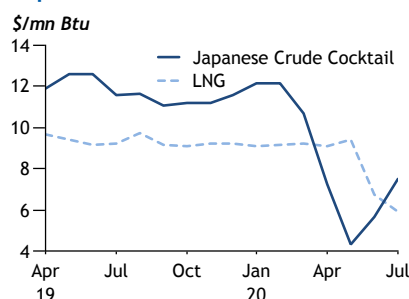


## Scenarios reveal very different outcomes for the industry after 2025, writes Livia Gallarati

### Japanese LNG vs crude



Key price points	\$/mn	
	Aug	Sep
Zeebrugge gas month-ahead	1.77	2.82
US Nymex month 1	1.76	2.26
US LNG import price	na	na
Japanese Crude Cocktail	7.90	8.40
Japanese LNG import price	5.90	5.47

– Markets and data pp13-28

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## Pandemic, climate to test LNG's future: IEA

A delayed recovery from the Covid-19 pandemic and stronger climate policies could loosen the supply-demand balance of the global LNG market over the next decade, the International Energy Agency (IEA) says.

The LNG market remains amply supplied in the first couple of years following the onset of Covid-19 in all four of the IEA's scenarios in its *World Energy Outlook 2020*. But the picture could diverge by 2025, with each of the agency's scenarios revealing very different outcomes for the LNG industry.

A supply gap emerges in the late 2020s in the stated policies scenario (STEPS), in which Covid-19 is gradually brought under control in 2021 and governments pursue today's announced policy intentions and targets. As-yet-unsanctioned LNG projects with an additional 50bn m<sup>3</sup>/yr (39mn t/yr) of production capacity need to come on line by 2030 to meet rising gas demand under this scenario, which reaches 4.6 trillion m<sup>3</sup>/yr by the same year.

But if recovery is delayed because of extended Covid-19 outbreaks and a deeper economic slump, as in the IEA's delayed recovery scenario (DRS), or if there were to be a concerted policy push for sustainable recovery, as in the sustainable development scenario (SDS), the liquefaction capacity existing or under construction today continues to operate below capacity until 2025 and is sufficient to meet global demand through the end of this decade.

The DRS is designed with the same policy assumptions as in the STEPS, but the global economy returns to its pre-crisis size only in 2023, while in the SDS a surge in clean energy policies and investment puts the energy system on track to achieve sustainable energy objectives in full, including the Paris climate agreement, energy access and air quality goals.

### Buyers to seek better contractual terms

A global glut until the mid-2020s maintains downward pressure on LNG prices in the STEPS, which may encourage buyers to seek better contractual terms.

Buyers are likely to be looking for significant concessions on pricing and volumes in new deals, with LNG contracts totalling about 150bn m<sup>3</sup>/yr scheduled to expire by the mid-2020s, the IEA says. About half of all gas traded over long distances is still priced against oil at present, with gas importers tied to long-term purchase obligations that prevent them from fully taking advantage of loose market conditions. This particularly affects buyers in Asia that paid, on average, two-thirds more for their gas supplies in 2020 than if they had paid spot prices.

But sellers may only be able to meet buyers halfway, and in any case, may struggle to offer long-term supply at anything near the spot prices seen in 2020. With the exception of Qatar and some low-cost brownfield developments in Russia, new gas export projects need to sell gas at a delivered cost of \$6-8/mn Btu to break even, the IEA says. Prices in the main importing regions of Europe and Asia only rise to these levels after 2025 under the STEPS as the global supply surplus recedes, the IEA says. But while this price trajectory would remunerate investment in new supplies, it raises questions about the long-term affordability of gas, particularly for price-sensitive buyers in the emerging Asian markets that account for the bulk of the natural gas demand growth in the STEPS.

## QATAR

**Capacity growth of more than 126mn t/yr would make project approvals difficult elsewhere, given the demand dent caused by Covid-19, writes Livia Gallarati**

**More investment in LNG supply is warranted now that demand is rebounding from the pandemic**

## Expansion plans hang over investment outlook

Expansion at Qatari state-owned QP's 77mn t/yr Ras Laffan LNG facility will be a "decisive moment" that determines the supply-demand balance for the remainder of this decade, industry executives say.

Qatar is working on plans to boost its liquefaction capacity to 110mn t/yr by 2025 by adding four trains at Ras Laffan. A second phase could expand capacity to 126mn t/yr by 2027, and energy minister Saad Sherida al-Kaabi in mid-October reaffirmed the potential for [growth beyond 126mn t/yr](#). Once Qatar gives the go-ahead for its expansion, it will make project approvals challenging for other LNG producers.

Only brownfield projects might be able to reach a final investment decision (FID), Total vice-president for LNG marketing and shipping Andrew Seck told the Energy Intelligence Forum last month. Total is developing the 12.9mn t/yr Mozambique LNG project, which it acquired in 2019. Construction work at the project, which reached an FID last June, is back to pre-Covid-19 levels, with first LNG expected in 2024, in line with the original schedule, Seck says.

More investment in LNG supply is warranted now that demand is rebounding from the pandemic, according to Hiroki Sato, senior executive vice-president of Japan's largest thermal power operator, Jera. Some firms reacted to the demand crunch by freezing investment. State-controlled Saudi Aramco has pushed back plans for its debut push into LNG from the short to medium and longer term, chief executive Amin Nasser says. Aramco is involved in the [13.5mn t/yr Port Arthur LNG export facility](#) on the US Gulf coast with local firm Sempra LNG, but an FID has been delayed until 2021.

"Gas is not for the faint-hearted," LNG producer Malaysian state-owned Petronas' chief executive Tengku Muhammad Taufik told the forum. No new LNG supply projects [have been approved this year](#), after Covid-19 undermined gas demand and exacerbated a supply glut following a mild northern hemisphere winter, knocking LNG prices to record lows. Before the pandemic struck, the volume of new export capacity approved in 2020 was expected to be similar to [last year's record of more than 70mn t/yr](#), based on announced project timelines.

Only projects that can produce LNG at the lowest cost will be sanctioned, US producer Venture Global's chief commercial officer, Tom Earl, says. Venture Global took an FID on the 10mn t/yr Calcasieu Pass LNG project in Louisiana last year. First LNG is expected at the end of 2021 or in early 2022, Earl says. But the firm has yet to fund its 20mn t/yr Plaquemines and Delta LNG projects.

### 2020s vision

The global LNG market is expected to remain amply supplied in the first couple of years following the onset of Covid-19, under all four scenarios presented by the IEA in its [World Energy Outlook 2020](#) this week. But the picture could diverge by 2025, with each of its scenarios revealing very different outcomes for LNG.

A supply gap emerges in the late 2020s in the stated policies scenario, which outlines a future where Covid-19 is gradually brought under control in 2021. Currently unsanctioned LNG projects representing an additional 39mn t/yr of capacity need to come on line by 2030 to meet rising gas demand in this scenario.

But if a recovery is delayed because of extended virus outbreaks and a deeper economic slump, as in the delayed recovery scenario, or if there were to be a concerted policy push for sustainable recovery, as in the sustainable development scenario, the liquefaction capacity existing or under construction today would continue to operate below capacity in the first half of this decade and remain sufficient to meet global demand through to the end of this decade.

US

**Exports were buoyed by recent capacity additions that raised US liquefaction capacity from last year, writes Livia Gallarati**

**LNG exports rise in October**

US LNG exports rose on the year in October – the first year-on-year increase since May – as additional liquefaction capacity more than offset shutdowns resulting from maintenance and hurricanes.

Loadings at the six operational US export terminals rose to 4.82mn t in October from 3.9mn t a year earlier, judging by vessel size. Exports had held below year-ago levels since May, as Covid-19 weighed on gas demand and delivered LNG prices to such an extent that it became uneconomic to lift US cargoes. Numerous June-September loadings were cancelled by offtakers, but there were fewer turndowns in October, with about 10 cargoes cancelled.

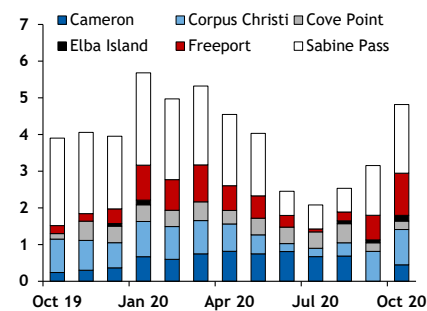
US October exports were buoyed as recent capacity additions left the country’s liquefaction capacity 23.8mn t/yr up on the year. Additions include Cameron LNG’s 5mn t/yr third train and Elba Island’s 10th 400,000 t/yr train in August. But all six terminals produced below capacity in October.

Maintenance on 21 September-12 October left exports from the 5.75mn t/yr Cove Point plant at 230,000t in October. Loadings at the 15mn t/yr Freeport LNG facility totalled 1.15mn t, as the first train was shut down following a fire on 21 October. Freeport LNG said the train is expected to return in a few days.

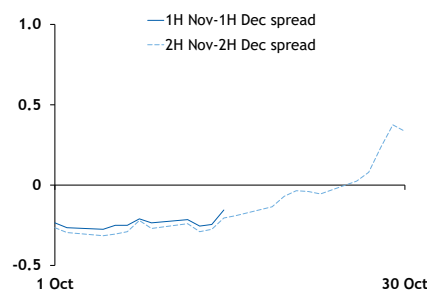
The 15mn t/yr Cameron LNG facility resumed exports on 21 October, having halted for Hurricane Delta in mid-October. It had loaded just one cargo, on 5 October, after a 44-day shutdown following Hurricane Laura in late August. Cameron exported 450,000t in October, up from 302,000t a year earlier.

Trade shifted to the Pacific, tracking the inter-basin arbitrage. About 52pc of October’s loadings were for south and northeast Asian markets, up from 46pc a year earlier. Central and South American countries took 22pc, up from 12pc, while Europe’s share fell to 26pc from 42pc.

**US LNG exports** mn t



**ANEA 2020 time spreads** \$/mn Btu



**Floating storage increases**

The number of US October loadings slow sailing was up on the year, although inter-month des price spreads were tighter. At least 13 vessels that loaded a US cargo last month were declaring for delivery more than five weeks after their loading date. Only about a month is required for delivery from the US to northeast Asia. Six cargoes loaded in October 2019 were delivered more than five weeks after loading.

About 53pc of US shipments to northeast Asia sailed through the Panama Canal, with the rest taking a week longer to round the Cape of Good Hope. In October 2019, 80pc of US deliveries to northeast Asia transited the Panama Canal.

Tight prompt Atlantic availability and high demand from northeast Asia supported ANEA prompt prices in the second half of October, giving US producers an incentive to deliver cargoes promptly.

**Freeport LNG shuts down train 1 after fire**

The 15mn t/yr Freeport LNG plant on the US Gulf coast shut down its first liquefaction train for two and a half weeks after a fire broke out. A small fire was discovered by officials investigating a trip of the low-pressure mixed refrigerant compressor on train 1 that occurred on 21 October. Freeport had restarted the train by 9 November and continues to investigate the cause of the fire. Fires have caused disruptions at other US liquefaction terminals in recent months. In May, a fire erupted at Kinder Morgan’s 4mn t/yr Elba liquefaction facility in Georgia in a mixed refrigerant compressor of unit 2, shutting down that unit and temporarily, as a precaution, two adjacent units.

## AUSTRALIA

*The shutdown of Gorgon's two other liquefaction trains remains unchanged, writes Camille Klass*

*Safety regulator DMIRS is satisfied with Chevron's progress and its management of safety issues*

## Chevron to restart Gorgon LNG train 2 in 2H November

Plant operator Chevron expects to restart production at the second train at its 15.6mn t/yr Gorgon LNG project in Western Australia in the second half of this month, with weld repairs to the train's propane heat exchangers now completed.

The second-half November timing for production to resume marks the second time the restart date was pushed back since Gorgon's second train was taken off line for scheduled maintenance on 23 May. The train was scheduled to return to production on 11 July but has remained off line for extended maintenance to address weld defects on its propane heat exchangers.

Chevron originally [planned to restart production in September](#). But in early September, it pushed the train's restart back to October, which was when it had expected repairs to the propane heat exchangers to be completed.

The sequencing of the shutdown of Gorgon's three liquefaction trains remains unchanged despite the delay to the second train's restart. Chevron expects the first train to be taken out of service for inspection of its propane heat exchangers after the second train is back on line. The third will be inspected once the first train has returned to normal operations.

Chevron did not provide more specific dates for the restart of train 2 or the shutdowns of trains 1 and 3. The firm also did not provide specific guidance in its announcement on 21 August when it said it planned to temporarily halt production at train 1 to inspect and conduct repairs on its propane heat exchangers, if necessary, following the planned restart of train 2 in September.

Chevron said at the time that the repair and restart of train 1 could take 45-90 days based on its experience with train 2 and that the combined outcomes from trains 1 and 2 would inform the activity and timing for train 3.

Australian safety regulator the Department of Mines, Industry Regulation and Safety (DMIRS) had instructed Chevron to inspect the propane heat exchangers at trains 1 and 3 in view of the discovery of weld defects on propane heat exchangers at the second train during maintenance in July. It had proposed a shutdown schedule of early October and January 2021 for Gorgon's train 1 and train 3 on 21 August following its revision to an earlier remediation notice for the two trains to be inspected by 21 August.

DMIRS' director of dangerous goods and petroleum safety, Steve Emery, told *Argus* that the regulator and Chevron have agreed to an inspection and repair schedule for the propane vessels at the firm's Gorgon LNG plant. The department is satisfied with Chevron's progress and its management of safety issues, he says.

Chevron, along with its project partners, ExxonMobil and Shell, has term supply contracts with customers including Japan's Jera, Eneos – formerly known as JX Nippon Oil and Energy – Tokyo Gas, Kyushu Electric Power and Osaka Gas, China's PetroChina, India's Petronet, South Korea's SK and GS Caltex and BP.

### Prelude production shutdown prolonged

Shell does not expect its 3.6mn t/yr *Prelude* floating liquefaction unit off-shore northern Australia to return to full operations before the end of this year. The project has been off line since February after an electrical supply issue halted LNG production, leading *Prelude* to cease loadings. *Prelude*, which loaded its first cargo in June 2019, can load about four 160,000m<sup>3</sup> cargoes a month at nameplate capacity, but it loaded a maximum of three in a single month before halting production, averaging two a month in the eight months that it was on line, data from oil analytics firm Vortexa show.

## AUSTRALIA

*The plant has already exceeded its output guidance for the year, writes Kevin Morrison*

### Gladstone LNG's July-September sales stutter

The 7.8mn t/yr Gladstone LNG (GLNG) plant in Australia's Queensland state reported a rise in sales to 1.3mn t in the July-September quarter from 1.2mn t a year earlier, but it was down by 5.2pc from 1.37mn t in the previous quarter.

GLNG produced 4.24mn t in January-September, up from 3.77mn t in the same nine-month period in 2019, GLNG operator and 30pc owner Australian independent Santos says. This implies that GLNG will have to sell at least 1.66mn t in October-December to meet its 5.9mn-6.1mn t [output guidance](#) for 2020.

LNG production was lower than in the previous quarter because of a one-month planned [statutory maintenance](#) shutdown of LNG train 2 in July, combined with customers exercising contractual flexibility from lower demand resulting from the Covid-19 pandemic, Santos says.

GLNG is one of three LNG plants in which Santos owns a share. It increased its stake in the 3.7mn t/yr Darwin LNG in the Northern Territory (NT) to 68.4pc after [buying ConocoPhillips' share](#).

July-September sales and production were higher than the previous quarter, reflecting Santos' higher equity interest in the Bayu-Undan field in the Timor Sea, which provides gas feedstock to Darwin LNG, while spot sales partially offset customers exercising contractual flexibility on LNG cargoes. The two spot cargoes loaded in August and September were the first to be marketed by Santos on behalf of Darwin LNG since Santos became operator and were the two largest cargoes ever loaded at Darwin LNG, it says.

Bayu-Undan production will enter a prolonged decline in the coming years, with Santos and its Darwin LNG partners looking to backfill the plant with gas from the Barossa project in the Bonaparte basin offshore NT. Santos is still targeting Barossa to be ready for a final investment decision by the end of this year.

## AUSTRALIA

*A rise in spot trade sales helped the firm maintain its production guidance for this year, writes Kevin Morrison*

### Woodside boosts July-September LNG sales

Australian independent Woodside Petroleum's LNG sales rose from a year earlier in July-September, thanks largely to increased spot trade sales.

Total LNG sales were 2.28mn t in the third quarter, up from 2.11mn t in July-September 2019 but down slightly from 2.35mn t in [April-June](#). The quarter-on-quarter fall stemmed mainly from maintenance on the third train of the 16.3mn t/yr North West Shelf LNG venture offshore Western Australia (WA).

The 2.5mn t/yr third train was scheduled for maintenance in April-June but this was delayed to July-September because of the Covid-19 pandemic. The 4.4mn t/yr fourth train was scheduled to shut in the July-September quarter, along with the Goodwyn A platform, but Woodside did not confirm whether this took place.

Woodside sold 26pc of the LNG it produced on a spot basis during the quarter. It expects this proportion to be about 30pc in 2020 as a whole, compared with its [August guidance of 25-30pc](#). Woodside maintained its production guidance for 2020 of 97mn-103mn bl of oil equivalent (265,000-281,000 boe/d), up from 89.6mn boe in 2019.

