argus consulting services

argusmedia.com

Issue 20-4
Friday
3 April 2020

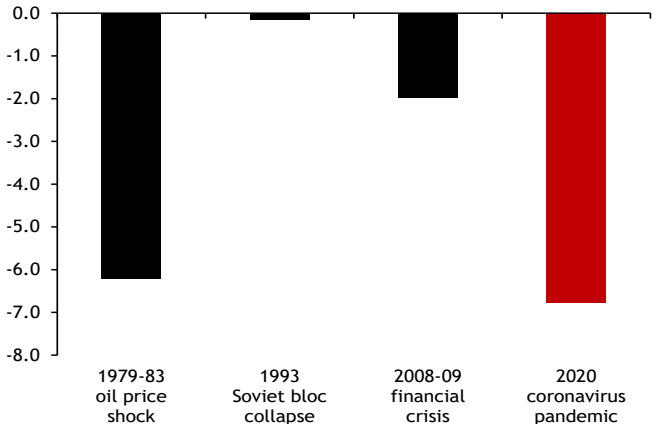
Argus Crude and Refined Products Outlook

Overview

Crude prices have crashed, especially prompt physical values. Almost all grades have been trading below $20/bl, with some truly eye-watering outright timestamps recorded on some days — CPC Blend in the Mediterranean has fallen as low as $7/bl, WCS in Canada to $9/bl and at the Texas Midland hub, WTS and WTL to $7/bl and just $3/bl, respectively. Only Asian values seem to have partially escaped the mayhem. Little wonder the equity value of upstream operators around the world has tumbled to distressed levels.

Refiners are hurting, too. Most FCC refining margins are in positive territory because of very cheap crude prices and strong diesel and HSFO crack spreads. But this is scant comfort as an unprecedented wave of demand destruction crashes across the globe, with naphtha, gasoline and jet fuel values all plummeting as a result.

Historical declines in global oil demand ***mn b/d***



The coronavirus pandemic has taken the world by surprise. Health systems in even some the most advanced economies are struggling to cope with the contagion. So the strategy has been to try and contain the spread to manageable proportions. Containment means quarantine, isolation and government-imposed curbs on the movement of people. It means widespread recession as economic activity dries up. And it means a massive hit to global oil demand.

This year is expected to see the largest fall in global demand ever recorded — not just in a single year, but in any cumulative period of time (*see graph*). The only remotely comparable decline was the 6mn b/d drop in demand in the wake of the oil price shock after the Iranian revolution of 1979. But this took place over a four-year period. Today, the industry faces a decline of nearly 7mn b/d in just one year — a massive 18.5mn b/d in the second quarter alone and an average of 9mn b/d between the first and third quarters. By any measure, this is a shock to the system.

Any attempt by the Opec+ group to offset downward price pressure by restricting output would always have been doomed to failure. In the event, the previous agreement is now dead and producers are free to supply whatever they can — which in the case of Saudi Arabia is a considerable amount. The Saudis plan to increase crude exports by 600,000 b/d in May and are offering heavily discounted prices in order to shift as many barrels as they can. Russia, too, is planning to raise exports — as are any others with spare capacity to hand.

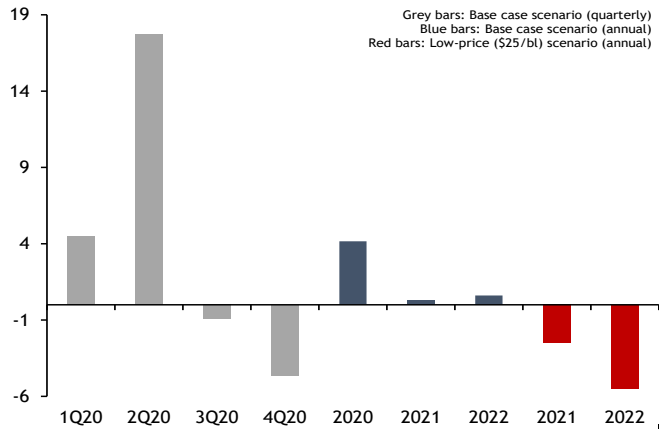
Summary of global crude balance												*mn b/d*
	1Q19	2Q19	3Q19	4Q19	2019	1Q20	2Q20	3Q20	4Q20	2020	2021	2022
Demand	100.63	100.20	100.89	101.66	**100.84**	95.70	81.74	97.22	101.66	**94.08**	**98.71**	**100.03**
Supply	100.28	100.17	100.35	101.83	**100.66**	100.14	99.43	96.23	97.00	**98.20**	**99.02**	**100.64**
Opec crude	30.02	29.39	28.81	29.30	**29.38**	27.98	29.70	29.80	30.13	**29.40**	**30.50**	**30.63**
Opec NGL and condensate	6.09	6.13	6.16	6.15	**6.13**	6.06	6.06	6.06	6.06	**6.06**	**6.02**	**6.13**
Non-Opec crude and NGL	59.06	58.83	59.29	60.75	**59.48**	61.03	57.91	54.30	55.09	**57.08**	**56.83**	**58.22**
Other supply	5.11	5.82	6.09	5.63	**5.66**	5.06	5.77	6.08	5.72	**5.66**	**5.66**	**5.66**
Global balance*	-0.41	0.06	-0.50	0.27	**-0.14**	4.46	17.74	-0.94	-4.62	**4.16**	**0.32**	**0.61**

**equivalent to global stock change*

We are in a full-scale price war, with global oil demand in free fall. There is no happy outcome and no winner in this environment. Little wonder that the market is now awash with reports of renewed efforts to cut production and stabilise the situation. Numbers as high as 15mn b/d are being bandied about — not unreasonably, since it would take at least this to put a floor under prices in the short term. And there are credible reports that the Texans may be prepared to join the party — an intriguing new ingredient to the Opec+ mix. To be a fly on the wall as the leadership dynamic within such a grouping is thrashed out...

It may happen. Opec and others plan a video conference on 6 April to discuss options, and the Texas Railroad Commission will meet a week later to discuss curtailing production there — which presumably precludes their active participation in the earlier Opec+ call in any meaningful way. That the US is seriously considering joining efforts to reverse the slump in prices shows just how serious the situation is — and all the urgent for President Trump because of the threat of losing the energy states in an election year.

Global balance: Supply minus demand ***mn b/d***



Ironically, our analysis shows that however bad the situation appears at the moment, the chances that prices will stay low for long are small. Unless there is a protracted global economic recession, demand will bounce back sharply once the coronavirus emergency has passed. Meanwhile, a combination of low refiner demand, logistical and storage bottlenecks and low prices is going to decimate non-Opec production, which we see almost 6mn b/d lower in the fourth quarter than it was in January-March.

Demand recovery and lower non-Opec production would quickly lead to a tighter market. Unless prices recover to underpin a rebound in non-Opec output, global supply could be 2.5mn b/d below demand in 2021 and 5.5mn b/d below in 2022 (*see graph*). If this were to happen, however, prices would come under strong upward pressure in late 2021-early 2022. In fact, we believe prices will start to rebound well ahead of this. Assuming the crisis is contained, the fourth quarter should see demand growth starting to recover against a backdrop of falling non-Opec output. And with Opec already at capacity, the market needs non-Opec supply to feed the recovery in demand over the next few years. This requires prices to rise.

Dominated by short-cycle US shale, non-Opec output is more elastic to prices than ever. This means the global supply-demand balance can react more quickly to price falls than in the past. Unlike in 2014-15, massive demand destruction has delivered the price collapse needed to bring this supply elasticity fully to bear. Efforts to counteract these market forces, to underpin prices and protect jobs and operations may well succeed. But even if they do not, we still see price recovery on the horizon. It will be brutal in the meantime, but the industry may emerge on a more robust footing — although with price recovery will inevitably re-emerge the impetus for market management.

Forecast crude prices									$/bl
	Mar	Apr	May	Jun	2Q20	3Q20	2020	2021	2022
Ice Brent	33.73	21.00	21.50	21.00	21.20	22.80	**30.70**	**39.60**	**47.30**
Nymex WTI	30.45	16.50	17.00	16.00	16.50	17.30	**25.60**	**33.60**	**41.30**
North Sea Dated	31.71	18.00	19.00	20.00	19.00	22.10	**29.70**	**39.10**	**46.80**
Urals NWE	28.39	13.10	15.90	16.60	15.20	20.10	**27.20**	**38.00**	**46.00**
Urals Med	29.51	14.40	16.40	17.20	16.00	20.80	**28.00**	**38.40**	**46.40**
CPC Blend	27.58	11.70	17.10	18.00	15.60	20.20	**27.20**	**37.90**	**45.70**
Bonny Light	31.08	14.10	17.60	18.20	16.60	21.50	**29.10**	**40.70**	**48.50**
Dalia	30.78	12.80	15.97	17.01	15.26	20.05	**27.48**	**40.58**	**49.15**
WTI Midland	28.18	12.30	12.70	14.40	13.20	16.30	**24.30**	**35.00**	**42.50**
WTI Houston	30.20	14.30	15.00	16.70	15.30	18.50	**26.50**	**37.30**	**44.80**
LLS	29.13	12.10	15.50	16.90	14.90	18.80	**26.50**	**38.60**	**46.50**
Mars	27.98	13.60	14.40	15.30	14.50	17.70	**25.40**	**35.90**	**43.30**
WCS Hardistry	18.29	2.30	1.21	1.84	1.78	1.52	**9.36**	**21.11**	**29.34**
WCS Houston	24.91	7.89	10.57	11.59	10.01	13.51	**21.09**	**30.84**	**38.20**
Dubai	33.78	20.90	20.10	21.20	20.70	23.40	**30.90**	**38.40**	**47.00**
Murban	35.60	23.70	22.32	22.61	22.87	24.26	**32.58**	**40.58**	**49.14**
ESPO Blend	38.03	23.70	21.60	23.30	22.90	24.90	**33.30**	**42.30**	**50.00**

