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Argus *Ethylene and Derivatives*

Formerly Argus DeWitt Ethylene

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HIGHLIGHTS

Americas

- EPC ethylene prices rise moderately
- Export interest surge over the prior week
- Buying resumes at Port Arthur cracker
- Calvert City cracker down

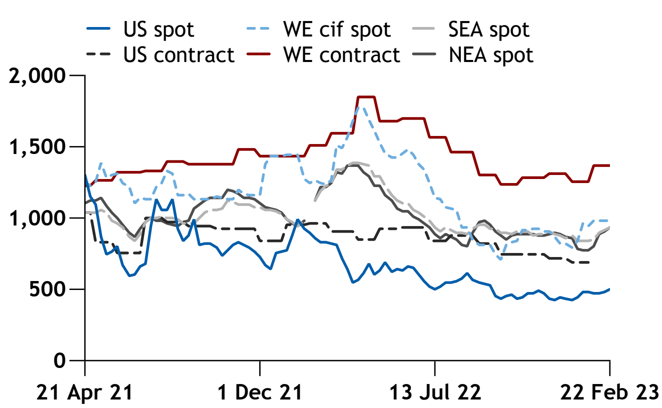
Europe

- The European ethylene market is very quiet
- Cracker margins remain poor even with lower natural gas prices
- Demand for key derivatives PE/PVC is reasonable but the market is cautious

Asia-Pacific

- Asian ethylene rose again on supply constraints
- Crackers raised production rates as margins improved
- China launched a second new cracker in February
- Sentiment in China improved on signs of an economic recovery

World ethylene prices $/t



MARKET SNAPSHOTS

Ethylene global prices				$/t
	Timing	Low	High	Mid
US				
Contract net transaction price	Jan			689
Pipeline del USGC spot		479.5	512.6	496.0
Month to date average spot prompt	Feb			481.7
Month to date average spot				481.9
Western Europe				
Contract MCP	Feb			1,369
NWE pipeline spot, del		935.6	988.7	962.2
Med spot, cif		1,060.0	1,195.0	1,127.5
NWE spot, cif		950.0	1,015.0	982.5
Asia-Pacific				
Taiwan contract	Jan			915
Southeast Asia spot, cfr		920.0	950.0	935.0
Northeast Asia spot, cfr		920.0	950.0	935.0
Northeast Asia spot, fob		960.0	990.0	975.0
China domestic truck ex-tank		930.0	943.0	937.0
Sinopec east China truck ex-tank				930.0

Polyethylene global prices				$/t
	Timing	Low	High	Mid
US, del EOR, 17 Feb				
LDPE liner film HC	Feb			2,183
LLDPE butene-1 film HC	Feb			1,896
HDPE blow mold HC del	Feb			1,918
Western Europe, del NWE, 17 Feb				
LDPE liner film	Feb			1,823
LLDPE butene-1 film	Feb			1,653
HDPE blow mold HIC	Feb			1,461
Asia-Pacific, cfr CMP, 17 Feb				
LDPE liner film spot		1,080	1,100	1,090
LLDPE butene-1 film spot		980	1,000	990
HDPE film spot		1,000	1,030	1,015

Related feedstocks				
	Delivery	Low	High	Mid
Ethane Mt Belvieu non-LST *¢USG*	Feb	23.13	24.75	23.94
Propane Mt Belvieu non-LST *¢USG*	Feb	80.50	84.00	82.25
Propane ARA large cargo *$/t*		651.50	657.50	654.50
Propane Argus Far East Index™ *$/t*				722.25
Butane Mt Belvieu non-LST *¢USG*	Feb	124.50	128.00	126.25
Naphtha full-range cif USGC *¢USG*		177.56	185.56	181.56
Naphtha 65 para NWE cif *$/t*		727.25	728.25	727.75
Naphtha Japan c+f *$/t*		723.50	733.00	728.25

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

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US/Canada

The traded range for prompt-month spot deals at Enterprise Products Partners (EPC) cavern at Mont Belvieu, Texas rose moderately from the prior week, trading between 21.75-23.25¢/lb. Traded volumes totaled 45mn lb for February physical EPC ethylene. March EPC ethylene discussions failed to produce a deal over the prior week.

March paper ethylene traded once at 20.625¢/lb on 21 February, with fourth quarter 2023 paper ethylene trading twice at 20¢/lb on that same day. A second half 2023 paper ethylene strip traded at 19.75¢/lb. Financial ethylene trades totaled 9mn lb.

Texas "other" ethylene buying cooled, trading one time at 22.50¢/lb.

Choctaw, Louisiana, ethylene traded six times for February delivery and twice for March. Traded ranges for Choctaw, ethylene for both months was 18.50-19¢/lb, with a volume total of 38mn lb.

US prices				¢/lb
	Timing	Low	High	Mid
Ethylene				
Contract net transaction price	Jan			31.25
Contract net transaction price	Dec			32.50
Contract net transaction price	Nov			34.00
Pipeline del USGC spot		21.75	23.25	22.50
Month to date average spot prompt	Feb			21.85
Month to date average spot	Feb			21.86
Related assessments				
EG fiber grade contract marker, exw		37.00	38.00	37.50
EG antifreeze, USGC spot		19.50	20.50	20.00
EDC export, fob USGC		9.50	10.50	10.00
Polymers, 17 Feb				
LDPE liner film HC del EOR	Feb			99.00
LLDPE butene-1 film HC del EOR	Feb			86.00
HDPE blow mold HC del EOR	Feb			87.00
PVC pipe HC del EOR	Feb			67.50

The premium for EPC ethylene in Mont Belvieu, Texas over Choctaw, Louisiana, ethylene narrowed this week after previously nearing record highs, surpassing 5¢/lb the week of 13 February. The spread between the two locations was partially driven by the lack of derivative demand in Louisiana, which has since begun to return.

The recent price movements in ethylene come as US ethane prices have reached a 22-month low, declining alongside natural gas prices. February EPC ethane fell to 24.125¢/USG on 21 February, the lowest since 22 April 2021.

With the decline in ethane prices, ethylene cracking margins have widened. Ethane margins reached 11.86¢/lb on 21 February, according to *Argus* data. The cracking margin for propane also remains profitable, with a value of 4.32¢/lb. Ethylene cracking margins for N-Butane and Light Naphtha remain negative.

Ethylene export interest surged over the prior week, with market participants noting increased demand for late March and early April delivery.

Buying resumed at Baystar's 1mn t/yr cracker in Port Arthur, Texas, with the unit believed to be on schedule to attempt a restart sometime this week. Westlake Chemicals Partners (Opcos) 331,000 t/yr ethane-cracker in Calvert City, Kentucky is down for the month of February for a turnaround.

