LNG capacity expansion.

The two outlets’ interviews and investigations showed that whilst the launch of sanctions may initially result in a swift withdrawal of services by foreign companies, these are usually resumed shortly thereafter, sometimes with modified parts or very specific customs declarations to avoid contravening existing sanctions. In this context, French broadsheet Le Monde reported in January that French engineering group Technip supplied key Arctic LNG 2 equipment and services with apparent tacit approval by the French government.

This also puts into context the call by Swedish Foreign Minister Tobias Billstrom to more seriously tackle Russia’s ‘shadow fleet’. Whilst the term ‘shadow fleet’ was not closer defined by Billstrom, maritime analytics firm Windward has assessed Russia’s post-war hydrocarbon shipping capacity and the extent to which some vessels have obfuscated ownership structures to avoid sanctions. According to Windward, a sizeable portion of the fleet carrying Russian hydrocarbons have had a swift ownership change following the imposition of sanctions, which Windwards describes as ‘grey’ because ‘it is difficult to

determine legality and sanctions compliance in many cases’. The research firm noted that ‘a significant number of these vessels also switch flags (“flag hopping”) frequently’. Notably, Windward has highlighted in a report that European registrations comprise a significant portion of these ‘grey fleets’.

Concluding thoughts

Our data highlights the duality of both Russia’s keenness in maintaining market share in Europe and European dependence on Russian LNG. As a result, the massive Yamal LNG plant has consistently run well above its nameplate capacity of 16.5mtpa to achieve exports of almost 21mmt last year whilst European LNG imports from Russia have continued to trend upwards.

The current security crisis in the Red Sea and the Gulf of Aden further serves to underscore Europe’s importance as Russia’s prime LNG market given the location of the bulk of its capacity and geographical obstacles in the way of redirecting LNG flows towards Asia. Meanwhile, there are strong indicators that even the 14th attempt by the EU to curb Russian LNG flows will only produce a marginal difference when it comes to existing Russian LNG capacity.

Nevertheless, the picture might change in relation to future expansions. Arctic LNG 2 has had to be put on ice and whilst equipment and services supplies have flowed in the past, Novatek is reportedly struggling with a supply crunch in adequate shipping capacity.

Fast Solutions for & Transport



We can build your small-scale LNG terminal

Bulk Storage Tanks, Intermodal ISO Tank-Containers, Tanker Trailers



CORBAN ENERGY GROUP

For your LNG Storage Solution Needs.



al or peak-shaving plant within 18 months.

s, Ship/Barge Cargo Tanks for LNG or any Cryogenic/Liquefied Gases

www.CorbanEnergyGroup.com T. +1 201 509 8555

ADNOC aims for FID on Ruwais LNG by June, plans to double production

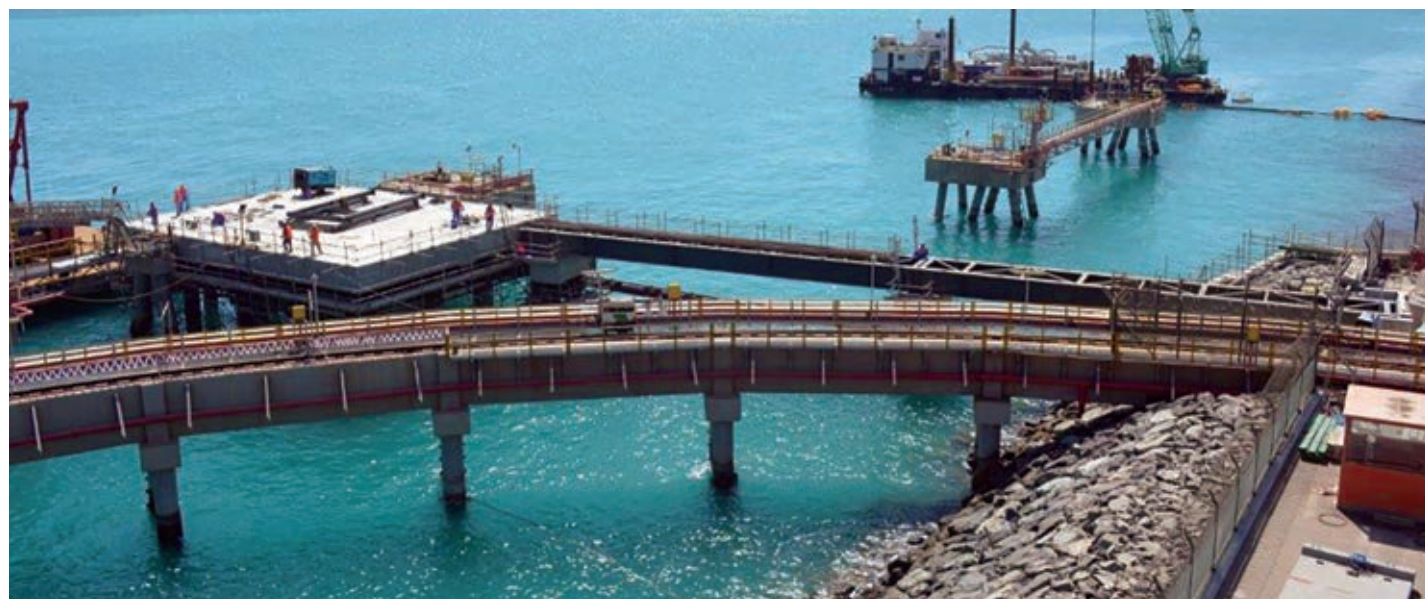
Abu Dhabi National Oil Company's natural gas arm (ADNOC Gas) has vowed to invest \$13 billion at home and abroad over the next five years as it wants to more than double its LNG production capacity to 15 million tons per annum (mtpa) by 2028. Limited notice to proceed EPC works for the Ruwais LNG project has been issued to a Technip-led consortium, as ADNOC aims to reach financial close in the first half of 2024 – in a move deemed “strategically timed,” our Markets Editor Anja Karl investigates.

State-owned ADNOC intends to take FID on the Ruwais project, consisting of two 4.8 mtpa liquefaction trains, which ADNOC Gas would then acquire. Technip and JGC Corp were told to proceed with early construction activities as first deliveries of LNG cargoes from Ruwais are scheduled for early to mid-2028.

By rushing to get the project to market, ADNOC wants to take advantage of the Biden administration's pause on US LNG export approvals that pushed back many projects by at least six months, shipbrokers at Poten & Partners reckon. Texas, Louisiana and more than a dozen Republican-led states have filed a lawsuit to overturn the permitting suspension, with no success thus far.

“Both Qatar's extension project and ADNOC's Ruwais project have been strategically timed to help Middle Eastern LNG sellers gain market share – now that US projects are delayed,” said Irvin Yeo, Poten's Singapore-based LNG business analyst.

“Clear advantages of Qatargas' and ADNOC's projects are that they primarily rely on balance-sheet funding – as opposed to debt-financing of US projects



Construction works for Ruwais LNG terminal

– which adds certainty that these liquefaction plants will come online,” he stressed, but cautioned: “Middle Eastern LNG deliveries are predominantly sold indexed to the Brent oil price which some buyers find difficult to manage because of its volatility and how it is tied to geopolitical issues.”

Splashing out billions to tap challenging resources

With a market capitalization of over

\$65.2 billion, ADNOC Gas ranks among the Top 20 oil and gas companies worldwide. Group chairman Sultan Ahmed Al-Jabar said at the company's first annual general meeting since its IPO in March 2023, the signing of LNG export agreements worth \$12 billion will secure ample returns in the coming years. ADNOC Gas reaped revenues of \$22.7 billion and a net income of \$4.7 billion in 2023, setting the foundation for growth as the company plans to more than double its LNG production capacity.

Free cashflow is of the essence as analysts estimate the company may need to splash out over \$40 billion for the United Arab Emirates to reach natural gas self-sufficiency by 2030 due to the challenging nature its resources.

Development of the two LNG trains in Ruwais, with 9.6 mtpa capacity combined, is underpinned by a 15-year offtake agreement from ENN. The Chinese privately-held company envisages to buy at least 1 mtpa of LNG right after the liquefaction terminal enters commercial operation in 2028.

Another multi-year offtake accord has been agreed with JERA Global Markets for deliveries from Das Island and potentially later from Ruwais, while a 15-year heads of agreement over 1 mtpa was reached with the German midstream energy firm SEFE Securing Energy for Europe with volumes to be primarily sourced from Ruwais. The Ruwais LNG project will run on ‘clean power’ and add

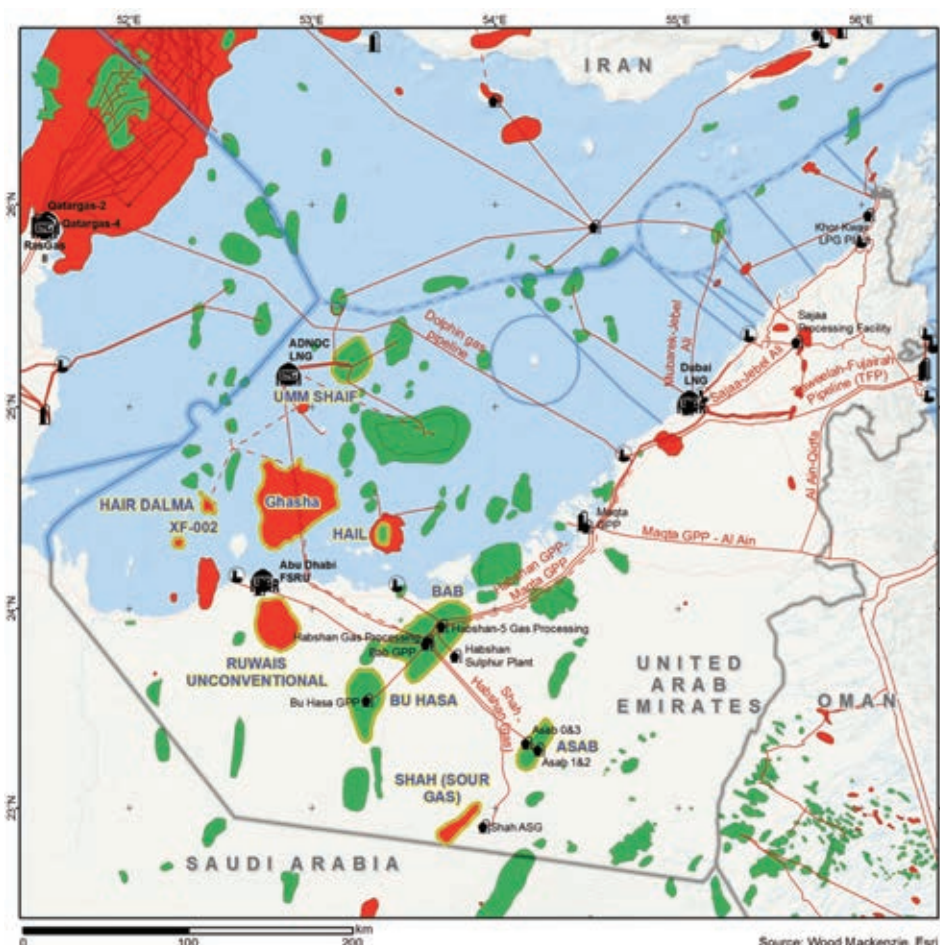
to the UAE's existing 6 mtpa LNG export capacity from Das Island – hence ADNOC strives to tap more of its domestic gas resources to ensure sufficient feedgas supplies.

Come 2028, LNG cargoes are meant to be shipped from ADNOC's new liquefaction facility to Zhoushan, the largest regasification terminal in China's Zhijiang province. But the planned 9.6 mtpa LNG export terminal at Ruwais will need an additional 1.5 billion cubic feet per day (bcf/d) of feedgas.

For long, Abu Dhabi has been importing 19-20 bcf/d of gas from Qatar through the Dolphin pipeline as domestic gas production is technically challenging and expensive, hence analysts warn Abu Dhabi could face serious gas shortages if the Dolphin contracts are not renewed.

Struggle to replace imported Qatari volumes

With Dolphin contracts set to expire in July 2032, Abu Dhabi is hard pressed to develop its own resources and rely less on volumes imported from the neighbouring gas giant Qatar. In Wood Mackenzie's worst case scenario, the UAE could be short of natural gas as early as 2027 – long before the Dolphin contracts run out and pipeline gas imports from Qatar grind to an end. ADNOC is hence examining all options, even including ultra-sour gas reserves that were previously deemed too complex and expensive to develop.





LNG carrier berthing on Das Island in the Persian Gulf

The substantial upstream investment estimate of over \$40 billion comes from WoodMac’s latest report on ADNOC. Having to tap sour gas resources will increase the costs of feedgas for the new Ruwais LNG plant and analysts also warned the simultaneous development of oil and gas could lead to pressure imbalances and some loss of ADNOC’s current oil output.

“The risk of gas shortages pushes ADNOC to choose between its 5 million barrel per day oil target, its gas self-sufficiency goal and its LNG ambitions,” said Dalia Salem, Wood Mackenzie’s senior analysts, Middle East Upstream and her colleague Alexandre Araman. They reckon that achieving the company’s gas self-sufficiency target would require a “mega upstream investment,” as well as fast-tracked execution and strong operational performance.

“For Ruwais LNG to be competitive, controlling the upstream and plant costs is essential,” Salem stressed. In her view, this may well make ADNOC abandon the idea of Fujairah as the location of its new liquefaction plant and stick to Ruwais, which has established infrastructure is situated close to the gas fields and the country’s nuclear power station.

Fujairah is the end point of the Dolphin pipeline, in operation since 2007, when Qatargas developed a dedicated sector of the North Field to export 1.9 bcf/dto the UAE via a 600-kilometre subsea pipeline. On top of these pipeline gas import, the UAE occasionally bought LNG cargoes – but in additions ADNOC started to tap its expensive sour gas resources. Occidental in 2011 entered the Shah Gas Development project with a 40 percent stake and in 2015 first volumes were produced from the Shah field.

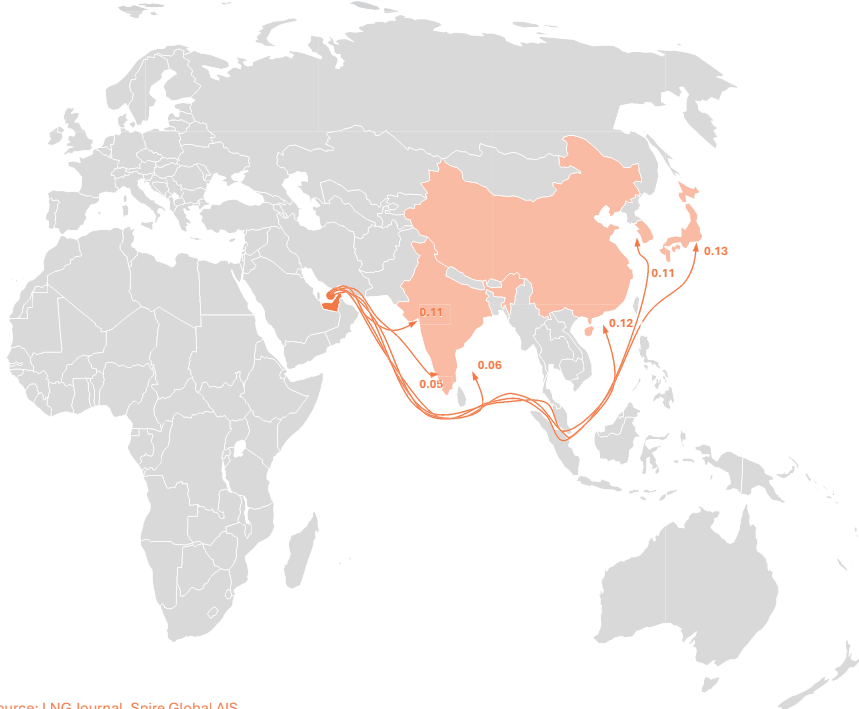
New upstream ventures are the answer to Abu Dhabi’s gas shortages –

but they come at a high cost. The UAE’s Supreme Petroleum Council recommends ultra-sour gas, unconventional and gas cap resources as well as rising use of associated gas. In particular, the Ghasha development is deemed critical for attaining self-sufficiency, with a target to produce 1 bcf/d of gas before 2030. But factoring in the necessary sulphur handling equipment to manage sour gas and low domestic gas prices, mean costs could come to at least \$20 billion.

The Shah gas Development is another key venture which can potentially boost ADNOC’s total upstream capacity to 1.85 bcf/d from currently 1.45 bcf/d. Other potential projects include large untapped unconventional gas resources at Ruwais Diyab as well as gas caps and some conventional resources.

The timelines slipped for many of these projects, while others were simply called off: High cost led to the recent cancellation of pre-construction service agreements for Hail and Ghasha, two ultra-sour offshore fields from which ADNCO had been targeting 1 bcf/d of gas

Das Island LNG Exports (MMt)
19 March – 22 April



Source: LNG Journal, Spire Global AIS

sales. “ADNOC is moving on all fronts via mega-development projects, ambitious production targets and IOC partnerships. But the complex and expensive nature of these resources has derailed progress with escalating costs and final investment decision delays,” analysts commented.

Fear about the West’s zeroing out on fossil fuels

Arab upstream companies are concerned about the West’s intention to end support for fossil fuels abroad. Sultan al-Jaber, the head of ADNOC said “zeroing out” on hydrocarbon investment would lead to a loss of millions of barrels of oil per day – vastly more than the supply shock during the 2021/22 global energy crisis.

