Argus *Propylene and Derivatives*

Formerly Argus DeWitt Propylene

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HIGHLIGHTS

Americas

- Spot PGP for December trades higher
- December contract settles lower
- PP supplies tightening

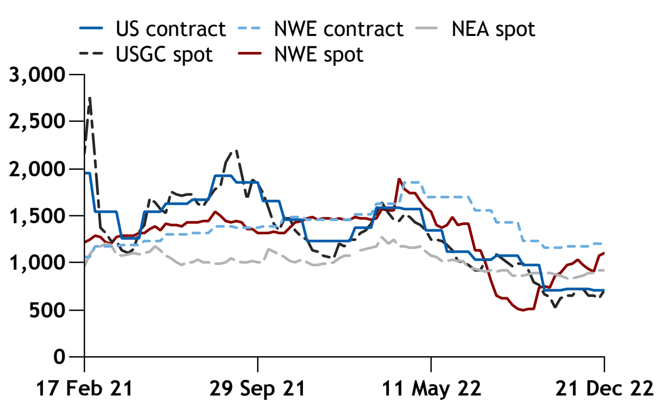
Europe

- PGP discounts narrow with supply issues
- Sharp fall in feedstock costs will drive January contract negotiations
- EU gas price mechanism will reduce potential for spiking utility prices

Asia-Pacific

- Asian propylene prices were stable with limited discussions
- Term negotiations will take place next week
- South Korea YNCC extended a cracker shutdown to end-February
- PP prices declined as spot trades waned

World PG propylene prices $/t



MARKET SNAPSHOTS

Global prices				$/t
	Timing	Low	High	Mid
US				
Poly grade USGC contract	Dec			705
Poly grade USGC contract	Nov			728
Poly grade USGC contract	Oct			705
Chemical grade USGC contract	Dec			672
Chemical grade USGC contract	Nov			694
Chemical grade USGC contract	Oct			672
Poly grade USGC pipeline spot		683	722	703
Refinery grade Mt Belvieu spot		336	347	342
C3 alkylation USGC calc value		1,479	1,521	1,500
PP Homo GP IM del EOR 16 Dec	Dec			1,257
Western Europe				
Poly grade NWE contract	Dec			1,207
Poly grade NWE cif spot		1,082	1,114	1,098
Chem grade NWE cif spot		743	775	759
PP Homo GP IM NWE del 16 Dec*	Dec			1,564
Asia-Pacific				
Poly grade Taiwan contract	Nov			905
Poly grade Taiwan contract	Oct			910
Poly grade Taiwan contract	Sep			900
Poly grade SE Asia cfr spot		870	910	890
Poly grade SE Asia fob spot		820	860	840
Poly grade NE Asia cfr spot		900	930	915
Poly grade NE Asia fob spot		880	910	895
Raffia cfr China 16 Dec		910	930	920

**freely negotiated monthly prices*

Acrylonitrile				$/t
	Timing	Low	High	Mid
USGC fob prompt *¢/lb*		60	61	61
China cfr spot		1,450	1,480	1,465

Related feedstocks				
	Delivery	Low	High	Mid
Ethane Mt Belvieu non-LST *¢/USG*	Dec	35.00	36.38	35.69
Propane Mt Belvieu non-LST *¢/USG*	Dec	63.00	64.88	63.94
Propane ARA large cargo *$/t*		507.00	513.00	510.00
Propane Argus Far East Index *$/t*				604.50
Butane Mt Belvieu non-LST *¢/USG*	Dec	91.50	92.88	92.19
Naphtha full-range cif USGC *¢/USG*		168.28	175.28	171.78
Naphtha 65 para NWE cif *$/t*		569.75	570.75	570.25
Naphtha Japan c+f *$/t*		622.00	625.75	623.88

Tables include hyperlinks to those values maintained in the Argus database.

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US/Canada

The traded range of US prompt-month spot polymer-grade propylene (PGP) increased this week to between 31¢/lb and 32.75¢/lb, with three December deals trading for a total of 13mn lb. The moderate spot price increase comes as several contract market participants agreed to a December PGP contract price of 32¢/lb. The settlement price represents a 1¢/lb decrease from November.

Multiple physical PGP spreads were also reported this week. Large volume activity was seen for December/Second Quarter 2023, indicating possible planned shutdowns.

Invista's 658,000 t/yr propane dehydrogenation (PDH) unit in Houston remains offline due to a turnaround originally planned for early 2023. The turnaround will involve debottlenecking to increase the capacity of the unit. BASF-Total's 1.14mn t/yr mixed-feed cracker in Port Arthur, Texas, is still offline for scheduled maintenance.

LyondellBasell's Equistar plant in Corpus Christi, Texas, reported olefins flaring on 19 December, and Dow Chemical's Freeport, Texas, light hydrocarbons unit (LHC-8) flared on 14 December due to a process upset caused by a flare vent valve malfunction.

The financial markets were more active this week, with third quarter 2023 paper PGP trading five times at 36¢/lb. Second quarter 2023 paper PGP traded once at 34¢/lb. A December physical PGP / Second Quarter paper PGP spread traded at 1.375¢/lb contango.

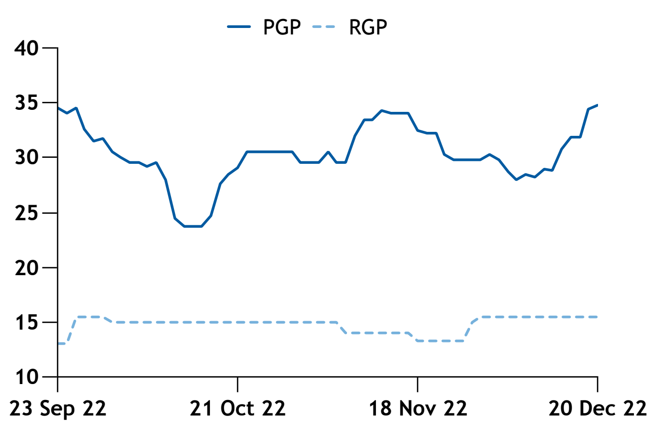
The premium of US PGP to US propane, the margin most integral for profitability at PDH units, increased to 19.60¢/lb, as propane prices continue to decline. Propane inventories in the US are 24.8pc higher year-over-year, as weakened demand and exporting delays have hampered the market.

