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Asia: Refining & Petrochemical Market Outlook 2023

SOLAR MARKET OUTLOOK

Supply and Regulatory Uncertainties Cloud Solar Market Outlook

Solar project developers are looking forward to sunnier days in 2023 following the recent collapse in solar module costs. But supply mismatches and trade tensions continue to cast clouds of uncertainty over the global photovoltaic supply chain.

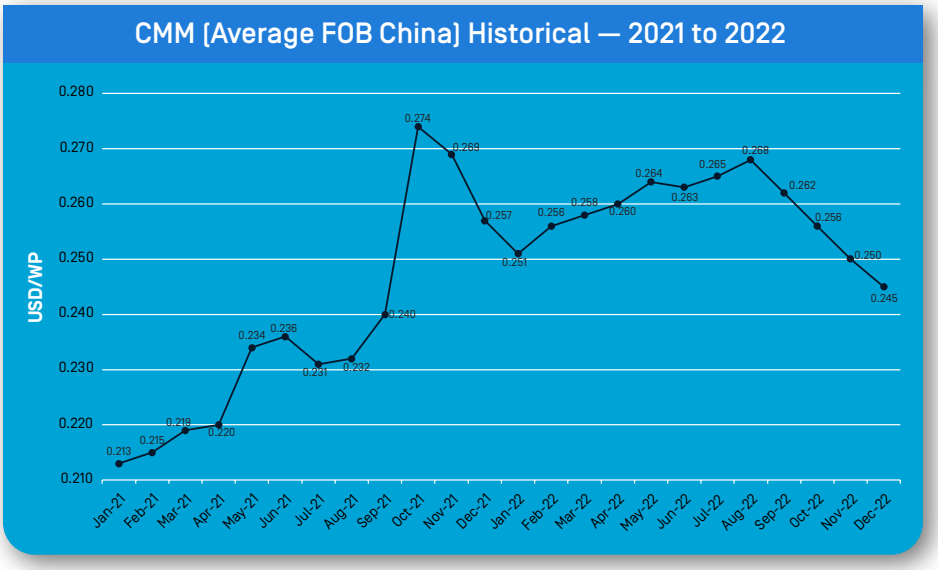
The FOB China solar module price had kicked off 2022 with a January average of $0.251 per Watt peak (wp) before embarking on a near unbroken bull-run to reach a nine-month high of $0.268/wp in August, OPIS data showed.

Supply tightness in polysilicon, the raw material in the solar manufacturing chain of ingots, wafers, cells, and modules, was a key contributor to the soaring prices.

The month-average price of mono-grade polysilicon in China, the world's largest supplier of the raw material, had rallied for most of 2022 to peak in September at CNY 318.75/kg ($47.23/kg), a 33.37% increase from the start of the year, according to OPIS data.

But 2023 might finally be the year to make up for the polysilicon supply deficit and then some.

Investment bank ROTH Capital is expecting 900,000 metric tons (mt) of new polysilicon capacity this year alone, which would almost double the global capacity to 1.8-2.1 mt. More optimistic market estimates foresee the total to balloon to almost 3 million by the end 2023.



The switch from famine to feast in polysilicon capacity was due partly to the vagaries of starting new production plants, said industry players. Capacities that some market participants had expected for 2022 now look set to start this year, adding to the slew of new plants already slated for 2023.

China's GCL Technology will be leading the pack with 300,000 mt/year of new polysilicon capacity in Inner Mongolia, followed by Qinghai Lihao and Risen Energy with 150,000 mt/year each in Qinghai and Inner Mongolia respectively.

In face of the supply boom, FOB China module prices are expected to trend downwards in 2023, industry sources said.

The price reversals have already started late last year, cascading down the PV manufacturing chain with the seasonal lull in demand adding to the downward pressure.

Chinese mono-grade polysilicon ended 2022 at a month-average of CNY 285/kg, 11% lower than its September peak and 19% higher than the start of the year. FOB China solar modules ended the year at $0.245/wp, 9% lower than its August peak and 2% lower than January 2022, OPIS data showed.

Leading Chinese wafer manufacturers, TCL Zhonghuan and Longi Green Energy have slashed their prices across the board on Dec. 23 by 23% and 27 % respectively.

