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Argus Biofuels Outlook

Overview

US D4 and D6 RIN prices fell sharply at the end of January and went as low as ¢52/RIN, the lowest level in four years, bringing the Argus Renewable Volume Obligation (RVO) figures to ¢8/USG, also unseen since November 2020, and much lower than the ¢21/USG noted in January 2023. We expect RIN prices will not fluctuate much during most of this year as none of the market fundamentals that could provide further support are expected to change in the short term. Following continued weakness through December, UCO, tallow, and corn oil were relatively flat through January while soybean oil prices continued to weaken. Brazilian soybean oil demand for biodiesel fell in December, but activity should pick up in March as the country's mandatory biodiesel blend goes up to 14pc.

In Europe, biodiesel prices held broadly steady for most grades during January, while HVO prices fell 8-11pc on the month and hit multi-year lows. As feedstock prices are understood to have reached a floor owing to rising collection costs, European Ucome and HVO production could slow in the next few months, tightening supplies of both products and providing support to prices.

Chinese UCO prices firmed in January, and the January differential between Ucome and UCO fob China narrowed to $160/t, indicating Ucome producers will have to push offers higher. But the EU investigations into Chinese and Indonesian biodiesel continue, and with higher freight rates from Asia to Europe weighing on the supply chain, imports from Asia to Europe are likely to remain low in the coming months.

Key biofuel prices, prompt

	Dec 23	Jan 24	Feb 24e	Mar 24e
Europe				*$/t*
RED FAME 0°C CFPP fob ARA	1,048	1,072	1,079	1,109
RED Rapeseed OME fob ARA	1,190	1,198	1,169	1,199
RED UCOME fob ARA	1,283	1,283	1,263	1,295
RED HVO fob ARA (Class I)	1,770	1,572	1,532	1,584
RED HVO fob ARA (Class II)	1,845	1,702	1,667	1,730
SAF fob ARA (Class II)	2,864	2,801	2,771	2,760
Bionaphtha fob ARA	1,798	1,770	1,745	1,788
UCO cif ARA	855	918	903	926
Ethanol Regular fob ARA	829	837	875	879
US (biofuels)				*¢/USG*
Ethanol Chicago	165	159	168	177
Ethanol USGC	181	173	182	190
B100 SME Chicago	459	447	404	410
R100 (UCO) del California	597	581	543	539
US feedstocks (US Gulf coast del rail)				*¢/lb*
Soybean oil crude degummed	53	49	47	47
Tallow bleached fancy	45	41	42	41
UCO	41	39	39	39
South America				*$/t*
Anhydrous fob Santos	626	583	661	668
Asia-Pacific				*$/t*
RED HVO Class II fob Singapore	1,764	1,593	1,555	1,619
UCO fob China	808	818	814	837
RED Ucome fob China	982	977	1,007	1,018

EUROPE

Summary

This month
European biodiesel and hydrotreated vegetable oil (HVO) prices moved in divergent directions through January as prices were directed by the market's reaction to tensions in the Red Sea and weak product demand. All biodiesel grades were flat or gained on the month, but daily prices fell in the latter half of the month despite firmer diesel prices. HVO markets were persistently weak through the month, down 8-11pc from December, with HVO Class II regaining a premium to other grades.

Next month
Average biodiesel and HVO prices are expected to weaken in February as prices continue to recover from losses at the end of January. HVO Class IV is now competitive against HBE-Gs to meet compliance in the Dutch market, indicating demand for physical volumes will start firming up as demand and pricing pressure from oversupplied ticket markets weakens.

3-6 months ahead
European biodiesel supplies are expected to tighten later in the year, as weak prices in the first quarter will keep arbitrage for imports closed. European used cooking oil methyl ester (Ucome) producers are slowing production amid high used cooking oil (UCO) costs, which will further tighten supplies through the second quarter. The higher blending targets set in the Netherlands will result in carried-over HBE-Gs being used up and physical volume demand for HVO will rise as a result.

6-12 months forward
Sustainable aviation fuel (SAF) premiums to jet fuel are expected to weaken through the year but at a slower pace than previously expected as upcoming capacity is pushed back into 2025. Ethanol demand is expected to peak over the summer, but outright volumes will be 10pc lower than 2023 as weaker gasoline demand weighs on the blending component.

Regulation

EU circumvention investigations continue
The European Commission has announced it is continuing its investigation into alleged circumvention of EU trade measures against Indonesian biodiesel despite the European Biodiesel Board (EBB) withdrawing its original request from July 2023 for the matter to be looked into. The EBB has decided to withdraw the complaint as biodiesel exports from the Chinese island of Hainan had stopped since the inquiry was launched.

The commission has stated there is no obligation for investigation to end following the withdrawal, and imports remain subject to registration until the investigation concludes no later than 17 May.

This is unrelated to the separate anti-dumping investigation against Chinese-origin biodiesel instigated on 20 December, which is ongoing.

Germany's unrestricted HVO100 sales set for delays
The German government introduced legislation in June 2023 approving free HVO100 sales starting in April this year. However, unrestricted sales at public gas stations are not allowed until the planned changes are fully implemented into the 10th BImSchV, the Federal Emissions Control Act, and approved by the parliament. The next opportunity to approve the final changes is unlikely to be earlier than 7 March, and market participants say an implementation by 13 April is now unlikely.

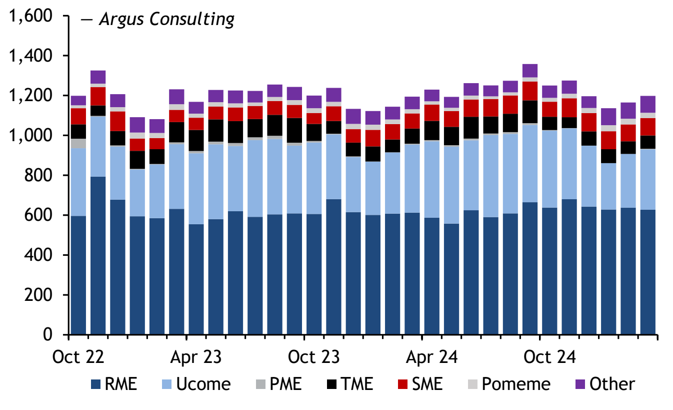
Demand

Biodiesel

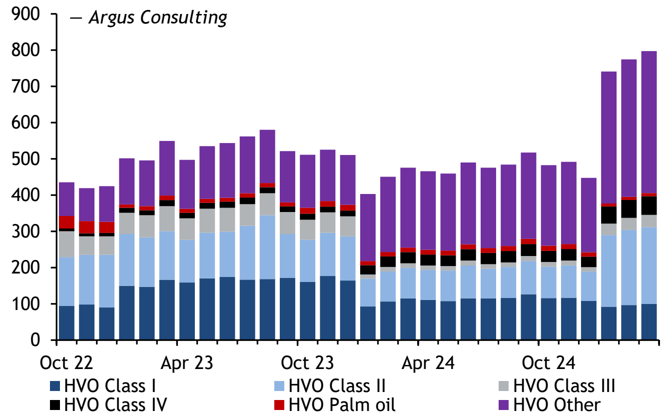
November consumption reflects specification change
Accounting for the latest data from the majority of European countries, biodiesel consumption in November was up 3.2pc on the previous month at 1.24bn litres, as fuel suppliers switched to grades suitable for winter blending. Owing to its beneficial CFPP, rapeseed oil methyl ester (RME) demand rose 12pc to 680mn litres, replacing lower volumes of Ucome, which fell 9.3pc to 325mn litres, and tallow methyl ester (TME), which fell 25pc to 64mn litres. Demand will have weakened in December, down 8.5pc to 1.13bn litres owing to weaker diesel demand, and we expect this will primarily pressure RME and Ucome volumes, down 65mn litres and 50mn litres.

Demand is also estimated to have weakened a further 0.9pc in January, but standing at 1.12bn litres, this is up on the previous three years. Volumes are still down compared with January 2019 and 2020, but European consumption of single-

European biodiesel demand *mn litres*



European HVO demand *mn litres*



counted palm methyl ester and soybean oil methyl ester has fallen in favour of double-counted products calling on lower physical volumes.

Italy's consumption drops ahead of winter

Despite total European consumption rising in November, Italian biodiesel consumption fell 24pc to 113mn litres, owing to Italy's biodiesel mix being dominated by double-counted grades, so consumed volumes fall during colder months, and we expect Italian biodiesel consumption will have fallen a further 36pc to 73mn litres in December. Monthly consumption is unlikely to rebound from this level in the first half of this year, but we forecast biodiesel consumption to peak at 100mn litres in October.

Ireland hits record biodiesel consumption in December

Irish biodiesel consumption rose to an all-time high of 23mn litres in December, a 54pc rise from November. This brought Irish consumption to 192mn litres in 2023, but this is down 17pc on 2022 as HVO accounted for a higher share of the diesel pool last year. Owing to Ireland's significant year-on-year increase for its blending mandate, now at 21pc from 17pc for 2023, we expect Irish biodiesel demand increased to 25mn litres in January, and we forecast total consumption at 349mn litres this year.

HVO

German HVO demand set to recover

European HVO consumption rose in November, up 2.7pc to 525mn litres, which we attribute to HVO Class I consumption rising 10pc to 177mn litres on higher demand in France and Germany, while other grades posted little change.

The rise in Germany's November 2023 HVO consumption reflects a sharp rise in road fuel demand closer to levels last seen at the start of the summer. But it is clear that HVO demand in the country is still pressured by a high carryover of compliance tickets, and we have adjusted our short-term forecast to reflect lower demand for physical volumes. Our current expectation for German HVO demand is closer to 90mn litres in December and January — 15-20pc lower than what would have been forecast if greenhouse gas reduction certificates were not in place. But as the ticket situation has started to ease, we foresee German HVO consumption will recover in February, particularly as HVO prices have returned to competitive levels.

Maintenance pressures Portuguese consumption

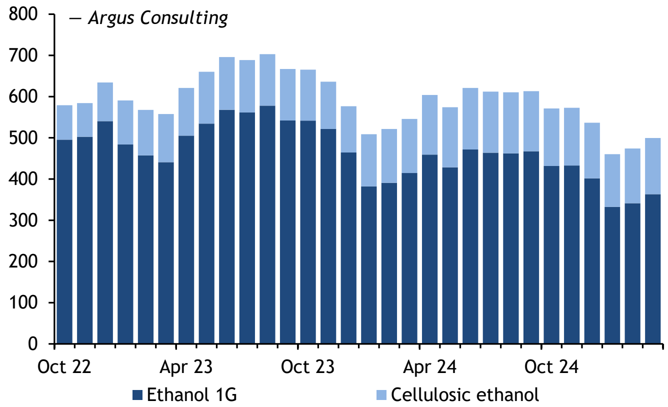
According to regulator Ense, Portuguese HVO consumption was 111,000 litres in November, a sharp decline from 13mn litres in the previous month and the lowest monthly volume in the previous four years, but we do not expect this to reflect any change in market dynamics. Volumes in October were the second highest to date in 2023 as Galp increased deliveries to its service stations ahead of launching HVO100 in November. The Sines refinery was then under maintenance for much of November, and so reported deliveries would have fallen as any available product prior to the shutdown was sent out in October.

Ethanol

January demand to decline on the year

European ethanol consumption declined in November, down 4.4pc to 636mn litres and we expect demand weakened further to 577mn litres in December tracking typical seasonality over winter. Our expectation for January's consumption is 509mn litres, a further 12pc decline on the previous month and a 14pc decline on the same month in the previous year. Demand is expected to firm up over the first half of the year, peaking at 621mn litres in June, but

European ethanol demand *mn litres*



this remains 11pc lower than June 2023 owing to falling gasoline demand and no shift in market dynamics calling on higher ethanol volumes.

Irish ethanol consumption firms in Q4

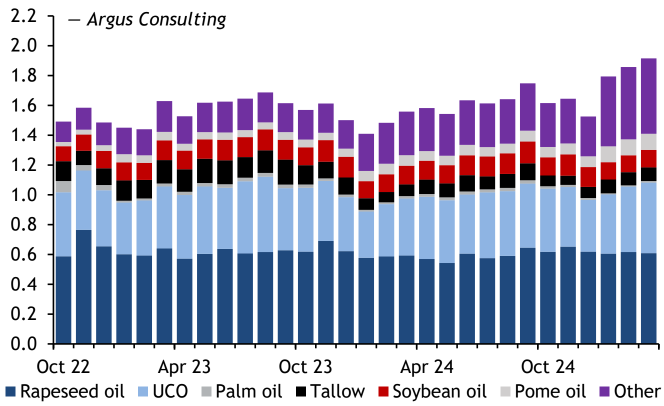
Ireland consumed 6mn litres of ethanol in December, up 54pc on the previous year and relatively flat on the previous two months. This brings total consumption to 64.9mn litres in 2023, a 41pc rise on the previous year owing to the introduction of a 5.5pc gasoline blending target in July 2023. With the target in effect for the entirety of 2024, we expect Irish consumption will rise a further 24pc to 80.4mn litres.

Feedstocks

November feedstock demand favours crops

Following a sharp rise in RME demand in November, we expect Europe's biodiesel and HVO consumption was predominantly met by crop-based feedstocks. Demand for rapeseed oil rose 12pc to 691,000t, the highest monthly volume since November 2022, bringing the total volume of feedstock required to meet European consumption to 1.61mn t, up 2.8pc from October. Demand for UCO is expected to have weakened over the fourth quarter, down 6.2pc to 402,000t in November and a further 10pc to 362,000t in December.