December refinery-grade propylene (RGP) discussions failed to produce a deal this week, though January RGP pipeline

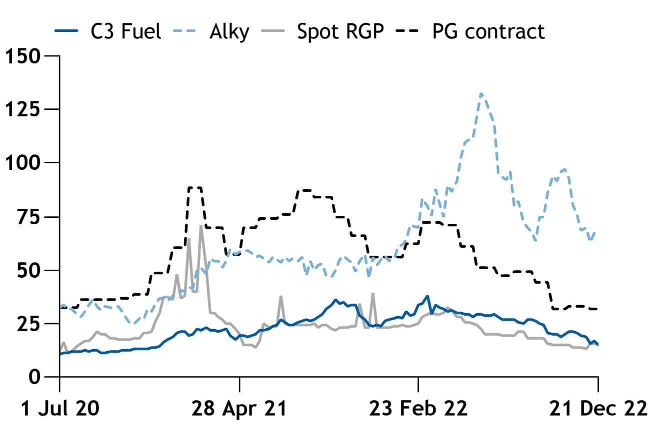
US prices				¢/lb
	Timing	Low	High	Mid
Propylene				
Poly grade USGC export spot		33.50	35.25	34.38
Poly grade USGC pipeline spot		31.00	32.75	31.88
Refinery grade USGC spot		15.25	15.75	15.50
Refinery grade USGC spot MTD	Dec			15.00
C3 alkylation USGC calc value		67.10	69.00	68.05
C3 fuel USGC calc value		14.50	15.50	15.00
Polypropylene				
PP Homo GP IM del EOR 16 Dec				57.00
Copolymer del EOR 16 Dec				59.00
Acrylonitrile				
USGC fob prompt		60	61	61

US contract pricing		
	$/t	¢/lb
Poly grade		
Dec	705	32.00
Nov	728	33.00
Oct	705	32.00
Chemical grade		
Dec	672	30.50
Nov	694	31.50
Oct	672	30.50

US Gulf coast spot propylene prices *¢/lb*



US propylene relationships *¢/lb*



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traded on 19 December at 15.50¢/lb. The December RGP pipeline assessment was unchanged at 15.50¢/lb throughout the week amid hushed negotiations.

December railed refinery-grade propylene traded at 25¢/lb on 20 December, the only railed RGP deal heard this week.

Refineries operated at 90.9pc of their operable capacity last week, according to this morning's data from the Energy Information Agency (EIA).

US Acrylonitrile (ACN) markets saw prices decline into the $1,340/t range, with market participants speculating year-end inventory to be partially responsible for sales.

US PP supply is tightening up as plants continue to slow operating rates, and as some operators shut down units in advance of an expected winter storm that is forecasted to take temperatures below freezing for two to three days along the US Gulf coast. One Texas producer was heard to be shutting down units in advance of the storm, though that information could not be immediately confirmed. Others said they would be implementing winter weather policies, but said many units are already running at low rates, so any further shutdowns should not be a major impact to the market.

Spot pricing has continued to hold fairly steady, with generic prime homopolymer heard discussed around 48-50¢/lb during the week, with thin availability. With PGP prices rising, market participants expect those spot prices to bounce higher in the new year.

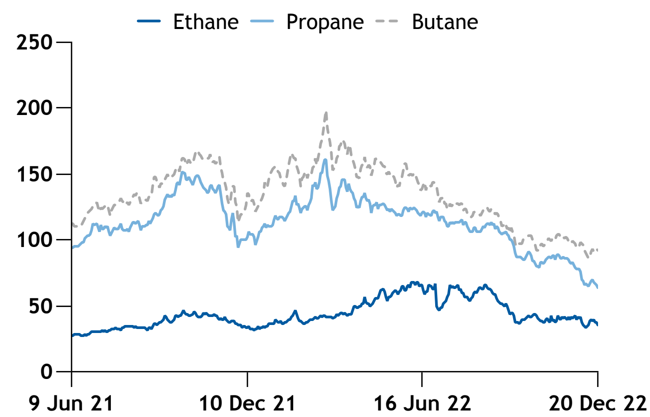
Preliminary November data from the American Chemistry Council (ACC), showed producers did a good job of cutting inventory levels last month by cutting production to the lowest level seen since February 2021, following the freeze that interrupted resin production throughout the US Gulf coast. Plants last month ran at around 68pc of total capacity.

PP sales rose slightly in November, with domestic sales leading the growth, rising by 2.7pc and exports actually falling by 34pc over the period. With sales far outpacing output, producers drew down inventories by around 143mn lb in November, taking days of inventory back to around 37 days, down from a high of 40 days in October. Inventory levels are still higher than normal, but market participants anticipate further draws due to weak operations this month.

Demand in December remains weak with converters taking extended time off during the end-of-year holidays. Weakness has been seen across multiple sectors, with US retail sales in November down 0.6pc from October in a larger decline than many economists had expected, according to the US Commerce Department. Some market participants said there are some sectors, however, that are seeing steady demand, including the automotive compounding sector.

December contracts are largely settling down by 4¢/lb, including a 3¢/lb margin decrease and a 1¢/lb decrease in December PGP contracts. So far, at least one producer, LyondellBasell has announced a 3¢/lb increase for January contracts in an effort to regain some of the margin lost toward the end of 2022.

US Gulf coast NGL prices *¢/USG*



Latin America

The political scenario is dominating the end of 2022 in Latin America. In Brazil, the new president, Luis Inácio Lula da Silva, has been announcing his ministry team, impacting the financial market and the R$/USD exchange rate in the short term. In Chile, Congress agreed on how the process of creating the country's new Constitution will be carried out. Peru is under a 30-day nationwide state of emergency, given the social crisis since the removal of the former president of that country, Pedro Castillo, on December 7. The Government of Bolivia is coordinating consular cooperation with Argentina and Chile to assist and evacuate citizens of these affected countries in different Peruvian regions.

