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Argus *Global Polyvinyl Chloride*

Global polyvinyl chloride prices and market analysis

Issue 21-26 | Friday 26 November 2021

HIGHLIGHTS

Feedstocks
- Crude prices volatile
- Seaborne caustic soda prices ease back from highs

US
- Production issues limit exports
- Contract prices are expected to rise in November

Latin America
- Competitive US offers reemerge

Western Europe
- Production impacted by integrated chlor-alkali issues
- Demand expected to remain strong into next year

Turkey
- Buyers wait as prices fall

China
- PVC prices fell with higher supply

India
- Participants stay bearish on high prices
- Buyers wait for price protections to end

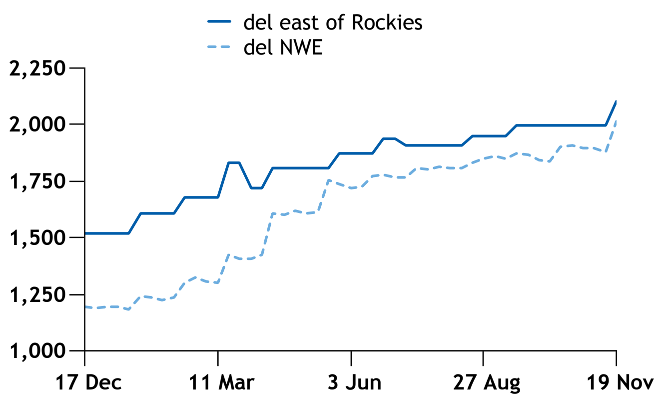
MARKET PRICES

Contract prices				$/t
	Timing	Contract marker		Argus Δ
US				
PVC pipe del east of Rockies	Nov	2,105.00	▲	+110.00
Western Europe				
PVC pipe del NWE	Nov	2,014.0	▲	+136.0

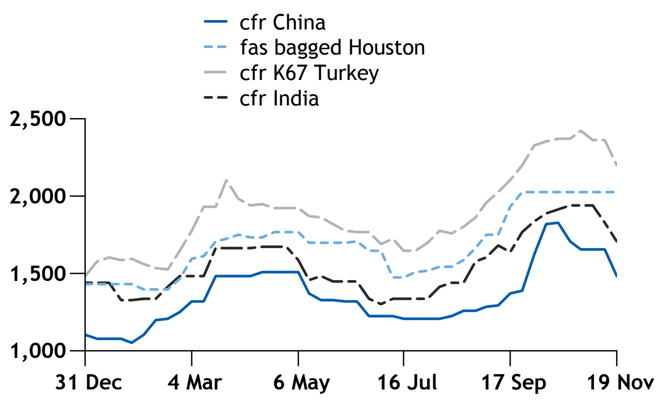
The Argus Δ (delta) is the assessed change in price from the previous month

Spot prices			$/t
Product and basis	Price		±
US			
PVC pipe fas Houston bagged	2,006-2,050	-	0.0
Latin America			
PVC pipe cfr Brazil	2,080.00	-	0.00
PVC pipe cfr WCSA	2,080.00	▼	-60.00
Turkey			
PVC k67 west Europe origin cfr Turkey	2,150-2,190	▼	-25
Asia-Pacific			
PVC pipe ex-works China	1,301.05-1,314.06	▲	+5.97
PVC pipe cfr CMP	1,450-1,460	▼	-30
PVC pipe India cfr	1,700-1,720	-	0