Leading cell manufacturer, Tongwei Solar followed suit on Dec. 27, cutting its cell prices by an average of 20%.

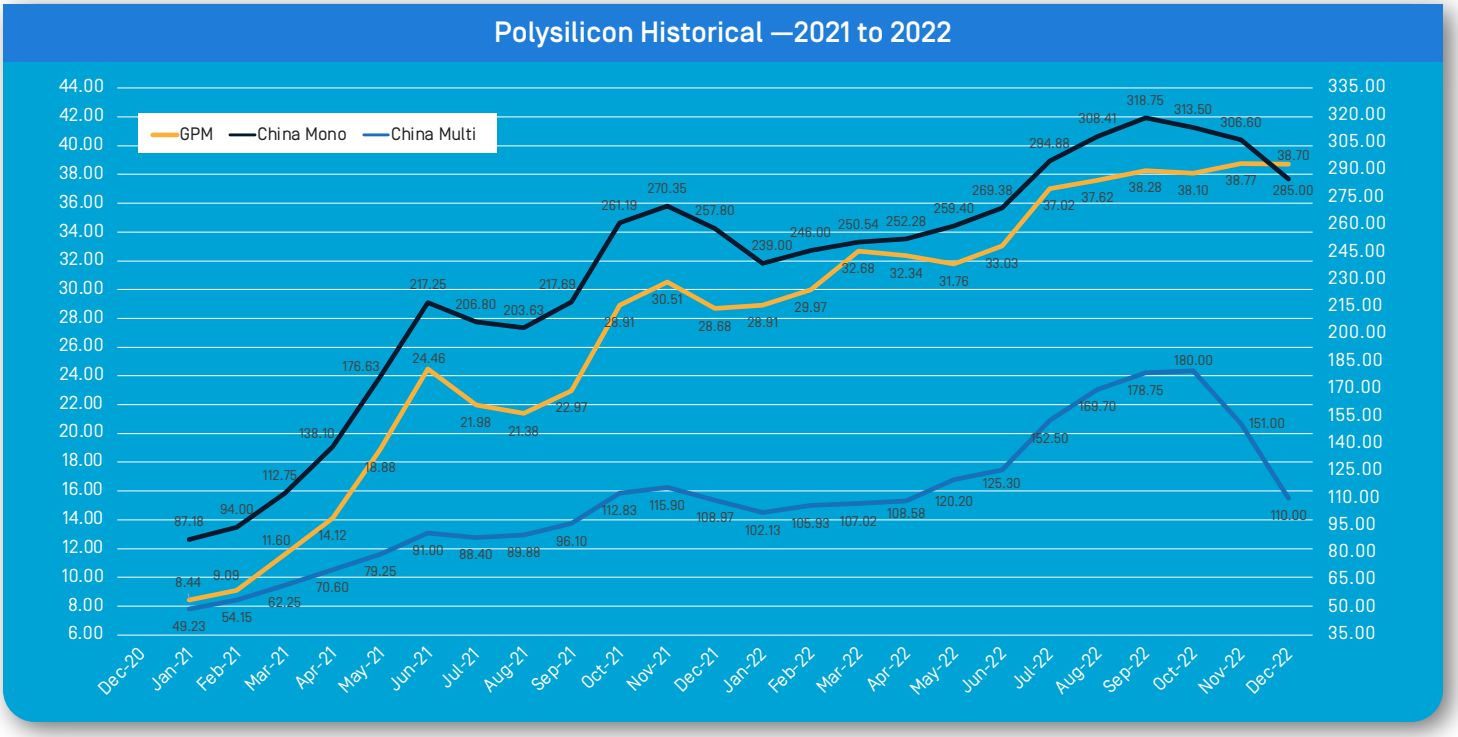
"2023 will be challenging pricing-wise," said a source at one of the top module manufacturers. Module prices could stabilize by Q3 when the price of polysilicon "achieves consistency", he added. Other market players told OPIS they expect prices to continue falling until April 2023 at least.

Solar project developers who spent the past year grappling with skyrocketing costs welcome the expected fall in module prices, but caveats abound in a market teetering on yet another wave of technological change and simmering with trade tensions.