Brazil did not export propylene in November, interrupting the monthly shipments from August to October. This year through November, the country exported 17,000t of propylene, mainly to Mexico, at an average price of $457/t. In 2021,

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Braskem moved the total propylene surplus from its Camacari, Bahia, cracker to its PP unit in Rio de Janeiro.

Naphtha imports in Brazil in November fell 67pc to 175,000t from November 2021, with 80pc fewer acquisitions from the US, which Russia replaced as the leading seller. The fall centered on Camaçari buys and aimed to reduce the input stocks in the face of a weak olefins demand at year-end, maximizing the naphtha buys from local suppliers. In November, the import price average was $830/t fob, 23pc higher than in November 2021. In the first eleven months of this year, naphtha imports were 4.100mn t, 19pc lower than in 2021, with the average price going up from $707/t fob in January to $830/t fob in November.

Brazilian resins distributors complain about imports competition from the Manaus Free Zone, which reached 81,900t of polypropylene (PP) this year through November, increasing 15pc from 2021, helped by 55pc growing imports from August to November year-on-year, reverting the 6pc fall from January to July. From January to November, distributors' total sales increased modestly, at 1pc compared with 2021.

PP monthly imports have been increasing since August comparatively with 2021, mainly stimulated by import tax reduction on 5 August and the no anti-dumping action renewal against PP imports from the US on 20 October. PP imports totaled 391,100t from January to November, falling 12pc year-on-year. Still, from August to November, PP imports jumped 48pc from 2021, helping Africa-Middle East and Asia-Pacific this year to climb their market share to 35pc and 26pc, while South American sellers fell to 30pc, losing in that period the top position. PP exports in the first 11 months of this year totaled 243,300t, 2pc more than in 2021 year-on-year, with 76pc going to South American countries. From January to November, Brazil's PP imports outweigh exports by 147,800t or $245.7mn.

With more available PP from the international market at very competitive prices, Braskem has been reducing PP domestic prices since June. In December, they fell $38/t, the seventh consecutive fall. The cumulative price contraction from June to December is $502/t, converted by the R$/USD rate of 5,2747 recorded in November's average.

Acrylonitrile exports from Brazil fell 18pc to 45,100t through November year-on-year, with the fall centered in Europe. From the total, North America had 55pc, Africa-Middle East 35pc, Europe 8pc, and South America 2pc. The export prices dropped from an average of $2,003/t in January to $1,250/t in November. Unigel, the Brazilian Group to which the acrylonitrile producer belongs, will produce methacrylic acid, green hydrogen, and green ammonia. The project will be based on wind energy and is expected to be online in late 2023, in Camacari Complex, in Bahia. Unigel plans to quadruple its green hydrogen and ammonia production until 2025 with a potential foreign partner.

Exports of acrylic acid and 2-ethylhexyl ester from January to November increased significantly compared with last year. For acrylic acid, exports were 12,700t, 81pc more than shipped in 2021 year-on-year, and for 2-ethylhexyl ester exports, they totaled 4,900t, 49pc more than in 2021. The acrylic acid production in Brazil will expand 105,000 t/yr with Basf's investment of $300mn. The acrylic complex in Camacri, Bahia, has 160,000 t/yr and 90pc of the current production stays in the country.

In Argentina, industrial production went up 3.5pc in October, compared with October 2021. Still, it fell 1.1pc from September. The cumulative index shows a 5.7pc growth through October year-on-year. The production of manufactured plastic products increased 6pc in October from October 2021 and 7.6pc through October year-on-year.

PP domestic prices are stable, rolling in November and December. In November, domestic sales exceeded expectations, and PP production had appropriated ethylene and propylene supply.

Argentinean PP imports fell 12pc to 123,600t through November 2022, year-on-year, with South American suppliers leading and increasing its market share from 65pc to 74pc at an average price of $1,799/t. On the other hand, in the same period, exports were 74,200T according to INDEC, with most volume driven to the region but shipped to confidential countries at the average price of $1,445/t cif for PP homopolymer and $2,000/t cif for PP copolymer.

In Colombia, the economic activity continued its monthly decline, falling 0.6pc in October from September. The annual growth for this year fell to 4.6pc, according to a projection in October by the National Administrative Department of Statistics (Dane).

Propylene preliminary import data showed Colombia buying 15,700t of propylene from the US in October, paying $691/t.

In Chile, amid an adverse economic scenario, PP imports and exports declined this year in the cumulative period through October. The imports fell 21pc to 47,500t, with the fall shared among all regions. The exports dropped 34pc to 32,800t, centered in South American countries.

WESTERN EUROPE

Propylene spot discounts have narrowed for PGP at the coast in the past week because of supply issues in northwest Europe. Demand in December has been at least as weak as expected, but managed by continued operating rate cuts at producers and downstream units. There are expectations that December will mark a low as the pressure to destock before year-end passes, but the lack of visibility in the supply chain is leaving most people cautious.

Spot PGP for January traded at a 10pc discount to the January monthly contract price (MCP) for 4,000t cif northwest Europe. This was a further narrowing from a previous discount of 13pc to the December MCP. Pipeline volumes have also been sold at a similar level. Wider discounts may still be available to consumers on a case-by-case basis from regular suppliers, but have not been considered as pure spot transactions this week. Chemical and refinery-grade propylene remain more challenging to manage. Floating storage is being utilised to help manage some off-spec refinery propylene in northern Europe, and many refineries are still consuming a significant portion of propylene internally as fuel.

Demand remains lacklustre in December with maintenance in the Amsterdam-Rotterdam-Antwerp region the main driver of renewed spot activity into January. The fire at a cracker in northern France is supporting some propylene demand into next year, with cargoes moving from the Mediterranean region to northwest Europe.

