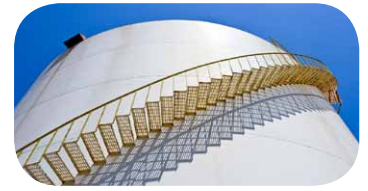


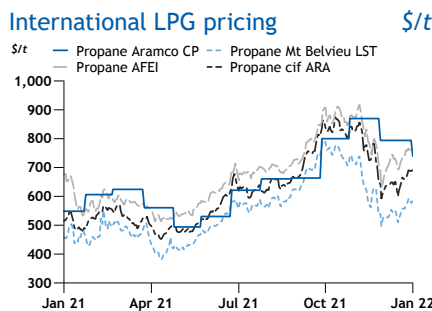
# Argus LPG World

News, prices and analysis



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**US LPG could be spared further punitive import tariffs in China given its growing importance to both countries as hostility builds**



## US-China relations key to LPG trade in 2022

A deterioration in relations between the US and China has brought into focus trade ties between the world’s largest economies, raising the question of whether the LPG sector will suffer again if tensions worsen.

LPG fell victim when the two countries collided over trade in August 2018. But flourishing flows of the product from the US to China since the duo’s truce in early 2020 has brought a deeper co-dependency. Beijing’s retaliatory 25pc import tariffs resulted in imports of US LPG shrinking to 1.6mn t in 2018 and almost zero in 2019 from 3.3mn t in 2017, Chinese customs data show. A decision to waive the fees for Chinese LPG importers in March 2020 as part of a “phase one” trade deal helped boost arrivals from the US to 4.8mn t that year. And at 7.8mn t in January-November 2021, imports from the country were already 63pc higher than the 2020 total and more than double the pre-tariff level in 2017.

The growth in LPG imports from the US is further highlighted by the fact that China’s total arrivals fell in 2020 owing to the Covid-19 pandemic, pushing the US’ share of the market to about 24pc from 19pc in 2017 – its share rose to 34pc in January-November 2021. The US is now by far China’s dominant LPG supplier, with the UAE the second-largest at 3.7mn t, or 16pc, in the first 11 months of last year.

But US-China relations have remained fraught even after the election of US president Joe Biden in early 2021, and have worsened over alleged Chinese human rights violations and the status of Taiwan. A US-led diplomatic boycott of the Beijing Winter Olympics in February 2022 owing to concerns about China’s human rights record has been heavily criticised by Beijing, which had promised “resolute countermeasures” to any boycott prior to Washington’s announcement.

The last US-China trade war led to a major reshuffling of import flows in Asia-Pacific and significant premiums for non-US origin cargoes. Chinese importers had to pay around an \$80/t premium to buy alternative supplies in January 2020.

## CONTENTS

China’s LPG imports face headwinds	2
India demand may lose momentum	3
NWE supply issues expected to ease	4
US LPG exports, production to grow	5
VLGC freight rates on firm footing	7
Russia LPG exports to climb	8
Japan city gas growth faces hurdles	8
Europe’s refinery LPG under pressure	9
Canada LPG exports to increase	9
Guangdong promotes natural gas	10
China’s DCE drops location charges	10
Ecopetrol to boost LPG output	11
SeaOne to open fuel, LPG terminal	11

## Plastics’ explosive growth

China’s growing imports of US LPG and in total are underpinned by mushrooming LPG-fed petrochemical production capacity in the country. The largest expansion has been in propane dehydrogenation (PDH), with capacity more than doubling to 10.5mn t/yr by the end of 2021 from 5.1mn t/yr in 2017. Propane supplies are abundant from the US Gulf coast, while availability from the Mideast Gulf – the main alternative supply region – is mostly a mix of propane and butane. Petrochemical buyers of Mideast Gulf supplies also have to compete with the large residential markets in south Asia that require a blend of propane and butane.

Surging LPG trade between China and the US benefits both, helping the latter narrow its trade deficit with the former, and providing the Chinese petrochemical industry with access to a competitive feedstock. This growing co-dependency may not avert another trade war, but it could spare LPG from further punitive tariffs.

## 2022 OUTLOOK

**An expected economic slowdown is likely to lead to oversupply of petrochemical products, tempering rising feedstock demand**

China LPG-fed petchem projects '000 t/yr				
Location	Plant	Cap.*	LPG import†	Start-up
<b>2021</b>				
Fuqing	PDH	750	900	Jan-Feb
Ningbo	PDH	600	720	Feb
Ningbo	Cracker	600	1,200	Apr
Qingdao	PDH	900	1,080	Sep
Zhangzhou	Cracker	800	300	Sep
Anqing	PDH	300	180	Nov
Luoyang	PDH	150	180	Dec
<b>2022</b>				
Lianyungang	PDH	700	840	1Q 22
Zibo	PDH	700	840	1Q 22
Zibo	PDH	250	300	1Q 22
Zibo	PDH	300	360	2Q 22
Binzhou	PDH	600	720	3Q 22
Lianyungang	PDH	600	720	3Q 22
Ningbo	PDH	600	720	3Q 22
Dongguan	PDH	600	720	3Q 22
Qin Zhou	PDH	750	900	3Q 22
Taixing	PDH	600	720	4Q 22
Dongying	PDH	1,000	1,200	4Q 22
Weifang	PDH	450	540	4Q 22
Panjin	PDH	600	720	4Q 22
Dongying	Cracker	1,000	200	1Q 22
Ningbo	Cracker	1,200	300	1Q 22
Jiaxing	Cracker	1,000	1,000	3Q 22

\* propylene/ethylene output (PDH/cracker)  
† Argus' estimated import demand

### China's LPG imports to face headwinds

China's LPG imports are expected to continue growing strongly in 2022 in line with the country's fast-expanding petrochemical production capacity. But the pace of growth may slow on potential oversupply of petrochemical products and the increasing switch to natural gas use in the residential market.

China imported 22.6mn t of LPG over January-November 2021, an increase of 26pc from a year earlier, customs data show. It received an additional 4.1mn t of propane and 600,000t of propane – signalling that a significant proportion of these imports were destined for its expanding fleet of propane dehydrogenation (PDH) plants that produce propylene. As well as PDH units, China has continued starting up new LPG-fed ethylene crackers, and more of both types of olefin production plants are due to open in 2022.

China's PDH capacity has grown significantly in recent years, more than doubling to 10.5mn t/yr by the end of 2021 from 5.1mn t/yr in 2017. This is expected to expand even further, with another 13 PDH units with a total propylene production capacity of 7.75mn t/yr scheduled to start up this year – requiring approximately 9.3mn t/yr of propane as feedstock. These PDH units are in addition to another nine mixed-feed crackers that are targeting commissioning in 2022, including three that will rely partially on imported LPG – up to about 1.5mn t/yr.

But tempering the latest wave of petrochemical plant expansions over the coming year is an expected slowdown in the country's economic growth. This is likely to lead to an oversupply in downstream petrochemical products – in particular of propylene – and mounting competition among producers, potentially forcing them to lower utilisation.

The IMF forecasts China's GDP growth to slow to 5.6pc in 2022 from 8pc in 2021, while the country's total propylene production capacity is simultaneously on course to increase to 60mn t/yr by the end of this year from 47.7mn t/yr at the end of last year.

PDH operating rates averaged 87pc in 2021. But assuming PDH utilisation declines by 10pc on the year and ethylene cracker run rates are unchanged, this would mean demand for LPG imports would only increase by around 3.5mn t in 2022, Argus estimates.

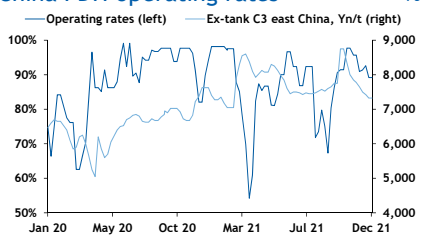
China's imports for energy purposes – for the residential, commercial, industrial and autogas sectors – also face headwinds in 2022. The country's imports to wholesale terminals climbed by 5.6pc to 9.6mn t in the first 11 months of 2021, data from Chinese customs and oil analytics firm Vortexa show. This growth was mostly attributable to the strong demand recovery in the above sectors from the lows experienced in 2020 as a result of the Covid-19 pandemic.

### Long sighted

But LPG consumption for non-petrochemical purposes is expected to weaken this year on firming competition from natural gas in the residential sector and **increasing domestic supply**. China's refining capacity is due to expand further following the start up of private-sector Shenghong Petrochemical's 320,000 b/d refinery in Jiangsu, east China, at the end of 2021, and state-controlled PetroChina's new 400,000 b/d plant in Guangdong, south China, which it plans to bring on line by the middle of 2022.

Butane demand for gasoline blending is also expected to slow given weak gasoline margins and stricter supervision on the implementation of taxes on gasoline blenders. Demand for butane from the petrochemical sector is likely to remain strong following the start-up of two new butane-fed maleic anhydride plants that will add 300,000t of demand in 2022.

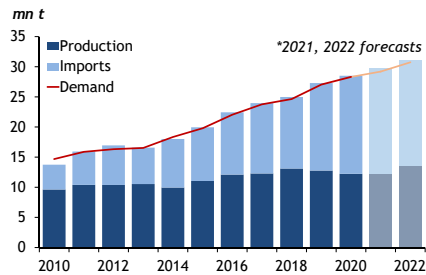
### China PDH operating rates



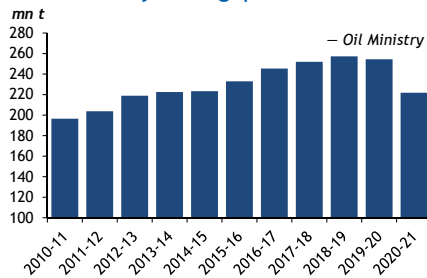
## 2022 OUTLOOK

*India's LPG market expansion is nearing saturation, and the country is still some way off recovering from the effects of the pandemic, writes S Dinakar*

India LPG fundamentals\*



India refinery throughput



### India demand growth may fail to regain momentum

India's LPG demand is expected to rise in 2022 but at a similar rate to last year and slower than in pre-pandemic years owing to higher prices and a weaker economy.

Consumption is due to rise by around 4-5pc this year, according to officials at the three state-run refiners that control the sector – IOC, Hindustan Petroleum (HPLC) and Bharat Petroleum (BPCL). But other industry sources expect growth closer to the 2pc in 2021 – with domestic use rising to around 27.9mn t from 27.4mn t in 2020, oil ministry data show.

India's LPG market expansion is nearing saturation, with largely poorer populations in more rural locations now targeted under the government's Pradhan Mantri Ujjwala Yojana (PMUY) incentive scheme. Around 80pc of the 10mn low-income households targeted under phase two of the scheme are connected to LPG, [the government said last month](#). But Delhi and the state-run refiners still face an uphill struggle getting the PMUY users to buy more cylinder refills and not [abandon LPG](#) for cheaper traditional fuels such as firewood.

The government may choose to [reintroduce subsidies](#) on LPG for PMUY users with an eye on provincial elections in February. Five Indian states, including the key state of Uttar Pradesh, go to polls late next month, raising the prospect that ruling parties will look to LPG as a way to curry favour with voters. Punjab's INC government has promised eight free cylinder refills to homes in the state each year, although it is unclear which households will qualify and how the debt-strapped government plans to deliver on its promise.

India's LPG imports are also on course to continue increasing this year in the absence of new refining capacity. Refinery expansions that incorporate added LPG output are to be delayed until 2023-24 except for the 130,000 b/d upgrade of HPCL's Vizag refinery taking capacity to 300,000 b/d. Domestic LPG production is expected to be flat or inch higher, industry officials say. India's LPG imports rose by 6.3pc to 15.7mn t in January-November 2021 compared with a year earlier. This coincided with domestic production falling by 0.5pc to 11.05mn t, and 5.8pc lower than the 11.7mn t in pre-pandemic 2019.

India's LPG demand growth has been slowing despite the boosts from Covid-19 lockdowns, lifting household use for cooking, and the PMUY scheme. Demand rose by 4.4pc on the year to 27.5mn t in 2020, and by 8.8pc to 26.3mn t in 2019, oil ministry data show. Consumption did increase by 6.3pc on the year to 2.5mn t in December, data from state-controlled refiners show, after the government provided free refills under PMUY 2, while residential retail prices have stabilised at around 900 rupees (\$12) and commercial rates have been cut by 5pc to Rs1,999 for January 2022 – despite strong crude prices and a weak rupee. Yet these are still historically high and difficult to afford for the many poorer Indians already suffering from the economic fallout from the pandemic.

### Long Covid

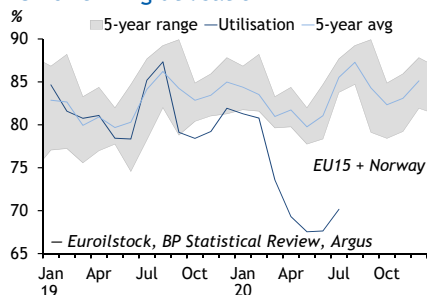
India's unemployment stood at close to a record high of around 8pc in November. The middle classes and the poor have been hardest hit by the Covid-19 crisis, particularly in the rural areas the LPG expansion programme is targeting. The government's gradual elimination of subsidies on LPG has dented cylinder refill rates as the customer base has continued to expand. The PMUY scheme has connected more than 90mn low-income homes, but only covers the cost of the connection, equipment and a first free refill.

The Omicron variant has emerged as a growing concern for India, with cases rising rapidly in the first few days of 2022 to nearly 60,000 by 5 January. A broad economic recovery is still some distance away, with Omicron heightening the uncertainty, Mumbai-based India Ratings and Research says.

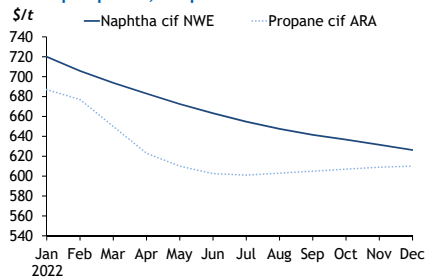
## 2022 OUTLOOK

**The return of a workable arbitrage from the US when demand peaks in Europe is vital this year as local output is expected to be capped, writes Peter Wilton**

### EU-16 refining utilisation



### NWE propane, naphtha forward curves



## Open US arbitrage to ease NWE supply pressure

A recent weakening in US propane prices and the reopening of the arbitrage to northwest Europe should facilitate vital flows into the region this year, alleviating refinery supply pressures.

US propane flows to northwest Europe were stunted until as recently as October 2021 owing to long-held US inventory concerns that had elevated Mont Belvieu prices on the Gulf coast. As winter approached, supply fears in Europe grew as a result and were exacerbated by lower expectations for local supply as a result of increased refinery consumption of LPG as natural gas prices soared. But **US propane values retreated** sharply towards the end of last year after reaching seven-year highs in October as stock concerns dissipated. US propane inventories remained below historical averages but US retailers' pre-winter purchases left them well covered as winter began mildly.