“Now is the time to point out that long term underinvestment in oil and gas has made a difficult situation even worse,” he

stressed, referencing the energy supply chain shocks following the Russian invasion of Ukraine. Russia has been by far the world’s largest exporter of fossil fuels, but a reorientation of global energy trade in the wake of the Ukraine war, left it with a much-diminished position. Russia’s share of internationally traded energy, which stood at close to 20 percent in 2021, is forecast to falls to 13 percent in 2030 the International Energy Agency’s (IEA) Stated Policies Scenario, while the shares of both the United States and the Middle East are bound to rise.

Reacting to the supply gap, the UAE has been quick to increase its production capacity for oil, gas and refined products. But the emirate is also venturing into clean energy: “It is not oil, or gas, or solar, or wind, or nuclear or hydrogen,” Jaber said. “It is all of the above.”

Latest LNG cargoes shipped from ADNOC's Das Island terminal

Vessel Name	IMO	Sailed Date	Import Country	Import Facility	Arrival Date	MMt
Seri Balqis	9331672	19/03/2024	Japan	Futtsu	07/04/2024	0.06
Sohar LNG	9210816	23/03/2024	India	Dahej	09/04/2024	0.06
Maran Gas Posidonia	9633434	01/04/2024	India	Dahej	10/04/2024	0.05
Umm Al Ashtan	9074652	06/04/2024	India	Cochin	20/04/2024	0.05
Al Hamra	9074640	26/03/2024	South Korea	Boryeong	22/04/2024	0.06
Yari LNG	9636747	03/04/2024	Japan	Higashi-Ogishima	22/04/2024	0.07
Maran Gas Coronis	9331048	11/04/2024	China	China	30/04/2024	0.06
Sestao Knutsen	9338797	14/04/2024	India	India	05/05/2024	0.06
Mubaraz	9074626	18/04/2024	South Korea	Pyeongtaek	07/05/2024	0.06
Sohar LNG	9210816	22/04/2024	China	China	21/05/2024	0.06



Bring the worldwide standard on board.

In FLNG plant applications, every square foot matters—and performance needs to be a guarantee.

Unrivaled experience. For over 60 years, Air Products has been advancing the science of LNG. Our FLNG technology was employed on the world's first deepwater FLNG vessel and is currently in operation on four deepwater FLNG facilities.

Unrivaled technology and equipment. Our AP-N™ and AP-DMR™ LNG processes pass performance tests the first time and are in productive, reliable operation. Ideal for FLNG, our coil-wound heat exchangers (CWHEs) deliver maximum reliability in minimal deck space.

Unrivaled solutions. Our unique combination of critical liquefaction equipment and proven process technologies guarantees production, power, and quality that has become the worldwide standard.

tell me more
airproducts.com/FLNG



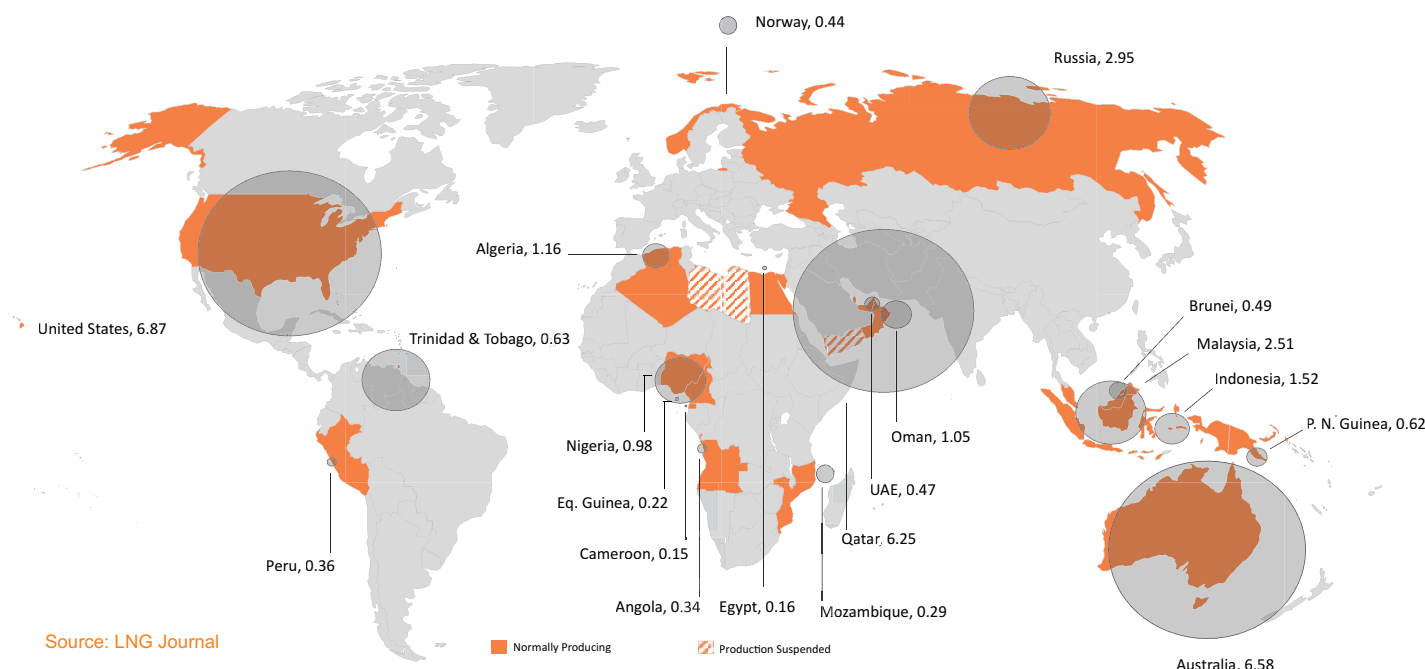
April flows down following bumper trade in March

Our April data showed significant LNG trade decrease globally as strong export growth in March did not continue in April. Meanwhile, demand was weighed down by import reductions in Europe and the Far East, our Market Editor Alexander Wilk reports.

According to our data at the end of April, which remains subject to change, global LNG exports amounted to 34.04mmt and thus ended the month with a significant decrease of 2.16mmt (-6 percent) from 36.20mmt in March. Our preliminary assessment indicates that this decrease was in part due to vessels spending more time at loading berths, which on several occasions led to departure dates falling into May. Moreover, strong month-on-month export growth in March led to a downturn in April as the wave of LNG flows 'crested'. As such, production among large-scale producers returned to more sustainable levels.

Among the three most significant exporters in April, the United States cut exports by 1.21mmt (-15 percent) to 6.87mmt from 8.08mmt in March. Nevertheless, this still meant most US plants produced above nameplate capacity. Concurrently, Australia decreased its loaded volumes by 0.43mmt (-6 percent) to 6.58mmt from 7.01mmt in March. Again, most Australian plants continued to produce at or above nameplate capacity. Finally, Qatar decreased exports by 0.73mmt (-10 percent) to 6.25mmt from 6.98mmt in March. This pegged Ras Laffan's annualised capacity utilisation at 97

Global LNG Exports (MMt)



Source: LNG Journal

percent, according to our data and calculations.

As large-scale producers had considerably reduced their output in April, smaller producers struggled to compensate in terms of global trade, even when they showed significant month-on-month growth rates. Due to their smaller capacities, net growth among exporters such as Norway and Angola represented little more than a single cargo whilst others such as Oman and Russia merely kept their shipped April volumes broadly

steady.

Global LNG demand, meanwhile, had decreased by 1.97mmt (-5 percent) month-on-month. Offtakes were still led by China with imports of 6.58mmt in April, down marginally by 0.10mmt (-1 percent) to 6.58mmt. Japan reduced imports by 0.79mmt (-13 percent) to 5.12mmt alongside a reduction of 0.34mmt (-8 percent) to 3.88mmt in South Korea. Concurrently, smaller Pacific buyers collectively had seen imports increase by only 0.31mmt to 3.34mmt at the time of writing. In Europe, strong negative demand growth mainly among northern European buyers overshadowed significant growth spots among southern European terminals. However, Middle Eastern demand had swung back into month-on-month growth, although this was insufficient to offset the significant aforementioned reductions.

Export - Pacific Basin

At the time of writing, Pacific exports had accrued to 13.13mmt and thus came in below March's equivalent total of 13.30mmt by 0.17mmt (-1 percent). Consequently, annualised capacity utilisation stood at 85 percent. Nevertheless, exports were up by 0.90mmt (7 percent) year-on-year.

Australia: The Pacific Basin's most significant exporter by installed capacity – Australia – saw a significant export decrease of 0.43mmt (-6 percent) to 6.58mmt in April from 7.01mmt in March as most plants faced an export decrease.

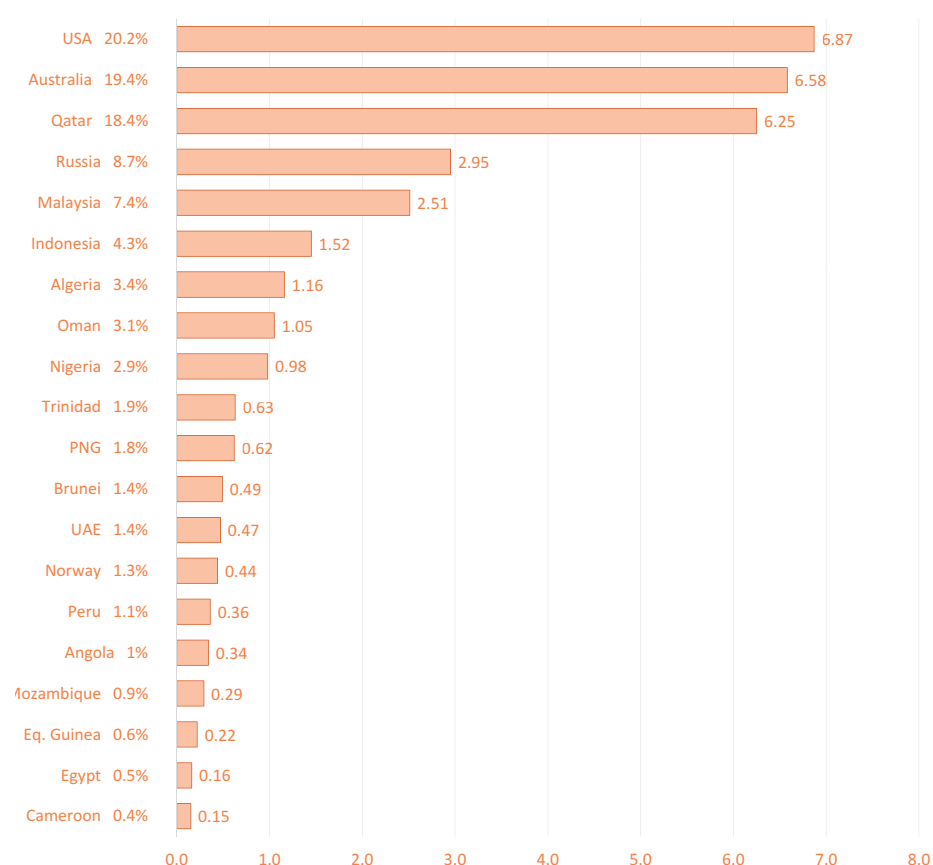
Among the most significant month-on-

month reductions, Gorgon LNG and NWS LNG cut shipments by 0.20mmt, which meant their exports were down by 13 percent to 1.29mmt from 1.49mmt in March and by 18 percent from 1.14mmt to 0.94mmt, respectively. Concurrently, Gladstone LNG curtailed shipment by 0.17mmt (-29 percent) to 0.41mmt from 0.58mmt in March whilst Ichthys LNG faced a decline of 0.15mmt (-18 percent) to 0.70mmt. Exports were also down at Prelude FLNG, which had shipped 0.06mmt (-21 percent) less by the end of the month with 0.23mmt in exports compared to 0.29mmt in March. These export reductions were cushioned, however, by increases totalling 0.35mmt at Wheatstone LNG, Australia Pacific LNG and Pluto LNG. Wheatstone LNG achieved a significant increase of 0.22mmt (30 percent) to 0.96mmt from 0.74mmt in March. Concurrently, Australia Pacific LNG increased loaded volumes by 0.07mmt (9 percent) to 0.85mmt alongside a substantial increase of 0.06mmt (15 percent) to 0.47mmt at Pluto LNG. Queensland Curtis LNG, meanwhile, kept monthly output stable at 0.73mmt.

Australian exports in April were led by shipments to China amounting to 2.03mmt, followed by Japan with 1.86mmt. South Korea was the third most significant destination for Australian LNG with 0.90mmt. Notably, we were also tracking 0.59mmt of Australian exports that were headed to still undisclosed destinations within the Pacific Basin.

Southeast Asia: North of Australia,

Market Share & LNG Exports by Country (MMt)

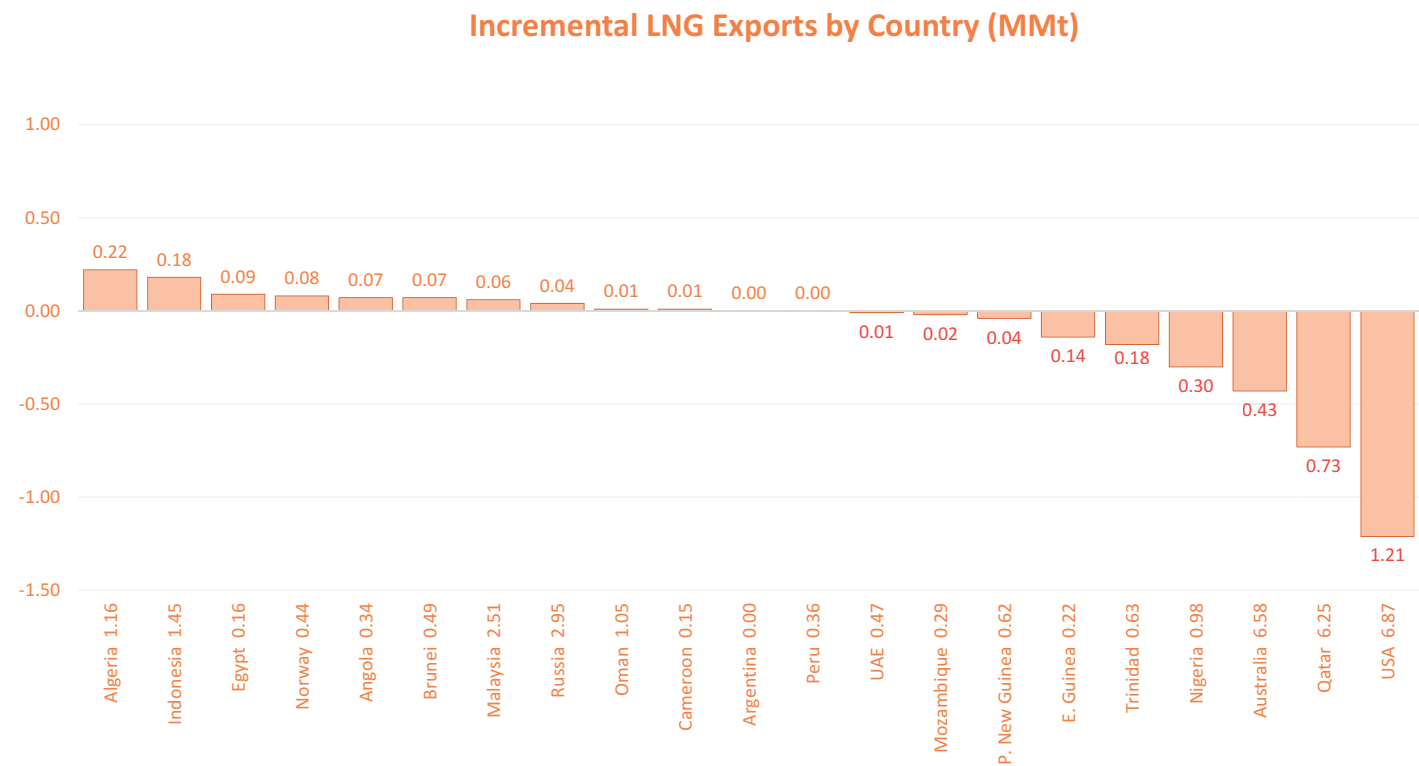


Source: LNG Journal

our data for PNG LNG showed an export decrease of 0.04mmt (-6 percent) to 0.62mmt from 0.66mmt in March. The plant's annualised capacity utilisation rate thus stood at 90 percent. PNG exports were led by shipments to China amounting to 0.26mmt in April, which were up by 0.04mmt (18 percent) month-on-month. South Korea also imported 0.01mmt (14 percent) more from PNG LNG month-on-month at 0.08mmt. Japan, however, decreased imports by 0.01mmt (-5 percent) to 0.21mmt. Meanwhile, Taiwan had also not yet received LNG from Papua New Guinea at the time of writing compared to 0.15mmt in March although a 0.07mmt cargo still had to declare its destination within the Pacific at the time of writing.

Indonesia, meanwhile, boosted exports by 0.25mmt (20 percent) to 1.52mmt in April compared to 1.27mmt in March. Tangguh saw a substantial increase of 0.17mmt (20 percent) to 1.01mmt alongside a significant increase of 0.09mmt (36 percent) to 0.34mmt at Bontang LNG. This growth was only tempered by a 0.01mmt (-6 percent) reduction to 0.17mmt at Donggi-Senoro LNG. Consequently, the Tangguh and Bontang plants produced at 99 and 35 percent of annualised capacity utilisation, respectively, whilst Donggi-Senoro continued to produce above capacity at 102 percent.