The transition from the incumbent p-type to the more efficient n-type solar modules is expected to occur sometime between late-Q4 2023 and early-Q1 2023, as measured by when the latter comprise more than 50% of total module shipments, said Sakura Yamasaki, founder and director of trading firm Singapore Solar Exchange.

"While this transition requires the technological prowess of wafer makers, high polysilicon quality serves as the baseline... the consensus seemed to be that there are only two domestic Chinese producers capable of offering that baseline," Yamasaki said.

The risk of supply and demand mismatches is clear but given the speed of quality advancement and technological innovation in China, it is conceivable more Chinese polysilicon producers would rise to meet the demand for n-type



modules, Yamasaki said. But this only would only raise the risk of the second caveat — trade tensions that are threatening to upend the global solar market order.

With the enactment of the Uyghur Forced Labour Protection Act (UFLPA) in the US in Dec. 2021, US module importers now face massive hurdles in importing material that incur the slightest suspicion of having originated from China's Xinjiang Uyghur Autonomous Region.

Uncertainty over the burden of proof required have compelled importers to consider precluding China-made material completely. Despite the ensuing disruptions of shipment delays and cargo seizures by US Customs, the EU and Australia have announced their intentions to adopt a similar regulatory stance.

However non-China polysilicon capacity is currently only at around 125,000 mt/year, or the rough equivalent of 42GW of modules production, as of January 2023, which is less than 15% of the global capacity. Demand in the EU alone was expected to surpass 40GW in 2022; the US would have installed around 15 GW the same year, Australia around 5 GW.

Since there have been no production capacity expansion announcements from non-Chinese polysilicon manufacturers for 2023 and beyond, there is a substantial risk of a massive shortage in the raw material this year and going into 2024, said Yamasaki.

In view of the decoupling between non-Chinese and Chinese polysilicon, OPIS has started price assessments of the former, labelled the Global Polysilicon Marker (GPM). While the month-average for both grades slipped in December from the previous month, the GPM fell by just 0.18% to $38.70/kg while mono-grade FOB China polysilicon fell by 7.05% to 285 yuan/kg, according to OPIS data.

There is no quick way to reshape the China-centric polysilicon supply chain, but steps are being taken to address the balance of capacities further downstream. Time, however, remains the limiting factor, market sources said.

In the U.S., the Inflation Reduction Act (IRA) is poised to unleash $369 billion of investments towards forging energy security and tackling climate change. Solar energy is expected to feature prominently.

"Given the recent subsidies and policy changes, domestic module production is looking better than ever. From our insights, the spin-up time for setting up these facilities are unlikely to allow for module production before 1Q24 or 4Q23 at the earliest," said a major utility scale developer in the US.

The EU has also reportedly imported more than 75GW of modules in 2022 alone, noted Frank Haugwitz, founder of solar consultancy Asia Europe Clean Energy Advisory (AECEA). "But latest deployment forecast puts it at over 40GW, meaning the EU is supposed to have plenty of modules in stock and thus may import less in 2023," said Haugwitz.

Europe needs to have the ability to supply part of its demand locally, but it is going to take time, said a Spanish developer. "I do not see Europe competing with China in terms of volumes, but it will put some pressure," he added, referring to potential new capacities.

The hasty attempts to delink PV supply chains from China have raised the obvious question of what alternative arrangements would look like. But here, the forecasts are cloudy. With geopolitical fragmentation a constant threat, solar developers longing for sunny skies remain wary of supply chain gloom heading into 2023.

(1 USD = CNY 6.75)

*—Reporting by **Farahdian Aziz**, faziz@opisnet.com; Editing by **Hanwei Wu**, hwu@opisnet.com*