Polyethylene (PE) operations in February remain somewhat constrained with some ongoing force majeures continuing to keep supplies tight. Ineos Olefins & Polymers is continuing to operate under a "force majeure event" following a hit from a January tornado. Sources indicated that some production is believed to have restarted, but that full operations are not expected until March. Chevron Phillips Chemical also remains on force majeure on PE produced out of its Cedar Bayou, Texas, plant. Sources have said the part plant operators were waiting on has arrived, but it could take some time for the plant to return to normal operations. A few other minor issues were heard, as well as some operational upsets in the Mexico market.

Supplies are tight for most grades, with high density polyethylene (HDPE) high molecular weight film and blow molding among the tightest grades. Sources said material is obtainable for shipment within a few days if buyers are willing to pay higher prices, but producers are not actively seeking buyers in the spot market.

Preliminary January data from the American Chemistry Council (ACC) showed total PE production last month rose to 4.8bn lb, up by 16pc from December levels, but down by 0.2pc from January 2022, according to data from the ACC's Plastics Industry Producers' Statistics Group as compiled by Vault Consulting. Average operating rates rose to 83pc, up from around 72pc in December.

Total Sales in January fell to 4.532bn lb, down by 0.7pc from December, with exports down by 12.7pc and domestic

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sales up by 10.3pc from the prior month. Sales are up by 5.6pc from January 2022 levels, according to the ACC.

With output exceeding sales, producers added around 288mn lb to inventories in January, with the bulk of that (208mn) from linear low density polyethylene.

Demand in February is continuing to improve, but market participants said it is still below typical levels. Part of the weaker demand is believed to be due to buyers who are holding off on orders as much as possible, trying to push producers to give up efforts to push through February price increases.

Producers are pushing for increases of between 3-5¢/lb on top of the January 3¢/lb increase, though buyers argue that demand is not strong enough to support further price hikes.

Export prices have continued to inch higher and availability remains limited. US prices are still largely competitive in global markets.

The US polyvinyl chloride (PVC) market is in continued negotiations for domestic February contracts this week as producers look to implement a 4-5¢/lb increase while many buyers hope to see a shallower price rise. Export prices have remained flatter this week as momentum in the export market has shown some weakness, creating a nominal price range between $830/t-$860/t.

Sales for January 2023 totaled 1.45bn lbs, or roughly 656,633 metric tonnes (t), according to the ACC. That's a near 25pc improvement from the prior month and 13.5pc better than January 2022.

Domestic sales growth was the major driver of the improvement, while export totals remained at a high point. Domestic sales grew 40pc from December to 853.5mn lbs, or roughly 387,132t, in January. Exports grew 7pc from December to 594.1mn lbs, or 269,500t, in the same timeframe. Exports, while higher than the prior month, fell from 48pc of all sales in December to 41pc in January after domestic sales grew substantially.

Production also increased 21pc from December to 1.41bn lbs, or roughly 638,351t, in January. Capacity utilization rose to 90.3pc, the highest figure since September 2022 and a sharp increase from the 74.7pc utilization in December.

With sales outperforming production, inventories declined by 40.3mn lbs, or 18,282t. Days of supply fell to 15.5 days, compared to the more than 20 days available in December.

Most buyers have said they are either at or above projections for the beginning of 2023, but these projections had been set low on expectations of a very poor market. Those in the construction sector especially had initial expectations of a weak market due to persistently high interest rates that show no immediate sign of easing. A more optimistic outlook has emerged among some market participants, but the general outlook remains that the highpoint for demand in 2023 may not reach those of the prior two years.

Latin America

In Brazil, domestic ethylene demand is weak in February, which is already a short month and host to carnival this year from 18-22 February. That is the usual period when petrochemical producers shut down the units for maintenance or to hold new projects. Indeed, the ethylene supply was reduced from 15 January after Triunfo's ethylene/PE unit ethanol-based shutdown to conclude the 30pc expansion project. It should be ready to run at full capacity by the end of 1Q23, going from 200,000 t/yr to 260,000 t/yr.

The new government has announced increasing the minimum wage above inflation to R$1,320 ($255) from May and income tax exemption for people who earn below R$2,640 per month ($511). The two measures will increase the purchasing power of the poorest population, pushing polyolefin's domestic consumption.

There is reduced naphtha supply in the country, with Petrobras' refinery, Refap, in the south, and Refinaria de Mataripe (Acelen), in the northeast, in maintenance since January. Refap's fluid catalytic cracking unit (FCC), responsible for naphtha and propylene production, should return from turnaround between February-end and early March. Refinaria de Mataripe has two FCC units down, with no news about when the units will resume. Braskem manages its naphtha inventories by increasing imports and tracking its cracker's operational rates with demand.

Brazil imported 540,600t of naphtha in January, 51pc more than in 2022, to balance the lack of feedstock from those two refineries. Europe was the top seller with a 52pc market share priced at $710/t, surpassing North America, the usual leader, which lost 20 p.ps to 43pc at $795/t. Africa-Middle East had 5pc at $655/t, and there were no buys from South America.

There are no plans to export ethylene from Brazil in 2023 as in 2022.

In February, Braskem rolled over low-density PE (LDPE) domestic prices and increased R$350/t ($67/t) the linear-low den-

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sity (LLDPE) and high-density (HDPE). In the last 12 months, Brazilian PE domestic prices cumulated a price contraction of $173/t for HDPE, $183/t for LLDPE, and $279/t for LDPE, converted by the R$/USD rate of 5,2007 recorded in January's average.

In January, PE imports in Brazil reached 147,100t, climbing 58pc from January 2022, amid lower domestic supply and reduced import duties, mainly for LLDPE, which import tax fell from 11.2pc in November 2021 to 3.3pc in August 2022. From the total, 75pc were acquired from North America priced at $1,160/t, which market share jumped from 58pc in January 2022. South America sold 16pc, losing 8 p.ps, at $1,454/t, and Africa-Middle East had 5pc at $1,119/t. Europe and Asia-Pacific had 2pc each. Brazilian PE exports fell 21pc from January 2022 to 42,700t. South American countries acquired 59pc, Asia-Pacific 23pc, and Europe 16pc. Brazil's PE trade balance showed imports surpassing exports by 104,380t, or $131.3mn.

In January, there were no Brazilian styrene (SM) imports, contrasting with January 2022, when 16,500t were acquired from North America priced at $1,354/t.

There were no ethylene dichloride (EDC) imports in January, with Brazilian units running according to plans. In January 2022, the country imported 11,200t from the US priced at $1,032/t.

Brazilian ethylene glycol's imports in 2022 January were 18,300t, 28pc fewer than in 2022, mainly acquired from the US at the average price of $457/t fob, falling from $562/t in January 2022.

In Argentina, inflation jumped, recording 6pc in January, cumulating an interannual rate of 98.8pc. Despite that, the government maintains the 30pc inflation target in the first half. In 2022, the country's inflation was 94.8pc year-on-year.

Restrictions on imports favor domestic producers, increasing their sales by reducing competition even with high prices.

