

# JET FUEL INTELLIGENCE®

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## SUSTAINABLE AVIATION FUELS

### Shell and Neste Ramp Up Global SAF Ambitions

Fuel suppliers are jostling for position in a new global sustainable aviation fuel (SAF) market that could reach 12 million metric tons per year by the end of the decade.

This week saw early SAF mover Finland's Neste and its customer and soon-to-be rival European major Royal Dutch Shell both set out large-volume SAF plans.

#### Shell Plays Catch Up

Shell says it wants to produce 2 million tons/yr of SAF by 2025 and for 10% of its total airline fuels business to be SAF by 2030. The into-wing heavyweight published its own Decarbonising Aviation Flight Path this week, alongside a joint report with Deloitte on broader industry perspectives championing SAF over other technologies in the short term.

A new 820,000 ton/yr biofuels plant at Shell's former Pernis refinery in the Netherlands was approved last week that could produce over 400,000 tons/yr of SAF from 2024. More Shell SAF volume could come from a 100,000 tons/yr power-to-liquids SAF plant at Shell's former Heide refinery in Germany which could be up and running by the end of 2025, as well as from a slew of joint venture projects.

Shell is working with Dutch firm SkyNRG and Canada's Enerkem on SAF plants in Europe and with LanzaJet in the US, making the most of multiple production technologies.

The European major is also looking to scale up its SAF purchases from third parties, signing new offtake agreements with Red Rock Biofuels in the US and ECB in Paraguay over the last year. Shell already buys SAF from World Energy in the US and Neste in Europe to supply its huge roster of airline customers.

Neste's SAF production is meanwhile set to hit 1.5 million tons/yr by the end of 2023 with more capacity already in the pipeline. The firm's first "worldscale" renewable fuels refinery in Singapore is still on track to start production during the first quarter of 2023 with SAF production capacity of up to 1 million tons/yr.

A standalone SAF project at Neste's existing Rotterdam oil refinery will add a further 500,000 tons/yr to the firm's SAF production by the end of 2023 with a second world-scale plant in Rotterdam likely to follow soon after.

#### Neste Talks Up SAF

SAF got top billing in Neste's Sep. 23 Capital Market Day webcast. The firm's Executive Vice President for Renewable Aviation Thorsten Lange highlighted steady growth in SAF

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demand over the last 18 months, even as the Covid-19 pandemic destroyed airline demand for regular jet fuel.

With airline sustainability budgets largely intact and a heady mix of government policy and changing public perceptions all driving interest in SAF, Lange said Neste now has more than 30 SAF customers and is delivering low-carbon fuel to more than 20 airports across the globe.

The firm now expects global SAF demand to reach 12 million metric tons/yr by 2030, up from earlier estimates before the pandemic of 5 million-10 million tons/yr. As well as expanding production, the firm is shoring up future HEFA [hydrotreated esters and fatty acids] feedstock supplies buying US waste cooking oil aggregator Mahoney last year and Agri Trading earlier this month.

Lange said Neste was keen to make the most of its “first-mover advantage.” “We know the customers and already have a good team,” Lange said in response to a question about Shell’s ambitious SAF plans. Neste is currently Europe’s only commercial SAF supplier producing 100,000 tons/yr at its Porvoo refinery in Finland.

Lange told Energy Intelligence that the firm had no qualms about shipping SAF from Singapore to Europe or the US. He said a reverse shipment from Europe to Japan had been certified with 89.7% lower lifecycle carbon emissions compared to conventional jet, adding that emissions from transporting the fuel played a very minor role.

*Kerry Preston, London*

## AIR TRAFFIC

# Jet Demand Poised for Growth as US Lifts Travel Ban

The US decision to remove restrictions on vaccinated travelers from Europe and several other countries after 18 months could finally unleash pent-up jet fuel demand. The vibrant domestic market is keeping US jet consumption just 20% below pre-Covid levels at some 1.38 million barrels per day this year. Liftings are projected to reach at least 1.5 million b/d next year with more international flights. Vaccinated passengers from China, India, Brazil and South Africa are also now permitted entry to the US.

With travelers from Europe barred from the US for most of this year, European jet fuel demand is expected to fall 50% short of 2019 levels at some 748,000 b/d. But additional long-haul

flights to the US and elsewhere could lift European consumption by 25% to 939,000 b/d in 2022, according to latest Energy Intelligence projections.