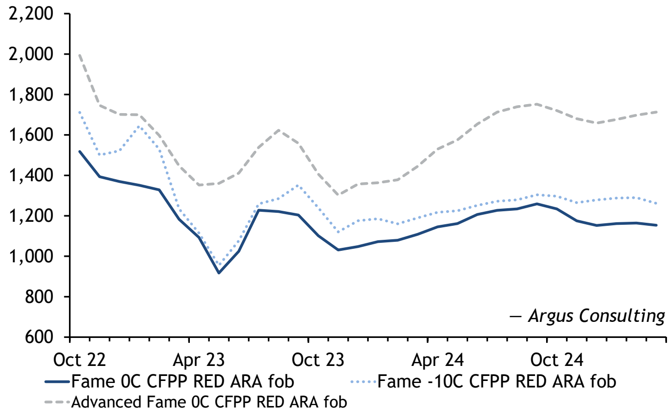
Biodiesel and HVO feedstock demand *mn t*



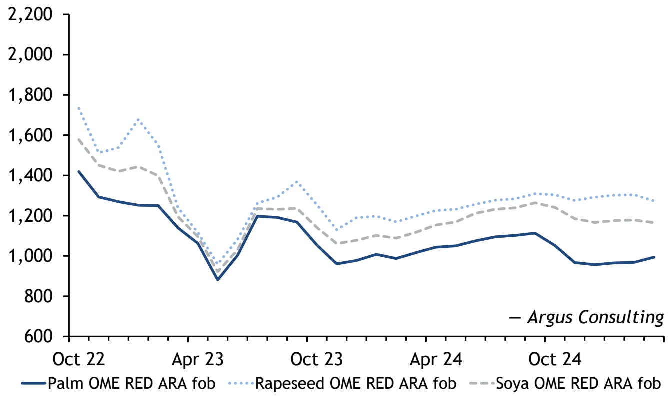
European demand outlook *mn litres*

Product	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	1Q24	2Q24	3Q24	4Q24	1Q25
Biodiesel											
POMEME	24	22	27	26	23	21	71	53	51	68	85
PME	7	3	3	1	1	4	5	22	26	5	3
RME	606	680	615	601	608	612	1,821	1,769	1,863	1,961	1,893
SME	55	74	67	83	77	76	236	246	272	261	262
TME	85	64	69	76	64	76	216	299	292	193	200
UCOME	358	325	276	267	307	341	916	1,120	1,198	1,046	805
Other	63	70	75	68	64	63	195	175	180	187	251
Total	**1,176**	**1,216**	**1,106**	**1,096**	**1,120**	**1,173**	**3,389**	**3,630**	**3,831**	**3,653**	**3,413**
HVO											
HVO Class I	160	177	164	93	106	115	314	334	358	341	288
HVO Class II	116	119	122	77	83	84	244	257	259	257	617
HVO Class III	55	56	55	12	12	13	37	39	39	39	99
HVO Class IV	17	16	16	26	29	31	85	91	95	91	149
HVO Palm oil	17	15	16	11	12	13	36	39	41	40	25
Other	146	142	138	185	208	220	613	655	685	655	1,135
Total	**511**	**525**	**511**	**403**	**451**	**476**	**1,329**	**1,415**	**1,477**	**1,422**	**2,313**
Ethanol											
Ethanol 1G	542	522	464	382	391	415	1,188	1,359	1,394	1,266	1,037
Cellulosic ethanol	124	115	112	127	131	131	388	440	442	415	397
Total	**665**	**636**	**577**	**509**	**521**	**546**	**1,576**	**1,799**	**1,836**	**1,681**	**1,434**
Grand Total	**2,353**	**2,377**	**2,193**	**2,008**	**2,092**	**2,195**	**6,295**	**6,845**	**7,144**	**6,756**	**7,160**

European FAME prices *$/t*



European crop-based biodiesel prices *$/t*



Prices

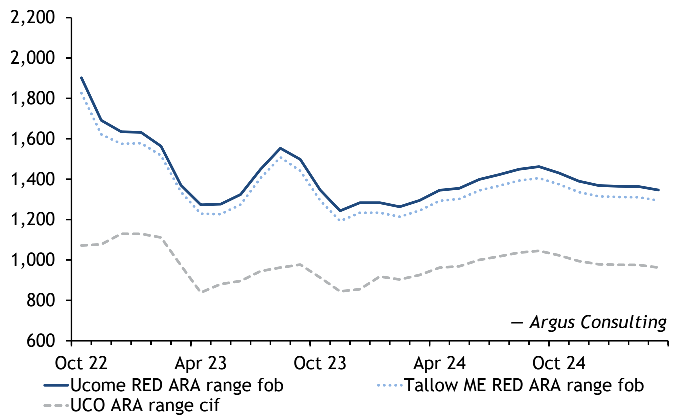
Biodiesel

Prices hold steady in January

European biodiesel prices were at their most stable for over two years in January as averages for most grades rose or fell by 3pc or less on the previous month. Following late December's rally, prices for all grades remained flat into the first three weeks of January, but the impact of tensions in the Red Sea on the European biofuels markets has eased since December and biodiesel prices have come down. Fame 0 prices averaged 3pc higher, at $1,072/t, and prices have remained between $1,070/t and $1,099/t, but ended the month on a lower note closer to $1,030/t.

Ucome and TME averaged $1,283/t and $1,233/t, respectively, unchanged from their December average, and Advanced Fame 0 rose 0.5pc on the month to $1,363/t, as premiums to Ucome were unchanged at $80/t. RME prices rose 0.7pc, tracking the 2.1pc rise in diesel prices and supporting higher prices for other crop-based grades. But RME prices lost some support in the latter part of the month, as crushing volumes in December were at their highest since August 2022, increasing rapeseed oil supply during January. Fame 0 prices held firm and the average spread between the two products tightened to $126/t, which we expect to continue to narrow heading into the summer.

European waste-based biodiesel prices *$/t*



Ucome margins squeezed

Biodiesel premiums to gasoil fell in recent weeks, leading to some slowdown in Ucome production as UCO costs have not declined recently. *Argus* expects the European diesel market will move into oversupply through the second quarter, holding a downward pressure on diesel prices ahead of the summer. But reflecting a tighter market for finished products as production slows in the near future and stocks are drawn down, our current expectation for biodiesel prices is that premiums will widen from current levels as demand recovers in the spring.

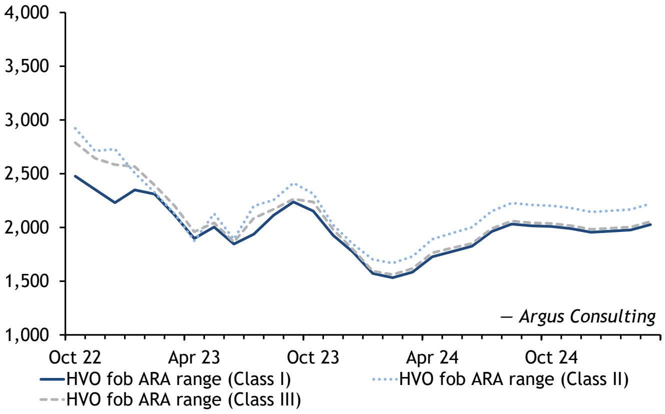
HVO

HVO prices at three-year lows

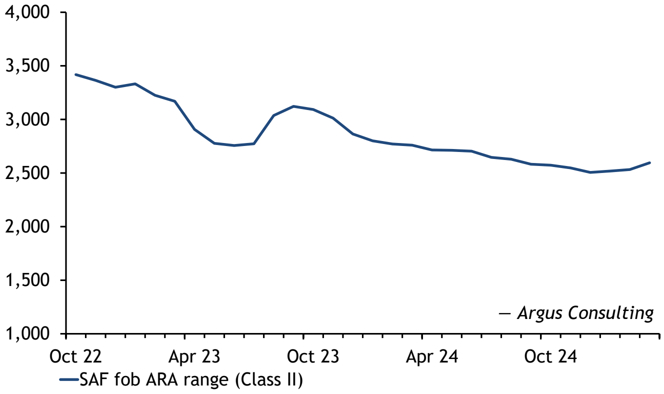
Unfavourable market conditions continued to weigh on HVO prices in January, and prices across all grades declined to levels last reported in late 2020. HVO Class I and III average prices fell 11pc on the previous month to $1,572/t and $1,593/t, respectively. HVO Class II prices held firmer, but still posted an 8pc decline to $1,702/t. Class I and III prices continue to track each other closely, and we expect a steady $30-40/t spread between the two grades over the next few months, with outright prices tracking HVO Class II.

Prices are still expected to pick up in the second quarter ahead of the summer as demand recovers amid potential

European HVO prices *$/t*



European SAF prices *$/t*



supply tightness across Europe. Feedstock prices are understood to have reached a floor owing to rising collection costs, and European HVO production could slow in the next few months against the current backdrop of weak bids for finished product. Imports are unlikely to provide much relief as higher freight rates for Asia-Pacific suppliers will also start weighing on the supply chain.

HVO Class IV competitive against Dutch tickets

Pome oil-based HVO (Class IV) prices have historically held close to HVO Class II, but since early November, they have tracked Class III prices more closely, remaining flat at a $10-15/t premium range to Class III. On a cost basis, this is unsurprising, as Pome oil conversion yields and feedstock prices are more favourable for HVO producers over UCO, tallow, or other vegetable oils. Higher prices for the finished product are instead supported by its Annex IX Part A classification and associated double-counting mechanisms.

Class IV prices are now at their weakest to date, but physical blending of HVO Class IV has become cost-competitive against meeting compliance with HBE-Gs in the Netherlands. This points to HVO Class IV prices recovering later in the year on higher Dutch demand, provided the higher blending targets will mean tickets carried over from 2023 will not be used as far into the year as would be expected if the targets were unchanged.

SAF

SAF premiums fall 6pc

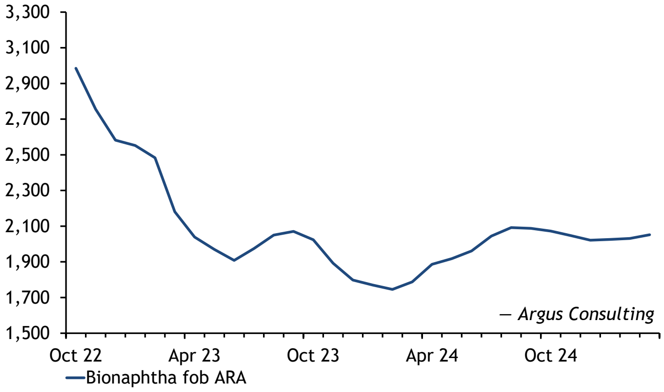
SAF prices fell 2.2pc in January, averaging $2,692/t despite firmer jet prices as SAF premiums to the underlying gasoil contract fell $118/t in mid-January. This was broadly in line with HVO price declines earlier in the week, but premiums have since held flat, and outright prices tracked rising jet prices the rest of the month amid a weak spot market. We continue to forecast weaker SAF prices for the rest of this year, down into the $2,500-2,600/t range by December. But we have softened our expected pace of decline in the first half of the year as Shell's Rotterdam refinery, Europe's largest capacity addition for this year, may not start product deliveries until 2025, when market demand will rise on the back of the 1pc mandatory blend from the ReFuelEU aviation regulation.

Bionaphtha

Bionaphtha-HVO spread inverts

Bionaphtha prices have held firm in recent weeks, reflecting high UCO prices and detaching from trends in the wider hydrotreated product complex. Prices averaged $1,770/t in January, and for the first time since June 2023, the HVO Class II premium over bionaphtha inverted to a discount of $68/t for the month. The bionaphtha to UCO differential tightened to its lowest to date, but as a biofuel more suitable for blending with gasoline, the product was less affected by pricing pressures coming from weak HVO grades.

European bionaphtha prices *$/t*



We do not expect this trend to hold going forward, and the HVO Class II-bionaphtha spread should revert to positive territory by April. Assuming bionaphtha premiums to UCO hold flat, prices are forecast to remain in the $1,750/t to $1,900/t range, but our assumption is that bionaphtha will also get support from a recovery in HVO prices and firm up to the $2,000-2,100/t range for the second half of the year.

Ethanol and ETBE

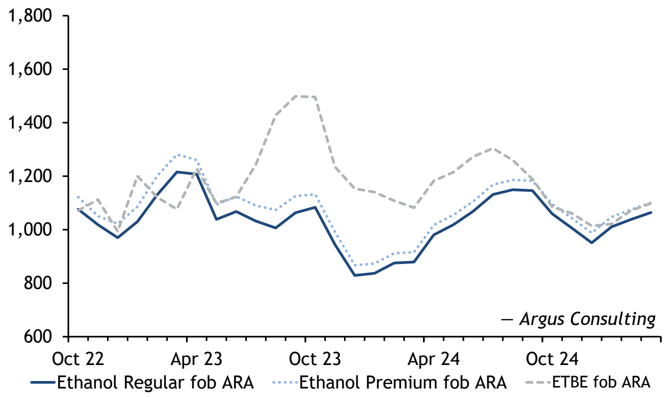
January ethanol prices hold firm

Average prices for regular and premium ethanol grades rose in January, up 0.7pc and 0.9pc on the previous month to $837/t and $873/t, respectively. But the prices did not rise at the same pace as gasoline prices, and the ethanol-gasoline spread tightened to $75/t amid weak European demand.