Forecast crude differentials									$/bl
	Mar	Apr	May	Jun	2Q20	3Q20	2020	2021	2022
Ice Brent vs North Sea Dated	2.01	3.00	2.50	1.00	2.20	0.70	**1.00**	**0.50**	**0.50**
Urals NWE vs North Sea Dated	-3.32	-4.90	-3.10	-3.40	-3.80	-2.00	**-2.50**	**-1.20**	**-0.80**
Urals Med vs Urals NWE	1.12	1.30	0.60	0.60	0.80	0.70	**0.80**	**0.40**	**0.40**
Urals Med vs North Sea Dated	-2.20	-3.60	-2.60	-2.80	-3.00	-1.30	**-1.70**	**-0.80**	**-0.40**
CPC Blend vs North Sea Dated	-4.13	-6.30	-1.90	-2.00	-3.40	-1.90	**-2.40**	**-1.30**	**-1.20**
Bonny Light vs North Sea Dated	-0.63	-3.90	-1.40	-1.80	-2.40	-0.60	**-0.60**	**1.60**	**1.70**
Dalia vs North Sea Dated	-0.94	-5.20	-3.00	-3.00	-3.70	-2.00	**-2.20**	**1.50**	**2.30**
Nymex WTI vs Ice Brent	-3.28	-4.50	-4.50	-5.00	-4.70	-5.50	**-5.10**	**-6.00**	**-6.00**
WTI Midland vs Nymex WTI	-2.27	-4.20	-4.30	-1.60	-3.30	-1.00	**-1.30**	**1.40**	**1.20**
WTI Houston vs Nymex WTI	-0.25	-2.20	-2.00	0.70	-1.20	1.20	**0.90**	**3.60**	**3.40**
LLS vs Nymex WTI	-1.32	-4.40	-1.50	0.90	-1.60	1.50	**0.90**	**5.00**	**5.10**
LLS vs Mars	1.15	-1.60	1.10	1.60	0.40	1.20	**1.10**	**2.70**	**3.20**
Mars vs Nymex WTI	-2.47	-2.90	-2.60	-0.70	-2.00	0.40	**-0.20**	**2.20**	**1.90**
WCS Hardistry vs Nymex WTI	-12.16	-14.20	-15.80	-14.20	-14.70	-15.80	**-16.20**	**-12.50**	**-12.00**
WCS Houston vs Nymex WTI	-5.53	-8.60	-6.40	-4.40	-6.50	-3.80	**-4.50**	**-2.80**	**-3.10**
Dubai vs Ice Brent	0.05	-0.10	-1.40	0.20	-0.40	0.60	**0.30**	**-1.20**	**-0.30**
Murban vs Ice Brent	1.88	2.70	0.80	1.60	1.70	1.50	**1.90**	**1.00**	**1.80**
ESPO Blend vs Dubai	4.25	2.80	1.50	2.10	2.10	1.50	**2.30**	**3.90**	**3.00**

Crude futures analysis

The coronavirus pandemic has hit the oil industry exceptionally hard on the demand side of the equation. Preliminary estimates suggest a year-on-year drop in global oil consumption in the first quarter of 2020 of around 5mn b/d — most of it occurring in March — but the second quarter is expected to see an even bigger slump.

The latest US weekly implied consumption data — compiled from product deliveries from primary sources — show a 2.2mn b/d year-on-year decline for all products in the week ending on 27 March. Gasoline sales in the world's largest market for this product fell by 2.5mn b/d on the year and jet kerosene sales were down by 0.55mn b/d, with sharper drops to follow as restrictions on movement are tightened.

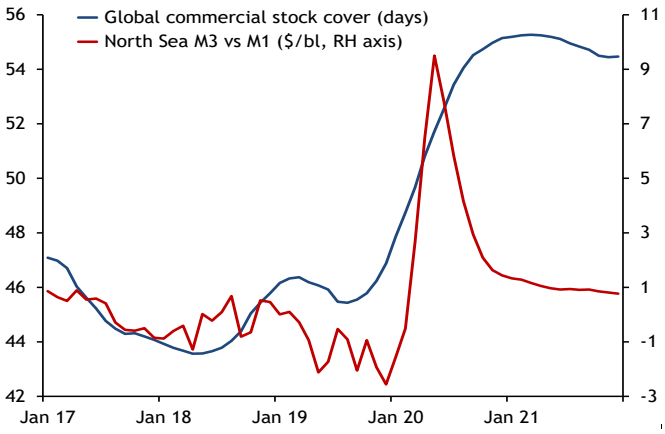
Global oil inventory cover is rising especially rapidly, with stocks surging as consumption collapses. The impact of this is particularly severe on spot oil prices, which swiftly reflect rapidly rising availability, reinforced by concomitant declines in futures prices. On 30 March, spot Brent sunk below $20/bl for the first time since 26 February 2002. Spot WTI's crash has been even more spectacular — on the same day it dropped to $14.10/bl, a level unseen since 11 March 1999.

How can the oil industry cope with such a build-up? Shutting in production is usually a last resort, because there are costs involved and because future extraction from shut-in wells could be impaired. It is better for private-sector firms to continue producing as long as operating costs are covered, thereby making a contribution to fixed costs. State-owned or controlled entities could cut production, but as last month's collapse of the Opec+ production restraint deal showed, agreement on further cuts is difficult when some producers face a disproportionately heavy burden. Oil-consuming nations could top up their strategic reserves with ultra-cheap oil — as China has just announced, with a predictable effect on prices — but commercial storage must ultimately take the strain until the crisis passes.

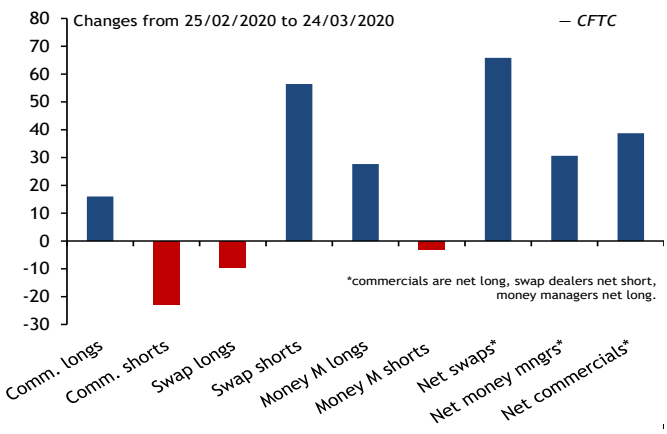
Fortunately, the forward curve changes in such a way as to incentivise refiners and traders to store oil surplus to requirements. With the impending rapid rise in stock cover, the third-month to front-month North Sea differential swung into a $2.68/bl contango for March 2020, which is just about enough — including the cost of working capital — to justify chartering a VLCC for three months of floating storage at time-charter rates on 25 March (*see graph*). Onshore storage is still available, which explains the relatively low number of charters for storage so far. But the forward curve on 31 March shows the differential rising to a peak of $9.50/bl in May, reflecting the need to store around 650mn bl of additional oil worldwide by the end of June, much of which will need to be stored on tankers.

The spectacular $31/bl — 91pc — fall in spot WTI from 25 February to 24 March 2020 led to some expected changes in open interest positions on Nymex. The single largest change during this period was in swap dealers' short positions, which increased by 56mn bl, or 9pc (*see graph*). Unlike Ice, where producer hedgers prefer to hedge output directly on the exchange, these Nymex hedgers also cover their hedging needs through swap dealers, which in turn sell futures on

Global stock cover vs North Sea forward spreads



Nymex: Change in open interest positions ***mn bl***



Nymex to cover their own exposure to fluctuating oil prices, having offered fixed prices to those producers seeking cover against further price falls. At the same time, those producers that had previously taken short positions when futures prices were much higher decided after the heavy oil price fall to take profits, hence the 23mn bl decrease in their shorts. As for the speculators, large price falls tend to attract those that expect prices to rise in due course, and the 28mn bl increase in the money managers' longs is testament to this tendency.

As a result of these changes, the net positions of all three groups of players increased last month, bearing in mind that the commercials and the money managers are net long and the swap dealers net short. By taking new positions, all participants, hedgers and speculators alike, are liable to see gains or incur losses when oil prices rise again, as they are wont to do when circumstances change — when the coronavirus is finally tamed or Opec calls a truce in the output war.

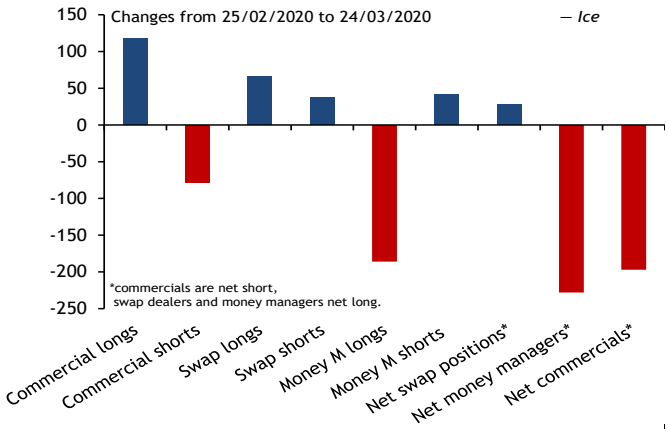
Perhaps reflecting Brent's long-standing position as the premier international benchmark, the 63pc fall in spot Brent between 25 February and 24 March sparked some massive changes in participants open interest positions on the Ice exchange (*see graph*).

Faced with such a collapse, the consumer hedgers were bound to boost their longs to secure cheap oil, which they did by 118mn bl, or 13pc. Not content to increase their hedging through Ice directly, either as refiners or proxy hedgers using Brent, the consumers also boosted their hedging through swap dealers, which in turn covered their raised exposure to price variability by increasing substantially their long positions —by 66mn bl, or 14pc. On the other hand, some producer hedgers cut their short positions by 79mn bl, or 6pc, taking advantage of the price fall to realise huge profits, while others sought protection against further price falls through swap dealers, which increased their shorts to cover their fixed price exposure to the producers.

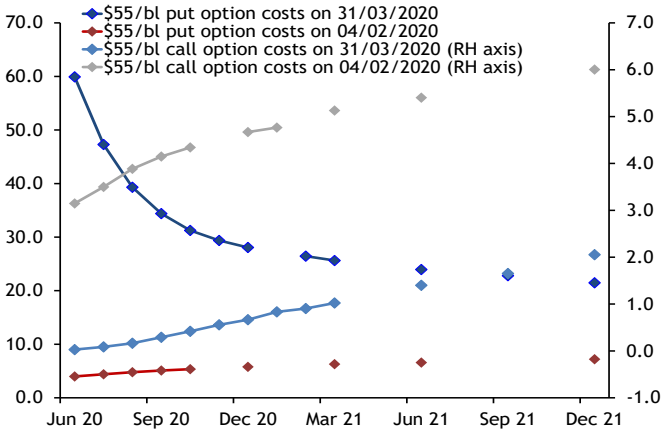
And last — but by no means least — we have the money manager speculators, which slashed their long positions by 186mn bl, or 64pc. There is little doubt that the money managers that had gone long would have incurred massive losses with the sharp fall in Brent and would have sought to limit these losses as quickly as possible. Other speculators, anticipating further price falls, increased their shorts by 42mn bl, or 33pc, thereby contributing to the doubling of *Argus*' speculation intensity index for Brent from a low initial position, but leaving themselves exposed to a possible price recovery.