The new US rules take effect from early November, which comes too late to appreciably boost global jet usage for the year. Energy Intelligence had projected that global jet fuel demand would average 6.1 million b/d for the second half of 2021, or some 1.9 million b/d below pre-pandemic levels.

More long-haul flights across the Atlantic would go a long way toward resurrecting international traffic, which was still 75% below 2019 levels this summer, according to data from the International Air Transport Association (IATA). Europe is by far the largest market for international traffic with a 19% share of global flows.

By mid-September trans-Atlantic flows from Europe to the North America were down by 45% versus 2019, Eurocontrol figures show. Traffic rates out of European airports have wide variations, with Athens in Greece showing a 30% deficit in passenger numbers in August versus 2019 as tourists flocked to the country. London Heathrow’s numbers were off by 75% due to limited trans-Atlantic flights and stringent UK protocols for air travel involving testing and quarantines.

European carriers that cut back flights on the lucrative trans-Atlantic corridor amid the US travel ban will benefit the most. Virgin Atlantic reported a 600% increase in bookings to the US on Monday following the announcement.

“Today’s announcement is a major step forward. Allowing access to the US for those vaccinated will open travel to the US for many who have been locked out for the past 18 months. This is excellent news for families and loved ones who have suffered through the heartache and loneliness of separation. It’s good for the millions of livelihoods in the US that depend on global tourism. And it will boost the economic recovery by enabling some key business travel markets,” said IATA’s Director General Willie Walsh.

### US - EUROPE DEMAND TRENDS

('000 b/d)	2019	2020	2021 <sup>f</sup>	2022 <sup>f</sup>	Chg. '21 vs. '20	Chg. '22 vs. '21
United States	1,737	1,078	1,380	1,531	28.0%	11.0%
Europe	1,476	645	748	939	16.0%	25.5%
OECD Europe	1,451	628	727	917	15.8%	26.1%
Germany	220	101	127	144	25.7%	13.4%
France	171	82	91	114	11.0%	25.3%
UK	267	107	122	180	14.0%	47.5%
Italy	104	38	47	60	23.7%	27.7%
Spain	149	52	69	83	32.7%	20.3%
Non-OECD	25	17	21	22	23.5%	4.8%
Europe						

<sup>f</sup>=forecast. Source: IEA, EIA, Jodi, Energy Intelligence

US airline executives report that corporate travel had jumped to 65% of 2019 rates in July from 30% in March. But the most profitable segment for airlines fell back to 50% in August amid a surge in the Delta variant and company decisions to push back return to work dates.

*Cristina Haus, New York*

## SPOT CARGO MARKETS

# Inflation Fears Drive Oil Prices Higher

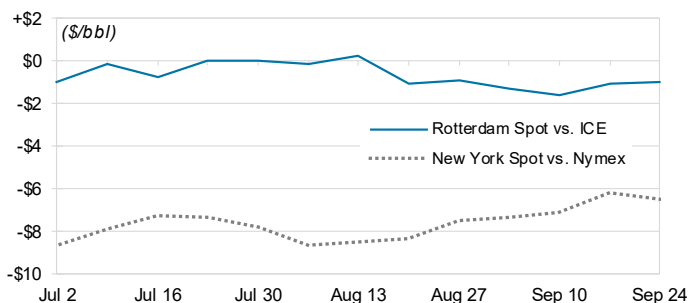
Oil prices continued their upward trend as inflation fears pulled more investors into commodity markets that are seen as a relative safe haven in times of global economic stress. Oil prices are an efficient hedge against inflation, and can be a profitable investment channel in their own right for funds that can cope with higher volatility. "Commodity markets are the best-performing asset class year-to-date, with gains of more than 25%," Rabobank commodity strategist Ryan Fitzmaurice said in a note Thursday. International benchmark Brent gained another \$1.58 per barrel this week to close at \$77.25/bbl Thursday, while US domestic price-pin WTI rose 69¢/bbl to end the week at \$73.30/bbl. Brent futures are up 37% since the start of the year.