LPG OUTLOOK

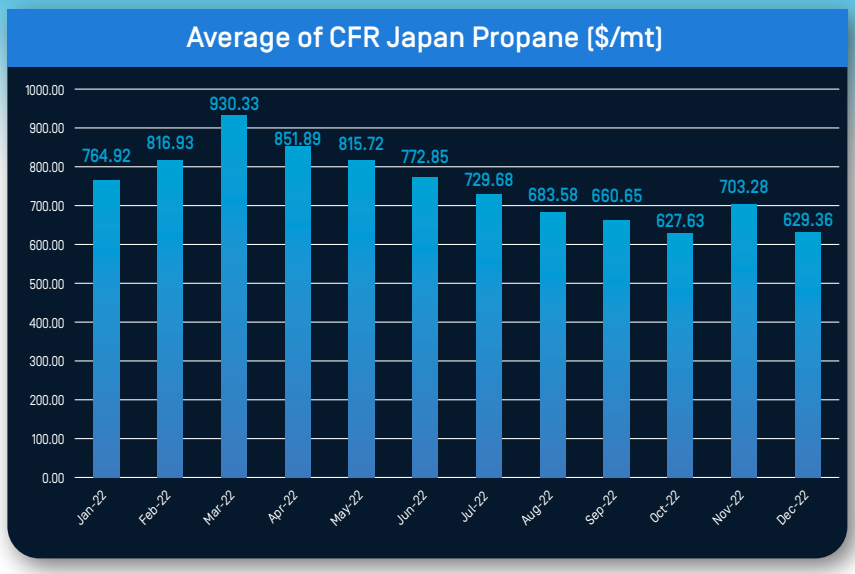
Asia LPG Market Eyes China For Demand Recovery Hope

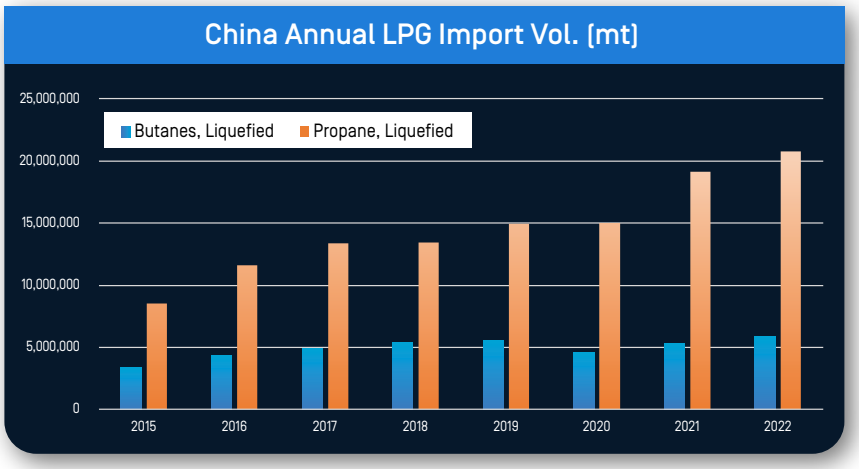
Asia's liquefied petroleum gas (LPG) demand in 2023 will depend heavily on the behemothic Chinese market, where the fallout from poor downstream margins has so far eclipsed the potential for fresh demand from new buyers, industry players said.

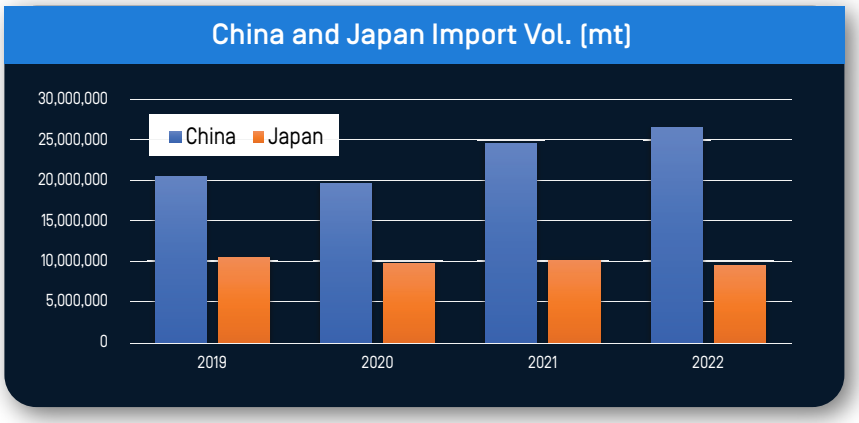
The price of CFR Japan propane, the reference price for Asia LPG, has fallen by around 17.7% in 2022 from a January average of $764.92/mt to an average of $629.36/mt in December, OPIS data showed. In a year of mostly buoyant commodity prices, Asia LPG prices had bucked the trend largely due to poor demand from China.