The arbitrage to northwest Europe duly swung open – netbacks flipped to an average of \$12/t in the fourth quarter from minus \$11/t in the third – markedly shifting 2022 forecasts. Northwest European imports from the US hit a five-month high of 339,000t in November 2021 before hitting 551,000t in December, up from just 160,000t a year earlier and 296,000t in December 2019, *Argus* data show.

The return of a workable arbitrage from the US as and when European demand peaks is especially vital in 2022 as local output is expected to be capped. Refinery capacity in Europe has been hampered by full and partial closures, mothballing and conversions in the wake of Covid-19. Around 4.6pc of the region's refining capacity, or 722,000 b/d, in 2020 will be lost by the end of 2022, *Argus* forecasts. Globally, around two-thirds of LPG is primarily produced from upstream gas processing and a third from refining, but in Europe, refineries account for more than 70-75pc of supply.

Surging and sustained high natural gas prices have additionally led to refineries consuming the relatively cheaper LPG they produce in place of natural gas. This had the effect last year of at times inverting typical market patterns, as refiners bought LPG on the spot market to fulfil their contractual obligations. High gas prices also incentivised gas suppliers to leave as much LPG in their natural gas streams as possible, reducing the fractionation of natural gas liquids (NGL).

Russian exports remain muted by historical norms, although they are expected to rise slightly this year. Feedstock use at petrochemical producer Sibur's Zapsibneftekhim complex in Siberia has resulted in LPG shipments from the Baltic Sea terminal of Ust-Luga dwindling to 500,000 t/yr from nearly 2.5mn t/yr as recently as 2018. These factors combine to leave *Argus'* forecast for northwest European LPG supply at just below 24mn t in 2022, up by around 500,000t from 2021 and unchanged on 2020, but down by 10pc from the pre-pandemic 26.4mn t in 2019.

## Plastic sponge

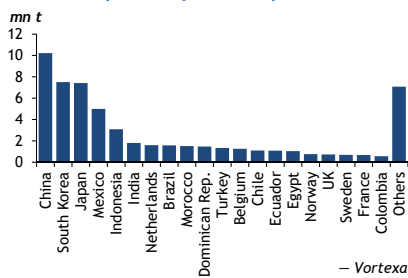
Demand is expected to fall slightly this year because of reduced use as autogas, limiting the impact of lower regional output. But *Argus* forecasts Europe's net import requirements to rise to 14.9mn t in 2022 – from 13mn t in 2021, 11.5mn t in 2020 and 13.2mn t in 2019. The northwest European petrochemical sector – the region's flexible LPG market – will soak up the majority of the additional transatlantic tonnes meeting this net short.

*Argus* forward curves show propane at discounts to naphtha across 2022 – averaging around 90pc, or about minus \$60/t outright – and increased arbitrage flows will only widen this. *Argus* forecasts LPG flows to the petrochemical sector at 15.2mn t in 2022, up from 12.4mn t and 13mn t in the past two years when propane was often at a premium to naphtha. The petrochemical market's share of total European demand is projected to hit 39pc in 2022 – an all-time high.

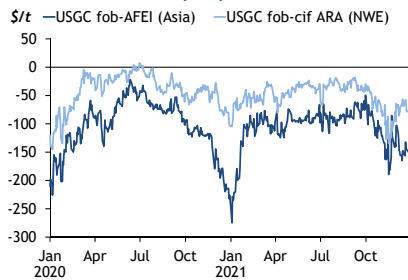
## 2022 OUTLOOK

**Despite lingering concerns over stocks and the shadow of Omicron, output is expected to grow, write Amy Strahan, Abby Downing-Beaver and Ethan Stafford**

US LPG exports by country



US-Asia, US-NWE propane arbs



### US LPG exports and production to grow in 2022

US LPG exports to Asia-Pacific are expected to continue to grow in 2022 as strong petrochemical demand in the region bolsters the sector’s buying of US feedstocks, particularly propane, while domestic production expands.

The US continued to ship more than twice the volume of LPG to Asia-Pacific compared with Europe in the second half of 2021, even as a spike in European heating demand early in the fourth quarter improved the arbitrage from the US. The country’s LPG exports to Europe totalled 2.16mn t – about 295,000 b/d assuming this was mostly propane – in September-November, according to oil tracking analytics firm Vortexa, down from 2.3mn t during the same period of 2020. In contrast, exports to Asia-Pacific continued to account for the lion’s share of US exports, rising to 7.1mn t – roughly 969,700 b/d of mainly propane – in the same three-month period from 6.69mn t a year earlier.

US exports increased as the arbitrage to Asia and Europe widened sharply after propane prices at the Gulf coast hub of Mont Belvieu in Texas retreated from seven-year highs in October 2021 on low inventory concerns. US Gulf coast fob propane prices stood as low as a \$189/t discount to Japan delivery prices on the Argus Far East Index on 17 November 2021 – the widest discount since the end of January 2021, when concerns over heating fuel supplies in parts of Asia pushed delivered propane prices higher. The wide differential in mid-November followed strong pre-buying of LPG cargoes ahead of winter demand in Asia-Pacific early in the month, even as US buying interest waned late in the fourth quarter.

US LPG retailers, concerned over historically low propane inventories, pre-purchased needed volumes for the domestic heating season in September and October, and by November had largely left the spot market, leaving US propane at Mont Belvieu comparatively weak to the international market. US propane inventories remained 16pc below year-ago levels at the start of December, according to US government agency the EIA.

Discussions for spot-loading propane cargoes out of the US Gulf coast hit a 2021 high of 9¢/USG over Mont Belvieu EPC propane in mid-November, as Asian demand picked up. Prices subsequently fell to a near 5¢/USG premium as term LPG buyers appeared well supplied and uncertainty over freight delays left traders unwilling to purchase incremental cargoes, despite the wider arbitrage on paper.

### Propane shortage fears abate

US production and exports of propane are expected to rise this year as the concerns over shortfalls this winter eased in the fourth quarter. Mild weather in November and early December moderated draws on stocks, which had been more than a fifth lower than year-earlier levels for much of last year following the extreme cold weather in February 2021. The strong increase in global LPG prices from late in the third quarter until November 2021 owing to fears over inventories was “a bit overdone”, US midstream firm Targa Resources senior vice-president Rob Donaldson said last month.

A shortage of propane in the US this winter is now less likely, but market participants continue to worry that strong export demand will create further tightness into 2022, shortening the off-season for propane producers. Should that occur, inventories may not build adequately again before the 2022-23 heating season, repeating the inventory concerns later next year.

US propane stocks declined by a significant 3.6mn bl to 66.5mn bl (5.36mn t) over the week to 24 December, EIA data show. But the relative stability of inventories in the fourth quarter meant that this was only 11.6pc lower than a year earlier, compared with 29pc lower in early October 2021. US production of natural gas liquids (NGL) remained steady at 5.54mn b/d at the end of the week to 24

## 2022 OUTLOOK

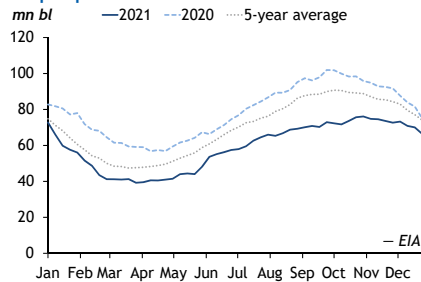
December, up from 5.31mn b/d a year earlier, EIA data show.

The fall in US propane prices from the October highs and the widening of arbitrages to Asia-Pacific and Europe has increased export demand. But prices at the Mont Belvieu hub remain above 100¢/USG on average. Mont Belvieu LST stood at 110.125¢/USG on 3 January, an increase of 31.5¢/USG from 4 January 2021.

Supply fears and a wide arbitrage to Asia earlier in 2021 drove Mont Belvieu propane prices to 151.875¢/USG on 4 October, more than double a year earlier. This led the EIA to forecast a 54pc increase in retail propane expenditures during the winter based on a projected 3pc increase in heating-degree days compared with winter 2020-21. At the same time, a wider propane and ethane price spread in 2021 led to midstream operator Enterprise buying back spot propane cargoes sold on the domestic market in the summer.

But mild weather in autumn 2021 led to a lack of demand for heating and crop drying, allowing stocks to recover and easing concerns heading into 2022. In addition, Targa and peer Energy Transfer plan to expand NGL production this year. Targa expects to add another 250mn ft<sup>3</sup>/d (2.58bn m<sup>3</sup>/yr) of gas processing capacity in the Permian basin of west Texas and New Mexico, where it is currently capable of processing 662,000 b/d of NGLs. Energy Transfer hopes to complete the final part of its 250,000 b/d Mariner East 2X NGL pipeline by March 2022, which will boost supplies from the Marcellus shale basin in the US northeast and allow it to export more from its 340,000 b/d Marcus Hook terminal on the east coast.

US propane stocks



### Omicron won't cap output growth

US NGL production is also expected to continue rising in 2022 as crude and natural gas output rebounds to pre-Covid levels. As restrictions ease and vaccination levels increase, producers anticipate a weaker economic impact from the latest Covid-19 and Omicron variant outbreak – further lockdown measures from recent rising infection rates for now seem unlikely. This will create a more stable environment for producers to continue increasing NGL output.

The EIA has forecast a temporary slowdown in oil demand because of Omicron, although it is not expected to overturn the predicted recovery in the agency's latest *Short-Term Energy Outlook* (STEO). The EIA estimates natural gas production will increase to 96bn ft<sup>3</sup>/d in 2022, a 3pc increase over 2021, while crude output is forecast to be 11.8mn b/d, up from 11.2mn b/d.

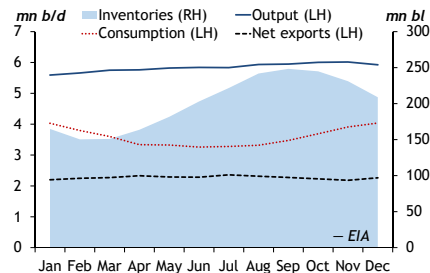
Gains in crude and natural gas production will bolster NGL supplies from gas processing next year. The EIA expects NGL output to increase to 5.84mn b/d in 2022, raising its forecast by 8.8pc in its latest STEO. The agency expects propane output to rise to 1.81mn b/d from 1.73mn b/d in 2021. US butane from gas processing is expected to have averaged 913,500 b/d in 2021 and to rise by 5.3pc to 962,100 b/d this year, according to the EIA.

US butane exports increased to a record high 472,000 b/d in April 2021 as the arbitrage to Asia-Pacific remained wide open, while many countries in the region faced lockdown restrictions that boosted retail demand from the residential sector. As these restrictions eased, exports from the US correspondingly fell, approaching year-earlier levels by September at 343,000 b/d.

Mont Belvieu EPC butane prices averaged 118¢/USG in 2021, double the average price in 2020 and up by more than 80pc from the 2019 average. As a percentage of Nymex WTI crude, butane averaged 72.4pc in 2021, up by 9.8 percentage points from 2020 and 24.4 percentage points from 2019.

Record exports fuelled the strength of butane relative to crude last year as the arbitrage to Asia-Pacific remained opened throughout the year. But a continued economic recovery may reduce export demand this year if production builds in key importing regions, weighing on prices relative to crude.

US NGL balance forecast 2022



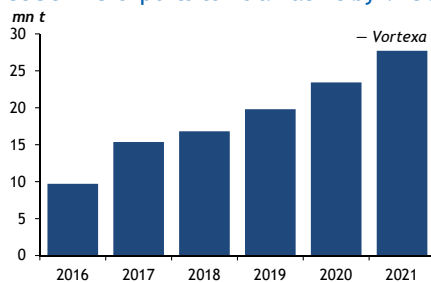
## 2022 OUTLOOK

**Continued rising demand in Asia and increased LPG production in the Mideast Gulf will help support the VLGC market, writes Jamie Aldridge**

**Panama Canal Neopanamax locks southbound waiting days**



**USGC LPG exports to Asia-Pacific by VLGC**



### VLGC freight rates on firm footing for 2022

A rising volume of LPG exports from the US Gulf coast to northeast Asia and an expectation that ships will face more delays at the Panama Canal puts the very large gas carrier (VLGC) market on course for a firmer 2022.

LPG flows from the US Gulf to Asia-Pacific strengthened last year, with 20.1mn t shipped by VLGC last year, up from 15.27mn t in 2020 and 11.35mn t in 2019, oil analytics firm Vortexa data show. US exports are projected to rise by 6pc on the year in 2022, according to Argus Consulting, while a number of propane dehydrogenation (PDH) plants are scheduled to start up in China in 2022, further driving demand in the country for propane imports.

The long-haul route from the US to northeast Asia is a major contributor to VLGC tonne-miles, given the length of the voyage – around 55-60 days – and the added potential for delays at the Panama Canal, which averaged seven days for vessels without a pre-booked slot using the Neopanamax locks in April-December 2021. Congestion at the canal can have a profound impact on freight rates globally, as demonstrated in November 2021 when VLGCs had to wait up to 18 days, pushing rates up to 11-month highs. Shipowners often opt to send vessels on longer alternative routes around the Cape of Good Hope at the tip of Africa or the Suez Canal in north Africa to avoid the costly delays.

A new booking system at the Panama Canal introduced this month means that VLGCs are only permitted to book Period 2 and Period 3 slots – 2-21 days in advance of transit – rather than Period 1 slots as before, which can be booked up to 365 days in advance. This could result in longer delays at the Panama Canal for VLGCs and additional booking costs. The tightening of availability could create added volatility in spot VLGC rates, as was seen in early 2021 when they climbed to five-year highs, and to a lesser degree in November last year.

Slowly rebounding LPG production in the Mideast Gulf in the second half of last year as a result of the Opec+ group's deal to unwind crude output restraints enabled exports on VLGCs to start rising. The region exported 9.6mn t of LPG on VLGCs to east Asia in January-November, compared with 10.6mn t in 2020, Vortexa data show. The Opec+ group started ramping up output by 400,000 b/d each month from August 2021, and a further uncapping of production this year – provided spiralling Covid-19 rates do not trigger an about-turn on the group's relaxations – should lift Mideast Gulf LPG exports this year. This will be supported by an expected increase in LPG demand in China and India.

India's residential LPG demand continues to grow despite retail prices rising, while imports have also risen as domestic output has fallen. The country imported 10.41mn t from the Mideast Gulf in January-November 2021, a rise of 1.4pc on the year and 13pc from 2019, Vortexa data show. The country's LPG demand and imports are expected to continue trending upwards in 2022 and beyond, after a second phase of the Pradhan Mantri Ujjwala Yojana scheme began in August 2021, aiming to connect another 10mn households to LPG in lower-income rural areas. But further material gains are likely to be dependent on retail LPG prices not climbing any further, as lower-income users struggle to pay for cylinder refills.