Ethylene supply is tracking the demand and there is no delivery interruption.

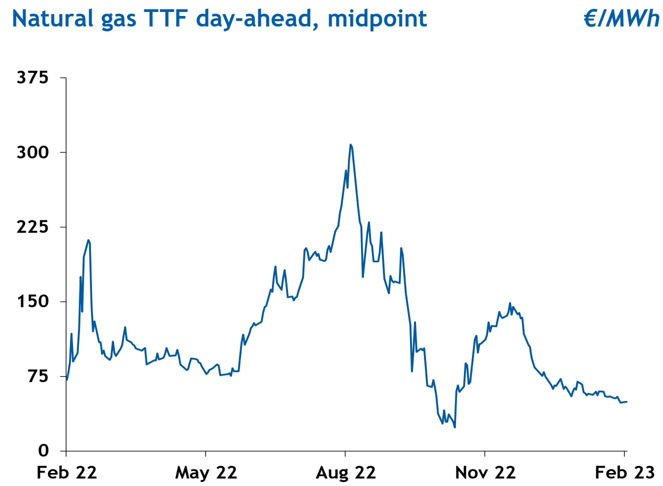
There are no plans for importing ethylene in 2023. Argentina imported 35,800t from the US in 2022, centered in July and August, during the cracker maintenance.

PE imports in 2022 increased 12pc from 2021, reaching 360,400t. Still, in 4Q22, there was a sharp decrease in imports due to limited dollars acquisitions, even with falling global PE prices from 1,818/t in January to $1,762/t in December. North America was the top supplier in 2022, with 40pc market share, surpassing South America, which fell to 35pc. Africa-Middle East had 13pc, while Asia-Pacific and Europe had 6pc each.

On the other hand, exports increased 12pc in 2022 to 261,200t at the average price of $1,670/t, according to INDEC, with most volume recorded to South America, but under a confidential country destination.

Due to improved local demand, styrene (SM) imports in Argentina in 2022 grew 49pc from 2021, totaling 11,900t. The US led with 59pc market share, Saudi Arabia had 30pc, and China 11pc.

EUROPE



Western Europe prices	Timing	Low	High	Mid
Ethylene				
Contract MCP €/t	Feb			1,260.00
Contract MCP €/t	Jan			1,175.00
Contract MCP €/t	Dec			1,270.00
NWE pipeline spot, del €/t		880.0	930.0	905.0
Med spot, cif $/t		1,060.0	1,195.0	1,127.5
NWE spot, cif $/t		950.0	1,015.0	982.5
Related assessments, del NEW				
EG fiber grade contract €/t	Jan			790.00
EG fiber grade contract €/t	Dec			850.00
EG fiber grade contract €/t	Nov			870.00
Polymers, 17 Feb				
LDPE liner film €/t	Feb			1,710.0
LLDPE butene-1 film €/t	Feb			1,550.0
HDPE blow mold HIC €/t	Feb			1,370.0
HDPE injection mold €/t	Feb			1,370.0
HDPE HMW film €/t	Feb			1,415.0
PVC pipe €/t	Feb			1,560.0

Western Europe feedstock prices	Price	Diff to previous month
Naphtha para 65 cif NWE barge averages (€/t)		
Feb (Month-to-Date)	668	+28
Jan	640	+78
Dec	561	-94

The European ethylene market is quiet and balanced. Producers have settled on an operating rate that works for them and with little new in terms of unplanned events there has been limited need to deviate in the past two weeks. There is a certain amount of optimisation between buyers and sellers across their various assets, but the net effect is minimal and mostly dealt with swaps. The spot market has been very quiet with nothing reported. Demand remains weak but stable for key derivatives PE and PVC and ethylene buyers are still very cautious with their volume nominations safe in the assumption that if they need more it will be available.

Modelled cracker margins remain close to breakeven despite the reduction in energy and natural gas prices. Natural gas prices — TTF day-ahead — fell below €50/MWh in recent trading, the lowest they have been since October last year and closer to the long-term pre-June 2021 average, which was well below €25/MWh. The lower gas price is a benefit to producers but not enough to offset the low operating rates and poor product margins. European producers are also not rushing to switch back into gas usage where they have found alternatives. Pressure remains to minimise gas usage to support the Ukrainian cause and the European energy balance, but this will recede as the spring advances. For producers that use ethane sourced in Europe and priced against natural gas, there is benefit from the lower gas prices. But in some cases, producing more natural gas for the European system is a higher priority and for others the ethane has found a different use in the site's energy balance so is not finding its way into the cracker.

While gas prices have fallen North Sea Dated crude has tracked sideways this month averaging just €0.11/bl higher than in January. Naphtha has strengthened relative to crude and is €26.70/t higher this month compared with January. Naphtha is being underpinned by demand from the gasoline pool and as European buyers have begun to look for substitute supplies following the EU's imposition on 5 February of a ban on seaborne imports from Russia. Since 2019 Russia has been the largest naphtha importer into Europe — in 2022 this amounted to 9.9mn t or nearly 40pc of that import market. European buyers have been replacing the volume most significantly from Spain and Algeria, but this new optimisation has a logistical cost. Demand from the gasoline pool is being capped by rising transatlantic freight rates and a rise in US gasoline stocks, but a large refinery maintenance programme in the US will support gasoline exports into the spring and as a consequence support the relative strength of naphtha to crude.

EUROPE

European buyers — operating in euros — have been impacted by a strengthening of the US dollar since the start of February, moving to 1.066 from 1.09.

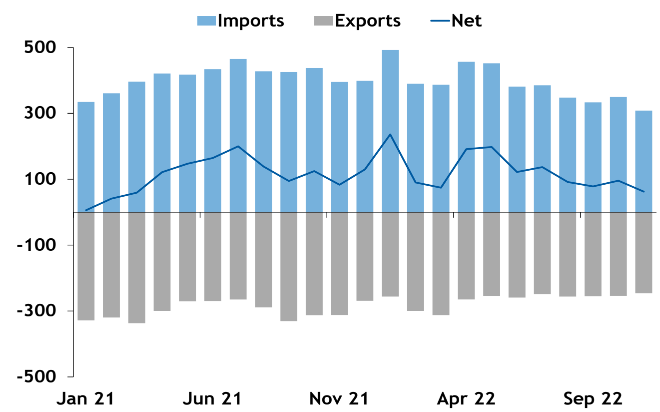
The European contract price for March (MCP) will be negotiated next week. Buyers will continue to push for lower prices citing poor demand and import pressure from other regions where ethylene prices are lower. But producers feel they have little room to manoeuvre, cracker margins are poor or even negative and lower prices will do nothing to garner additional demand, at least in the short term. Lower gas prices — as they feed through to consumers — should start to improve consumer confidence but this will take time assuming stability is maintained.