Woodside's other two LNG projects are its 90pc-owned 4.3mn t/yr Pluto LNG venture and 13pc interest in the Chevron-operated 8.9mn t/yr Wheatstone LNG venture, both offshore WA.

Pluto produced at an average of 14,551 t/d in July-September, or an annualised rate of 5.33mn t/yr – almost 24pc above the plant's nameplate capacity. Wheatstone produced at an average rate of 26,738 t/d in the third quarter, an annualised rate of 9.79mn t/yr that is 10pc above its nameplate capacity.

## RUSSIA

*Russian independent Novatek's four export projects in the far north will need to stay on track if the country is to meet its LNG goals, writes Anastasia Goreva*

*Russia aims to ensure year-round navigation along the NSR in 2025-30 by adding three new nuclear icebreakers to the fleet of four*

## Kremlin Arctic LNG strategy dependent on Novatek

Russia's Arctic strategy to 2035 has been approved by President Vladimir Putin, including LNG output targets and a development timeline for shipping on the Northern Sea Route (NSR) through Arctic waters. The government has been ordered to prepare plans for implementing the three-stage strategy by February.

But achieving the country's LNG goals is entirely reliant on independent gas producer Novatek commissioning four new export projects in Russia's far north.

During phase one, in 2020-25, LNG output is expected to rise to 43mn t/yr, from 8.6mn t/yr in 2018. But this first target could prove hard to meet because only two Novatek-led Arctic projects have a high chance of operating at capacity – the 17.44mn t/yr Yamal LNG and under-construction 19.8mn t/yr Arctic LNG 2.

The 940,000 t/yr fourth, and final, production train at Yamal LNG should be commissioned late this year. Novatek's development plan for Arctic LNG 2 on the Gydan peninsula sees the first of three 6.6mn t/yr trains coming on stream in 2023, with the others following in 2024 and 2026. The commissioning of Novatek's 5mn t/yr Obsky LNG project on the Yamal peninsula has been pushed back to 2024, but no investment decision has been taken and changes may yet be made.

Novatek is also leading the state-backed development of LNG transshipment hubs at Kamchatka and Murmansk in Russia's Arctic region, aiming for start-up in 2022, although the strategy document does not refer to these projects.

The 2025-30 second stage of the strategy sets a more achievable 64mn t/yr output target, if Novatek fulfils its project development plans. It aims to commission the 19.8mn t/yr Arctic LNG 1 project by 2030. Its 2030 strategy targets output of 57mn-70mn t/yr, although it could be revised higher in the next two years, it says.

Russia aims to ensure year-round navigation along the NSR in 2025-30 by adding three new nuclear icebreakers to the fleet of four operated by state-owned Rosatom by 2025. The NSR is the shortest, cheapest route to Asia-Pacific and year-round navigation is crucial for Novatek's Arctic export projects to be viable.

During stage three, in 2030-35, Russia expects LNG production of 91mn t/yr. The main addition would come from Novatek's proposed Arctic LNG 3 project, although it has not yet given a capacity for the plant.

Russian state-controlled Gazprom may decide on LNG exports from its 800bn m<sup>3</sup> Tambei field cluster on the Yamal peninsula after 2030 – an option considered for output of 55bn m<sup>3</sup>/yr alongside pipeline marketing. But it has not set a date for commissioning the Tambei fields or decided a marketing strategy.

Russia plans to build a fourth nuclear icebreaker for Rosatom by 2030, to provide support as shipments along the NSR steadily rise.

## Rosneft reveals arctic LNG plan

Russia's Rosneft may add an LNG plant to its planned Vostok Oil project in Russia's arctic, although it has yet to confirm whether there are sufficient gas reserves to support it. The proposed 35mn-50mn t/yr LNG facility would be next to the Vostok Oil project's planned Sever port on the Taimyr peninsula, which will be able to load 100mn t/yr of crude and 50mn t/yr of coal, according to a presentation by Rosneft chief executive Igor Sechin at the Eurasian Economic Forum in Verona, Italy. Russian state-owned bank Sberbank estimates that LNG capacity of 35mn-50mn t/yr is comparable with Russia's total LNG capacity, "including existing projects and projects currently under construction", and suggests the plant could cost at least \$30bn and require at least 1.2 trillion m<sup>3</sup> of proven and probable gas reserves in place to be viable.

## RUSSIA

*The firm hopes that an expected rise in Asian consumption will buoy global LNG demand growth, write Anastasia Goreva and Ellie Holbrook*

## Gazprom to boost sales in 2020

Russian state-controlled Gazprom plans to sell 6mn t of LNG this year, up from 4.3mn t in 2019, Gazpromexport general director Elena Burmistrova says.

The firm sold 3.65mn t in the first half of this year, meaning it would have to export 2.35mn t in the second half to meet its target.

The firm expects Europe's LNG imports to fall next year, with quicker pipeline receipts from Russia and a slowdown in global liquefaction capacity growth owing to commissioning delays for new export projects. European LNG and gas demand next year could also be cut by restrictions imposed to slow the spread of the Covid-19 outbreak, which would weaken energy consumption in the region, Burmistrova says. But rising Asian consumption will support global LNG demand growth.

Growing LNG bunkering demand in Europe, coupled with lower European domestic production, could provide opportunities for Europe to import more LNG in the future, Burmistrova says. European gas demand will also be supported by coal-to-gas fuel switching, which Gazprom sees as a potential in Germany.

Gazprom's LNG exports are expected to further increase next year once the planned 1.5mn t/yr Portovaya export facility is commissioned. But the commissioning of the Portovaya project has been [pushed back multiple times](#). Gazprom intended to start operations at Portovaya LNG in 2018, but this was later pushed back to 2019 and again to 2020.

Gazprom has term supply contracts for 900,000 t/yr with Austrian oil firm OMV and about 2.5mn t/yr with Indian state-owned Gail. Most of the company's LNG sales are in Asia-Pacific, handled by subsidiaries Gazprom Marketing and Trading Singapore and Gazprom Global LNG. Gazpromexport manages sales to OMV.

Gazprom has contracts for up to 2.9mn t/yr of supply from the Novatek-led 17.44mn t/yr Yamal LNG project and the 1.2mn t/yr Kribi plant offshore Cameroon. Its LNG portfolio includes a 1mn t/yr share of output from the Gazprom-led 9.6mn t/yr Sakhalin 2 project in Russia's far east and spot market purchases.

## RUSSIA

*Further output rises are expected later this year with the company's fourth train soon to start operations, writes Ellie Holbrook*

## Yamal LNG exports rise in October

Exports from Russian independent Novatek's 16.5mn t/yr Yamal facility rose year on year in October, with a larger share of shipments heading to Asia-Pacific.

Yamal loaded 21 cargoes last month, data from analytics firm Vortexa show, in line with a year earlier, but exports edged up to 1.6mn t from 1.51mn t judging by vessel size. Exports also rose from 1.58mn t in September, when output may have been curbed by works on the planned fourth 940,000 t/yr train.

Yamal's output may rise further by the end of this year, with commissioning works for the fourth train scheduled to begin in the "upcoming weeks", [Novatek said on 29 October](#). Once the train has started operations, it will add about one cargo a month to Yamal output, with all its production planned for sale on the spot market.

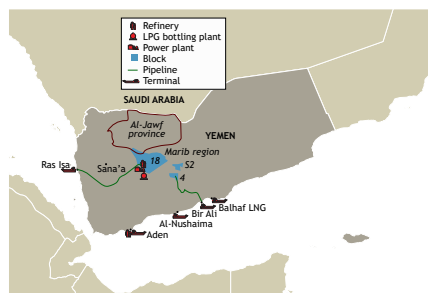
Asia-Pacific took a 28.5pc share of Yamal's October production, vessel tracking data show, up from 19pc a year earlier but down from 60pc in August and 57pc in September.

Four cargoes loaded last month were shipped via the Northern Sea Route (NSR) to northeast Asia, up from only one a year earlier but down from eight in August and nine in September. One cargo was transhipped in Europe for delivery to Asia-Pacific, in line with a year earlier but down from two in September. Yamal also shipped less through the Suez Canal without performing a transshipment last month, with only one vessel taking the route, down from two a year earlier.

## YEMEN

**Tensions are rising in Shabwa province at the same time as its local government is coming into conflict with shareholders in Balhaf LNG, writes Adal Mirza**

## Yemen energy infrastructure



## Balhaf plant back in the firing line?

Yemen's Balhaf LNG facility – out of commission since 2015 because of the country's civil war – could soon be in the firing line from renewed conflict in southern Yemen, raising the risk of damage to an already-beleaguered energy sector.

The 6.7mn t/yr LNG plant in the province of Shabwa is operated by Yemen LNG, an international and Yemeni consortium led by France's Total. But tensions have been mounting as the local government is looking to take over control of the facility. Along with the other shareholders, Total continues to finance the upkeep of the complex, which remains in good condition. But part of the plant hosts a military base for UAE-led operations in southern Yemen.

UAE forces control access to the terminal, but the local authorities have been calling for them to pull out and hand over the site and for a resumption of LNG exports, which they claim the UAE is blocking – despite no gas being produced upstream and there being no potential offtakers. Yemen's oil and gas facilities remain hugely valuable assets to the competing armed groups hoping to control them. And friction is growing in the wider Shabwa governorate, whose local government is dominated by the Islah party – a Sunni Islamist group with ties to the Muslim Brotherhood – which the UAE sees as just as big a threat in Yemen as the Houthi rebels fighting the Saudi-backed government forces in the north.

Most Shabwa crude comes from block S2, operated by Austria's OMV and restarted in 2018. Shabwa remains under government control. State-owned Safer operates block 18, once Yemen's most prolific oil-producing block, which provided feedgas for Balhaf LNG. Associated gas from the block is being reinjected to maintain reservoir pressure. But in the longer term, sustained block 18 crude output could enable gas flows to resume to Balhaf. Any attempt to forcibly take over Balhaf by the Islah-led Shabwa government could result in damage to the plant.

In the north, the Houthis this year have been pushing to capture Marib, a key oil-producing region and the internationally recognised government's final major northern stronghold. It also hosts a refinery, a power plant and one of Yemen's few LPG bottling plants – all key revenue sources.

A Houthi conquest would harden Yemen's north-south divide and bolster the separatist Southern Transitional Council, based in Aden and once backed by the UAE. This would have major implications for the energy sector, given the split between where reserves and export infrastructure are located (see map).

"They are already largely bifurcated, with the exception of Yemen LNG," a local source says. "The French were literally agitating against federalism in 2012-14 because of the issues it would cause Total. It would be even worse if the south seceded."

## IN BRIEF

## Egypt's Zohr output to fall further below capacity

Production from Egypt's Zohr field is expected to fall further below capacity this year, with decreasing domestic demand and limited LNG exports. Production from the 850bn m<sup>3</sup> field was about 2.2bn ft<sup>3</sup>/d (62.3mn m<sup>3</sup>/d) in the third quarter and is expected to average 2bn ft<sup>3</sup>/d in 2020, Italy's Eni says. Egypt's 7.2mn t/yr Idku terminal has loaded 10 cargoes this year, down from 44 shipments by this point in 2019, as LNG prices fell below the cost of Egyptian production. Loadings should resume this winter as long-term offtakers have a take-or-pay minimum of about 20 cargoes for 2020. But Zohr is not expected to reach its 3.2bn ft<sup>3</sup>/d production capacity for another "couple of years at best", as it will require a full recovery of Egypt's domestic demand and an "improvement" of export capacity, Eni says.



## GLOBAL

*This year will be bleak for overall consumption but the next two decades will see a steady recovery, writes Livia Gallarati*

## Gas demand to fall by record 3pc this year: IEA

Global natural gas demand is expected to fall by 3pc this year compared with 2019 – the largest annual fall since gas emerged as a major fuel in the 1930s – as a result of Covid-19 and associated lockdowns, according to the Paris-based IEA's *World Energy Outlook 2020*.

The IEA previously expected demand to **fall by 2.7-5.0pc this year**. But gas has been more resilient to the immediate impact of the Covid-19 crisis than oil and coal, with demand for these fuels expected to fall by 8pc and 7pc, respectively, the IEA said, adding that overall global energy demand is set to decrease by 5pc this year.

The IEA also expects energy investment to fall by 18pc this year, with no new LNG supply project likely to get the green light in 2020. A supply gap in global LNG markets could emerge from the late 2020s, creating opportunities for as-yet-unsanctioned projects.

Gas demand recovers quickly from this year's drop in the IEA's stated policies scenario (STEPS), under which the pandemic is gradually brought under control in 2021 and all of today's announced policy intentions and targets are taken into account. Demand rebounds by almost 3pc in 2021, then rises to 14pc above 2019 levels by 2030 to 4.6 trillion m<sup>3</sup>/yr.

Consumption then continues to rise at 1.2pc/yr over the following decade, reaching 5.2 trillion m<sup>3</sup>/yr by 2040. Annual growth in the 2020s is expected to be slightly lower than in the agency's pre-crisis projections, because cost-effective fuel switching previously foreseen as taking place after 2030 now is expected to take place this decade.

### Eastern promises

The rise in gas demand over the next two decades will be concentrated in south and east Asia, where policy drivers, combined with a lower natural gas price outlook, underpin the expansion of gas infrastructure. But consumption in advanced economies will decline slightly through to 2040 – the first time this has been projected in the STEPS.

Opportunities to displace coal are projected to be largely exhausted in advanced economies by the mid-2020s, with natural gas facing increasingly strong competition from renewables, efficiency, electrification of end-use demand and from alternative low-carbon gases – especially in Europe.

Under the STEPS, EU gas demand in 2030 is expected to be 8pc lower than last year.

But under the IEA's sustainable development scenario (SDS) – which takes into account policies needed to comply with the Paris climate agreement – a surge in clean energy policies and investment would put the energy system on track to achieve sustainable energy objectives in full, rendering all of the gas demand growth to 2030 projected in the STEPS unnecessary.

Global gas demand recovers slightly and exceeds 2019 levels throughout the mid-2020s in the SDS, but it peaks shortly after the middle of this decade and returns to 2019 levels by 2030.

India is the only major economy forecast to record greater natural gas demand in 2040 in the SDS than under the STEPS, although steady growth is also projected in China.

In emerging market and developing economies, gas demand growth peters out before 2040 in the SDS.

The scenario sees global gas consumption dropping to 3.5 trillion m<sup>3</sup> by 2040 – more than 10pc lower than in 2019 – and remaining on a declining trend.

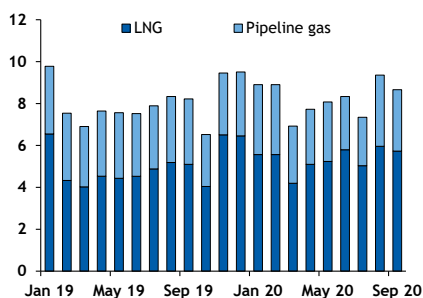
*The rise in gas demand over the next two decades will be concentrated in south and east Asia*

## CHINA

*The country's rising domestic gas output growth could hamper its need for more LNG going forward, writes Livia Gallarati*

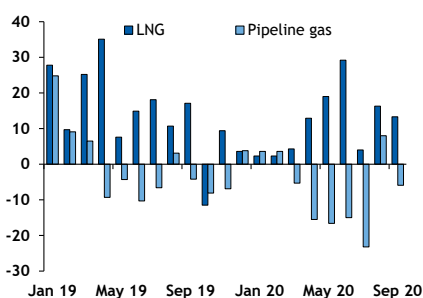
## China's gas imports

mn t



## China's gas imports, y-o-y growth

%



## LNG imports rise in September

China's LNG imports rose in September from a year earlier as the country showed signs of economic recovery since the Covid-19 outbreak.

The country's LNG receipts rose to 5.73mn t last month from 5.1mn t a year earlier, data from China's General Administration of Customs show. The year-on-year growth, at 13.3pc, was lower than the 16.3pc increase in August but up from 4pc in July. It averaged 11.7pc in the first half of this year, with import growth particularly strong in the second quarter, while the pandemic weighed more on growth in the first quarter.

Pipeline gas deliveries fell by 5.9pc to 2.93mn t in September from 3.12mn t a year earlier. Pipeline imports **rose on the year in August** for the first time since January-February, with falls in oil prices in March having provided an incentive to maintain slow deliveries of oil-linked volumes in recent months.

Flows from Russia's Power of Siberia (PoS) pipeline project, which started to deliver gas to China in December last year, quickened in recent weeks from previous months. Gazprom supplied 20pc more than its contracted daily commitment on 19 October, with PoS sales rising steadily, **the firm said in late October**. But flows could still fall short of the 5bn m<sup>3</sup> scheduled for delivery this year. Gazprom used the line to supply 2.4bn m<sup>3</sup> to China in January-August, Chinese customs data show, suggesting flows would need to more than double to 21.3mn m<sup>3</sup>/d in September-December to meet the 5bn m<sup>3</sup> annual contract quantity.

Aggregate gas imports, at 8.66mn t, were higher on the year in September and the second-highest after August since January-February. LNG receipts were also higher in the third quarter than in the first and second quarters.