Prices are forecast to firm through to September, tracking rising gasoline prices, which are set to peak in the third quarter.

ETBE prices were down 1.1pc in January, averaging $1,140/t. *Argus* expects prices will weaken further in the current quarter reflecting low ethanol prices. Once the price spread between ETBE and ethanol narrows, ETBE should firm up and peak at around $1,300/t in the summer.

European ethanol and ETBE prices ***$/t***



European price outlook											***$/t***
Product	**Oct 23**	**Nov 23**	**Dec 23**	**Jan 24**	**Feb 24**	**Mar 24**	**1Q24**	**2Q24**	**3Q24**	**4Q24**	**1Q25**
Crop-based biodiesel											
FAME 0 fob ARA	1,101	1,031	1,048	1,072	1,079	1,109	1,087	1,171	1,240	1,187	1,160
FAME -10 fob ARA	1,240	1,120	1,176	1,186	1,160	1,190	1,178	1,231	1,285	1,280	1,280
Advanced FAME 0 fob ARA	1,406	1,302	1,357	1,363	1,378	1,445	1,395	1,586	1,735	1,686	1,696
PME fob ARA	1,054	961	978	1,008	987	1,017	1,004	1,056	1,103	992	976
RME fob ARA	1,255	1,130	1,190	1,198	1,169	1,199	1,189	1,238	1,290	1,291	1,293
SME fob ARA	1,141	1,061	1,078	1,102	1,088	1,118	1,103	1,178	1,245	1,198	1,173
Waste-based biodiesel											
UCOME fob ARA	1,346	1,243	1,283	1,283	1,263	1,295	1,280	1,366	1,445	1,396	1,358
TME fob ARA	1,294	1,193	1,233	1,233	1,214	1,244	1,231	1,313	1,388	1,342	1,305
UCO cif ARA	913	844	855	918	903	926	916	977	1,033	998	971
HVO											
HVO Class I fob ARA	2,152	1,927	1,770	1,572	1,532	1,584	1,563	1,776	2,003	1,984	1,989
HVO Class II fob ARA	2,314	2,023	1,845	1,702	1,667	1,730	1,700	1,946	2,196	2,176	2,181
HVO Class III fob ARA	2,237	1,980	1,796	1,593	1,561	1,618	1,591	1,808	2,031	2,012	2,017
SAF											
SAF fob ARA	3,092	3,013	2,864	2,801	2,771	2,760	2,777	2,710	2,619	2,542	2,549
Bionaphtha											
Bionaphtha fob ARA	2,024	1,892	1,798	1,770	1,745	1,788	1,768	1,922	2,075	2,047	2,036
Ethanol											
Ethanol Regular fob ARA	1,083	944	829	837	875	879	864	1,023	1,142	1,005	1,038
Ethanol Premium fob ARA	1,132	992	867	873	912	916	900	1,059	1,179	1,042	1,075
ETBE fob Rotterdam	1,496	1,235	1,153	1,140	1,108	1,082	1,110	1,223	1,251	1,053	1,064

Fundamentals

Agriculture

Rapeseed prices steady since November

Rapeseed prices averaged the month of January at $467/t, remaining relatively unchanged since November. Demand remains strong from the EU's biodiesel sector and the success of the Ukrainian harvest has continued to pressure prices in a bearish fashion. Ukraine is also well positioned to produce a record crop for the new marketing year — all major producing regions are in good condition and production could exceed that of last year. We expect if this were to happen, the EU will be comfortably supplied for most of the year from Ukrainian origins, but we also picture room in the following months for increased EU dependence on Australia's canola, which has been gaining share since last September.

Ukraine ups pressure on EU

Corn prices have been in a bearish trajectory over the last month and have continued to head down in recent weeks after increased Ukrainian pressure on the EU's grain market. Ukrainian export activity has resulted in a heavily supplied and highly competitive European market, pushing down prices. Competitive exports by Russia have also increased competition, fighting European market share in north Africa. In the following months, the main price driver will continue to be the Black Sea's export potential. We expect Ukrainian exports via land and river into the EU to decrease in the following months in favour of deep-sea ports.

Black Sea competition

Exports of wheat from Russia and Ukraine have prolonged bearish pressure on the EU's wheat market. Despite high competition, northern hemisphere wheat exports are accelerating and should keep a strong pace during the second part of the marketing year. So far, we have a decent crop production outlook for Russia and Ukraine, with Europe facing slight risks to crop conditions and the possibility of a lower acreage. We still expect a bumper crop in Russia and a decent one in Ukraine, enough to partially offset the lower crop expected in the western EU. After months of bearish competition, we expect an increase of the weather market premium during summer. But with a weak corn/feed grain complex, this bullish potential should be capped, and without a big crop incident, the wheat market is expected to remain bearish after the summer.

Fossil fuel demand and prices

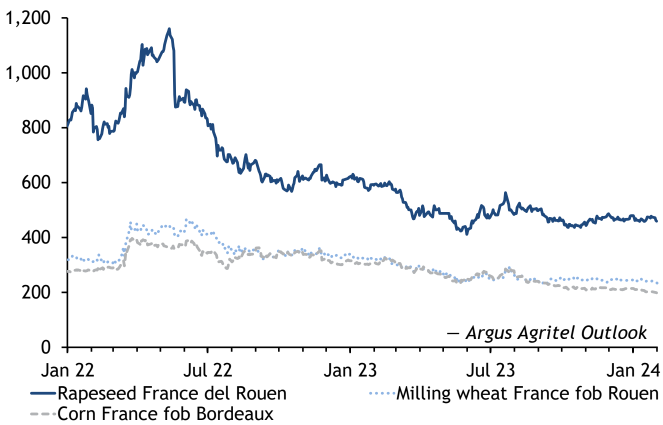
Regional demand weak and supply stable

Gasoline crack spreads strengthened only slightly in northwest Europe compared with other regions, by just $0.30/bl to $9.07/bl. January exports from northwest Europe rose by 21pc on the month but were still down by 4pc on the year. Regional demand remains weak and supply has been stable, with refining operations running smoothly since December. Looking forward, gasoline production in the region is expected to fall, with some refinery maintenance scheduled for this month. But more gasoline could stay in the region as rising freight rates, partly driven by the disruption in the Red Sea, have been eroding arbitrage economics to the US Atlantic coast.

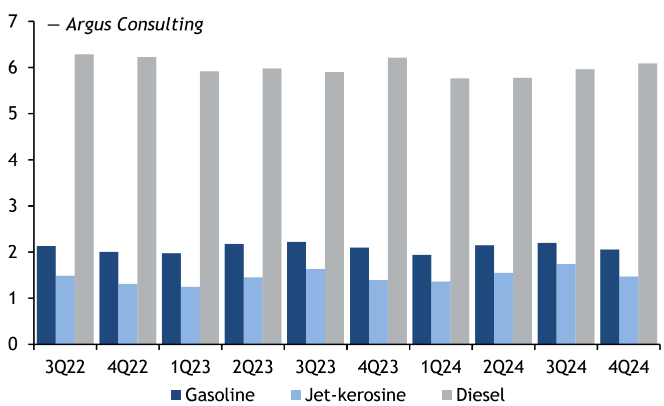
Red Sea tensions drive crack spreads higher

Diesel cracks in northwest Europe and the Mediterranean inched down on the month in January, from $28.70/bl to $28.20/bl and $26.20/bl to $26/bl, respectively, continuing a downturn that began in November. But as we forecast last

Biofuel agricultural feedstock prices *$/t*



European fuel demand *mn b/d*

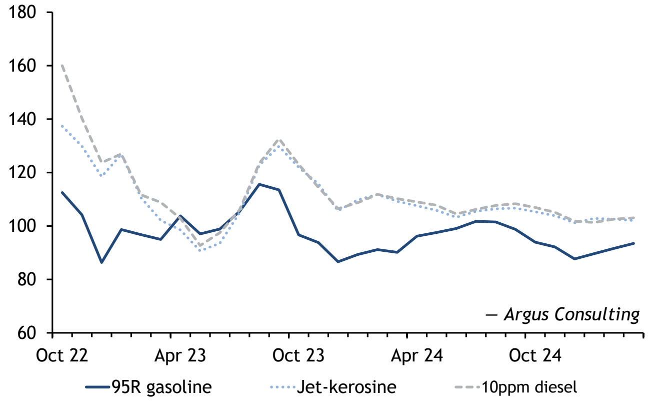


month, the escalation of tensions in the Red Sea has eroded east-west arbitrage economics and driven middle distillate crack spreads higher in northwest Europe and the Mediterranean, which rely on imports through the Suez Canal.

The European downturn was underpinned by a well-supplied market and weak demand growth. But deliveries from the Mideast Gulf and India are now affected by the Red Sea situation — 60,000 b/d of diesel was redirected around the Cape of Good Hope in January and an uneconomical arbitrage has led to reduced diesel loadings to Europe.

Supply in Europe will probably tighten, with turnarounds in northwest Europe and the Mediterranean starting in February-March. This could coincide with revived demand in spring. European stocks typically build in December-January, when demand is weak, and are then drawn down when activity picks up in spring. But in the last two months, inventories have trended lower, as backwardation disincentivised stocking.

European fuel prices *$/bl*



Jet fuel's strength is being driven by the Red Sea attacks and a strong diesel market. Although European demand is seasonally weaker, demand on the US west coast has been firm, resulting in a surge in prices since late December. This is probably why the US Gulf coast crack spread exceeded the European crack spread for most of January.

NORTH AMERICA

Summary

This month

California R99 differentials at the head of the pipeline nudged higher in the last week of January. The gains were made amid lower Low Carbon Fuel Standard (LCFS) credit prices, and potentially lower-than-expected local supply, as more renewable diesel (RD) was projected to be on line by this time of year. After hovering around 80¢/RIN for a few months, RIN prices entered a steady declining period in the second half of January, and reached their lowest level in four years, ending January and starting February in the low 50¢ — and where we expect prices to remain during most of this year. Production margins for key RD feedstocks reversed course in January, strengthening in part because of lower feedstock prices not seen since November 2020, which was before the RD production boom. Following continued weakness through December, used cooking oil (UCO), tallow, and corn oil were relatively flat through January while soybean oil prices continued to weaken as Brazil's harvest progressed, which kept the wider market depressed. Ethanol margins recovered to start the year over the first half of January as corn futures sunk to new contract lows following a bearish USDA report and held steady in the second half on limited price movement in corn futures. Softer spot ethanol prices were slow to outpace the large drop in corn futures.

Next month

February renewable diesel demand is projected to be lower at 266mn USG, with an expected overall blend rate of 4.93pc as California grapples with wet weather that has reduced blending activity. RD demand will pick up during the year, with levels showing more strength above 270mn USG from March onwards as agricultural demand picks up in California, the biggest demand centre for RD in the US. Biodiesel blending is typically sluggish during the first quarter as cold weather prevents higher blend rates, but strong diesel demand will support average first-quarter biodiesel demand. First-quarter biodiesel demand is expected to be higher than last year despite weak blend economics taking hold of the industry.

3-6 months ahead

Average R100 renewable diesel outright prices are expected to remain close to February levels through to June on the back of weak diesel prices after the first quarter and a poor outlook for D4 RINs. Ethanol prices are forecast to weaken further as high production will continue to bloat stocks in February, despite ethanol demand starting to pick up. Prices will then strengthen in March and the second quarter as gasoline prices continue to rise and demand firms. On the feedstock side, there is little indication that US UCO imports from Asia-Pacific seen in 2023 will cease. Therefore, we expect UCO prices to remain at 39¢/lb for the first half of the year.

6-12 months forward

The latest data on California LCFS credits available for compliance indicated the credit bank grew by a record 2.25mn t in the third quarter, adding pressure to an ongoing rulemaking process as more production of the green fuels inundating the state comes on line. Tallow is also expected to be well supplied this year, following news that Brazilian exporters have continued investing in tallow storage facilities to meet rising US demand for the feedstock.

Regulation

Applications for SREs rise following RFS waivers ruling

The US Environmental Protection Agency (EPA) received 12 applications for small refinery exemptions (SREs) in December, spanning compliance years 2022-24 and including refineries owned by US Oil and Refining, Calumet, Hunt Refining, Wynnewood Refining, Ergon and Wyoming Refining. SRE requests have increased after the US 5th Circuit Court of Appeals on 22 November overruled the EPA's blanket denial of SREs going back several years. Biofuel groups issued legal proceedings in reaction to the court's decision.

If the petitions are accepted, larger volumes of conventional road fuels could be exempt from the Renewable Fuel Standard (RFS). Those refineries securing SREs would not need to blend biofuels or acquire RIN credits for the specific compliance years. Historically, these scenarios have led to lower demand for RIN credits, and have resulted in the Argus Renewable Volume Obligation (RVO) price weakening.