The Brent options market evidenced a staggering rise in the normalised/real cost of $55/bl put options (*see graph*). The June 2020 normalised put option on 4 February cost $3.98/bl, whereas at the end of March its cost was almost 15 times higher. The market is most likely to tighten once the immediate crisis recedes, so that further along the options curve the cost of the December 2021 put option drops to a level just above $20/bl, considerably less than its exorbitant June 2020 level, but nevertheless still a hefty sum to sell $55/bl oil. When $55/bl Brent put options become so expensive, the equivalent call options become correspondingly less so — and certainly a lot less costly than they were not long ago. So Brent $55/bl call options continue to look a bargain, especially in view of President Trump's latest claim that the Saudis and Russia will cut output.

Ice: Change in open interest positions ***mn bl***



Cost of Ice Brent options ***$/bl***



Northwest Europe

Forties fell to its lowest average discount to North Sea Dated since November 2016 last month, while on a daily basis it slumped to a record discount of $3.25/bl in late March, reflecting collapsing global demand and an expected surge in Opec+ production. Furthermore, record price cuts for April-loading Mideast Gulf crude lessened the appeal of medium and light sour grades from the North Sea and Atlantic basin to Asia-Pacific refiners. Weak demand in Asia-Pacific has prompted companies to sell barrels on a cif Rotterdam basis, but with demand also evaporating in Europe, around 3.6mn bl is reportedly being held on vessels offshore Hound Point.

Forties sailings to Asia-Pacific slowed in February-March, but could recover in April. The Dubai-Brent EFS has shifted to a record $6/bl discount since Saudi Aramco sharply cut its official formula prices and buying interest for light crudes faded as a result of collapsing light distillate cracks. The reversal of the EFS spread could offset high freight rates and make Forties sailings east of Suez attractive again. And the market's contango structure — expected to persist in the coming weeks thanks to the coronavirus' impact on demand — means crude increases in value while in transit.

BFOET exports are scheduled at 813,000 b/d in May, down by 10pc from April and the lowest since June 2019, with Forties loadings scheduled at 290,000 b/d, compared with 340,000 b/d in April. But Forties supplies are expected to be higher in June-July, after maintenance on the FPS system was postponed until at least August because of the pandemic.

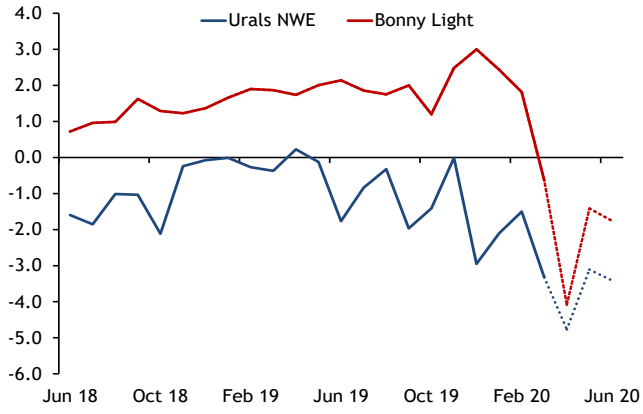
Urals cif Rotterdam weakened to a discount of $3.30/bl, its lowest monthly average discount since April 2011, in the wake of the collapse of the Opec+ alliance, with a surge in light and medium sour output expected from Mideast Gulf companies that have cut April prices to record lows in response to demand destruction in Europe and Asia. But strong diesel and HSFO cracks in northwest Europe kept a floor under the medium sour grade. Similar strong spreads in Asia-Pacific have prompted renewed interest in bulk shipments east of Suez.

But with Russia poised to quickly ramp up output by 200,000-300,000 b/d, seaborne Urals Baltic exports are scheduled at nearly 1.61mn b/d in April, up by 12pc on March. Urals is now trading at its widest discount to Dated in 12 years — $4.75/bl.

Support for Urals could come from eastbound arbitrage economics remaining favourable and Chinese refinery runs ramping up quickly, drawing shipments for May-June arrival. Urals for June-July arrival are assessed at wide discounts to Ice Brent on a des Shandong basis.

But any such boost for Urals could be easily offset by imploding European and Mediterranean demand, with almost all refiners ramping down or shutting down CDUs. There are reports that some European buyers of Saudi crude are considering backtracking on requests for additional volume, as the outbreak stifles demand. Appetite for Mideast crude has been weakened by Aramco and Somo's decision to respectively restrict and cancel freight subsidies for west-of-Suez buyers, given spiking freight rates. And Urals is also facing competition in the Shandong market from US medium sour Mars, which was has been offered at $9/bl discounts to Ice September Brent for July-delivery.

Urals NWE and Bonny Light vs North Sea Dated ***$/bl***

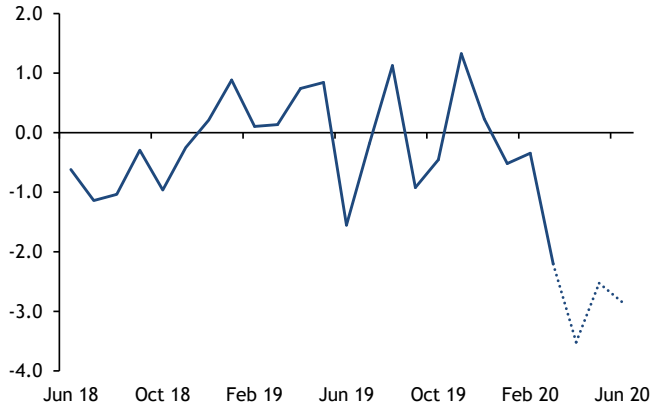


Plunging demand also pushed west African grades to multi-year lows, with lighter, sweeter grades weakening most as light distillate cracks collapsed. What buying interest remains has moved more towards medium/heavy grades as diesel and HSFO cracks stay strong. Nigerian values will remain soft as a result of the collapse in Indian demand, although Angolan grades are expected to hold up better as the worst of the pandemic seems to have passed in China — their key export market. All west Africa grades can benefit to an extent from favourable arbitrage economics, but will compete with other Atlantic basin cargoes seeking a home in northeast Asia amid sharp refinery run cuts in Europe, India and the US.

Mediterranean

Aframax cargoes of Mediterranean Urals averaged a $2/bl discount to North Sea Dated on a cif Augusta basis last month, down from February, but not as sharply as Baltic Urals cif Rotterdam. March-loading Urals cargoes from Novorossiysk cleared early in the month. But notional values still followed the downward trend observed for competing regional grades.

Urals cif Med vs North Sea Dated ***$/bl***



Some market participants said Saudi Arabia and Iraq's decision to reduce and scrap, respectively, the freight compensation for European buyers — following a sharp rise in shipping costs in the middle of last month — could bolster Mediterranean demand for Black Sea-loading Urals. The freight compensation is used to offset the higher shipping cost and expense of transiting the Suez Canal associated with buying on a fob Mideast Gulf basis. Traders suggested the new cap will sap European and Mediterranean demand, but any reduction will probably be limited as most purchases are made on a fob Sidi Kerir basis.

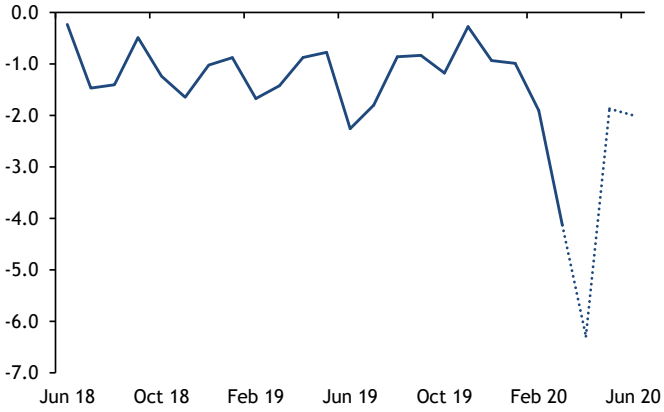
It is unclear how much of April's additional Saudi crude has been sold on a Ras Tanura basis. Aramco approved April allocation increases of 20-200pc for several European buyers, as Riyadh prepares to up supplies after the collapse of the Opec+ production restraint deal. But European demand is severely constrained by the coronavirus pandemic and reports have emerged that some buyers of Saudi crude are considering backtracking on requests for extra volumes.

Black Sea Urals exports are scheduled to rise to just under 500,000 b/d, up by around 30pc on March, as Russia ramps up output by 200,000-300,000 b/d in the short term. Norway's new medium sour, Johan Sverdrup, is being booked for Turkey, which is a key market for Black Sea Urals.

Light sour CPC Blend crashed to a record discount to Dated of $4/bl in March, pressured to a greater extent than regional medium sours by weak gasoline and naphtha cracks amid collapsing regional demand and heavily-discounted light Mideast Gulf grades Murban and Arab Extra Light, which it competes against in Asia-Pacific. CPC Blend exports are scheduled at 1.5mn b/d in April, following March's record loading programme of 1.62mn b/d.

As is the case with other Atlantic basin crudes, rebounding demand from northeast and southeast Asia might provide some uplift. But CPC Blend will continue to face stiff competition from Mideast Gulf light sour alternatives, with Saudi Aramco expected to further reduce prices for May-loading Arab Extra Light, with Abu Dhabi following suit with Murban.

CPC Blend vs North Sea Dated ***$/bl***

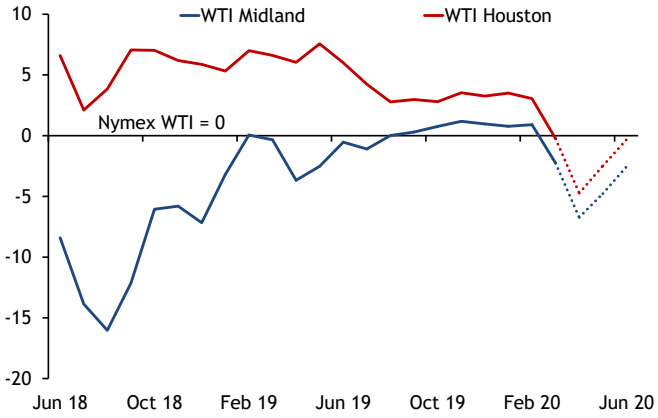


Light sweet Algerian Saharan Blend and Azeri BTC Blend will remain under severe pressure as European refiners aggressively cut runs — some by as much as 50pc or more. Smaller Aframax cargoes that target the Mediterranean market are particularly vulnerable. The prospects for larger Suezmax cargoes typically earmarked for the Asia-Pacific market are slightly better. A contango market can encourage sellers to take advantage of time spreads with long-haul voyages to Asia-Pacific, while Ice Brent futures are at record discounts to Dubai swaps.