Malaysia, meanwhile, saw a slight increase in shipments of 0.06mmt (2 percent) to 2.51mmt in April from 2.45mmt in March. Notably, PFLNG 1 showed a significant export increase of 0.13mmt (186 percent) to 0.20mmt from just 0.07mmt in March, pegging its annualised nameplate capacity utilisation at 200 percent. This boost was



Source: LNG Journal

tempered, however, by an export decrease amounting to 0.07mmt (-33 percent) to 0.14mmt at PFLNG 2, but which nonetheless still produced at 140 percent capacity. Malaysia LNG, meanwhile, maintained monthly output at 2.17mmt with 89 percent of capacity utilisation.

Brunei LNG recorded a production increase of 0.07mmt (17 percent) to 0.49mmt at the time of writing, up from 0.42mmt month-on-month. The plant's annualised capacity utilisation rate thus stood at 82 percent. Although Japan and China slashed their respective offtakes from Brunei LNG, these losses were compensated by higher exports to South Korea and Taiwan. An additional Brunei cargo also still had to declare its Pacific destination at the time of writing.

Russia, Peru & Mozambique: Elsewhere in the Pacific, our data

indicated Sakhalin-2 LNG saw a marginal export increase of 0.01mmt (1 percent) to 0.83mmt from 0.82mmt in March. The plant's annualised capacity utilisation rate thus stood at 104 percent. The plant's LNG exports were led by shipments to China amounting to 0.41mmt, which represented a boost to that specific LNG flow by 0.29mmt (242 percent). Flows to South Korea and Japan, meanwhile, were down by 0.05mmt (-29 percent) to 0.12mmt and by 0.23mmt (-3 percent) to 0.30mm month-on-month, respectively.

Concurrently, Peru's Pampa Melchorita LNG maintained its monthly exports at 0.36mmt in April. The plant's annualised capacity utilisation rate had thus also remained unchanged at 97 percent. LNG exports from Peru were led by 0.23mmt in shipments to the Pacific

Basin but which still had to determine their destination.

Finally, Mozambique's Coral Sul FLNG recorded a production decrease of 0.02mmt (-6 percent) to 0.29mmt in April, which pegged the plant's annualised capacity utilisation rate at 102 percent.

Atlantic Basin

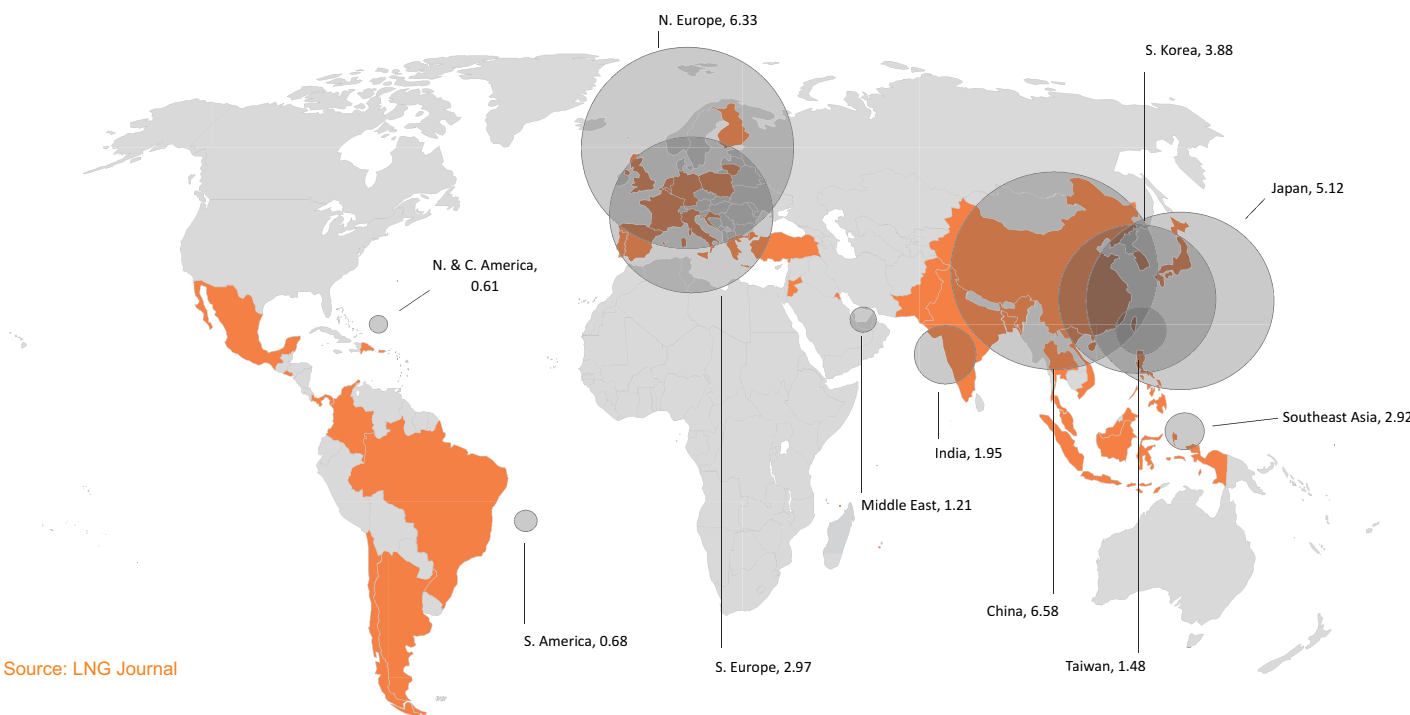
Exceeding the significant negative growth in the Pacific, the Atlantic Basin's overall shipped LNG had decreased by 1.42mmt (-10 percent) to 12.91mmt at the time of writing from 14.33mmt in March. This translated into annualised export capacity utilisation of 73 percent for the Basin. Exports were thus also down by 1.36mmt (-10 percent) year-on-year.

North Africa & Europe: The amount of LNG shipped from within its north-eastern part - comprising the EEA, Russia and North Africa (and not including re-exports) - amounted to 5.41mmt in April and thus saw exports remain broadly steady with only a marginal reduction of 0.03mmt (-1 percent) from 5.44mmt in March.

The relatively small regional decrease was mainly due to an Algerian export boost by 0.22mmt (23 percent) to 1.16mmt in April from 0.94mmt in March. Arzew achieved a significant increase of 0.15mmt (21 percent) to 0.86mmt whilst Skikda increased its cargo loadings by 0.07mmt (30 percent) to 0.30mmt. The two plants thus operated at 50 and 46 percent of annualised capacity utilisation, respectively, our data showed at the end of April.

Our data also showed Norway's Snohvit LNG enjoyed a production

Global LNG Imports (MMt)



Source: LNG Journal

increase of 0.08mmt (22 percent) to 0.44mmt in April from 0.36mmt March, an intermittent maintenance and safety shutdown notwithstanding. The plant's annualised capacity utilisation rate thus stood at 126 percent. Norway's export growth was mainly due to higher European demand based on two cargoes that still had to confirm their destinations. Beyond these, net northern European demand for Norwegian LNG remained steady as Spain and Lithuania increased their imports by 0.07mmt overall.

Russia's Atlantic Basin capacity also saw a shipment increase by 0.03mmt (1 percent) to 2.12mmt in April from 2.09mmt in March. Whilst Portovaya LNG maintained exports at 0.14mmt, Yamal LNG increased flows by 0.03mmt (2 percent) to 1.98mmt from 1.95mmt in March. As such, the plant continued to produce well above nameplate capacity at 137 percent whilst Portovaya's annualised capacity utilisation stood at 84 percent.

West Africa: West African LNG flows, however, had slumped by 0.36mmt (-18 percent) to 1.69mmt from 2.05mmt

in March.

Our data for Nigeria's Bonny Island LNG plant showed a significant export decrease of 0.30mmt (-23 percent) to 0.98mmt from the 1.28mmt we recorded in March. Although more moderate in volume terms, the 0.14mmt reduction to 0.22mmt from 0.36mmt at EG LNG represented an even faster month-on-month decrease at 39 percent. Month-on-month export growth in April thus only came from Angola LNG and Cameroon's FLNG facility, which increased shipments by 0.07mmt (26 percent) to 0.34mmt and by 0.01mmt (7 percent) to 0.15mmt, respectively. West Africa's April exports were led by 0.42mmt in shipments to yet to be identified Pacific destinations, followed by 0.29mmt destined for India. Concurrently, however, exports to India were down by 0.20mmt (-41 percent) whilst other large-scale importers in South Korea and Japan, for example, had also slashed their offtakes from West African producers.

Americas: Our US LNG export data for April showed a slump in shipments by 1.21mmt (-15 percent) to 6.87mmt from

8.08mmt in March. According to our data at the time of writing, the most drastic change stemmed from Calcasieu Pass LNG, which had slashed its exports by 0.34mmt (-40 percent) month-on-month to 0.51mmt from 0.85mmt in March. Sabine Pass LNG also curtailed exports by 0.32mmt (-11 percent) to 2.67mmt whilst Freeport LNG faced an export reduction of 0.31mmt (-40 percent) to 0.46mmt. Concurrently, Corpus Christi LNG cut exports by 0.22mmt (-17 percent) to 0.51mmt. In addition to these larger-scale export curbs, we recorded more moderate reductions totalling 0.04mmt by Cameron LNG and Cove Point LNG to 1.37mmt and 0.51mmt, respectively. As such, month-on-month growth solely stemmed from a relatively small 0.02mmt (9 percent) increase to 0.24mmt at Elba Island LNG. However, these significant reductions notwithstanding, average US LNG capacity utilisation still stood at 90 percent, owed to plants such as Sabine Pass and Cameron LNG frequently pushing significantly past their nameplate capacity.

In South America, Atlantic LNG had

curtailed its month-on-month LNG exports by 0.18mmt (-22 percent), according to our data, with shipments amounting to 0.63mmt. The plant's utilisation rate thus stood at 49 percent.

Middle East

Middle Eastern LNG exports at the time of writing in April amounted to 7.93mmt and thus showed a significant decrease of 0.64mmt (-7 percent) from 8.57mmt in March. Exports were also down by 0.83mmt (-10 percent) year-on-year. Nevertheless, our data still showed the Basin's annualised utilisation of operational export capacity (i.e., excluding Yemen) at 102 percent at the time of writing.

The Middle East's overall negative export growth was driven by Qatar's Ras Laffan LNG complex. Our April data indicated the facility had exported 7.93mmt at the time of writing, a decrease of 0.64mmt (-7 percent) month-on-month. Nevertheless, the plant's annualised capacity utilisation rate still stood at 97 percent. With European demand subdued, the necessity to avoid



Attending Companies

ExxonMobil
Golar LNG
Pertamina Gas
Shell
QatarEnergy Gas
Hoegh LNG

OFFSHORE
LNG



Offshore LNG

11 September 2024 |
Singapore EXPO

Advancing Offshore
LNG Projects to Meet
Rising Demand

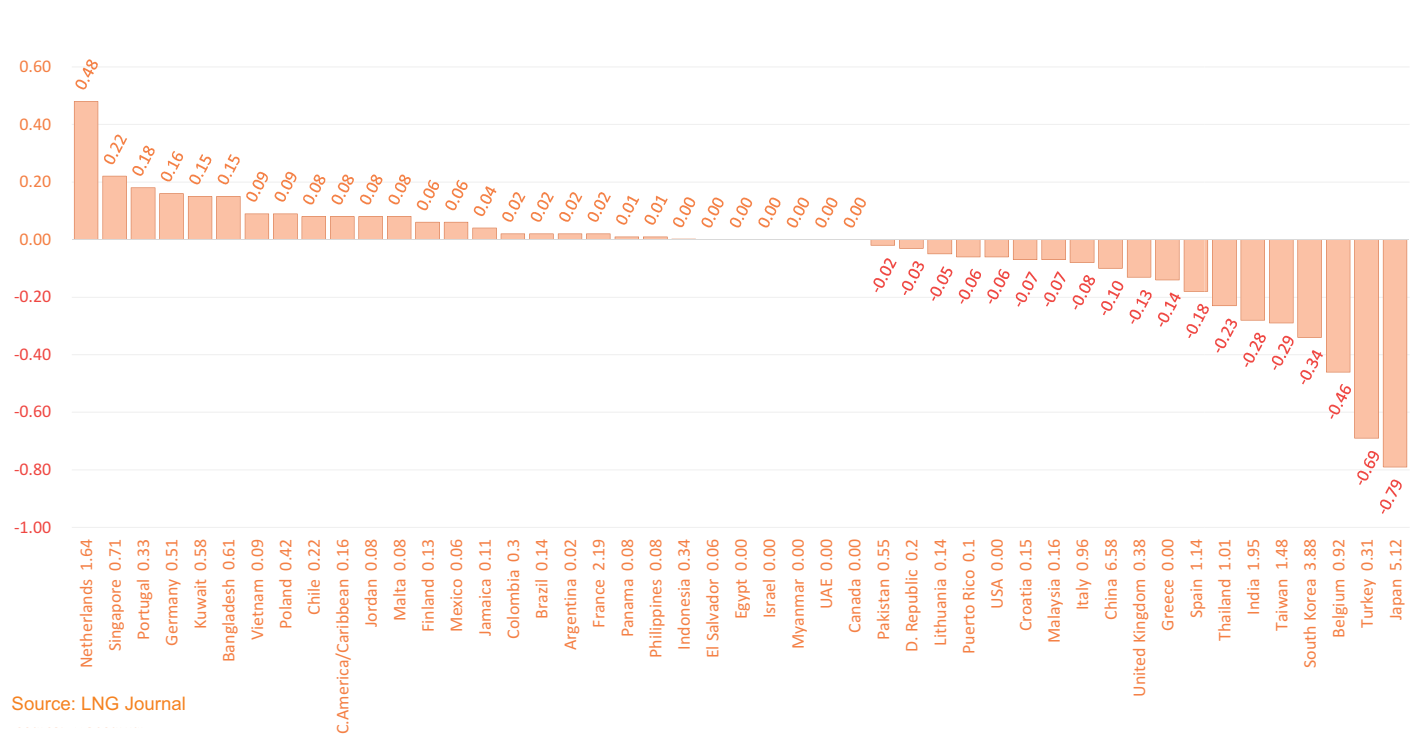
Learn More >



Attending Companies

Petronas
CNOOC
Indian Oil Corporation
TotalEnergies
Chevron
Bumi Armada

Incremental LNG Imports by Country (MMt)



Source: LNG Journal

the Suez Canal in favour of the Cape Route, which previously has had a trade reducing effect with Europe, did not come into play in April. Instead, it was the slump in Qatari exports to China and India that weighed heaviest on monthly trade. This reduction came in addition to less demand in Southeast Asia and the Middle East, which was down by 0.17mmt and 0.13mmt, respectively. However, we highlight that 0.51mmt of Qatari LNG still had to declare its destinations at the time of writing.

In contrast to lower performance by Qatar, Egypt was again seen in the market with two exports from Idku LNG amounting to 0.16mmt. This pegged the plant’s annualised capacity utilisation at 27 percent and meant Egypt’s net growth in April amounted to 0.09mmt (129 percent). Neighbouring Damietta SEGAS LNG, however, was not seen in the market in April following a 0.07mmt export in March.

Meanwhile, a marginal export increase of 0.01mmt (1 percent) to 1.05mmt in Oman was negated by a commensurate reduction in volume terms at the UAE’s Das Island plant. Nevertheless, this still meant annualised capacity utilisation at Das Island stood at 103 percent whilst at Oman LNG that figure had climbed to 121 percent.

Imports & Domestic Trade

Global LNG imports in April had decreased significantly by 1.97mmt (-5 percent) to 33.97mmt from the 35.94mmt we recorded for March. Demand growth at the time of writing was elusive in both the Pacific and Atlantic Basins, which meant that even strong Middle Eastern growth could not compensate.

Pacific Basin

Month-on-month Pacific Basin imports were down by 1.49mmt (-6 percent) net to 22.35mmt from 23.84mmt in March. The roster of larger-scale importers consisting of China, India, Taiwan, South Korea and Japan collectively decreased their offtakes by 1.80mmt (-9 percent) in total to 19.01mmt from 20.91mmt in March.

Concurrently, the roster of smaller Pacific buyers – including Thailand, Bangladesh, Singapore, Malaysia, Indonesia, the Philippines, Chile, El Salvador and Myanmar – collectively had seen imports increase by 0.31mmt to 3.34mmt at the time of writing. This increase was primarily due to demand growth in Singapore and Bangladesh, where offtakes were up by 0.22mmt (45 percent) and by 0.15mmt (33 percent) to 0.71mmt and 0.61mmt, respectively. Vietnam, Chile, Mexico and the Philippines also saw imports go up by a total of 0.24mmt month-on-month, our data showed at the end of April. The roster’s overall growth was thus only tempered by demand reductions totalling 0.30mmt in Malaysia and Thailand as well as merely steady offtakes of 0.34mmt and 0.06mmt in Indonesia and El Salvador, respectively.

Atlantic Basin

In contrast to the Pacific, LNG demand in the Atlantic Basin had decreased more moderately. Offtakes were down by 0.69mmt (-6 percent) to 10.41mmt, with annualised utilisation of installed capacity at 38 percent.