Five states progress bills introducing LCFS programmes

Lawmakers in five US states continue to work on developing low-carbon fuel standard (LCFS) schemes beyond the US west coast. New Jersey has proposed introducing an LCFS programme, and a Minnesota working group is aiming to complete a final draft of its scheme, following previous rejections. Lawmakers in New York, Illinois and New Mexico continue to push for introducing LCFS schemes in the face of continued opposition from other legislators. The proposals mirror California's LCFS, but with their own targets for carbon intensity reduction:

- Illinois: 20pc by 2038
- New Jersey: 10pc (from 2019 levels) in roughly five years
- New York: 32pc by 2032
- New Mexico: 20pc by 2030 and 30pc by 2040
- Minnesota: 25pc by 2031 (failed to advance last year)

Oregon, Washington progress LCFS updates

Oregon has scheduled a preliminary rule-making session for its LCFS programme on 20 March, which will follow a consultation period that is scheduled to end on 16 February . So far, the rule making is expected to consider a new verification requirement for generated credits, expanding requirements for fuel pathways and for electric vehicle (EV) chargers to generate credits and deficits, and a reserve system to back up credits generated involving carbon capture projects in case those efforts do not deliver their expected carbon reductions.

The Washington state ecology department plans to incorporate SAF into its LCFS programme, and has scheduled meetings on 22 and 28 February to outline rules to promote the use and production of SAF through credit generation.

E15 blend approved for majority of vehicles

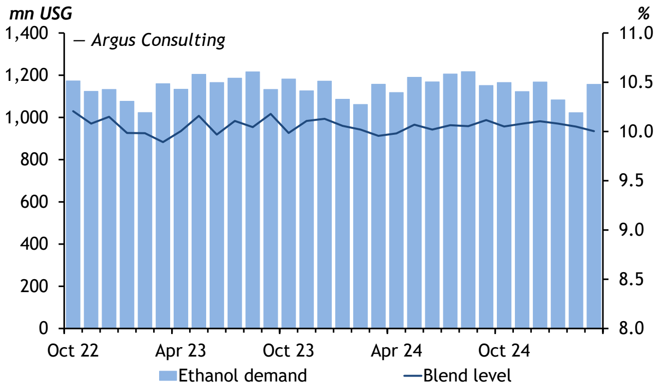
The US Renewable Fuels Association concluded in its annual review that automakers have approved E15 fuel for use in 95pc of 2024 car and light truck models. Following petitions from eight states, the EPA has approved year-round sales of E15, which are scheduled to start on 28 April.

Canada sets alternative Clean Fuel credit prices

Regulator Environment and Climate Change Canada has updated prices for alternative compliance credits for the country's LCFS that could be available later this year through an auction-type mechanism. Credit Clearance Mechanism (CCM) credits will cost C$312/t ($230.76/t), and Emissions Reduction Fund credits will cost C$364/t.

CCM credits follow a process used in California and other LCFS programmes that allow credit generators to pledge credits to a process for any party that fails to meet its annual obligations. The credits fetch a higher price than currently traded, but do not represent a maximum price for the programme.

US ethanol demand and blend level



Demand

Ethanol

February demand still below pre-pandemic levels

US ethanol demand is expected to average 870,000 b/d in February, picking up by 4.6pc from January as gasoline consumption rises over the same period. But anticipated February gasoline demand of 8.7mn b/d would be down slightly, by 0.5pc, from year-earlier levels, and 4.4pc lower compared with pre-pandemic February 2020 demand of 9.05mn b/d.

Ethanol demand fell from 908,000 b/d (1.18mn USG) in October to 894,000 b/d (1.13mn USG) in November, with the blend level up to 10.11pc from 9.98pc, the latest figures suggest. December ethanol demand is estimated at 1.17mn USG.

We have maintained our yearly average US blend level at 10.05pc for 2024-25 as RIN markets have yet to signal the need for stronger blending activity. But we anticipate upward revisions as obligated parties may boost discretionary blending given higher compliance obligations in 2025.

Renewable diesel

Demand to drop in January after hitting record high

Renewable diesel (RD) consumption is estimated to have declined to 277mn USG in January from a record-high 321mn USG in December. February is projected to be lower still, at 266mn USG, with an expected overall blending rate of 4.93pc as California grapples with wet weather, which has reduced blending activity. But RD demand will pick up during the year, returning above 270mn USG from March onwards as agricultural demand strengthens in California, the largest demand centre for RD in the US.

RD comprises 54pc of California diesel pool in 3Q23

California's RD consumption grew by 11pc during the third quarter to generate nearly 40pc of all new credits during the period — more than double the share of the next-highest credit generator. Fuels derived from tallow and corn oil feedstocks grew during the quarter, while volumes of UCO and SBO-based fuels fell. The shifting feedstock profile helped cut average RD carbon intensity by 1.7pc from the previous quarter, although the fuel's carbon intensity remained 5pc higher than in the same quarter of 2022.

RD accounted for roughly 54pc of California's diesel pool for the third quarter, little changed from the previous quarter. Petroleum diesel consumption rose faster than RD or biodiesel demand during the period, according to state data.

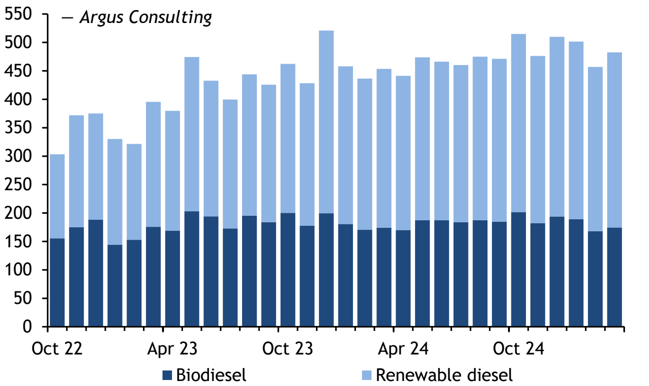
Biodiesel

Higher diesel demand supports 1Q blending level

Biodiesel blending is typically sluggish during the first quarter as cold weather prevents higher blending rates, but strong diesel demand will support average first-quarter biodiesel demand of 175mn USG/month, at an average blending rate of 3.2pc. This compares with average biodiesel demand of 158mn USG/month in the first quarter of 2023, when the blending rate averaged 3.1pc. Outright biodiesel demand will increase further in the second quarter, growing to 182mn USG/month as average blending rates rise to 3.5pc.

First-quarter biodiesel demand is expected to be higher than that of last year despite weak blending economics affecting the industry. Blending economics in January were well below those a year earlier as lower current-year D4 RINs outweighed a weaker SBO-heating oil (BOHO) spread. The BOHO spread fell by 59¢/USG, or 40pc, from the same period last year to average 87¢/USG in January owing to falling SBO prices and a higher Nymex ultra-low sulphur diesel contract. But this year-on-year support for margins was offset by lower prices for current-year D4 RINs, which fell by 57pc over this period to $1.09/USG, when factoring in an equivalence value of 1.5.

US biodiesel and RD consumption *mn USG*



Feedstocks

December demand up on price falls, RD demand rise

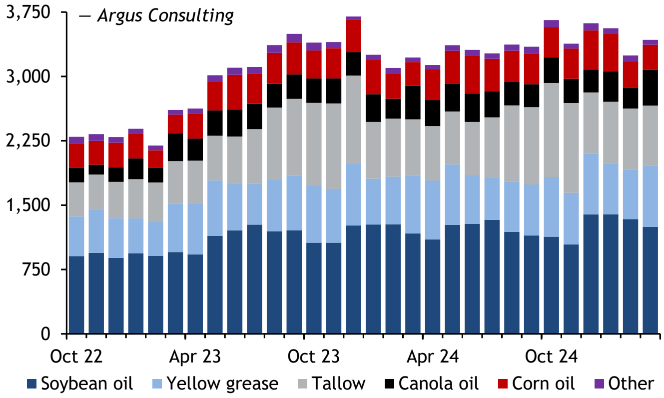
We anticipate total feedstock consumption for biodiesel and RD to have strengthened to a record 3.7bn lbs in December, supported by RD consumption rising to a record high, with many plants operating closer to their nameplate capacity.

Tallow demand is expected to have grown by only 2pc from November owing to ample supply from South America in previous months. SBO use is estimated to have risen by 19pc in December compared with November to 1.3bn lbs, accounting for more than a third of US feedstock during the month.

US biofuel demand outlook

Product	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	1Q24	2Q24	3Q24	4Q24	1Q25
Biofuel											*mn USG*
Ethanol	1,182	1,126	1,172	1,086	1,062	1,157	3,305	3,477	3,575	3,456	3,263
Biodiesel	200	178	200	181	171	174	525	545	556	578	532
Renewable Diesel	262	251	321	277	266	280	823	837	850	923	909
Total	**1,645**	**1,555**	**1,693**	**1,544**	**1,498**	**1,611**	**4,653**	**4,858**	**4,981**	**4,957**	**4,704**
Biodiesel and renewable diesel feedstocks											*mn lbs*
Canola oil	286	291	274	323	233	391	947	960	846	849	1,012
Corn oil	324	353	382	398	296	276	969	1,173	1,100	1,160	1,039
Soybean oil	1,062	1,062	1,262	1,273	1,277	1,172	3,723	3,654	3,664	3,568	3,977
Tallow	962	998	1,019	661	676	654	1,991	1,870	2,493	2,851	2,128
Yellow grease	668	626	729	535	554	675	1,764	1,960	1,672	2,008	1,885
Other	93	71	33	61	63	54	178	190	211	221	190
Total	**3,394**	**3,401**	**3,699**	**3,252**	**3,099**	**3,221**	**9,571**	**9,807**	**9,986**	**10,658**	**10,231**

US biodiesel and RD feedstocks demand *mn lbs*



We see corn oil use rising to 382mn lbs in December, up by 8pc compared with November, as margins stay above the key $1/USG level. Canola oil use will be lower at 274mn lbs, or around 6pc weaker than in November. UCO, or yellow grease, demand is expected to remain robust at 729mn lbs, supported by margins of around $2.19/USG in December.

US biofuel feedstocks consumption up in November

US feedstocks consumption in November was higher than a year earlier as more biofuel production capacity came on line. Canola oil use more than doubled from a year earlier to 9.7mn lbs/d in November and was 5.4pc higher compared with October, according to the EIA's *Monthly Biofuels Capacity and Feedstocks Update*. US SBO consumption in November increased by 13pc from a year earlier to 35.4mn lbs/d, while usage was virtually unchanged compared with the previous month. Distillers corn oil (DCO) consumption in November was reported at 11.8mn lbs/d, 27pc higher than a year earlier and a 12pc rise compared with October. November Tallow usage of 33.3mn lbs/d was more than double November 2022 levels and was up by 8pc compared with a month earlier. Yellow grease consumption, which includes UCO, rose by about 23pc on the year in November to 21mn lbs/d, but was around 3pc lower than in October.

Credits

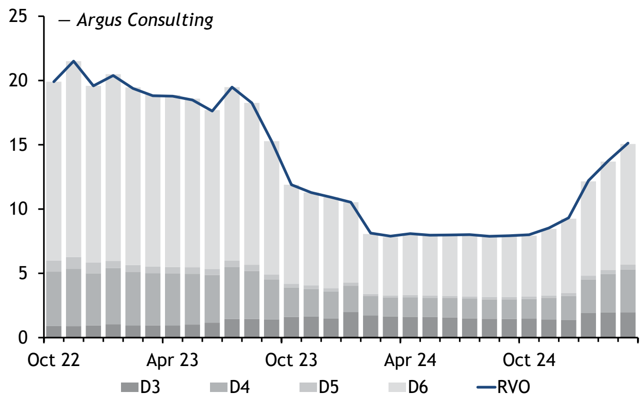
RINs/RVO

RIN prices tumble to four-year lows

January RIN prices fell by 10-11pc on a monthly average basis, to 73¢/RIN, 72¢/RIN and 72¢/RIN for D4, D5 and D6 credits, respectively. After hovering around 80¢/RIN for a few months, prices declined steadily in the second half of last month, falling to their lowest in four years. Prices ended January and began February at around the low 50¢/RIN levels — which is where we expect prices to remain for most of this year. None of the market fundamentals that could provide further support is expected to change in the short term.

The sharp fall in prices is a result of rising RIN generation and a depressed BOHO spread. RIN generation increased again in December across all fuel types, resulting in full-year 2023 credit generation rising to 23.75bn, 11pc up on the year. Biomass-based diesel D4 credits rose to their highest generation level ever, at 7.96bn, almost 40pc higher on the year, while ethanol D6 credit generation increased by 2pc on the year to 14.82bn credits in 2023. D4 credit generation reached 840mn credits in December, 44pc higher than in December 2022 and accounting for 39pc of all RINs, their highest proportion ever.