China's domestic gas output growth accelerated in September to 14.6bn m<sup>3</sup> from 13.5bn m<sup>3</sup> in September 2019. This equates to year-on-year growth of 8pc, from 2.9pc in August and 2.5pc in July. Output in January-June grew by 10.9pc on the year, while full-year 2019 production growth was 9.3pc. China's domestic gas output growth was expected to slow in the second half of this year, and the quicker-than-expected rise in production could limit the country's need for LNG imports.

China's apparent gas demand has increased in recent months as the country recovered from the coronavirus outbreak. GDP increased by 4.9pc from a year earlier in the third quarter, according to the national statistics bureau. This was an acceleration from year-on-year growth of 3.2pc for April-June and follows a first-quarter decline of 6.8pc. Apparent gas demand grew by **3.6pc in the first nine months** of this year, China's main economic planning agency NDRC said in late October, with estimates based on customs data showing demand growing more sharply in the third quarter.

## PetroChina expects higher imports in 2020

China's biggest gas importer, state-controlled PetroChina, expects to import 70bn m<sup>3</sup> of natural gas this year, up by 2pc on 2019, with pipeline supplies making up almost 70pc of the total, according to the general manager of the natural gas department at PetroChina International, Wang Lei. PetroChina's total gas imports in 2019 were 68.5bn m<sup>3</sup>, with 50.1bn m<sup>3</sup> being pipeline imports and 18.4bn m<sup>3</sup> (13.34mn t) LNG. Wang expects relatively expensive pipeline imports from central Asia to fall by 14pc to 39bn m<sup>3</sup> this year from 45.4bn m<sup>3</sup> in 2019. The remaining pipeline imports will come from Russia and Myanmar, at about 4bn m<sup>3</sup> each. PetroChina is the country's sole importer of pipeline gas. It accounted for 52pc of China's total natural gas imports last year.

## DOMINICAN REPUBLIC

*Capacity of the country's gas-fired plants is projected to grow to 43pc of demand, writes Canute James*

### Imports to soar on plant conversions

The Dominican Republic's LNG imports are poised to soar on the back of power plant conversions from oil.

The conversions will help lift the country's gas-generated capacity to 40pc of demand at the end of 2020, against a current 27.6pc, independent power producers' (IPP's) federation Adie said on 5 November.

The capacity of gas-fired plants will grow to 43pc of demand by the end of 2021, reflecting the implementation by the IPPs of a [government-promoted programme](#) to convert about 1GW of oil-burning capacity.

"We anticipate gas imports will reach about 130 Bcf in the final quarter of 2021 as the plant conversion programme nears its end," the Dominican energy ministry tells *Argus*.

LNG sendout reached 44.62 Bcf in the first half of 2020, up by 1pc on a year earlier, according to central bank data. Sendout was 96.4 Bcf in 2019, up by 23pc from 2018 and more than twice the 2014 volume.

US utility AES subsidiary AES Dominicana operates the country's Andres re-gasification terminal, which currently imports LNG from the US and Trinidad and Tobago. AES is adding 120,000m<sup>3</sup> of storage capacity at its Boca Chica terminal, bringing the total to 280,000m<sup>3</sup> by early 2023.

The most recent power plant conversion was Dominican Republic IPP CESPMP's 300MW plant in San Pedro de Macoris that previously burned diesel.

Coal-fired plants currently account for 36.3pc of the country's 2.1GW of installed capacity, with oil products at 19.1pc and renewables (hydropower, wind, solar and biomass) at 17.1pc, according to Adie.

The conversions are facilitated by a new 50km (31mi) gas pipeline from Boca Chica in Punta Caucedo to San Pedro de Macoris.

Power production costs currently average just over \$0.07/kWh, 40pc less than a year ago, and will fall to \$0.05/kWh by the end of 2020 and remain in that range during 2021, Adie says.

"The future of energy generation is based on natural gas and renewables," new president Luis Abinader said at the October commissioning of the CESPMP plant. "That is the government's goal."

## PUERTO RICO

*The company could raise its gas exports to the country to as much as 3bn m<sup>3</sup>/yr, writes Eleanor Holbrook*

### Naturgy extends supply deal with power authority

Spanish firm Naturgy has extended and expanded its long-term supply agreement with the Puerto Rico Electric Power Authority to 2032 from 2020.

Naturgy now will supply Puerto Rico with 2bn m<sup>3</sup>/yr of gas – equivalent to 1.5mn t/yr of LNG – with the possibility of supplying 3bn m<sup>3</sup>/yr – 2.3mn t/yr – "depending on Puerto Rico's gas needs", the firm says. The supply will be 100pc indexed to the US Henry Hub.

Puerto Rico's import capacity rose in [February](#), with the start-up of US firm New Fortress Energy's (NFE's) 1.05mn t/yr San Juan LNG-to-power project. NFE was in the process of [contracting supply](#) for San Juan through to 2025 and aimed to contract 80pc of overall volumes once all of its other projects hit "run rate".

The San Juan import facility is Puerto Rico's second, joining the 1.5mn t/yr Penuelas import terminal in which Naturgy holds a 47.5pc stake.

Puerto Rico is unable to import LNG directly from the US because of a 100-year-old protectionist shipping regulation known as the Jones Act, which requires traffic between US ports to be conducted on US-flagged, US-crewed and US-built ships. No LNG carriers currently in service meet these criteria.

## ARGENTINA

**Breaking the contractual terms has left YPF indebted to Exmar for the next 18 months, write Samuel Good and Daniel Politi**

## Exmar, YPF terminate Tango FLNG charter

Belgian shipowner Exmar and Argentina's state-controlled YPF have ended a charter for the 500,000 t/yr *Tango* floating liquefaction (FLNG) unit in Bahia Blanca.

YPF declared *force majeure* on the FLNG charter earlier this year, stating that it was unable to meet contractual payments to owner Exmar because of issues related to Covid-19. The project's two term-chartered LNG carriers have also been sublet on the spot and short-term charter markets.

The Argentinian firm will pay \$150mn to Exmar under the early charter termination agreement, \$22mn of which was paid immediately, with the remaining \$128mn scheduled over the coming 18 months. The charter was for 10 years.

YPF's late-2018 agreement with Exmar was celebrated by the company and the administration of then-president Mauricio Macri as a sign that Argentina's gas production was rising after a decade of imports to meet domestic demand.

The landmark deal coincided with the end of a contract for Exceletrate Energy's 150,900m<sup>3</sup> *Exemplar* FSRU that was installed in 2008, one of two LNG import terminals in the country. In the end, the LNG export business proved to be a money-losing proposition for YPF. The state-controlled firm lost money in each of the five LNG cargoes that it exported starting in mid-2019. According to YPF's calculations, it would have needed at least \$6-\$7/mn Btu to break even on the exports and it ended up receiving less than half of that for each cargo on average.

Argentina still imports LNG at the Escobar terminal to supplement its production and pipeline imports from Bolivia during the southern hemisphere's winter months, when heating demand soars.

## ARGENTINA

**Companies have neglected gas in favour of oil projects because of low prices, leading to the risk of a supply crunch, writes Daniel Politi**

## Buenos Aires outlines gas subsidy plans

Argentina has launched a long-awaited [gas subsidy](#) programme that seeks to stimulate production and allow it to cut back on costly imports.

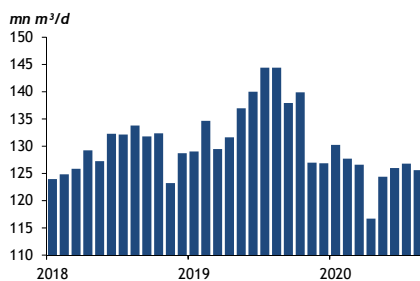
The programme will supply about 70mn m<sup>3</sup>/d to distributors and power generators through state-controlled electricity wholesaler Cammesa under three-year contracts, according to energy secretary Dario Martinez. The gas will be priced below a government-set cap of \$3.70/mn Btu. The subsidy scheme does not have an official start date yet but will run to 2023, and is expected to save \$5.63bn in imports. The cost of the programme has been pegged at just over \$5bn, according to the energy secretariat.

The subsidies should drive plans by state-controlled YPF to invest \$1.8bn in upstream gas projects over the next three years, President Alberto Fernandez says. Firms involved in the programme are expected to invest \$5bn in the gas sector over its duration, according to government estimates.

Producers receive \$2.00-2.50/mn Btu at present for their gas, which they say is not enough to develop the vast shale resources in Argentina's Vaca Muerta formation. Firms have switched much of their focus to oil as a result, contributing to a fall in production that has raised fears that imports will surge during the southern hemisphere winter, when gas demand for heating soars. Measures enacted owing to Covid-19, including a freeze on residential utility tariffs, have also hit [production](#).

Argentina imports gas from Bolivia and through the 3.7mn t/yr Escobar LNG terminal in Buenos Aires province. On the export side, companies that offer the lowest prices in the subsidised tenders will be prioritised in agreements for pipeline sales to Chile. Argentina's gas output fell by 7.5pc to 125.6mn m<sup>3</sup>/d in January-August from a year earlier, energy secretariat figures show.

### Argentina gas production



## BRAZIL

*No reason was given for the termination but Golar's Barcarena project remains on track, writes Samuel Good*

### Golar LNG ends Norsk Hydro supply deal

Shipowner and project operator Golar LNG has terminated a preliminary agreement to supply LNG to fellow Norwegian firm Norsk Hydro's Alunorte aluminum smelter in Brazil's northern Para state.

The agreement, [signed in July this year](#), was scheduled to come into force in the first half of 2022, but was terminated by mutual agreement between the two parties, Golar says. The firm did not offer a reason for the termination.

In a statement, Norsk Hydro said its decision to terminate the initial agreement is based on the "provisions of the agreement" and added that it is committed to pursuing natural gas as an energy source for the smelter.

The termination of the sales agreement will not affect Golar's intention to proceed with its planned Barcarena LNG import terminal, the firm says, estimating that there remains about 1.8mn t/yr of potential LNG demand currently met by other fuels but that could be replaced by regasified LNG from the terminal. The import project remains on track to start up in first half 2022, Golar says.

The announcement comes as Golar faces a series of setbacks in Brazil after its former chief executive, Eduardo Antonello, was implicated in a plea deal with Brazilian state prosecutors in the sweeping Car Wash corruption probe, which dates back to 2014 when he was working with Norwegian contractor Seadrill. Paul Hanrahan has replaced him as chief executive of Golar's Brazilian operations.

Golar LNG was forced to cancel an initial public offering for its Brazilian LNG and energy unit on the Nasdaq stock exchange slated to take place in September. Golar LNG also faces lawsuits from investors in its shares from April to September.

State-controlled Petrobras [disqualified Golar Power](#) from a tender to lease its 20mn m<sup>3</sup>/d LNG import terminal in Bahia state. Golar has appealed the decision.

## NICARAGUA

*The firm now expects first gas late in the first quarter, or early in the second quarter, of next year, writes Ellie Holbrook*

### NFE delays LNG import terminal project

US firm New Fortress Energy's (NFE's) planned LNG import terminal in Nicaragua is scheduled to start operations early next year, having previously been expected to begin operations by the end of this year.

NFE now aims to launch the Nicaragua facility towards the end of the first quarter or start of the second quarter of next year, having previously [anticipated](#) first gas next month. But the terminal and power plant initially were expected to start operations in the second half of 2021, the firm [said](#) in February. NFE expects to deliver 419,000 t/yr over 25 years to the import project, which will use a floating storage and regasification unit.

The firm's import terminal under construction in Mexico – the 685,000 t/yr La Paz facility – remains on track for completion by mid-December, but the 135MW power plant supplied by the terminal is planned to start up by the end of the first quarter of 2021. NFE "encountered a couple of months of delay in March-July due to Covid-19", which affected the completion of the La Paz project.

Authorities granted the firm preliminary approval for a "new generation licence" at La Paz owing to an "increasing demand for power" in the area. NFE has since acquired "new land" and a construction permit but did not provide details about the potential for expansion.

NFE has identified two barges that it will purchase in the next "two weeks" to use for ISO containers at its planned Mexico and Nicaragua sites. It previously said it sought to use ISO containers for LNG import projects and move away from breakbulk using LNG terminals and carriers. NFE traditionally used floating storage units, onshore terminals and smaller vessels to receive LNG from large carriers.

## EMISSIONS

*The move is another significant setback for the project developer, which aims to reach a final investment decision next year, writes Chris Knight*

*Industry officials concede they need to do more to demonstrate their lifecycle greenhouse gas emissions are lower than those of competing energy sources*

### Engie ditches US LNG deal amid emissions worries

French energy firm Engie has ended talks over a long-term supply contract from the proposed 27mn t/yr Rio Grande LNG export terminal in the US state of Texas, following scrutiny of the project's potential upstream emissions.

Engie on 3 November said it had decided not to pursue the talks further, following a 30 September decision by its board of administration to [review](#) the deal in greater depth.

Engie's withdrawal is a significant setback to project developer NextDecade, which so far has only a 2mn t/yr long-term purchase agreement with Shell.

The company is targeting a final investment decision in 2021, but it needs to sign long-term agreements for another 9mn t/yr of capacity. Engie was in talks for a slightly smaller volume than the Shell deal.

Engie did not elaborate on the reasons for its review and subsequent withdrawal from talks, but environmentalists believe it was driven partly by the French government's concerns about methane emissions from shale producers in Texas that would supply feed gas for the LNG facility.

The European Commission has adopted a plan that seeks to limit methane emissions domestically and from energy imports, noting that methane is the second-largest contributor to climate change after carbon dioxide. France has banned hydraulic fracturing.

NextDecade did not respond to requests for comment. But on 6 October, a week after Engie's decision for further review, the company said it was "targeting" carbon-neutrality for Rio Grande LNG.

The company said this could be achieved primarily by installing carbon capture and sequestration technology.

### Political climate change

President Donald Trump's administration months ago scrapped direct US methane emissions regulations, ignoring warnings from large producers that doing so risked creating the perception that shale gas is bad for the climate.

The administration has touted emissions reductions in the US relative to other countries and cited data from the IEA showing natural gas exports are contributing to lower emissions globally.

And it took a combative line when it first emerged that Engie was reviewing the project.

"It is short-sighted and narrow-minded to delay LNG projects for political posturing and hinder the environmental progress we have made using American natural gas, especially if countries like France hope to meet their own climate goals," the Energy Department said at the time.

US industry officials point out that projects such as Rio Grande LNG would offer an outlet for associated gas in Texas that might otherwise be flared. Permian producers flared 500mn-600mn cf/d in the five months before oil prices crashed in March, according to estimates from consulting firm Rystad Energy.

But industry officials concede they need to do more to demonstrate their lifecycle greenhouse gas emissions are lower than those of competing energy sources.

"Methane is an issue that is not going away in Brussels and other European capitals," LNG Allies president Fred Hutchison says. "The US will have to continue to work to convince the Europeans that we are serious about addressing methane."

The methane rule lawsuit will likely be put on hold once Democratic president-elect Joe Biden enters the White House.

Biden has promised to reinstate the methane regulations and strengthen them so they will also apply to existing oil and gas facilities.

## EMISSIONS

### Total makes carbon-neutral LNG push

Total delivered its first carbon-neutral LNG cargo to China's state-controlled CNOOC last month. The carbon footprint of the shipment was offset with Verified Carbon Standards emissions certificates financing a wind power project in China and a forest protection project in Zimbabwe. Total's senior vice-president for LNG, Thomas Maurisse, spoke to Argus' Konstantin Rozhnov about carbon-neutral LNG and Total's energy transition strategy. Edited highlights follow:

#### What are carbon-neutral LNG cargoes?

A standard 3.5 trillion Btu cargo emits on average 250,000t of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) in total – including production, liquefaction, regasification, shipping and consumer usage. In fact, 75-80pc is emitted in the consumer use. So a carbon-neutral cargo is a cargo where emissions have been offset as part of the transaction. We have seen a few deals like ours, but in some deals only upstream emissions have been offset, and in a couple of deals, it was only the consumer part. In our cargo, it is the full value chain that has been offset. The way to offset the emissions is by bringing or purchasing carbon offset credits. This is what we did with CNOOC. We took a cargo from the 8.9mn t/yr Ichthys LNG plant in Australia, where we hold a 26pc stake. It was important for us to ship it from a facility where we are a stakeholder, as it allowed us to monitor emissions through the whole value chain.

#### Is this a new trend in the market?

I think it will come, not least because it is in line with new requests from our customers or due to pressure from regulators and growing expectations from society. It is important for Total as we want to [achieve carbon neutrality by 2050](#), together with society. Continuing to grow in LNG, as well as in renewables and carbon capture, use and storage, is part of our strategy to become a broad energy company.

#### What does this carbon-neutral LNG approach mean in terms of extra costs?

Total is among companies developing projects that generate carbon credits. You can also purchase credits – there is a market. A typical range now is \$1-5/t of CO<sub>2</sub>. For a standard cargo that emits on average 250,000t of CO<sub>2</sub>e over the whole value chain, the extra cost then is \$250,000-1.3mn/cargo. It translates into cost increases of \$0.10-0.50/mn Btu. So if the price of gas in Europe is \$5/mn Btu, then it could add up to 10pc to the cost of gas for the whole value chain.