Cracker operators across Europe have reduced operating rates and taken some units off line for periods in the fourth quarter. Some of this has been to manage balances and some has been for necessary, unplanned or opportunistic maintenance. This pattern is likely to continue into the first quarter. But other crackers and downstream units that have been off line are in the process of restarting or planning to return in January. Others still will be expecting to lift cracker operating rates from where they have been in the past few weeks if demand improves. Managing the balances across all cracker products will remain challenging. Although there is capacity available to ramp up in theory, in practice it may prove more difficult because of planned schedules and the need to manage balances across the cracker products. As ever, ethylene rather than propylene will be the primary driver for operating rates.

A sharp decline in upstream oil and naphtha costs in December will be the main focus of negotiation for the January MCP. North Sea Dated crude prices have settled for now around \$80/bl, which is \$10/bl lower than the November average. The response to the G7 price cap has been muted so far, but the true impact has not been tested because Russian Urals crude is trading well below the \$60/bl price cap. An already complex market is becoming even more unpredictable and susceptible to the actions and policies of importers as well as exporters and will continue to create volatility. For now, average naphtha prices are €96/t lower in December so far than in November, according to *Argus* assessments.

High energy prices remain a major concern for the European chemical industry. EU energy ministers this week reached agreement on a wholesale gas price cap mechanism that is designed to prevent further spikes in prices, but does not lower prices compared with today. It caps TTF front-month, three-month ahead and year-ahead transactions on exchanges at €180/MWh if this level is reached for three consecutive days and if prices are €35/MWh above a reference basket for LNG. Contracts last traded above these levels in early October. The gas price cap will also indirectly help to cap electricity prices.

The proposed mechanism will be in place from 15 February 2023. Some parties remain concerned that under the condi-

Western Europe prices				€/t
	Timing	Low	High	Mid
Propylene				
Poly grade NWE cif spot		1,020	1,050	1,035
Chem grade NWE cif spot		700	730	715
Polypropylene				
PP Homo GP IM del spot 16 Dec*	Dec			1,475
Copolymer del 16 Dec*	Dec			1,545
Acrylonitrile				
Monthly feedstock cost delta	Dec			-109

*freely negotiated monthly prices

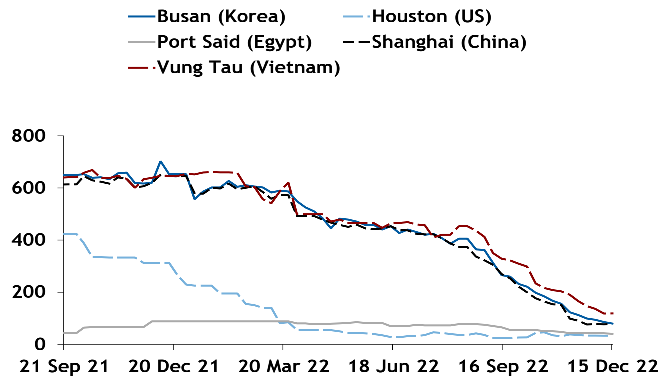
Western Europe contract pricing (MCP)		
	\$/t	€/t
Poly grade		
Dec	1,207	1,170
Nov	1,170	1,200
Oct	1,155	1,180

Western Europe feedstock prices		
	Price	Diff to previous month
Naphtha para 65 cif NWE barge averages (€/t)		
Dec (Month-to-Date)	559	-96
Nov	656	-28
Oct	656	+51

WESTERN EUROPE

Dutch gas prices and EU price cap level *€/MWh*

Polymer freight rates for Antwerp destination *$/t*



— Freightos, Argus

tions that could cause a potential price spike, the cap would constrain supply from the global market. For chemical and industrial users, some reassurance over price will be welcome, but they remain high historically and potential risks to supply are still a major concern.

Separately, national governments are separately still introducing energy bills designed to cap energy prices for customers. The details and eligibility vary and are still not clear in many cases, but in most cases they again limit potential increases in bills rather than significantly reducing them. Household and business budgets will remain constrained by higher energy costs, limiting spending and demand for other goods.

Derivative demand remains weak in December with operating rates reduced and some units off line. Some integrated producers indicate significantly higher nominations for January, although this says more about the weakness in December than the strength of recovery in January. Many others are cautious and are yet to see evidence of higher orders working their way up the supply chain, although this could come next month. Expectations of a significant fall in propylene contract prices could add to any demand impetus in January, especially if upstream crude prices were to rebound and propylene prices globally become more aligned.

Fundamentals remain weak in the European polypropylene (PP) market on the back of persistently soft demand. Market participants remain focused on destocking ahead of their financial year ends, while expectations of further bearishness on prices in the first quarter is discouraging buyers from taking any speculative positions on inventories in December. Besides running lines at reduced run rates, some converters have also shut down lines ahead of the festive season holidays and expect to restart them in January.

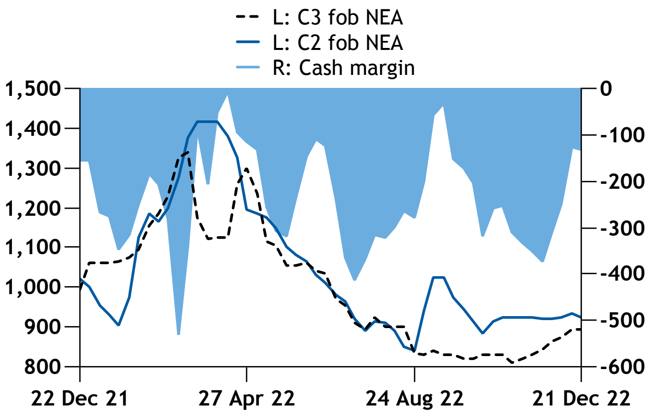
Against this backdrop of fundamental weakness but disciplined plant run rates, outcomes have been mixed in December for PP contract prices. With feedstock propylene's December MCP settling at a €30/t decrease, producers had stepped forward offering €20-30/t decreases on December PP contract prices to defend margins or create buffers, especially as electricity prices in Europe remain at multiples of historical averages and keep costs high. Consequently, many instances of settlements have so far been reported at decreases of around €30/t. But some buyers have also succeeded in securing steeper decreases of as much as €60/t.