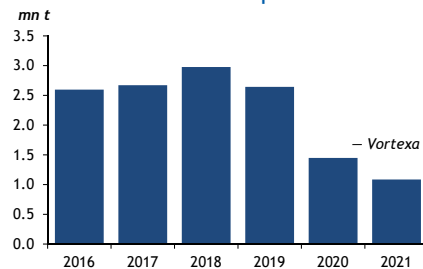
### Stretched fleet

Rising demand for VLGC cargoes in the US and Mideast Gulf, particularly given the likelihood of more Panama Canal delays, will stretch the fleet this year. This is particularly true given newbuild deliveries in 2022 are due to be similar to the past few years, with 19 to be delivered this year, shipbroker Affinity says. Some headwinds could emerge, such as energy use targets in China potentially capping the country's PDH expansion in the coming years. The longer-term vessel supply outlook may also concern shipowners, with 43 VLGCs expected to hit the water in 2023.

## 2022 OUTLOOK

*The phased removal of Opec+ crude production caps will allow Russia to produce more LPG-rich associated gas, boosting yields, writes Svetlana Novolodskaya*

Russia LPG seaborne exports



### Russia LPG exports to climb on extra output

Russia's LPG exports are expected to rise slightly in 2022, largely as a result of rising output as the Opec+ restraint deal is unwound and production capacity expands.

The phased removal of Opec+ crude production caps this year will allow Russia to produce more LPG-rich associated gas, boosting yields. And expansions of oil company Rosneft's new [Rospan gas processing complex](#) and fellow firm Irkutsk Oil's Ust-Kut gas processing plant (GPP) should also lift LPG output, while domestic demand is expected to stabilise. But a high level of uncertainty, especially in light of the [EU sanctions on Belarus](#) and rising tensions between Russia and Ukraine, may keep a lid on any rise in exports, market participants say.

Irkutsk Oil plans to start up a new unit at the Ust-Kut plant in eastern Siberia next summer, which will raise LPG production to around 37,000 t/month (444,000 t/yr) from 16,000 t/month. Output at Rosneft's Rospan complex in northern Russia's Yamal-Nenets region, which opened early last year, is expected to rise to at least 400,000-500,000 t/yr from 202,300t in 2021, traders say, as technical issues that weighed on production last year are overcome.

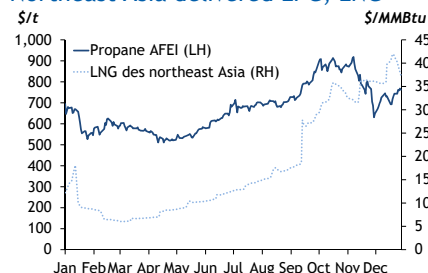
Russia's state-controlled Gazprom and private-sector oil firm Lukoil are also likely to boost LPG output this year after difficulties in 2021. A [fire at Gazprom's Urengoy condensate treatment plant](#) in early August and prolonged turnarounds at its Astrakhan GPP weighed on the firm's output last year, as did a fire at Lukoil's Lokosovsky GPP in December 2020.

Russia's LPG demand from its growing petrochemical sector should be relatively steady in 2021, market participants say, as will use in the autogas, household and industrial sectors. Autogas demand dropped last year owing to higher retail prices in the second half of the year, with autogas retrofits also slumping.

## 2022 OUTLOOK

*The liberalisation of Japan's city gas market has not been as successful as its power market reforms, writes Reina Maeda*

Northeast Asia delivered LPG, LNG



### Japan city gas growth faces hurdles despite reforms

Japan's city gas sector faces challenges in expanding further this year despite the market undergoing the final stage of its liberalisation in April 2022.

The city gas sector – piped natural gas sold to the residential, commercial and industrial sectors – was gradually deregulated over 1995-2017. The final phase of the reform will end the dominant pipeline operations of three gas suppliers – Tokyo Gas, Osaka Gas and Toho Gas – which must create new independent piped gas subsidiaries from 1 April 2022. But the liberalisation has not had the same success of the country's similar electricity market reforms of 2016. Around 4mn city gas accounts had switched to new retailers as of 31 March 2021, but this was only 17pc of total users, data from Japan's trade and industry ministry Meti show.

Japan has 26 registered city gas suppliers, including distributors, utilities, refiners and LNG importers. But investing in a new market entrant does not guarantee profits and may not be a feasible business, market participants say. It is hard to provide competitive prices to customers owing to high wholesale prices, they say. And many of the country's suppliers are increasingly looking to invest in decarbonisation projects, slowing the gas grid expansion, an industry expert says.

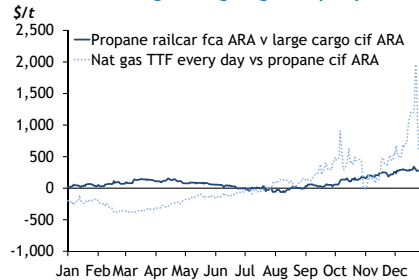
Gas grids cover only around 6pc of Japan's land area in mainly urban areas, Meti says. People living in rural areas use cylinder LPG or electricity. The share of city gas in Japan's energy mix is much smaller than electricity's, although the number of city gas users has been slowly increasing. Domestic city gas sales rose by 4.8pc on the year to 28.4bn m<sup>3</sup> in January-September, Meti data show. The use of LPG as a city gas component, to raise the calorific value, rose by 18pc to 908,800t. But the expansion of the market and the resulting loss in LPG consumption in the residential sector outweighs any gain from additional use as a city gas blendstock.



## 2022 OUTLOOK

**Record-high natural gas prices in Europe have led refineries to consume more LPG as an alternative to gas, reducing availability, writes Emma Reiss**

NWE rail v large cargo, gas v propane



### Europe's refinery LPG still under gas pressure

New record-high natural gas prices in Europe are continuing to eat into availability of refinery LPG across the region and could bring further disruption this winter.

Having rarely been above €40/MWh (\$45/MWh) in the past 17 years, Europe's benchmark TTF gas price **started a rapid climb this summer**, spurred by low stocks following a cold winter, minimal wind generation over the summer, increased demand from Asia and concerns about Russian supply. The price has not dropped below €60/MWh since September, equivalent to almost \$1,000/t propane, and has mostly been substantially higher. Day-ahead TTF prices spiked to €182.75/MWh on 21 December, more than \$2,880/t, or almost \$2,000/t more than propane railcars.

Refineries have moved to consume as much LPG as an alternative to gas as possible, reducing availability. Most plants are meeting their contractual requirements but additional spot supplies that moderate the market during peak demand have dissipated. German refinery output of LPG fell by more than a fifth on the year in October 2021, despite a 2pc increase in throughput, plant data show.

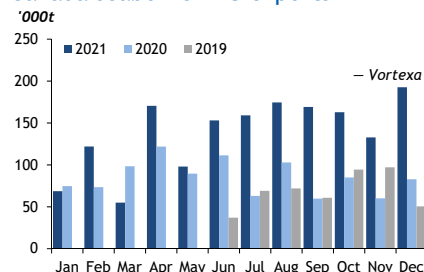
Almost three-quarters of Europe's LPG supply comes from regional refineries, with the remainder coming from upstream North Sea producers or imports, mainly from the US. But import terminal capacity is limited – only two key terminals in the Amsterdam-Rotterdam-Antwerp (ARA) hub are designed for onward distribution. And the newer large storage units are intended for petrochemical plants.

The reduced supply helped propel ARA railcar and truck propane prices above \$1,000/t in early November, for the first time since 2013. Prices have eased since to around \$940/t but the premium for propane railcars over large cargoes averaged over \$283/t in December, compared with \$34/t last year and \$49/t in December 2019. These numbers reflect a supply chain being stretched to its limit. A relatively mild winter so far has allowed supply to reach customers, albeit at far higher cost. But any sustained period of cold weather could bring more disruption.

## 2022 OUTLOOK

**Export terminal capacity expansions on the country's Pacific coast will drive much of the growth, writes Yulia Golub**

Canada seaborne LPG exports



### Canada seaborne LPG exports to increase

Seaborne LPG exports from Canada are expected to rise in 2022 as more export terminal capacity comes on line on the country's Pacific coast.

Growth in Canada's west coast export capacity will be led by upgrades at midstream companies Altagas' Ridley Island and Pembina's Prince Rupert terminals in British Columbia. At least 30,000 b/d (880,000 t/yr) is expected to be added in total, with another 30,000 b/d of capacity possible over the next few years.

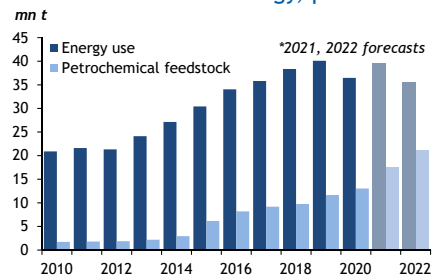
Altagas intends to expand the Ridley Island propane export terminal to 80,000 b/d in the coming years from 58,000 b/d in the second half of 2021 and an initial 40,000 b/d following its **opening in May 2019**. The firm also exports around 50,000 b/d of propane and butane from its Ferndale terminal in the US state of Washington, having **acquired a controlling stake in operating firm Petrogas** in late 2020. Pembina is also contemplating an expansion of its 25,000 b/d Prince Rupert terminal, which it **opened in April 2021**, to 45,000 b/d. The company expects to make a final investment decision on the project in the first quarter.

Canada's petrochemical sector demand for propane is also due to rise this year. Midstream firm Inter Pipeline aims to start up its new 525,000 t/yr Heartland propane dehydrogenation plant in Alberta in the second quarter, which will consume around 650,000 t/yr of propane at capacity. But an expected increase in LPG production should more than offset any additional demand this year, as upstream output in Alberta continues to expand, supported by higher commodity prices. Propane production in Alberta averaged 179,000 b/d in January-October 2021 compared with 163,000 b/d a year earlier, according to Alberta Energy Regulator.

## CHINA

### Plans to expand the gas grid in Guangdong province are likely to displace the use of LPG as a fuel

#### China LPG demand: energy, petchem



### Natural gas drive to pare LPG use in Guangdong

A push by local authorities to expand the natural gas network in south China's Guangdong province is expected to displace LPG as a fuel in an area that is the heart of the country's non-petrochemical market.

The provincial government's recently announced city gas five-year plan foresees a drop in LPG consumption of 1.13mn t/yr, or 34pc, to 2.18mn t/yr by 2025 compared with 2020 as grid networks are expanded. Guangdong plans to invest 108.4bn yuan (\$16.9bn) on natural gas infrastructure by 2025 and increase natural gas pipeline connections to over 70pc of households, up from 45.8pc in 2020. The province used around 3.32mn t of LPG for energy in 2020, with 1.83mn t of this consumed in the residential sector, 1.32mn t in the commercial and industrial sectors, and 160,000t as autogas, according to the five-year plan.

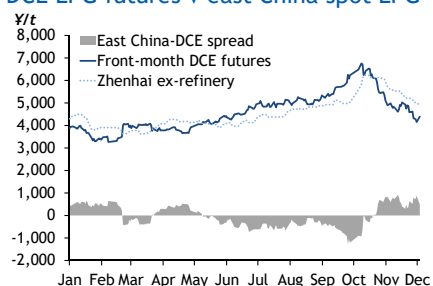
The Guangdong government expects consolidation in the LPG bottling sector, resulting in plants with larger capacities, while it will move to shut down illegal bottling operations or those deemed security risks. The province is the key demand centre for LPG as a fuel in China. Total supply in the region hit about 7.5mn t in 2021 – with 5mn t of this coming from imports and 2.5mn t from refinery output, customs and Argus data show.

LPG import terminals in Guangdong are faced with waning regional demand and rising refinery production. The province is home to seven import terminals that supply the residential, commercial, industrial and autogas markets, with total refrigerated storage capacity of 575,000t. Imports to these facilities decreased by 10pc on the year to 4.46mn t in January-November, customs data show. Refinery production of LPG is meanwhile expected to increase, with state-controlled PetroChina opening a 400,000 b/d refinery in Jieyang, Guangdong, that will add around 400,000-500,000 t/yr of LPG when it opens in mid-2022.

## CHINA

### A levy on physical LPG deliveries to designated storage sites outside Guangdong province will be eliminated

#### DCE LPG futures v east China spot LPG



### China's DCE drops location charges for LPG delivery

China's Dalian Commodity Exchange (DCE) is dropping charges for physical LPG deliveries to designated storage "warehouses" outside Guangdong province.

The DCE had a 100 yuan/t (\$15.70/t) charge for sellers delivering to south China warehouses in Fujian, Guangxi, Jiangsu, Zhejiang and Shanghai provinces and a Yn200/t charge for deliveries to storage sites in east and northeast China's Shandong, Hebei and Tianjin provinces. Buyers from warehouses in these areas benefit from an equivalent discount.

The charges were put in place to encourage delivery to designated warehouses in Guangdong in south China – the centre of LPG use for energy purposes. But the levies had little success, with most of the stored volumes remaining outside south China. The effort was in part likely to have been undermined by the DCE [designating new warehouses](#) with large storage capacity in east China.

The DCE approved 27 physical delivery points, of which only six, with a total capacity of 181,000t, were in south China. The other 21 points with capacity of 864,000t are mostly in east China. A large part of warehouse receipts are also registered from delivery points outside south China.

Only 170 lots were held at warehouses in south China by 22 December, while 8,202 lots were held at other locations. Each lot represents 20t.

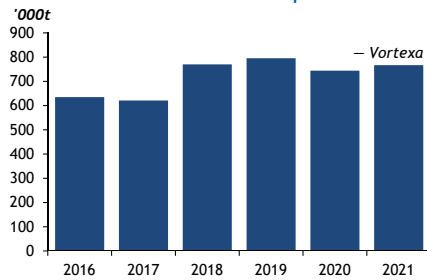
Although the DCE publicly announced its decision to eliminate the charges on 17 December, the changes will only affect futures contracts trading from April 2023 onwards.

The most actively traded contract on the DCE is currently February 2022, which closed at Yn4,291/t with 69,590 lots of open interest on 22 December.

## COLOMBIA

*The state-controlled firm will increase supply from its fractionation plant at the Cupiagua oil field, writes Diana Delgado*

Colombia LPG seaborne imports



### Ecopetrol to boost LPG output and cut prices

Colombian state-controlled energy company Ecopetrol plans to increase LPG supply by 8pc during the first half of 2022, limiting the need for imports and helping it to cut its wholesale prices.

Ecopetrol will boost LPG production to 48,790 t/month in January-June – equivalent to 292,700t – up by 3,810 t/month from the 44,980 t/month delivered in the second half of last year, the company says. The additional supply will come from the \$125mn fractionation plant the firm started up at its Cupiagua oil field in 2019, Ecopetrol says.

Some of the Cupiagua LPG that was used to generate electricity for Ecopetrol's Castilla and Chichimene oil fields will be redirected to supply the Colombian market, as those fields are now being supplied from a new 9.2MW natural gas-fired power plant and a new 61MW solar power facility in San Fernando, Colombian LPG association Agremgas director Felipe Gomez says.