#### Is Total taking steps to reduce emissions at its existing and future facilities?

Total has indeed decided to take concrete actions and commitments. In the upstream, there have been more than 500 ideas put forward after collective brainstorming from the teams. We will take steps at our existing plants by revisiting processes, better electrifying them, including renewable power supplies, eliminating leakage and flaring, and so on. On top of that, Total's new projects will take steps at early stages to integrate zero-emission designs as much as possible. Those actions will allow us to meet our objective to get to net zero across worldwide operations by 2050 or sooner in terms of Scope 1 and 2 emissions.

#### Why is natural gas important for Total as the world moves to a greener future?

Natural gas complements renewables for power generation by offsetting intermittency and emits half as much CO<sub>2</sub> as coal. If we want to succeed towards carbon neutrality, [gas is key](#). And within gas, LNG is key because it allows gas to be brought to countries where there is no gas production. In that perspective, LNG is essential for addressing growing energy demand while reducing carbon intensity.

*We will take steps at our existing plants by revisiting processes, better electrifying them, including renewable power supplies, eliminating leakage and flaring, and so on*

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**IN BRIEF**

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**Hammerfest LNG shutdown to last up to 12 months**

Norway's state-controlled Equinor has extended the shutdown of its 4.2mn t/yr Hammerfest LNG export facility to up to 12 months, following a fire on 28 September. Seawater used to extinguish the fire has "damaged other auxiliary systems" and it could take until 1 October 2021 for Hammerfest to resume production, Equinor says. The shutdown had already been [extended](#) to 1 January 2021 from 28 October.

**PNG LNG produces at rate of 8.9mn t/yr in third quarter**

The 6.9mn t/yr PNG LNG venture in Papua New Guinea (PNG) produced at an annualised rate of 8.9mn t in the July-September quarter, up from [8.8mn t/yr in the preceding quarter](#) and level with the 8.9mn t/yr a year earlier, Australian independent Oil Search, which has a 29pc stake in the ExxonMobil-operated venture, says. The annualised rate of 8.9mn t/yr is the highest such rate for a nine-month period since the project's start-up in 2014.

**Pakistan, Bangladesh LNG imports surge**

LNG deliveries to Pakistan and Bangladesh rose sharply in September and October from a year earlier, as the countries increased their spot purchases. Pakistan's LNG imports rose to 907,000t in October from 718,000t a year earlier, with September LNG deliveries rising to 811,000t from 803,000t, judging by vessel size. Deliveries to Bangladesh rose to a record high of 567,000t in October from 496,000t a year earlier, with September LNG imports increasing to 550,000t from 375,000t. Qatar continued to be the biggest supplier to both Pakistan and Bangladesh in September and October, supplying 22 out of the 36 cargoes received.

**Thailand's September LNG receipts rise**

Thailand received more LNG in September than a year earlier, even as domestic gas production rose and cooling demand appeared to be unchanged. Imports rose to 478,000t from 442,000t a year earlier as Qatari deliveries quickened but Australian receipts slowed. Domestic gas production also increased, to 85.3mn m<sup>3</sup>/d from 82.6mn m<sup>3</sup>/d. The production growth ended a six-month run of slower domestic output on the year, with greater imports offsetting the shortfall.

**Gdansk LNG non-binding phase 'confirms' market interest**

The non-binding phase of a project to build a floating storage and regasification unit (FSRU) at the port of Gdansk in Poland "confirmed" market interest, Polish state-owned operator Gaz System says, without giving further details on how much capacity market participants wished to book or for which periods. The FSRU is expected to have a capacity of at least 4.5bn m<sup>3</sup>/yr and run from the 2026-27 gas year for 20 years. A final decision on terminal capacity will be dependent on offers submitted during the binding phase.

**Qatar signs 25-year LNG deal at UK's Isle of Grain**

Qatar's state-owned QP has signed a 25-year contract for 7.2mn t/yr of regasification and storage capacity at the UK's 14.8mn t/yr Isle of Grain terminal from 2025, secured at the second round of an [open season](#). The 20-year contracts with BP and Algeria's state-owned Sonatrach that anchored the first-phase development of the Isle of Grain expire in July 2025, freeing up 3.3mn t/yr of capacity. And the agreement will permit Isle of Grain to increase sendout capacity to 25bn m<sup>3</sup>/yr from 20bn m<sup>3</sup>/yr and install a fifth storage tank that will lift storage capacity to just over 1.2mn m<sup>3</sup> of LNG from nearly 1mn m<sup>3</sup> at present.



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**IN BRIEF**

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**Fire closes China's Beihai LNG terminal**

The 3mn t/yr PipeChina-operated Beihai LNG terminal in China's Guangxi province is closed after a fire broke out at one of its four storage tanks. It is unclear how long the terminal will be shut. The terminal receives 4-5 LNG cargoes/month, can regasify 8mn m<sup>3</sup>/d and operates a fleet of 350-400 trucks for inland LNG transport, lifting its capacity to about 10.3mn m<sup>3</sup>/d. Sinopec has agreements to receive LNG from Australia and Papua New Guinea at the terminal.

**Belgium's Fluxys to offer virtual liquefaction at Zeebrugge**

Belgian system operator Fluxys has proposed the introduction of a virtual liquefaction service at its 7.4mn t/yr Zeebrugge LNG terminal. When limited volumes of LNG are needed, bringing a tanker to Zeebrugge may be "uneconomic", Fluxys says. The system operator plans to address this issue by introducing a service that allows shippers to inject LNG "virtually" by submitting entry nominations into the terminal that would be netted off against regasification nominations.

**Yamal sends first laden Arc 4 LNG carrier through NSR**

The Arc 4 ice-class 162,000m<sup>3</sup> *Clean Planet* is transiting the Northern Sea Route (NSR) laden with a cargo loaded at the 16.5mn t/yr Yamal LNG project and is expected at Tianjin, China, on 25 November. It will be the first LNG carrier with an ice classification lower than Arc 7 to deliver a cargo using the route. Yamal's 15-strong Arc 7 tanker fleet normally performs the task. Laden transit of the NSR by Arc 4 LNG carriers could raise the Yamal project's shipping capacity. [Seven Arc 4 carriers are currently permitted](#) to transport hydrocarbons along the route.

**LNG use in shipping, road transport to remain low: IEA**

LNG use in shipping and road freight activity offers only modest potential for growth, with oil likely to remain the dominant fuel, the International Energy Agency (IEA) says. While increasingly ambitious policies in some European countries, China and India support the use of natural gas for transport, mainly for LNG-fuelled trucks and in maritime transport, the fall in oil prices earlier this year and signs that post Covid-19 stimulus policies favour electric vehicles have largely put a brake on growth prospects for natural gas in transport, the IEA says.

**Japan begins LNG ship-to-ship bunkering**

Japanese joint venture Central LNG Shipping has started the country's first ship-to-ship LNG bunkering operations. The 3,500m<sup>3</sup> LNG bunkering vessel *Kaguya*, based at power firm Jera's Kawagoe LNG import terminal, has begun to supply ships that sail maritime logistics networks operated by manufacturers based in the Nagoya areas, including Japan's biggest carmaker, Toyota Motor. The Central LNG Shipping joint venture was set up by NYK Line, fellow shipping firm K Line, Jera and Toyota's trading arm, Toyota Tsusho, to own and manage the LNG bunkering vessel. Jera supplies the LNG to be used as a marine fuel.

**Liqvis enters France's small-scale LNG market**

Small-scale LNG supplier Liqvis, a subsidiary of German utility Uniper, has opened its first LNG filling station in France. The new station in Calais will supply customers in the French market and heavy goods traffic transiting through Calais to the UK. The firm also plans to open four new stations in Germany near Hamburg, Hannover, Magdeburg and Bad Honnef. It already operates four stations near Berlin, Kassel, Ulm and Hamm. Liqvis' new site is the only operational LNG station in Calais, but there are several others in northwest Belgium and northeast France.

MARKET OVERVIEW

**A production snag at Malaysia's Bintulu export plant has lifted northeast Asian LNG prices in recent days**

**Supply concerns widen spot-term price differential**

Lower expected LNG supply in the Pacific basin, following production issues at the 30mn t/yr Bintulu export facility, has buoyed northeast Asian LNG prices in recent days, extending their premium to oil-indexed term supply prices – which could spur Asian buyers to maximise their term supply over the rest of winter in preference to making spot purchases.

Long-term offtakers had reduced their receipts to the take-or-pay minimum over the summer, when spot prices were weak and the slide in oil prices had not yet translated into lower term supply costs. But this has now reversed: since late October, Argus Northeast Asian (ANEA) des prices for December-February have held above the three-month and six-month average oil-indexed prices typically used to price long-term LNG supply in the Pacific basin.

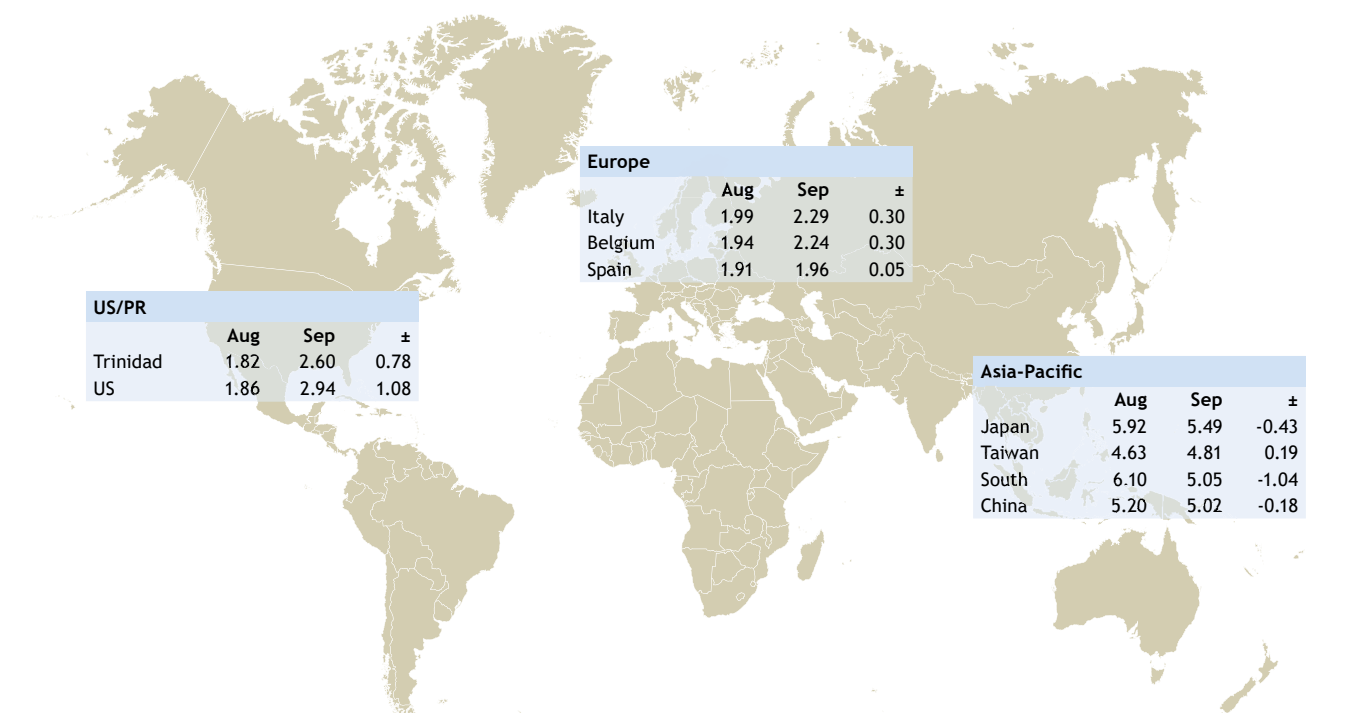
That said, this premium has fluctuated with the weather outlook. Forecasts for unseasonably cold weather across much of northeast Asia for mid-November have given way to an unusually mild outlook, trimming city gas demand expectations for the region and weighing on ANEA prices.

December overnight temperatures have been forecast to hold broadly in line with seasonal averages in northeast China's Beijing and well above average in South Korea's Seoul, having initially been forecast to remain below and in line, respectively. Minimum temperatures are forecast to remain below normal in Tokyo, broadly unchanged from previous forecasts.

A pivot to using term supply to meet this winter's heating demand could weigh on spot LNG demand in the Pacific basin through the winter, although this would be at least partly offset by LNG producers offering fewer uncommitted cargoes to the spot market. Overall, the combination could significantly reduce liquidity mid-winter.

Global LNG prices at a glance

\$/mn Btu



## MARKET OVERVIEW

LNG prices													\$/mn Btu
Importer/source	Sep 19	Oct	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Japan</b>													
Abu Dhabi	7.95	5.70	8.98	8.78	8.11	8.35	8.95	5.97	10.43	6.15	4.03		6.00
Australia	9.67	9.54	9.74	9.43	9.26	9.09	9.28	9.37	10.03	9.57	7.72	6.20	5.56
Brunei	8.32	9.21	9.73	9.88	9.81	9.97	9.27	10.13	10.39	7.04	5.42	5.71	5.24
Equatorial Guinea		9.12											
Indonesia	10.49	8.78	10.07	9.93	9.76	9.70	9.92	10.30	10.73	9.06	6.84	5.33	4.80
Malaysia	8.73	9.11	8.28	8.63	8.82	8.91	8.87	8.04	8.33	7.07	6.07	4.89	4.72
Nigeria	4.64	9.92	6.72	5.75	5.50	5.25	9.75	6.80	7.34	6.17	6.08		5.88
Oman	7.99	10.05	8.46	8.67	9.24	8.98	9.98	9.71	9.41	9.40	9.12	4.96	6.83
Papua New Guinea	8.67	9.55	9.89	9.15	9.30	9.86	9.11	10.51	9.03	8.38	6.57	7.50	5.94
Peru	10.90	7.68			10.42			6.94		7.10			
Qatar	10.05	9.90	9.62	9.59	9.43	9.64	9.57	9.82	9.77	8.88	6.30	4.82	4.29
Russia	8.31	7.97	8.56	9.07	8.76	9.07	9.41	7.97	9.75	7.92	7.04	4.98	5.46
US	7.52	8.52	9.13	8.86	8.45	8.71	8.65	8.98	8.49	8.70	9.27	9.34	8.08
<b>Average</b>	<b>9.18</b>	<b>9.09</b>	<b>9.22</b>	<b>9.24</b>	<b>9.11</b>	<b>9.17</b>	<b>9.25</b>	<b>9.09</b>	<b>9.39</b>		<b>6.77</b>	<b>5.90</b>	<b>5.47</b>
LNG Japan spot prices (contracted)	5.40	5.50		6.40	5.90	3.40	3.40	2.40					
LNG Japan spot prices (arrived)	4.90	5.40	5.50	6.70	6.00	5.50		3.00					
<b>China</b>													
Abu Dhabi	4.85		8.41		8.37	8.37	9.36	9.44				3.56	
Algeria				8.50					4.01				4.96
Angola					6.94	6.94	6.17		2.37			7.88	2.93
Australia	9.53	9.25		8.27	8.23	8.23	7.85	8.27	7.42	6.77	7.30	5.17	4.84
Belgium										2.11			
Brunei		4.70		8.41	6.73	6.73	5.89	10.18	3.60	2.14	6.98		
Cameroon			6.09	6.61						2.76	3.41	2.20	
Equatorial Guinea			12.94	10.07	6.65	6.65			2.48				
France		13.15	6.32										4.30
Indonesia	7.36	6.73	8.92	8.53	8.44	8.44	6.08	7.61	7.69	6.83	2.99	5.87	5.94
Malaysia	6.89	7.03	7.64	7.08	6.51	6.51	6.08	4.36	5.81	5.14	4.90	4.97	5.04
Netherlands		5.20	5.24	8.35	14.28	14.28							
Nigeria	4.72	10.30	8.55	8.54	7.23	7.23	7.24	10.72	5.45	2.45	5.98	4.45	3.34
Oman	11.75	4.02	10.14	7.22	6.56	6.56	3.70	4.88	8.73	4.52		2.35	3.11
Papua New Guinea	10.31	10.01	9.66	9.54	9.56	9.56	9.58	8.93	7.15	6.99	7.18	5.38	5.51
Peru	6.64			6.44					6.50	8.41		4.15	6.34
Qatar	11.59	8.29	10.71	10.07		10.69	10.96	10.44	8.29	6.13	6.47	4.66	5.76
Russia	8.43	10.41	6.44	6.70	8.05	8.05	6.78	5.02	6.28	5.86	6.95	5.84	5.35
Singapore										8.40			
Trinidad	7.44	11.33	10.56	10.45	6.61	6.61							
US								3.58	6.94	5.54	5.82	7.07	4.83
unspecified	7.10	6.97	6.95	16.02	8.33	8.33							
<b>Average</b>	<b>8.82</b>	<b>8.92</b>	<b>8.82</b>	<b>8.49</b>	<b>8.38</b>	<b>8.38</b>	<b>7.82</b>	<b>7.66</b>	<b>6.90</b>	<b>5.60</b>	<b>6.56</b>	<b>5.20</b>	<b>5.02</b>
<b>South Korea</b>													
Abu Dhabi			5.74		5.41								
Angola					7.75		4.46	3.13					
Australia	8.87	8.55	9.03	8.13	8.95	8.15	8.99	8.58	7.45	9.49	6.30	5.72	4.88
Brunei	11.13	5.70	5.66				2.87	10.34	6.85		2.28		4.29
Egypt				6.55	10.18								
Equatorial Guinea								10.44					
Indonesia	6.47	6.07	6.24	8.69	5.81	6.11	6.66	7.36	7.19			4.31	4.65
Malaysia	9.07	8.18	8.24	7.72	7.94	8.33	7.67	8.10	8.66	6.88	6.89	4.67	3.74
Nigeria	10.99		6.23	8.75					7.43	5.81	5.59		
Oman	12.54	12.70	10.81	10.17	11.41	9.89	10.73	11.24	11.72	11.38	8.89	5.98	4.65
Papua New Guinea			10.22	5.39						70.15	8.70		75.17
Peru	11.13		9.92	9.80	9.62	9.93	9.56	10.74		6.69	6.74		4.05
Qatar	11.19	12.47	11.32	10.45	10.42	10.29	10.82	11.04	11.61	11.10	10.43	7.77	5.70
Russia	10.42	8.93	8.05	8.21	9.60	8.61	7.93	9.79	8.52		7.63	2.42	3.01
Trinidad		10.43											