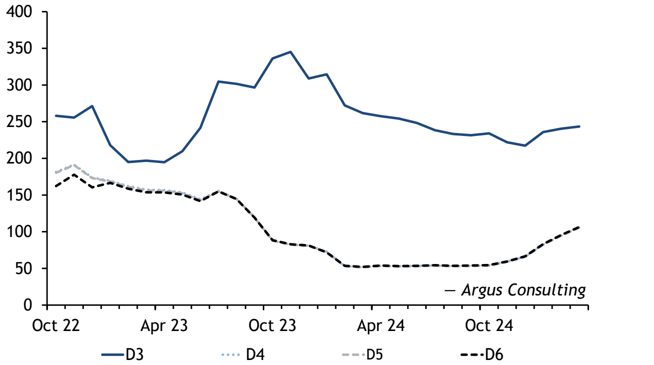
Argus RVO breakdown by RIN category *¢/USG*



US RIN and LCFS price outlook

Credit	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	1Q24	2Q24	3Q24	4Q24	1Q25
RIN											¢/RIN
D3	336	345	309	315	272	262	283	253	234	224	240
D4	89	83	81	73	54	52	59	53	54	60	95
D5	88	82	81	72	53	51	59	53	53	60	94
D6	88	83	81	72	54	52	59	53	54	60	95
RVO ¢/USG	12	11	11	11	8	8	9	8	8	9	14
LCFS											$/t
California LCFS	69	67	70	62	57	56	58	61	73	95	111

RIN price forecast ¢/RIN



The BOHO spread, which is indicative of biodiesel production costs, fell to a three-year low of 58¢/USG on 29 January, as weakening SBO prices reduced biodiesel production costs, while heating oil futures have generally trended upwards. The BOHO spread averaged 87¢/USG in January — 24¢/USG, or 22pc, lower than December's average, although the lowest values came in the last five sessions of the month, when the spread averaged 64.6¢/USG. Cheaper costs for biodiesel producers could translate into higher output, putting further pressure on biomass-based diesel D4 RIN values after credit generation surpassed mandated levels in 2023.

D3 prices briefly rise to one-year peak in January

Cellulosic biofuel D3 RIN prices have oscillated in recent months. Prices increased steadily from 20 December and reached 340¢/RIN in mid-January, the second-highest since early 2022. But this strength proved short-lived, and prices have dropped below 300¢/RIN since the last week of January. D3 RIN credit generation also posted record highs last year, surpassing 2022 figures by 5pc. D3 credit prices rallied briefly in the first week of February, but remain below 300¢/RIN.

Argus RVO back to single digits

Weakening D4, D5 and D6 RIN prices prompted a fall in the *Argus* RVO to a more than three-year low. The RVO started the year at 11.10¢/USG, a slight increase on the December close owing to higher RIN targets. But the RVO fell from 11.70¢/USG on 9 January to 8.05¢/USG on 29 January, its lowest since November 2020. Prices hovered around 8¢/USG in early February, with RIN prices unlikely to move the RVO away from this level for most of this year, although D3 credits will continue to provide some support.

LCFS

California LCFS prices fall on record supply

Completed transfers of California LCFS credits closed out 2023 at a new record monthly volume. Participants moved 6.2mn t equivalent of credits across 422 transfers in December, according to the latest California Air Resources Board (CARB) data. The latest data on credits available for compliance indicate that the credit bank grew by a record 2.25mn t in the third quarter, adding pressure to the continuing review of the scheme's rules as more production of the renewable fuels inundating the state comes on line.

This pushed monthly average LCFS prices down by almost 11pc in January compared with December. Prices have remained in the \$56-61/t range, ending the month at the lower end, before rebounding to the low \$60s/t in the first week of February. But we expect this recovery to be temporary as abundant credit supply will weigh on any further increases. Prices are forecast to stay below \$60/t through to May, but will rise steadily thereafter to end the year at \$104/t, based on the assumption that more stringent carbon intensity reduction targets will be in place by then.

Prices

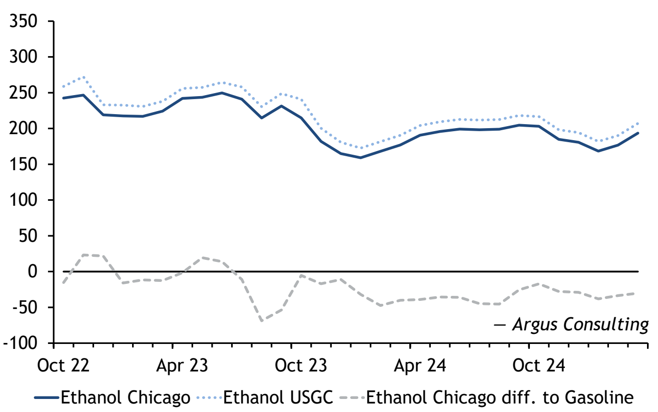
Ethanol

Margins recover in January

Margins recovered to start the year over the first half of January as corn futures sunk to new contract lows following a bearish USDA report and held steady in the second half on limited price movement in corn futures. Softer spot ethanol prices were slow to outpace the large drop in corn futures.

The January *World Agricultural Supply and Demand Estimates* (Wasde) report raised the corn yield to 177.3 bushels per acre, while reducing harvested area by 500,000 acres to 86.5 mn. As a result, final production for corn came in higher than expected at 15.342bn bushels. Although corn

US ethanol prices ¢/USG



feed use was raised 25mn bushels and ethanol demand was increased by 50mn, ending stocks still increased 31mn bushels from December.

Spot ethanol prices softened on the back of lower corn futures and higher supply fundamentals. For the marketing year to date in January, ethanol production was averaging 1.028mn b/d, which was 4pc above last year's pace 21 weeks into the season. While ethanol stocks posted a larger decline than expected for the week ending 26 January and dropped for the first time in nine weeks, over the prior eight-week period, ethanol stocks rose by a sizeable 186mn USG, 20.7pc versus the more modest build of 49mn USG during the same period last year. The drop in stocks for the week ending 26 January may have resulted from plants playing catch-up following transportation disruptions from the cold snap in mid-January.

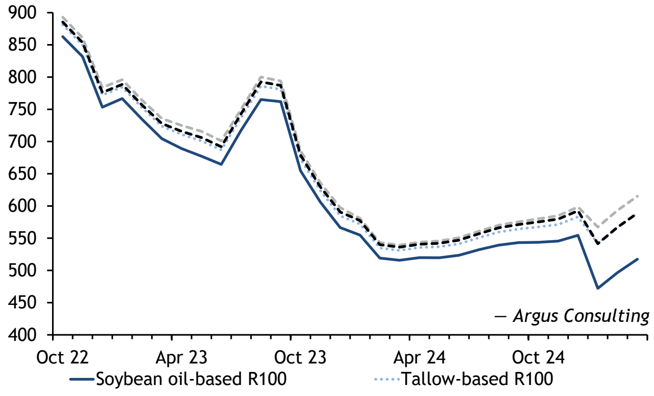
Ethanol prices are forecast to weaken further as high production will continue to bloat stocks in February, despite ethanol demand starting to pick up. Prices will then strengthen in March and the second quarter as gasoline prices continue to rise and demand firms. We forecast Argo terminal prices will rise to 199¢/USG by June, when prices should hold flat through to August. On the back of steady corn prices, we expect Argo terminal ethanol will hold a 40¢/USG discount to gasoline through to September, when the end of the corn marketing year will push feedstock prices higher and the ethanol differential to gasoline will tighten into the 15-30¢/USG range for the rest of the year.

Renewable diesel

Cali R99 diffs recover after four weeks of decline

California R99 differentials at the head of the pipeline nudged higher in the last week of January. The gains were made amid lower LCFS credit prices, and potentially lower-than-expected local supply, as more RD was projected to be on line by this time of year. But the overhang of product persisted, with rail extremely backlogged.

US renewable diesel prices ***¢/USG***



Differentials for R99 head of pipeline in Los Angeles rose by 6¢/USG to 36.5¢/USG under California Air Resources Board (CARB) ultra-low sulphur diesel (ULSD) + attributes after being bid as high as 40¢/USG under CARB ULSD + attributes, and offered as low as 33¢/USG under the same basis during the last week of January.

California LCFS credit prices remained under pressure, ending the week at $57.50/t and breaking recent records as the $60/t floor was broken two weeks prior. CARB's third-quarter 2023 data release on 31 January displayed a climb in the bank to 20.6mn t credits.

Local California supply has also been late to appear. Phillips 66 expects to ramp up toward half of its more than 50,000 b/d RD capacity at its Rodeo plant by April and reach full capacity by July. Marathon will operate its 48,000 b/d Martinez RD plant at 22,000 b/d while working with regulators in response to two fires at the facility in November. Timelines for both plants are longer than expected, but imports could be filling the gap in lower-than-expected local California supply.

So although the spot market nudged higher in the last week of January, mostly on the back of weaker credits, differentials were still at a five-month low. Many participants were behind on blending, with plentiful offers on hand. Producers that were off line 1.5 months ago, that were running well below nameplate capacity, were just then getting caught up on deliveries, and buyers were having trouble catching up with them. Diesel demand in California was also low given the amount of wet weather, and seasonally demand should stay subdued until March-April, when agricultural farming demand picks up.

Average R100 prices are forecast to weaken further this month, and we expect outright prices will remain close to February levels through to June on the back of weak diesel prices, and a poor outlook for D4 RINs. Reflecting our latest diesel forecast, R100 prices should firm up through the second half of the year with UCO and tallow-based R100 back up above $5.90/USG.

Margins improve on lower feedstock prices

Production margins for key RD feedstocks reversed course in January, strengthening in part because of lower feedstock prices not seen since November 2020, which was before the RD production boom. Although UCO margins held steady at $2.19/USG, distillers corn oil (DCO) margins rose the most, by 19¢ to $1.36/USG. Tallow and soybean oil-based margins strengthened by 14¢ and 17¢, respectively, to $1.87/USG and $1.09/USG.

Biodiesel

USGC B99 rises to offset D4 losses

USGC B99 prices rose 11¢/USG to $2.45/USG in January, partially offsetting weaker prices for D4 RINs. As a result, average B100 USGC prices fell by just 2¢/USG to $4.54/USG. Chicago B100 prices, however, reflected the D4 losses, falling 4.3pc to $4.47 as B99 prices held flat on the month.

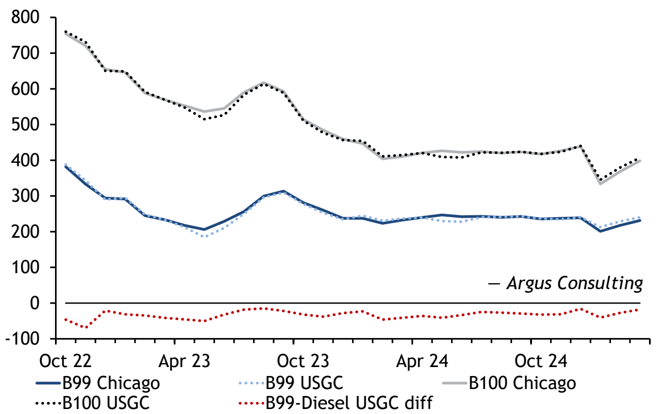
Owing to persistent weakness in SBO costs, B99 prices are expected to fall this month to $2.24/USG in Chicago and $2.31/USG in the USGC. *Argus* expects a sharp rise in diesel and heating oil prices this month, resulting in the B99-diesel USGC differential widening to a 46¢/USG discount, the highest since last May. The market is long on supply, and we expect B99 prices will remain at a discount of 30-45¢/USG into June.

Feedstocks

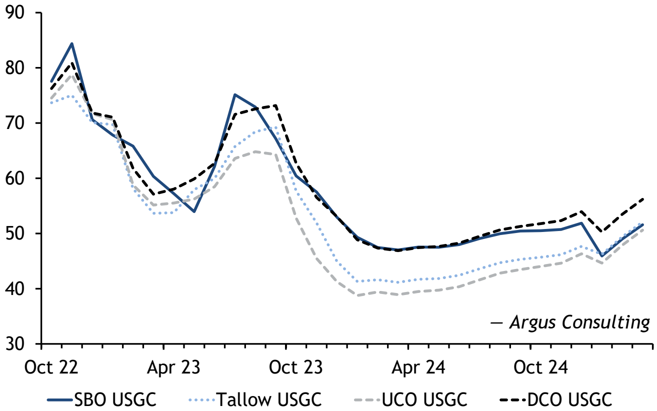
Feedstock prices hit three-year low

Following continued weakness through December, UCO, tallow, and corn oil were relatively flat through January while

US biodiesel prices *¢/USG*



US biofuel feedstock prices *¢/lb*



US biofuel price outlook

Product	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	1Q24	2Q24	3Q24	4Q24	1Q25
Ethanol											*¢/USG*
Ethanol Chicago	215	182	165	159	168	177	168	195	201	190	180
Ethanol USGC	241	200	181	173	182	190	182	209	214	203	193
Biodiesel											*¢/USG*
B99 SME Chicago	281	260	237	237	224	232	231	243	242	237	217
B99 SME USGC	278	253	235	245	231	237	237	232	242	237	227
B100 SME Chicago	514	485	459	447	404	410	420	423	423	427	367
B100 SME USGC	511	477	456	454	411	415	427	412	422	427	377
Renewable diesel (del California)											*¢/USG*
R100 (soybean oil)	655	606	566	555	519	516	530	521	538	548	495
R100 (tallow)	673	624	585	572	535	531	546	538	558	574	566
R100 (UCO)	685	636	597	581	543	539	554	547	569	588	592
R100 (corn oil)	679	630	591	577	540	536	551	543	565	582	566
Feedstocks (US Gulf coast del rail)											*¢/lb*
SBO crude degummed	60	58	53	49	47	47	48	48	50	51	49
Tallow bleached fancy	58	52	45	41	42	41	41	42	45	47	49
UCO	53	46	41	39	39	39	39	40	43	45	48
Distillers corn oil	63	57	53	49	47	47	48	48	50	53	53

soybean oil prices continued to weaken as Brazil's harvest progressed, which kept the wider market depressed. Average monthly prices for all four feedstocks were their lowest since the start of 2021, especially with imports of UCO and tallow reaching new records this year.