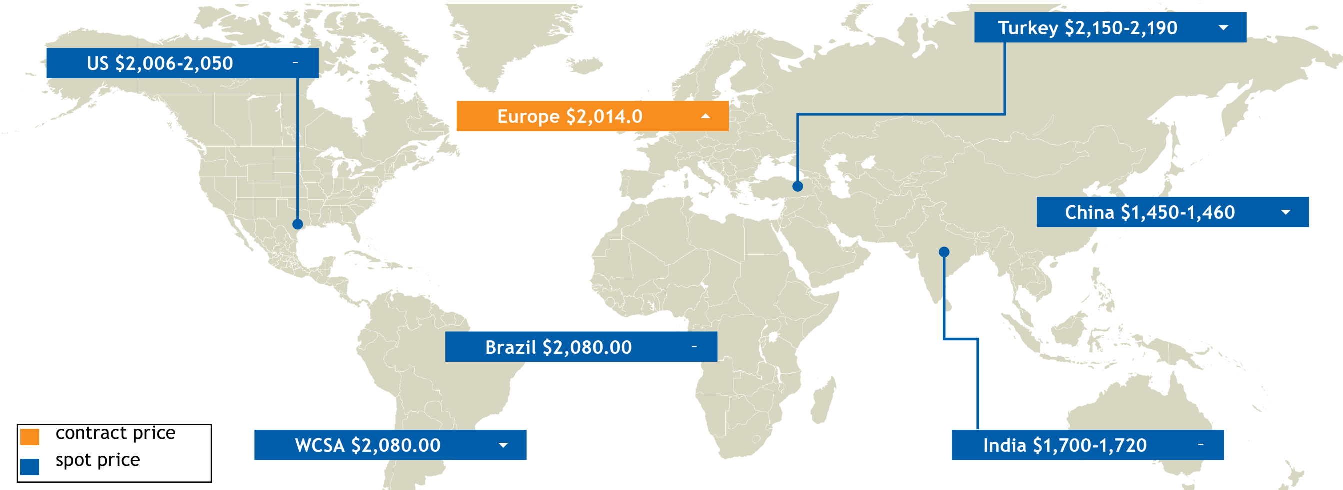
Global PVC contract prices $/t



Global PVC spot prices $/t



GLOBAL SNAPSHOT



ENERGY AND FEEDSTOCKS

Crude oil

The Ice Brent front-month crude contract was volatile this week, initially falling amid concerns over slowing demand in Europe and China. But prices later rebounded, shrugging off the US' announcement that it will release 50mn bl of crude from its emergency stockpile as part of a multi-nation effort to lower prices. The contract closed at $82.16/bl on 25 November, up from $80.82/bl a week earlier. However, it fell sharply to $77.55/bl as of 11:00 GMT on 26 November as governments reacted to a new Covid-19 variant by introducing new travel restrictions, including flight bans.

The front-month Nymex WTI contract followed a similar trajectory, closing at $78.39/bl on 24 November, ahead of the Thanksgiving holiday in the US. This was little changed from $78.36/bl on 17 November. But the contract also reacted to the demand concerns posed by a new Covid-19 variant and was trading at around $73/bl in the morning of 26 November.

Crude	Effective date	Price		Weekly ±
$/bl				
Ice Brent	25 Nov	82.22	▲	+3.33
Nymex WTI	24 Nov	78.39	▲	+2.29
Naphtha *$/t*				
70 min paraffin USGC waterborne del	24 Nov	740.04	▲	+31.60
65 para NWE cif	26 Nov	666.25	▼	-40.25
Japan c+f	26 Nov	719.00	▼	-39.00

Ethylene	Basis	Effective date	Price		±
del USGC ¢/lb	Oct	3 Nov	42.00	▼	-1.00
del Europe €/t	Nov	3 Nov	1,282.50	▲	+92.50
cfr NE Asia $/t	spot	24 Nov	1,135.00	▼	-10.00

Effective date is the date of last assessment. Change is compared with the previous assessment.

Naphtha

On the US Gulf coast, naphtha trading was light heading into the long weekend, and strong gasoline futures had muted naphtha trading for most of the week. Naphtha demand was sluggish on the US Gulf coast this week. Production barrels remained available for naphtha as a reformer feedstock in Houston refineries. But at least two crude distillation unit (CDU) shutdowns on the Mississippi River previously inhibited demand.

Northwest European naphtha refining margins rose from five-month lows this week, as Asia-Pacific continued to absorb excess European supply. Rising demand from European gasoline blenders also supported notional naphtha refining margins. And demand from the petrochemical sector remains high amid relatively high costs for all alternative feedstocks, so fluctuations in the gasoline market have had a more pronounced effect on naphtha than usual in recent weeks. The opening of gasoline arbitrage routes out of Europe has stimulated export demand and in turn increased demand for naphtha as a blending component. The volume of naphtha available in the European market has also fallen, following the booking of more than 1mn t to depart European outlets for Asia-Pacific since the middle of November. The naphtha price has averaged €654/t in November, slightly lower than the October average of €658/t. This is also keeping sentiment stable for ethylene and propylene contract

ENERGY AND FEEDSTOCKS

prices for December — negotiations on which will commence next week.