## MARKET OVERVIEW

LNG prices												\$/mn Btu	
Importer/source	Sep 19	Oct	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
US	6.84	7.51	7.52	7.81	7.60	7.13	6.64	7.59	7.05	6.24	6.14	6.45	5.96
unspecified						4.61							
<b>Average</b>	<b>9.80</b>	<b>7.65</b>	<b>8.73</b>	<b>8.75</b>	<b>8.99</b>	<b>8.55</b>	<b>8.87</b>	<b>9.18</b>	<b>8.98</b>	<b>8.49</b>	<b>7.33</b>	<b>6.10</b>	<b>5.05</b>
<b>Taiwan</b>													
Abu Dhabi											3.30		
Australia	8.67	8.94	8.79	7.03	8.41	8.39	8.17	8.66	6.25	5.71	6.57	5.12	5.15
Brunei	10.45		10.00					6.95					2.68
Cameroon													2.56
Egypt				7.87							2.09	2.43	2.88
Indonesia		4.54	5.79	5.39	10.11			6.64	3.06	2.14	3.88		
Malaysia	11.00	10.99	10.68	10.29	10.17	10.03	10.03			3.21	2.16		2.40
Nigeria	7.37												
Oman					5.53						9.25	9.18	5.12
Papua New Guinea	11.28	11.00	10.82	10.46	10.32	10.21	6.47	10.54	7.37	10.61			
Peru	11.10										6.32	4.79	4.02
Qatar	7.80	7.01	7.14	6.91	7.14	6.65	7.21	5.90	6.87	5.91	5.87	6.08	6.17
Russia	9.88	7.77	7.84	8.79	9.00	9.47	9.18	9.27	9.47	8.47	5.87	6.08	6.17
Trinidad			7.21						5.79				
US	8.34		7.54	7.30	7.35	5.53	10.79	5.57		2.51	2.39		
<b>Average</b>	<b>9.16</b>	<b>8.63</b>	<b>8.33</b>	<b>7.81</b>	<b>8.44</b>	<b>8.09</b>	<b>8.15</b>	<b>7.41</b>	<b>6.74</b>	<b>6.35</b>	<b>5.41</b>	<b>4.63</b>	<b>4.81</b>
<b>Thailand</b>													
Australia	9.49	9.13			8.03	7.98	7.99	8.49	8.75		7.28	5.58	
Brunei						7.91							
Indonesia					7.81		8.27						
Malaysia	9.16	9.54	8.73	6.59	7.82		8.06	6.28	6.13	6.06	7.28		
Nigeria							8.05						
Qatar	11.56	10.70	10.46	10.07	9.74	10.04	10.31	2.99	10.01	9.50	5.64	5.15	
Trinidad				8.38									
US			8.70				2.80	8.85	8.78	6.81		5.56	
unspecified	9.69			8.02			8.26						
<b>Average</b>	<b>10.39</b>	<b>10.02</b>	<b>9.31</b>	<b>8.44</b>	<b>8.96</b>	<b>8.52</b>	<b>7.86</b>					<b>5.32</b>	
<b>India</b>													
Algeria	6.50		8.32					7.47			6.76		
Angola	6.97	6.13	7.62	7.17	7.06	5.01	4.82	2.78		4.80	3.99		
Australia	8.66	8.59				3.95	6.77		6.20				
Belgium											5.78		
Cameroon	7.98	7.74		4.78	8.01	6.82			2.89				
Egypt			6.49										
Equatorial Guinea					5.67	6.05	4.68			2.07			
France	9.83	9.70	7.07					4.88	8.17	4.14			
Malaysia													
Netherlands													10.03
Nigeria	8.69	7.28	6.60		6.67	7.20	5.01		5.81	6.53	5.29		
Oman		8.02	9.41			4.51	6.23	7.09	7.04	3.70			
Qatar	8.50	7.95	7.78	8.04	7.98	7.86	7.28	6.47	6.18	4.05	4.58		
Russia							3.34						
Trinidad				7.72			3.24			6.15	8.27		
UAE	4.15	5.48	5.41	6.29	13.70	4.56	4.51	3.66	3.19	3.68	2.29		
US	5.41		8.67	9.83	7.27	9.09		6.20	6.12	8.65	4.66		
unspecified	6.50			5.22									
<b>Average</b>	<b>7.63</b>	<b>7.48</b>	<b>7.47</b>	<b>7.67</b>	<b>7.67</b>	<b>6.12</b>	<b>5.10</b>	<b>5.61</b>	<b>5.29</b>	<b>5.15</b>	<b>5.42</b>		
<b>Belgium</b>													
Qatar	2.87	4.43	4.53	4.53	3.76		3.57	2.31	1.65	1.41	1.25	1.42	
Russia	2.48			3.68	4.37	5.26	5.01	4.06	3.20	1.54	1.19	1.18	
<b>Average</b>	<b>2.84</b>		<b>4.53</b>		<b>4.07</b>	<b>5.23</b>	<b>4.24</b>	<b>3.03</b>	<b>3.06</b>	<b>2.53</b>	<b>1.95</b>	<b>1.30</b>	
<b>Greece</b>													
Algeria		7.87	7.94	7.97	7.93	8.42	8.81					2.46	
Nigeria									1.94		1.35		

## MARKET OVERVIEW

LNG prices												\$/mn Btu	
Importer/source	Sep 19	Oct	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Norway													1.98
Qatar	3.87						2.95	2.77		1.42	1.35	1.82	
US						4.50	3.80	2.61	2.00	1.67	1.35	1.92	
Italy													
Algeria	7.09	7.80	6.42	13.40	13.45	13.30	7.53	8.27	3.60	4.44	4.33		
Norway		3.79											
Qatar	4.39	4.54	4.96	5.20	5.04	4.71	4.24	3.84	3.52	2.79	2.66		
Trinidad	4.21	4.23	2.06										
US	3.84	4.10	5.31	5.04	4.43	3.10	3.97	4.05	2.07	1.57	1.71		
<b>Average</b>	<b>5.20</b>	<b>5.03</b>	<b>4.14</b>	<b>6.34</b>	<b>5.96</b>	<b>5.68</b>	<b>4.83</b>	<b>4.50</b>	<b>4.86</b>	<b>3.52</b>	<b>4.53</b>		
Portugal													
Nigeria	6.28	6.29	6.20	6.11	6.45	6.32	6.75	5.98	5.68	5.44	4.70		
Norway							2.10	2.05					
Other		6.57	7.59	6.81	6.96	5.32	5.57						
Qatar	7.62	6.69	4.63	5.51			2.59		6.58				
US	3.60	4.39	6.58	5.88	5.93	6.35	6.75	3.65	1.86	1.50	6.28		
Spain													
Algeria	3.76	4.83	6.88	6.39	6.04	6.01	6.12	6.69	5.78	3.73	5.41	2.59	
Angola					4.72								
Equatorial Guinea													
Nigeria	5.81	6.08	5.84	5.70	5.38	6.40	4.73	4.55	3.89	2.90	3.30	3.12	
Norway		4.64		4.96		6.00							2.41
Peru		4.76	4.80				6.12				3.14		
Qatar	6.25	5.94	5.64	6.31	6.02		3.77	5.31	4.85	3.29	2.14	2.28	
Russia	4.58	5.10	4.56	6.34	5.65	3.09	3.79	5.51	5.60	2.39	3.36	3.42	
Trinidad	4.52		6.63	3.74	4.91	4.87	2.70	5.74	3.45	3.98	4.80	3.20	
US	4.86	5.70	5.44	5.04		3.91				1.17			
<b>Average</b>	<b>5.02</b>	<b>5.39</b>	<b>5.57</b>	<b>6.10</b>	<b>6.25</b>	<b>4.29</b>	<b>6.09</b>	<b>4.57</b>	<b>2.85</b>	<b>3.45</b>	<b>3.40</b>	<b>5.31</b>	
Trinidad					5.66	4.71	5.08	5.40	4.40				
UK													
Algeria		4.80			4.97								
Nigeria				4.48	5.13			2.54		1.05			
Norway				6.55	6.06								
Qatar	3.98	3.91	3.39	7.18	3.61	2.65	2.45	2.20	1.87	1.74	0.58	1.03	
Russia	4.54		4.47	4.66	6.00	3.45	4.02	4.34	2.23	2.02	0.32		
Trinidad			2.49	3.69	4.45	1.19	2.06	0.53	0.41				
US	4.39	5.34	5.01	4.94	4.70	3.23	4.23	2.65	2.06			1.23	
<b>Average</b>	<b>4.12</b>	<b>4.03</b>	<b>4.14</b>	<b>4.96</b>	<b>4.86</b>								
Brazil													
Equatorial Guinea	3.88												
Nigeria	3.71							3.78					
Norway			3.61										
Trinidad	3.91		3.83					3.03					
US	3.72	3.80	4.76	5.11	4.90	3.38	3.36	2.81	3.46	2.55			
<b>Average</b>	<b>3.78</b>	<b>3.80</b>	<b>4.35</b>	<b>5.11</b>	<b>4.90</b>	<b>3.38</b>	<b>3.36</b>	<b>3.02</b>	<b>3.46</b>	<b>2.55</b>			
US													
Cove Point													
Nigeria				6.57									
Trinidad				6.57									
Elba Island													
Trinidad		2.17											
Everett													
Trinidad		6.56	6.77	6.64	6.13	5.39	4.13						
<b>US average</b>		<b>4.42</b>	<b>6.77</b>		<b>6.13</b>	<b>5.39</b>	<b>4.13</b>						
Puerto Rico													
<b>Average</b>	<b>7.56</b>	<b>7.74</b>	<b>8.54</b>	<b>7.19</b>	<b>8.33</b>	<b>6.41</b>	<b>6.57</b>						

These numbers are derived from official sources and are subject to change without notice.

## LNG MOVEMENTS

Import volumes												'000t
Importer/source	Oct 19	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Japan</b>												
Abu Dhabi	239.20	60.39	178.70	178.38	185.82	122.41	59.55	66.86	117.70	58.79		56.28
Australia	2,230.64	2,250.22	2,460.70	2,759.08	2,173.99	3,121.13	2,384.66	1,811.73	1,756.01	2,712.53	2,165.32	2,576.45
Brunei	455.48	325.70	390.16	458.50	453.41	393.10	268.46	132.67	578.42	200.61	253.92	327.20
Equatorial Guinea	68.82											
Indonesia	352.62	186.45	351.39	300.81	226.92	229.17	60.58	114.10	114.19	232.79	52.08	357.47
Malaysia	572.17	782.49	669.35	1,289.91	981.63	1,116.48	660.53	717.93	727.68	725.43	926.58	714.24
Nigeria	59.29	261.79	56.98	112.95	55.01	131.32	125.72	186.37	125.03	116.36		241.52
Oman	188.45	245.94	250.64	191.62	251.59	119.31	304.84	189.27	187.44	183.89	181.74	261.42
Papua New Guinea	308.16	224.69	431.60	282.95	294.47	363.41	229.81	156.03	350.94	219.61	427.47	210.89
Peru	71.22		70.66	70.73	72.92		63.25	68.16				
Qatar	631.86	878.40	868.24	923.54	876.61	695.70	296.96	403.61	765.74	728.44	822.00	627.39
Russia	531.71	587.98	672.22	541.10	597.14	522.49	392.78	323.62	265.95	390.67	594.96	652.18
US	590.88	467.08	406.06	403.04	472.58	394.24	349.06	409.31	206.59	466.63	271.13	419.13
<b>Total</b>	<b>6,300.49</b>	<b>6,271.12</b>	<b>6,806.70</b>	<b>7,512.61</b>	<b>6,642.07</b>	<b>7,208.76</b>	<b>5,196.20</b>	<b>4,579.66</b>	<b>5,198.69</b>	<b>6,035.74</b>	<b>5,840.06</b>	<b>6,504.01</b>
<b>South Korea</b>												
Abu Dhabi		125.59		58.71		840.76	596.23					
Angola				69.72		67.01	62.77					
Australia	766.21	510.15	1,257.92	784.46	838.86		550.29	721.69	491.30	479.30	330.65	850.23
Brunei	69.41	64.82				58.25	63.99	68.12		64.60		63.93
Egypt			111.57	59.16								
Equatorial Guinea							62.48					
Indonesia	186.75	242.85	179.62	252.39	357.81	252.45	119.08	121.53	321.53	312.42	121.65	195.78
Malaysia	679.79	432.38	597.90	561.85	570.03	489.37	413.71	286.52	284.90	56.40	292.00	419.98
Nigeria		180.96	72.23					75.95				
Oman	290.84	298.95	429.43	408.90	414.12	358.02	238.62	237.05	298.85	302.20		236.89
Papua New Guinea		78.14	78.14						70.15	8.70		75.17
Peru		140.21	75.47	215.02	291.11	217.55	70.70		139.88	71.49		208.87
Qatar	469.68	728.59	1,133.03	924.85	1,051.10	806.06	809.00	694.92	463.00	356.20	648.79	581.16
Russia	329.38	190.20	255.74	190.19	325.09	251.64	118.85	308.37		128.90	69.79	64.41
Trinidad	70.66											
US	273.24	807.55	610.17	652.22	850.62	212.24	596.23	394.76	407.22	532.84	197.83	249.27
unspecified					64.17							
<b>Total</b>	<b>3,858.11</b>	<b>3,800.38</b>	<b>4,801.00</b>	<b>4,177.47</b>	<b>4,762.90</b>	<b>3,553.34</b>	<b>3,701.95</b>	<b>2,974.11</b>	<b>2,600.42</b>	<b>2,378.89</b>	<b>1,964.48</b>	<b>2,949.49</b>
<b>China</b>												
Abu Dhabi				29.48	29.48		121.87				58.36	
Algeria			61.60					59.29				63.11
Angola				33.63	33.63	52.42		68.53			75.05	69.76
Australia	2,091.23	2,542.71	2,479.96	2,477.83	2,477.83	1,912.44	2,798.05	2,382.47	2,253.46	2,430.64	2,505.97	2,309.03
Belgium									73.61			
Brunei	60.22		270.16	30.72	30.72	64.78	69.51	126.40	64.47	69.25		
Cameroon		121.37	61.06						68.04	67.06	61.79	
Egypt						0.02						
Equatorial Guinea		69.88	70.01	32.26	32.26			74.31				
France	62.92	57.77										69.61
Indonesia	339.75	456.73	537.05	424.32	424.32	336.72	497.57	274.36	988.13	114.78	580.06	548.47
Malaysia	320.49	759.68	727.86	446.55	446.55	454.10	379.36	431.65	561.53	655.59	697.31	545.26
Netherlands	334.80	0.36	0.90	0.22	0.22							
Nigeria	67.56	337.29	284.34	201.53	201.53	276.06	10.02	224.32	141.77	353.50	318.71	330.71
Oman	62.61	195.32	259.10	159.73	159.73	62.14	55.94	129.29	63.52		62.32	119.38
Papua New Guinea	230.86	305.43	242.27	187.90	187.90	239.68	304.92	310.22	239.94	302.08	309.65	237.69
Peru			76.80	33.61	33.61	63.59	71.39	121.93	262.64		57.69	192.40
Qatar	307.99	118.37	111.51	909.74	909.74	520.35	300.55	360.06	266.92	698.56	544.47	570.46
Russia	42.46	335.78	131.79	430.24	430.24	210.58	269.27	330.21	395.88	201.51	545.48	412.73
Singapore									73.22			
Trinidad	71.19	139.98	138.61	131.60	131.60							
US							218.32	340.23	340.01	141.22	140.35	262.45
unspecified	0.12	0.83	1.20	1.32	1.32							
<b>Total</b>	<b>4,040.94</b>	<b>5,441.50</b>	<b>5,454.22</b>	<b>5,530.68</b>	<b>5,530.68</b>	<b>4,192.88</b>	<b>5,096.77</b>	<b>5,233.85</b>	<b>5,793.23</b>	<b>5,034.20</b>	<b>5,957.21</b>	<b>5,731.07</b>