In order to secure volumes, the US refining sector started importing UCO from Asia-Pacific in 2023, and earlier in the year average prices were a $100/t premium above ISCC certified to Europe. Total imported volumes surpassed 800,000t last year, a sharp rise from 41,000t in 2022, and by the end of the year on a $/t basis, prices for UCO USGC del rail were almost equal with UCO fob China. With little indication this trade flow will cease, we expect UCO prices to remain close to 40¢/lb for the first half of the year. Tallow is also expected to be well supplied this year, following news that Brazilian exporters have continued investing in tallow storage facilities to meet rising US demand for the feedstock.

Fundamentals

Agriculture

Falling US prices to spur corn exports

US corn prices, as in most other regions, have come under pressure over the past month, which has continued into early February. US corn supplies are on course to reach record levels in the 2024-25 marketing year. We currently stand with a production expectation of 378mn t for the year, with a further 55mn t anticipated to be held in stock at the beginning of the year, resulting in one of the highest years of supply in the US. Previous fears regarding the impact on the US corn market of Brazil's late planting of its second corn crop have faded. Planting in Brazil avoided heavy disruption from the soybean crop cycle being two weeks shorter, allowing time for farmers to seed the second corn crop. Relatively low US prices should help exports to recover but we will be monitoring competition from Ukrainian and South American supply.

S American soybean potential to squeeze US exports

US soybean exports are expected to face heavy competition from Brazil in the coming months, despite Brazilian losses. South America's crop potential is expected to stand at 210mn t for this year, with supply from Brazil and Argentina likely to exceed expectations. This crop potential could be enough to supply global demand, which remains weak, notably from China, although any recovery in Chinese appetite may allow for higher US exports. Next month will be crucial in assessing the US soybean acreage outlook for the next marketing year, with a possibility that soybean prices could be under pressure in the coming months.

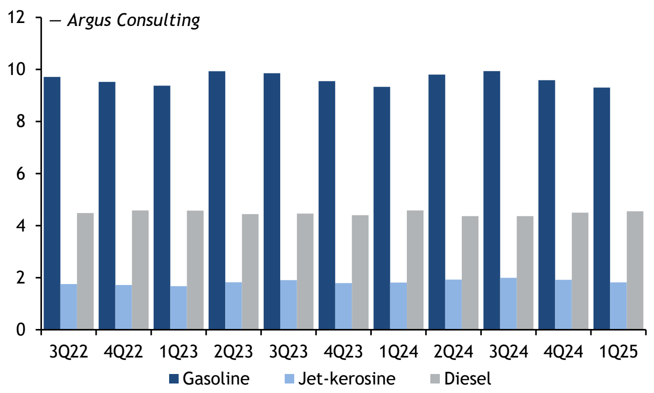
Fossil fuel demand and prices

Gulf coast crack spreads defy demand weakness

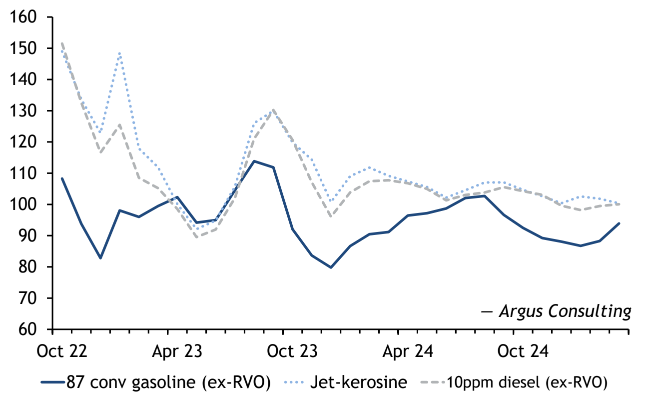
Gasoline crack spreads relative to benchmark crude prices strengthened in January compared with a month earlier in all four of the main refining regions, mainly driven by supply disruption. US Gulf coast crack spreads rose sharply on the month, by $4.96/bl to $10.79/bl despite weak domestic consumption. Demand averaged 8.1mn b/d from 1-26 January, down by 1.7pc compared with full-month December consumption. Prices for high-octane blending components have been rising ahead of the transition to summer-grade gasoline, pushing cracks spreads higher.

On the supply side, a winter storm in the US Gulf disrupted refining operations, while a heavy turnaround programme is scheduled for this quarter. Supply has tightened as a result, with refinery output of gasoline for 1-26 January falling by

North America fuel demand *mn b/d*



North America (USGC) fuel prices *$/bl*



5pc from full-month December to 9.1mn b/d. Rising reformate prices in the US have also supported demand for heavy naphtha, helping to further narrow naphtha's discount to WTI Houston crude. The crack spread has narrowed for four consecutive months, averaging -$2/bl in January.

US demand for jet fuel strengthens

US Gulf coast diesel exports to Europe dropped from 350,000 b/d in December to 230,000 b/d in January, as the transatlantic arbitrage narrowed and cold weather hit refining operations. Jet fuel's strength is being driven by the disruption to Red Sea shipping and a strong diesel market. European jet consumption is seasonally weaker, but demand on the US west coast has been firm, resulting in a surge in prices since late December, with the US Gulf coast crack spread exceeding its European equivalent for most of January.

SOUTH AMERICA

Regulation

Brazil conducts E30 safety tests

A working group co-ordinated by the Brazilian ministry of mines and energy is conducting feasibility tests to raise the maximum anhydrous ethanol blend in gasoline from 27.5pc to 30pc. The group is expected to submit a final report for national energy policy council CNPE's approval by March. The report is not intended to hinder the Fuel of the Future programme's targets, but to confirm the safety requirements of implementing E30. Current gasoline specifications allow a 1pc margin in the ethanol blend in either direction, which may require further testing. If required, the working group will be granted a three-month extension on the March deadline.

Demand

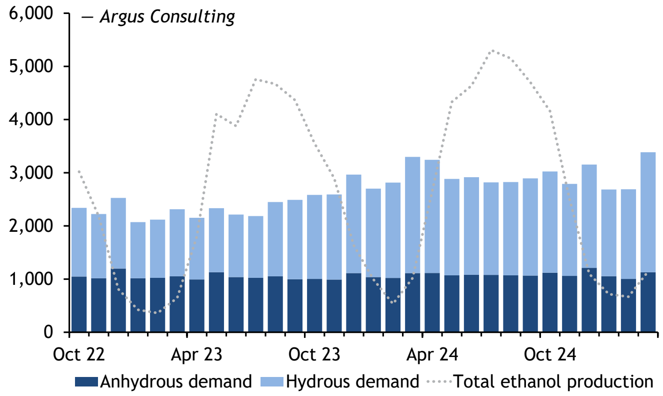
Ethanol

December ethanol sales up 17pc in Brazil

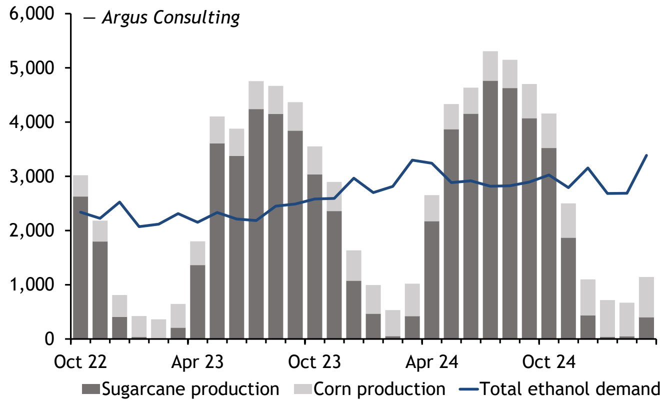
December ethanol sales in Brazil increased by 17pc compared with the same month in 2022, owing to strong consumer interest for hydrous ethanol. Hydrous ethanol sales increased by 39pc on the year to 1.9bn litres in December, driven by favourable pump economics for the product, which have been slowly improving because of soaring domestic gasoline values. Total ethanol sales also increased by 14pc on the month in December, typically a seasonal peak in motor fuel demand.

Ethanol demand is forecast to increase 24pc in 2024 as gasoline values continue to support hydrous ethanol demand and as the country moves closer to the introduction of E30 — feasibility tests are ongoing. January ethanol sales are expected to stand at 2.7bn litres, a 30pc increase on the year, and in February, continued strength in pump economics for hydrous ethanol is expected to drive 2.8bn litres of ethanol sales.

Brazilian ethanol demand *mn litres*



Brazilian ethanol production *mn litres*



Corn ethanol production peaks at 560mn litres

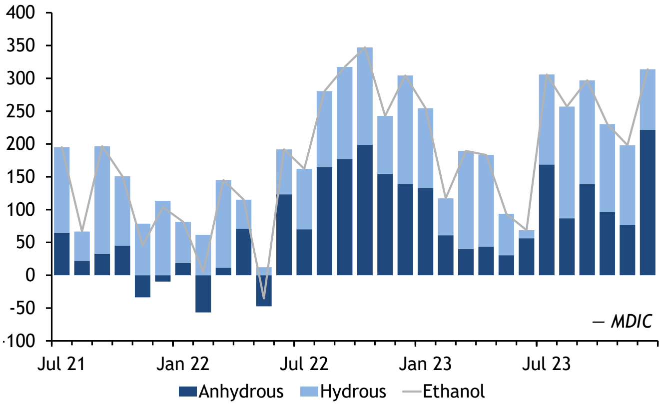
Ethanol output fell to 1.6bn litres in December as 246 mills stopped feedstock processing for the 2023-24 cycle with the sugarcane interharvest well under way. Corn ethanol production, however, peaked in the final month of last year, reaching 560mn litres. The steady emergence of new corn-based ethanol production plants since the beginning of the 2023-24 crop cycle resulted in a 39pc increase in corn ethanol production in December last year compared with 2022.

We expect investments in corn ethanol production plants to continue this year, driving growth in overall ethanol production. But while the sugarcane interharvest remains under way, we expect ethanol production to fall this month and in March, when total production is forecast to reach 530mn litres. Ethanol production is then set to climb in April and May as the sugarcane harvest for 2024-25 begins, but with international sugar prices still in a bullish direction, mills may favour sugar production over ethanol.

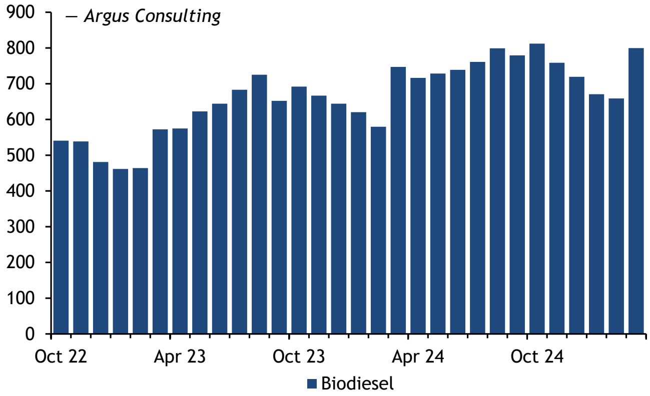
Net exports up 16pc from 2022

Net exports of ethanol increased by 58pc in December to 314mn litres. The rise marked an increase in the annual total net exports to 2.51bn litres in 2023, a 16pc increase from 2022 and beating optimistic industry forecasts despite narrower arbitrage conditions during the year. Healthy inventories, abundant feedstock, average domestic retail demand and new production capacity coming on line made foreign markets an essential factor for ethanol firms to increase

Brazilian net ethanol exports *mn litres*



Brazilian biodiesel demand *mn litres*



profitability last year. We expect Brazil to sustain robust ethanol flows to overseas markets in 2024 as companies look to expand their international footprint and pivot to destinations previously dominated by US exports.

Biodiesel

Brazil's March biodiesel sales to increase 31pc

Brazilian biodiesel sales fell 3.4pc in December to 644mn litres, ending the year at 7.4bn litres of sales, 19pc higher than they were in 2022. The Brazilian government increased the biodiesel blend mandate from 10pc in April 2022 to 12pc in March 2023, and this year we expect a similar trend with Brazil's biodiesel mandate set to increase to 14pc in March. We anticipate this will lift biodiesel sales to 747mn litres in March, a 31pc increase on the year and a 29pc increase over February.