European demand saw a net decrease of 0.73mmt (-7 percent) to 9.30mmt. Strong negative import growth in Turkey by 0.69mmt (-69 percent) to 0.31mmt

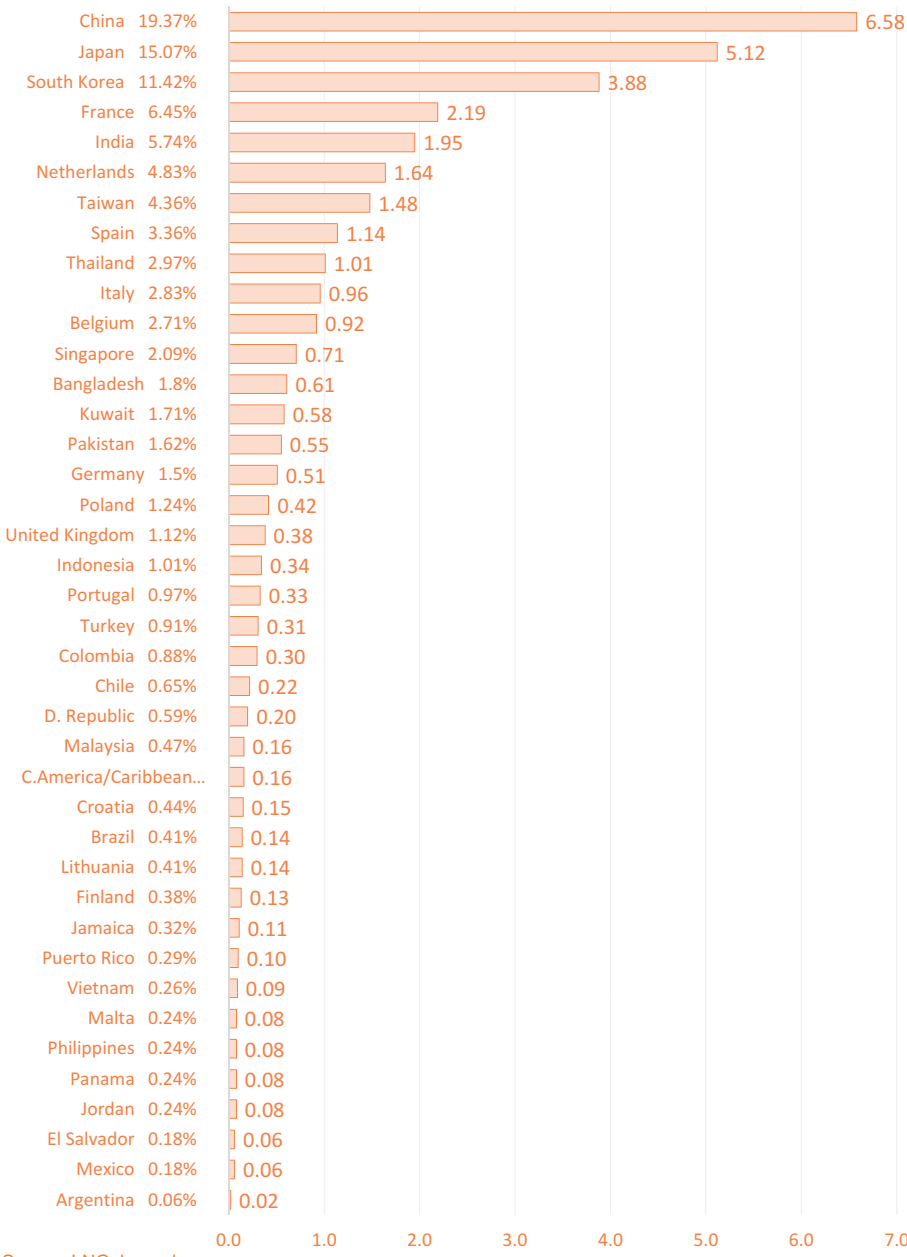
exacerbated decreases totalling 1.11mmt elsewhere in Europe, mainly Belgium, Spain and Greece. As such, these decreases overshadowed sizeable growth of 1.07mmt stemming mainly from northern European buyers such as the Netherlands and Germany.

Our April data also showed a small demand increase of 0.04mmt (4 percent) in the Americas. Notably, the Dominican Republic, Puerto Rico and the United States curtailed offtakes by a total of 0.15mmt. However, this was outweighed by demand growth totalling 0.19mmt stemming from Colombia, Brazil, Argentina, Panama and Jamaica as well as a doubling of inflows to 0.16mmt at the OPT LNG Hub.

Middle East

Meanwhile, overall Middle Eastern LNG demand of 1.21mmt in April was up by 0.21mmt (21 percent) from 1.00mmt in March. Our data for Kuwait showed a significant offtake increase of 0.15mmt (35 percent) to 0.58mmt whilst Jordan’s Aqaba terminal returned to the market with a 0.08mmt import. This growth was thus only tempered by a demand reduction of 0.02mmt (-4 percent) to 0.55mmt in Pakistan. As such, the Middle East’s annualised import capacity utilisation stood at 23 percent in April.

Market Share & LNG Imports by Country (MMt)



Source: LNG Journal



LNG infrastructure for harsh weather conditions

Crown LNG's vision is to enhance energy security & support a responsible green energy transition.



The Crown LNG value chain



To find out more visit www.crownlng.com

First PureMetrics commercial deployment on an LNGC

Trafigura is to install Daphne Technology's first commercial patented PureMetrics software on an LNGC. Technical Editor, Ian Cochran reports.

Under the terms of the agreement, Daphne Technology will employ the system on board an LNGC chartered by Trafigura and managed by Latsco LNG, starting this summer.

PureMetrics directly measures and accurately reports real time tonnes of GHG emissions to the environment, eliminating inaccurate reporting, based on fuel consumption estimates, the company claimed.

With a combination of an array of sensors, multi-source data integration, and approved methodologies and algorithms, PureMetrics ensures compliance with EU Monitoring, Reporting and Verification (EU MRV) and IMO's Data Collection System (IMO DCS) regulations.

PureMetrics compares and optimises functions further improve operational efficiency, reducing GHG emissions and costs for the operators. The software system was awarded a Lloyd's Register Approval in Principle (AiP) in June, 2023.

The planned approach for implementing PureMetrics in Trafigura's fleet involves ensuring the integration with existing systems and processes, addressing technical challenges, and

adhering to evolving environmental regulations and GHG emissions standards, the company said.

"We are thrilled to have signed our first commercial contract with Trafigura, marking a significant milestone for our young company. While Trafigura is one of our strategic investors, this contract stands on its own merits as a testament to the effectiveness of our PureMetrics' solution.

"It is a clear indication of our commitment to delivering value to our partners and clients, and we are proud to collaborate with Trafigura and Latsco on this important initiative," said Dr Mario Michan, Daphne Technology's Founder & CEO.

Trafigura's Head of the Energy Transition Group and Venture Capital Investments, Margaux Moore, added: "The deployment of PureMetrics on our first vessel is a crucial step towards establishing a baseline measurement for GHG emissions in our maritime operations. This baseline will provide a foundational understanding of actual emissions levels, enabling effective monitoring and targeted reduction efforts."

Latsco LNG CEO, George Margaronis,

commented: "We are excited to participate in such an innovative project, which will enable us to understand the level of emissions in a broader operating profile.

"Participation in this project shows our commitment to manage efficient ships, while always monitoring the environmental impact. The data collected via the installation of the PureMetrics system should help us to operate the ship with a reduced emissions footprint in the future," he said.

Software upgrades

Last October, Daphne Technology unveiled a series of developments and enhancements for the software.

Following its successful introduction earlier last summer, the company increased its value proposition and features to improve GHG transparency.

As a result, PureMetrics continued to evolve with the integration of established systems for reporting and verification. Users can benefit from reporting to MRV (monitoring, reporting, and verification) and DCR (data collection and reporting) standards, ensuring compliance and transparency in emissions collection and reporting and enabling accurate estimation of the carbon intensity of goods transported by sea.

Meanwhile, PureMetrics-Compare allows users to combine noon reporting fuel consumption with direct measurement against current factoring methods.

This is of great benefit to users, as they will assess the baseline of other emissions, such as methane slip, typically unknown to users and only known to engine makers, the company claimed.



Dr Mario Michan, Daphne Technology's Founder & CEO

The feature provides users with the ability to align the period selection on a timeline. For ships, users can also view the location of the assets and where the most emissions are present, either at port or sea, in a timeline or in a heatmap.

Finally, PureMetrics-Optimise provides insights on the operational regimes of the machinery that contribute most GHG, positioning it as the go-to solution in the industry to select the best abatement and operational profile to minimise these emissions.

Daphne Technology first installed a PureMetrics solution on the LNGC 'Maran Gas Chios' last autumn for testing.

As part of an expansion plan, Daphne Technology established a new subsidiary in the US.

This came with the appointment of industry expert, Jamie Brick, who is spearheading operations from Houston, Texas.

Committed to combating methane emissions, this move comes as a result of tightening US regulations, Daphne said. ■



Analysing the operation

Wood Group wins more LNG contracts

A concept study contract was recently awarded to Wood Australia Pty Ltd, a subsidiary of UK-based Wood Group.

The contract was signed with the Sunrise joint venture (SJV) stakeholders - TIMOR GAP (56.56%), operator Woodside Energy (33.44%), and Osaka Gas Australia (10%).

This study will be aimed at the key issues for the development, processing, and marketing of gas with a strong focus on its delivery to Timor-Leste for processing and LNG sales, or alternatively, delivering the gas to Australia.

A range of options will be included, such as engineering, financial assessment and financing, local content, strategy and

security, health safety and environment, and socio-economic analysis.

It is targeted to be completed by no later than the fourth quarter of this year.

Greater Sunrise fields, located around 450 km northwest of Darwin and 150 km south of Timor-Leste, comprise the Sunrise and Troubadour gas and condensate fields.

In addition, Wood subsidiary Massy Wood has secured a three-year agreement with Atlantic LNG of Trinidad and Tobago (Atlantic), to provide project management and engineering expertise

for its liquefaction facility at Point Fortin, Trinidad.

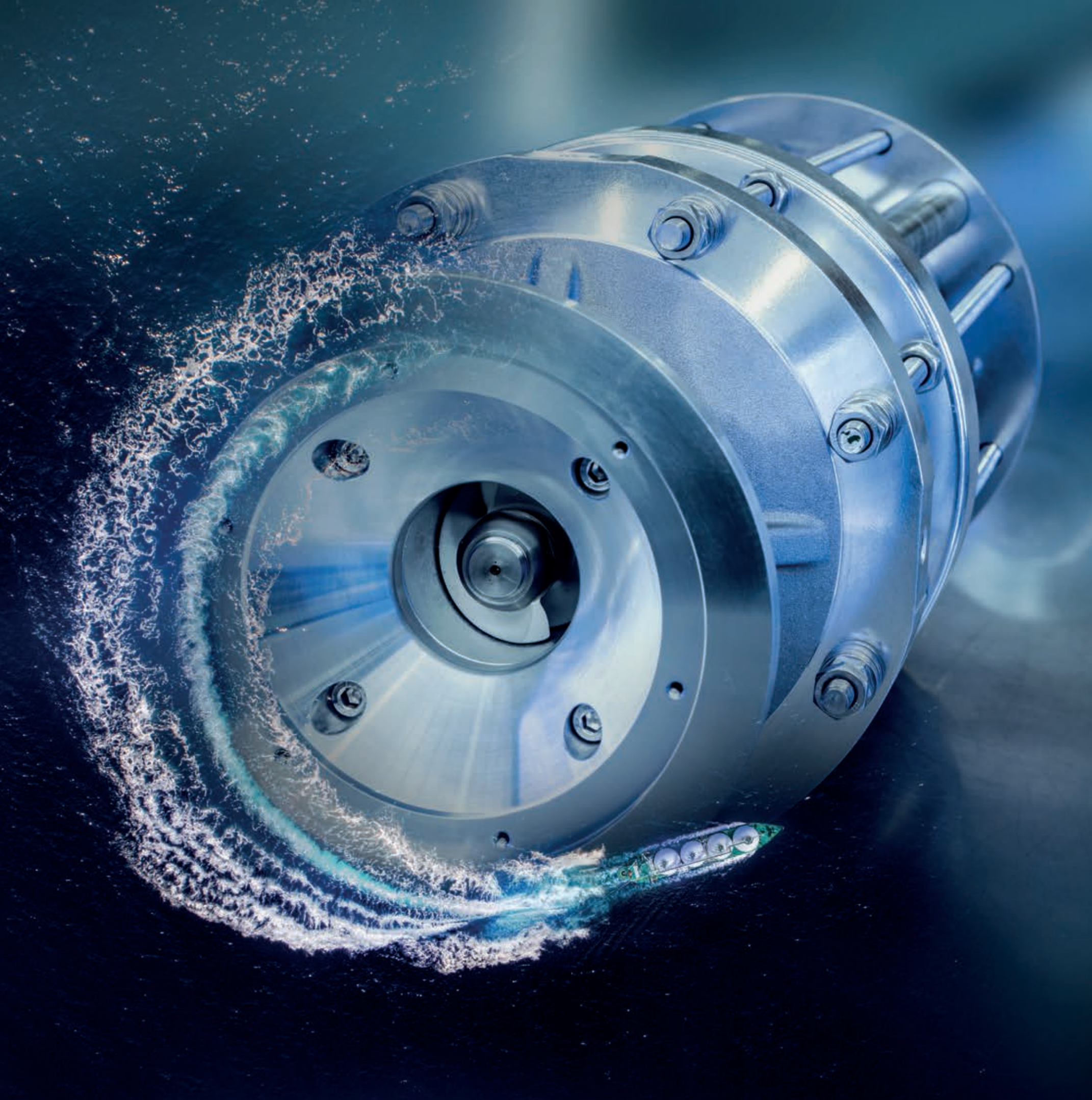
Atlantic LNG is Trinidad's sole LNG producer, and exports around 15 mill tonnes of LNG per annum.

Massy Wood has delivered construction management for Atlantic's liquefaction facility for the last decade, focusing on reducing risk and improving performance.

This new award builds on the existing services to deliver complete end-to-end EPC solutions.

Mala Baliraj, Massy Wood's CEO, said: "We are delighted to grow our relationship with Atlantic, building on the scope of services we already provide to this important natural gas facility.

"Massy Wood has been a trusted partner of choice for over 20 years in Trinidad. We are particularly proud of our delivery teams, who recently achieved over 43 mill man-hours without a lost time incident, further demonstrating our unwavering commitment to safety and performance excellence," he said. ■



NAVIGATING

Fuel Transition

Thanks to its considerable investments in R&D and expert knowledge in cryogenic pumps design, Vanzetti Engineering is a recognized leader in low and high-pressure LNG marine applications.

VANZETTI ENGINEERING.
Born in Italy, installed worldwide.

www.vanzettiengineering.com

VANZETTI: CRYOGENIC
TECHNOLOGY

Sublime invests in gas liquefaction demonstrator

Liquefaction technology start-up Sublime Energie is set to launch a new demonstrator project to produce green fuel by 2025, as part of plans to accelerate the role of gas in the energy transition. Fuelling Editor Malcolm Ramsay has more.

The French deeptech firm aims to build on its proprietary biogas liquefaction technology to create a ground-breaking fuel network, following a recent funding boost.

“The company will develop its first biogas collection network in the Bretagne region of France, to be started at the end of 2026. The goal is then to reach 18 projects installed by the end of 2030 in France and abroad, including Germany and Italy,” Bruno Adhemar, CEO and founder of Sublime Energie, tells *LNG Journal*, adding that the firm aims to produce its first few hundred tonnes of bioLNG and bioCO₂ next year.

Funding round

In March, the firm announced that it had successfully secured €11.5 million in financing to accelerate the scale up of its technology, with support led by the

Environment and Solidarity Revolution Fund managed by Credit Mutuel Impact and PSL.

This new funding will be used to create a demonstrator capable of producing 180 tonnes of low-carbon fuel and 300 tonnes of biogenic CO₂ per year. It will be installed at a site operated by Gazéa, an agricultural methaniser company, by 2025 and the first commercial project is expected to integrate around a dozen methanisers with this innovation by 2026.

“The equipment used to ensure biogas liquefaction includes compressors, adsorption columns, cold production machines,” Adhemar explains. “All these components are selected and conceived by Sublime Energie in order to liquefy 50 Nm³/h of biogas.”

Liquefaction equipment will be installed directly on a farm, allowing

biogas produced on site to be fed directly to the on-farm digester. This feedstock is then liquefied and stored in a tank.

“The liquefaction drastically reduces the volume of the biogas, allowing an efficient storage and transportation,” Adhemar continues. “When the tank is full, it is transported by truck one to three times a week to a hub (30km on average), where the biomethane and bioCO₂ are upgraded and packaged to be sold in gas stations or transported by truck to the final customers site.”

Tackling clogging problems

The primary purpose of the new demonstrator will be to showcase the commercial viability of this approach for farms around the world, but it will also act as a valuable staging ground to drive development and improve efficiency of existing processes.

“The presence of CO₂ in the biogas is a serious issue,” Adhemar comments. “Indeed, at the low temperature levels required to liquefy biogas, CO₂ clogging problems may occur because of the solidification of CO₂. Our technology helps avoid this issue by adding a carrier agent in the biogas mixture, making it possible to liquefy it.”

Biogas production is already a mature technology in France with national gas transmission system operator GRTgaz estimating that some 652 biomethane production sites will be operational in the country by the end of 2024. Across this network, an estimated total capacity of over 11 Terawatt hours per year (TWh/y) is generated, equivalent to the production capacity of two nuclear power stations.

“Biogas production is the most mature method of producing renewable and low-carbon gas,” Frédéric Guillou, Head of Anaerobic Digestion Development at GRTgaz, states. “GRTgaz is taking a proactive approach with the aim of mobilising project developers and facilitating the installation of new biogas production units. What are the objectives? To support decarbonisation and the energy autonomy of France’s regions.”