US

Nymex WTI's discount to Ice Brent closed to just $3.3/bl in March, the narrowest since July 2017, as a deep contango in US markets spurs interest in Cushing storage. But the contango will lead to large stockbuilds at Cushing, which could push the Brent-WTI spread wider again.

WTI Midland and WTI Houston vs Nymex WTI ***$/bl***



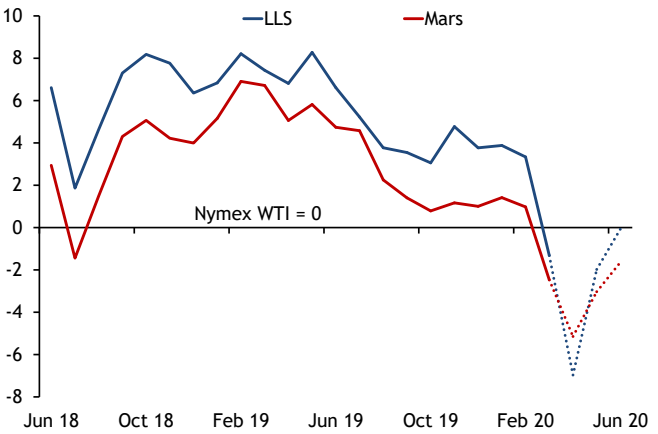
An oversupplied global market and falling light distillate cracks pressured light sweet coastal grades WTI Houston and LLS to record discounts to Nymex WTI. Inland west Texas WTI Midland also fell to a wide discount against Cushing. With reduced export demand, supplies are backing up and the deeper contango is encouraging more storage. Big WTI Midland discounts to Cushing and Houston indicate that Midland storage is filling up, opening the arbitrage to Cushing or the Texas coast. But these volumes will most likely end up in storage, given a contango market triggered by declining domestic and export demand for crude. Most US Gulf coast refiners are cutting run rates by 20-30pc in response to poor margins and a lack of storage.

WTI is now at discounts of $7.50/bl to Dated on a des Rotterdam basis and $7/bl to Dubai on a des northeast Asia basis in order to compete with lower-priced Mideast Gulf crude in an oversupplied global market. Deeply discounted Mideast Gulf crude is expected to squeeze light crude from complex refineries, further weighing on US light sweet values. But demand for US crude seems to be rising in China and South Korea as import costs fall sharply. Mars is now priced lower than Russian ESPO Blend on a des Shandong basis.

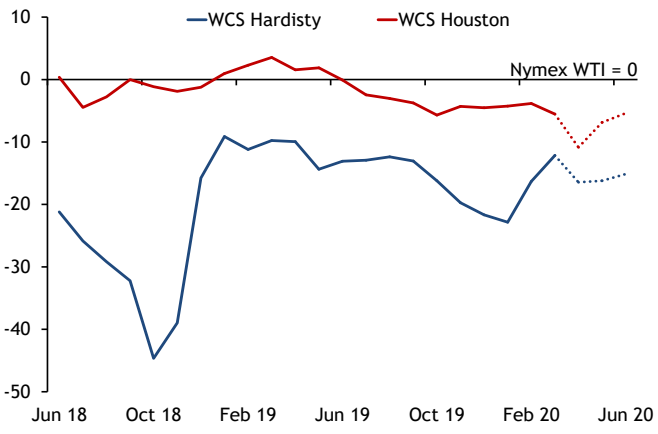
As storage fills, prompt prices could continue to fall relative to forward values. Although all coastal US prices were discounted against Nymex WTI, lighter crudes with high gasoline yields have been hit by negative gasoline cracks. Grades with higher diesel yields will find more support, thanks to stronger diesel cracks. A gradual rebound in differentials is expected, however, as US shale production is poised to fall.

Canadian output is also forecast to fall, which could support WCS values at Hardisty and Houston. Producers are suspending crude-by-rail programmes and scaling back output after the WCS in Alberta tumbled to an outright price of around $10/bl. But the large majority of cuts are expected to come from mined bitumen upgraded to synthetic light crude, as opposed to bitumen that is extracted through steam injection, which is much more challenging and expensive to scale back and restart when prices rebound.

Mars and LLS vs Nymex WTI ***$/bl***



WCS vs Nymex WTI ***$/bl***

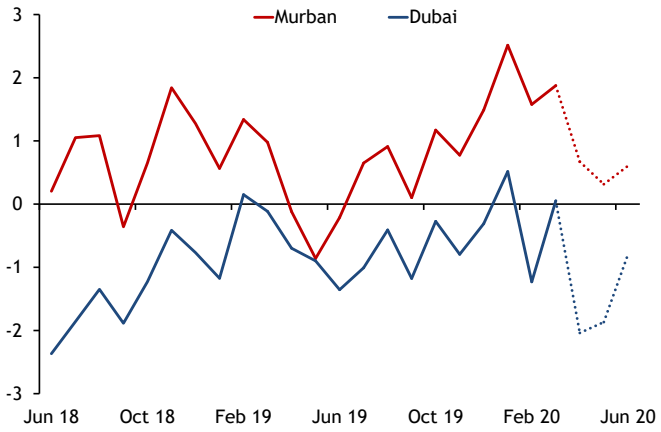


Asia-Pacific

The depressed market outlook was reflected in Dubai's deep contango. Front-month physical Dubai widened to a $3/bl discount to third-month Dubai prices in March — the widest front-month to third-month discount since October 2008 — compared with a premium of $2/bl in January.

Despite overall weak sentiment in the Mideast Gulf market, forward Dubai firmed to parity with Ice Brent in March. The May Brent-Dubai EFS fell to record discounts in the second half of last month. Sharp price cuts from Mideast Gulf producers made shipments of their crude to destinations west of Suez more attractive, and was probably a factor restraining Ice Brent values relative to Dubai swaps.

Murban and Dubai vs Ice Brent ***$/bl***



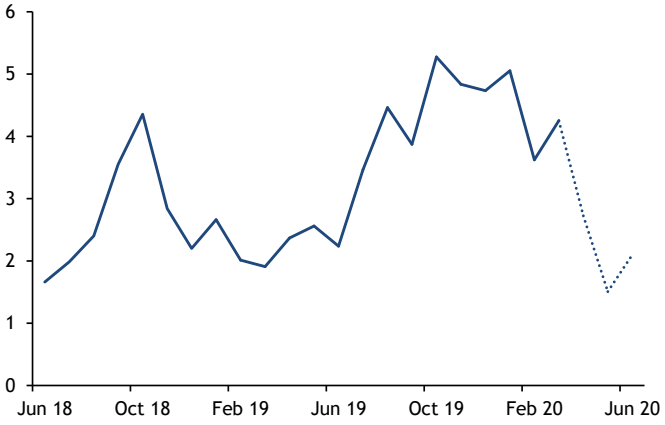
Saudi Aramco slashed April formula prices for Asia-bound shipments of Arab Light, Arab Extra Light and Arab Medium by $6/bl each, setting the first two at a $3.10/bl discount to the monthly average of Oman-Dubai assessments and the latter at a $4.05/bl discount — the widest on record for all three grades.

The possibility of more Mideast Gulf crude heading to Europe may have added to the pressure on the European crude benchmark, as Aramco slashed its prices into Europe and the Mediterranean. The initial signs were that European and Mediterranean demand for April-loading Saudi crude picked up following the price cuts. But as the month progressed, it became increasingly clear that European demand for Mideast Gulf crude — or any other crude — has collapsed as economies grind to a halt and extensive lockdowns are enforced to contain the coronavirus outbreak.

The rebound in Chinese refinery runs — with economic activity in the country apparently returning to some form of normality — should provide support for Dubai, Murban and other Mideast Gulf grades. But other key crude consumers in Asia-Pacific, such as India, Thailand and Indonesia, are now seeing the virus' outbreak eroding their own economic activity as strict lockdown measures are implemented. This is already being reflected in deep refinery run cuts in response to collapsing gasoline and jet fuel demand. The extreme prompt weakness will keep Dubai in a deep contango.

Mideast Gulf light and medium sours will also stay under pressure from ample supply as Opec members raise output, with Saudi Arabia and the UAE fronting the battle for market share. Heavy sours will be more supported by tighter supply from Iran, Venezuela and Canada. In fact, some buyers in Asia-Pacific that requested extra April volumes of Arab Medium and Arab Heavy from Aramco were heard not to have received the volumes. Mideast Gulf light sours should fare worst, with light distillate cracks hit harder and for longer.

ESPO Blend vs Dubai ***$/bl***



Russian ESPO Blend values are expected to come under downward pressure from rising April-loadings of competitively-priced light sour Saudi Arab Extra Light crude. ESPO Blend exports should rise in coming months because of higher Russian crude production. The recovery in Chinese demand will put a floor under prices, with high VLCC freight rates giving an advantage to short-haul ESPO Blend shipments. But the grade will still have to compete with cheap WTI, Johan Sverdrup, Urals and Mars arriving in China's Shandong — ESPO Blend's primary market.

Light distillates

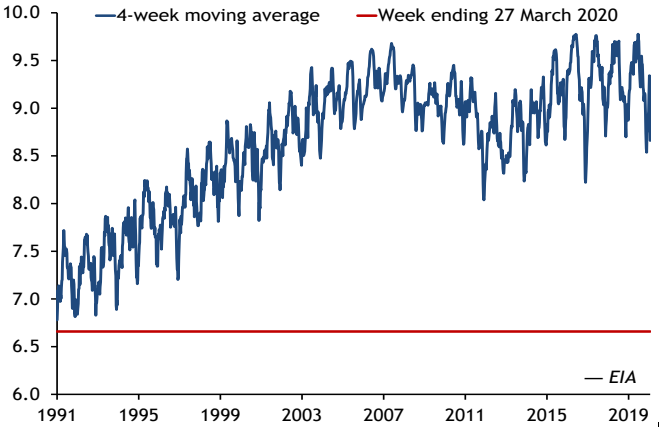
The effects of the coronavirus pandemic were evident in outright crude prices and light distillate values relative to crude. The northwest Europe 95R gasoline crack fell by more than $5.50/bl on the month in March, reflecting weak demand domestically and in key export markets. Its monthly average premium to regional benchmark North Sea Dated crude hit a 14-month low of $1.10/bl, but gasoline values had plunged to a record discount of more than $6/bl on 24 March, before a slight uptick driven by the switch to summer grade gasoline.