Cracker operations in Europe are stable, mostly reduced to balance the weak demand. Bad weather in the Mediterranean region did disrupt operations over the past couple of weeks but that is now normalising. A cracker in France remains off line with an estimated restart of mid-March and a cracker in the UK — off line since late 2020 — is scheduled to restart later in the year.

PE demand has been reasonably stable at the start of the year. Producers are not suggesting demand is good but there are elements of PE demand that are relatively resilient to an economic downturn. There is import pressure, but this is more in terms of price than volumes.

Total PE imports into the EU 15 fell steadily from May through to November last year and are likely to have been even lower in December as demand weakened and consumer confidence fell. Exports also fell but less significantly, leaving net PE trade more balanced as the year developed. Imports are likely to increase in the first quarter as imports fixed late last year feed through, but volumes are likely to have been capped by the continuing uncertainty regarding key feedstock price evolution and consumer demand.

EU15 net PE trade *'000 mt*



— Eurostat/Argus

PVC operating rates remain low across the European region hampered by slow demand and a weak caustic market. PVC prices are firming but buyers are resisting a full pass through of 50pc of the €85/t ethylene price movement in February. Demand from the window profile and pipe sectors is reasonable but converters remain cautious about their forecasts for the key spring period. Demand in January was better than December as converters wanted to restock to some extent and February order intake has also been better than the pessimists expected.

Lower gas and energy prices since December are giving some relief to European MEG producers although the demand remains muted, both into the PET and antifreeze segments. The prospect of an EU anti-dumping investigation against Chinese PET could allow domestic producers to increase operating rates later this year, increasing demand for MEG, but it remains uncertain if any duties will be implemented. Europe is a net importer of MEG and operating rates have been supported by lower imports from the US this quarter.

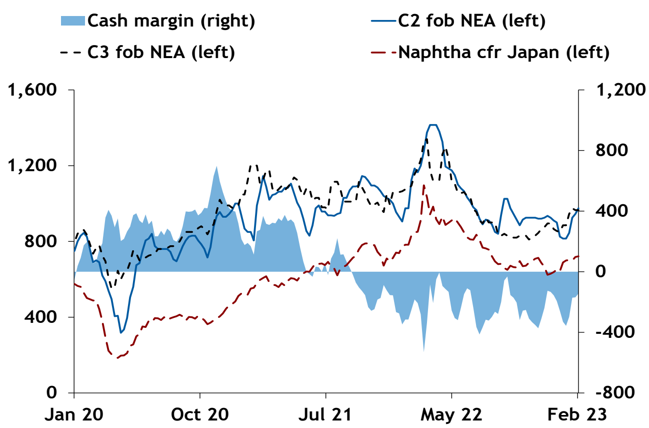
ASIA-PACIFIC

Upstream and cracker margins

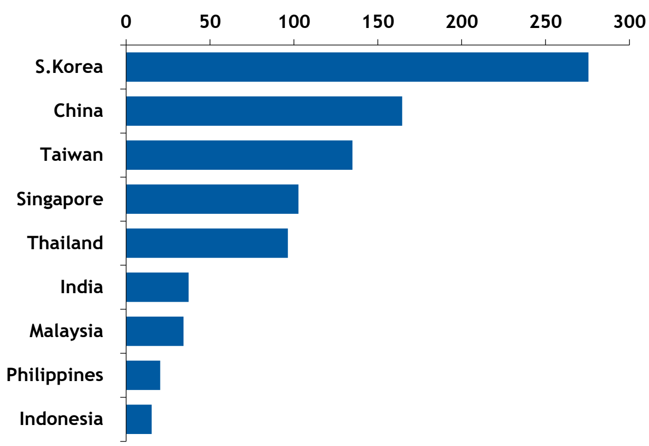
Feedstock naphtha extended gains again this week to an average of $721/t cfr Japan, up by $4/t. Propane prices retreated to $738/t cfr Japan, down by $21/t. Crackers production margins continued to rebound for the fourth consecutive session alongside higher values in ethylene this week. Naphtha cracker margins inched up to negative $144/t, up by $25/t. The propane cracker cash margin settled at negative $188/t, up by $75/t compared with the last session. The ethane cracker cash margin rose to $381/t, up by $38/t on a strong rebound in ethylene prices. The recent significant improvement in cracker production margins has resulted in some producers mulling an

ASIA-PACIFIC

Asian cracker cash margin spot $/t

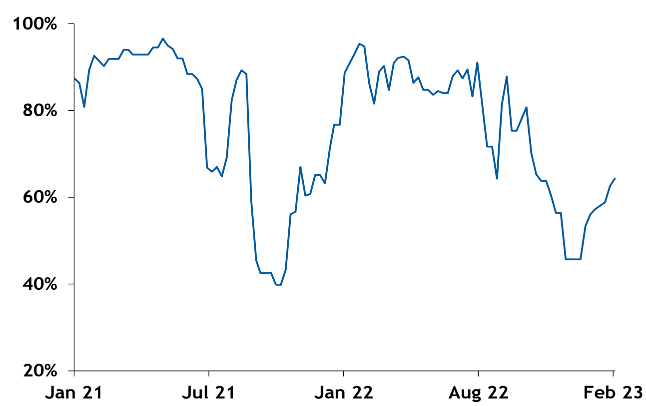


Asia estimated February ethylene capacity loss '000t



Asia-Pacific prices	Timing	Low	High	Mid ($/t)
Ethylene				
Taiwan contract	Jan			915
Taiwan contract	Dec			930
Taiwan contract	Nov			960
Southeast Asia spot, cfr		920	950	935
Northeast Asia spot, cfr		920	950	935
Northeast Asia spot, fob		960	990	975
China domestic truck ex-tank		930	943	937
Sinotec east China truck ex-tank				930
Related assessments, cfr				
MEG contract	Feb	840	890	865
MEG contract	Jan	820	850	835
MEG contract	Dec	800	830	815
VCM NE Asia spot		760	820	790
EDC NE Asia spot		300	320	310
**preliminary*				
Polymer assessments, cfr, 17 Feb				
LDPE liner film, CMP		1,080	1,100	1,090
LLDPE butene-1 film, CMP		980	1,000	990
HDPE injection mold, CMP		960	970	965
HDPE film, CMP		1,000	1,030	1,015
PVC pipe cfr China		880	925	903

China MTO operating rate %



Note: Excluding idle capacites

increase in cracker operating rates, despite weak margins still lingering.

Production losses in February are estimated to be at 9.9pc, slightly lower than previous estimates of 10.1pc in early February. Some Asian crackers, like South Korea's Hanwha Total and a Singapore-based cracker, have been raising their operating rates slightly in the past two weeks as margins have improved. Chinese MTO plants have also been ramping up production for the same reason. The average run rate of MTO plants rose to 64pc on 17 February from 59pc in early February.