Colombia was expected to quadruple its LPG imports to meet growing demand as Ecopetrol looked to divert more of its supply for use as diluent and gasoline feedstock, Agremgas said in November last year. Imports were expected to rise to an average of 20,660 t/month in the first half of 2022, up from 5,000-6,000 t/month in January-September 2021. But the additional supply from Ecopetrol means LPG arrivals are likely to revert to around 5,000-10,000 t/month in February-June. Colombia is not expected to need any LPG imports in January as the market can be supplied with stockpiles, Gomez says.

Colombia was expected to consume around 63,000 t/month, or 756,000t, of LPG in 2021, including 48,000 t/month of Ecopetrol supply, 6,000 t/month from private-sector producers and the balance from imports, Agremgas says. The country's domestic demand stood at around 553,000t in 2020, Argus data show, with 362,000t of this coming from the residential sector.

Ecopetrol is to cut LPG prices for local distributors by 30pc from January to compensate for recent international gains. The firm's wholesale price rose to 2,300 pesos/kg (56¢/kg) in December 2021 from Ps850/kg a year earlier, Gomez says.

## COLOMBIA

*A planned terminal and associated infrastructure in Buenaventura will handle hydrocarbons from the US Gulf of Mexico, writes Diana Delgado*

Puerto Solo terminal



### SeaOne to open fuel and LPG terminal in 2025

Houston-based midstream operator SeaOne has signed sales contracts for the supply and storage of compressed natural gas (CNG), LPG and other fuels at its new Colombian terminal, which it expects to launch in late 2025.

The 1.8mn b/d Puerto Solo complex in Buenaventura will provide storage and pipeline infrastructure to store and deliver hydrocarbons from the US Gulf of Mexico to Yumbo in Colombia, SeaOne says. It will have initial sendout capacity of 386mn ft<sup>3</sup>/d (4bn m<sup>3</sup>/yr) and handle 40,000 b/d (1.3mn t/yr) of LPG. SeaOne secured a 30-year port concession in February 2021. The project is in the engineering and design stage and would take 30 months to construct, but the Covid-19 pandemic and security issues have caused delays, the company says. SeaOne has the only fully permitted regasification port site on the Pacific coast.

The Puerto Solo complex will provide "a direct connection to the US natural gas and NGL markets, ensuring long-term lower-cost fuels for industry and power generation", SeaOne said in March 2021. The \$225mn project also includes the development of two power plants – an 80MW unit at Buenaventura and a 148MW unit at Pal Mira – capable of operating on imported LPG or other fuels. The terminal will eventually supply around 100,000 b/d of LPG for the power plants under phase one, while natural gas, LPG, and refined products pipelines will be built to Cali city under phase two, SeaOne said last year.

## IN BRIEF

### Asia-Pacific

#### JBIC to fund Air Water's Vietnam LPG arm

State-owned Japan Bank for International Co-operation (JBIC) is to provide \$4mn in finance to Japanese LPG supplier Air Water's [business in Vietnam](#) and support the company's efforts to explore [opportunities overseas](#). Air Water will also obtain \$4mn in funding for its Vietnamese arm Pacific Petroleum Export and Import Trading from private bank Sumitomo Mitsui Banking (SMBC). Air Water began LPG distribution in Vietnam in December 2019. The firm is aiming to boost LPG sales in the country, where demand is expected to rise further on a growing economy and population. Japan's economy, trade and industry ministry Meti has encouraged domestic LPG firms to [seek overseas opportunities](#) as the domestic market is shrinking. Fellow suppliers Itochu Enex and Tokai bought shares in LPG distributors in [Thailand](#) in 2021 and [Vietnam](#) in 2020,

#### India's HPL to build oil-to-chemicals plant

Indian petrochemical producer Haldia Petrochemicals (HPL) plans to develop a new oil-to-chemicals facility in Cuddalore in the southern state of Tamil Nadu. The first phase of the project will establish an ethylene cracker with an expected capacity of 1.8mn t/yr, plus downstream units producing butadiene, high-density polyethylene (HDPE), linear low-density polyethylene (LLDPE), monoethylene glycol, propylene and polypropylene. Feedstock for the cracker will come from its upstream 6.2mn t/yr, or 127,400 b/d, crude processing unit at the same complex. HPL is also expected to import butane and propane to feed the cracker, according to a company submission to India's environment ministry in early December. The firm will develop an aromatics plant in phase two. The project is estimated to cost 783bn rupees (\$10.5bn) and take eight years to develop.

### Middle East

#### Saudi Aramco cuts January LPG prices

State-controlled Saudi Aramco has lowered its January propane and butane contract prices (CP) to their lowest since September 2021, as falling crude prices and weaker spot demand weighed on sentiment. Aramco set the propane CP for January at \$740/t, down by \$55/t from the December price, while it dropped the butane CP to \$710/t from \$750/t. The prices were above the higher range of market participants' expectations despite the fall. Term customers' first and second-round recommendations were \$700-730/t for propane and \$660-705/t for butane. January propane CP swaps averaged \$696/t in December, while its butane equivalent averaged \$670/t. Aramco may have cut or deferred some January term supply on muted spot demand.

### FSU

#### Uzbek 3.6bn m<sup>3</sup>/yr GTL plant opens

Uzbekistan has opened its first gas-to-liquids (GTL) plant as it looks to convert domestic gas into higher-value fuels and in turn reduce its dependency on fuel imports.

The 3.6bn m<sup>3</sup>/yr Uzbekistan GTL plant, launched on 25 December in the Guzar district of the southern Kashkadarya region, will produce 1.5mn t/yr of liquid fuels worth over \$1bn. The plant will produce 307,000 t/yr of jet fuel, 724,000 t/yr of Euro-6 diesel, 437,000 t/yr of naphtha and 53,000 t/yr of LPG, but has the flexibility to adjust its production slate based on demand. The plant will be fed with natural gas from the Shurtan gas chemical complex.

The plant, developed by state-owned Uzbekneftegaz, is expected to reach 15pc of capacity in the first quarter of 2022, rising to 100pc within a year. The plant may begin supplying jet fuel, diesel and LPG to the domestic market in January-March, according to industry sources.

Fuel produced in the plant will free up around \$500mn/yr that was previously spent on imports, the Uzbek government says, while exports will add around \$200mn/yr to the state's revenues.

### Europe

#### Ineos' Antwerp ethane cracker green lit

UK-based petrochemical firm Ineos has been granted an environmental permit by Antwerp to construct its planned ethane-fed ethylene cracker in the Belgian city. The firm aims to start up the unit in 2026. A previous permit was pulled by Ineos after a court challenge from environmental groups. Ineos said in January 2021 that it would delay the planned construction of a related propane dehydrogenation plant to focus on the ethane-fed cracker. The olefins produced at the plant will have an environmental footprint that is less than half of the average European naphtha cracker, Ineos says. And through integration of technologies such as carbon capture and storage, hydrogen and electrification, the facility will be climate neutral within 10 years of start-up, it says.

#### Norway's NGL output rises in November

Norway's natural gas liquids (NGL) production rose by 8pc on the month to around 257,000 b/d (647,500t) in November, preliminary data from the Norwegian Petroleum Directorate (NPD) show. But output was 10pc lower than the 717,000t a year earlier and 13pc below the NPD's forecast for the month of 296,000 b/d. NGL production has lagged the agency's estimates since May 2021 because of prolonged maintenance at the Karsto gas processing plant, with monthly output 9pc under its forecast over January-November 2021.

## IN BRIEF

### Latin America

#### Petrobras opens access to GPPs

Brazilian state-controlled Petrobras has signed deals with local upstream companies Shell Brasil, Repsol Sinopec Brasil and Petrogal allowing them to process their natural gas at its gas processing plants.

The agreements consist of gas purchases and sales on swap operations. No further details were disclosed. The contracts are the first of their kind signed by Petrobras, enabling the firms to start supplying gas in Brazil's new market model from 1 January. The deals contribute to the natural gas market opening, Petrobras says. After the gas is processed, the companies will receive the supply for delivery to local distributors or final consumers.

The contracts are in line with commitments agreed to with antitrust agency Cade, "with the objective of achieving an open, competitive and sustainable market in Brazil", Petrobras says. Petrobras was the only company able to process natural gas in Brazil using its own facilities prior to the reforms. Other oil and gas companies sold their gas to Petrobras at the wellhead, and Petrobras had a monopoly on the midstream and on gas sales to local distributors.

#### Pemex LPG imports rose in November

Mexico's state-owned Pemex imported 82,600 b/d (213,600t) of LPG in November, up from 77,900 b/d a month earlier and significantly higher than the 69,700 b/d of LPG in November 2020, the latest data from the company show. Pemex produced 90,000 b/d of propane and butane from upstream gas processing in November, up from 84,000 b/d in October. Ethane production from gas processing rose to 61,000 b/d from 51,000 b/d a month earlier.

### North America

#### US butane, ethane output hit new highs

US butane and ethane production from upstream gas processing rose to record highs in October 2021, according to US government agency the EIA. Butane output rose by 8,000 b/d on the month to 511,000 b/d (1.47mn t). This failed to prevent butane stocks falling by 4.1mn bl on the month and 5.4mn bl on the year to 53.2mn bl (4.93mn t) in October, as exports climbed by 7,000 b/d to 440,000 b/d compared with September 2021. The largest share went to Indonesia, although its intake fell by 9.2pc on the month to 59,000 b/d. US ethane output rose by 106,000 b/d on the month to 2.3mn b/d (4.03mn t), also a record high, with exports surging to 507,000 b/d from 363,00 b/d in September.

#### CP Chem to build C3 splitter in Texas

US petrochemical producer Chevron Phillips Chemical plans to build a C3 splitter at its Cedar Bayou plant in Baytown, Texas, to boost output of polymer grade propylene (PGP). The splitter will convert a mixture of refinery-grade propylene (RGP) and propane into PGP, with capacity of 1bn lb/yr (454,000 t/yr), the company says. Construction is due to begin this month, with start-up in 2023. A C3 splitter takes advantage of PGP and RGP price spreads. Chevron Phillips Chemical operates C3 splitter units at its Cedar Bayou, Port Arthur and Sweeny facilities in Texas.

#### Superior Plus buys midcontinent retailer

Toronto-based LPG distributor Superior Plus has acquired US propane retailer Hopkins Propane for an undisclosed price. The purchase of the company, which sells approximately 5mn USG/yr (9,600 t/yr) to 7,000 residential and commercial customers in the northern US state of Michigan, closed on 21 December. The deal was Superior Plus' seventh acquisition of 2021 as it continues with its [expansion programme](#) across the US and Canada.

#### AltaGas to spend \$772mn in 2022

Canadian midstream firm AltaGas has increased its capital expenditure (capex) budget for 2022 to C\$995mn (\$772mn), up from C\$910mn in 2021. The company plans to spend almost 80pc of this on its US utilities business. The company also plans to improve its network systems, including replacing older gas pipelines, as well as expand its customer base. The remaining 20pc of the capex budget will be invested in maintenance, facility optimisation and increasing utilisation, the company says. AltaGas expects its midstream business to grow this year as a result of higher natural gas liquids fractionation yields at its facilities and higher exports from its two [LPG export facilities](#) in British Columbia, Canada, and in Ferndale, Washington state, US.

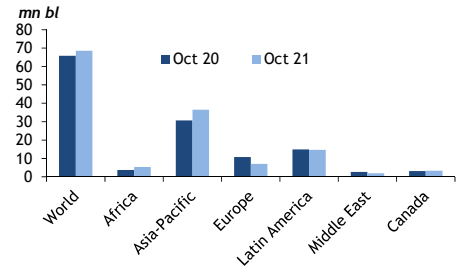
#### Canadian propane stocks decline

Propane inventories in Canada fell in November 2021 as a result of steady exports, although the draw fell on the lower end of market participants' expectations owing to muted domestic demand. Propane stocks in western Canada fell to 5.8mn bl (468,000t) from 6.3mn bl a month earlier, and were well below the 8.7mn bl in November 2020, data from the Canada Energy Regulator show. Butane stocks in western Canada rose slightly to 3.2mn bl (296,000t) from 3.1mn bl in October 2021, but were also down substantially on the 6mn bl a year earlier. The small build came as diluent demand declined following a three-week shutdown of the 300,000 b/d Trans Mountain crude pipeline. Eastern Canadian propane stocks fell to 5.6mn bl from 6.3mn bl in October 2021 and 5.8mn bl in November 2020, while butane stocks slipped to 1.7mn bl from 2.3mn bl and 1.9mn bl, respectively.

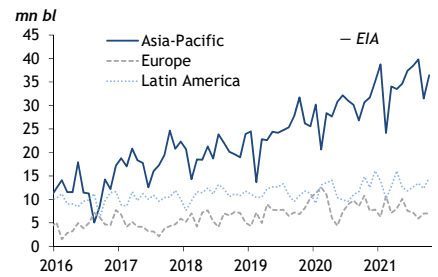
## TRADE FLOWS: US EXPORTS

US LPG exports				'000 bl
Exports by country	Oct	Aug-Oct	Aug-Oct 20	±%
China	8,576	26,899	20,995	28.1
Japan	12,613	33,867	31,370	8.0
Singapore	544	3,037	1,077	182.0
South Korea	4,161	14,276	11,545	23.7
Other Asia-Pacific	10,546	29,673	21,984	35.0
<b>Total Asia-Pacific</b>	<b>36,440</b>	<b>107,752</b>	<b>86,971</b>	<b>23.9</b>
Ghana	0	486	0	-
Morocco	1,006	2,695	2,429	11.0
Ivory Coast	239	469	600	-21.8
Other Africa	4,103	10,069	5,537	81.8
<b>Total Africa</b>	<b>5,348</b>	<b>13,719</b>	<b>8,566</b>	<b>60.2</b>
Belgium	172	1,679	1,796	-6.5
France	728	728	3,208	-77.3
Netherlands	1,123	3,528	4,780	-26.2
Portugal	413	1,129	2,946	-61.7
Spain	0	0	2,010	-100.0
UK	2,270	3,938	6,658	-40.9
Other Europe	2,311	7,703	6,170	24.8
<b>Total Europe</b>	<b>7,017</b>	<b>18,705</b>	<b>27,568</b>	<b>-32.1</b>
Aruba	11	22	16	37.5
Brazil	1,639	3,811	6,231	-38.8
Chile	950	3,400	2,689	26.4
Dominican Rep.	1,097	3,434	2,490	37.9
Ecuador	1,059	3,274	3,669	-10.8
Guatemala	0	576	1,377	-58.2
Honduras	545	1,327	924	43.6
Mexico	8,031	20,623	16,924	21.9
Panama	71	179	149	20.1
Peru	280	1,031	252	309.1
Other Latin America	937	2,700	2,808	-3.8
<b>Total Latin America</b>	<b>14,620</b>	<b>40,377</b>	<b>37,529</b>	<b>7.6</b>
Turkey	1,148	4,311	3,969	8.6
Other Middle East	755	5,206	2	-
<b>Total Middle East</b>	<b>1,903</b>	<b>9,517</b>	<b>3,971</b>	<b>139.7</b>
Canada	3,308	9,575	10,354	-7.5
<b>Total exports</b>	<b>68,636</b>	<b>199,645</b>	<b>174,959</b>	<b>14.1</b>