US inflation topped 5% for the fourth month in a row in August as the post Covid-19 recovery continues. The Eurozone is seeing prices rise at their fastest rate in over a decade. Higher energy prices are a major contributor to inflation in Europe with the European Commission now accusing Russia of deliberately withholding gas supplies from the market in order to shore up prices. Several household energy suppliers have gone bust in the UK, which is also now facing gasoline and diesel shortages after Brexit labor rules compounded a shortage of fuel tanker drivers. BP was forced to close some of its branded service stations in the UK on Thursday when Exxon also confirmed shortages of some fuels in its retail network.

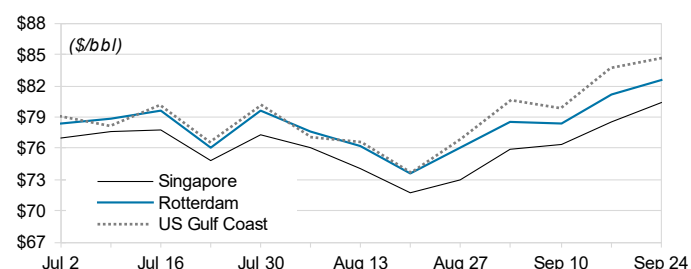
Most UK airports are served by pipeline rather than road tankers, making jet fuel supply disruptions far less likely, especially given the weakened state of airline fuel demand across Europe. Flight numbers were down 30% versus 2019 levels in the week to Sep. 23, according to Eurocontrol, with 86% of flights still within Europe and using comparatively little fuel. The US will finally allow fully vaccinated European travelers to enter the country from the start of November. US passport holders have been allowed to travel to and from Europe since mid-June.

Cargo premiums are rising in anticipation of November's restart of trans-Atlantic air travel. Into-wing heavyweight BP paid a \$25 per ton premium to October ICE gasoil futures for 30,000 tons of jet delivered into Le Havre Oct. 2-6 by China's Unipeac in Wednesday's

### JET-GASOIL SPREADS



### SPOT JET FUEL PRICES



### EUROPEAN QUARTERLY JET FUEL SWAPS QUOTES

(Bid/Offer Range in \$/ton, c.i.f. NWE)

Q	Chg.	Sep 24	Sep 17
Q4'21	30.25	675.75 - 676.75	645.50 - 646.50
Q1'22	22.25	668.75 - 669.75	646.50 - 647.50
Q2'22	19.25	661.00 - 662.00	641.75 - 642.75
Q3'22	16.25	656.50 - 658.00	640.50 - 641.50

Prices are live for midday. Source: FCStone

window. That is up from October plus \$21/ton traded last Friday when Swiss trader Vitol bought Sep. 30-Oct. 4 barrels into Le Havre also from Unipeac. Vitol bought another cargo from Unipeac for Sep. 27-Oct. 1 delivery into Rotterdam the same day at a Platts-related price. Firmer prompt prices are encouraging destocking with closely watched jet tanks in Amsterdam-Rotterdam-Antwerp falling to a 22-week low of 879,000 tons on Sep. 23, according to Insights Global. Jet stocks are now lower than year-earlier levels for the first time since the start of the pandemic but remain a third higher than 2019 levels. Insights Global noted import tankers discharging in Rotterdam from South Korea and the US.

Airlines are facing higher fuel bills as US jet fuel markets head into autumn with much tighter fundamentals. Extreme volatility in the oil complex kept jet fuel prices on edge, with a 5¢ per gallon surge in basis diesel futures to \$2.25 on Thursday recouping losses earlier in the week. Outright jet quotes climbed above \$2.10/gallon for only the second time since mid-May 2019. Chicago had the most expensive rates with differentials rising by 4¢ to 9.5¢/gallon below the October print amid active trade. Los Angeles spreads jumped by 5¢ to a 13¢ discount. Gulf Coast spreads climbed 1.5¢ to 18¢ below November diesel futures.

Imports are filling in for any shortfalls from ongoing refinery outages. About 500,000 b/d of capacity remains off-line in the aftermath of Hurricane Ida. Jet output jumped by 120,000 b/d to 1.38 million b/d in the week ended Sep. 17, with the Gulf Coast accounting for 75,000 b/d of that gain. Sales rose by 110,000 b/d to 1.47 million b/d and have more room to grow following the US decision to lift the ban travelers from Europe, China, India, Brazil and South Africa. US jet fuel stocks climbed by 180,000 barrels to 42.4 million bbl, with higher Gulf Coast jet supplies offset by lower tank levels in the Midwest and on the East Coast.