The gasoline crack has been buoyed slightly by announcements of temporary closures at several refineries. Italy's 85,000 b/d Ancona refinery, the 130,000 b/d Come-by-Chance refinery on the east coast of Canada and other small plants in France and South Africa have announced the suspension of crude processing in recent weeks, with further temporary closures and a more general paring back of throughputs expected in coming weeks. Even some of the world's most complex refineries have shown signs of reducing activities, with Indian refiner Reliance offering prompt crude in anticipation of April run cuts, while ExxonMobil announced plans to close a 90,000 b/d FCC unit at its Baytown refinery in Texas. This follows the closure of a 240,000 b/d CDU at its Beaumont facility, also in Texas, and a reduction of more than 10pc in throughputs at its 502,500 b/d Baton Rouge refinery in Louisiana. Overall Gulf coast refinery throughputs are likely to drop by as much as 20-30pc in the coming weeks.

US Gulf coast conventional gasoline hit a discount of $3/bl to LLS crude, while the outright price reached a 21-year low, squeezed by weak domestic demand. Gulf coast refiners' throughput cuts have propped up cracks to come extent, but there is only limited scope for further support. With extensive travel restrictions in place in the US, the EIA's weekly product data show finished motor gasoline supplies falling to 6.66mn b/d, the lowest since 1994. Given the number of US citizens subject to travel restrictions, this figure gives some idea of what to expect in the weeks and months ahead. The indications are that average vehicle miles clocked up in the US will drop sharply this year, and that this will translate into a drop in domestic gasoline demand of as much as 1.8mn b/d on an annual average basis.

The Singapore naphtha crack strengthened by nearly $1/bl on the month in March against Dubai crude, moving to a premium to northwest Europe naphtha of over $5/bl — the highest in more than 10 years. Petrochemicals producers in the region have sought more than 2.45mn bl for April delivery, prompted by higher propane prices.

Implied US gasoline demand *mn b/d*

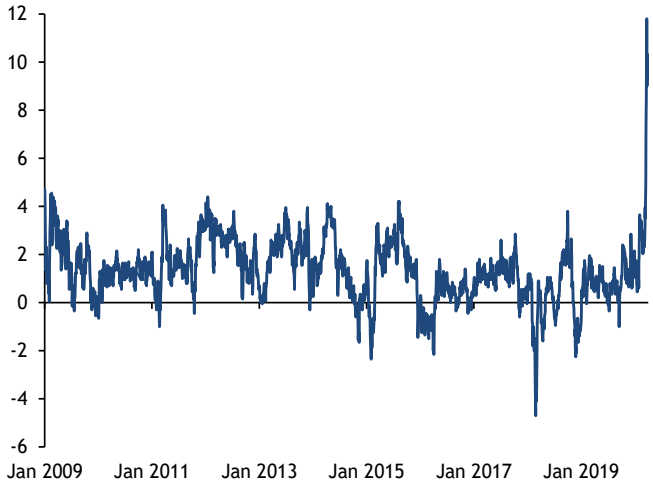


Light distillates crack spreads					*$/bl*
	Feb	Mar	Apr	May	Jun
Northwest Europe vs Dated					
Propane	-29.15	-14.62	-8.20	-9.20	-10.10
Butane	-16.88	-11.47	-5.60	-7.00	-7.70
Naphtha 65 para	-3.58	-4.33	-2.10	-1.60	-1.80
95R gasoline	6.79	1.08	3.20	5.30	6.50
Mediterranean vs Urals					
Propane	-29.67	-12.55	-4.80	-6.90	-7.60
Butane	-13.42	-4.81	-0.90	-3.50	-3.80
Naphtha 65 para	-5.65	-2.12	0.60	-0.80	-0.70
95R gasoline	8.03	3.78	7.60	8.20	9.70
US Gulf coast vs LLS					
Propane	-37.41	-15.12	-8.70	-12.60	-13.10
Butane	-26.93	-14.04	-7.90	-12.00	-12.00
Naphtha	-1.42	-2.39	4.30	3.30	2.70
87 conv gasoline	10.25	6.45	11.50	11.50	11.90
Singapore vs Dubai					
Propane	-23.25	-9.88	-6.40	-6.30	-7.40
Butane	-13.75	-4.40	-3.00	-3.20	-4.10
Naphtha	-1.69	-0.84	-1.50	-1.00	-1.10
Naphtha Japan c+f	-1.09	0.68	-0.30	-0.20	-0.40
95R gasoline	10.09	2.64	1.80	5.40	5.20

Middle distillates

Despite a tightening of travel restrictions globally, middle distillate cracks were reasonably well supported in March, with diesel cracks in particular holding up. In Europe and the US Gulf coast, jet cracks also remained strong, although a wide discount to diesel emerged. In Singapore, however, the jet crack has fallen to a record low, illustrating the magnitude of the coronavirus' impact on the world economy.

Singapore diesel vs jet ***$/bl***



The Singapore jet crack fell by $3.20/bl from February last month, but in the final week of March, it had slumped to a record low of just 60¢/bl, some $12/bl below gasoil, a record wide differential *(see graph)*. Much of the weakness in late March was the result of the tentative return of Chinese refiners. Sinopec's Hong Kong trading unit sent 3.8mn bl of jet to Asian and European destinations, while PetroChina's Anning refinery sent its first jet cargo of the year by pipeline to Kunming International Airport in March. But it remains to be seen whether the recovery in domestic demand will keep up with growing refinery outputs. If it does not, surplus Chinese products will flood onto the export market. Indeed, a new announcement by the Chinese government could lead to independent refiners being able to secure export quotas for the first time since 2016.

On the US Gulf coast, jet cracks rose in March — perhaps reflecting the lag in the spread of the coronavirus outbreak from Asia to North America. Data from the Official Aviation Guide (OAG) indicate that while scheduled flights were down by almost 90pc in Singapore in the final week of March, the reduction was just 23pc in the US. And the first week of March saw just a 2pc drop in flights in the US, against 25pc in Singapore. But confirmed coronavirus cases in the US now exceed any other country, and 75pc of the population has been instructed to stay at home. The extent of the lockdown now in place is certain to see middle distillate cracks retreating from their current levels — the jet crack rose to $16/bl and the diesel crack to $29/bl on the final day of March — in the coming weeks. In the medium-term, a sharp rise in unemployment will probably result in an limp demand recovery in the aftermath of the pandemic, and possibly lower cracks.

Middle distillate cracks in northwest Europe mirrored those on the US Gulf coast by rising strongly at the end of March, although the March average for jet was down by $1.60/bl from February. Diesel rose by $3.50/bl on the month. German buying drove the strength in diesel cracks, as consumers took advantage of the fall in the outright price triggered by the crude price crash. Refinery turnarounds in Germany are also supporting distillate cracks. Although jet cracks ended the month strongly, they had retreated to a 17-year low in mid-March, as almost all airlines announced a drastic reduction in flight schedules. A complete collapse in jet cracks might be avoided as refiners could optimise diesel production over jet production.

Middle distillates crack spreads					***$/bl***
	Feb	**Mar**	**Apr**	**May**	**Jun**
Northwest Europe vs Dated					
Jet-kerosine	9.57	7.96	7.10	6.40	5.70
10ppm diesel	10.27	13.75	14.10	10.40	8.90
50ppm heating oil	9.72	13.33	9.80	8.10	6.80
Mediterranean vs Urals					
Jet-kerosine	8.16	8.25	8.80	7.50	6.90
10ppm diesel	10.83	15.52	17.30	13.10	11.70
1,000ppm heating oil	10.07	15.54	13.40	10.70	9.60
US Gulf coast vs LLS					
Jet-kerosine	9.97	10.20	12.40	9.60	7.80
10ppm diesel	11.94	18.37	23.00	16.50	14.60
2,000ppm heating oil	7.32	12.36	17.50	11.30	9.60
Singapore vs Dubai					
Jet-kerosine	8.80	5.61	3.20	3.70	2.70
10ppm diesel	11.71	11.66	11.00	9.10	7.80
500ppm gasoil	10.42	10.64	10.10	8.10	6.80

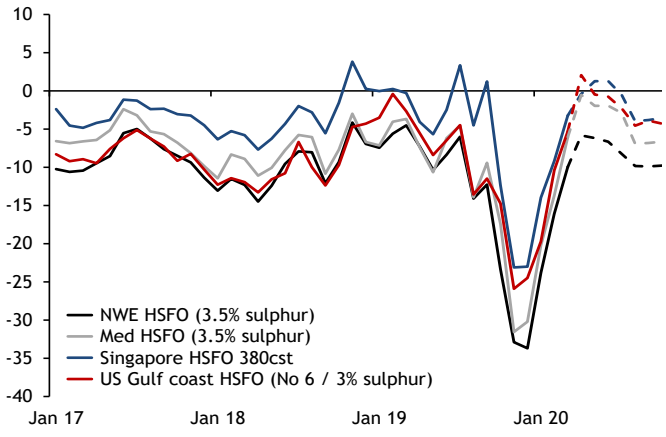
Fuel oil

High-sulphur fuel oil (HSFO) cracks strengthened on the month against regional benchmark crudes in each of the four key refining regions in March. The Singapore HSFO crack narrowed by $6/bl against benchmark Dubai crude to a discount of just $3.20/bl, reflecting lower throughputs at a number of refineries across Asia-Pacific.

Indian state-owned refiners BPCL, IOC and MRPL all announced reductions to their refinery throughputs of around 30pc. Some Thai refiners have reduced their runs by 10-20pc and we expect more refiners elsewhere in the region to follow suit in the coming weeks.

The northwest Europe HSFO crack spread moved to its narrowest discount to regional benchmark North Sea Dated crude since July 2019, strengthening by more than $6/bl from February's average. Lower refinery output in Asia-Pacific and Europe has tightened supplies, while demand in the Mideast Gulf kept the market relatively tight. The crack is forecast to strengthen further during April as more refineries opt to reduce their utilisation rates, keeping the market for HSFO relatively tight.

HSFO crack spreads *$/bl*



As more and more refiners opt to either cut run rates or suspend operations altogether in response to the significant drop in gasoline and middle distillate demand, the impact of lower demand from the bunker market should be offset. In addition to tightness on the supply side, seasonal demand for fuel oil for power generation in the Middle East and south Asia should provide further support towards the end of the second quarter and throughout the third quarter.