France is currently one of the leaders in biomethane production in Europe, followed by Germany which produces



Bruno Adhemar

12.8 TWh/y of biomethane a year at 242 sites. The UK produces around 7 TWh/y, while Denmark in fourth place produces 5.6 TWh/y.

Expanding workforce

As well as direct investment in technology, Sublime Energie’s recent funding round will also allow the firm to expand its workforce, hiring engineers and a team in industrial program management to follow up on the different contracts with the main partners and suppliers.

Adhemar explains that the group is now also seeking to build out the technical team to operate the first on-farm demonstrator in Brittany as well as employing business developers to strengthen market understanding, build relationships with market stakeholders and prepare the deployment of the first biogas collection project.

“Sublime Energie has already received Letters of Intent (LOI) from different farmers and agricultural cooperatives to develop biogas collection networks,” Adhemar notes. “Agricultural cooperatives, having access to a large network of farmers, will act as business providers.”

Ahead of the commercial launch of the demonstrator project, Sublime Energie will officially launch the technology during a forthcoming event in the prestigious Engineering School MINES in Paris. The firm aims to broaden its partnership network, sharing details around the unique technology as well as crucial data for prospective operators. ■



BioLNG demonstrator unit



Your GOAL

We ACHIEVE

We DESIGN

We LISTEN

There is a world under our products.

The finished product is only a part of our work. We start from a custom-made approach, listening to all needs of our clients. Our R&D office designs highly engineered solutions for LNG and BIO LNG handling for both marine and onshore installations. The design and manufacturing cycle of the tanks is completely carried out in the Tombolo Plant, in the heart of Tuscany. The result is a system that perfectly meets the needs of our customers.

 gasandheat.it



Discover all
our solutions



For the Record

BAKER HUGHES, the US liquefied natural gas equipment-maker and energy services and technology company, has received an order relating to gas technology for Saudi Arabia Oil Company (Aramco) as the Middle East Kingdom moves to boost its natural gas production.

Baker Hughes has received an order from global engineering company Worley, for and on behalf of Aramco, to supply gas technology equipment for the third phase of the Master Gas System project.

The US company with main offices in Houston and London has booked the award for the first quarter of 2024.

Baker Hughes will supply 17 pipeline centrifugal compressors driven by state-of-the-art aeroderivative gas turbines for Aramco's project.

The new 4,000-kilometre pipeline is vital to the Kingdom's energy transition, with expectations to increase domestic gas distribution and contribute to a reduction of emissions and oil consumption.

The order follows the delivery of 18 of Baker Hughes centrifugal compressors driven by aeroderivative gas turbines for Phase 1 and 2 of the Master Gas System projects executed by Baker Hughes.

Lorenzo Simonelli, Chairman and Chief Executive of Baker Hughes, said the company's had been a trusted partner in natural gas operations and has a long-standing partnership with Aramco.

"Baker Hughes solutions are advancing the efficient use of natural gas, and we are proud to be delivering a reliable system to transport and distribute gas across Saudi Arabia," stated Simonelli.

Baker Hughes is also investing in expanding its manufacturing site at Modon in Saudi Arabia.

In addition to doubling the capacity of its workforce, the upgraded site will further support the delivery of projects in the country, including MGS3, with localized testing and packaging solutions.

In February, Baker Hughes also announced the delivery of the first two trains of advanced hydrogen compression solutions for the NEOM green hydrogen project in the Kingdom, the largest such project in the world.

Aramco, the largest oil exporter, plans to increase natural gas output by 60 percent to take advantage of its massive

associated gas in oil fields as well as huge shale-gas reserves as Western nations stall new gas production.

Aramco recently halted plans to expand crude oil output and to concentrate on gas and possibly liquefaction and export projects in the future.

The company has also said it is looking at opportunities to invest in LNG projects around the world.

Aramco noted in its most recent earnings that natural gas projects were advancing across the Kingdom.

Baker Hughes has two divisions, Industrial & Energy Technology (IET), including LNG, and the Oilfield Services & Equipment (OFSE) unit.

The company has many orders from US LNG projects and also from LNG ventures elsewhere, including the Middle East.

Baker Hughes was awarded more than \$1Bln of contractual service agreements and booked a contract from the Al-Ruwais LNG project in Abu Dhabi in the United Arab Emirates, which will have capacity of 9.6 million tonnes per annum.

CLEAN ENERGY Fuels Corp., the US producer of natural gas make from waste, said its latest facility at Victory Farms Dairy in South Dakota has successfully completed construction and is injecting pipeline-quality gas into the interstate natural gas infrastructure.

The Victory Farms two-digester facility is utilizing the manure of 6,000 Jersey cows, which could process approximately 120,000 gallons of manure each day to produce an estimated 900,000 gallons of negative carbon-intensity Renewable Natural gas (RNG) annually.

The RNG produced at the facility in Revillo, South Dakota, will find its way to Clean Energy's fueling network, helping commercial fleets reduce their greenhouse gas (GHG) emissions significantly and immediately.

Clean Energy currently operates over 600 fuel stations around North America that provide fuel and services to customers.

Its fixed customer bases includes some of the largest logistics operators like UPS and Amazon, many transit agencies including those in New York City and Los Angeles, and dozens of waste companies including WM, Republic Services and Waste Connections.

Developed in partnership with Dynamic Renewables and financed through one of Clean Energy's production joint ventures, the construction costs of the RNG facility in South Dakota, including the build of the manure collection facility,

digestors and the processing plant, totalled around \$26 million.

Clean Energy, which is based in Newport Beach, California, said it was also in the process of filing the necessary applications to generate federal and state environmental credits.

"We are committed to working with dairies to bring more RNG into the market," said Clay Corbus, senior Vice President of Renewables at Clean Energy.

"Projects like Victory Farms will provide us the fuel to help decarbonize heavy-duty transportation while simultaneously providing an additional revenue stream for dairy owners and helping with their waste management," Corbus explained.

"With fleets quickly learning that RNG is a proven solution readily available now, it is perfect timing that Victory Farms and the other dairy facilities are coming online to meet the growing demand," Corbus stated.

Agriculture accounts for nearly 10 percent of US GHG emissions and the transportation sector accounts for another 28 percent, according to the US Environmental Protection Agency.

Capturing methane from farm waste lowers these emissions and RNG produced by that captured methane and used as a transportation fuel, significantly lowers GHG emissions on a lifecycle basis when compared to diesel fuel.

This allows RNG to be one of the only fuels to receive a negative carbon-intensity score based on the reduction of emissions at the source and at the vehicle.

"Victory Farms is part of an industry that is uniquely positioned to have the opportunity to produce such a sustainable and valuable by-product from everyday waste," said the owners of Victory Farms. "We are incredibly proud of what we are doing here, and that we've been able to partner with Clean Energy to help create a healthier planet," they added.

ENAGAS, the Spanish natural gas operator of six large LNG terminals and with gas assets in other European countries and overseas, reported an increase in first-quarter 2024 earnings even as gas demand in Spain declined because of warmer weather.

The Madrid-based company reported that profits after tax increased by 19.5 percent to €65.3 million (\$69.5M) during the first three months of the year.

Enagás also posted gross earnings (EBITDA) during the quarter of €178.3M, an increase of 2.7 percent compared with the same three months of 2023.

"The is the first growth of EBITDA for Enagás since the 2021-2026 Regulatory Framework came into force," the company noted.

"In a quarter marked by international conflicts in the Middle East and Ukraine, the Spanish Gas System has operated with 100 percent availability," said Enagás.

"Spanish regasification terminals received natural gas from nine different countries during the quarter and have more than 90 percent LNG storage contracted," it added.

"The underground storages have ended the winter at 78 percent full and with 100 percent of the available capacity contracted," the company added.

Enagás said there was a positive trend in the industrial sector in Spain with an increase of 8.4 percent in demand to reach 47.6 terawatt hours, driven by the refining, chemical, pharmaceutical and cogeneration sectors.

"However, total demand decreased by 4 percent in the first quarter of 2024, compared to the same period of the previous year, due to the drop in demand for gas for electricity generation of 24 percent, and the decrease in domestic commercial demand of 10.3 percent driven by the high temperatures in the winter months," the company explained.

Enagás is also investing in an LNG project in Germany after the final investment decision was taken for the Hanseatic Energy Hub (HEH) joint venture to build Germany's first onshore LNG terminal of which Enagás will be the operator.

Enagás also increased its stake in HEH in March 2024 from 10 percent to 15 percent.

Enagás subsidiaries have also performed well during the first quarter and contributed 13.3 percent more in earnings than in the prior-year quarter.

The company said that in the United States, the Tallgrass Energy subsidiary was on track to achieve adjusted earnings in 2024 of between \$775M and \$815M, according its projections.

"Tallgrass continues to make progress in adapting the Trailblazer gas pipeline to transport carbon-dioxide from ethanol production sites in the Midwest to a storage facility in Wyoming, which will begin operations in 2025," said Enagás.

Regarding the control of operating and financial costs, Enagás has counteracted the impact of inflation on manageable costs, maintaining flat operating expenses.

As of March 31, the company's net debt stood at €3.34 billion, a figure similar to

that of 2023 and with the expectation of maintaining a stable debt position by the end of 2024.

EQT Corp., the leading US natural gas producer in the Appalachian shale basins and an emerging LNG player, reported a dropped in net income in the first quarter of 2024 as prices were lower, sales increased and a merger was agreed with Equitrans Midstream Corp.

Pittsburgh-based EQT, which has shale-gas operations in the Marcellus and Utica formations of western Pennsylvania, Ohio and West Virginia, posted adjusted quarterly net income of \$365 million versus \$669M in the prior-year quarter.

Net cash provided by operating activities came to \$1.156 billion, down from \$1.663Bln in the same three months of 2023.

Total sales volume rose to 534 billion cubic feet equivalent from 459 Bcfe, which EQT said was towards the high-end of guidance adjusted for curtailments and reflected continued operational efficiency gains and strong well performance.

However, free cash flow declined to \$402M versus \$774M in the first quarter of 2023 as prices were lower.

Adjusted earnings per share more than halved to \$0.82 per share from \$1.70 per share in the prior-year quarter.

EQT logged quarterly realised natural gas prices of \$3.22 per thousand feet equivalent compared with \$4.11 per mcfe in the 2023 first quarter.

EQT had secured an agreement in March 2024 for the transformative acquisition of Equitrans Midstream to create a premier vertically integrated natural gas business positioned to be a globally competitive American energy leader.

The companies had said that they would be merging in a combination worth over \$23Bln with Equitrans Midstream's key activities being its operatorships of natural gas gathering systems and the key Mountain Valley Pipeline.

The other quarterly highlight for EQT included signing a second non-binding Heads of Agreement with Texas LNG to upsize liquefaction tolling capacity from 0.5 million tonnes per annum to 2 million tonnes per annum beginning in 2028.

Texas LNG is building a plant at the Port of Brownsville in Texas and is a subsidiary of leading infrastructure developer Glenfarne Energy Transition.

EQT said that its latest quarterly earnings were additionally affected by the previous acquisitions of Tug

Hill and XcL Midstream.

"Gathering expense decreased on a per Mcfe basis for the three months ended March 31 compared to the same period in 2023 due primarily to the lower gathering cost structure that resulted from the company's ownership of the gathering assets acquired through Tug Hill and XcL Midstream," said EQT.

EQT noted that transmission expenses also fell on a per Mcfe basis for the three months due primarily to increased sales volumes from the acquired assets.

"The strong operational momentum we achieved last year has carried over into 2024, with our drilling team continuing to perform at exceptional levels, and our completions team again setting a new company record for pumping hours in the month of March," said President and Chief Executive Toby Z. Rice.

"We also announced the transformational acquisition of Equitrans Midstream during the first quarter," Rice added.

"The combination of EQT and Equitrans Midstream will create America's first large-scale integrated natural gas business, with assets uniquely positioned to create a well-to-watt solution that will power growing baseload demand associated with the data center and artificial intelligence booms that are burgeoning at the doorstep of our asset base," Rice stated.

In EQT's full 2024 outlook, the company updated its expectation of 2024 total sales volumes to 2,100-2,200 Bcfe, which assumes 1 Bcf per day of operated production curtailments through May and embeds future curtailment optionality dependent on market conditions.

The company reiterated its maintenance capital expenditures of \$1.95Bln-\$2.05Bln in 2024 and strategic growth capital expenditures, which target opportunistic, high-return water, midstream and other infrastructure and land opportunities and expected this to total \$200M-\$300M in 2024.

GTT Group, the French LNG storage technology company, has increased its annual list of patent applications made to the Patent and Trademark Office in France, l'Institut National de la Propriété Industrielle.

The GTT group said it filed a total of 64 patents in 2023, an increase compared with 2022, thus maintaining its position as a technological leader in the category of intermediate-sized enterprises (ETIs) in France.

With 61 patents filed with the INPI,

GTT said it secured the second position in the 2023 INPI ranking of patent-filing ETIs.

GTT also filed three more patents with the European Patent Office (EPO) in 2023.

The group's order book has designs for GTT storage and conventional carriers and containment tanks for LNG-powered vessels.

GTT's earnings come from its technology licensing, hence the importance of the patents pipeline.

"Over the past decade, GTT's technological solutions have played a significant role in reducing greenhouse gas emissions from LNG carriers and optimizing the energy performance of its ship-owner clients," explained the Paris-based company.

GTT's core business has been centred around designs for tanks such as the Mark III membrane containment system.

However, GTT said it was now implementing an "ambitious innovation roadmap" in its adjacent markets and in its digital activities, as well as in the field of "zero-carbon" solutions at the subsidiary Elogen.

"With 61 patents filed with INPI and three patents filed with the European Patent Office, 2023 confirms the group's position of excellence in innovation and R&D and underlines GTT's technological stance," said Philippe Berterottière, Chairman and Chief Executive of GTT.

"I would like to extend my congratulations to Soitec for claiming the top spot in 2023 with 62 patents filed in France, and I am pleased to witness the dynamic technological innovation among French mid-sized companies," stated Berterottière.

He was referring to France's Soitec SA, a company that is involved in the microelectronics industry, designing and manufacturing innovative semiconductor materials.

INDIAN liquefied natural gas imports showed a long-awaited surge of over 17 percent in the full fiscal year to the end of March as growing domestic gas output was offset by falling LNG prices and the nation's increasing demand for gas marked by a new West Coast terminal set to start commercial operations soon.

India's LNG imports for the whole fiscal year from April 2023 to the end of March 2024 came to 22.87 million tonnes, up by 17.5 percent from the 19.46MT imported in the previous fiscal year.

LNG imports for the month of March 2024 actually edged lower to 1.87 million

tonnes, which was 0.6 percent down from the 1.88MT received in March 2023.

That's as India's eighth LNG import terminal, the Chhara facility in the West Coast state of Gujarat, received its commissioning cargo on April 12 from the Punta Europa LNG export plant on Bioko Island in the African nation of Equatorial Guinea.

The Chhara LNG import terminal has 5 million tonnes per annum of capacity as been developed by Hindustan Petroleum Corp.

The Ministry import data showed that LNG cargoes for the whole fiscal year from April 2023 to March 2024 cost India 111,181 crore Indian rupees (\$13.30Bln), which was around 22.5 percent lower than the 142,947 crore rupees (\$17.10Bln) paid in the prior fiscal-year period.

Indian LNG imports cost around \$1.1Bln in March 2024 compared with \$1.2Bln in March 2023.

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

The Indian Ministry data showed that domestic natural gas production for the month of March 2024 came to 3.138 Bcm, up by 6.2 percent from the March 2023 total of 2.956 Bcm.

For the whole fiscal year, gas output increased by 5.8 percent to 36.438 Bcm versus 34.450 Bcm in the previous fiscal year.

Reliance Industries, a leading Indian conglomerate with significant energy interests, started up a third gas field in the Krishna Godavari Basin KG-D6 block on the East Coast in July 2023 in a joint venture with BP of the UK.

Reliance and BP brought the MJ field on stream as the third part of a three-field project also involving the R-Cluster and the Satellite-Cluster fields.

The Ministry also gave average capacity utilization rates for the seven LNG terminals now operating and with data covering the first 11 months, one month in arrears, of the fiscal year from April 2023 to February 2024.

The total capacity of existing terminals has now risen to 52.7 MTPA from the eight facilities. However, the Chhara terminal will take several months to appear in the Ministry data book.

The largest Indian terminal at Dahej, located north of Mumbai and operated by Petronet LNG, has capacity of 17.5 MTPA and had the highest utilisation rate which rose to 95.1 percent of capacity.

At the Hazira facility, operated by Shell India, the utilisation rate fell to 31.5 percent from 34.6 percent previously for 5.2 MTPA of capacity.

The GAIL (India) terminal at Dabhol, south of Mumbai, reported an increase to 41.5 percent in throughput from the 36.4 percent 11-month average previously logged for its 5 MTPA.

The West Coast terminal at Mundra reported a rise in utilisation to 12.6 percent from 11.1 percent for 5 MTPA.

At the Kochi facility in the southwest state of Kerala usage edged higher to 20.6 percent versus 20.3 percent previously for 5 MTPA.

At the Kamarajar (Ennore) terminal on the East Coast, capacity usage rose to 17.8 percent from the 17.0 percent registered previously at the facility with 5 MTPA of capacity.

At the second East Coast terminal, owned by the Adani group and TotalEnergies and located at Dhamra in the state of Odisha, the utilisation rate edged lower to 23.1 percent versus 25.1 percent for its 5 MTPA of regasification capacity.