Production losses for March are expected to fall to 8.4pc. South Korea YNCC's No.3 cracker and Taiwan's Formosa's No.2 cracker are expected to emerge from extended shutdowns in March. More South Korean producers including Lotte Daesan and KPIC are looking to increase production. China's Sinopec Zhenhai Petrochemical will shut its 1.4mn t/yr No.1 cracker at the end of February for a major turnaround which will last for two and a half months.

ASIA-PACIFIC

Ethylene

Deals and discussions:

- Deal: $940-950/t cfr China, end-March loading, US origin, 1 lot, trading firm to PVC maker
- Buying ideas: Low-to-mid $900s/t cfr northeast Asia, March/April/May arrival
- Offers: $970-1,000/t cfr northeast Asia, US origin, March/April loading
- Tender to sell (due 23 February): 7,000-8,000t, March loading, from Formosa

Northeast Asian ethylene prices rose again this week because of a supply shortage, extending an uptrend that has lasted for the fourth consecutive week. Market sentiment turned more positive this week with derivative markets picking up after a two-week correction on more signs of an economic recovery.

An international trading firm sold a US-origin cargo on 17 February at $940-950/t cfr China for loading at the end of March. It was the first spot trade of a US cargo since the arbitrage window closed in mid-January. But with US ethylene prices rising to 23 USC/lb or $507/t this week, the arbitrage shut again as the cost to Asia rose from $930-960/t cfr Asia to $960-990/t, beyond what Asian buyers can accept.

Buying ideas from most standalone derivative factories in China have reached the low $900s/t cfr China, with a few converters willing to accept higher prices of around $950/t cfr China, especially a few coastal factories that are badly in need of supplies.

The supply tightness in Asia is likely to ease slightly. Some South Korean cracker operators are ramping up operating rates as cracker margins have improved in recent weeks. Lotte will raise its Daesan cracker rate to 90pc at the start of March from the current 82pc. LG Chem has decided not to advance its cracker turnaround and will stick to the originally-scheduled April to June. Hanwha Total has already ramped up cracker rates to 100pc this month to stock up on olefin inventories ahead of its cracker turnaround in late April.

Taiwan's Formosa is also considering restarting its No.2 cracker but has yet to decide when. Sinopec is also planning to raise overall cracker run rates in March to cater to higher consumption in downstream sectors because of a recovery in demand.

Taiwan Formosa emerged this week with a fresh sales tender for a 7,000-8,000t cargo loading in March, that will close on 23 February. This is Formosa's first sales tender since September 2022. The market is now awaiting the result of the tender as the price will shed light on the current market trend. Formosa will have an ethylene supply surplus because the company plans to shut one more ethylene glycol (MEG) plant in Mailiao in April, and to ship MEG out of its US plant for a swap to reduce losses.

Import demand from China is increasing. Guangxi Huayi plans to ramp up its new 400,000 t/yr polyvinyl chloride (PVC) plant to full rates in March from the current 80pc. Wanhua

Outages

Shutdown	Plant	KTA	Duration
Restarted			
SCG ROC	Cracker	800	15Sep, extended earlyFeb
CPC No.6	Cracker	700	20Jan-13Feb
Ongoing			
Formosa No.2	Cracker	1,035	11Jul, extended across Q1
GAIL	Cracker	900	1Oct, restart unclear
YNCC No.3	Cracker	500	1Oct, extended to 5-10Mar
Yangzi Petrochemical	Cracker	300	7Dec, restart unclear
Hyundai Chemical	Cracker	900	31Jan-30Jun
ExxonMobil No.2	Cracker	1,000	5Feb-midMarch
PTTGC I4 No.2	Cracker	400	endJan, 2months
IRPC	Cracker	350	earlyFeb, 45days
Zhejiang Petrochemical No.2	Cracker	1,400	15Feb, 20days
JG Summit	Cracker	480	17Feb, duration unclear
Luxi Chemical	MTO	180	11Nov-extended to endFeb
Nanjing Chengzhi No.1	MTO	130	7Aug, restart unclear
Jiangsu Sailboat	MTO	370	10-11Dec-endFeb
Ningbo Fund	MTO	600	19Feb, 10 days
Expected			
Sinopec Zhenhai No.1	Cracker	1,400	endFeb-midMay
Idemitsu Kosan Chiba	Cracker	370	27Mar-13June
S-Oil RFCC No.2	RFCC	200	10Mar-20Apr
New plants			
Zhejiang Petrochemical No.3	Cracker	1,400	Onspec 20Aug
Zhejiang Satellite	Cracker	1,250	Onspec 28Aug
Shenghong Petrochemicals	Cracker	1,100	Onspec 1Dec
Guangdong Petrochemical	Cracker	1,200	Startup 4-5Feb
Sinopec Hainan	Cracker	1,000	Onspec 17Feb
Sanjiang Chemicals	Cracker	1,000	Startup likely Mar

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Selected ethylene shipment					
Vessel	mts	Origin	Destination	Laycan	Charter
Navigator Oberon	11,500	Houston, Enterprise	Asia	05-10 Feb	Marubeni
Pacific Saturn	12,000	Houston, Enterprise	Asia	05-10 Feb	Vinmar
Deltagas	6,500	Ruwais, UAE	Asia	1H Feb	Marubeni
Eclipse	12,000	Houston, Enterprise	Asia	Ely Feb	BASF
Happy Kestrel	6,500	Houston, Enterprise	Europe	14-16 Feb	Shell
Seapeak Vision	6,500	Ruwais, UAE	Asia	Mid Feb	Marubeni
Thalea Schulte	6,500	Houston, Targa	Europe	08-10 Feb	Mitsubishi
Navigator Atlas	11,500	Houston, Enterprise	Asia	End Feb	Marubeni
Theresa Schulte	6,500	Rabigh¤Saudi Arabia	Asia	16-17 Feb	Marubeni
Astipalea	6,500	Ruwais, UAE	Asia	2H Feb	Marubeni
Navigator Umbrio	11,500	Houston, Enterprise	Asia	1H March	Marubeni
Navigator Pluto	12,000	Houston, Enterprise	Asia	End March	Vinmar
Ellington	11,500	Houston, Enterprise	Asia	End March	BASF
Navigator Triton	11,500	Houston, Enterprise	Asia	Ely April	Marubeni

Chemical plans to start up its new 400,000 t/yr PVC plant in Fujian province in late March, adding 15,000 t/month of ethylene demand. Wanhua has already bought some ethylene cargoes in preparation for the start-up. Sinopec Gulei is aiming to start up a new 300,000 t/yr ethylene vinyl acetate (EVA) plant in March-April, reducing its ethylene merchant supplies by about 15,000 t/month. China's domestic ethylene prices edged up to Yn7,300-7,400/t ex-tank, or $932-954/t on an import parity basis, up by Yn100/t from last week. Sinopec raised its list price by Yn100/t to Yn7,300/t.