Asia-Pacific naphtha margins narrowed this week, to \$137/t on 26 November. This was partly because of lower feedstock prices but also as cracker cash margins remained negative —they rose by \$93/t to -\$154/t. But naphtha premiums in the spot cargo market have yet to reflect the slump in prices and are still deemed too high by buyers. Market participants also said some consumers from South Korea or Japan emerged to buy LPG cargoes in "small volumes" to replace naphtha as a feedstock on 23 November when the propane-naphtha spread was around a negative \$1/t. *Argus* understands that the demand is not consistent, as LPG prices picked up again later in the week.

Ethylene

US spot ethylene for prompt-month delivery to Mont Belvieu, Texas, was indicated down about 4¢/lb during the week and was last assessed at 31¢/lb on 23 November. Choctaw ethylene followed the trend, losing about 4.5¢/lb, last assessed at 33.5¢/lb. The forward curve is slightly backward, assessed with December at a 0.25¢/lb discount to November. The move down reopens the arbitrage to Asia-Pacific.

The European ethylene market is settled. There is some availability, but considering it is almost December the market is remarkably balanced, and producers are not having to venture into the export market to shed year-end length. Planned maintenance is drawing to a close, although we are waiting for confirmation on the status of a cracker in the Mediterranean. One cracker in the UK remains off line and a second is running at reduced rates, while two crackers in Germany are undergoing additional maintenance on top of their longer-term turnaround schedules. The spot market is quiet. A deal was concluded inland on the pipe at the November monthly contract price (MCP) minus 18pc and a cif deal at November minus 19pc. Imports from the US have been arranged by producers that need volumes for their balances, but there is only limited interest elsewhere. The US price of 35¢/lb could translate into a cif Amsterdam-Rotterdam-Antwerp (ARA) price of \$1,065-1,075/t, which is a discount to the MCP of around 25pc, but buyers would need to find a ship and the cif price, by definition, does not include the European terminal or pipeline costs, which would further erode any benefit. However, it would not be a surprise to see this price being used in a negotiation by anyone needing spot ARA ethylene. The European ethylene MCP for November settled on 3 November at €1,282.50/t (\$1,441/t), an increase of €92.50/t.

Caustic soda	Effective date	Price	±
fob USGC contract \$/dst	Oct 21	760.00	▲ +70.00
fd NWE contract €/dmt	Q4-2021	548.00	▲ +100.00
fob NE Asia export \$/dmt	Week 46	610.00	▼ -10.00
Ethylene dichloride (EDC)			**\$/t**
fob USGC export	Oct 21	930.00	▲ +125.00
cfr Asia import	Oct 21	985.00	▲ +110.00

Effective date is the date of last assessment. Change is compared with the previous assessment.

Sentiment in the Asia-Pacific ethylene market continued to soften on weak buying interest from downstream producers amid poor margins. Notional buying indication were capped at \$1,100/t cfr China for December arrivals, but sellers were reluctant to offer lower prices amid high feedstock costs. Selling ideas were at \$1,150-1,160/t cfr China for some trading firms, while others were inclined to negotiate on a floating price basis.

Caustic Soda

US caustic soda export prices reached record highs earlier this month and producers directed incremental supply where available to the traders and buyers in other regions. Domestic supply was stable, with just a few planned maintenances, but the market remained tight amid robust demand and low inventories. Domestic contract prices increased further and there were large increases announced by distributors in the west coast market to recover the cost of higher imports. Resistance to price increases may grow as export prices declined in the second half of the month and as long as production remains stable.

The caustic soda supply tightness has started to relax across Europe following more stable operations after planned and unplanned maintenance. Current disruptions to production are few, operating rates have risen, chlorine consumption remains good and caustic soda customers are largely being supplied according to their needs. The progress with availability has prompted some price erosion in the seaborne markets and the southern European domestic markets, although pricing remains at one of its highest levels.