Asian jet markets strengthened even as the arbitrage flow of jet dipped and air traffic dropped in Asia's three largest aviation markets. Benchmark Singapore spot price differentials rose by 10¢/bbl to a premium of 4¢/bbl to Singapore quotes on Sep. 23. A total of 200,000 bbl of October-loading jet traded from Sep. 17-24 in the Singapore Platts trading window. BP snapped up all of that volume, with Aramco and Lukoil each selling 100,000 bbl. The arbitrage flow of jet from East of Suez to west of the canal dropped by 55,000 tons to 286,000 tons in the week starting Sep. 20, according to data intelligence company Kpler. Of those volumes, 94,000 tons loaded from Kuwait, 64,000 tons were taken from India, 44,000 tons loaded from the UAE and 42,000 tons from Japan. The cargoes are expected to arrive in Europe from Oct. 9-25, Kpler noted.

Scheduled airline capacity in Northeast Asia for the week of Sep. 20 dropped by 2.5%, outweighing gains in South Asia and Southeast Asia, according to aviation data analysis firm OAG. Capacity in South Asia for the same week rose by 1% while capacity in Southeast Asia jumped by 7.7% over that period, OAG added.

*Kerry Preston, London, Cristina Haus, New York and Freddie Yap, Singapore*

## IN BRIEF

**GX PLANS SAF PRICE ASSESSMENT** — A new market needs a new pricing benchmark and General Index (GX) is hoping to get in early with a daily spot assessment for sustainable aviation fuel (SAF) in Europe. In a Sep. 21 webinar, GX senior pricing analyst David Elward suggested that most SAF deals so far had been priced at a differential to c.i.f. northwest Europe jet cargo assessments. GX was looking to follow the market's lead and publish both the differential and resulting flat price on a daily basis. Elward invited the industry to submit their SAF deals to GX with the promise of confidentiality. "We're not taking a journalistic approach. We're not looking to generate new stories," he assured them, promising that details of any deals would only be used for verification and pricing, and not be made public. GX is now looking for industry input — particularly if the market wants any SAF price assessment to be on a f.o.b basis or at the airport gate, and if it wants prices to reflect neat or blended SAF. GX launched its fossil jet fuel assessment in Europe, alongside other oil products apart from fuel oil, on Sep. 2, 2020. Only its gasoline assess-

ment has gained any market traction so far with European major BP using GX pricing in a physical barge and gasoline swap deal back in April. GX pricing director Saket Vemprala said other oil majors were also considering GX for internal pricing, and also that airlines were looking at the cut-price assessments for upcoming jet fuel tenders. Legacy price providers Platts and Argus already produce refinery gate SAF price assessments based on the cost of making SAF from used cooking oil.

**AMERICAN BOOSTS SAF INVESTMENT** — American Airlines is investing \$100 million to become an anchor partner in Breakthrough Energy Catalyst to fund the development of sustainable aviation fuels (SAF). The Bill Gates-founded venture is bringing together companies, governments and private philanthropy to speed up adoption of four next-generation clean technologies that include SAF and green hydrogen. To help meet its goal of net zero by 2050, the airline has been taking delivery of SAF from Finland's Neste for more than a year and has committed to using 9 million gallons in total through 2023. It also has an agreement to purchase up to 10 million gallons of carbon-neutral SAF from start-up firm Prometheus Fuels. American's CEO Doug Parker said that, "we have an ambitious vision of a low-carbon future for our airline and a plan to match, but we know our own efforts can only get us so far. By working in partnership with Catalyst, we're helping accelerate and scale our industry's nascent solutions, like sustainable aviation fuel, along with other technologies that will be necessary to reduce emissions from aviation and across the economy."

**CATHAY PLEDGES 10% SAF** — Hong Kong's Cathay Pacific airline has committed to a 10% ratio of sustainable aviation fuel (SAF) in its total fuel usage by 2030, the company said in a Sep. 20 statement. The move is part of the airline's pledge to reach net-zero carbon emissions by 2050. The airline has also pledged to cut its absolute ground emissions by 32% from the 2018 baseline by 2030, through energy-saving measures and exploring renewable energy options in its premises and ground operations. The company has a deal to purchase 1.1 million tons of SAF over 10 years — which will cover around 2% of its pre-pandemic annual fuel requirements — from US-based Fulcrum BioEnergy. From 2024, Cathay Pacific expects to begin taking delivery of Fulcrum's SAF and using it on a wider basis for flights departing the US.