Feedstocks

Further pressure to come for tallow

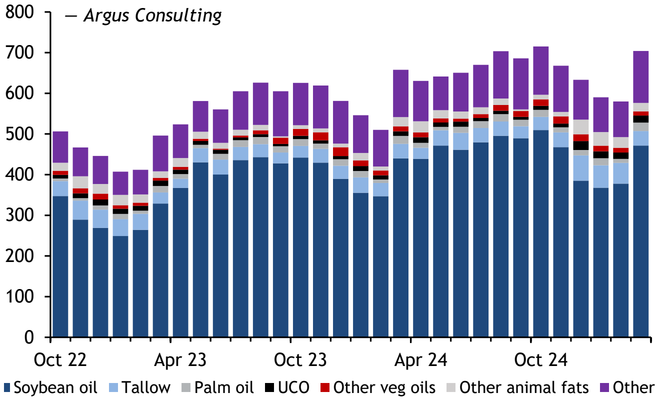
Demand for biodiesel feedstocks decreased to 581,000t in December, falling from 619,000t in November. Soybean oil

Brazilian biofuel demand outlook

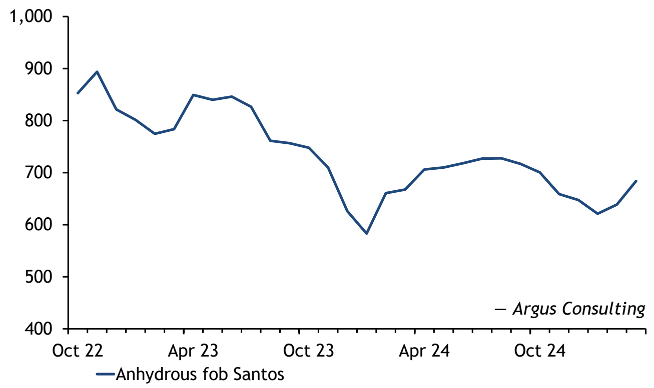
Product	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	1Q24	2Q24	3Q24	4Q24	1Q25
Ethanol demand											*mn litres*
Anhydrous ethanol	1,003	992	1,112	1,037	1,022	1,112	3,172	3,264	3,216	3,390	3,186
Hydrous demand	1,579	1,600	1,853	1,663	1,792	2,186	5,641	5,779	5,322	5,580	5,572
Ethanol demand	2,582	2,592	2,965	2,701	2,814	3,299	8,813	9,043	8,538	8,969	8,758
Ethanol production											*mn litres*
Sugarcane ethanol	3,034	2,359	1,074	465	52	421	937	10,197	13,460	5,820	490
Corn ethanol	518	538	560	530	482	598	1,610	1,425	1,698	1,938	2,039
Ethanol production	3,552	2,896	1,635	995	534	1,019	2,548	11,622	15,158	7,758	2,529
Biodiesel demand											*mn litres*
Biodiesel demand	692	667	644	620	580	747	1,947	2,184	2,340	2,290	2,129
Feedstock demand											*'000t*
Soybean oil	442	430	390	355	347	440	1,142	1,371	1,464	1,363	1,217
Tallow	29	34	32	38	32	36	106	107	100	131	142
Palm oil	17	13	16	16	9	19	44	36	51	43	48
UCO	8	8	8	12	10	11	34	37	23	41	50
Other vegetable oils	17	20	22	14	12	12	38	29	38	50	36
Other animal fats	9	9	9	18	10	23	51	66	37	58	81
Other	104	106	105	93	90	116	299	277	346	330	301
Total	**626**	**619**	**581**	**546**	**510**	**658**	**1,714**	**1,922**	**2,060**	**2,016**	**1,874**

Anhydrous ethanol: free of water and at least 99pc pure, and used in gasoline blends, currently set at 27pc. Anhydrous fuel meets all the requirements of the ASTM D4806. Hydrous ethanol: contains water and has a purity of 96pc. Can be used in Brazil as a 100pc gasoline substitute in flex-fuel vehicles.

Brazilian biodiesel feedstock demand *'000t*



Brazilian ethanol prices *$/t*



demand fell by 9pc to 390,000t in December, falling two percentage points in overall share of feedstocks to 67pc. Demand for other vegetable oils increased for the sixth consecutive month in December, hitting 22,000t and reaching close to 4pc of overall feedstocks.

Demand for alternative vegetable oils such as canola and cotton oil has increased in recent months following the growing export of Brazilian tallow to the US, reducing domestic availability. Tallow exports reached a record 246,000t in 2023 because of the large-scale expansion of renewable diesel capacity in the US. In the Brazilian market, it meant less availability for the feedstock and resulted in suppressed tallow consumption, with the latest December data recording 32,000t, down 29pc on the year. Further expansions in US production capacity at the Martinez Renewables and Rodeo plants are expected to put further pressure on Brazil's tallow market, and we anticipate shares used in the country's domestic industry to fall noticeably this year.

Prices

Ethanol

Weak demand in California pressures prices

Anhydrous ethanol fob Santos prices fell for the seventh month in a row to $583/t in January. Prices fell by 7pc on the month amid a decline in ethanol levels in California, the main Brazilian biofuels market in the US. Prices were also influenced by Brazil's domestic currency drifting lower against the US dollar, with traders scaling back bets on rate cuts from the Federal Reserve. However, the D5-D6 spread turned positive for the first-time last month, supporting prices from hitting further lows. It marked the first time since June last year that the spread was positive.

We expect anhydrous ethanol fob Santos prices to climb by 13pc to $661/t in February and anticipate prices to increase further throughout the year to around $727/t in July, tracking an increase in international gasoline values.

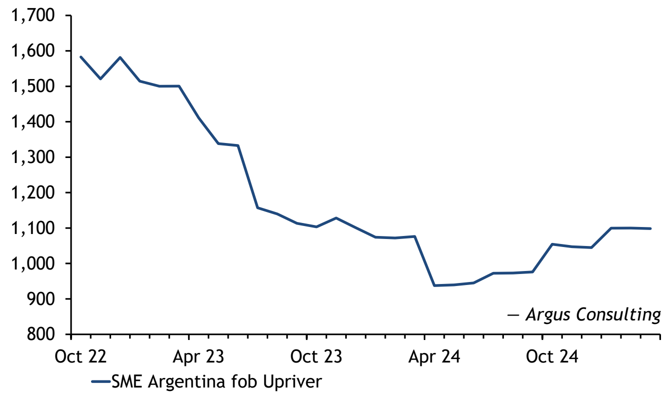
Biodiesel

Argentinean prices unchanged from December

Prices of Argentinean soybean oil methyl ester (SME) were static in January, with the EU's minimum import price unchanged over the month and prices standing at $1,074/t, continuing to limit arbitrage. Recent European SME prices suggest the minimum import price is likely to be reduced in April when arbitrage should return to a workable level.

Under an agreement reached in 2019, the EU can import 1.2mn t/yr of SME from Argentina with a standard import duty of 6.5pc. Any volumes above the quota are subject to an additional import tax that varies depending on the producer. This agreement is due to expire in February, but so far there have been no indications whether the import agreement will be extended, and Argentinian volumes may be uncapped going forward.

Argentina biodiesel prices *$/t*



But the EU also sets a minimum import price for the product on a fob basis under the agreement, excluding shipping costs and the standard 6.5pc import tariff. This has been persistently high since late 2022, lifting the fob value of Argentinian product, deterring importers, and closing the arbitrage with Europe for most of the year.

Domestic Argentinian fuel prices are rising as the new government continues to remove tax subsidies, including those for biodiesel producers, which were the EU's reasoning for introducing an import limit and minimum import price. Without subsidies, the EU may not have good reason to keep either system in place, and imports could flow unrestricted. However, it is possible that rising domestic prices may result in arbitrage being unworkable for Argentinian exporters, irrespective of EU trade measures.

South American biofuel price outlook

Product	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	1Q24	2Q24	3Q24	4Q24	1Q25
Brazilian ethanol											*$/t*
Anhydrous fob Santos	748	710	626	583	661	668	637	711	724	669	648
Argentinian biodiesel											*$/t*
SME Argentina fob Upriver	1,103	1,128	1,101	1,074	1,072	1,076	1,074	941	974	1,049	1,099

ASIA-PACIFIC

Regulation

India encourages molasses use for ethanol production

The Indian government has increased the prices of ethanol produced from C-heavy molasses for the November 2023 to October 2024 ethanol supply year to 56.28 rupees/litre ($0.68/l), up by 14pc from Rs49.41/l for the previous supply year. This is the highest price increase in more than five years since the government split ethanol purchase prices based on feedstock, with different prices applying for ethanol from C-heavy molasses, B-heavy molasses, and sugarcane juice. Ethanol produced from B-heavy molasses and sugarcane juice were priced at Rs60.73/l and Rs65.61/l in the previous supply year, but the government has since halted the allocation of these feedstocks for ethanol production in an attempt to control domestic sugar prices.

C-heavy molasses is the final by-product of the cane sugar refining process, containing significantly less sugar than raw sugarcane juice or B-heavy molasses, and is a lower priority feedstock for domestic sugar production. In the 2022-23 supply year, approximately 61pc of the ethanol blended into gasoline was produced from B-heavy and 2pc came from C-heavy.

The price hike aims to further incentivise ethanol production from C-heavy molasses, and to increase the availability of the feedstock, the government introduced a 50pc export duty on C-heavy molasses, effective from 18 January.

South Korea updates laws to facilitate co-processing

The Korean National Assembly passed an amendment to the Petroleum and Alternative Fuels Business Act on 9 January aiming to encourage more investment in “eco-friendly fuels” from the domestic oil industry. The amendments allow the input of “eco-friendly refining raw materials” designated by the ministry of trade, industry, and energy into the oil refining process, easing the process for oil refiners to begin co-processing of biomass feedstocks, as well as waste plastic pyrolysis oil and waste lubricants.

Indonesia moves to monthly reference price for palm

Crude palm oil (CPO) prices firmed up through January and the Indonesian trade ministry set the CPO reference price for 16-31 January at $774.93/t, up $28.24/t from 1-15 January, but the taxes and levies applied were unchanged.

The Indonesian trade ministry has stated the CPO reference price will be now set on a monthly basis instead of twice per month to ease logistics for businesses and exporters. It was set at $806.40/t for February, triggering a higher band of taxes and levies.

Export duties, which are paid to the treasury, are now set at $33/t for CPO, $5/t for palm kernel shells (PKS) and Pome oil, and $0/t for biodiesel. Used cooking oil (UCO) is not subject to export duties. Export levies, which are used to support the palm oil and biodiesel industry, are now set at $85/t for CPO, $3/t for PKS, $5/t for Pome oil, $55/t for biodiesel and $35/t for UCO.

Despite Indonesia raising its reference price, the Malaysian price has fallen from RM3,679.50/t ($798/t) in January to RM3,571.39/t for February, but this maintains an 8.0pc export duty for the 38th consecutive month.

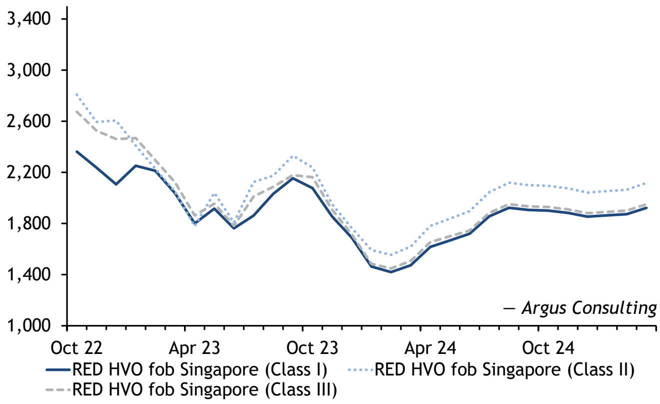
Demand and prices

HVO and SAF

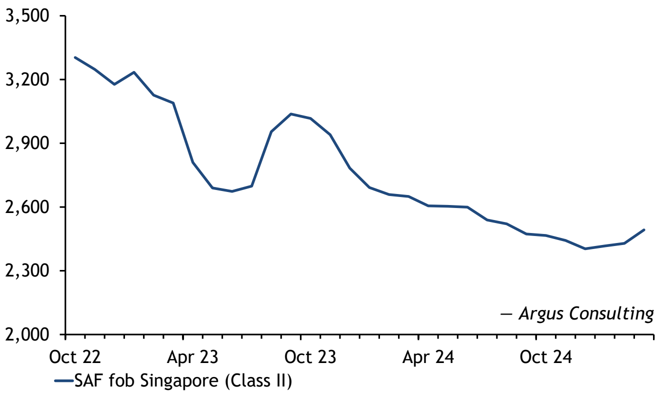
Freight rates pressure prices

Hydrotreated vegetable oil (HVO) fob Singapore prices continued to decline in January — HVO Class II was down 9.7pc on the previous month to $1,593/t, but held more support than Class I and Class III, which were both down 11pc from December. This was in line with prices for their European counterparts, which are at multi-year lows, and on higher freight rates resulting from tensions in the Red Sea that continue to redirect cargo around the Cape of Good Hope. The average spread between HVO fob Singapore and fob ARA rose to $109/t, the highest monthly average since the second half of 2022 when crude prices were at record highs.

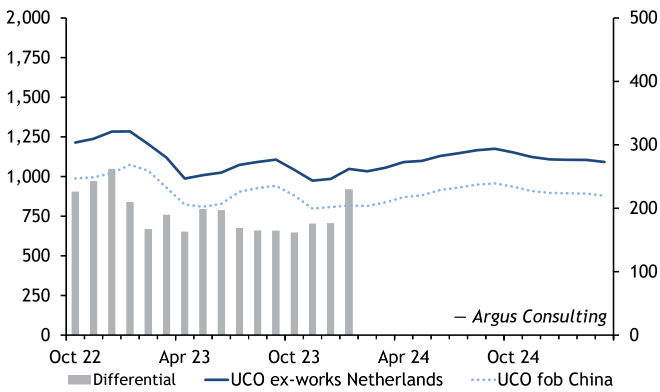
Asia-Pacific HVO prices *$/t*



Asia-Pacific SAF prices *$/t*



UCO prices *$/t*



Likewise, sustainable aviation fuel (SAF) fob Singapore fell month on month, down by 3.3pc to $2,692/t, coming under similar pressure to HVO grades, but also from a contraction of European premiums to the underlying gasoil contracts.