## LNG MOVEMENTS

Import volumes												'000t
Importer/source	Oct 19	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Taiwan</b>												
Abu Dhabi										131.47		
Australia	555.43	496.49	542.45	277.56	513.40	301.44	295.41	612.92	1,204.63	655.52	301.09	575.67
Brunei		135.03					125.47					65.61
Egypt			271.04								62.16	
Indonesia	56.03	122.71	60.30	58.92			60.23	167.42	56.63	56.62	177.54	113.14
Malaysia	192.23	121.56	247.30	122.34	178.85	113.50			63.10	122.95		
Nigeria										71.52	194.90	
Oman				63.48								
Papua New Guinea	156.25	77.54	78.15	158.76	158.06	156.70	157.84	346.57	347.08	172.83	77.31	149.99
Peru	442.39	381.28	382.55	315.32	442.37	442.52	591.29		506.29	382.34	441.89	473.06
Qatar	64.55	64.16	130.25	128.46	193.01	259.90	257.97	260.00	258.00	263.67	265.62	203.01
Russia		70.02										
Trinidad	64.30											
<b>Total</b>	<b>1,466.88</b>	<b>1,597.38</b>	<b>1,783.93</b>	<b>1,194.98</b>	<b>1,668.13</b>	<b>1,347.63</b>	<b>1,680.72</b>	<b>3,166.57</b>	<b>3,628.18</b>	<b>3,221.20</b>	<b>1,520.51</b>	<b>1,650.67</b>
<b>Thailand</b>												
Abu Dhabi	182.75	93.23										
Australia	72.68			70.49	148.56	71.11	212.22	71.27		71.75	69.20	
Brunei					60.7							
Indonesia				63.03		73.95						
Malaysia	120.10	120.17	127.67	66.27		128.06	183.57	120.79	191.51	61.58		
Nigeria						67.94						
Qatar			180.44	275.35	185.26	93.13	90.56	183.58	92.47	246.81	183.78	
Trinidad			51.58									
US		61.92				62.77	142.46				57.57	
unspecified			127.86			72.32						
<b>Total</b>	<b>375.53</b>	<b>275.32</b>	<b>487.55</b>	<b>475.15</b>	<b>394.52</b>	<b>569.28</b>	<b>628.81</b>	<b>445.77</b>	<b>495.06</b>	<b>591.04</b>	<b>310.55</b>	
<b>India</b>												
Algeria		8.85					56.40			63.50		
Angola	264.28	318.33	130.41	262.71	263.07	263.07	198.65		264.28	252.54		
Australia	74.40				62.83	92.69		278.31				
Belgium									75.1			
Cameroon	65.98		66.31	62.15	143.27			66.35				
Equatorial Guinea				142.88	73.84	146.4			72.75			
Egypt		64.07										
France	52.5	140.27						68.12	70.61	67.69		
Malaysia												
Nigeria	268.01	138.18		372.78	330.43	262.15		189.63	349.64	281.78		
Oman	66.84	147.30			138.66	139.66	75.93	140.34	77.24			
Qatar	950.54	641.07	1,018.19	964.05	1,144.90	982.04	456.52	569.86	894.23	1,004.35		
Russia						66.47						
Trinidad			71.70			72.55			72.26	71.71		
UAE	251.26	273.87	283.52	92.33	448.40	165.72	253.09	323.62	124.46	248.69		
US	147.17	215.82	203.72	143.75	66.25		204.69	420.30	147.02	199.30		
unspecified			68.89									
<b>Total</b>	<b>2,141.00</b>	<b>1,947.75</b>	<b>1,842.78</b>	<b>2,040.65</b>	<b>2,671.65</b>	<b>2,190.75</b>	<b>1,245.28</b>	<b>2,056.53</b>	<b>2,217.04</b>	<b>2,305.59</b>		
<b>Belgium</b>												
Qatar	180.37	189.66	269.78	57.48		63.63	426.99	244.80	184.49	246.57	181.55	
Russia			288.65	12.90	300.45	285.15	362.87	129.86	156.28	6.71	2.69	
<b>Total</b>	<b>180.37</b>	<b>189.66</b>	<b>558.43</b>	<b>70.38</b>	<b>300.45</b>	<b>285.15</b>	<b>984.65</b>				<b>184.24</b>	
<b>Greece</b>												
Algeria	32.92	32.72	32.81	65.17	32.87	32.27						29.66
Norway												61.24
Qatar						39.42	55.49		91.14	28.23	124.07	
US					65.57	90.55	167.42	119.29	8.48		36.07	
<b>Total</b>	<b>32.92</b>	<b>32.72</b>	<b>32.81</b>	<b>65.17</b>	<b>98.44</b>	<b>162.24</b>						

## LNG MOVEMENTS

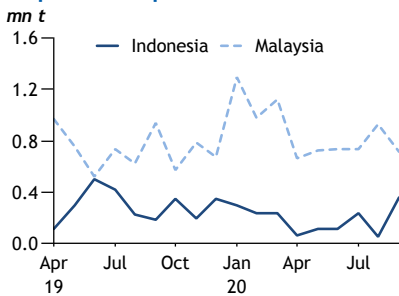
Import volumes												'000t
Importer/source	Oct 19	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Italy</b>												
Algeria	149.94	157.30	120.08	88.27	88.67	148.83	178.53	336.32	209.19	277.64		
Norway	61.81											
Qatar	448.96	383.87	450.59	324.08	450.68	321.88	452.85	318.50	538.95	543.63		
Trinidad	75.22	57.88						57.58				
US	62.68	58.14	192.00	236.28	127.34	260.00	193.53	62.64	189.78	126.51		
<b>Total</b>	<b>798.60</b>	<b>657.19</b>	<b>762.67</b>	<b>648.63</b>	<b>807.00</b>	<b>791.77</b>	<b>916.63</b>	<b>876.28</b>	<b>1,077.82</b>	<b>1,090.73</b>		
<b>Portugal</b>												
Nigeria	262.58	257.64	226.78	180.47	225.00	224.65	241.53	171.55	197.15	181.76		
Norway						14.66	6.96					
Other	24.63	25.62	20.71	6.88		18.67						
Qatar	19.11	46.91	10.2			17.23		42.59	57.13	12.55		
US	55.38	58.22	70.68	131.72	106.97	73.42	52.46	15.01	9.91	48.06		
<b>Total</b>	<b>361.70</b>	<b>388.39</b>	<b>328.37</b>	<b>319.06</b>	<b>355.80</b>	<b>349.73</b>	<b>358.69</b>	<b>271.94</b>	<b>282.18</b>	<b>303.43</b>		
<b>Spain</b>												
Algeria	106.58	50.32	107.28	303.11	113.54	123.15	34.70	34.65	99.10	34.64	106.51	
Angola				69.66								
Equatorial Guinea					66.21	125.46				55.86	64.44	
Nigeria	177.80	185.17	361.98	134.13	65.49	189.73	243.27	432.31	122.89	174.54	248.53	
Norway	61.32		63.33		62.19			63.10	54.56		61.22	
Peru	214.38	127.85				56.86				66.32		
Qatar	144.38	194.81	119.80	253.27		155.98	60.00	60.00	313.83	474.38	336.68	
Russia												
Trinidad		118.77	55.28	363.06	308.92	88.88	116.02	194.22	124.46	66.04	200.42	
UK					58.75				61.85			
US	321.41	532.01	411.75	362.76	653.41	530.78	314.50	411.52	368.97	375.86	66.12	
<b>Total</b>	<b>1,238.33</b>	<b>1,286.80</b>	<b>1,192.78</b>	<b>1,708.15</b>	<b>1,277.62</b>	<b>1,356.36</b>					<b>1,227.34</b>	
<b>UK</b>												
Algeria	58.63			60.18								
Nigeria			64.02	59.93								
Norway			61.80	61.59	184.50					56.15		
Qatar	1,137.68	297.66	66.90	657.75	181.36	754.87	1,027.06	1,027.11	961.99	595.43	296.24	
Russia												
Trinidad		71.58	136.16	318.78	114.75	200.74	136.04	53.17				
US	71.72	308.37	256.39	504.39	399.58	467.58	543.68	124.38			54.68	
<b>Total</b>	<b>1,268.03</b>	<b>882.68</b>	<b>729.07</b>	<b>2,481.77</b>								
<b>Brazil</b>												
Equatorial Guinea												
Nigeria							20.34					
Norway		47.80										
Trinidad		29.90					116.90					
US	134.90	121.90	28.00	110.50	41.00	124.80	77.42	115.39	72.50			
<b>Total</b>	<b>134.90</b>	<b>199.60</b>	<b>28.00</b>		<b>41.00</b>	<b>124.80</b>	<b>214.60</b>	<b>167.71</b>	<b>72.50</b>			
<b>US</b>												
<b>Cove Point</b>												
Trinidad			69.20									
Nigeria			61.50									
<b>Elba Island</b>												
Trinidad	53.22											
<b>Everett</b>												
Trinidad	55.20	54.20	55.60	106.22	110.93	55.70						
<b>Puerto Rico</b>												
Norway						1.50						
Trinidad	109.61	112.60	111.60	31.50	86.70	30.30						
<b>Total</b>	<b>109.61</b>	<b>112.60</b>	<b>111.60</b>	<b>31.50</b>	<b>86.70</b>	<b>31.80</b>						

These numbers are derived from official sources and are subject to change without notice.

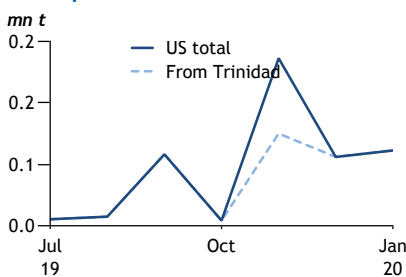


## LNG MOVEMENTS

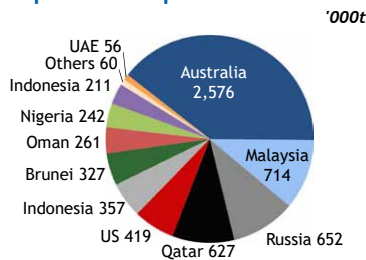
### Japanese imports



### US imports



### Japan LNG import sources



## Global LNG deliveries rebound in October

Global LNG deliveries rose in October from a year earlier, after falling short of last year's levels throughout most of the past summer.

LNG deliveries totalled 28.3mn t last month, up by approximately 10 standardized cargoes from the 27.6mn t recorded a year earlier, according to oil analytics firm Vortexa. LNG volumes delivered globally slowed on the year in April-August and were broadly unchanged in September despite a sharp increase in global liquefaction capacity earlier in the year, as Covid-19 weighed heavily on global gas demand.

The drop in summer deliveries has slowed but not reversed the expansion of the global LNG market, which has delivered 298mn t so far this year – up from 289mn t in January-October 2019.

Quicker deliveries to Asian, Middle Eastern and Latin American markets more than offset slower European demand.

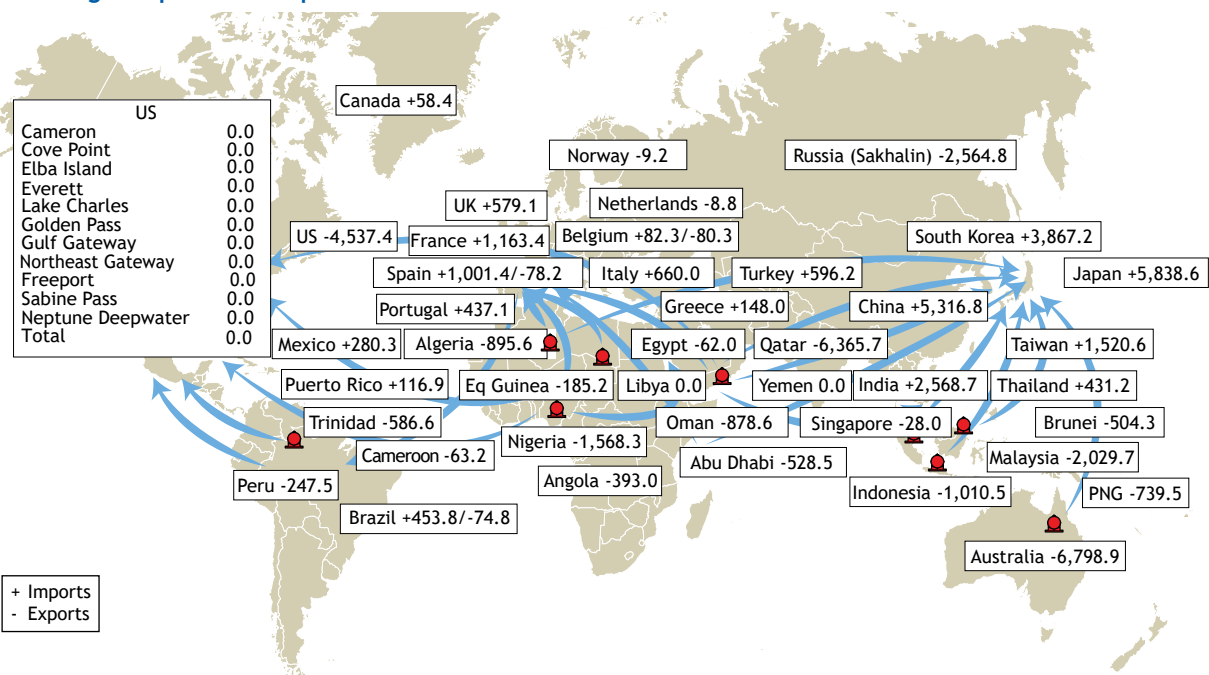
Asian markets extended import growth seen in recent months, with the region receiving 18mn t of LNG last month, up from 15.6mn t a year earlier. Lower demand from southeast Asia and Japan only marginally offset an increase in deliveries to China, South Korea and southern Asia.

Deliveries to Latin America rose on the year for the first time since April 2019, mostly as a result of firmer demand from Brazil and Chile, as well as Jamaica, which more than offset a continued drop in deliveries to Mexico.

Brazil received 398,000t of LNG in October, up from 205,000t a year earlier. The country received one cargo per month in April-May and none in June-September. A late start to the rainy season this year, coupled with a drought in the southern part of the country, has weighed on hydroelectric stocks and increased the call on thermal generation last month.

## Latest estimated gas imports and exports

'000 t/month



## EUROPEAN GAS WRAP

## European gas indexes extend rally

Northwest European prompt and front-month gas indexes climbed in October, with markets further south and east trailing behind.

A slide in LNG sendout lent support to European prompt and front-month prices last month. And the drop was most pronounced in northwest Europe – particularly the UK and Belgium – although regasification fell sharply in Spain too.

Firmer LNG demand in Asia, the Middle East and Latin America left fewer spare cargoes for Europe, while several unplanned shutdowns limited Atlantic basin supply availability.

And weaker European regasification coincided with an early boost to heating demand, with Dutch October heating degree days at their highest since 2016. This prompted an early start to withdrawals, with German inventories already slipping below the three-year average in early November. In contrast, the stockdraw did not start in earnest in many markets last winter until well into November.

European prices reversed some of their gains towards the end of October, as announcements of the reintroduction of lockdowns to contain a second wave of Covid-19 infections raised the prospect of a slowdown in gas and power demand and with mild weather forecast for most of the region this month.

Prompt prices across much of central, eastern and southern Europe moved to a discount to northwest European markets last month. A sharp fall in exports to Ukraine last month left more supply in central and eastern Europe. Ukrainian inventories entered the winter at their highest in at least a decade, limiting the country's import demand. Meanwhile, flows in southern Europe have flipped northwards, with strong Algerian pipeline receipts bolstering supply. Italian supply will be further bolstered by the start of Azeri deliveries in December, although the ramp-up may be gradual.