Two new Chinese crackers are in the process of ramping up operations. PetroChina Guangdong Petrochemical's 1.2mn t/yr cracker, together with its downstream 400,000 t/yr high density polyethylene (HDPE) and 600,000 t/yr polypropylene (PP) capacities, started up in early February. The company this week also brought on line a new 800,000 t/yr linear low-density/high-density polyethylene (LLD/HDPE) plant. A 800,000 t/yr styrene monomer plant will be operational likely by end of the month. The cracker is now running at 60-70pc rate.

Sinopec Hainan Refinery achieved on-specification olefin production at its 1mn t/yr cracker on 16 February. The company is now in the process of starting up its downstream 600,000 t/yr PE and 500,000 t/yr PP capacities. A 800,000 t/yr MEG plant which was originally slated to start up later has also achieved on-specification production recently.

Supply is tighter in southeast Asia with a slew of plant outages. Discussions were muted as buyers are mostly observing developments in north China. Buying ideas were still hovering in the low $900s/t cfr southeast Asia.

Polyethylene (PE)

The Chinese PE market rebounded alongside rising futures and an increase in demand. LLDPE futures on the Dalian Commodity Exchange increased to 8,324 yuan/t on 22 February, compared with Yn8,167/t a week earlier.

Polymer inventories at Chinese state-controlled producers Sinopec and PetroChina fell to 730,000t on 22 February, down by 80,000t from a week earlier. Downstream orders have yet to reach levels seen before Covid-19, but most downstream converters have returned to normal operations. Demand is expected to slowly pick up from late February. Chinese domestic prices rebounded during the week with rising futures. HDPE film increased by Yn50/t to Yn8,250-8,700/t. LLDPE prices rose by Yn100/t to Yn8,300-8,450/t. Low-density polyethylene (LDPE) film prices also increased by Yn125/t to Yn9,000-9,200/t ex-works east China. Overseas producers tried to raise offers in light of the supply tightness in overseas markets but were faced with competition from lower-priced Chinese materials. A Saudi producer quoted LLDPE at $1,050/t, unchanged from last week. LDPE was at $1,090/t with HDPE film at $1,050/t. The

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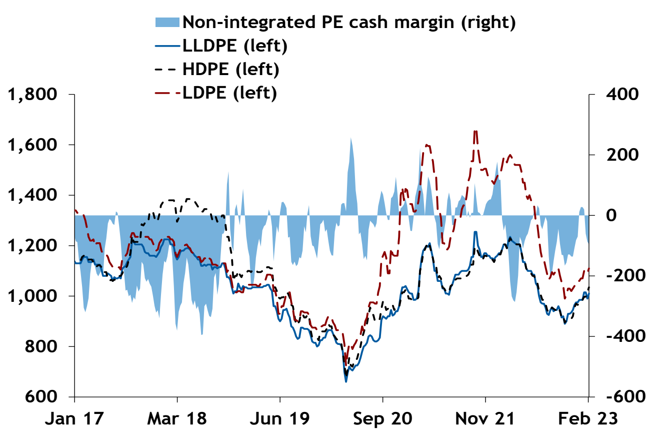
Asia non-integrated PE cash margin *$/t*



cfr China spot market rose along with the domestic market. LLDPE increased by $20/t to $1,000-1,020/t. HDPE film prices rose by $20/t to $1,020-1,050/t cfr China, while spot LDPE increased by $20/t to $1,100-1,120/t cfr China. Demand from the agricultural film industry continued to recover from a seasonal lull. Downstream operating rates increased by two percentage points to 45pc this week. Operating rates in east China's Shandong province were at 42pc, also up by two percentage points from last week. Average operating rates at Chinese PE plants remained at 85pc this week. As much as 2.28mn t/yr of production capacity was off line for maintenance. Lianyungang Petrochemical is conducting maintenance at its No.1 HDPE unit from 11-26 February and at its No.2 HDPE unit from 1-15 March. CTO maker Zhong'an United shut its 350,000 t/yr LLDPE/HDPE unit on 14 February for six days of maintenance. Guangdong Petrochemical's 400,000 t/yr HDPE and 800,000 t/yr LLDPE/HDPE units have started up. Sinopec Hainan Petrochemical is in the process of starting up its downstream 300,000 t/yr HDPE and 300,000 t/yr LLDPE/HDPE units this week. The start-up schedule of Shandong Jinhai's 400,000 t/yr HDPE unit has now been delayed to March. Another 1.7mn t/yr of new PE capacity is poised to start up in 2023, which brings total new capacities in 2023 to 3.5mn t/yr. China's PE export window was open as the price gap between overseas and domestic cargoes widened. Enquiries from Latin America and India increased. But most transactions are still based on re-exports rather than direct exports.

Ethylene glycol (MEG)

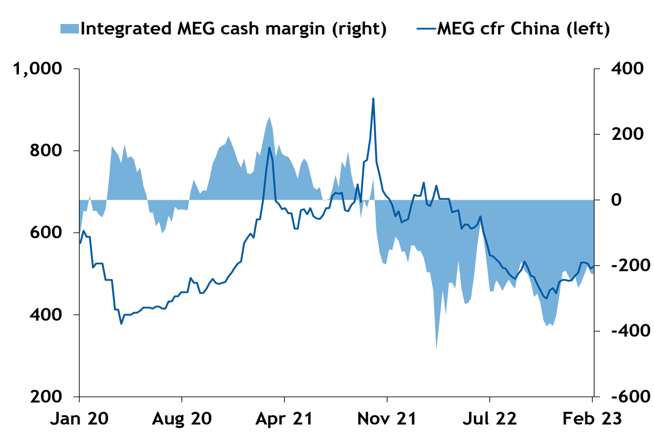
MEG on a cfr China basis traded at higher levels during the assessment week despite softer crude futures. Firmer MEG futures as well as higher feedstock ethylene prices supported MEG prices.

Traded prices for March shipments rose from $515/t to $525/t during 15-21 February although there was a marginal downward correction to $512/t on 17 February. But trades were limited because only a few trading firms finalised deals because of uncertainty over March demand.

Consumers remained on the sidelines as there are sufficient supplies from domestic MEG producers. They are trying to reduce their product stocks as they observed that the sales-to-output ratio for the past two weeks has remained below 50pc. Filament stocks increased by more than five days, and producers maintained operating rates at around 80pc with no plan to raise utilisation rates further in the coming weeks.

Negotiations in the domestic Chinese market became more active on firmer MEG futures. Some trading firms made purchases for late February or March shipments as they expect demand to recover in March. Deal prices edged up from Yn4,130/t to Yn4,170/t during 15-20 February alongside higher MEG futures. There was a further rise of Yn50/t on 21 February with trades at Yn4,220/t ex-tank driven by increased PET fiber sales. Some market participants expect the upcoming peak demand season in March-May to lift MEG prices. Discounts to the EG2305 futures contract narrowed from Yn90/t to Yn70/t because sentiment turned more positive.