Northeast Asian caustic soda export prices fell significantly over the past four weeks, from a high of \$930/dmt to a low of \$560/dmt fob. Chinese producers, especially from Shandong province, have started to release a significant number of cargoes for December-January loading, with domestic parity prices falling below \$500/dmt fob.

PVC PRICING ANALYSIS

US

It was a quieter week for the polyvinyl chloride (PVC) market due to the US Thanksgiving Holiday. Nevertheless, market dynamics stretching back to prior weeks have begun to have an impact. As contract negotiations continue in the PVC market, support for the 5¢/lb increase is firming. While the full increase is not officially confirmed, multiple producers are already treating it as settled and ongoing market dynamics are beginning to back it as well.

A combination of lower prices from overseas competitors, price drops to certain areas by US exporters, and a sudden supply crunch domestically has muddled the export market's previous predictability. Going forward, it is likely the market retains its current price of $2,000/t-$2,050/t fas Houston as a general base for the near future, while regional export prices see slight differences up or down from there to retain competitiveness.

Shintech reported they had increased prices by $20/t-$30/t for exports to South America and Africa, but lowered prices to Asia in order to compete with regional prices and Formosa Taiwan's announcement last week of a $150/t decrease to all markets. Westlake, meanwhile, indicated that anything more than the most minor price drops going into December were unlikely due to the expected 5¢/lb domestic increase coupled with the extraordinary tight supply the market is now experiencing.

The supply situation has shifted dramatically in the last week. Producers and traders alike are now reporting very tight supply which is counteracting last month's boost in inventories. This tightness is preventing exporters from fully exploring new market opportunities or even taking advantage of the export price adjustments they are making now.

Westlake's PVC plant issue has significantly cut what the company can export for the rest of this month and next, though details about the specific problem were not available. New capacity from Shintech is not yet online, but the company expects to get it up and running by the end of the month.

The American Chemistry Council's (ACC) data for October was finalized, with only minor adjustments to October's sales numbers. Production remained unchanged at 1.39bn lb, while October finished out with 1.31bn lb in sales and exports accounting for 240.5mn lb, according to the ACC's Plastics Industry Producers' Statistics Group as compiled by Vault Consulting. Due to output exceeding sales for the month, producers added 81.6mn lbs to inventories.

In terms of endpoint usage, compounders and resellers saw the biggest year-to-date change with a 27pc boost from 2020 through this year. Sales into windows and doors rose 17.6pc, rigid pipe and tubing rose 7.4pc, film and sheet rose 9.2pc, and wire and cable rose 3.4pc. Siding, Siding Acc., and mobile home skirting rose 6.9pc. Broad growth for domestic markets has cut into exports significantly, with year-to-date figures showing a 33.6pc drop in exports from October 2020 to October of this year.

Domestic demand remains strong, with market participants across the board corroborating the broad growth shown by the ACC's year-to-date figures. Additionally, the US Census Bureau and the Department for Housing and Urban Development (HUD) released data for October's new residential sales that showed a slight rebound. According to the Census data, sales of single-family houses in October 2021 were at a seasonally adjusted annual rate of 745,000. That is 0.4pc above the revised September rate of 742,000, but is still 23.1pc below October 2020's 969,000. The seasonally adjusted estimate of new houses for sale was at a supply of 6.3 months at the current sales rate.

Prompt-month delivery of ethylene to Mont Belvieu, Texas, was indicated down about 4¢/lb during the last week and was last assessed Tuesday at 31.0¢/lb. Choctaw followed the trend losing about 4.5¢/lb, last assessed at 33.5¢/lb, slightly reducing the premium to 2.5¢/lb. The forward curve is slightly backward, assessed with December at a 0.25¢/lb discount to November. The move down reopens the arbitrage to Asia-Pacific, which if it remains open will better balance US supply and demand as terminal bookings should pick up again.