The PP spot market in Europe also remains slow. The low end of prices still remains under pressure from imports, also helped by the weaker freight rates on container shipping routes and reduced delays on these lanes. Volumes now being shipped would arrive in Europe in February at the earliest. But buyers are not in a rush to procure volumes, and as such are leveraging these offers to extract lower prices on domestic supplies.

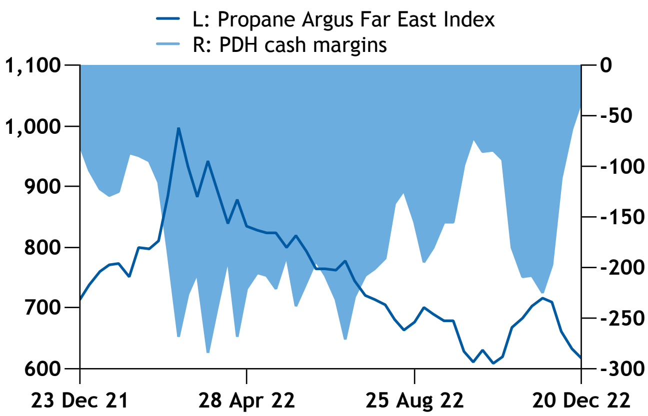
Propylene oxide production rates remain constrained, not least by the continued shutdown of one large unit in ARA, which was idled in November and December because of weak demand and high energy costs. This could restart in January.

ASIA-PACIFIC

Asian cracker cash margin spot $/t



PDH cash margin, based on propane AFEI $/t



Upstream and cracker margins

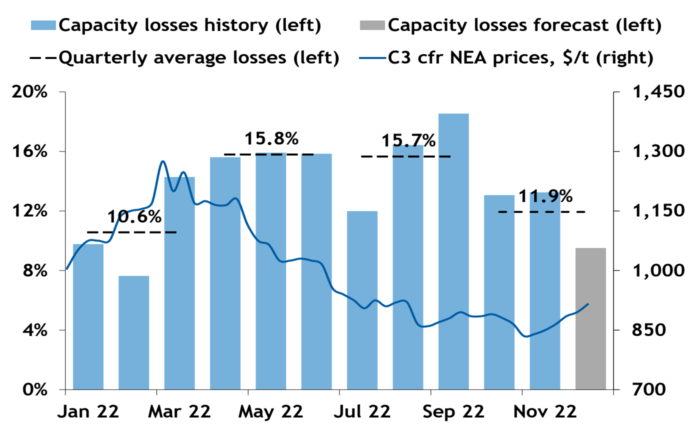
Feedstock naphtha prices inched up this week to an average of $629/t cfr Japan, up by $6/t. Propane prices extended losses again this week to an average of $617/t cfr Japan, down by $15/t. Cracker production margins remained in negative territory, with naphtha-based cracker margin settling lower at minus $133/t, down by $7/t, and propane-based cracker margins at minus $62/t, up by $28/t. PDH margins improved this week to negative $25/t, up by $29/t.

Production losses are expected to be around 9.8pc in December, up by 0.4 percentage points compared with the initial forecast because of extended shutdowns at Hebei Haiwei and Zibo Xintai's PDH plants in China. South Korea's YNCC will extend its cracker turnaround to the end of February 2023, while

Asia-Pacific prices	Timing	Low	High	Mid	$/t ±
Poly grade propylene					
SE Asia cfr spot		870	910	890	-10
SE Asia fob spot		820	860	840	-10
NE Asia cfr spot		900	930	915	0
NE Asia fob spot		880	910	895	0
east China domestic *Yn/t*		7,350	7,450	7,400	+100
Sinopec east China domestic *Yn/t*				7,300	-100
Polypropylene					
Raffia cfr China 16 Dec		910	930	920	+25.00
Copolymer cfr China 16 Dec		920	940	930	+25.00
Acrylonitrile					
China cfr spot		1,450	1,480	1,465	-10.00
Propylene oxide					
del east China *Yn/t*		9,000	9,400	9,200	+300
del east China		1,048	1,094	1,071	+32

Asia-Pacific contract pricing	$/t	€/t
Poly grade Taiwan		
Nov	905	860
Oct	910	908
Sep	900	921

Asia propylene capacity loss, 2022 %



Taiwan's Formosa Petrochemical is yet to decide the restart date for its No.2 cracker. Thailand's SCG is still in discussions about whether to extend the shutdown at its Rayong Olefins cracker. Philippines's JG Summit is considering shutting its

ASIA-PACIFIC

cracker in the first quarter of 2023 as a result of weak production margins. Most crackers operators are likely to run at reduced rates moving into the first quarter of 2023 as production margins show no signs of recovery. Propylene production losses are forecast at 6pc for January, before declining to 4.5pc in February.

Propylene

The following deals were done in the past week:

- Buying ideas: $900-910/t cfr northeast Asia, January arrivals.
- Selling ideas: $925-930/t cfr northeast Asia, January arrivals.

Asian propylene prices were stable this week as market participants adopted a wait-and-see approach after cfr northeast Asia prices reached a four-month high last week, resulting in limited deals done and fewer discussions.

Sellers continued to hold their offers firm at $925-930/t cfr China for January arrival cargoes. But buying interests were subdued as downstream demand and margins remained weak. Buying ideas for January arrivals were quoted at $900-910/t cfr China.

Term negotiations in China and South Korea are yet to be concluded. Market participants expect most Chinese participants to begin or finalise their negotiations next week, with an anticipation of higher premiums at about $30s/t to cfr northeast Asia assessments. Sellers are generally trying to quote higher premiums compared with last year's term contracts, but the weak economics in the petrochemical chain in both upstream and downstream sectors this year might weigh on final premiums. Term negotiations for 2022 had been concluded at $20-30/t to cfr northeast Asia assessments on a cfr northeast Asia basis.

Modest losses in polypropylene futures this week resulted in lower domestic prices. Ex-tank prices in east China edged down from Yn7,425/t early this week to Yn7,400/t on 21 December, equivalent to $932/t on an import parity basis. Sinopec dropped its list price in east China to Yn7,300/t on 21 December, down by Yn100/t from last week.