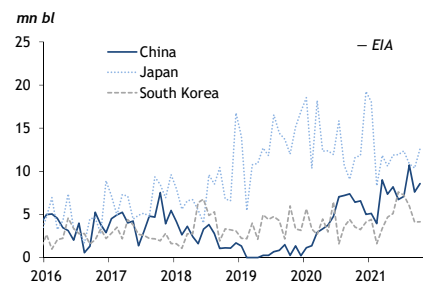
US exports: year-on-year change



US exports: key regions

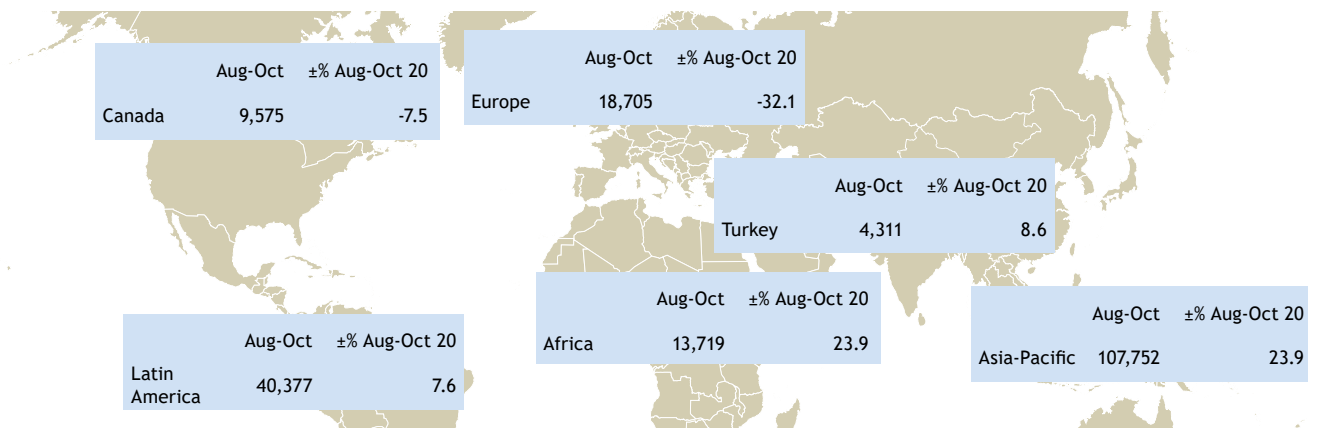


US exports: key Asia-Pacific countries



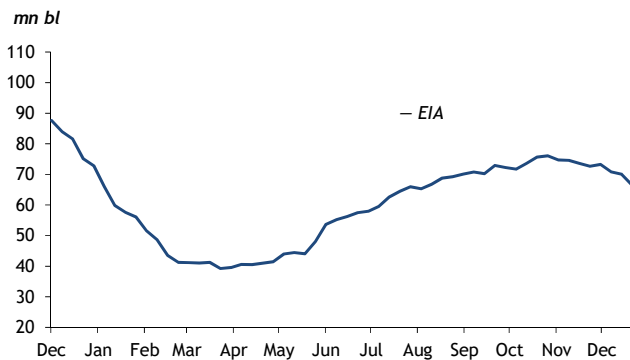
US exports by region

'000 bl

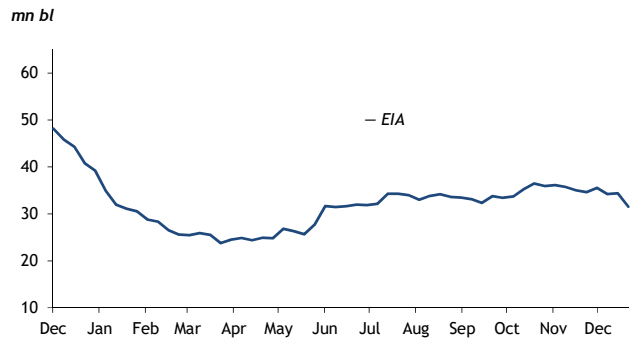


## INVENTORIES: US

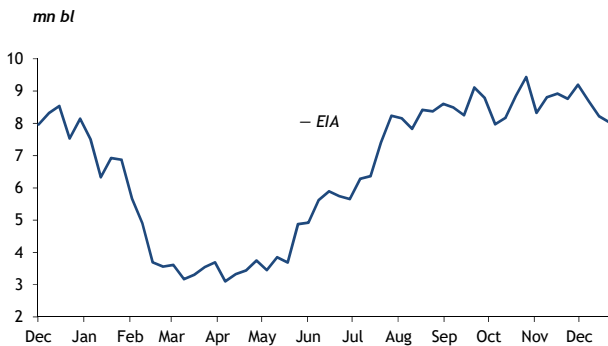
Total US weekly propane stocks



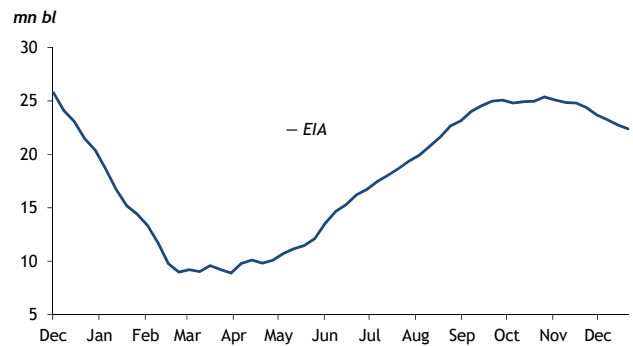
US Gulf coast stocks



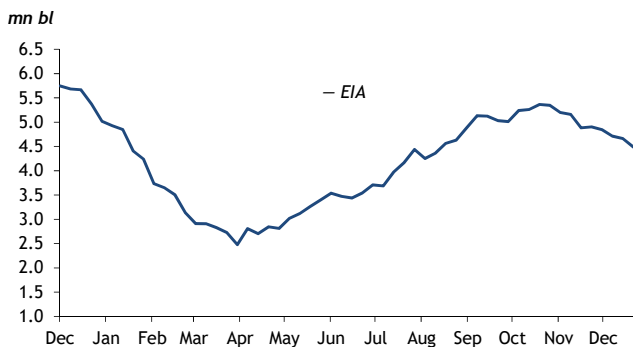
US east coast stocks



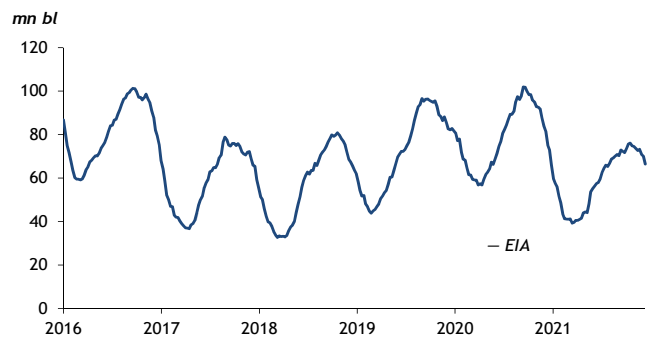
US midcontinent stocks



US west coast stocks



US stocks 5-year view



## MARKET ANALYSIS

■ US propane stocks declined by 3.6mn bl to 66.5mn bl (5.36mn t) over the week to 24 December, according to the EIA, leaving them 11.6pc below year-earlier levels.

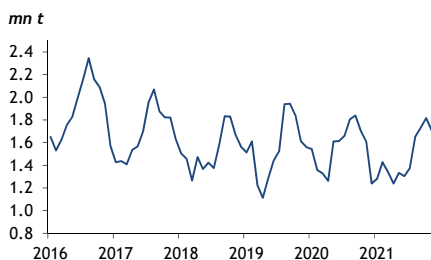
■ The stockdraw was significantly larger than the expectations of market participants, which had anticipated a decline of 600,000-2.8mn bl.

■ The largest decline was in the US Gulf coast, where stocks fell by 2.8mn bl to 31.5mn bl. Midcontinent inventories dropped by 366,000 bl to 22.4mn bl, while on the east coast they fell by 189,000 bl to 8mn bl. US propane exports fell to 1.35mn b/d from 1.55mn b/d a week earlier. But domestic sales rose to 1.7mn b/d from 1.2mn b/d. US propane production held steady at 2.4mn b/d.

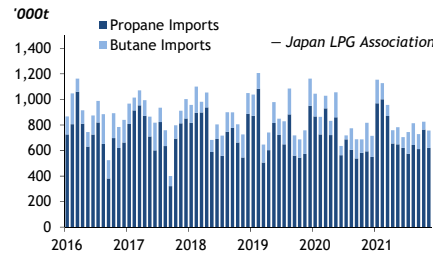
## TRADE FLOWS: JAPAN, SOUTH KOREA

Japanese LPG imports							'000t
Imports by country	Nov	Sep-Nov	Sep-Nov 20	21/20 ±%	Sep-Nov 19	21/19 ±%	2021
Saudi Arabia	0.0	0.0	44.4	-100.0	39.1	-100.0	91.3
Qatar	0.0	18.7	40.4	-53.7	15.4	21.6	104.3
Kuwait	0.0	0.0	96.7	-100.0	0.0	-	414.8
UAE	7.8	34.2	214.2	-84.0	164.0	-79.1	64.9
Australia	153.4	279.0	249.0	12.0	162.5	71.7	632.5
US	523.8	1,527.6	1,320.8	15.7	1,584.0	-3.6	6,291.3
Others	189.6	434.4	177.7	144.5	134.2	223.6	1,251.3
<b>Total imports</b>	<b>874.6</b>	<b>2,294.0</b>	<b>2,143.3</b>	<b>7.0</b>	<b>2,099.3</b>	<b>9.3</b>	<b>8,850.4</b>
Imports by product							
Propane	781.8	2,110.4	1,761.6	19.8	1,796.5	17.5	8,013.7
Butane	92.8	183.6	381.7	-51.9	302.8	-39.4	836.8

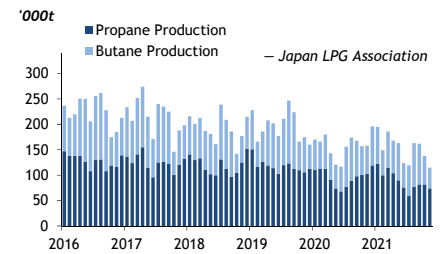
Japan: LPG stocks



Japan: LPG imports



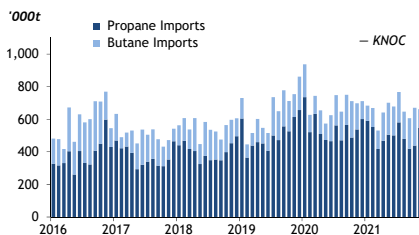
Japan: LPG production



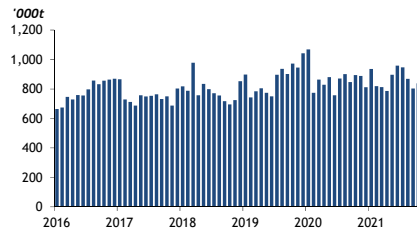
South Korean LPG imports

South Korean LPG imports							'000t
Imports by country	Nov	Sep-Nov	Sep-Nov 20	21/20 ±%	Sep-Nov 19	21/19 ±%	2021
US	573	1,748	1,745	0.2	1,874	-6.7	6,616
UAE	0	0	10	-100.0	68	-100.0	71
Qatar	0	0	64	-100.0	0	-	77
Australia	0	0	25	-100.0	34	-100.0	24
Nigeria	0	1	33	-97.0	0	-	4
Kuwait	0	0	22	-100.0	0	-	2
Saudi Arabia	0	0	12	-100.0	0	-	46
Others	86	177	57	210.5	2	8,750.0	318
<b>Total imports</b>	<b>659</b>	<b>1,926</b>	<b>1,968</b>	<b>-2.1</b>	<b>1,978</b>	<b>-2.6</b>	<b>7,158</b>
Imports by product							
Propane	546	1,400	1,585	-11.7	1,550	-9.7	5,480
Butane	113	525	382	37.4	430	22.1	1,677

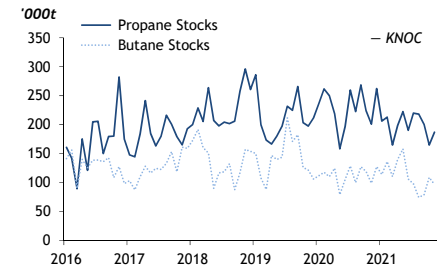
South Korea: LPG imports



South Korea: LPG consumption



South Korea: LPG stocks

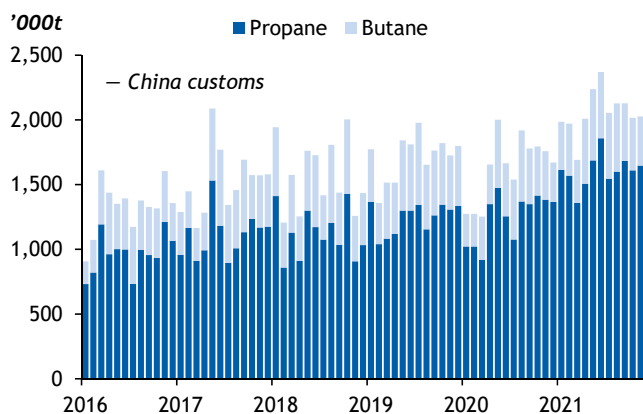




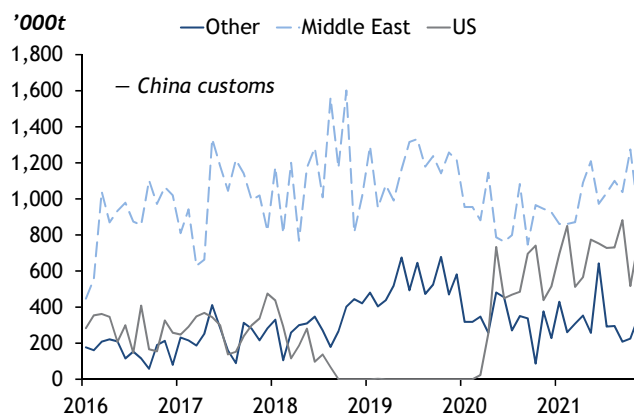
## TRADE FLOWS: CHINA

China LPG imports							'000t
Imports by country	Nov	Sep-Nov	Sep-Nov 20	21/20 ±%	Sep-Nov 19	21/19 ±%	2021
US	762	2,161	1,876	15.2	0	-	7,770
UAE	308	1,029	727	41.5	1,011	1.8	3,704
Qatar	142	716	704	1.7	1,064	-32.7	2,725
Saudi Arabia	165	275	208	32.2	488	-43.6	631
Kuwait	139	441	319	38.2	436	1.1	1,315
Australia	82	193	264	-26.9	328	-41.2	1,203
Others	429	1,356	1,236	9.7	1,982	-31.6	5,267
<b>Total imports</b>	<b>2,027</b>	<b>6,171</b>	<b>5,334</b>	<b>15.7</b>	<b>5,309</b>	<b>16.2</b>	<b>22,615</b>
Imports by product							
Propane	1,647	4,940	4,147	19.1	3,914	26.2	17,678
Butane	379	1,230	1,186	3.7	1,394	-11.8	4,936