Argus European long-term contract prices												€/MWh	
Delivery month	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov*	Dec*	Jan 21*
Oil index	24.15	24.44	24.57	24.39	22.53	20.20	18.09	16.29	14.69	13.74	13.80	14.55	15.05
+5pc discount	22.95	23.22	23.34	23.17	21.40	19.19	17.18	15.48	13.96	13.06	13.11	13.82	14.30
+7.5pc discount	22.34	22.61	22.73	22.56	20.84	18.68	16.73	15.07	13.59	12.71	12.77	13.46	13.92
+10pc discount	21.74	22.00	22.11	21.95	20.27	18.18	16.28	14.66	13.22	12.37	12.42	13.10	13.54
+12.5pc discount	21.14	21.39	21.50	21.34	19.71	17.67	15.82	14.26	12.86	12.03	12.08	12.73	13.17
+15pc discount	20.53	20.78	20.88	20.73	19.15	17.17	15.37	13.85	12.49	11.68	11.73	12.37	12.79
+20pc discount	19.32	19.56	19.65	19.51	18.02	16.16	14.47	13.04	11.76	10.99	11.04	11.64	12.04
TTF													
Oil index 90pc + 10pc TTF	23.16	23.11	23.02	22.78	20.93	18.66	16.81	15.20	14.03	13.51	13.91	14.60	15.06
Oil index 80pc + 20pc TTF	22.17	21.78	21.47	21.18	19.34	17.13	15.53	14.10	13.37	13.27	14.01	14.64	15.06
Oil index 70pc + 30pc TTF	21.17	20.45	19.92	19.57	17.74	15.59	14.25	13.00	12.70	13.03	14.11	14.69	15.07
Oil index 60pc + 40pc TTF	20.18	19.12	18.37	17.96	16.15	14.06	12.97	11.90	12.04	12.79	14.21	14.73	15.08
Oil index 50pc + 50pc TTF	19.19	17.79	16.83	16.36	14.55	12.52	11.69	10.80	11.37	12.56	14.31	14.78	15.09
NCG													
Oil index 90pc + 10pc NCG	23.20	23.16	23.07	22.82	20.97	18.70	16.81	15.20	14.03	13.49	13.88	14.58	15.04
Oil index 80pc + 20pc NCG	22.25	21.88	21.58	21.25	19.42	17.20	15.54	14.11	13.37	13.24	13.95	14.61	15.03
Oil index 70pc + 30pc NCG	21.30	20.60	20.08	19.69	17.87	15.70	14.27	13.02	12.70	12.99	14.03	14.64	15.02
Oil index 60pc + 40pc NCG	20.35	19.31	18.59	18.12	16.32	14.20	13.00	11.93	12.04	12.73	14.10	14.68	15.01
Oil index 50pc + 50pc NCG	19.39	18.03	17.10	16.55	14.77	12.70	11.73	10.84	11.37	12.48	14.18	14.71	15.00
VTP													
Oil index 90pc + 10pc VTP	23.23	23.18	23.12	22.87	21.05	18.78	16.87	15.30	14.13	13.52	13.83	14.52	
Oil index 80pc + 20pc VTP	22.31	21.91	21.66	21.35	19.58	17.36	15.66	14.31	13.57	13.30	13.86	14.49	
Oil index 70pc + 30pc VTP	21.39	20.65	20.21	19.83	18.10	15.94	14.45	13.32	13.01	13.07	13.89	14.46	
Oil index 60pc + 40pc VTP	20.47	19.38	18.76	18.31	16.63	14.52	13.24	12.33	12.44	12.85	13.91	14.43	
Oil index 50pc + 50pc VTP	19.55	18.12	17.31	16.79	15.16	13.10	12.03	11.34	11.88	12.62	13.94	14.40	

\*provisional

US

### Lower production lifts US gas prices

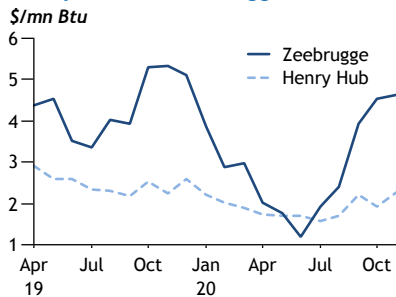
Front-month prices at the US' Henry Hub breached \$3/mn Btu for the first time since January 2019 on 21 October, as a combination of lower production and higher export demand tightened the market.

The Energy Information Administration (EIA) estimates that gas demand for liquefaction rose to 7.2bn ft<sup>3</sup>/d in October, a 2.7bn ft<sup>3</sup>/d increase from September and 1.5bn ft<sup>3</sup>/d higher than a year earlier. But US gas production was down by 0.74bn ft<sup>3</sup>/d on the month, and 6.06bn ft<sup>3</sup>/d lower on the year, at 97.16bn ft<sup>3</sup>/d. The combination resulted in the smallest October stockbuild since 2002.

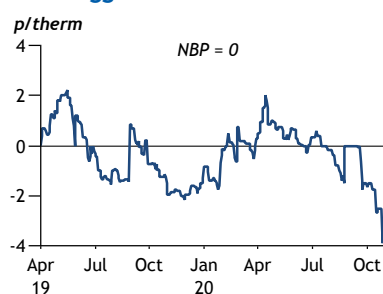
The EIA expects US gas production to continue declining through to May next year, despite the seasonal increase in domestic and export demand, which would lead to a strong draw on inventories through the heating season. Although end-of-October stocks were the second-highest on record, the EIA expects inventories to fall below the five-year average by December and to slip by nearly 11pc below the five-year average as the heating season winds down in March.

Meanwhile, the EIA expects gas demand for LNG export to peak at 9.5bn ft<sup>3</sup>/d in January 2021, up from 8.07bn ft<sup>3</sup>/d at the start of 2020.

Henry Hub vs Zeebrugge



Zeebrugge front month vs NBP



US gas in underground storage						bn ft <sup>3</sup>
Region	30-Oct	25-Sep	±	Year ago	Five-year av.	± % 5-yr ave
East	947	872	75	714	927	2.2
Midwest	1119	1033	86	827	1105	1.3
Mountain	240	231	9	177	208	15.4
Pacific	320	316	4	276	294	8.8
South Central	1,293	1304	-11	947	1186	9.0
<b>Total</b>	<b>3,919</b>	<b>3,756</b>	<b>163</b>	<b>2,941</b>	<b>3,720</b>	<b>5.3</b>

Spot market natural gas prices (pipeline)													
	Oct 19	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
<b>Europe p/th</b>													
UK NBP, 1st month	40.67	41.64	36.88	28.76	22.25	21.61	14.94	11.57	13.36	13.78	22.16	30.25	39.88
UK NBP, 2nd month	46.30	44.05	37.54	28.04	21.77	21.30	15.89	12.28	14.12	15.87	24.67	36.18	42.07
UK NBP, 3rd month	49.17	44.77	36.68	27.42	22.40	21.74	17.13	14.02	16.82	19.94	33.12	39.73	43.24
ICE, 1st month	41.04	41.72	36.95	28.71	22.16	21.70	15.00	11.57	13.36	13.90	22.21	30.37	39.99
ICE, 2nd month	46.46	44.04	37.52	28.02	21.74	21.45	15.98	12.31	14.21	16.03	24.99	36.30	42.13
ICE, 3rd month	49.21	44.69	36.61	27.41	22.41	21.89	17.20	14.14	17.00	20.38	33.24	39.84	43.29
<b>Europe €/MWh</b>													
UK NBP, 1st month	15.47	15.80	14.12	11.03	8.96	8.28	6.21	4.69	5.16	5.28	8.12	11.27	14.29
UK NBP, 2nd month	17.17	16.56	14.36	10.94	9.02	8.24	6.52	4.87	5.41	5.91	9.40	13.04	14.91
UK NBP, 3rd month	17.77	16.82	14.15	11.01	9.20	8.46	6.81	5.41	6.34	7.43	12.16	14.37	14.41
ICE, 1st month	15.42	15.85	14.22	11.13	9.08	8.32	6.58	4.84	5.30	5.31	8.06	11.37	14.15
ICE, 2nd month	17.27	16.65	14.47	11.10	9.25	8.37	6.91	5.29	5.65	6.05	9.53	13.01	14.44
ICE, 3rd month	17.78	16.84	14.23	11.05	9.46	8.49	7.21	5.76	6.29	7.86	11.98	13.63	14.59
<b>US \$/mn Btu</b>													
Henry Hub, 1st month	2.43	2.60	2.47	2.16	1.88	1.82	1.63	1.80	1.72	1.50	1.86	2.59	2.11
NY (Transco Zone 6)	1.64	2.80	2.78	2.10	1.88	1.49	1.54	1.39	1.47	1.70	1.55	1.26	1.32
Columbia TCO	1.64	2.28	1.90	1.74	1.66	1.47	1.56	1.53	1.42	1.56	1.69	1.41	1.55
SoCal border	2.47	2.74	2.96	2.18	1.87	1.54	1.42	1.68	1.62	1.79	3.37	2.30	2.79
Nymex, 1st month	2.51	2.31	2.66	2.31	2.06	1.86	1.74	1.74	1.82	1.71	1.76	2.26	2.29
Nymex, 2nd month	2.17	2.55	2.49	2.73	2.30	2.04	1.88	1.78	1.87	2.02	1.80	1.81	2.40

Please see the methodology for the Argus European Natural Gas report and the Argus Natural Gas Americas report at [www.argusmedia.com/en/methodology](http://www.argusmedia.com/en/methodology)

## COMPETING FUELS

Crude													\$/bl
	Oct 19	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Japanese Crude Cocktail	65.09	64.94	67.12	70.33	70.63	62.16	42.21	24.96	24.56	32.78	43.45	46.20	na
Tapis	66.01	70.21	74.22	71.42	62.67	35.38	17.91	26.40	40.78	45.62	46.30	39.48	39.15
Dubai (1st month) London close	59.34	61.91	64.93	63.68	54.22	32.86	21.18	31.18	40.67	43.19	43.94	41.23	40.58
North Sea dated	59.73	63.11	66.83	63.38	55.45	31.71	18.57	29.00	40.08	43.27	44.78	40.58	40.01
WTI (1st month)	53.98	57.16	59.81	57.52	50.53	29.89	16.52	28.57	38.30	40.76	42.36	39.60	39.53

Please see the methodology for the Argus Crude report at [www.argusmedia.com/en/methodology](http://www.argusmedia.com/en/methodology)

International fuel oil prices													\$/t
	Oct 19	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
HSFO 180 fob South Korea	314.08	260.69	285.40	341.30	307.13	210.63	159.25	180.61	245.25	260.81	278.85	262.38	272.42
HSFO 180 fob Singapore	303.08	249.69	274.40	330.30	296.13	199.63	148.25	169.61	234.25	249.81	267.85	251.38	261.42
LSWR fob Indonesia*	340.88	338.59	377.94	448.39	422.62	302.06	203.23	221.16	276.72	324.00	324.47	305.99	315.42
1pc fuel oil fob NWE	386.75	385.32	426.69	445.70	360.86	201.85	152.41	176.05	239.11	260.13	273.50	254.55	269.63
1pc fuel oil fob W Med	399.75	400.88	446.00	458.65	376.38	213.65	162.61	184.17	245.52	266.73	279.43	259.56	276.91
New York 1pc	406.15	403.14	454.15	464.20	373.70	211.20	164.93	173.38	231.17	262.21	287.36	274.24	282.37

\*LSWR fob Indonesia changed to 0.45pc sulphur specification with price in \$/t from 31 July. Prices before this date are for 0.35pc LSWR

Please see the methodology for the Argus European Products, Argus Asia-Pacific Products and Argus US Products reports at [www.argusmedia.com/en/methodology](http://www.argusmedia.com/en/methodology)

International gasoil prices													\$/t
	Oct 19	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
C+F Japan	578.82	575.99	598.22	581.06	495.12	344.13	229.10	274.01	359.42	384.41	365.02	327.42	331.07
Fob South Korea	560.40	556.96	578.00	559.95	480.13	328.31	221.49	253.57	338.91	367.63	358.98	321.08	323.17
German heating oil	581.24	576.10	592.51	562.03	491.93	344.06	245.73	252.82	330.90	363.49	364.56	319.23	328.51
Heating oil fob W Med	568.87	564.77	580.33	551.59	482.06	329.67	199.28	226.86	325.86	360.92	359.21	314.72	325.89
No 2 oil New York	580.47	563.44	573.47	535.10	472.15	327.53	207.57	210.36	310.63	345.62	353.82	314.65	327.60

Please see the methodology for the Argus European Products, Argus Asia-Pacific Products and Argus US Products reports at [www.argusmedia.com/en/methodology](http://www.argusmedia.com/en/methodology)

International electricity prices													€/MWh
	Oct 19	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
France month-ahead	52.99	48.92	49.94	40.02	32.75	23.84	17.82	22.96	31.38	33.81	39.54	45.20	47.01
Spain month-ahead	52.78	49.29	46.31	41.48	34.77	28.13	23.59	26.82	32.74	35.44	38.93	43.08	42.37
PJM West (off peak)(\$/MWh)	19.95	27.45	21.48	20.89	17.24	15.47	14.98	14.06	12.91	15.60	15.44	14.37	16.70
Entergy (off-peak)(\$/MWh)	18.94	22.05	19.65	16.69	17.82	15.62	14.89	14.48	12.99	14.51	16.55	14.85	19.45

Please see the methodology for the Argus European Electricity report at [www.argusmedia.com/en/methodology](http://www.argusmedia.com/en/methodology)

International coal prices													\$/t
	Oct 19	Nov	Dec	Jan 20	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Japan	81.77	80.25	82.47	83.07	78.85	75.80	68.94	58.67	60.21	58.33	58.47	60.41	64.82
South Korea	77.76	76.20	76.69	75.60	74.77	72.61	66.75	58.49	59.69	57.97	57.97	58.91	62.38
Indonesia	69.08	68.91	68.74	68.78	69.09	67.88	63.24	56.10	55.15	53.44	53.06	52.88	56.79
ARA	59.14	55.97	53.50	50.19	48.27	48.16	42.98	38.67	46.00	49.85	49.02	53.01	56.22
Nymex spec Q1	53.88	52.00	51.00	51.50	51.00	46.45	46.20	43.50	38.00	39.00	41.44	43.95	46.65

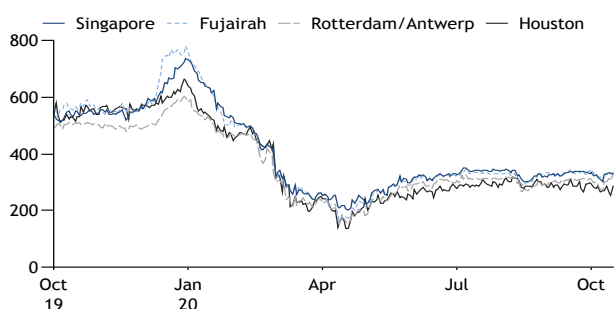
Please see the methodology for the Argus Coal Daily and Argus Coal Daily International reports at [www.argusmedia.com/en/methodology](http://www.argusmedia.com/en/methodology)

International shipping fuel prices							\$/t
	May	Jun	Jul	Aug	Sep	Oct	
Singapore 380cst	251.81	307.46	331.20	339.84	319.87	329.06	
Fujairah 380cst	238.82	302.66	326.67	330.63	315.70	331.26	
Rotterdam/Antwerp 380cst	216.15	257.49	281.86	294.76	293.52	285.64	
Houston 380cst	215.79	279.76	307.80	311.69	291.47	303.35	

Please see the methodology for the Argus Marine Fuels report at [www.argusmedia.com/en/methodology](http://www.argusmedia.com/en/methodology)

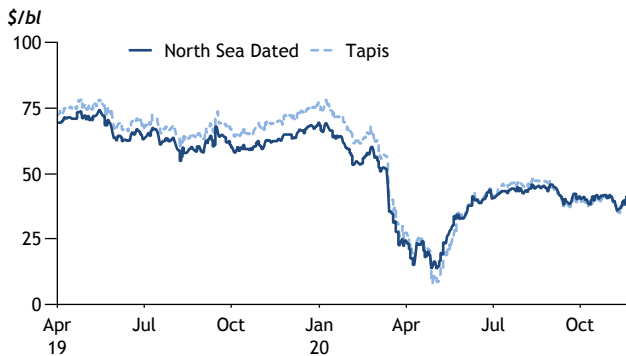
## Key shipping fuel prices

\$/t



## COMPETING FUELS

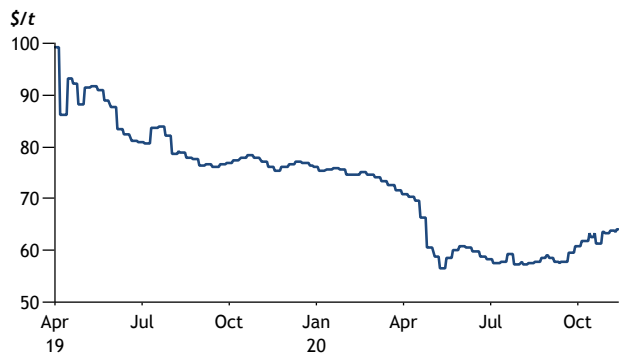
### North Sea Dated vs Tapis



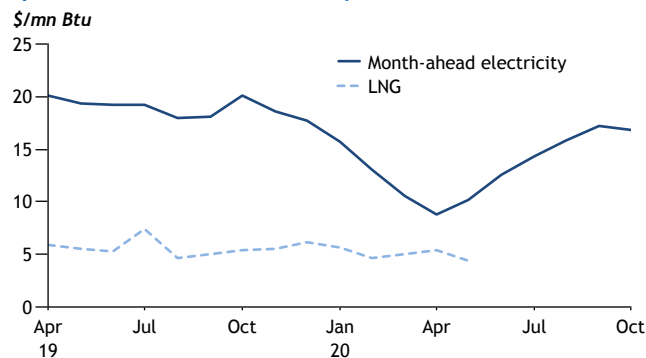
### 180cst fuel oil fob Singapore



### Coal cif South Korea



### Spain: Month-ahead electricity vs LNG



## Crude prices slide

Global crude prices declined as an increase in the number of Covid-19 infections triggered a return of national lockdowns across Europe. Libyan production also continued to ramp up, adding further pressure to crude prices. Atlantic basin benchmark North Sea Dated fell by \$2.36/bl over the month to end October at \$36.18/bl. US marker WTI dropped by \$2.93/bl over the same period to close at \$35.79/bl. Values were initially supported in October by the prospect of tighter US supplies, with tropical storms once again threatening the US Gulf coast. But gains were later erased by renewed Covid-19 concerns.

## Products margins still tight

Intensifying lockdown measures across Europe towards the end of last month began to curb demand for products, particularly for jet and road fuels. Refining capacity utilisation in mainland Europe remained low, at about 70pc, and even lower in some cases, as autumn maintenance work took several units off line during the month, somewhat offsetting the decrease in demand. Naphtha bucked the broader trend, with margins at above year-earlier levels and at rare premiums to crude in October. But this was driven by strong demand from the petrochemicals industry and firm prices of rival feedstocks.