Sentiment and prices weakened slightly in east China, but domestic propylene prices in the Shandong region rebounded mid-week as downstream participants emerged to snap up cheaper feedstock. Propylene prices in Shandong were initially lower at Yn7,200-7,300/t on 19 December, before rising to Yn7,370-7,400/t on 20 December and then falling to Yn7,350-7,400/t on 21 December.

Zhejiang Satellite restarted its 450,000t/yr No.2 propane dehydrogenation (PDH) unit in mid-December. Jinneng Tech-

Outages

Shutdown	Plant	KTA	Duration
Restarted			
CPC No.2 RFCC	RFCC	400	earlyOct-22Nov
PRefChem	Cracker	730	23Oct-lateNov
IRPC	Cracker	190	midOct, 45 days
Zhejiang Petrochemical	PDH	600	10-27Nov
Luxi Chemical	MTO	180	11Nov, 20 days
Chandra Asri	Cracker	490	11Nov-3Dec
Guangzhou Jvzhengyuan	PDH	600	30Nov-11Dec
LG Chem Yeosu No.1	Cracker	600	23Sep-8Dec
Zhejiang Satellite No.2	PDH	450	1Dec, 20days
Ongoing			
Formosa No.2	Cracker	515	11Jul-earlyDec, extended
Nanjing Chengzhi No.1	MTO	170	7Aug, restart unclear
Puyang Far East	PDH	150	27Jun, restart unclear
Indian Oil Panipat	Cracker	650	1Sep, extended
SCG ROC	Cracker	400	15Sep-endDec, extended
YNCC No.3	Cracker	270	1Oct-endFeb, extended
Zhejiang Xingxing	MTO	300	19Oct-Dec
Hebei Haiwei	PDH	500	10Nov, restart unclear
Chambroad	MDH	115	23Nov, 40-50days
Zibo Xintai	PDH	300	4-2HDec
Yangzi Petrochemical	Cracker	175	7Dec, restart unclear
Jiangsu Sailboat	MTO	470	10-11Dec, restart unclear
Jinneng Technology	PDH	900	15Dec, 30 days
Expected			
PTTGC I4 No.2	Cracker	40	EarlyFeb23, 2months
Ningbo Fund	MTO	300	endNov, delayed
Tianjin Bohua	PDH	600	Jan, 45 days
JG Summit	Cracker	280	Likely Q1
New plants			
Wanda Tianhong	PDH	450	Onspec early Nov22
Liaoning Kingfa	PDH	600	Onspec 28Nov22
Shenghong Petrochemicals	Cracker	550	Onspec 1Dec
Sinopec Hainan	Cracker	500	Late Dec 22
Guangdong Petrochemical	Cracker	600	Dec 22 or Jan 23

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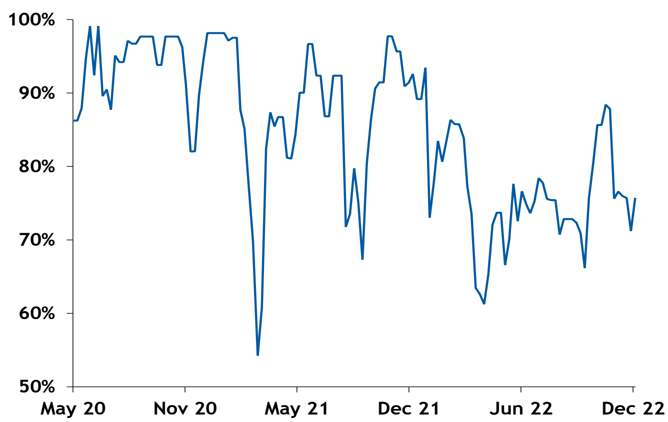
China PDH operating rates %



nology began a scheduled turnaround at its 900,000t/yr PDH plant on 15 December for a month. Average PDH operating rates dropped to 72pc this week, down by four percentage points compared with the last session.

Persistent weak margisn across Asia resulted in extensions in cracker shutdowns. South Korea's YNCC decided to further extend its No.3 cracker turnaround to the end of February 2023. As a result, the company cancelled a planned turnaround at its No.2 cracker, which was to begin in February. YNCC's No.3 cracker has a nameplate production capacity of 500,000t/yr of ethylene and 270,000t/yr of propylene.

Taiwan's Formosa Petrochemical has not decided an exact date for the restart of its No.2 cracker, in view of eroding production margins.

Malaysia's PRefChem emerged for a sale tender for a 2,300t, 29-30 December loading cargo this week, with bids due by 22 December. The company has been selling propylene in the market as its downstream polymer units will restart only in January.

Discussions were subdued in southeast Asia with market participants anticipating buying ideas hovering at $850-870/t cfr southeast Asia this week. Cfr southeast Asia prices were assessed marginally lower at $870-910/t this week as a result of weaker sentiment in the region.

Philippines's JG Summit is considering shutting its cracker during the first quarter of 2023 in response to weak production margins. The cracker has a production capacity of 480,000t/yr of ethylene and 240,000t/yr of propylene. The exact start date of the shutdown and the duration are still being discussed.

Polypropylene (PP)

PP prices in China edged down this week following weaker spot trades which weighed on sentiment.

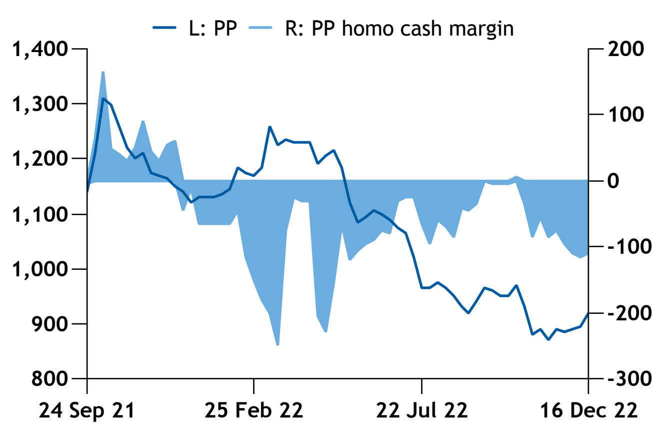
PP futures fluctuated mildly this week. But trades for PP fiber grade continued to stay robust as Covid-19 cases surged across the country after the easing of the zero-Covid policy, despite demand waning slightly compared with the previous week. Demand for PP raffia was even weaker. Trading activity was subdued by poor transportation and shortage of manpower. The plastic woven industry kept operating rates at 45pc, while run rates for biaxially-oriented PP stayed at 64pc.