**INDIA'S RECOVERY GAINS PACE** — Domestic passenger traffic in August more than doubled in India to 6.7 million compared with 2.8 million in the same month last year, according to latest data from the Directorate General of Civil Aviation. Higher passenger flows are spurring recovery in jet fuel demand to about 100,000 b/d this month. Traffic rates jumped by 34% versus July but remained far below pre-pandemic levels of 11.8 million passengers in August 2019. The government has allowed carriers to operate at 85% of their capacity, up from 65% in July and 50% in May when a second wave of Covid-19 ravaged India. Domestic passenger traffic for the January-August period grew 15% versus last year to 46 million, the data showed.



## EUROPEAN SNAPSHOT

# Travel Pass Revives Jet Demand

European jet fuel demand jumped to 2.6 million tons in June with the start of the summer season. That was double year-earlier rates and a 20% jump from May, as the EU's digital pass spurred travel within the continent. But restricted long-haul flights to the US and elsewhere kept consumption about 60% below pre-pandemic levels.

Regional jet markets were oversupplied amid a steady flow of imports from the Middle East and Asia totaling 1.4 million tons. With refinery output rising to 1.7 million tons in June, total supply outstripped demand by 600,000 tons. Much of the that volume was held in offshore storage which kept tanks on land below 11 million tons. Refiners kept utilization rates at 75% of capacity but lifted middle distillate yields to 54% of output.

### EUROPEAN JET FUEL STOCKS ('000 tons)

Region	Jun <sup>p</sup>	May <sup>r</sup>	Apr <sup>r</sup>	Mar <sup>r</sup>	Feb <sup>r</sup>	Jun '21 vs.	
						May '21	Jun '20
UK	1,132	1,253	1,291	1,225	1,323	-9.7%	-24.6%
Germany	1,537	1,534	1,541	1,536	1,566	+0.2	+2.4
France	1,438	1,354	1,307	1,423	1,451	+6.2	-10.1
Italy	735	771	799	803	780	-4.7	-23.3
Spain	977	891	949	1,057	1,093	+9.7	-15.4
<b>Big 5</b>	<b>5,819</b>	<b>5,803</b>	<b>5,887</b>	<b>6,044</b>	<b>6,213</b>	<b>+0.3%</b>	<b>-13.3%</b>
Other OECD Europe	5,114	5,442	5,382	5,194	5,365	-6.0	-8.2
<b>OECD Europe</b>	<b>10,933</b>	<b>11,245</b>	<b>11,269</b>	<b>11,238</b>	<b>11,578</b>	<b>-2.8%</b>	<b>-11.0%</b>

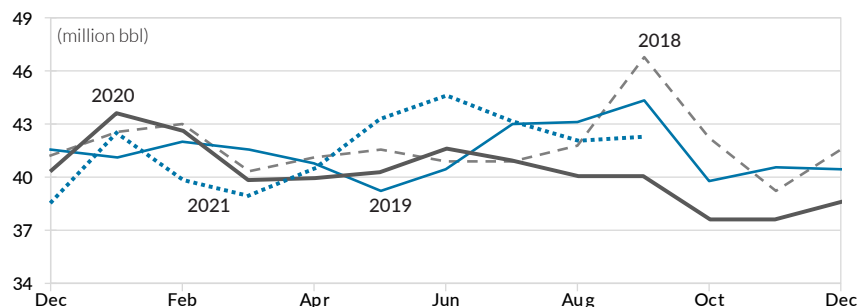
### SUPPLY, DEMAND & TRADE ('000 tons)