With HSFO now predominantly serving as a fuel for power generation — following the International Maritime Organisation's imposition of the global 0.5pc cap on sulphur content in bunker fuels — demand should prove relatively inelastic. This inelasticity of demand, combined with the reduction in supply, should ensure that regional markets remain relatively tight, despite this year's significant drop in global bunkering demand for HSFO.

Singapore 0.5pc sulphur fuel oil cracks declined by $5/bl on the month against Dubai crude in March, but remained at a premium of more than $10/bl. Substantial arbitrage arrivals from suppliers west of Suez added to the volumes heading from Abu Dhabi's Adnoc to Singapore, weighing on prices. A number of Indian refiners also emerged towards the end of the month to offer low-sulphur fuel oil cargoes for loading during April.

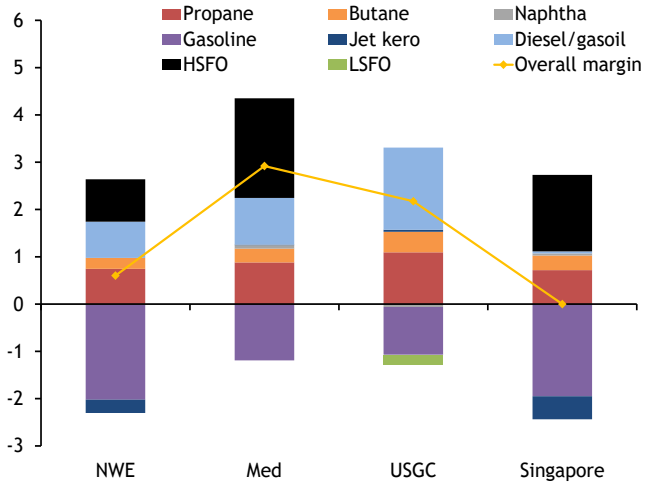
Despite the weakness of 0.5pc sulphur fuel oil in March, values are forecast to stabilise relative to crude over the coming months. Firstly, an uptick in the processing of heavier and sourer crudes as a proportion of the slate — following the collapse of the Opec+ production restraint deal and the return of Saudi and Russian barrels to market — will translate into a lower yield of IMO 2020-compliant bunker fuels. And secondly, the impact of lower refinery yields of low-sulphur residues on output of compliant fuels will be compounded by lower refinery utilisation rates in response to limited demand for transport fuels.

Fuel oil crack spreads					*$/bl*
	Feb	**Mar**	**Apr**	**May**	**Jun**
Northwest Europe vs Dated					
LSFO (1% sul)	1.40	0.09	-0.50	-1.30	-2.10
HSFO (3.5% sul)	-16.07	-9.95	-5.80	-6.20	-6.60
Mediterranean vs Urals					
LSFO (1% sul)	4.19	4.15	4.80	2.90	2.70
HSFO (3.5% sul)	-13.68	-6.04	-0.60	-2.00	-2.00
US Gulf coast vs LLS					
LSFO	4.51	3.88	6.40	2.40	0.90
HSFO (No 6 / 3% sul)	-10.39	-5.29	2.10	-0.50	-0.80
Singapore vs Dubai					
HSFO 180cst	-7.59	-2.33	0.90	3.00	2.50
HSFO 380cst	-9.18	-3.23	-0.40	1.30	1.30

Refining margins

Refining margins strengthened in all four regions to five-month highs. The collapse in the crude price has led to a narrowing of fuel oil and LPG discounts to benchmark crudes. Diesel cracks also strengthened globally, and this was more than enough to outweigh the sharp declines in gasoline and jet cracks cause by the travel restrictions imposed to combat the coronavirus pandemic *(see graph)*. Margins were also supported by a reduction in runs, as refiners scheduled maintenance to coincide with the downturn in demand for transport fuels, and logistical constraints made crude deliveries to refineries more difficult.

March vs February FCC margin and cracks ***$/bl***



Crude deliveries were a particular problem in the Mediterranean, which saw the largest month-on-month rise in refining margins of all the key regions in March. The French port complex of Fos-Lavera was expected to receive 7mn bl of crude last month, just half the volume that arrived in March 2019, with restrictions on workers stemming from social distancing hampering unloadings. Absent workers and overnight closures combined to reduce unloadings at the terminal, which serves four refineries — ExxonMobil's 133,000 b/d Fos plant, UK-Chinese joint venture Petroineos' 210,000 b/d Lavera plant, Total's 105,000 b/d Feyzin facility and Varo Energy's 63,000 b/d Cressier plant in Switzerland.

FCC margins in northwest Europe did not see the same support as in the Mediterranean — rising by just 60¢/bl in March from February — and remaining negative for a fifth consecutive month. The weakness in the gasoline crack was more pronounced in northwest Europe, falling to a 13-month low. And margins have not yet benefited from domestic refineries shutting for maintenance, with several turnarounds scheduled for April, including at Europe's largest refinery — Shell's 420,000 b/d Pernis plant. But it is uncertain whether all of these planned works will go ahead, after Finnish refiner Neste was forced to delay maintenance at its 197,000 b/d Porvoo refinery because social distancing measures meant workers were unable to carry out the work.

Refining margins were steady in Singapore in March, as transport fuel cracks fell sharply from February levels. The gasoline crack shed $7.50/bl, while the jet crack was down by $3.20/bl. Cracks in the region came under pressure from returning Chinese refineries, which were forced to sell their product on export markets, as domestic demand in China returned only slowly. Although the lockdown has been lifted in several areas in China, the return to normal life has been tentative. The declines in transport fuel cracks were offset by the top and bottom of the barrel, with fuel oil rising to a six-month high and LPG to a 48-month high.

Strong LPG cracks helped to push US Gulf coast refining margins up by more than $2/bl in March. With the US now one of the worst affected countries by coronavirus, a sharp drop in demand is inevitable, although reduced refinery throughputs could keep margins supported to some extent.

Refining margins					*$/bl*
	Feb	Mar	Apr	May	Jun
Northwest Europe					
vs North Sea Dated	-1.01	-0.41	1.40	1.00	0.90
vs Urals	-0.05	3.24	6.80	4.60	4.70
Mediterranean					
vs Urals	0.30	3.22	6.70	5.20	5.20
vs CPC Blend	2.46	5.36	8.10	3.50	3.30
US Gulf coast					
vs LLS	3.95	6.13	10.20	7.10	6.40
vs WTI (Houston)	6.32	5.99	8.60	8.60	7.70
vs Mars	1.27	2.95	5.80	5.90	5.80
Singapore					
vs Dubai	1.17	1.18	1.20	2.30	1.80
vs ESPO Blend	3.13	0.47	0.60	2.40	1.40

Margins calculated based on FCC unit yields

Forecast crude prices															$/bl
	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	1Q22	2Q22	3Q22	4Q22	2022
Ice Brent	51.00	21.20	22.80	27.80	**30.70**	33.80	38.10	42.20	44.50	**39.60**	45.20	46.40	48.00	49.70	**47.30**
Nymex WTI	46.20	16.50	17.30	22.30	**25.60**	27.80	32.10	36.20	38.50	**33.60**	39.20	40.40	42.00	43.70	**41.30**
North Sea Dated	50.20	19.00	22.10	27.30	**29.70**	33.30	37.60	41.70	44.00	**39.10**	44.70	45.90	47.50	49.20	**46.80**
Urals NWE	47.90	15.20	20.10	25.50	**27.20**	32.00	36.30	40.60	42.90	**38.00**	44.10	44.80	46.40	48.60	**46.00**
Urals Med	49.20	16.00	20.80	26.10	**28.00**	32.30	36.70	41.10	43.40	**38.40**	44.40	45.20	46.90	49.10	**46.40**
CPC Blend	47.80	15.60	20.20	25.20	**27.20**	32.20	36.30	40.40	42.60	**37.90**	43.70	44.60	46.30	48.10	**45.70**
Bonny Light	51.40	16.60	21.50	26.70	**29.10**	35.10	39.20	43.10	45.40	**40.70**	46.60	47.60	49.10	50.80	**48.50**
Dalia	50.50	15.30	20.10	24.10	**27.50**	35.20	38.60	43.30	45.20	**40.60**	47.70	47.70	49.80	51.40	**49.10**
WTI Midland	46.00	13.20	16.30	21.70	**24.30**	29.80	33.70	37.10	39.40	**35.00**	41.10	41.80	42.80	44.50	**42.50**
WTI Houston	48.30	15.30	18.50	23.90	**26.50**	32.10	35.90	39.40	41.60	**37.30**	43.30	44.00	45.00	46.70	**44.80**
LLS	48.10	14.90	18.80	24.20	**26.50**	32.70	37.90	40.60	43.30	**38.60**	44.20	46.30	46.60	48.70	**46.50**
Mars	46.10	14.50	17.70	23.20	**25.40**	29.90	34.90	38.10	40.60	**35.90**	41.50	42.80	43.20	45.60	**43.30**
WCS Hardistry	29.10	1.80	1.50	5.10	**9.40**	15.70	21.80	22.80	24.10	**21.10**	28.10	30.40	28.70	30.10	**29.30**
WCS Houston	41.60	10.00	13.50	19.20	**21.10**	24.30	29.40	33.30	36.30	**30.80**	35.80	37.30	38.40	41.30	**38.20**
Dubai	50.70	20.70	23.40	29.00	**30.90**	32.50	37.00	40.80	43.30	**38.40**	45.00	46.20	47.30	49.60	**47.00**
Murban	52.90	22.90	24.30	30.20	**32.60**	34.90	39.30	43.00	45.20	**40.60**	47.30	48.40	49.50	51.40	**49.10**
ESPO Blend	55.00	22.90	24.90	30.40	**33.30**	36.90	40.50	44.30	47.30	**42.30**	48.40	48.80	50.10	52.70	**50.00**