US polyvinyl chloride contracts				¢/lb
	Timing	Argus Δ	Contract marker	Low / High ±
PVC pipe del east of Rockies	Nov	+3.5	95.50	+2.0/+5.0

The Argus Δ (delta) is the assessed change in price from the previous month

US polyvinyl chloride spot exports			¢/lb
Product and basis	Price		±
PVC pipe fas/Houston bagged	91-93	-	0.0

Latin America polyvinyl chloride markets			$/t
Product and basis	Price		±
PVC pipe cfr Brazil	2,080.00	-	0.00
PVC pipe cfr West Coast South America	2,080.00	▼	-60.00

Latin America

After a hiatus of just over a week, US polyvinyl chloride (PVC) producers have resumed offers of competitive volumes of the material to Latin America, amid tight global supplies

PVC PRICING ANALYSIS

and a strong demand volatility globally and in the region.

Argus heard from a single global trader that a 1,000t cargo for the region has been obtained without major problems from a traditional US producer. The cargo compares to only 100t of imported PVC available from US producers last week for the same trading company.

The move kept prices of PVC imported to the region stable, in the case of Brazil, or with a slight drop compared to the previous week, as seen in the west coast of South America (WCSA).

US origin pipegrade PVC prices were assessed this week at $2,060-2,100/t cfr Brazil, compared to $2,050/t and $2,110/t last week. For WCSA, prices also hit $2,060-2,100/t, compared to $2,100/t and $2,180/t last week.

Meanwhile, PVC material from other traditional supplier for the region, China, has been hard to obtain due to freight prices and the lack of available space in ships and containers. *Argus* heard Asian freight prices to Latin America this week stable at $13,000-15,000/FEU (forty foot container), flat week on week, but still considered too high by buyers in the region.

However, market participants are seeing the PVC market in Latin America in a downward trend. Despite efforts of PVC producers to increase prices on a monthly basis, it seems there is no space for additional price hikes after the recent peak witnessed in September-October. There is large room for price decreases in the next months, as current PVC prices are not sustainable in the long-term, according to a source.

In the meantime, regional PVC producers continue to serve local buyers. *Argus* heard large cargoes of the material being offered by producers Vestolit (Colombia) and Braskem (Brazil) to buyers in different Latin American countries.

In Brazil, state-controlled oil company Petrobras said on Tuesday that it is considering its options for the planned sale of its 36.1pc stake in Braskem.

State-controlled Petrobras, the second-largest Braskem shareholder, continues to conduct studies to determine the best structure for the sale, but so far, the company has not reached a decision on how that sale would proceed, Petrobras said.

In late September, Novonor, Braskem's largest shareholder, said that it started a process to sell its Braskem stake and was evaluating all possible alternatives, including the sale of its stake in capital markets, but stated that no model was decided at that time.

Novonor, formerly known as Odebrecht, holds a 38.3pc stake in Braskem.

Western Europe polyvinyl chloride contracts				€/t
	Timing	Argus Δ	Contract marker	Low / High ±
PVC pipe del NWE	Nov	140	1,780	+110.0/+160.0

The Argus Δ (delta) is the assessed change in price from the previous month

Petrobras said its stake in Braskem is still part of the assets contemplated in its portfolio management plan, and added that facts deemed relevant to the subject will be disclosed to the market in a timely fashion.

Europe

The European polyvinyl chloride (PVC) market continues to deviate from the traditional seasonal trends so far this month, with strong offtake from construction segments offsetting incremental availability.

Demand for suspension-PVC (s-PVC) into pipes, profiles and flooring remains robust, with general strength being observed across most construction segments as converters continue to catch-up on order shortfalls from earlier in the year. Producers are running hard in order to meet these requirements, but a number of limitations in the form of transportation delays and tight supply of plasticisers and additives for certain formulations are keeping sentiment firm, while in some cases limiting overall output for construction applications at the consumer level.

More recent Eurostat construction data – dated up to September 2021 – indicates that production in construction across the eurozone depleted since March, mostly because of a combination of raw material shortages and higher input costs, but improving availability later in the year had contributed to a slight recovery in output during the fall. PVC demand into construction has persevered so far this year despite this lag in activity, mostly driven by buyers looking to secure supply in an uncertain market and pricing dynamic which continues to this day. Indications are already emerging about December offtake and demand expectations for next year, with most buyers noting that intake is expected to remain strong in pipe and profile applications within the short-term.