Freight rates are expected to rise further in February, with the spread averaging $112/t, but on the back of weak diesel and gasoil prices, this is expected to come down below $110/t by April. But until shipping can safely resume through the Red Sea, we expect freight rates to continue to lead to differentials above $100/t between Singapore and the ARA hub.

Biodiesel

Biodiesel prices raise on high UCO demand

UCO methyl ester (Ucome) fob China prices were unchanged for the first half of January, following the EU's anti-dumping investigation launched on 20 December, but market activity picked up in the latter part of the month. Ucome prices rose on the back of tight feedstock markets, and continued to rise in the following weeks, but average prices were still down 0.5pc on the previous month at $977/t. January was the fifth consecutive month of price declines, but UCO prices are firming up and the January differential between Ucome and UCO fob China stood at $160/t — significantly lower than in any month prior to June 2023, indicating Ucome producers will have to push their offers higher if there is any increase in domestic UCO prices.

Tracking our Ucome fob ARA and UCO price forecasts, Ucome fob China prices are expected to strengthen month on month into the $1,100-$1,200/t range by the third quarter, assuming current market conditions hold steady. But it is far more likely that price hikes will occur in the summer following the conclusion of the Indonesian anti-dumping duty circumvention investigation and possible implementation of provisional measures under the Chinese biodiesel anti-dumping duty probe.

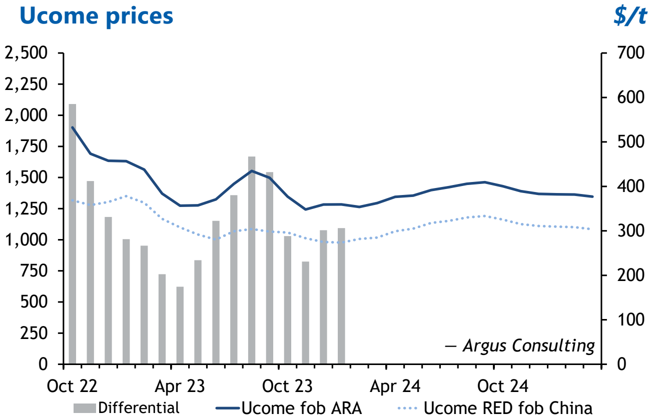
Feedstocks

UCO offers firm on high collection costs

UCO fob China prices rose 1.2pc in January, averaging $818/t, on the back of tightening supplies while demand remained muted. Market activity slowed down ahead of the lunar new year holiday, when collection rates lower, and flooding in key palm oil production regions has resulted in firmer crude palm oil prices, both of which provide support

Asia-Pacific biofuel price outlook *$/t*

Product	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	1Q24	2Q24	3Q24	4Q24	1Q25
Biodiesel											
RED Ucome fob China	1,058	1,012	982	977	1,007	1,018	1,001	1,098	1,174	1,133	1,097
HVO											
HVO Class I fob Singapore	2,077	1,854	1,689	1,463	1,420	1,473	1,452	1,668	1,895	1,879	1,886
HVO Class II fob Singapore	2,239	1,951	1,764	1,593	1,555	1,619	1,589	1,839	2,088	2,070	2,078
HVO Class III fob Singapore	2,162	1,908	1,715	1,484	1,449	1,507	1,480	1,700	1,923	1,906	1,914
SAF											
SAF Class II fob Singapore	3,017	2,940	2,783	2,692	2,659	2,649	2,667	2,603	2,511	2,437	2,446
Feedstock											
UCO fob China	881	798	808	818	814	837	823	889	945	914	889



to UCO prices. Buying interest from Europe has fallen as tensions in the Red Sea continue, resulting in rising freight rates for Asia-Pacific cargo.

Domestic US prices are at their lowest since December 2020 owing to an oversupplied D4 RIN market, but additional capacity coming on line may boost interest for feedstock.

UCO fob China prices should be close to a floor currently, and the coming holiday season may support higher prices as exports to Europe and the US slow down. But demand remains weaker than last year, which will we expect keep prices below $1,000/t this year, peaking at $957/t in September.

Trade

UCO and Ucome

Chinese biodiesel exports end year on high note

China exported 127,800t of biodiesel in December 2023, a significant rise of 53pc from the previous month, despite the EU instigating an anti-dumping duty investigation in the second half of the month, but year-on-year exports were down by 19pc. The month-on-month increase is understood to be a result of EU buyers looking to secure cargoes before potential anti-dumping duties kick in, as tipped by market participants.

China's total biodiesel exports reached 1.95mn t in 2023, up 9pc from 2022 and the highest yearly volume to date, despite concerns arising from multiple EU investigations into Chinese exports. Europe accounted for 96pc of Chinese biodiesel exports, with the Netherlands being the largest destination at 1.5mn t, owing to firm demand for waste-based biofuels. But 77pc of the exports arrived in the first eight months of the year and eased following the first of the EU's investigations into the Asia-Pacific biodiesel industry.

UCO exports surpass 2mn t in 2023

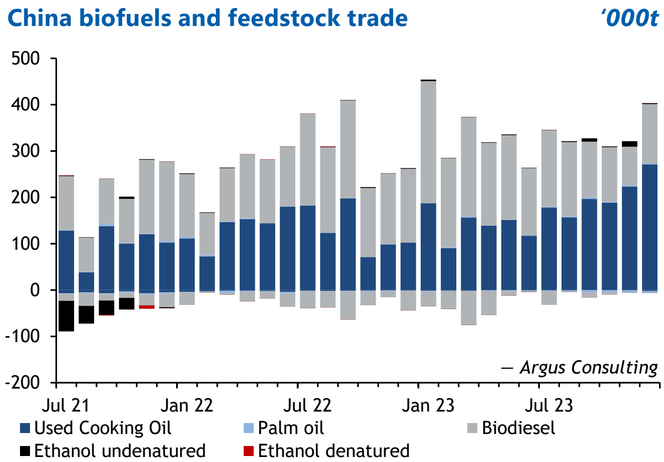
China's UCO exports rose to 271,000t in December, up 21pc from November and the second consecutive month in which exports stood at their highest volume to date. Exports to the US rose by 35pc to 144,300t, a new record high. Shipments to Singapore rose 27pc to 60,500t in December, a new record beating the previous high of 48,800t set in May 2023.

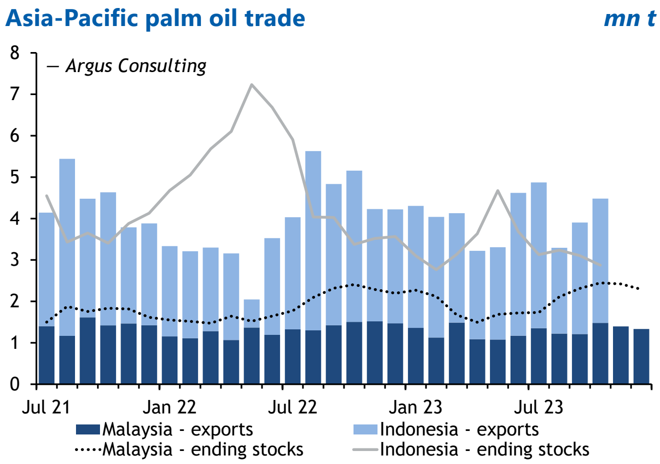
Total UCO export volumes reached 2.06mn t in 2023, a 30pc rise on the previous year owing to a likely drop in domestic consumption from biofuel producers as biodiesel, HVO and SAF fell within the scope of EU investigations, pressuring trade for finished products but increasing the volumes of UCO available for export.

Palm oil

Malaysia's stocks and exports tighten in December

Malaysia's palm oil stocks stood at 2.29mn t at the end of December, 4.5pc lower on the month and reflecting a similar





trend across the same period in the previous two years. Malaysia's palm oil exports fell 5.3pc to 1.33mn t, owing to a 13pc drop in crude palm oil production.

Flooding drives price hikes for palm products

Heavy rainfall and continued flooding in key production regions drove higher palm oil and waste biofuel feedstock prices in southeast Asia through January. Sellers in Malaysia and Indonesia have reported that the persistent rains have disrupted access to mills, slowing collections. Flooding issues are likely to persist in the near future, reducing palm oil output over the low harvest season between January and March, which will continue supporting higher prices for palm oil.

GLOBAL SUPPLY

Europe

Portuguese producer BioAdvance will soon open a 20,000 t/yr waste-based biodiesel facility at the port of Figueira da Foz in central Portugal. The company expects to increase production capacity at the plant to 200,000 t/yr within a three-year timeframe.

UK company Greenergy has completed expansions at its UCO-based biodiesel plants in the UK and the Netherlands, boosting production capacity at both plants by 25pc.

Lithuania has allocated €7mn ($7.6mn) to two projects that aim to develop biofuels produced from wastes and residues. The projects will produce up to 9,940 t/yr of oil equivalent from non-crop based feedstocks and must be built no later than 30 June 2025.

TotalEnergies has shut down units at its 500,000 t/yr La Mede HVO plant, possibly to convert the plant to run entirely on waste feedstocks, mainly UCO and tallow, instead of palm oil as it does presently.

Spanish oil company Repsol aims to increase the number of its service stations in Spain and Portugal offering HVO100 from 61 at present to more than 600 by the end of this year. The firm is also launching a pilot scheme that will make 100pc renewable gasoline available from three of its service stations in Madrid.

UK-based EQTEC and CompactGTL have set up a joint venture to open a waste-to-fuel plant in France, aiming to process 150 t/d of refuse-derived fuel from municipal waste into a synthetic crude. This would then be refined into around 11,700 litres/d of SAF, 8,650 litres/d of diesel and 5,000 litres/d of naphtha.

UK biofuel producer Hutanbio has secured £2.25mn ($2.86mn) from the Clean Growth Fund to further develop its diesel drop-in biofuel produced from marine microalgae.

Italian oil company Eni has signed an agreement to supply Irish carrier Ryanair with up to 100,000t of SAF in 2025-30 at selected airports in Italy. The product would come from Eni's biorefinery unit Enilive.

North America

US firm LanzaJet has opened the first alcohol-to-jet plant in Soperton, Georgia, with SAF production capacity of 9mn USG/yr, produced from sugarcane-based ethanol.

US refiner Phillips 66 has received environmental impact approval for its Rodeo refinery, allowing the 55,000 b/d renewable diesel plant to start production this quarter.

Canadian SAF developer Azure Sustainable Fuels has secured $40mn from Natural Resources Canada's Clean Fuels Fund, Canada Infrastructure Bank and the government of Manitoba to develop a 20,000 b/d SAF facility. The final investment decision is expected by 2025.

US companies Vertimass and Blue Biofuels have formed a partnership to build a 10mn USG/yr SAF and 2mn USG/yr bioLPG facility, using sugarcane-based ethanol as feedstock. A timeframe for the projects has not yet been disclosed.

The US Department of Agriculture (USDA) has awarded several biofuels companies a combined $19mn to expand access and infrastructure for biodiesel and ethanol in 22 states, under the Higher Blends Infrastructure Incentive Program. The USDA also recently awarded $15mn to three companies to fund the installation of E15 dispensers in the US.

South America

The Bolivian government expects commercial operations at its 1,500 b/d HVO plants in Santa Cruz and La Paz to begin this year, using UCO and animal fats as feedstock.

Brazil's state-controlled Petrobras plans to expand its 170,000 b/d Cubatao refinery in Sao Paulo to produce 2.7mn litres/d of renewable diesel and SAF from SBO and animal fats. Petrobras also plans to start testing co-processing at its southeast refineries to expand the availability of its R5 renewable diesel as part of its $1.5bn investment into biorefining in 2024-28.

Brazil's 3tentos plans to invest 1.04bn reals ($212mn) into building a 935,000 litres/d (5,880 b/d) corn ethanol plant in Porto Alegre do Norte, Mato Grosso, as part of its R2bn ($408mn) seven-year investment programme.

Brazilian fuel retailer Vibra Energia and corn ethanol producer Inpasa have signed an initial agreement to jointly explore production of green methanol from ethanol waste for maritime use.

Asia-Pacific

China has begun trial operations at a new 600,000 t/yr ethanol production facility in Huainan city, Anhui province, jointly developed by the Dalian Institute of Chemical Physics, Tanxin Technology and Shaanxi Yanchang Petroleum. The ethanol was produced from synthetic gases from coal, natural gas or steelmaking by-products and will be used for blending into the domestic gasoline pool.

South Korean refiner S-Oil has started producing co-processed biodiesel, bionaphtha, biopolypropylene and SAF from UCO and palm oil by-products at its 580,000 b/d Onsan oil refinery in southeast South Korea.

Indian state-controlled refiner IOC plans to open 300 ethanol pumps in India, as part of the country's plan to increase ethanol blending in gasoline to 15pc this year.

Japanese company Sumitomo and US-based Solariant Capital have signed an agreement to carry out a feasibility study into producing biodiesel from wood chips and bagasse. Solariant plans to build a pilot plant on Tanegashima island in Kagoshima, southern Japan, this year. The companies aim to begin commercial operations at the production facility by 2028.

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