Major Chinese producers' inventories of PP and polyethylene fell to 585,000t on 21 December, down by 25,000t from 610,000t on 14 December. Average operating rates at Chinese PP plants increased to 82pc, up by two percentage points from the previous week. Qingdao Jinneng decided to extend the maintenance at its 450,000 t/yr unit to late-January 2023, an extension of a month from the original end date of 30 December.

Ex-works prices for PP raffia were assessed at Yn7,750-7,900/t in east China, or an import parity equivalent of $906-924/t. PP co-polymer prices were assessed at Yn7,950-8,100/t ex-works in east China, down by Yn100/t from the previous assessment's high end.

The Chinese import market fell slightly in light of few fresh offers and buying interests. South Korean producers offered January-loading PP raffia and PP injection with $910-920/t cif China, while PP co-polymer with 3pc import tariff was at

PP homopolymer non-integrated margin $/t



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$950/t cif China. Deals were done for PP raffia and PP injection at $910/t cif China. Trading firms were offering $920-930/t cfr China for PP raffia and PP injection. Meanwhile, offers for PP co-polymer were at $930-940/t cfr China with no deals concluded.

PP raffia prices were assessed at $900-920/t cfr China, down by $10/t from the previous week's assessment. PP co-polymer prices were assessed at $910-920/t cfr China, down by $15/t from the previous week.

Export trades were muted this week. Chinese producers offered PP raffia at $1,020-1,040/t fob China, while domestic trading firms quoted re-exporting PP raffia at $980-990/t fob China. There were limited notional buying ideas at $910-920/t fob China for PP raffia. Freight rates from China to Vietnam were at $15-20/t, while ates from China to India and to Latin America were at $40/t and $60/t, respectively, according to market participants. Export prices for PP raffia were assessed at $920-980/t fob China, unchanged from the last assessment.

Propylene oxide (PO)

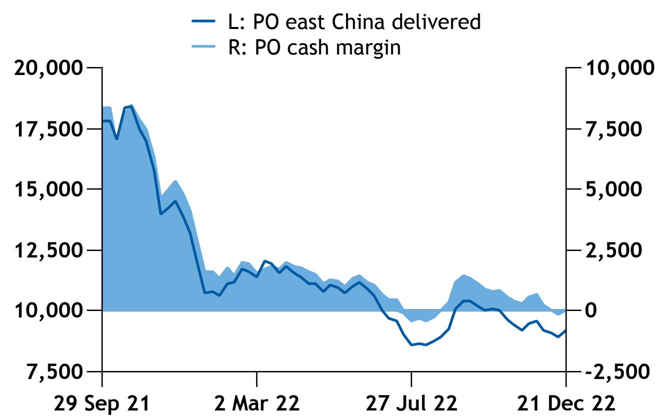
China's domestic PO prices rebounded modestly this week because of reduced supplies following plant shutdowns. But demand remained weak with more downstream producers opting to go for an earlier lunar new year holiday, capping PO price gains.

Delivered PO prices in east China rose to Yn9,000-9,400/t, up by Yn200/t or about $1,105/t on an import parity basis. There were limited imports discussions in the cfr China market with some traders looking for new PO arrivals from the Middle East by the end of the month.

Outages at PO plants led to slightly improved sentiment this week. Jiangsu Yida's 150,000t/yr PO plant went for shutdown on 14 December, with the restart date unclear. Sinopec Changling's 100,000t/yr PO unit was also shut for maintenance on 14 December for 15 days. Meanwhile, Sinochem Quanzhou restarted its 200,000t/yr PO line on 16 December. Qiaixng Tengda's 300,000t/yr PO unit is still operating at reduced rates of 50pc. The average operating rates this week were at 64pc, down by five percentage points compared with a month earlier.

Ongoing weak downstream demand, despite the lifting of the zero-Covid policy in most cities, weighed on PO sentiment. Some downstream polyether foam producers opted for earlier lunar new year holidays as domestic demand struggled to show

PO non-integrated margins *Yn/t*



any signs of improvement. December is also a typical lull season for PO, underscoring anticipation from market participants that PO prices might weaken in the coming weeks.

China imported 11,642t of PO in November, the lowest since August 2017 as a result of weak demand. Thailand exported the most to China in November at 8,643t, followed by Japan at 2,999t. Year-to-date imports were at 288,480t, with Saudi Arabia being the biggest exporter at 123,719t or 43pc, followed by Thailand at 101,694t or 35pc and South Korea at 51,944t or 18pc.

PO margins for non-integrated chlorohydrin-based producers inched up to Yn1,850/t this week, up by Yn175/t compared with the last session. Average month-to-date margin settled at Yn1,667/t.

Acrylonitrile (ACN)

Domestic ACN prices in east China increased slightly this week as a result of active stocking up among downstream players. But buying interests could wane with limited discussions moving forward, as more downstream participants will take a break for lunar new year holidays.

Ex-tank prices for ACN in east China rose to Yn9,600-9,700/t, up by Yn50/t or equivalent to $1,185/t on an import parity basis. Discussions for cfr northeast Asia were subdued as players in China prefer to procure domestic supplies because of cheaper prices. The cfr northeast Asia prices were assessed lower at $1,450-1,480/t, down by $10/t compared with last week.