S-PVC negotiations for November are almost over, with producers successfully passing increases within the range of €110-160/t across all European regions. On average, increases have ranged from €130-150/t in northwest Europe, southern Europe and central eastern Europe, and we will be maintaining our northwest Europe s-PVC contract delta assessment at €140/t following current input. We will be finalising the November contract delta next week.

Paste-PVC (e-PVC) contracts have mostly closed within

PVC PRICING ANALYSIS

a wider range of plus €90-150/t this month, with availability improving relative to s-PVC as intake into automotive remains slow. Across grades, producers are running well and are in most cases meeting domestic requirements as well as obligations for export, with only a few minor issues at integrated chlor-alkali units in Germany and Hungary limiting PVC output slightly this week. In northwest Europe, four producers continue to operate under force majeure in Germany, France and the Netherlands.

European import prices are edging lower this week, in line with renewed falls in other key foreign markets. Prices for US general-purpose grades are being quoted as low as €1,700/t ($1,903/t) on a delivered basis, with more common offer levels for US and other origin-product hovering towards €1,800-1,850/t ($2,015-2,071/t) on a ddp and cif Europe basis. Despite these falls, there are currently no reports of active trades and distributors are mostly viewing the European market as a last minute option for supply, but this could change as other global markets continue towards their price downtrend and European domestic prices become more attractive in the short to medium-term.

Turkey

PVC import prices into Turkey fell further this week, but demand and buying interest stayed low. Buyers are waiting for new prices to be announced before making purchases, expecting prices to fall further. Northwest European material was assessed at $2,150-2,190/t cfr this week — $40/t lower at the low end and $10/t lower at the high end compared with last week.

Mexico origin material was heard at $2,380-2,450/t cfr, and Iran origin material was available at $2,150-2,170/t cpt. South Korean material was heard at $2,080-2,280/t cfr, $170/t lower on the low end and 20/t lower on the high end. Egyptian offers were available at $2,270-2,300/t cfr — $130/t higher at the low end and $150/t higher at the high end. Russian material was available at $2,150-2,200/t cfr — $100/t higher at the low end and $10/t higher at the high end. US origin K67 was also heard at $2,000-2,150/t cfr, stable at the low end and $40/t lower at the high end.

Turkey polyvinyl chloride markets		$/t
Product and basis	**Price**	**±**
PVC k67 cfr Turkey western Europe origin	2,150-2,190	-25

China

The Asian PVC market weakened by $40/t from last week with increased supplies. Formosa's December offers slumped by $150/t from last month, at $1,490/t cif China, $1,710/t cif India and $1,460/t for the rest of Asia. Chinese domestic prices rebounded with rising futures on the Dalian Commodity Exchange which surged by day limit on last Friday.

China cfr market remained quiet with steadily reduced imports. China imported 30,701t PVC in October, which was down by 36pc from September, and a 40 pc decrease on the year. Meanwhile, China exported 111,740t PVC in October, which was up by 9pc from September, and showed a 16pc growth from last October. The total import volume was only 333,754t from January to October, compared with total export volume 1,447,356t which made China a net PVC exporter.

Cfr prices in China dropped by $40/t to $1,450-1,460/t this week, which was close to the level of China ethylene-based exporting prices which are at $1,420/t fob level. The export window remained wide open. Export deals for

PVC plant maintenance, outages and disruptions

Status	Plant	Location	Grade	Capacity '000t/yr	Nature of shutdown	Duration
	Tianjin Dagu	China	Ethylene-based		Shut for relocation	5Aug
	Hengyang Jiantao	China	Carbide-based		Maintenance	30 Aug for one month, extended
	Shandong Dongyue	China	Carbide-based		Maintenance	1 Nov till now
	Taiwen Yanhua	China	Carbide-based		Maintenance	4 Sep till now
	Ningbo Hanwha	China	Ethylene-based		Maintenance	20 Dec for 15 days
NEW	Yangmei Hengtong	China	Ethylene-based		Maintenance	Early Dec for one week
	Inovyn	Europe	Suspension		Force majeure	FM declared in Rheinberg in Sep
	Kem One	Europe	Suspension		Force majeure	FM declared in Berre in Sep
	Kem One	Europe	Bulk (mass)		Force majeure	FM declared in Saint Fons in Feb
	Vinnolit	Europe	Suspension		Force majeure	FM declared in Knapsack in Jul
	Vynova	Europe	Suspension		Force majeure	FM declared in Mazingarbe in May
	Vynova	Europe	Suspension		Force majeure	FM declared in Beek in May