OECD Europe Middle-Distillates	Jun <sup>p</sup>	May <sup>r</sup>	Apr <sup>r</sup>	Mar <sup>r</sup>	Feb <sup>r</sup>	Jun '21 vs.	
						May '21	Jun '20
Refinery Runs	42,317	43,239	42,400	42,524	37,977	-2.1%	+10.1%
Utilization	74.9%	74.1%	75.0%	72.8%	72.0%	+1.1	+11.0
Mid-Distillate Yield	53.7%	52.4%	51.5%	52.2%	51.0%	+2.4%	-1.3%
OECD Europe Jet Fuel							
Demand	2,646	2,204	1,943	1,810	1,652	+20.1%	+113.2%
Production	1,716	1,525	1,330	1,387	1,207	+12.5	+51.6
Imports	1,418	2,001	1,668	1,516	1,486	-29.1	-19.7
Exports	846	867	700	1,068	951	-2.4	-20.0
Stock Change	-312	-24	+31	-340	-33	...	...

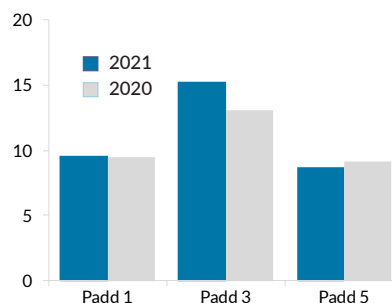
p=Preliminary. r=Revised. Latest available trade data. Sources: IEA

## US SUPPLY, DEMAND AND STOCK TRENDS AT A GLANCE

### US JET KEROSENE STOCKS



### REGIONAL STOCK LEVELS, SEP 17



### JET KEROSENE STOCKS

(million bbl)	2021					2020		Latest Levels vs.	
	Sep 17	Sep 10	Sep 3	Aug <sup>p</sup>	Jul <sup>p</sup>	Sep 18	Aug	Sep 10 '21	Sep 18 '20
East Coast (Padd 1)	9.6	9.9	9.9	10.1	10.3	9.4	9.8	-3.2%	+1.8%
West Coast (Padd 5)	8.7	8.8	8.4	8.4	7.2	9.2	9.5	-1.1	-5.3
Central (Padd 2-4)	24.1	23.5	23.5	23.5	25.6	20.4	20.8	+2.5	+18.0
<b>Total Stocks</b>	<b>42.4</b>	<b>42.2</b>	<b>41.8</b>	<b>42.1</b>	<b>43.0</b>	<b>39.0</b>	<b>40.1</b>	<b>+0.4%</b>	<b>8.6%</b>

('000 b/d)	2021				2020		Latest Wkly. Change	Aug '21 vs. Aug '20	Sep '21 vs. Sep '20
	Sep 17	4 Wk. Avg.	Aug <sup>p</sup>	Jul <sup>p</sup>	Aug	Jul			
Jet Refinery Output	1,382	1,348	1,409	1,446	851	836	+9.5%	+65.6%	+73.0%
% Jet Yield	8.7	8.7	8.6	8.7	4.9	4.9	+2.8	+73.8	+78.2
% Utilization	87.5	85.7	90.6	91.5	78.9	79.6	+6.6	+14.9	+14.9
Imports	219	236	223	145	166	166	-15.4	+34.4	-12.8
Sales	1,487	1,571	1,555	1,552	1,016	968	+8.1%	+53.1%	+60.4%

p=Preliminary. Source: US Department of Energy. Latest available data, including historical revisions.

# JET FUEL INTELLIGENCE DATA

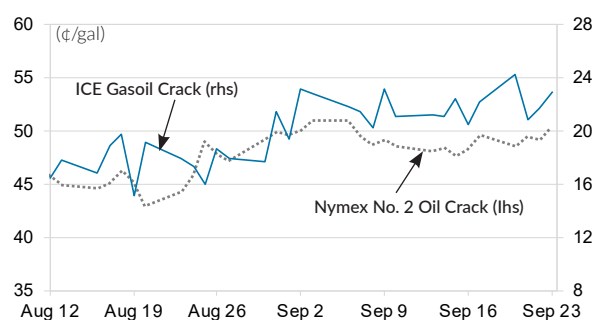
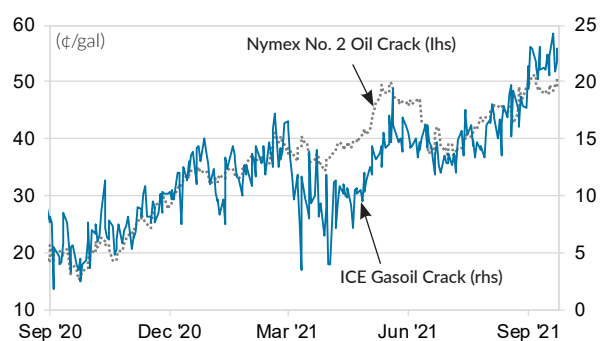
## PRICES IN SPOT CARGO AND FUTURES MARKETS