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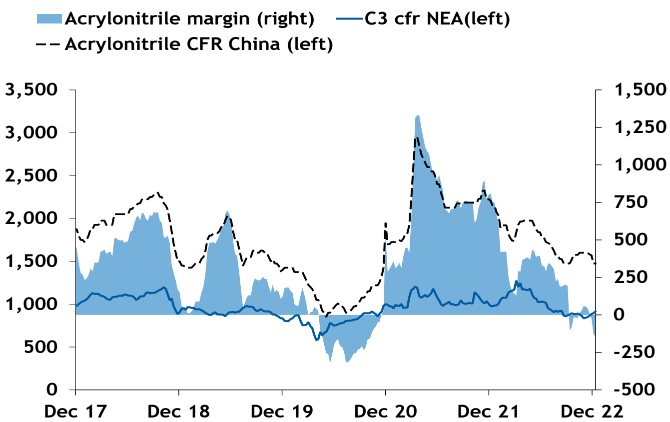
Non-integrated ACN margins $/t



Some producers opted for reduced operating rates because of squeezed margins. Keruer reduced its 260,000t/yr ACN plants to 75pc in response to weak margin. Most ACN operators are operating at 70-100pc this week, while Liaoning Kingfa is still operating one out of its two 130,000t/yr ACN units. Average operating rates in China dropped to 71pc, down by two percentage points compared with the last session.

The firmer sentiment seen this week is because of concerns about absent of workers owing to surging Covid-19 cases in China, leading to building up of inventories, according to market players.

China flipped to an exporter of ACN this year as more ACN capacities came online since late 2021. China exported 18,729t of ACN in November, and imported 12,908t. Year-to-date exports were at 209,304t, while imports shrank to 97,244t, down by 106,530t or about 52pc compared with 2021.

Estimated non-integrated ACN production margins in China remained in negative territory this week at minus $222/t, down by $13/t compared with two weeks earlier. Margins for other non-integrated Asian producers were at minus $158/t, down by $31/t.

Downstream outages

Shutdown	Plant	KTA	Duration
Changshu Changchun	Ph/Ac	300/180	30Sep-18Nov
Ningbo Formosa	Ph/Ac	300/180	1Nov, 2 mths
Ningbo Formosa	Ph/Ac	100/63	1Nov, 2 mths
Kingboard Huizhou	Ph/Ac	185/110	4Nov-10Nov
Saudi PetroRabigh	Ph/Ac	275-160	1Dec, 1 mth
Wanhua Chemical	Ph/Ac	400/250	started 18Nov
Guangxi Huayi	Ph/Ac	175/105	to start up in Q1 23
Shenghong Petrochemical	Ph/Ac	400/250	to start up in Q1 23
Yangnong Chemical	Ph/Ac	300/180	to start up in endDec
Sinochem Ruiheng	Ph/Ac	400/250	to start up in Q1 23
Shandong Haili	ACN	130	28Mar-20Nov
Shandong Keruer	ACN	260	10Nov, 10-15days
CPDC	ACN	130	20July-11Nov
Anqing Petrochemical	ACN	210	29Oct, 60 days
Shanghai Secco	ACN	130	12July, restart unclear
Liaoning Kingfa	ACN	130	started earlyNov
Jiangsu Sailboat	ACN	260	7Dec, restart unlcear
Zhonghai Fine Chemicals	PO	62	1Nov21, restart unclear
Jinling Huai'an	PO	100	14Oct21, restart unclear
Nanjing Hongbaoli	PO	120	MidApr, restart unclear
Jilin Shenhua	HPPO	300	9Oct, restart unclear
S-Oil	PO	300	15Sep-10Nov
PTT	PO	200	endOct-midDec
Qixiang Tengda	HPPO	300	started midNov
Jiangsu Yida	HPPO	150	14Dec, restart unclear
Sinochem Quanzhou	POSM	200	27Nov-16Dec
Sinopec Changling	HPPO	100	14Dec, 15 days

Phenol/acetone

China's phenol market declined this week owing to losses seen in upstream benzene. Subdued buying interests also weighed on sentiment, causing prices for phenol and acetone to drop to multi-month lows.

Ex-tank prices for phenol in Jiangsu were hovering at Yn7,700-8,000/t, down by Yn150/t compared with last week or about $925-961/t on an import parity basis, the lowest since February 2021. Acetone prices were also lower at Yn5,500-5,800/t ex-tank, down by Yn200/t, the lowest since early November.

Inventories and imports are likely to stay low. One of the main sellers to China from a Saudi Arabian producer started a-month long turnaround at its 275,000/160,000t/yr phenol/acetone plant in December. But recent low stocks did not underpin sentiment as much as anticipated as buyers were only buying on a need-to basis.

More capacities are coming up during end of December to

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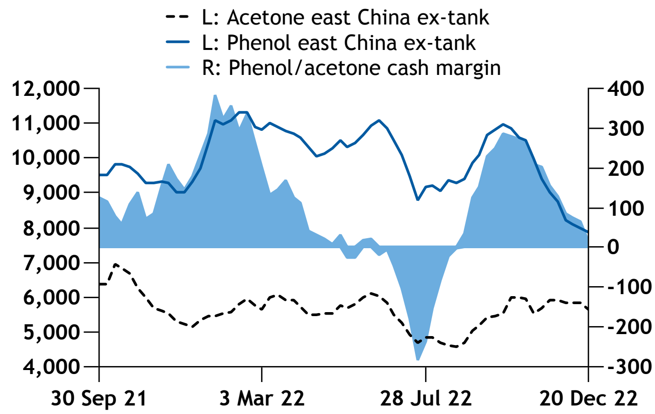
first quarter of 2023. Yangnong Chemical's 300,000/180,000t/yr phenol/acetone plant is likely to start up by the end of December. As many as three new plants are slated to come online by the first quarter of 2023, totalling up to 975,000t/yr of phenol and 605,000t/yr of acetone production. The additional capacities are also exerting pressure on phenol/acetone outlook, with market participants now adopting a wait-and-see approach before the restocking spree ahead of the lunar new year.

Losses in phenol prices this week led to production margins falling to \$16/t for non-Chinese phenol producers, down by \$58/t compared with two weeks earlier. Other Asian producers' margins flipped into negative territory at minus \$55/t, down by \$70/t.

Phenol non-integrated margins



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