The Ministry said that natural gas consumption for the month of March 2024 was 5.594 Bcm, up by 2.9 percent from March 2023.

The cumulative consumption for the whole fiscal year jumped by 11.1 percent to 66.634 Bcm compared with 59.969 Bcm in the 2022-2023 period.

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

JAPANESE liquefied natural gas imports decreased for a third straight month and were also 8 percent lower for the whole fiscal year to the end of March as storage was still high amid falling spot prices.

Japan's network of 37 terminals handled 5.55 million tonnes, or around 82 cargoes, in March 2024 and this was 3 percent lower than the 5.72MT received in March 2023.

The shipments cost 532.61 billion yen (\$3.45Bln) in March 2024 versus 588.58Bln yen (\$3.81Bln) in March 2023, which was 9 percent lower than in the same month of 2023.

Thermal coal imports in March 24 dropped by 10.4 percent to 7.74 million tonnes and cost 180.17Bln yen (\$1.16Bln), down 50 percent from a year ago.

The data from the Finance Ministry for March 2024 showed that deliveries of LNG from Asian nations like Malaysia and Indonesia amounted to 1.32MT, down 17.6 percent.

Deliveries from countries in the Middle East like Qatar came to 622,000 tonnes in March, a fall of 5.7 percent on March 2023.

US deliveries to Japan in March increased by 44.3 percent year-over-year to 325,000 tonnes, up by 21.5 percent from a year ago, while deliveries from Russia increased by 35.7 percent to 577,000 tonnes.

The balance of the shipments in March came mainly from Australia and the spot market and amounted to 2.71MT during the month.

This portion of the deliveries had amounted to 2.51MT in the previous month of February 2024.

Japan's LNG deliveries for the full fiscal year to the end of March amounted to 63.88MT, which was 8 percent lower than the previous fiscal year.

The Ministry data showed that the cost of the shipments for Japan have dropped 31.7 percent fiscal year-over-fiscal year to 6.058 trillion yen (\$39.20Bln).

Imports from the US during the fiscal year were up by 46.2 percent to 5.83MT while deliveries from Russia declined by 1.6 percent to 6.27MT.

Deliveries from the Middle East in the April 2023 to March 2024 period came to 6.07MT, down 4.2 percent.

Japan's imports from its Asian neighbours in the fiscal year came to 15.40MT, a drop of 15.2 percent from the previous fiscal year.

The balance of 30.3MT received came from the spot market, various African nations but mainly from Australia.

Japan's annual calendar year LNG imports dropped by 8.1 percent in 2023 to 66.15MT compared with China's overall imports of 71.35MT.

Japan is continuing with its nuclear plant re-start programme and a total of 11 nuclear reactors are now back in operation compared with the 54 that were online in 2011 before the Fukushima disaster and which had supplied around 30 percent of Japan's energy needs.

The 11th nuclear restart was the Takahama-1 plant owned by LNG importing utility Kansai Electric Power and this compares with 33 reactors that are capable of re-starting.

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

Takahama-3 and Takahama-4.

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

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

Japan's Tohoku Electric Power has also said that it planned to restart reactor No. 2 at its Onagawa nuclear plant around September 2024 after additional safety construction works had delayed the process.

JERA Co. Inc., the largest Japanese LNG importer, and the Singaporean Energy Market Authority signed an accord to cooperate on mutually beneficial areas in liquefied natural gas procurement and supply chains for Singapore and Japan.

Under the accord, the EMA and JERA said they would share best practices and knowledge in LNG procurement and management of supplies as well as explore collaboration opportunities for cargoes and supply chain management.

Soh Sai Bor, Assistant Chief Executive at EMA, said that natural gas would continue to be a major part of Singapore's energy mix even as the Asian island state pivots to lower carbon sources in the medium to longer term.

"EMA is pleased to partner JERA to mutually strengthen our LNG supply chains," said Soh.

"This is another step forward in Singapore's efforts to enhance the security and reliability of natural gas supply with stable and competitive pricing for our power sector in our energy transition," he stated.

Ryosuke Tsugaru, Senior Managing Executive Officer and Chief Low Carbon Fuel Officer, at JERA said the agreement, in the form of a memorandum of understanding, showed a shared commitment.

"Through this MoU, JERA and the EMA will seek to establish a more stable, resilient, and cost-efficient energy flow into both Japan and Singapore leveraging their mutually complementary relationship," added Tsugaru.

This MoU between EMA and JERA followed an earlier "memorandum of cooperation" on LNG and energy transitions signed in October 2022 between the Ministry of Trade and Industry of Singapore and the Ministry of Economy, Trade and Industry of Japan.

"Both memoranda aim to further strengthen the partnership between Singapore and Japan," the statement

added. The Energy Market Authority is a statutory board under the Singapore Ministry of Trade and Industry.

JERA is a joint venture between the two largest Japanese utilities, TEPCO Fuel & Power Inc. and Chubu Electric Power Co. who produce about 30 percent of all electricity in Japan.

JERA currently buys around 35 million tonnes per annum of LNG.

The Tokyo-based company also oversees the operations and provides fuel for a total of 26 power plants in Japan and imports LNG into 11 of Japan's network of 37 regasification terminals.

JERA is additionally involved in overseas energy trading and in shipping activities.

KINDER MORGAN Inc. (KMI), the leading US pipeline feed-gas company for liquefied natural gas plants and a key energy infrastructure operator and developer, reported an almost 10 percent rise in first-quarter net income with contributions from all business segments while forecasting soaring LNG and pipeline gas exports through 2030.

Net income attributable to KMI amounted to \$746 million compared with \$679M in the first quarter of 2023.

KMI's revenues for the first three months of 2024 were steady and came to \$3.84 billion versus \$3.88Bln in the same quarter of 2023.

"The company got off to a strong start this quarter on increased financial contributions from our Natural Gas Pipelines, Products Pipelines and Terminals business segments," said Chief Executive Kim Dang.

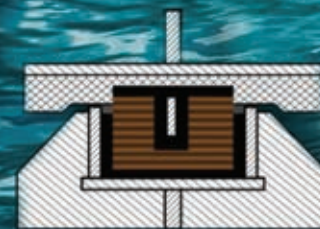
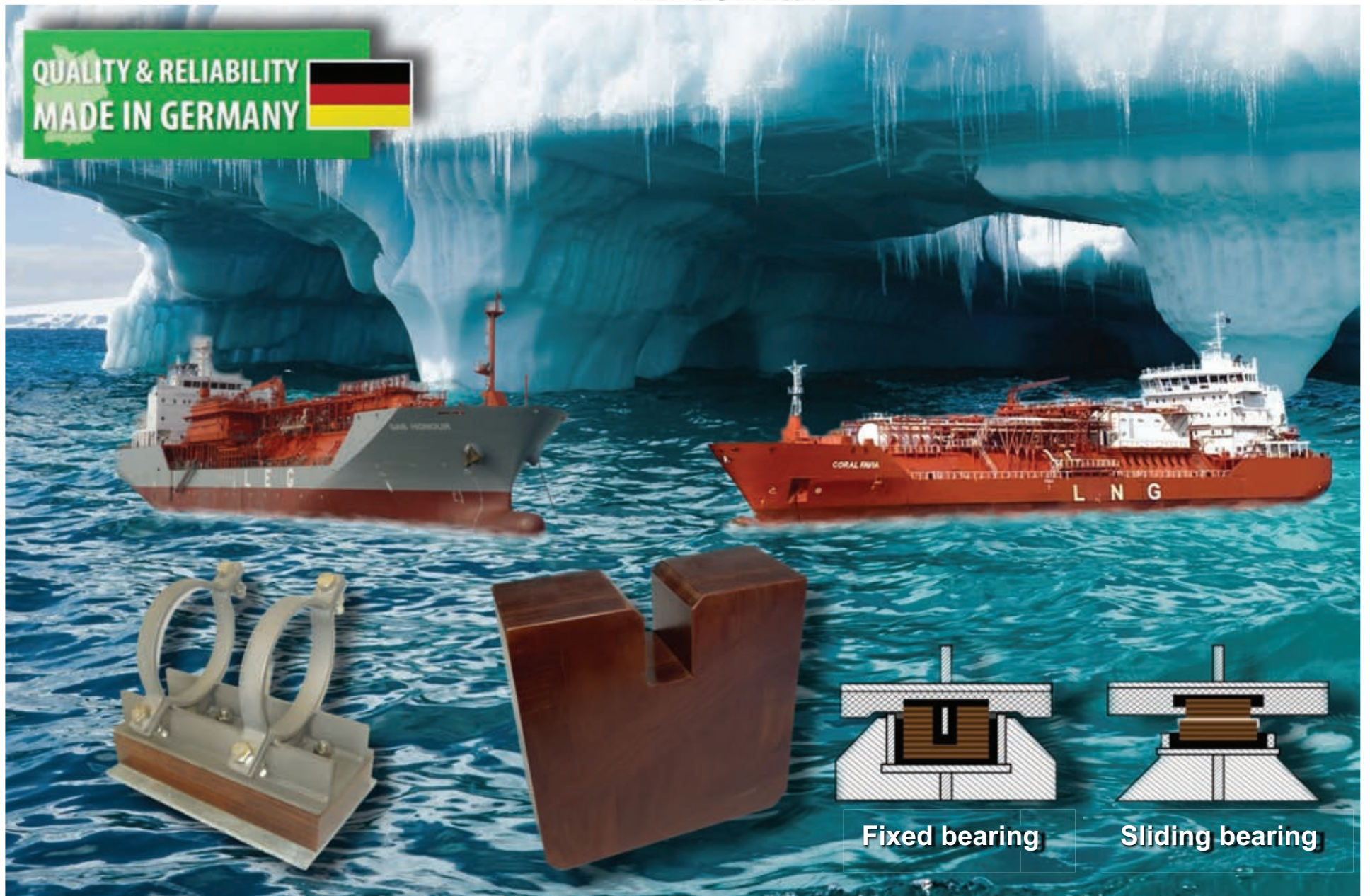
"Notwithstanding the current low natural gas price environment, the future looks very bright for our Natural Gas Pipelines business," Dang stated.

"We expect demand for natural gas to grow substantially between now and 2030, led by more than a doubling of demand for LNG exports and a more than 50 percent increase in exports to Mexico," she forecast.

"We are also anticipating significant new natural gas demand for electric generation associated with artificial intelligence operations, crypto-currency mining and data centers, which would be additive to the growth discussed above," explained Dang.

"It's also important to note that the Biden Administration's 'pause' in approving LNG exports to non-Free Trade Agreement countries, while disappointing, will likely have no impact on our planned projects to support LNG exports," Dang declared.

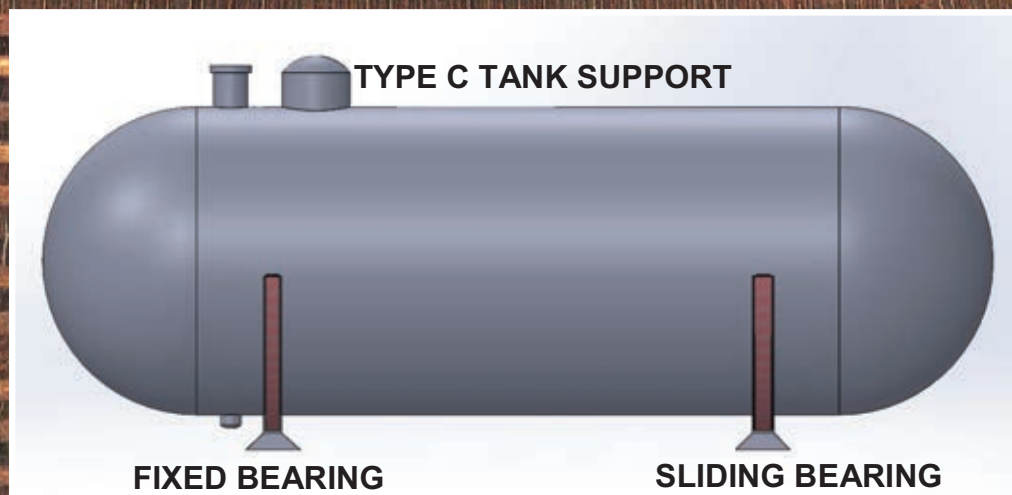
QUALITY & RELIABILITY
MADE IN GERMANY



Fixed bearing



Sliding bearing



DEHONIT® / PERMALI TANK SUPPORTS

- ◆ FOR IMO A, B, C, BILOBE AND TRILOBE TANKS
- ◆ FOR MEMBRANE TANKS
- ◆ FOR VERTICAL IMO TYPE C TANKS

WITH CARGO/ FUEL TYPE

- ◆ LNG, LPG, LH₂, LEG, LCO₂, LNH₃

DEHONIT® / PERMALI MATERIAL IS APPROVED BY

- ◆ DNV (DET NORSKE VERITAS)
- ◆ BV (BUREAU VERITAS)
- ◆ ABS (AMERICAN B. OF SHIPPING)
- ◆ LR (LLOYD'S REGISTER)
- ◆ CLASS NK
- ◆ CCS (CHINA CLASS. SOCIETY)
- ◆ KR (KOREAN REGISTER)
- ◆ GTT
- ◆ DIN ISO 9001:2015

FEATURES OF DEHONIT® / PERMALI

- ◆ MORE THAN 70 YEARS IN SERVICE
- ◆ LOW SPECIFIC WEIGHT
- ◆ HIGH COMPRESSIVE STRENGTH
- ◆ WATER RESISTANT
- ◆ LOW THERMAL CONDUCTIVITY
- ◆ LOW COEFFICIENT OF FRICTION
- ◆ TEMPERATURE STABILITY
- ◆ LOW COEFFICIENT OF LINEAR EXPANSION

KMI issued a 2024 outlook, including contributions from the acquired STX Midstream assets, and said it budgeted net income attributable to KMI was \$2.7Bln (\$1.22 per share), up 15 percent versus 2023.

KMI expects to declare dividends of \$1.15 per share for 2024, a 2 percent increase from the dividends declared for 2023.

The budget assumes average annual prices for West Texas Intermediate (WTI) crude oil and Henry Hub natural gas of \$82 per barrel and \$3.50 per million British thermal unit (MMBtu), respectively.

KMI President Tom Martin commented on the performance of the Natural Gas Pipelines business and all the ongoing projects in Texas, Louisiana and Mississippi.

Martin said that construction was nearly complete on KMI's project to expand the working gas storage capacity at its Markham Storage facility (Markham) in Matagorda County along the Texas Gulf Coast.

The project will add an additional cavern at Markham to provide more than 6 billion cubic feet (Bcf) of incremental working gas storage capacity and 650 million cubic feet per day of incremental withdrawal capacity on KMI's extensive Texas intrastate system.

"Shippers have subscribed to all of the available capacity under long-term agreements," Martin confirmed.

"Partial commercial service began last November, with full commercial service expected in June 2024," he added.

The KMI President said that construction activities continued for the Tejas project, the \$97 million South Texas-to-Houston Market expansion venture.

The project will add compression on Tejas's mainline to increase natural gas deliveries by around 0.35 Bcf per day to Houston markets. The target in-service date is the first quarter of 2025.

Martin added that construction was also underway on an a \$180M expansion of the Kinder Morgan Texas Pipeline (KMTP) system to provide transportation and treating services to lean gas Eagle Ford producers in Webb County.

"The expansion project, supported by a long-term contract, is designed to deliver up to 500 MMcf per day of Eagle Ford natural gas supply into our Intrastate network," Martin noted.

The project is currently on track to be placed in service in November 2024.

Construction has additionally begun on both phases of the Evangeline Pass project.

"The two-phase \$673M project involves modifications and enhancements to portions of the Tennessee Gas Pipeline and Southern Natural Gas systems in Mississippi and Louisiana, which will result in the delivery of approximately 2 Bcf per day of natural gas to Venture Global's proposed Plaquemines LNG facility," Martin said.

He added that the expected in-service date for Phase 1 is July 1, 2024, while the expected in-service date for Phase 2 is July 1, 2025.

The Tennessee Gas Pipeline (TGP) has executed long-term contracts to support its \$63M Muskrat project.

KMI said that the Muskrat project is designed to deliver up to 225 MMcf per day of supply to the Southeast markets. The project includes modifications to TGP's existing compression and auxiliary facilities and is expected to be in service on August 1, 2025.

NATURGY Energy, the power company with LNG operations from Puerto Rico to Europe and pipeline gas networks from Algeria to South America, has seen its shares jump by more than 6 percent amid moves for a takeover by a company from Abu Dhabi in the United Arab Emirates.

Naturgy shares rose by 6.18 percent to €22.84 per share, valuing the company at €22.15Bln (\$23.5Bln), according to the latest quotes on April 17 on the Madrid Stock Exchange, the Bolsa de Madrid.

TAQA, a power and water utility founded in 2005, is hoping to acquire Spain's largest natural gas company, together with contracts with Algeria and also a long-term contract to import some 3 billion cubic metres of Russian LNG per annum. Naturgy also has access to US Gulf Coast cargoes.

Under its formal name, Abu Dhabi National Energy Company (TAQA), the company confirmed press speculation in recent days regarding the Naturgy Energy Group.

TAQA is aiming to acquire the stakes of equity funds that own a large proportion of Naturgy shares.

The UAE company, which is itself listed on Abu Dhabi Securities Exchange (ADX), is an international energy and water operator with a presence in 11 countries.

TAQA said it was in talks with private equity firms CVC and GIP, each owning more than 20 percent of Naturgy, to acquire their stakes.

The Abu Dhabi company also said it was talking to Naturgy's largest shareholder, Criteria Caixa, which owns

a 26.7 percent stake about a possible partnership agreement.