NEA MEG integrated cash margins *$/t*



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Inventories at east China's main ports increased by 14,000t to 1.06mnt this week.

One of the three major MEG producers' nominated March Asian contract price was at $860/t.

A spate of new capacities are emerging. Sinopec Hainan brought on line a new 800,000 t/yr MEG plant last week. Shenghong Petrochemical plans to start up its second MEG plant with a 900,000 t/yr capacity by the end of February. Sanjiang Chemical is aiming to commission its 1mn t/yr MEG unit in March.

Taiwan Nanya plans to further reduce MEG output because of negative margins, by shutting down 360,000 t/yr No.3 and 360,000 t/yr No.4 MEG lines in April to undergo turnarounds. But its 360,000t/yr No.1 line will be restarted. Its 720,000 t/yr No.4 line has been kept idle for a year without any plans for an immediate restart. China's syngas-based MEG operating rates declined marginally to around 50pc, about 5 percentage points lower than in mid-January.

Ethylene oxide (EO)

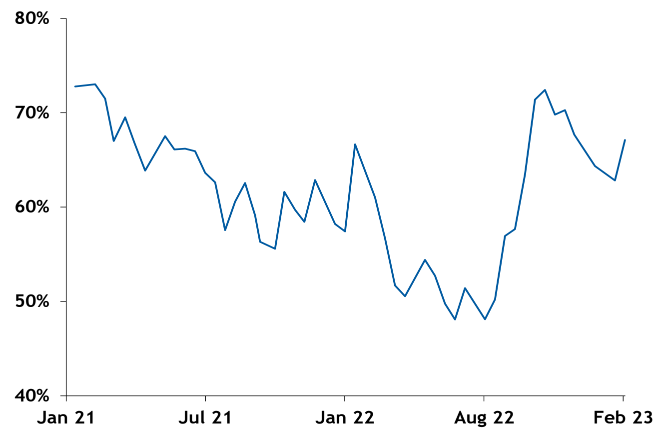
China’s EO market extended gains in the past two weeks on the back of firmer feedstock ethylene prices. The ex-tank east China prices rose to Yn6,800/t this week, up by Yn300/t from two weeks earlier.

But the price increases in EO were still not enough to cover costs. Non-integrated EO margins worsened to -$59/t this week based on import ethylene prices compared with -$50/t two weeks earlier. Based on China domestic ethylene prices, margins increased to -$60/t from the previous -$94/t.

It has become harder to push up prices in the past two weeks after a Yn400/t rise following the lunar new year holiday, said some producers. Trades waned as the major downstream water reducing agent factories slowed down their purchases after stocking up on sufficient inventories. The slower-than-expected recovery in the construction industry led to cautious sentiment among buyers.

An easing in supply tightness has also led to buyers’ resistance to higher prices. The average run rate at Chinese EO plants returned to 67pc this week after hitting a four-month low of 63pc in early February. Sinopec Zhongke and Satellite Lianyungang have both restarted their units on 15 February after short maintenances. Sinopec SK Wuhan has also brought back production at its 210,000 t/yr unit after an extended shutdown that began last November. But the upcoming major turnaround at Sinopec Zhenhai’s 180,000 t/yr No.1 unit from the end of February to mid-May will reduce supply again.

China EO plant operating rate %



Styrene monomer (SM)

SM rose this week, driven by tightness resulting from sellers withdrawing offers after production margins hit their narrowest level since the end of October 2022.

No offers were placed in the market, according to buyers. Consumers on the other hand also held off from purchasing, with narrowing production margins in downstream polystyrene.

Negotiations fell through for a fob southeast Asia cargo loading in March after SM production margins hit $101/t a week ago, the lowest level since October 2022.

A bid was placed for the cargo at $15/t discounts to published cfr China assessments. This bid would yield a landed cost of $55-60/t premiums to published cfr China assessments after accounting for $70-75/t of freight costs between southeast Asia and China to carry 3,000t of SM. This is compared with the last northeast Asian import deal for an April cargo which was priced at $20/t premiums to published cfr China assessments.

Prices averaged 8,537 yuan/t, or an import parity equivalent of $1,078/t, in the first three days of the week. This is compared with last week’s average of Yn8,342/t, or an import parity equivalent of $1,057/t. The rise was largely driven by the movements in SM futures, which closed at Yn8,591/t on 22 November, compared with Yn8,409/t on 17 February 2023.

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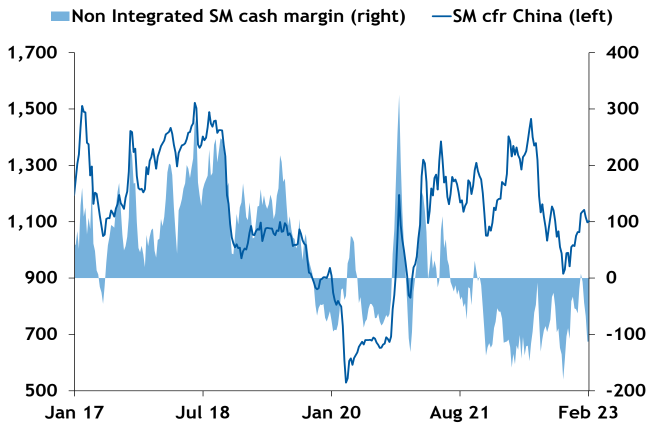
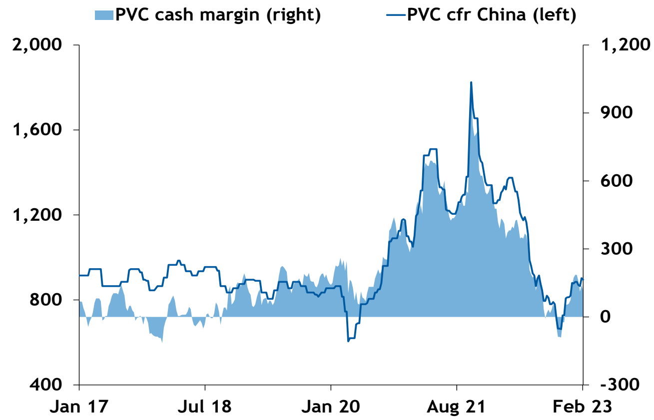
NEA SM non integrated cash margin $/t



Asia non-integrated PVC cash margin $/t



Despite the rise in SM futures, consumers are generally still holding off from spot purchases. Inventories in China remained high at 165,700t last week. Narrowing margins for end-product PS, which has fallen short of expectations after the lunar new year, contributed to the lack of demand for SM in the spot market.

Consumers outside China are not seeking to build up inventories either. Consumers in South Korea and Taiwan have largely completed their March and April purchases, and were hence not looking to secure any cargoes in the spot market. ABS and PS producers are reducing operating rates because of narrowing production margins, contributing to decreasing demand for spot SM this week.