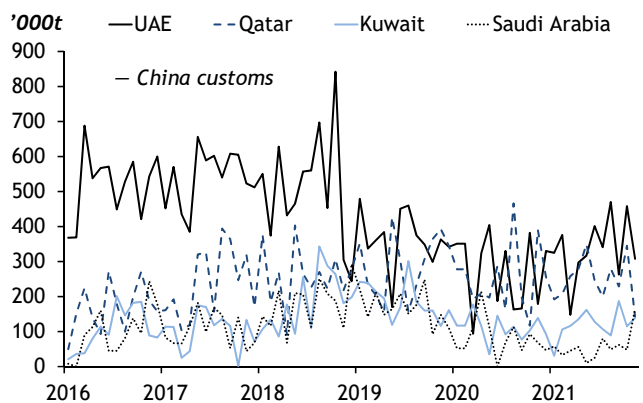
China LPG imports by product



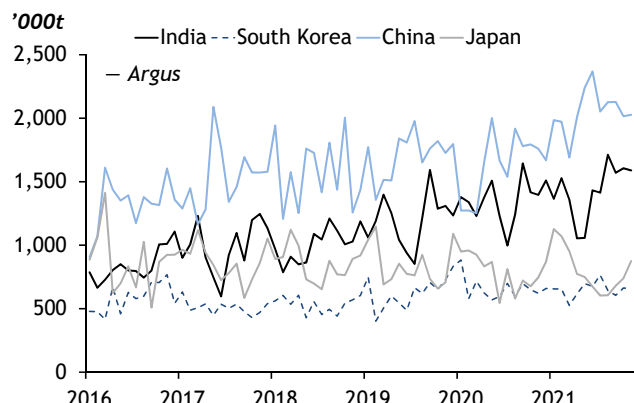
China LPG imports by origin



China LPG imports from Middle East

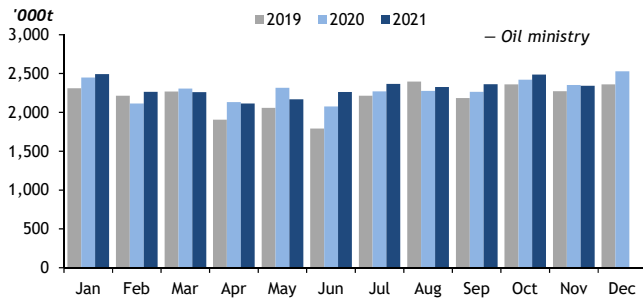


Key Asia-Pacific LPG importers

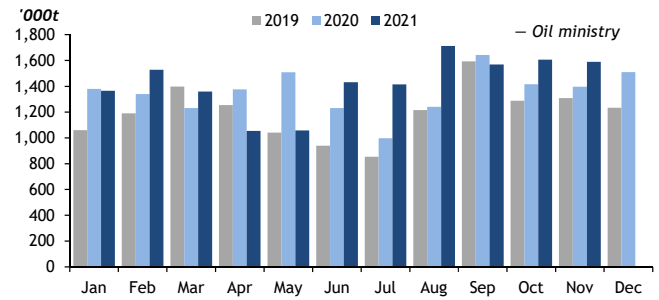


## STATISTICS: ASIA

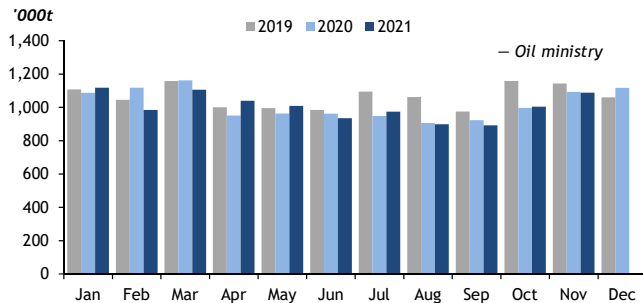
India: LPG demand



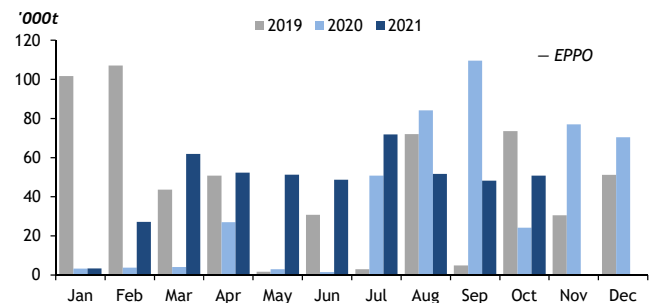
India: LPG imports



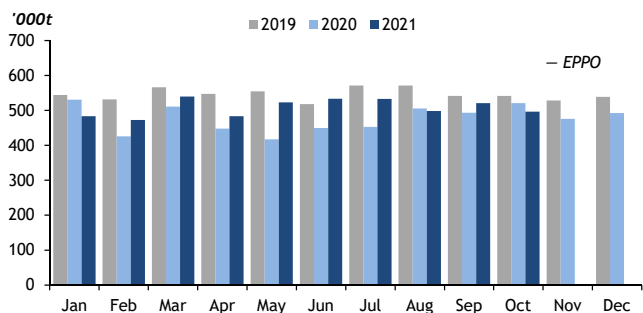
India: LPG production



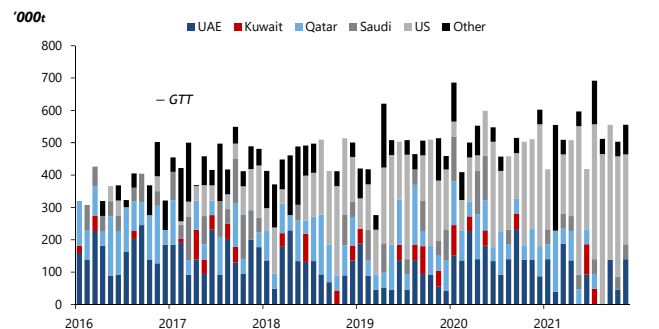
Thailand: LPG imports



Thailand: LPG consumption



Indonesia: LPG imports origin



## MARKET ANALYSIS

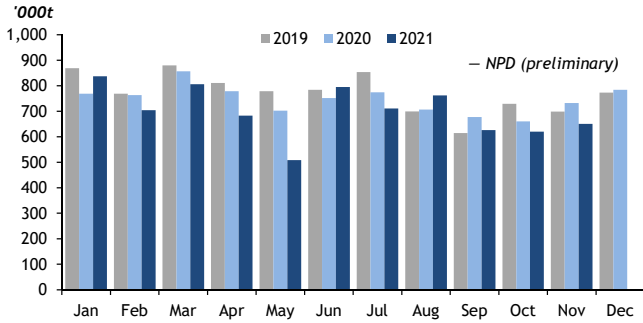
Japan's LPG imports rose by 18pc on the month and 19pc on the year to 874,600t in November, finance ministry data show. This came after domestic sales fell by 7.1pc on the year to 946,900t in October, JLPGA data show. Residential and commercial sales fell by 3.2pc to 509,200t, while industry and petrochemical deliveries fell by 19pc and 20pc to 197,500t and 116,700t, respectively.

South Korea's LPG stocks rose by 3.7pc on the month to 283,700t in November on weaker demand and higher output, data from state-owned KNOC show.

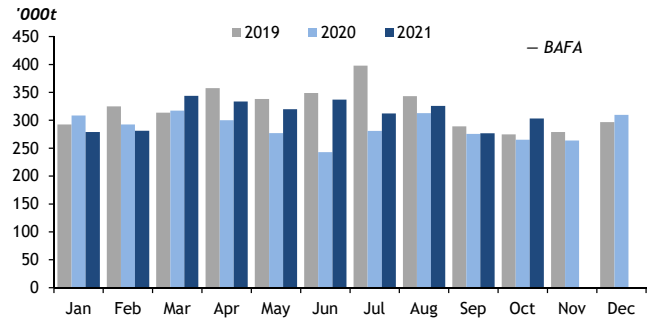
Consumption declined by 1.5pc to 825,400t on weaker autogas and industrial use, while production at domestic refineries increased by 6.1pc to 198,600t.

## STATISTICS: EUROPE

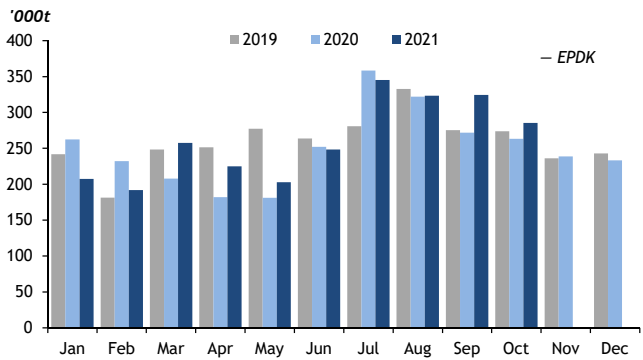
Norway: NGL production



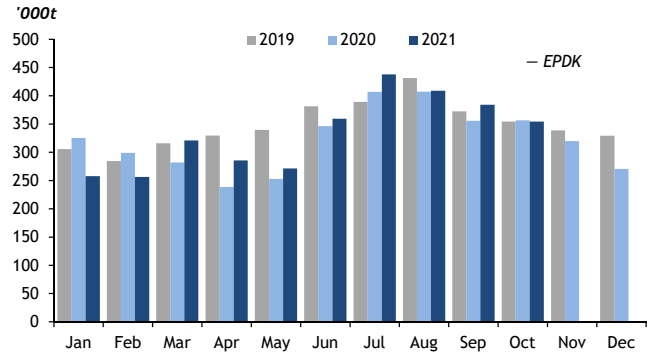
Germany: inland LPG deliveries



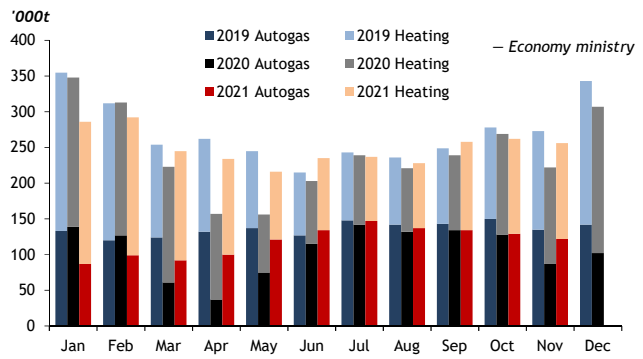
Turkey: LPG imports



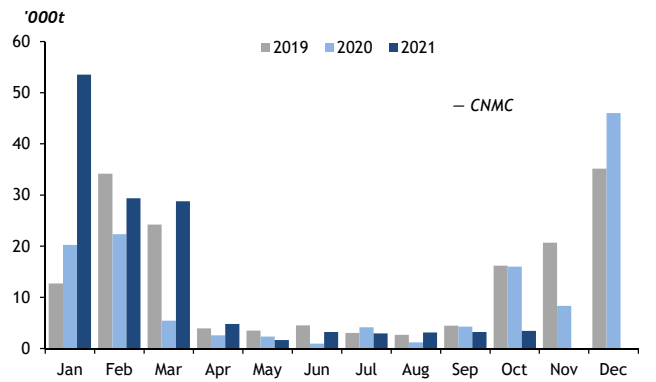
Turkey: LPG consumption



Italy: LPG transport and heating consumption



Spain: LPG imports



## EUROPEAN PROPANE

■ Large cargo propane prices rebounded to \$692/t cif Amsterdam-Rotterdam-Antwerp (ARA) by 30 December from \$650/t on 13 December, after dropping as low as \$600/t on 20 December. Trading was minimal with prices moving with paper, which edged higher relative to crude, supported by gains in naphtha. Asia-Pacific offered a better netback for US exports than Europe but the arbitrage was open, allowing more than 640,000t to arrive.

■ Propane coaster demand was modest in late December, with one open trade at \$730/t on 24 December, strengthening the premium to large cargo by \$33.50/t. Fob prices rose by 2.6pc to \$755/t over 11-31 December while cif coasters gained 2.4pc to \$803.50/t.

■ Railcar prices remained at stubbornly high premiums to large cargoes because of limited refinery availability, rising to \$949/t by 31 December from \$930/t on 13 December.

■ Mediterranean coaster prices edged up to \$785/t from \$758/t. But Lavera prices were expected to fall further owing to competition with Algeria's Sonatrach, which lowered its January propane price by \$30/t on the month to \$700/t.

## EUROPEAN BUTANE

■ Large cargo butane prices continued to hover at just under parity to naphtha in December. A 21,000t offer for 22-26 January delivery at 99.5pc of naphtha on 24 December failed to find a buyer, while a bid for 12,000t for 20-24 January delivery at 101pc of January naphtha paper on 30 December also went unmet. An open arbitrage from the US limited gains but increased interest from petrochemical crackers and thin local supplies provided support.

■ Pockets of Mediterranean demand kept northwest European fob coaster sellers busy in late December, with the last deal at \$791.50/t fob Antwerp on 30 December. Outright prices rose by 9.6pc to \$776.50/t over 13-31 December while the ratio to naphtha gained five percentage points to 105.5pc. Cif coaster trade was muted but buying support from the south kept the ratio to naphtha steady at 106pc, while outright prices rose to \$780.25/t from \$738/t.

■ Barge prices edged higher against naphtha to 102pc from just over 101pc. Trading remained slow, hampered by limited supplies and sluggish demand.

■ Mediterranean coaster prices rose to \$845/t from \$815/t but trading was muted. Algeria's Sonatrach kept its January butane price unchanged from December at \$715/t.