## European coal prices rise

European physical coal prices rose in October, supported by continued disruption to key suppliers across the Atlantic and higher European gas prices. Argus' cif ARA NAR 6,000 kcal/kg coal assessment increased by \$4.08/t on the month to \$56.37/t. Atlantic basin fundamentals remained tight as activity at several Colombian mines remained halted and despite a year-on-year decrease in coal burn in northwest Europe. Renewed lockdowns across Europe could weigh on power demand in November, although prevailing generating economics suggest gas-fired plants will be turned down before coal-fired units are.

## Renewables limit European CCGT runs

UK power demand remained lower year on year in October, which, with wind generation being strong, squeezed out combine-cycle gas turbine production, which was about 15pc lower on the year. In France and Germany, demand was higher on the year. But French combine-cycle gas turbine production fell to its lowest level in five months, as nuclear generation climbed to its highest since January this year, while wind output reached an eight-month high. Wind generation in Germany reached its highest level since February, which, combined with favourable coal-fired generating economics, pushed gas-fired production to a five-month low.

## SHIPPING

## LNG charter rates rise sharply in October

Prompt spot charter rates for LNG carriers rose in late October, as the scope for quicker inter-basin LNG flows and expectations of a rise in US exports lifted tonnage demand in both basins.

Rates for a tri-fuel diesel-electric carrier for a prompt fixture west of Suez rose to \$106,000/d on 29 October, from \$62,500/d at the start of this month. Corresponding rates east of Suez jumped to \$100,000/d from \$59,500/d.

Unlike previous years, this was not primarily the result of demand to use vessels as floating storage, although there has been some such activity that has contributed to the market's tightness. Instead, the gains were largely the result of inter-basin price spreads widening sufficiently to draw Atlantic basin supply into the Pacific, lengthening journey times and lifting demand for tonnage. Firms that had yet to secure vessels needed in December found themselves paying significantly more than if they had fixed the tankers during the summer.

Newbuild deliveries continued apace, with five new carriers arriving in October – the most since May. At least four of these vessels were already committed – to Swiss trading firms Gunvor and Vitol, Russia's Yamal project and one unnamed charterer. But two more tankers – destined for Bermuda-based Gaslog and Greece's Capital Gas – missed their October delivery window, despite beginning sea trials at the start of this month. Further delays could add to the wave of 16 new vessels expected in the first quarter of 2021 – up from four a year earlier.

Netbacks for 138,000m<sup>3</sup> tanker Oct

	Sailing days, one-way	Bunker fuel \$	Manning \$	Insurance \$	Repairs & maintenance \$	Stores and lubes \$	Capital costs \$	Total shipping and storage \$	Gas delivered, minus boil-off '000m <sup>3</sup>	Delivered value of cargo \$	Transport and regas costs \$/mn Btu	Delivered price \$/mn Btu	Reporting month	Netback \$/mn Btu
Qatar-Japan	14	1,121,455	129,115	72,261	10,602	24,955	803,786	2,162,173	125,320	11,720,224	0.81	4.29	Sep 20	3.48
Qatar-S Korea	15	1,177,338	134,946	75,524	11,081	26,082	840,086	2,265,057	125,174	15,554,124	0.85	5.70	Sep 20	4.85
Qatar-Spain	11	897,921	105,791	59,207	8,687	20,447	658,586	1,750,639	125,906	6,258,052	0.65	2.28	Aug 20	1.63
Abu Dhabi-Japan	14	1,121,455	129,115	72,261	10,602	24,955	803,786	2,162,173	125,320	16,391,921	0.81	6.00	Sep 20	5.19
Qatar-Belgium	3	274,777	40,817	22,844	3,352	7,889	254,100	603,778	127,539	3,948,083	0.22	1.42	Aug 20	1.20
Algeria-S Korea	20	1,600,014	179,095	100,233	14,706	34,615	1,114,929	3,043,592	124,065	22,772,875	1.15	8.42	May 17	7.27
Algeria-Spain	1	67,209	19,159	10,723	1,573	3,703	119,271	221,638	128,083	7,231,800	0.08	2.59	Aug 20	2.51
Algeria-US	11	873,529	103,292	57,809	8,482	19,964	643,029	1,706,103	125,969	11,341,509	0.63	4.13	Mar 20	3.50
Australia-Japan	8	680,336	78,302	43,823	6,430	15,134	487,457	1,311,481	126,597	15,344,560	0.48	5.56	Sep 20	5.08
Australia-S Korea	8	731,784	83,300	46,620	6,840	16,100	518,571	1,403,215	126,471	13,454,531	0.52	4.88	Sep 20	4.36
Brunei-Japan	5	423,094	53,312	29,837	4,378	10,304	331,886	852,810	127,225	14,533,129	0.31	5.24	Sep 20	4.93
Brunei-S Korea	6	491,692	59,976	33,566	4,925	11,592	373,371	975,122	127,057	11,882,650	0.36	4.29	Sep 20	3.93
Indonesia-Japan	7	620,313	72,471	40,559	5,951	14,007	451,157	1,204,458	126,743	13,262,429	0.44	4.80	Sep 20	4.36
Indonesia-S Korea	7	594,589	69,972	39,161	5,746	13,524	435,600	1,158,591	126,806	12,854,342	0.43	4.65	Sep 20	4.22
Malaysia-S Korea	5	405,945	51,646	28,904	4,241	9,982	321,514	822,232	127,267	10,376,294	0.30	3.74	Sep 20	3.44
Nigeria-Spain	8	673,945	82,467	46,154	6,772	15,939	513,386	1,338,662	126,492	8,603,500	0.49	3.12	Aug 20	2.63
Oman-Japan	13	1,041,621	120,785	67,599	9,918	23,345	751,929	2,015,197	125,530	18,690,627	0.75	6.83	Sep 20	6.08
Oman-S Korea	12	1,001,704	116,620	65,268	9,576	22,540	726,000	1,941,708	125,634	12,735,557	0.72	4.65	Sep 20	3.93
Oman-Spain	12	985,738	114,954	64,336	9,439	22,218	715,629	1,912,313	125,676	12,054,864	0.71	4.40	May 20	3.69
Oman-US	9	746,237	89,964	50,350	7,387	17,388	560,057	1,471,383	126,304	11,371,652	0.54	4.13	Mar 20	3.59
Trinidad-US	5	386,221	52,479	29,371	4,309	10,143	326,700	809,223	127,246	11,456,430	0.30	4.13	Mar 20	3.83
USGC-Japan	20	1,598,670	179,095	100,233	14,706	34,615	1,114,929	3,042,248	124,065	21,853,305	1.15	8.08	Sep 20	6.93
Algeria-UK	4	322,677	45,815	25,641	3,762	8,855	285,214	691,964	127,413	13,804,689	0.25	4.97	Jan 20	4.72
Nigeria-India	15	1,200,846	137,445	76,923	11,286	26,565	855,643	2,308,708	125,111	14,428,080	0.86	5.29	Jul 20	4.43
Qatar-India	3	243,285	37,485	20,979	3,078	7,245	233,357	545,429	127,622	12,742,316	0.20	4.58	Jul 20	4.38

## SHIPPING

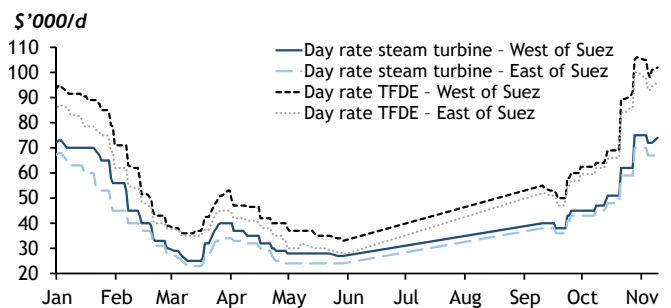
LNG vessel fleet, May					
Owner	No	Age of fleet			Total cap. m <sup>3</sup>
		Av	Min	Max	
Teekay	29	8	1	27	4,602,900
Maran Gas Maritime	26	4	1	7	4,370,925
Nakilat	25	11	10	12	6,055,700
GasLog	24	7	1	14	3,870,600
MISC	22	19	11	39	3,098,900
Mol	17	5	1	16	2,901,447
BW	16	11	1	17	2,467,100
BGT Ltd	13	11	4	18	2,029,000
Dynagas	12	7	1	13	1,771,970
Knutsen OAS	12	9	1	16	1,957,600
NYK	12	10	1	14	1,894,600
BP	10	6	1	13	1,662,800
Golar LNG	10	7	5	17	1,594,000
J4 Consortium	10	22	16	24	1,374,100
SK Shipping	10	14	1	26	1,525,900
Golar LNG Partners	9	20	6	43	1,281,003
Hoegh	9	5	1	14	1,508,332
Hyundai LNG Shipping	9	17	3	26	1,288,200
Excelerate Energy	8	12	6	15	1,191,000
National Gas Shipping Co	8	25	23	26	1,082,300
NYK, K Line, Mol, lino, Mitsui, Nakilat	8	12	12	12	1,704,200
Sovcomflot	7	4	2	6	1,198,000
Chevron	6	5	3	6	960,000
Flex LNG	6	2	1	2	1,041,600
Korea Line	6	12	3	20	921,400
Maran Gas Maritime, Nakilat	6	12	2	15	902,000
Shell	6	15	10	18	886,200
Brunei Gas Carriers	5	9	5	18	740,600
China LNG Ship Mgmt	5	11	11	12	736,800
China Shipping Group	5	3	2	3	870,500
K Line	5	8	2	13	804,300
Nakilat, Teekay	5	12	12	14	1,020,600
Petronas	5	3	2	4	751,000
Teekay, Marubeni	5	11	10	12	830,900
TMS Cardiff Gas	5	8	6	16	788,100
Commerz Real, Nakilat, Pronav	4	13	12	13	840,800
Hanjin Shipping Co	4	22	20	25	544,400
Mitsui, NYK, Teekay	4	9	8	9	641,200
Mol, China LNG	4	5	4	5	684,223
Mol, NYK, K Line, SCI, Nakilat, Petronet	4	12	4	16	604,200
Nakilat, OSC	4	13	12	13	864,800
North West Shelf Venture	4	29	26	31	507,400
OSC, Mol	4	16	14	19	579,500
Sinokor Merchant Marine	4	21	16	31	543,900
Teekay, China LNG Shipping	4	1	1	1	688,000
Tepeco, NYK, Mitsubishi	4	13	11	17	568,800

LNG vessel fleet, May					
Owner	No	Age of fleet			Total cap. m <sup>3</sup>
		Av	Min	Max	
BW, Pavilion LNG	3	4	1	5	497,400
Golar Power	3	5	2	7	490,000
Hyproc	3	8	3	16	490,900
K Line, PT Meratus	3	12	11	12	464,800
Mitsui, Sonangol, Sojlitz	3	9	9	9	480,000
Mol, Kepco	3	7	4	12	467,900
Mol, NYK	3	11	10	12	440,600
Mol, NYK, K Line	3	27	15	36	399,200
Shell, Gaslog	3	13	13	14	435,000
Stena Bulk	3	11	9	14	491,700
Thenamaris	3	6	5	7	480,000
Others	81	11	1	43	11,909,500
<b>Total</b>	<b>534</b>	<b>3</b>	<b>1</b>	<b>43</b>	<b>85,798,800</b>

## Key ship deliveries 2020-22

Owner	No of vessels	Delivery period
Maran Gas Maritime	11	2020-2021
TMS Cardiff Gas	11	2020-2021
NYK Line	9	2020-2021
Capital Gas	7	2021
Gaslog	7	2020-2021
BW	6	2020-2022
Mol	6	2020-2021
Knutsen OAS Shipping	6	2020-2022
Alpha	4	2020-2021
Minerva Marine	4	2021
Dynagas	4	2021-2022
Celsius Shipping	4	2020-2021
Sovcomflot	3	2020-2021
CSSC Shipping Leasing	2	2021
Thenamaris	2	2020-2021
Consolidated Marine	2	2021
JP Morgan	2	2022
Korea Line	2	2022
Jovo Group	2	2021
MISC	2	2023
Frontline Mgmt	1	2020
Triumph Offshore Pvt	1	2020
Anthony Veder	1	2020
Others	21	2020-2022

## LNG vessel day rates



## SPARK SPREADS

International spark spreads			Spark spreads at varying conversion rates					\$/MWh
Oct	Fuel	Electricity	30pc	34pc	38pc	49.13pc	55pc	
<b>Japan</b>								
LNG	18.60	46.10	-15.83	-8.60	-2.85	8.24	12.28	
Coal, cif Japan	9.29	46.10	15.16	18.78	21.65	27.19	29.21	
HSFO 180, cif Japan	22.41	46.10	-28.51	-19.80	-12.86	0.49	5.36	
<b>South Korea</b>								
LNG	17.17	69.75	12.57	19.25	24.56	34.80	38.53	
Coal, cif Korea	8.94	69.75	39.98	43.45	46.22	51.55	53.49	
HSFO 180, fob Korea	22.75	69.75	-6.03	2.82	9.86	23.43	28.37	
<b>Belgium</b>								
LNG	4.42	51.61	36.89	38.61	39.98	42.62	43.58	
Zeebrugge pipeline natural gas	13.26	51.61	7.46	12.61	16.72	24.62	27.50	
Coal	8.06	51.61	24.78	27.92	30.41	35.21	36.96	
Fuel oil 1pc fob NWE	22.52	51.61	-23.38	-14.62	-7.65	5.77	10.66	
<b>France</b>								
LNG	15.40	53.33	2.04	8.03	12.80	21.98	25.33	
Pipeline natural gas, Russia	37.91	53.33	-72.91	-58.16	-46.43	-23.83	-15.60	
Coal	8.06	53.33	26.50	29.64	32.13	36.93	38.68	
Fuel oil 1pc fob w Med	23.13	53.33	-23.69	-14.69	-7.54	6.25	11.28	
<b>Italy</b>								
LNG	15.40	55.67	4.38	10.37	15.14	24.32	27.67	
Pipeline natural gas, Russia	41.21	55.67	-81.55	-65.52	-52.77	-28.20	-19.25	
Coal	8.06	55.67	28.84	31.98	34.47	39.27	41.02	
Fuel oil 1pc fob w Med	23.13	55.67	-21.35	-12.35	-5.20	8.59	13.62	
<b>Spain</b>								
LNG	15.01	50.69	0.70	6.54	11.19	20.14	23.40	
Pipeline natural gas, Algeria	41.34	50.69	-86.98	-70.90	-58.11	-33.46	-24.48	
Coal	8.06	50.69	23.87	27.00	29.49	34.30	36.05	
Fuel oil 1pc fob w Med	23.13	50.69	-26.33	-17.33	-10.17	3.62	8.64	
<b>US Gulf coast</b>								
LNG	14.09	19.45	-27.47	-21.99	-17.63	-9.23	-6.17	
Natural gas, Henry Hub Nymex	8.02	19.45	-7.27	-4.15	-1.67	3.12	4.86	
Coal Central Appalachia	6.69	19.45	-2.81	-0.21	1.86	5.84	7.29	
HSFO 3pc fob USGC	20.13	19.45	-47.59	-39.76	-33.53	-21.53	-17.16	
<b>US Northeast</b>								
LNG	14.09	23.24	-23.68	-18.20	-13.84	-5.44	-2.38	
Natural gas, Transco Z6 NY	4.49	23.24	8.29	10.04	11.43	14.11	15.08	
Coal Central Appalachia	6.69	23.24	0.98	3.58	5.65	9.63	11.08	
HSFO 3pc fob NYH	20.73	23.24	-45.78	-37.71	-31.30	-18.94	-14.44	

Please see the methodology for the Argus Coal Daily and Argus Coal Daily International reports; Argus European Products, Argus Asia-Pacific Products and Argus US Products reports; and the Argus European Natural Gas report and the Argus Natural Gas Americas report at [www.argusmedia.com/en/methodology](http://www.argusmedia.com/en/methodology)

Conversion factors (left-hand column units are multiplied by the factor shown to convert to units in the top row)								
Equals	Million British thermal units	Barrels of oil equivalent	Tonnes of oil equivalent	Cubic feet (ft <sup>3</sup> ) gas	Cubic metres (m <sup>3</sup> ) gas	m <sup>3</sup> LNG	Tonnes LNG (specific gravity 0.425)	Tonnes LNG (specific gravity 0.475)
1 million Btu (1mn Btu)	1	0.172	0.0235	1000	28.3	0.0459	0.0195	0.0218
1 barrel of oil equivalent (boe)	5.8	1	0.136	5800	164.2	0.266	0.113	0.126
1 tonne of oil equivalent (toe)	42.5	7.33	1	42.5	1200	1.95	0.828	0.925
1 ft <sup>3</sup> gas	0.001	0.000172	0.0000235	1	0.0283	0.0000458	0.0000195	0.0000218
1 m <sup>3</sup> gas	0.0353	0.0061	0.00083	35.3	1	0.00162	0.000688	0.000769
1 m <sup>3</sup> LNG	21.8	3.76	0.513	21,824	618	1	0.425	0.475
1 tonne LNG (specific gravity 0.425)	51.3	8.85	1.207	51,350	1,450	2.353	1	
1 tonne LNG (specific gravity 0.475)	45.9	7.91	1.081	45,950	1,300	2.105		1





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