"TAQA confirms it is in discussions with Criteria Caixa in relation to potential cooperation in relation to Naturgy," said the UAE company in a statement.

"TAQA also confirms that it is in discussions with CVC and GIP in relation to a possible acquisition of their shares in Naturgy. If such an acquisition occurs, this would trigger an offer for all the shares of Naturgy," stated TAQA.

It added that no agreements had yet been reached with Criteria Caixa, CVC nor GIP.

"There can be no guarantee of any transaction nor any certainty as to the terms of any potential transaction. There has been no approach by TAQA to Naturgy," TAQA stated.

Naturgy posted net income for 2023 of €1.98 billion (\$2.15Bln) which was an increase on the €1.64Bln (\$1.77Bln) logged in the previous year.

Naturgy's LNG and gas are in the Energy Management division covering the supply of LNG and related maritime transport activity.

The Spanish company also has widespread pipeline natural gas assets in Europe, South America and in North Africa, including the Medgaz Pipeline for natural gas connecting Algerian gas fields to Almeria in southeast Spain.

Naturgy holds a 49 percent stake in Medgaz while Algeria's state oil and gas company Sonatrach owns 51 percent.

Other Naturgy divisions include thermal generation in Spain with nuclear and gas-fired power as well as a Latin American division, Global Power Generation.

This division's activities are in Mexico as well as other large South American nations as well as the Dominican Republic and the US territory of Puerto Rico, with the latter equity's held in the business called EcoEléctrica LP.

Naturgy's operations include gas and power assets in Mexico, Panama and Argentina where demand has been increasing.

The company additionally has natural gas distribution businesses inside and outside of Spain and has access to a 136,272-kilometre (84,670 miles) pipeline gas distribution network.

Naturgy deliveries LNG cargoes to Puerto Rico where it has installed capacity of 540 megawatts of gas-fired power plant that includes an LNG import terminal located in Peñuelas in the south of the island.

Spanish rules require a mandatory

tender offer when a buyer wants to acquire more than 30 percent of a publicly traded company.

They also require any takeover agreements to be approved by Spanish and other regulators.

NEW FORTRESS Energy, the US integrated LNG and power company that owns, operates or provides natural gas to 30 facilities in five countries, has signed an engineering contract to build a gas-fired power plant adjacent to its Barcarena LNG import terminal in Pará, the northeast Brazilian state.

NFE has signed the engineering, procurement and construction contract with a consortium formed by Japan's Mitsubishi Power Americas and Andrade Gutierrez, the Brazilian infrastructure builder, known as the MHI-AG consortium for a 1.6 gigawatts power plant.

The New York-based company has additionally issued full notice to proceed to the MHI-AG consortium.

"The power plant will provide firm power capacity under the previously announced 15-year capacity reserve contract that NFE acquired from Denham Capital and CEIBA Energy, which closed in March 2024," NFE explained.

Under the terms of the fixed-price EPC contract construction activities for the thermal power plant are already in progress with commercial operations scheduled to commence no later than August 2026.

"The power plant will operate under the 15-year agreement with the Brazilian Chamber of Electric Energy Commercialization," NFE added.

NFE completed construction and commissioning of both the Barcarena and Santa Catarina LNG terminals in the first quarter of 2024.

The Santa Catarina terminal is located in the state of the same name in the far south of Brazil.

NFE noted that along with the existing 630 megawatt power plant and 25-year agreement, the Barcarena LNG terminal will now host and supply LNG to more than 2,200 MW of power capacity owned by NFE.

The facility will also supply natural gas to Norsk Hydro's Alunorte alumina refinery under a 15-year contract which commenced in the first quarter of 2024.

"We are very pleased to announce this EPC contract and the start of construction for our 1.6 GW power plant in Barcarena," said Andrew Dete, Managing Director of NFE.

“We are grateful to our partners at Mitsubishi Power and Andrade Gutierrez for their swiftness and collaboration in placing this great project into construction and we look forward to finalizing the work over the next 24 months,” Dete added.

NFE reported in March 2024 that its Puerto Rico gas contract more than doubled the volumes of gas it currently provides to power plants in the US territory in the Caribbean.

The company additionally sold two operating power plants to the Puerto Rico Electric Power Authority (PREPA).

NFE sold the emergency power plants it constructed on behalf of the US Army Corps of Engineers in San Juan and Palo Seco in Puerto Rico to PREPA for \$373 million in cash, subject to certain items and conditions.

In NFE’s “Fast LNG” operation whereby it will produce LNG from feed gas using assorted offshore platforms, it placed into service its first unit offshore the Gulf of Mexico and the first LNG is expected to be shipped by the end of April 2024.

ROYAL VOPAK, the Dutch operator of global energy storage assets, reported a strong first quarter and an increase in net profits as it broadened its activities around the world and planned an LNG import terminal in South Africa.

Vopak posted first-quarter net profits of €105.8 million (\$113M) compared with €103.1M in the same three months of 2023.

The stronger results were driven by more favourable storage demand across different geographies and markets.

Earnings per share continued to improve to €0.85 per share compared with €0.82 per share in the first quarter of 2023.

However, Vopak’s revenues, including exceptional items, were lower for the quarter at €328.2M, down from €361.8M the 2023 quarter.

In South Africa, Vopak together with its South African partner Transnet was appointed to design, develop, construct, finance, operate and maintain an LNG import terminal at the Port of Richards Bay on the Indian Ocean coast in the north of KwaZulu-Natal province.

“Currently market interest is being gauged in order to serve the South African market with an LNG import solution to help provide energy security and accelerate the decarbonization journey,” explained Vopak.

The Rotterdam-based company said it continued to deliver on its strategy in the first quarter to improve its financial and sustainability performance and to grow the business in industrial and gas terminals.

Vopak said demand for infrastructure services remained robust, resulting in an increased proportional occupancy of 93 percent.

“Oil and gas markets were strong, driven by a higher demand for energy, and rerouting of supply chains. Chemical markets remain under pressure, having a limited impact on our chemical distribution terminals so far, while industrial terminals maintained solid results, backed by long-term take-or-pay contracts,” Vopak added.

The company said it continued to grow its footprint in India and acquired a new terminal in Mangalore.

The Aegis Vopak Terminals, which is Vopak’s joint venture with Aegis, is strengthening its leading position through the acquisition of a new terminal in the port of Mangalore which is well-connected to marine and road infrastructure.

The terminal has a capacity of 44,000 cubic metres, 11,000 more under construction and potential for further expansion at a later stage.

The company was also making progress in developing a greenfield liquefied petroleum gas (LPG) export terminal project in Western Canada.

“We are committed to grow our business in industrial and gas infrastructure and accelerate towards new energies and sustainable feedstocks,” Vopak stated.

In other highlights, Vopak collaborated with partners in Singapore to execute an ammonia bunkering operation.

“The vessel successfully loaded liquid ammonia from our existing ammonia infrastructure at our Banyan Terminal on Jurong Island,” said the company.

Also in Singapore, Vopak completed the repurposing of 40,000 cubic metres capacity at Sebarok terminal for blending of biofuels into marine fuels.

In the United States, Vopak said it was continuing efforts to improve its sustainability performance.

Vopak terminals in Long Beach, Los Angeles and Corpus Christi and Houston in Texas are using 100 percent green electricity as of January 2024.

“Globally, we have reached a total of 35 terminals across the world using green electricity,” it added.

SANTOS, the Australian LNG operator, posted a first-quarter decline in LNG sales revenues as prices dropped in various operations, though reported progress in projects in Australia to boost gas resources.

Santos said overall revenues in the first three months of 2024 fell to US\$1.39 billion from US\$1.63Bln in the prior-year quarter, including LNG, domestic gas, crude oil, condensate and liquefied petroleum gas.

Quarterly LNG sales alone amounted to US\$901 million, down from US\$1.07Bln in the same quarter of 2023.

Santos’s LNG projects shipped 53 cargoes in the first quarter, of which five were sold on a Japan-Korea Marker-linked basis, all from PNG offtake.

The company said average realised LNG prices fell to US\$12.68 million British thermal units in the first quarter from \$14.46 MMBtu in the same quarter of 2023.

However, the LNG price was slightly higher than the prior quarter price of US\$12.33 MMBtu to the end of December, while realised prices were higher for oil-linked sales contracts reflecting the lagged Japan Customs-cleared Crude (JCC) prices.

Three-month lagged JCC averaged US\$92.29 a barrel in the first quarter of 2024 compared with US\$83.08 a barrel in the fourth quarter of 2023.

The Gladstone LNG plant in Queensland sent out 27 cargoes, two fewer than in the previous quarter and the same as in the prior-year quarter.

Santos said 60 onshore coal-seam gas well were drilled and 47 connected for the Gladstone plant during the first three months of 2024 to maintain output from the Fairview, Arcadia and Roma CSG fields.

The PNG plant at Caution Bay operated by ExxonMobil Corp. shipped 27 cargoes compared with 30 in the previous three months and 28 in the prior-year quarter.

“Steady production continued at PNG LNG, supported by strong production from Santos-operated fields. LNG production was down on the previous quarter due to a combination of Hides field natural decline and annual preventative maintenance undertaken at the Central Processing Facility during the quarter,” Santos explained.

French major TotalEnergies, operator of the Papua LNG project to expand PNG LNG production, has advised Santos that it would keep working with contractors to agree commercially-viable engineering, procurement and construction contracts to reach an expected final investment decision by 2025.

Santos Chief Executive Kevin

Gallagher said the “strong underlying business performance, combined with a disciplined focus on operational excellence” delivered a “robust” first-quarter result.

“The first quarter brought strong free cash flow which provides a solid foundation for the year ahead. It positions us well to fund shareholder returns, backfill and sustain our existing business, complete our major projects and grow our Santos Energy Solutions business,” Gallagher said.

“I am very pleased that Barossa pipelaying activities are now almost complete and all other Barossa activities are progressing well with first gas expected in the third quarter of 2025,” said Gallagher on the project that will help resume LNG output at the Darwin liquefaction plant in the Northern Territories.

The existing Bayu-Undan field continued to produce gas for the Darwin plant through the first quarter for the domestic market.

“The asset is expected to reach end of field life in the second quarter of 2024,” said Santos.

The Barossa gas and condensate project to backfill Darwin LNG is currently 70.6 percent complete and the integration of the topside modules on the floating production storage and offloading (FPSO) platform continued in Singapore with 13 of 16 modules successfully loaded onto the hull.

The company added that installation of the gas export pipeline for Darwin LNG commenced in November 2023 with 213 kilometres of the 262km pipeline completed to the end of the first quarter. Full completion was expected before the start of May.

Gallagher said that the company’s Pikka oil project in Alaska had made excellent progress over the winter months and was on track for first production in 2026.

“Barossa and Pikka are world-class projects that will be transformative for Santos and set the company up with long-term, stable cash flows for the next 10-15 years at least,” the CEO said.

Gallagher explained that the company’s Moomba carbon-capture and sequestration project in south Australia was on scheduled for the first injections of CO2 this year and would “a game-changer for decarbonising” of Santos operations.

“We can now see line of sight to our major projects progressively coming online in 2024, 2025 and 2026, putting us in a strong position to deliver sustainable, long-term shareholder returns,” Gallagher stated. ■

Explanatory Notes

■ The tables do not include the following types of LNG facilities:

- ♦ Small marine satellite terminals receiving LNG from liquefaction plants in their own country (such as exist in Norway) or which receive LNG transhipped from nearby reception terminals in their own country (such as in Japan)

♦ Satellite LNG storage facilities that receive LNG transported only by road or rail

■ Expansions of LNG reception terminals are only shown if they involve new storage tanks

■ Where there is a blank in the table the information is uncertain or unknown.

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

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

Conventional LNG Terminals

Country	Location (Project)	Owners	Start up	Nom. Capacity (MTPA)	Storage Tanks	Capacity
Belgium	Zeebrugge	Fluxys	1987	6.6	5	566,000
Canada	St. John (Canaport) LNG	Repsol	2009	7.1	3	480,000
Chile	Mejillones LNG	Tractebel Engie, Ameris Capital AGF	2010	1.5	1	187,000
	Quintero	ENAP, Metrogas, Enagas	2009	3.8	3	334,000
China	Beihai LNG	PipeChina	2013	6.0	4	640,000
	Caofeidian LNG	PetroChina	2012	10.0	8	1,280,000
	Caofeidian Xintian LNG	China Suntien Green Energy Corp.	2023	5.0	2	—
	Dalian LNG	PipeChina	2011	6.0	3	480,000
	Dongguan LNG	JOVO Energy	2010	1.5	2	160,000
	Fujian LNG	CNOOC	2008	6.3	6	960,000
	Guangdong Dapeng LNG	CNOOC	2006	6.8	4	640,000
	Hainan LNG	PipeChina	2014	3.0	2	320,000
	Hainan Transfer Station	PetroChina	2020	0.6	2	40,000
	Jiangsu LNG	PetroChina	2011	10.0	5	1,080,000
	Jieyang LNG	PipeChina	2018	4.2	3	480,000
	Nansha LNG	Guangzhou Gas	2023	1.0	2	160,000
	Pinghu LNG	Zhejiang Hangjiaxin Clean Energy	2022	1.0	2	200,000
	Qidong LNG	Guanghui Energy	2009	4.0	5	620,000
	Qingdao LNG	Sinopec	2006	7.0	6	960,000
	Shanghai (Yangshan) LNG	CNOOC	2009	3.0	5	895,000
	Shanghai Peak Shaving	Shenergy	2008	1.5	5	320,000
	Shenzhen Peak Shaving	Hua'an	2012	0.8	1	80,000
	Shenzhen Diefu LNG	PipeChina	2018	4.0	4	640,000
	Tianjin - Nangang LNG	Sinopec	2018	6.0	4	640,000
	Tianjin LNG	PipeChina	2013	6.0	7	397,000
	Tianjin Binhai LNG	Beijing Gas	2023	5	10	—
	Wenzhou LNG	Zhejiang Energy, Sinopec	2023	3.0	4	—
	Yancheng LNG	CNOOC	2022	3.0	4	880,000
	Zhejiang LNG	CNOOC	2018	6.0	6	960,000
	Zhoushan LNG	ENN	2018	5.0	4	640,000
	Zhuhai LNG	CNOOC	2014	3.4	3	480,000
Dominican Republic	Andres LNG	AES Andres	2003	1.9	1	160,000
France	Dunkerque Le Clijton	EDF, Fluxys, TotalEnergies	2016	9.5	3	600,000
	Fos-sur-Mer	TotalEnergies, Elengy	2010	9.2	4	410,000
	Montoir-de-Bretagne	Elengy	1980	8.0	3	360,000
Greece	Revithoussa	DESFA	2000	7.1	3	225,000
India	Cochin	Petronet	2013	5.0	2	368,000
	Dabhol	GAIL, NTPC	2007	5.0	3	480,000
	Dahej	Petronet	2004	17.5	6	932,000
	Ennore LNG	IndianOil LNG	2019	5.0	2	360,000
	Hazira	Shell, TotalEnergies	2005	5.0	2	320,000
	Mundra LNG	Adani, GSP	2019	5.0	2	320,000
	Dhamra LNG	Adani, TotalEnergies	2023	6.5	2	360,000
Indonesia	Arun Conversion	Pertamina	2015	3.0	4	508,000
Italy	Panigaglia	Snam	1963	2.5	2	100,000
	Rovigo Adriatic LNG	QatarEnergy, ExxonMobil, Snam	2009	6.6	2	250,000
Jamaica	Montego Bay	New Fortress Energy	2020	0.5	7	7,000
Japan	Chita	JERA, Toho Gas	1977	24.0	14	1,560,000
	Fukuoka	Saibu Gas	1993	0.8	1	70,000
	Futtsu	JERA	1985	20.0	10	1,110,000
	Hachinohe	ENEOS	2015	1.6	2	280,000
	Hatsukaichi	Hiroshima Gas	1996	0.9	2	170,000
	Hibiki LNG	Saibu Gas, Kitakyushu Gas	2014	4.0	2	360,000
	Higashi-Ogishima	Tokyo Electric	1984	15.0	9	540,000
	Himeji	Kansai Electric, Osaka Gas	1979	12.9	15	1,360,000
	Hitachi LNG	JERA	2015	2.2	2	230,000
	Ishikari LNG	Hokkaido Gas	2012	1.4	1	180,000
	Joetsu LNG	JERA	2012	2.3	3	540,000
	Kagoshima	JERA	1996	0.2	1	86,000
	Kawagoe	Chubu Electric	1997	8.0	3	480,000
	Mizushima	Chugoku Electric, ENEOS	2006	1.7	2	320,000
	Nagasaki LNG	Saibu Gas	2003	0.1	1	35,000
	Nakagusuku LNG	Okinawa Electric	2012	0.7	2	280,000
	Negishi	TEPCO, JERA	1969	11.0	14	1,180,000
	Niigata	Tohoku Electric	1984	10.0	8	720,000

Conventional LNG Terminals (Continued)