Forecast crude differentials															$/bl
	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	1Q22	2Q22	3Q22	4Q22	2022
Ice Brent vs N Sea Dated	0.80	2.20	0.70	0.50	**1.00**	0.50	0.50	0.50	0.50	**0.50**	0.50	0.50	0.50	0.50	**0.50**
Urals NWE vs N Sea Dated	-2.30	-3.80	-2.00	-1.90	**-2.50**	-1.30	-1.30	-1.10	-1.00	**-1.20**	-0.70	-1.00	-1.10	-0.60	**-0.80**
Urals Med vs Urals NWE	1.30	0.80	0.70	0.60	**0.80**	0.40	0.40	0.50	0.50	**0.40**	0.40	0.40	0.50	0.50	**0.40**
Urals Med vs N Sea Dated	-1.00	-3.00	-1.30	-1.30	**-1.70**	-0.90	-0.90	-0.60	-0.60	**-0.80**	-0.30	-0.70	-0.60	-0.10	**-0.40**
CPC Blend vs N Sea Dated	-2.30	-3.40	-1.90	-2.10	**-2.40**	-1.10	-1.30	-1.30	-1.30	**-1.30**	-1.00	-1.30	-1.30	-1.10	**-1.20**
Bonny Light vs N Sea Dated	1.20	-2.40	-0.60	-0.70	**-0.60**	1.80	1.60	1.40	1.40	**1.60**	1.90	1.70	1.60	1.60	**1.70**
Dalia vs North Sea Dated	0.30	-3.70	-2.00	-3.20	**-2.20**	1.90	1.00	1.60	1.20	**1.50**	3.00	1.80	2.30	2.20	**2.30**
Nymex WTI vs Ice Brent	-4.80	-4.70	-5.50	-5.50	**-5.10**	-6.00	-6.00	-6.00	-6.00	**-6.00**	-6.00	-6.00	-6.00	-6.00	**-6.00**
WTI Midland vs Nymex WTI	-0.20	-3.30	-1.00	-0.60	**-1.30**	2.10	1.60	0.90	1.00	**1.40**	1.80	1.40	0.70	0.80	**1.20**
WTI Houston vs Nymex WTI	2.10	-1.20	1.20	1.60	**0.90**	4.30	3.80	3.20	3.20	**3.60**	4.10	3.60	2.90	3.00	**3.40**
LLS vs Nymex WTI	2.00	-1.60	1.50	1.90	**0.90**	4.90	5.80	4.40	4.80	**5.00**	5.00	6.00	4.60	5.00	**5.10**
LLS vs Mars	2.00	0.40	1.20	1.00	**1.10**	2.70	3.00	2.50	2.70	**2.70**	2.70	3.50	3.40	3.10	**3.20**
Mars vs Nymex WTI	0.00	-2.00	0.40	0.90	**-0.20**	2.20	2.80	1.90	2.10	**2.20**	2.30	2.40	1.20	1.90	**1.90**
WCS Hardistry vs Nymex WTI	-17.10	-14.70	-15.80	-17.20	**-16.20**	-12.10	-10.30	-13.40	-14.40	**-12.50**	-11.10	-10.00	-13.30	-13.60	**-12.00**
WCS Houston vs Nymex WTI	-4.60	-6.50	-3.80	-3.10	**-4.50**	-3.50	-2.70	-2.90	-2.20	**-2.80**	-3.40	-3.10	-3.60	-2.40	**-3.10**
Dubai vs Ice Brent	-0.20	-0.40	0.60	1.10	**0.30**	-1.30	-1.10	-1.40	-1.20	**-1.20**	-0.20	-0.10	-0.70	-0.20	**-0.30**
Murban vs Ice Brent	1.90	1.70	1.50	2.40	**1.90**	1.10	1.20	0.80	0.70	**1.00**	2.10	2.00	1.50	1.70	**1.80**
ESPO Blend vs Dubai	4.30	2.10	1.50	1.40	**2.30**	4.50	3.50	3.50	4.10	**3.90**	3.40	2.60	2.80	3.10	**3.00**

Product prices															$/bl
	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	1Q22	2Q22	3Q22	4Q22	2022
Northwest Europe															
Propane	26.20	9.80	9.90	14.50	**15.10**	18.10	19.10	22.10	26.10	**21.30**	25.10	21.60	23.50	27.00	**24.30**
Butane	34.80	12.20	12.40	18.00	**19.40**	23.30	23.70	28.40	33.30	**27.20**	32.80	27.30	30.80	35.10	**31.50**
Naphtha 65 para	46.00	17.20	18.00	24.40	**26.40**	31.40	34.10	38.10	41.70	**36.30**	42.10	41.20	42.70	46.10	**43.00**
95R gasoline	54.50	24.00	29.00	31.60	**34.80**	40.40	48.60	52.30	50.50	**47.90**	52.40	57.70	58.90	56.30	**56.30**
Jet-kerosine	60.20	25.40	31.10	37.40	**38.50**	46.60	49.70	54.60	57.60	**52.10**	58.00	57.90	60.40	62.90	**59.80**
10ppm diesel	62.20	30.10	31.60	37.40	**40.30**	46.30	50.30	55.00	57.70	**52.30**	57.90	58.70	60.90	63.10	**60.10**
50ppm heating oil	61.70	27.20	31.80	37.70	**39.60**	46.50	50.20	54.90	57.60	**52.30**	57.70	58.20	60.50	62.60	**59.70**
LSFO (1% sul)	53.00	17.70	24.10	29.80	**31.10**	35.90	40.10	44.20	46.40	**41.60**	46.70	47.70	49.40	51.00	**48.70**
HSFO (3.5% sul)	33.60	12.80	12.90	17.70	**19.20**	21.90	26.90	31.70	34.00	**28.60**	32.40	34.30	36.60	38.40	**35.40**
Mediterranean															
Propane	25.60	9.60	9.60	14.20	**14.80**	18.30	19.20	22.20	26.40	**21.50**	25.50	21.70	23.70	27.40	**24.60**
Butane	38.40	13.30	13.50	19.50	**21.20**	25.10	25.60	30.20	35.30	**29.00**	35.40	29.50	32.80	37.20	**33.70**
Naphtha 65 para	44.30	15.70	16.20	22.60	**24.70**	29.20	32.20	36.50	39.60	**34.40**	39.90	39.20	41.00	44.00	**41.00**
95R gasoline	55.20	24.50	29.50	31.90	**35.20**	39.10	47.80	51.40	50.00	**47.10**	51.20	56.90	58.10	55.80	**55.50**
Jet-kerosine	58.20	23.70	29.50	35.60	**36.80**	45.50	48.60	53.70	56.60	**51.10**	56.90	56.90	59.50	61.80	**58.80**
10ppm diesel	62.00	30.00	31.70	36.90	**40.20**	46.90	50.80	55.50	57.70	**52.70**	58.40	59.20	61.40	63.10	**60.50**
1,000ppm heating oil	61.70	27.20	31.80	37.70	**39.60**	46.50	50.20	54.90	57.60	**52.30**	57.70	58.20	60.50	62.60	**59.70**
LSFO (1% sul)	55.10	19.50	25.80	31.80	**33.00**	37.30	41.10	45.00	47.50	**42.80**	48.20	48.80	50.30	52.30	**49.90**
HSFO (3.5% sul)	35.80	14.50	15.30	19.60	**21.30**	24.00	28.60	34.20	36.10	**30.70**	34.20	35.70	38.80	40.30	**37.30**
US Gulf coast															
Propane	15.80	3.40	3.30	7.30	**7.40**	10.90	10.90	13.40	17.50	**13.20**	16.80	13.10	14.90	18.20	**15.70**
Butane	24.20	4.20	4.10	9.20	**10.40**	13.20	13.20	16.60	21.80	**16.20**	20.60	15.80	18.50	23.10	**19.50**
Naphtha	45.80	18.30	19.10	25.10	**27.10**	33.90	36.70	40.40	42.70	**38.40**	44.70	43.80	45.00	47.10	**45.20**
87 conv gasoline	55.70	26.50	31.10	31.40	**36.10**	43.00	53.00	56.00	51.60	**50.90**	54.50	61.30	62.00	57.00	**58.70**
Jet-kerosine	59.20	24.80	31.50	36.80	**38.10**	46.10	49.20	54.90	57.20	**51.90**	57.50	57.40	60.80	62.40	**59.50**
10ppm diesel	62.70	32.90	35.20	39.10	**42.50**	47.10	50.80	55.70	58.20	**53.00**	58.70	59.20	61.60	63.60	**60.80**
2,000ppm heating oil	57.80	27.70	30.10	34.60	**37.50**	41.70	45.20	50.10	53.30	**47.60**	53.00	53.40	55.80	58.40	**55.10**
LSFO	54.60	18.10	25.60	31.10	**32.40**	37.20	39.70	45.40	46.90	**42.30**	48.00	47.30	50.50	51.50	**49.30**
HSFO (No 6 / 3% sul)	36.30	15.10	15.40	20.60	**21.90**	24.00	27.90	32.00	35.30	**29.80**	34.50	35.30	37.00	39.70	**36.60**
Singapore															
Propane	32.00	14.00	13.80	18.70	**19.60**	21.50	21.60	24.20	28.60	**24.00**	27.30	23.50	25.10	28.70	**26.10**
Butane	40.30	17.30	17.00	22.50	**24.30**	27.10	27.00	30.60	35.20	**29.90**	34.50	29.30	31.40	35.40	**32.60**
Naphtha	48.90	19.50	20.30	26.90	**28.90**	32.10	34.80	38.20	42.30	**36.80**	42.90	41.80	42.70	46.70	**43.50**
Naphtha Japan c+f	49.60	20.40	20.80	27.50	**29.60**	32.90	35.70	39.50	43.50	**37.90**	43.70	42.80	44.10	47.90	**44.60**
95R gasoline	57.30	24.90	29.40	35.00	**36.60**	41.10	48.50	52.10	51.10	**48.20**	53.30	57.60	58.70	57.00	**56.60**
Jet-kerosine	59.30	23.90	29.00	35.60	**37.00**	46.20	49.30	53.80	57.00	**51.60**	57.50	57.30	59.30	62.00	**59.10**
10ppm diesel	62.60	30.00	31.30	37.10	**40.20**	46.10	49.90	54.30	56.90	**51.80**	57.50	58.10	60.00	62.10	**59.50**
500ppm gasoil	61.70	29.00	30.00	36.10	**39.20**	45.20	48.80	53.00	55.90	**50.70**	56.50	57.00	58.70	61.00	**58.30**
HSFO 180cst	43.40	22.90	21.80	27.80	**29.00**	29.70	34.10	37.20	41.80	**35.70**	40.50	41.80	42.50	46.50	**42.80**
HSFO 380cst	41.90	21.40	20.70	26.80	**27.70**	28.90	33.00	36.50	41.20	**34.90**	39.70	40.60	41.70	45.80	**41.90**