	ICE Prompt Futures (\$/ton)	European Spot Jet Fuel (\$/ton)*			Asian Spot Jet Fuel Markets (\$/bbl)†	
	Gasoil 0.1% Sulfur	NW Europe	Mediterranean	Mideast	Singapore	Japan c.i.f.
Weekly Trend	+8.24	+8.95	+13.51	+1.22	+1.52	+1.24
This Week	632.94	652.50	645.26	79.23	80.43	82.21
Previous Week†	624.70	643.55	631.75	78.00	78.90	80.97
Sep 6-Sep 10	605.00	620.70	618.72	59.81	76.43	78.59
Aug 30-Sep 3	606.05	622.00	614.47	75.33	76.25	78.53

	Nymex Prompt Futures (\$/gal)	US Spot Jet Fuel Markets (¢/gal)			
	NY Harbor ULSD	New York†	US Gulf†	Chicago*	Los Angeles†
Weekly Trend	+0.01	+0.08	+2.21	+3.81	+2.87
This Week	2.20	204.35	201.71	208.45	204.53
Previous Week†	2.19	204.26	199.50	204.64	201.66
Sep 6-Sep 10	2.13	195.97	190.72	200.98	200.04
Aug 30-Sep 3	2.15	197.21	192.47	199.28	203.97

r=Revised. Source: \*OPIS Worldwide Jet Fuel Report, †Thomson Reuters.

### DISTILLATE CRACK SPREADS - ICE vs Nymex



### KEY BIOFUEL PRICES

US (\$/gallon)	Sep 21	Sep 14	Chg.
<b>Futures</b>			
CBOT Ethanol	2.22	2.22	0.00
RBOB Gasoline	2.11	2.17	-0.07
<b>Spot market</b>			
Ethanol Midcont.	2.57	2.57	0.00
Ethanol NY Harbor	2.63	2.63	0.00
Ethanol US Gulf	2.64	2.64	0.00
<b>Europe (\$/ton)</b>			
<b>Futures</b>			
ICE Gasoil	620.00	615.00	+5.00
<b>Spot market</b>			
Gasoline	701.00	721.00	-20.00
Diesel	624.75	614.75	+10.00
<b>Biodiesel:</b>			
Fame O	1,595.00	1,540.00	+55.00
RME	1,320.00	1,280.00	+40.00
SME	1,950.00	1,700.00	+250.00
PME	1,400.00	2,410.00	-1010.00

Source: Thomson Reuters, Exchanges

### GLOBAL CARBON PRICES

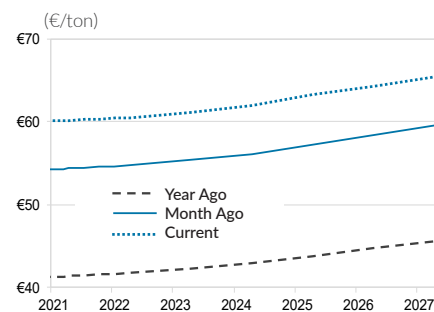
(€/ton)	Sep 21	Sep 14	Chg.
EUA Dec '20	60.16	59.85	+0.31
<b>US (\$/ton)</b>			
CCA (Calif) Dec '21	25.73	24.75	+0.98
RGGI (NE) Dec '21*	9.74	9.63	+0.11
<b>New Zealand (NZ\$/ton)</b>			
NZU (spot)	64.50	64.00	+0.50
<b>Asia (\$/ton)</b>			
	Sep 17	Sep 10	Chg.
China (National)	6.72	6.83	-0.11
South Korea	24.05	24.35	-0.30

### EU CARBON FUTURES PRICES



ECX front-month futures. Source: ICE

### EU CARBON FORWARD CURVE



ECX EUA forward curve. Source: ICE

Benchmark months. \*Short tons; all others metric tons. Based on given week's exchange rates. Source: ICE, OMF