Country	Location (Project)	Owners	Start up	Nom. Capacity (MTPA)	Storage Tanks	Storage Capacity
Japan (continued)	Ogishima	JERA	1998	3.0	4	850,000
	Oita	Kyushu Electric	1990	5.1	5	460,000
	Sakai	Kansai Electric	2006	6.4	4	420,000
	Sakaide	Shikoku Electric, Cosmo Oil, Shikoku-Gas	2010	1.2	1	180,000
	Senboku	Osaka Gas	1972	12.5	20	1,675,000
	Shin Sendai	Tohoku Electric	2016	1.0	2	320,000
	Sodegaura	JERA	1973	29.4	35	2,660,000
	Sodeshi Shimizu	Shizuoka Gas, ENEOS	1996	2.9	3	337,200
	Soma LNG	JAPEX	2018	1.5	2	460,000
	Tobata Ward	Kita-Kyushu LNG	1977	7.6	8	480,000
	Toyama LNG	Hokuriku Electric	2018	1.8	1	180,000
	Yanai	Chugoku Electric	1990	2.4	6	480,000
	Yokkaichi	Chubu Electric	1987	7.2	2	320,000
Kuwait	Al Zour LNG	KIPIC	2022	22.0	8	1,800,000
Malaysia	Pengerang LNG	Petronas	2017	3.5	2	400,000
Mexico	Energia Costa Azul	Sempra	2008	7.6	2	320,000
	Manzanillo	Samsung, KOGAS, Mitsui	2012	3.8	2	300,000
Netherlands	Maasvlakte Gate Terminal	Gasunie	2011	8.9	3	540,000
Panama	AES Costa Norte LNG	AES	2018	1.5	1	130,000
Philippines	PHLNG	AG&P	2023	5.0	1	137,512
Poland	Swinoujscie LNG	Polskie LNG	2015	3.6	2	320,000
Portugal	Sines	REN	2004	5.6	3	390,000
Puerto Rico	Penuelas	EcoElectrica	2000	1.4	1	160,000
Singapore	Singapore LNG	Singapore LNG Corp.	2013	11.0	4	800,000
South Korea	Boryeong	GS Energy	2017	10.8	6	1,200,000
	Gwangyang	POSCO Energy	2005	7.1	5	730,000
	Incheon	KOGAS	1996	54.4	23	3,480,000
	Pyeongtaek	KOGAS	1986	41.0	23	3,360,000
	Samcheok	KOGAS	2014	11.6	12	2,400,000
	Tongyeong	KOGAS	2002	26.6	17	2,600,000
	Jeju Island	KOGAS	2019	1.1	2	90,000
Spain	Bahia de Bizkaia LNG	BP, Enagás, EVE	2003	6.9	3	450,000
	Barcelona	Enagás	1969	12.6	6	760,000
	Cartagena	Enagás	1989	8.7	5	587,000
	Huelva	Enagás	1988	8.7	5	619,500
	Mugardos	Reganosa	2007	2.6	2	300,000
	Sagunto	Enagás	2006	6.4	4	600,000
	El Musel	Enagás	2023	5.8	2	300,000
Taiwan	Taichung	CPC	2009	7.0	6	960,000
	Yung-An	CPC	1990	10.5	6	690,000
Thailand	Map Ta Phut LNG	PTT	2011	19.0	6	940,000
Turkey	Izmir	EgeGaz	2006	10.6	2	280,000
	Marmara Ereglisi	BOTAS	1994	4.2	3	255,000
UK	Dragon LNG	Shell, Ancala Partners	2009	6.5	2	320,000
	Isle of Grain	National Grid	2005	14.8	8	1,000,000
	South Hook LNG	QatarEnergy, ExxonMobil, TotalEnergies	2009	15.6	5	775,000
United States	Everett Marine Terminal	Constellation Energy	1971	5.1	2	155,000
Vietnam	Thi Vai LNG	PetroVietnam Gas	2023	1.0	1	180,000

FSRU Terminals

Country	Location (Project)	Owners	Start up
Argentina	Escobar GasPort	Excelerate/Enarsa	2011
	Bahia Blanca	YPF	2023
Bangladesh	Moheshkhali	Excelerate, PetroBangla	2018
	Cox's Bazar	Summit Power International, Excelerate Energy	2019
Brazil	Pecem, FSRU	Petrobras	2009
	Guanabara Bay FSRU	Petrobras	2009
	Salvador, Bahia FSRU	Petrobras	2013
	Porto Sergipe FSRU	Golar LNG/Stonepeak	2020
	Porto do Acu FSRU	GNA	2020
	Terminal Gás Sul	New Fortress Energy	2024
China	Tianjin FSRU	CNOOC, Hoegh, various	2013
Croatia	Hrvatska LNG	Hrvatska Elektroprivreda Plc, Plinacro Ltd	2021
Colombia	Cartagena FSRU	Promigas, Sociedad Portuaria El Cayao	2016
Egypt	Ain Sokhna, Suez	EGAS, BW Gas	2015
El Salvador	Acajutla	Energía del Pacífico	2022
Finland	Inkoo FSRU	Gasgrid Finland	2022
France	Le Havre	TotalEnergies	2023
Germany	Wilhelmshaven FSRU	Uniper	2022
	Lubmin FSRU	Deutsche ReGas	2022
	Brunsbüttel	RWE	2023
Ghana	Tema LNG	Helios/GNPC	2021
Greece	Revithoussa FSU	DESFA	2022
	Alexandroupolis	Gastrade	2024
Hong Kong, China	FSRU Bauhinia	CLP Power	2023

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

Future LNG Import Projects

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

LNG Export Plants

Country	Location/Project	Shareholders	Start up	Liquefaction		Storage	
				Trains	Nom. capacity (MTPA)	No. of tanks	Capacity m ³
UAE	Das Island	ADNOC, Mitsui, BP, TotalEnergies	1977/1994	3	5.7	3	240,000
Algeria	Arzew	Sonatrach	1964-2014	13	20.8	6	920,000
	Skikda	Sonatrach	1980/2013	4	7.9	5	308,000
Angola	Soyo	Sonangol, Chevron, BP, Eni, TotalEnergies	2012	1	5.2	2	370,000
Australia	NWS LNG	BP, Chevron, MIMI, Shell, Woodside Energy, CNOOC	1989-2004	5	16.3	6	520,000
	Darwin LNG	Santos, Eni, INPEX, JERA, Tokyo Gas	2006	1	3.7	1	188,000
	Australia Pacific LNG	ConocoPhillips, Origin, Sinopec	2016	2	9.0	2	320,000
	Gladstone LNG	Santos, Petronas, TotalEnergies, KOGAS	2015-2016	2	7.8	2	280,000
	Gorgon LNG	Chevron, Shell, ExxonMobil, Osaka Gas, Tokyo Gas, JERA	2016-2017	3	15.6	2	360,000
	Pluto LNG	Woodside Energy, Kansai Electric, Tokyo Gas	2012	1	4.9	2	240,000
	Queensland C. LNG	Shell, CNOOC	2014	2	4.5	2	280,000
	Wheatstone LNG	Chevron, KUFPEC, Woodside Petroleum, Kyushu Electric Power Co., PEW	2017	2	8.9	2	300,000
	Ichthys LNG	INPEX, TotalEnergies, CPC, Tokyo Gas, Osaka Gas, Kansai Electric, JERA, Toho Gas	2018	2	8.9	2	330,000
	Prelude FLNG	Shell, INPEX, CPC, KOGAS	2018	1	3.6	6	228,000
Brunei	Brunei LNG	Gov. of Brunei, Shell, Mitsubishi	1972-74	5	7.2	3	195,000
Cameroon	Cameroon FLNG	Golar LNG	2018	4	2.4	1	125,000
Egypt	Damietta	Eni, EGAS, EGPC	2004	1	5.0	2	300,000
	Idku	EGPC, EGAS, Shell, Petronas, TotalEnergies	2005	1	7.2	2	280,000
Equ. Guinea	EG LNG	Marathon, Sonagas, Marubeni	2007	1	3.4	2	272,000
Indonesia	Bontang (E-H)	Pertamina, VICO, JILCO, TotalEnergies	1990-1998	4	11.5	5	635,000
	Dongi-Senoro	Medco Energi, Pertamina, Mitsubishi	2015	1	2.0	1	170,000
	Tangguh	BP, Mitsubishi, Inpex, CNOOC, JX Nippon, KG Mitsui, LNG Japan	2008-2023	3	11.4	2	340,000
Malaysia	Malaysia LNG	Petronas, Shell, Sarawak, Mitsubishi, Nippon Oil	1983-2016	9	29.3	6	445,000
	PFLNG Satu	Petronas	2016	1	1.2	4	177,000
	PFLNG Dua	Petronas	2020	1	1.5	4	177,000
Mozambique	Coral Sul FLNG	Eni, ExxonMobil, CNPC, GALP, KOGAS, ENH	2022	1	3.4	8	227,840
Nigeria	Bonny Island	NNPC, Shell, TotalEnergies, Eni	1999-2007	6	22.2	6	505,200
Norway	Snøhvit LNG	Equinor, TotalEnergies, Petoro, Neptune Energy, Wintershall DEA Norge	2007	1	4.2	2	250,000
Oman	Oman LNG	Oman Gov., Shell, TotalEnergies, Korea LNG, Mitsubishi, Mitsui, Partex O&G, Itochu Corp.	2000	3	10.4	4	480,000
Papua New Guinea	PNG LNG	ExxonMobil, Oil Search, Santos, JX Nippon Oil	2014	2	8.3	2	320,000
Peru	Pampa Melchorita	Hunt Oil, Shell, Marubeni, SK Group	2010	1	4.5	2	260,000
Qatar	Ras Laffan	QatarEnergy, Shell, ExxonMobil, TotalEnergies, ConocoPhillips et al.	1997-2010	14	77.4	18	2,340,000
Republic of the Congo	Congo FLNG Ph. I	Eni	2024	1	0.6	1	177,000
Russia	Sakhalin-2 LNG	Gazprom, Sakhalin Energy, Mitsubishi, Mitsui	2009	2	9.6	2	200,000
	Yamal LNG	Novatek, TotalEnergies, CNPC, Silk Road Investment Fund	2017-2019	3	17.4	4	640,000
	Portovaya LNG	Gazprom	2022	1	1.5	-	-
Trinidad & Tobago	Atlantic LNG	BP, Shell, NGC	1999-2005	4	15.3	4	640,000
USA	Sabine Pass LNG	Cheniere	2016-2022	6	30.0	5	800,000
	Corpus Christi LNG	Cheniere	2019-2021	3	15.0	3	480,000
	Freeport LNG	Freeport LNG, JERA, Osaka Gas	2019-2020	3	15.5	3	480,000
	Cameron LNG	Sempra, TotalEnergies, Mitsui, Mitsubishi	2019	3	15.0	3	480,000
	Calcasieu Pass LNG	VentureGlobal	2022-2023	18	11.3	2	440,000
	Cove Point LNG	BHE GT&S, Dominion Energy, Brookfield Asset Management	2017	1	5.3	7	695,000
	Elba Island LNG	Kinder Morgan, EIG Energy, Blackstone	2019-2020	10	2.5	5	560,000
Yemen	Balhaf LNG (Mothballed)	TotalEnergies, Hunt Oil, SK Innovation, Hyundai, KOGAS, Yemen Gas Corp., GASSP	2009	2	6.7	2	320,000

LNG Export Projects U. Construction

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

Future LNG Export Projects

Country	Project	Project Developers	Estimated Start Up	Number of Trains	Capacity In MTPA
Argentina	Vaca Muerta (YPF) LNG	YPF	2024+	—	5.37
Australia	Browse FLNG	Woodside Energy, Japan Australia LNG, Shell, BP, PetroChina	—	2	11.4
	Darwin LNG Life Extension	Santos, SK E&S, JERA, INPEX, Eni SpA, Tokyo Gas	2025	1	3.7
	Pluto LNG T2	Woodside Burrup Train 2A Pty Ltd., Global Infrastructure Partners	2026	1	5
Cameroon	Etinde FLNG	Perenco, Bowleven	2023+	—	1.3
Canada	Bear Head LNG	Bear Head LNG	2027	4	12
	Cedar FLNG	Haisla Nation, Pembina Pipeline Corp.	2027	—	3
	Energie Saguenay LNG	GNL Quebec	2026	2	11
	Ksi Lisims FLNG	Ksi Lisims LNG GP Ltd.	2027	—	12
	Placentia Bay FLNG	Horizon Maritime Services, LNG Newfoundland and Labrador Ltd.	2030	—	4
	Tilbury Island LNG T1	FortisBC	2026	1	0.9
	Tilbury Island LNG T2	FortisBC	2028	1	2.5
Equatorial Guinea	Fortuna FLNG	New Fortress Energy	—	1	—
Gabon	Boudji FLNG	Petronas	—	—	—
Guinea	Guinea LNG	West Africa LNG Group	2026+	1	—
Indonesia	Abadi FLNG	INPEX Masela Ltd.	2030	—	9.5
Israel	NewMed FLNG	NewMed Energy	2026	—	5
Mauritania	New Fortress Banda LNG	New Fortress Energy	2024	—	1.4
Mexico	Mexico Pacific LNG Ph. I	AECOM Capital, DKRW Energy	2025	2	9.4
	Mexico Pacific LNG Ph. II	AECOM Capital, DKRW Energy	2026+	1	4.7
	AMIGO LNG	Epsilon LNG, LNG Alliance	2026	1	4.2
	Vista Pacifico LNG	Sempra Energy	2025+	—	4
	Lakach FLNG	New Fortress Energy	—	1	1.4
	Altamira FLNG	New Fortress Energy	—	2	2.8
Mozambique	Rovuma LNG	Eni, ExxonMobil, CNPC, ENH, Galp, KOGAS	2025+	2	15.2
Nigeria	Brass LNG	Brass LNG Ltd.	—	2	10
	Greenville LNG	Greenville LNG	—	1	1.1
	UTM Offshore FLNG	UTM Offshore	2026	—	1.52
Papua New Guinea	Papua LNG	TotalEnergies, ExxonMobil, Papua New Guinea Gov., Santos	2027	2	5.4
	PNG LNG Expansion	ExxonMobil, Kumul Petroleum, Santos, JX Nippon O&G, MRDC	2025	1	2.6
Republic of the Congo	Congo FLNG Ph. II	Eni Congo	2025	1	2.4
Russia	Yakutia LNG	A-Property, Globaltek, Zhejiang Energy	2027	—	18
	Far East LNG I	ExxonMobil, SODECO, ONGC, Rosneft	2027+	1	6.2
	Far East LNG II	ExxonMobil, SODECO, ONGC, Rosneft	2035	1	10
	Vladivostok LNG	Gazprom, INPEX, Itochu Corp., JAPEX, Marubeni Corp.	2025	3	1.5
	Arctic LNG II	Novatek	2027	—	19.8
	Obssky LNG	Novatek	2026	—	6.6
	Chernomorsky LNG	Gazprom	2025	—	1.5
	Arctic LNG III	OOO Arctic LNG 3	2032	—	19.8
	Kara LNG	Rosneft	2030	—	30
Tanzania	Tanzania LNG	Equinor, ExxonMobil, Ophir Energy, Pavilion Energy, Shell, TPDC	2027	2	10
United Arab Emirates	Ruwais (ex Fujairah) LNG	ADNOC	2027+	2	6
United States	Fourchon LNG	Energy World	—	1	2
	Alaska LNG	Alaska Gasline Development Corp.	2030	3	20.1
	Cameron LNG Expansion	Cameron LNG LLC	2026	1	6.75
	Commonwealth LNG	Commonwealth LNG	2026	6	9.3
	Corpus Christi LNG Midscale Expansion	Cheniere Energy	2031	2	3.28
	Delfin FLNG	Delfin LNG LLC	2026+	4	12
	Driftwood LNG T1-5	Tellurian	—	5	27.6
	Freeport LNG Expansion	Freeport LNG Dev.	2026	1	5.1
	Gulf LNG	KinderMorgan	—	2	10.86
	Lake Charles LNG	Energy Transfer	2026+	3	17.79
	Magnolia LNG	Glenfarne Group	—	4	8.8
	Port Arthur LNG Ph. I	PALNG Common Facilities Co., Port Arthur LNG, LLC	—	2	13.5
	Port Arthur LNG Ph. II	PALNG Common Facilities Co., Port Arthur LNG, LLC	—	2	13.5
	Texas LNG	Glenfarne Energy Transition	2027	2	4
	Rio Grande LNG Ph. I	NextDecade	2026	2	10.8
	Rio Grande LNG Ph. II	NextDecade	—	3	16.2
	Pointe LNG	Pointe LNG, Pointe Pipeline Co.	2026	3	6
	Repauno Works LNG	Delaware River Partners LLC	—	—	1.5
	Qilak LNG	Qilak Energyy	2026	—	4
	CP2 LNG Ph. I	Venture Global	2026+	9	10
	CP2 LNG Ph. II	Venture Global	2027+	9	10
	Delta LNG Ph. I	Venture Global	2028+	—	10
	Delta LNG Ph. II	Venture Global	2029+	—	10
	West Delta LNG Deepwater Port	LNG21 Group	2026+	6	6.1
	Grand Isle FLNG	New Fortress Energy	2025+	—	2.8



NEXUS OF CLEAN™

"Chart's vision is to be the global leader in the design, engineering and manufacturing of cryogenic process technologies and equipment for the Nexus of Clean™ — **clean power, clean water, clean food and clean industrials**, regardless of molecule."

A handwritten signature in blue ink, appearing to read "Jill".

JILL EVANKO / CEO / CHART INDUSTRIES

CLEAN
CLEAN
CLEAN
CLEAN

 CHART DELIVERS CLEAN SOLUTIONS FOR



Power



Water



Food



Industrials



Learn more at chartindustries.com



EXHIBITION & CONFERENCE
GEORGE R BROWN CONVENTION CENTER | HOUSTON | 17-20 SEPTEMBER 2024

Co-Hosts



Gastech Houston 2024

Transforming energy through
vision, innovation and action

BOOK A
DELEGATE
PASS



Organized by:

dmg::events

gastechevent.com @gastechevent #Gastech