Product crack spreads															$/bl
	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	1Q22	2Q22	3Q22	4Q22	2022
Northwest Europe vs North Sea Dated															
Propane	-24.00	-9.20	-12.20	-12.80	**-14.60**	-15.20	-18.50	-19.60	-17.90	**-17.80**	-19.60	-24.30	-24.00	-22.20	**-22.50**
Butane	-15.30	-6.80	-9.70	-9.30	**-10.30**	-10.00	-13.90	-13.30	-10.60	**-11.90**	-12.00	-18.60	-16.70	-14.10	**-15.30**
Naphtha 65 para	-4.10	-1.80	-4.10	-2.90	**-3.20**	-1.90	-3.50	-3.60	-2.30	**-2.80**	-2.60	-4.70	-4.90	-3.10	**-3.80**
95R gasoline	4.30	5.00	6.90	4.20	**5.10**	7.10	11.00	10.60	6.50	**8.80**	7.60	11.80	11.30	7.00	**9.50**
Jet-kerosine	10.00	6.40	9.00	10.00	**8.90**	13.30	12.10	12.90	13.70	**13.00**	13.30	12.10	12.90	13.70	**13.00**
10ppm diesel	12.00	11.10	9.50	10.10	**10.70**	13.00	12.70	13.30	13.70	**13.20**	13.10	12.80	13.40	13.80	**13.30**
50ppm heating oil	11.50	8.20	9.70	10.30	**9.90**	13.20	12.60	13.20	13.70	**13.20**	13.00	12.30	12.90	13.40	**12.90**
LSFO (1% sul)	2.80	-1.30	1.90	2.50	**1.50**	2.60	2.50	2.50	2.40	**2.50**	1.90	1.80	1.90	1.80	**1.90**
HSFO (3.5% sul)	-16.60	-6.20	-9.20	-9.60	**-10.40**	-11.30	-10.70	-10.00	-10.00	**-10.50**	-12.30	-11.60	-10.90	-10.80	**-11.40**
Mediterranean vs Urals															
Propane	-23.50	-6.40	-11.20	-11.90	**-13.20**	-14.00	-17.40	-18.90	-17.00	**-16.80**	-18.90	-23.40	-23.20	-21.70	**-21.80**
Butane	-10.70	-2.70	-7.20	-6.60	**-6.80**	-7.20	-11.10	-10.90	-8.10	**-9.30**	-9.00	-15.70	-14.10	-11.90	**-12.70**
Naphtha 65 para	-4.90	-0.30	-4.60	-3.50	**-3.30**	-3.10	-4.40	-4.60	-3.80	**-4.00**	-4.50	-5.90	-5.90	-5.10	**-5.40**
95R gasoline	6.00	8.50	8.70	5.80	**7.20**	6.80	11.10	10.30	6.60	**8.70**	6.80	11.80	11.20	6.70	**9.10**
Jet-kerosine	9.10	7.70	8.70	9.50	**8.80**	13.20	12.00	12.60	13.20	**12.80**	12.50	11.70	12.60	12.70	**12.40**
10ppm diesel	12.80	14.00	10.90	10.90	**12.20**	14.50	14.20	14.40	14.30	**14.40**	14.00	14.00	14.50	14.00	**14.10**
1,000ppm heating oil	12.50	11.20	11.00	11.60	**11.60**	14.20	13.50	13.80	14.20	**13.90**	13.30	13.00	13.60	13.50	**13.30**
LSFO (1% sul)	5.90	3.50	5.00	5.80	**5.00**	5.00	4.50	3.90	4.10	**4.40**	3.80	3.70	3.40	3.20	**3.50**
HSFO (3.5% sul)	-13.30	-1.50	-5.40	-6.50	**-6.70**	-8.30	-8.10	-6.90	-7.30	**-7.70**	-10.20	-9.40	-8.10	-8.80	**-9.10**
US Gulf coast vs LLS															
Propane	-32.40	-11.50	-15.60	-16.90	**-19.10**	-21.80	-27.00	-27.20	-25.80	**-25.40**	-27.40	-33.20	-31.80	-30.50	**-30.70**
Butane	-24.00	-10.60	-14.80	-15.00	**-16.10**	-19.40	-24.70	-24.00	-21.50	**-22.40**	-23.70	-30.50	-28.10	-25.70	**-27.00**
Naphtha	-2.30	3.40	0.20	0.90	**0.50**	1.20	-1.20	-0.10	-0.60	**-0.20**	0.40	-2.50	-1.60	-1.60	**-1.30**
87 conv gasoline	7.60	11.60	12.20	7.20	**9.60**	10.40	15.00	15.50	8.30	**12.30**	10.30	15.00	15.40	8.20	**12.20**
Jet-kerosine	11.10	9.90	12.70	12.60	**11.60**	13.50	11.30	14.30	13.90	**13.30**	13.30	11.00	14.10	13.60	**13.00**
10ppm diesel	14.50	18.00	16.40	14.90	**16.00**	14.50	12.90	15.10	14.90	**14.40**	14.50	12.90	15.00	14.90	**14.30**
2,000ppm heating oil	9.70	12.80	11.30	10.40	**11.00**	9.00	7.30	9.60	10.00	**9.00**	8.80	7.00	9.20	9.70	**8.70**
LSFO	6.50	3.20	6.80	6.90	**5.90**	4.60	1.80	4.80	3.60	**3.70**	3.80	1.00	3.90	2.80	**2.90**
HSFO (No 6 / 3% sul)	-11.80	0.30	-3.40	-3.60	**-4.60**	-8.70	-10.00	-8.60	-8.00	**-8.80**	-9.70	-11.00	-9.70	-9.00	**-9.80**
Singapore vs Dubai															
Propane	-18.70	-6.70	-9.60	-10.30	**-11.30**	-10.90	-15.50	-16.50	-14.60	**-14.40**	-17.70	-22.70	-22.30	-20.90	**-20.90**
Butane	-10.40	-3.40	-6.40	-6.40	**-6.70**	-5.40	-10.10	-10.20	-8.10	**-8.40**	-10.50	-16.90	-16.00	-14.10	**-14.40**
Naphtha	-1.90	-1.20	-3.10	-2.10	**-2.10**	-0.40	-2.20	-2.60	-1.00	**-1.60**	-2.20	-4.40	-4.60	-2.90	**-3.50**
Naphtha Japan c+f	-1.10	-0.30	-2.50	-1.50	**-1.40**	0.40	-1.30	-1.30	0.20	**-0.50**	-1.40	-3.40	-3.30	-1.60	**-2.40**
95R gasoline	6.60	4.10	6.10	6.00	**5.70**	8.70	11.50	11.30	7.80	**9.80**	8.30	11.40	11.30	7.40	**9.60**
Jet-kerosine	8.50	3.20	5.60	6.70	**6.00**	13.80	12.20	13.00	13.80	**13.20**	12.50	11.10	12.00	12.50	**12.00**
10ppm diesel	11.90	9.30	7.90	8.10	**9.30**	13.70	12.90	13.50	13.60	**13.40**	12.50	11.90	12.70	12.50	**12.40**
500ppm gasoil	11.00	8.30	6.70	7.10	**8.30**	12.70	11.80	12.20	12.60	**12.30**	11.50	10.80	11.40	11.50	**11.30**
HSFO 180cst	-7.40	2.10	-1.60	-1.10	**-2.00**	-2.80	-3.00	-3.50	-1.40	**-2.70**	-4.50	-4.50	-4.90	-3.00	**-4.20**
HSFO 380cst	-8.80	0.70	-2.70	-2.20	**-3.20**	-3.50	-4.00	-4.20	-2.10	**-3.50**	-5.40	-5.70	-5.70	-3.70	**-5.10**

Refining margins															$/bl
	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	1Q22	2Q22	3Q22	4Q22	2022
Northwest Europe															
vs North Sea Dated	-1.00	1.10	1.00	0.40	**0.40**	2.40	3.10	3.30	2.40	**2.80**	2.10	2.60	2.90	2.00	**2.40**
vs Urals	0.70	5.30	3.00	2.30	**2.80**	3.30	4.00	4.10	3.30	**3.70**	2.30	3.40	3.80	2.50	**3.00**
Mediterranean															
vs Urals	0.70	5.70	3.70	2.80	**3.20**	3.80	4.50	4.70	3.80	**4.20**	2.80	3.80	4.40	2.90	**3.50**
vs CPC Blend	3.10	5.00	4.10	3.90	**4.00**	4.70	5.00	5.20	4.80	**4.90**	4.00	4.30	4.60	4.00	**4.20**
US Gulf coast															
vs LLS	4.30	7.90	7.70	5.80	**6.40**	5.70	5.70	7.20	5.10	**5.90**	5.00	4.90	6.50	4.40	**5.20**
vs WTI (Houston)	6.10	8.30	9.00	7.20	**7.70**	5.70	7.10	7.90	6.10	**6.70**	5.50	6.80	7.70	5.80	**6.50**
vs Mars	0.50	5.80	5.10	3.60	**3.80**	4.00	3.90	4.80	3.60	**4.00**	3.20	3.40	4.80	3.20	**3.60**
Singapore															
vs Dubai	0.70	1.80	1.20	1.60	**1.30**	4.20	4.00	4.10	4.20	**4.10**	2.70	2.50	2.80	2.70	**2.70**
vs ESPO Blend	2.30	1.40	2.20	2.10	**2.00**	3.00	3.80	4.00	2.90	**3.40**	2.60	3.20	3.40	2.30	**2.90**

Margins calculated based on FCC unit yields

Argus *Crude and Refined Products Outlook* is published by Argus Media group

Registered office
Lacon House, 84 Theobald's Road,
London, WC1X 8NL
Tel: +44 20 7780 4200

ISSN: 2515-771X

Publisher
Adrian Binks

Chief operating officer
Matthew Burkley

Global compliance officer
Jeffrey Amos

Chief commercial officer
Jo Loudiadis

SVP Consulting services
Lloyd Thomas

SVP Consulting Americas
Kristine Klavers

Head of forecasting
Francis Osborne

Senior Analyst
Martha Tallas
Tel: +44 20 7780 4200
martha.tallas@argusmedia.com

Customer support and sales:
support@argusmedia.com
sales@argusmedia.com

London, UK
Tel: +44 20 7780 4200
Nur-Sultan, Kazakhstan
Tel: +7 7172 72 92 94
Beijing, China Tel: +86 10 8535 7688
Dubai Tel: +971 4434 5112
Moscow, Russia Tel: +7 495 933 7571
Sao Paulo, Brazil
Tel: +55 11 3235 2700
Singapore Tel: +65 6496 9966
Tokyo, Japan Tel: +81 3 3561 1805
Argus Media Inc, Houston, US
Tel: +1 713 968 0000
Argus Media Inc, New York, US
Tel: +1 646 376 6130