Production margins have widened with the rise in SM prices. SM production margins averaged $183/t in the first three days of the week. This is compared with last week's average of $144/t.

In India, demand for SM remained slow. Demand for imported SM was minimal, given that TKSC has resumed regular shipments and domestic demand was slow. Import offers were placed at $25/t premiums to published cfr China assessments and were met with lukewarm responses. Lower demand for SM from Turkey, which was hit by an earthquake, could contribute to lower offers of spot SM, according to market participants. Domestic prices in India remained in the region of 98-99 rupees/kg this week.

Polyvinyl chloride (PVC)

Domestic PVC prices in China rose with a rebound in PVC futures this week, mainly supported by improved sentiment in view of a pick-up in demand.

Trading activity weakened, resulting from cautious buying sentiment from downstream converters as they showed less interests in purchasing feedstocks at higher prices. Operating rates at downstream converters increased further to 51-52pc, up by 8 percentage points from the previous week, according to a market participant that mainly focuses on domestic trades with downstream converters.

Prices of carbide-based PVC were at 6,350-6,550 yuan/t ex-works, or an import parity equivalent of $750-774/t, up by Yn150/t from the previous session. Ethylene-based PVC prices were assessed at Yn6,400-6,800/t, up by Yn100/t from the previous week.

Average operating rates at Chinese PVC plants kept steady at 80pc. Run rates at carbide-based plants were at 79pc, while ethylene-based plants operated at 83pc. Sinopec Qilu shut its 360,000 t/yr unit for a 10-day maintenance on 13 February. Wanhua Chemical plans to start up its new 400,000 t/yr PVC unit at Fuqing in southern China's Fujian province in March.

Export trades diminished as a result of weaker buying interest from overseas buyers. Ethylene-based PVC traded at $870-900/t fob China, while carbide-based PVC traded at $840- 870/t fob China, mainly destined for south Asia. Freight

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rates from China to Vietnam and to India were at $15-20/t and $20-40/t, respectively. Carbide-based PVC was assessed at $840-870/t fob China, up by $10/t from the previous assessment. Ethylene-based PVC was assessed at $880-900/t fob China, $10-20/t higher from the previous week.

The import market was quiet this week in the absence of fresh offers. Prices fell on less buying interest resulting from the depreciation of the Chinese yuan against the US dollar. Prices were assessed in a narrower range of $880-910/t cfr China, down by $15/t from the previous assessment's high end.

Feedstock ethylene dichloride (EDC) prices were steady this week. The arbitrage for China-origin EDC remained open with sufficient supplies and a slow recovery in demand in China. China-origin EDC was exported at $335/t fob China this week, with the quantity and destination unclear. Cfr Asia prices were assessed unchanged at $300-320/t. Chinese domestic EDC prices stabilised at Yn2,300- 2,500/t ex-tank.

Feedstock vinyl chloride monomer (VCM) prices surged this week to reflect deals done late last week. Indonesian VCM was sold at $820/t cfr southeast Asia. But demand in northeast Asia remained relatively weak. Spot VCM prices were assessed at $760-820/t cfr Asia, up by $50/t from last week's assessment. Domestic prices in east China were steady at Yn5,500-5,600/t ex-tank. China's SP Chemical again postponed the start-up of its new 400,000 t/yr VCM plant to late February from the originally-planned early February.

The range for Indian PVC pipe widened to at $920-970/t cfr India last week as new offers emerged for March shipment. The midpoint price fell by $10/t. A key Taiwanese producer offered cargoes at $970/t cif early this week. But interest in these cargoes was limited as buyers deemed the offer to be too high. Some deals were done but the producer was unable to fully sell out its allocations for India like it did in the last two months. Another Taiwanese producer offered cargoes at $970/t cif as well.

Selected downstream outages

Shutdown	Plant	KTA	Duration
Shandong Yuhuang	SM	200	23Oct-earlyFeb
Huaxing Petrochemical	SM	80	1Nov, likely 4-5 mths
SP Chemical	SM	320	22Nov, restart unclear
Ningbo Keyuan	SM	150	lateDec, restart unclear
Zhejiang Petrochemical	SM	1,200	5Feb, 45 days
Hebei Xuyang	SM	300	15Feb, 40-45 days
Shandong Lihuayi	SM	720	19Feb, 10-15 days
Satellite Lianyungang	SM	600	1Mar, 15 days
Liaoning Bora	SM	350	midMar, 10-15 days
LG Chem Yeosu	SM	200	earlyNov, likely 3-4 mths
Formosa Mailiao	SM	350	midOct, restart unclear
PetroChina Guangdong	SM	800	startup likely 25Feb
Sinopec Maoming	EO/EG	100/120	earlyFeb, restart unclear
Nanjing Dynamic	EO	60	15Nov-2HFeb
Sinopec SK Wuhan	EO/EG	210/280	26Nov-15Feb
Sinopec Yangzi	EO/EG	240/260	7Dec, restart unclear
Sinopec Zhongke	EO/EG	250/400	7Feb, 1 week
Satellite Lianyungang	EO/EG	200/900	31Jan-15Feb
Sinopec Zhenhai No.1	EO/EG	180/650	endFeb-midMay
Taiwan Nanya No.4	MEG	720	28Mar22, restart unclear
Taiwan Nanya No.1	MEG	360	10Jul22-Apr
Taiwan Nanya No.2	MEG	360	Apr, restart unclear
Taiwan Nanya No.3	MEG	360	Apr, restart unclear
Shenghong Petrochemical No.1	MEG	1,000	started up 6Dec
Shenghong Petrochemical No.2	EO/EG	100/900	to start up in endFeb
Sinopec Qilu	PVC	360	13Feb, 10 days
Wanhua Chemical	PVC	400	to start up likely in Mar

ANNOUNCEMENTS

Proposed change to US, Asia-Pacific EDC, VCM coverage

Argus proposes changes to its US and Asia-Pacific EDC and VCM coverage because of market illiquidity and to provide more specific price assessments where possible. Under this proposal:

- The EDC cfr southeast Asia/northeast Asia assessment would be discontinued because of market illiquidity
- The US EDC export assessment would be renamed "EDC export fob USGC (calculated price)" to differentiate the calculated value from other assessed EDC prices
- The existing VCM cfr southeast Asia/northeast Asia assessment would be redefined as a northeast Asia price and published monthly instead of biweekly to provide a more specific assessment of this illiquid market

Argus will accept comments on this proposed change until 24 February. To discuss comments on this proposal, please contact Michael Vitiello at michael.vitiello@argusmedia.com or +44 20 7199 8408. Formal comments should be marked as such and may be submitted by email to petrochemicals@argusmedia.com and received by 24 February. Please note, formal comments will be published after the consultation period unless confidentiality is specifically requested.

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