Propane cif NWE cargoes large



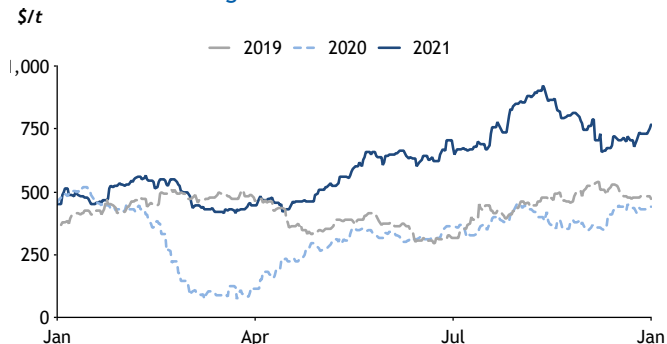
Propane fob ARA barge



Butane cif NWE cargoes large



Butane fob ARA barge



## FSU LPG

■ Russian LPG producers cut prices by 3,500-4,500 roubles/t (\$47-61/t) over the second half of December owing to increasing stocks and weakening autogas demand. But demand for heating sharply increased in Moscow and the surrounding regions as temperatures fell significantly below averages and ahead of the new year holiday.

■ Daf Brest propane-butane mix prices on the Poland-Belarus border fell by \$84/t during 10-30 December to \$532.50/t owing to weaker demand and increased supply, despite technical issues after a fire at the Rospan production facilities in Western Siberia, Russia, at the start of the month. A total of 38,350t changed hands on the Argus Open Markets (AOM) platform between 9 and 30 December.

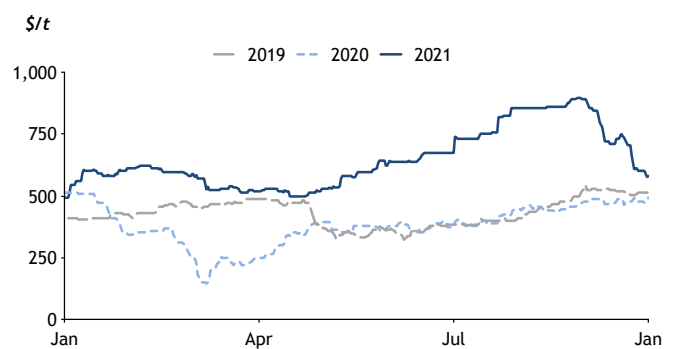
■ Daf Brest propane prices decreased by \$147/t to \$581.50/t by 30 December in line with mix prices and cif ARA large cargo assessments in northwest Europe. After zero trades for almost five months, 10,500t changed hands on the AOM during 13-30 December. The previous propane deal was initiated on 22 July.

■ Propane-butane mix prices at the Russia-Ukraine and Belarus-Ukraine borders fell to \$607.50/t by 30 December from \$680/t on 9 December in line with Polish import prices and weaker autogas demand. No deals were concluded on the AOM for delivery to Ukraine in December.

■ Propane-butane mix prices at the Uzbek-Tajik border collapsed by \$195/t to \$445/t in the second half of December on weaker demand from Tajik buyers and increased availability from Kazakh producers.

■ Propane-butane mix prices on the Ukraine-Romania border dropped to \$545/t from \$610/t in line with falling international assessments.

Propane Argus daf Brest



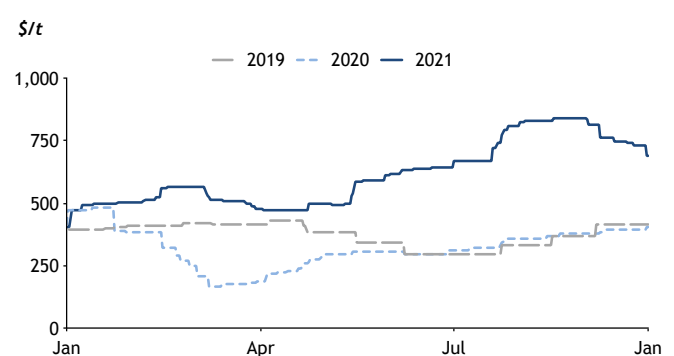
## BLACK SEA LPG

■ Argus fob Black Sea assessments for propane-butane mix, propane and butane declined in line with international prices, while buying interest from Turkey and the Balkans region was weak.

■ Propane-butane mix prices decreased by \$37.50/t to \$697.50/t, while propane prices declined by \$57.50/t to \$687.50/t and butane by \$15/t to \$710/t.

■ Total LPG loading at Russian Black Sea and Sea of Azov ports totalled 63,100t in December compared with 58,300t in November.

Propane Argus fob Black Sea



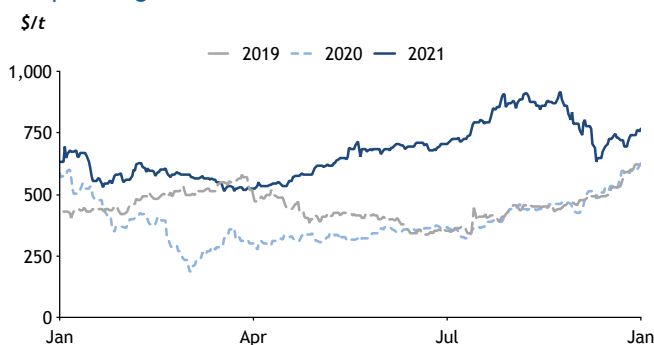
## ASIA PROPANE

■ Propane prices rebounded alongside crude. The Argus Far East Index (AFEI) rose by 3pc from 13 December to settle at \$762/t by 31 December.

■ Ample supply in the January delivered market capped upward price movements. Premiums to paper for 23,000t cargoes for delivery in the second half of January fell to \$3/t against the January AFEI swap from a \$25/t premium recorded on 14 December.

■ State-controlled Saudi Aramco cut its January propane contract price (CP) to \$740/t from \$795/t from December. The January propane CP exceeded the range of market participants' expectations, where term customers had submitted their first and second round of propane CP recommendations at \$700-730/t.

Propane Argus Far East index



## ASIA BUTANE

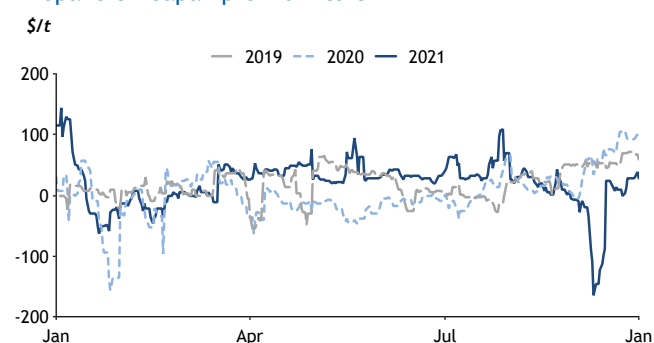
■ Butane prices rose alongside propane. The Argus Far East Index (AFEI) increased by 4.6pc from 13 December to settle at \$732/t by 31 December.

■ Butane AFEI's discount to February cif Japan naphtha reached close to parity, stoking buying interest from northeast Asian ethylene producers. South Korean importer E1 sought 23,000t for 5-15 February while Hanwha Total procured 23,000t at a \$18-19/t premium to January naphtha prices for February deliveries.

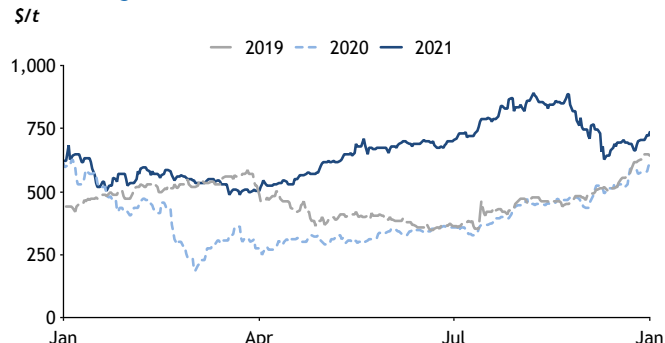
■ State-controlled Saudi Aramco lowered the January butane contract price (CP) to \$710/t from \$750/t, narrowing the propane-butane spread to \$30/t from \$45/t in December.

■ Indonesian importer Pertamina bought an evenly split propane-butane cargo for 10-12 February delivery at around a \$25/t premium to February CP paper.

Propane cfr Japan premium to CP



Butane Argus Far East Index



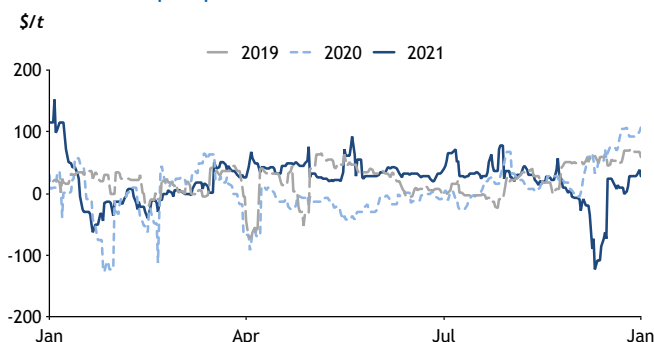
## ASIA PRESSURISED

■ Export offers from terminals in south China steadied at \$33/t premiums to January CP paper on a fob basis but spot demand remained tepid owing to adequate term supplies.

■ China's domestic prices rose after import terminals raised offers on higher import costs. The Pearl River Delta index (PRD) rose by 8.3pc to Yn5,596/t on 13-31 December.

■ North Vietnam delivered prices stabilised at \$83/t premiums to January CP paper for January delivery to Haiphong.

Butane cfr Japan premium to CP



## AMERICAS PROPANE

■ Mont Belvieu prompt-month LST propane prices in the US Gulf coast rose to 113.125¢/USG (\$591/t) from 106.375¢/USG over 13-30 December. During that time, prices briefly fell to a low of 97.5¢/USG. LST propane's value relative to Nymex WTI crude fell to 61.7pc from 62.6pc.

■ US propane inventories fell by a larger-than-expected 3.6mn bl to 66.5mn bl (5.36mn t) over the week to 24 December, EIA data show. The draw put inventories 11.6pc below year-earlier levels, narrowing the gap from a 16pc deficit in the first half of December.

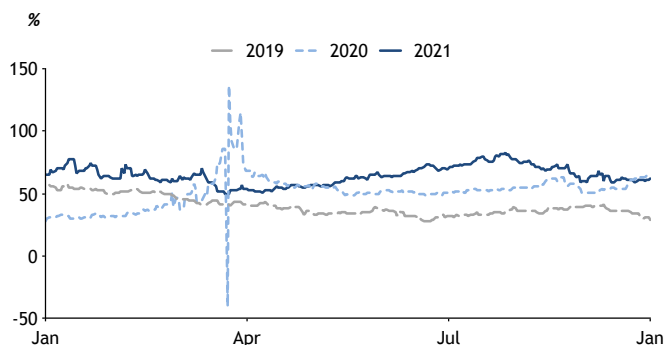
■ Conway prompt-month prices in the US midcontinent remained at near parity to the US Gulf coast levels in late December, rising to 113.125¢/USG from 104.75¢/USG over the second half of the month. Conway's value relative to Nymex WTI crude held steady at 58.5-62.3pc.

■ Edmonton in-well propane prices in Alberta, western Canada, remained at double-digit discounts to the mid-continent in the second half of December as regional spot demand remained subdued.

Propane Mont Belvieu non-LST



Propane Mont Belvieu LST % to Nymex WTI



## AMERICAS ETHANE

■ US Gulf coast Mont Belvieu EPC ethane prices fell to 33¢/USG (\$245.50/t) from 34¢/USG during 13-30 December – briefly hitting 31.75¢/USG in late December, the lowest since August 2021, as US natural gas prices eased.

■ December EPC ethane prices remained heavily discounted to December LST propane, widening to an 80.25¢/USG discount late in the month from a 72.375¢/USG discount in mid-December.

Ethane Mont Belvieu



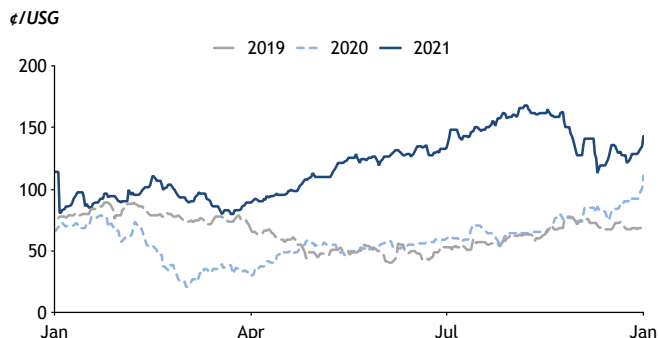
## AMERICAS BUTANE

■ Mont Belvieu EPC butane prices in the US Gulf coast rebounded in the second half of last month, to 143.25¢/USG (\$649/t) by 30 December from 135.25¢/USG on 10 December, tracking gains in crude and gasoline. The price relative to RBOB gasoline weakened to 62.4pc from 63.3pc.

■ US midcontinent Conway prices rose to 149.375¢/USG from 142.5¢/USG over 10-30 December. Conway's premium to EPC butane narrowed to 6.125¢/USG from 7.1875¢/USG.

■ Edmonton prices in Alberta, western Canada, remained at steep discounts to US midcontinent levels as spot demand remained subdued, and was valued at 72pc of the calendar month average of WTI crude by the end of December.