carbide-based cargoes were done at $1,320-$1,340/t this week, slightly higher than last week but in limited volumes.

Sentiment in the domestic market improved this week with firmer futures. PVC futures soared to day limit on 19 November because of bullish news in China's real estate. Chinese banks opened a financing whitelist for state-owned real estate companies which showed China may support the real estate industry. This helped sentiment, but the reality is it will take time for this to meaningfully affect PVC demand and market participators remained cautious.

Carbide-based PVC traded at Yn9,480-9,620/t ex-works in east China, up by Yn370-480/t from last week. Prices for ethylene-based material edged up by Yn50/t to Yn10,100-10,200/t ex-works in east China.

Average operation rate of PVC production improved to 79pc. Carbide-based plants have raised operation rates increased to 80pc this week. Operation rates for ethylene-based plants have increased to 75pc.

Ethylene-based plant Suzhou Huasu's 130,000 t/yr unit restarted up from 25 November. Ningbo Hanwha is planning a two-week maintenance at its 400,000 t/yr plant from 20 December.

India

Indian PVC pipe was assessed at $1,700-1,720/t cfr. Spot offers were limited this week. A Thai producer offered cargoes at $1,760/t cif, with these cargoes subjected to 5pc import duties instead of the usual 10pc. A major South Korean producer offered cargoes at $1,710/t cif. In local markets, price protections remain in force until 1 December after producers lowered prices last week.

Sentiment remains bearish in India as buyers feel that prices have been too high for too long. More participants are adopting a wait-and-see stance in anticipation of further price falls in the coming weeks. Many are waiting for the end of the price protections to see if import offers change in response to the lifting of these protections. Demand remains tepid as the high-priced environment has kept many buyers on the sidelines.

India's Reliance Industries (RIL) and Saudi state-controlled Aramco have opted to shelve a multi-billion dollar plan that would see the latter take a 20pc stake in RIL's oil and chemicals business. The pair signed a "non-binding Letter of Intent" in August 2019 for the sale, but RIL released a statement over the weekend saying the deal had been withdrawn as the private-sector Indian conglomerate is shifting its focus to renewables. Despite the collapse of the deal, RIL said it will remain Aramco's preferred partner for investments in India's private sector and that they will look to collaborate on investments in Saudi Arabia.

Asia-Pacific polyvinyl chloride markets $/t

Product and basis	Price		±
China			
PVC pipe import parity	1,301.05-1,314.06	▲	+5.97
PVC pipe cfr China Yn/t	10,100-10,200	▲	+50
PVC pipe cfr CMP	1,450-1,460	▼	-30
India			
PVC pipe cfr India	1,700-1,720	-	0

RIL's olefins to chemicals business comprises of its 1.4mn b/d refinery complex at India's Jamnagar and 38.4mn t/yr of petrochemicals capacity. More than 60pc of the refinery's output is earmarked as feedstock for petrochemicals. When the deal with Aramco was first announced in August 2019, RIL valued its refining and petrochemical operations at $75bn including debt, implying a $15bn valuation for Aramco's stake.

Some participants were hoping that this would lead to an increase in PVC supply to India as India remains one of the largest importers of PVC worldwide. The absence of US producers in import markets has made it difficult for Indian buyers to obtain more volumes. But participants are looking forward to the start-up of the new 360,000 t/yr PVC facility in Ruwais, a joint venture between India's RIL and Abu Dhabi's state-owned Adnoc. PVC supply to India is expected to lengthen once the facility has been built.

Argus *Global Polyvinyl Chloride* is published by Argus Media group

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ISSN: 2752-5244

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Chemicals

illuminating the markets