Butane Mont Belvieu non LST



## NGL ECONOMICS/SHIPPING

Ethylene plant total variable cash cost*					
	1 Dec	8 Dec	15 Dec	22 Dec	29 Dec
Purity ethane	15.65	14.95	14.12	14.64	14.18
Propane	30.07	27.85	30.35	29.90	35.32
N-Butane	31.21	28.34	32.61	30.72	39.60
Light naphtha	36.20	39.46	38.17	39.68	44.88
Gasoil	34.09	44.71	43.39	47.84	53.94

\*at Mont Belvieu, Texas

— Argus

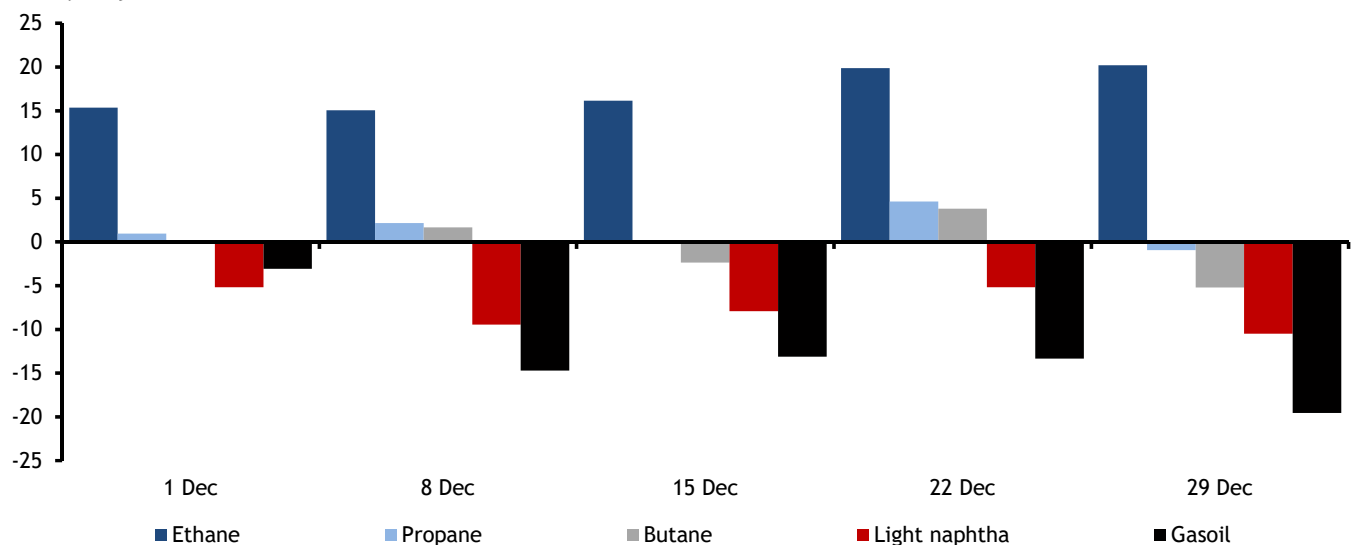
Ethylene plant gross margins* (see graph below)					
	1 Dec	8 Dec	15 Dec	22 Dec	29 Dec
Ethane	15.35	15.05	16.13	19.86	20.19
Propane	0.93	2.15	-0.10	4.60	-0.95
Butane	-0.21	1.66	-2.36	3.78	-5.22
Light naphtha	-5.20	-9.46	-7.92	-5.18	-10.50
Gasoil	-3.09	-14.71	-13.14	-13.34	-19.57

\*at Mont Belvieu, Texas

— Argus

### US Ethylene plant gross margins (Mont Belvieu, Texas)

€/lb of ethylene



## Shipping

Chinese shipbuilder Jiangnan Shipyard has delivered the world's largest very large ethane carrier (VLEC) to UK-based petrochemical company Ineos in Shanghai. The *Pacific Ineos Belstaff* has a capacity of 99,000m<sup>3</sup>. The vessel has a dual-fuel engine that can run on ethane.

The VLEC can also carry LPG and ethylene. Jiangnan Shipbuilding has three other 99,000m<sup>3</sup> VLECs under construction that are due for delivery in 2022.

## Shipping rates

Very large gas carrier (VLGC) rates on the Ras Tanura-Chiba route hit an 11-month high of \$75/t on 20-21 December, as market tightness persisted. Rates then edged down to \$73.50/t by the end of the month. Fog-related closures on the US Gulf coast on 30 December had cleared by 31 December.

Coaster rates edged higher over 11-30 December, with Tees-ARA closing at \$52/t, up by \$3/t, and the Tees-Mohammedia rate also \$3/t higher at \$83/t.

Shipping rates				\$/t
Spot				
44,000t	Ras Tanura-Chiba	▲		73.50
44,000t	Houston-Chiba	▲		118.00
44,000t	Houston-Flushing	▼		63.00
1,800t	Tees-ARA	▲		52.00
1,800t	Tees-Lisbon	▲		103.00
4,000t	Tees-Mohammedia	▲		83.00

— Argus International LPG

Shipping rates*			\$/calendar month
12-month time charter			
82,000m <sup>3</sup> +	◀ ▶		1,050,000
38,000m <sup>3</sup>	◀ ▶		830,000
35,000m <sup>3</sup>	◀ ▶		715,000
3,500m <sup>3</sup> pressurised (west)	◀ ▶		245,000
3,500m <sup>3</sup> pressurised (east)	◀ ▶		235,000

\*23 December — Gibsons



PROPANE													
	Jan 21	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 22
Middle East \$/t													
Saudi Arabia	550.00	605.00	625.00	560.00	495.00	530.00	620.00	660.00	665.00	800.00	870.00	795.00	740.00
Kuwait	550.00	605.00	625.00	560.00	495.00	530.00	620.00	660.00	665.00	800.00	870.00	795.00	740.00
Mediterranean \$/t													
Algeria (Sonatrach)	485.00	495.00	545.00	500.00	465.00	495.00	595.00	620.00	640.00	808.00	820.00	730.00	700.00
Spot prices \$/t													
Large cargo cif ARA*	493.50	558.00	488.00	469.50	497.50	605.00	621.50	639.75	757.25	828.00	780.00	662.00	na
Large cargo cif Lavera	520.31	548.13	538.55	485.90	482.12	556.73	625.68	637.58	742.89	855.10	801.88	655.48	na
Large cargo Japan cfr	622.34	584.63	581.32	534.77	545.53	614.76	684.32	696.75	767.49	878.30	827.03	715.55	na
Large cargo east China cfr	622.34	584.63	581.32	534.77	545.53	614.76	684.32	696.75	767.49	878.30	827.03	715.55	na
Large cargo south China cfr	622.34	584.63	581.32	534.77	545.53	614.76	684.32	696.75	767.49	878.30	827.03	715.55	na
Large cargo Far East index*	564.75	608.50	570.00	520.00	554.50	648.25	680.00	688.25	806.75	874.50	801.25	758.75	na
Asia spot premiums to CP \$/t													
Mideast Gulf	-24.45	-24.42	-29.39	-11.33	-8.84	2.14	0.71	2.10	2.55	0.81	-9.43	-14.00	na
India cfr	na	na	na	na	na	na	na	na	na	35.82	na	40.57	na
South China (pressurised)	75.95	70.21	70.00	70.00	68.53	70.41	73.00	72.33	66.91	63.86	63.00	60.95	na
East China (refrigerated)	61.14	-22.00	-30.73	-9.51	44.95	67.81	56.56	34.70	80.81	69.16	-29.88	-68.09	na
South China (refrigerated)	61.14	-22.00	-30.73	-9.51	44.95	67.81	56.56	34.70	80.81	69.16	-29.88	-68.09	na
Taiwan	32.44	-20.63	-9.42	27.20	41.32	33.95	43.70	29.85	41.26	43.77	-2.41	-25.87	na
Japan	32.44	-20.63	-9.42	27.20	41.32	33.95	43.70	29.85	41.26	43.77	-2.41	-25.87	na
Mont Belvieu €/USG													
LST	87.43	91.53	92.35	81.96	82.48	96.99	109.39	111.31	128.98	144.56	126.00	103.71	na
Non-LST	86.68	89.60	92.06	83.65	81.96	96.75	108.93	110.75	129.24	144.58	125.83	103.04	na
Europe \$/t													
Coasters fob NWE	527.38	600.75	578.13	529.52	503.79	575.44	638.57	652.39	761.39	871.67	833.33	721.60	na
Barges fob NWE	550.10	591.30	644.17	579.50	551.47	575.68	618.48	620.55	763.99	956.31	990.31	896.19	na
Coasters fob Med	547.00	606.00	599.70	476.20	436.86	497.38	615.93	657.62	724.25	877.43	856.01	751.88	na
Ethane €/USG													
	Dec 20	Jan 21	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mont Belvieu	19.98	23.59	26.55	21.68	23.74	26.11	27.78	31.37	33.56	38.99	43.46	40.24	33.63
Naphtha \$/t													
	Dec 20	Jan 21	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cargoes cif NWE	432.63	500.98	556.31	574.28	559.29	594.26	635.18	673.84	648.65	680.73	763.76	736.73	700.64
Cargoes c+f Japan	448.98	513.53	564.81	593.32	571.20	602.19	643.90	684.10	653.48	689.58	770.62	760.53	702.70
BUTANE													
	Jan 21	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 22
Middle East \$/t													
Saudi Arabia	530.00	585.00	595.00	530.00	475.00	525.00	620.00	655.00	665.00	795.00	830.00	750.00	710.00
Kuwait	530.00	585.00	595.00	530.00	475.00	525.00	620.00	655.00	665.00	795.00	830.00	750.00	710.00
Mediterranean \$/t													
Algeria (Sonatrach)	490.00	510.00	535.00	510.00	460.00	492.00	605.00	650.00	670.00	742.00	825.00	715.00	715.00
Spot prices \$/t													
Large cargo cif ARA*	451.75	553.50	492.00	430.00	490.50	594.25	648.00	683.00	709.00	836.50	760.75	712.25	na
Large cargo cif Lavera	458.95	521.06	513.34	468.91	457.83	529.98	617.73	630.55	686.13	784.23	766.13	677.69	na
Large cargo Japan cfr	591.14	564.21	553.40	513.73	539.11	613.45	678.80	691.18	763.89	852.49	793.36	688.96	na
Large cargo east China cfr	591.14	564.21	553.40	513.73	539.11	613.45	678.80	691.18	763.89	852.49	793.36	688.96	na
Large cargo south China cfr	591.14	564.21	553.40	513.73	539.11	613.45	678.80	691.18	763.89	852.49	793.36	688.96	na
Large cargo Far East index*	540.75	580.50	534.00	497.00	548.50	650.25	675.00	685.25	797.75	856.50	767.25	722.75	na
Asia spot premiums to CP \$/t													
Mideast Gulf	-24.45	-24.42	-29.39	-11.33	-9.00	2.14	0.71	2.10	2.55	0.81	-9.43	-14.00	na
India west coast cfr	46.29	-26.11	-32.90	-7.85	50.63	65.40	46.94	28.52	73.86	na	na	na	na
India cfr	na	na	na	na	na	na	na	na	na	35.82	na	39.71	na
South China (pressurised)	75.95	70.21	70.00	70.00	68.53	70.41	73.00	72.33	66.45	61.00	63.00	60.95	na
East China (refrigerated)	51.29	-21.58	-27.90	-2.85	55.63	70.40	51.94	33.52	78.86	50.87	-24.17	-51.87	na
South China (refrigerated)	51.29	-21.58	-27.90	-2.85	55.63	70.40	51.94	33.52	78.86	50.87	-24.17	-51.87	na
Taiwan	31.19	-16.68	-7.34	30.54	44.90	33.40	42.75	29.71	42.08	35.58	2.17	-14.87	na
Japan	31.19	-16.68	-7.34	30.54	44.90	33.40	42.75	29.71	42.08	35.58	2.17	-14.87	na
Mont Belvieu €/USG													
LST	87.64	97.78	101.74	82.13	87.38	105.59	123.06	129.63	146.35	164.83	151.12	133.30	na
Non-LST	88.24	95.17	98.91	85.61	94.46	112.29	125.43	130.64	147.26	161.74	147.61	127.25	na
Europe \$/t													
Coasters fob NWE	491.71	543.48	517.35	440.43	447.20	522.93	633.22	669.11	668.70	834.20	808.69	712.63	na
Barges fob NWE	478.53	534.29	503.88	429.44	457.76	517.05	636.83	640.36	695.98	860.58	784.94	710.74	na
Coasters fob Med	510.50	554.00	581.19	475.40	433.86	552.23	621.32	659.00	688.57	873.00	877.48	815.73	na

\*as of Apr 2019 spot price on 25th or nearest working day to 25th of the month

— all prices from Argus International LPG

## DATA

Chinese domestic prices													Yuan/t
	Dec 20	Jan 21	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>East China terminal</b>													
Ningbo ex terminal	3,927	4,520	4,110	3,999	4,266	4,103	4,196	4,696	4,838	5,136	6,288	5,831	5,209
Wenzhou ex terminal	3,925	4,483	4,108	3,983	4,267	4,106	4,196	4,696	4,846	5,147	6,290	5,857	5,209
Taicang ex terminal	3,935	4,544	4,115	4,109	4,340	4,159	4,255	4,733	4,816	5,245	6,419	6,040	5,470
Shanghai ex terminal	3,851	4,468	4,005	3,909	4,206	4,099	4,112	4,592	4,814	5,100	6,286	5,826	5,161
Zhangjiagang ex terminal	3,925	4,539	4,112	4,109	4,340	4,159	4,255	4,733	4,820	5,245	6,419	6,040	5,470
Fujian ex terminal	3,897	4,431	4,122	4,140	4,286	4,120	4,222	4,766	4,857	5,198	6,360	6,148	5,495
<b>East China refinery</b>													
Shanghai ex refinery	3,564	4,118	3,502	3,613	4,040	3,985	3,947	4,327	4,580	4,855	6,038	5,523	4,820
Zhenhai ex refinery	3,686	4,241	3,827	3,767	4,186	4,058	4,096	4,401	4,763	4,970	6,100	5,496	4,848
Yangzi ex refinery	3,656	4,295	3,703	3,882	4,276	4,178	4,156	4,469	4,792	5,124	6,116	5,549	5,072
Fujian ex refinery	3,788	4,142	3,695	3,984	4,208	4,022	4,064	4,452	4,717	5,090	6,228	5,968	5,396
Gaoqiao ex refinery	3,561	4,116	3,486	3,575	4,010	3,956	3,946	4,320	4,580	4,855	6,036	5,561	4,818
<b>South China terminal</b>													
Zhuhai ex terminal	3,933	4,515	3,978	4,318	4,257	3,958	4,264	4,564	4,743	5,124	6,319	6,022	5,362
Shenzhen ex terminal	3,934	4,538	4,021	4,315	4,268	3,982	4,265	4,573	4,764	5,128	6,334	6,040	5,395
Raoping ex terminal	3,915	4,477	3,997	4,324	4,351	4,017	4,219	4,603	4,812	5,158	6,314	6,104	5,466
Nansha ex terminal	3,925	4,531	4,007	4,306	4,266	3,973	4,255	4,571	4,760	5,128	6,332	6,034	5,392
Shantou ex terminal	3,915	4,477	3,997	4,324	4,351	4,017	4,219	4,603	4,812	5,158	6,314	6,104	5,466
Yangjiang ex terminal	3,924	4,418	3,977	4,287	4,172	3,908	4,305	4,598	4,717	5,097	6,303	5,931	5,292
<b>South China refinery</b>													
Maoming ex refinery	3,742	4,364	3,840	4,254	4,010	3,773	4,161	4,521	4,596	4,973	6,109	5,847	5,141
Guangzhou ex refinery	3,834	4,464	3,908	4,231	4,156	3,838	4,049	4,449	4,685	5,025	6,168	5,942	5,276
<b>Northeast China refinery</b>													
Daqing ex refinery	3,616	4,130	3,652	3,855	4,208	4,181	3,920	4,201	4,668	4,818	6,438	5,333	5,020
Dalian ex refinery	3,289	3,630	3,235	3,658	4,070	3,980	3,734	4,116	4,581	4,785	6,247	5,054	4,808
<b>Northwest China refinery</b>													
Urumqi ex refinery	2,611	2,915	2,468	2,849	3,565	3,625	3,232	3,196	3,573	3,735	4,575	4,213	3,575
<b>Inland China refinery</b>													
Lanzhou ex refinery	na	na	na	na	na	na	na	na	na	na	na	na	na
Yan-An ex refinery	3,371	3,817	3,517	3,697	4,199	4,179	3,986	4,196	4,646	4,848	6,038	5,079	4,676

— all prices from Argus International LPG



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