According to data from China Customs, China imported 26.6 million mt of LPG in 2022, retaining its position as Asia's largest LPG importer by far. But the 8.6% year-to-year growth in its import volume was a sharp fall from the 24.8% increase between 2020 to 2021, more than enough to take a toll on Asia LPG prices.

A similar slowdown occurred in Japan, Asia's second largest LPG importer. Based on Japan Customs' latest data for 2022 which was released up to November 2022, the country imported 9.58 million mt of LPG for the year, down 5.5% year-to-year and a reversal from the 3.6% increase between 2020 to 2021.







Suppressing the import appetite of Asian buyers was the woeful state of downstream petrochemical margins. Converting propane into propylene was largely a lossmaking proposition in 2022, with Northeast Asian propane dehydrogenation (PDH) plant operators and flexible steam crackers averaging margins of around negative $113/mt for the year, according to data from CMA.

And just as Asia's LPG demand growth revolves round the massive Chinese market, so too does the region's petrochemical demand. Policies aimed at snuffing out the spread of Covid-19 collaterally throttled China's economic

engine as well, severely dampening consumer demand in Asia's largest petrochemicals market-including for propylene derivative products.

The slew of new petrochemical plants that started up in 2022 had done little to alleviate the bearish mood, market players said.

A total of seven Chinese PDH plants started up in 2022, bringing online a combined propylene production capacity of 3.15 million mt/yr. Another three flexible steam crackers - crackers able to consume propane, butane, and naphtha- also started up in China in 2022 with a combined ethylene capacity of 2.9 million mt/yr, according to OPIS CMA.

But with the market awash in red ink, most PDH and cracker operators were more focused on keeping costs low than ramping up operating rates and propane purchases, a Singapore-based consultant said.

Operating rates of Chinese PDH plants, key consumer of LPG as feedstock, were at around 80% in October 2022 before falling to 66-67% in December, according to another industry source. OPIS CMA anticipates the PDH operating rates to be at around 78.7% for January 2023 before increasing slightly to around 80.5% in February 2023, still a far cry from maximum capacity.

Changes are afoot, however, to loosen the shackles of poor margins hobbling the LPG market.

China has begun easing its strict Covid-control measures starting late-December, which should lift end-user demand. The regional market has been boosted by pent-up seasonal demand amid the Lunar New Year holidays, and unexpected heating demand from the cold snap gripping north Asia, among other factors.

The slew of new petrochemical plants that started up in 2022 was also packed towards the end of the year, which meant its full impact has yet to be fully played out.

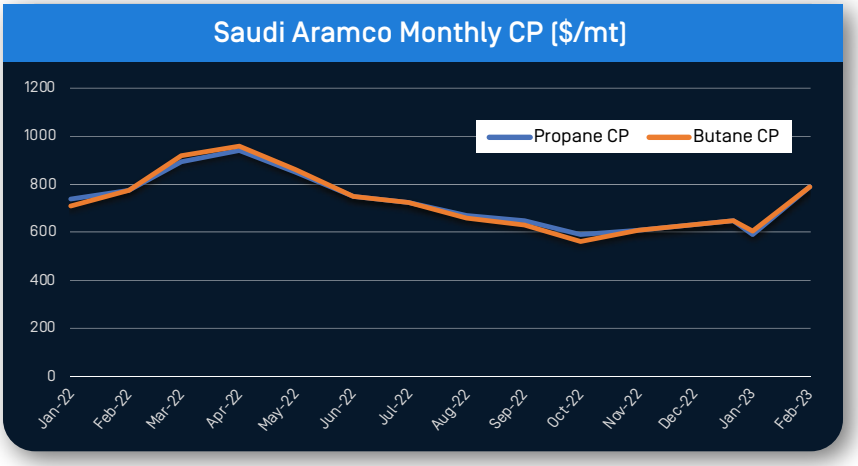
Of the seven new Chinese PDH plants started up in 2022, four were scheduled to come online only in the fourth quarter, representing 76% of the new capacity.

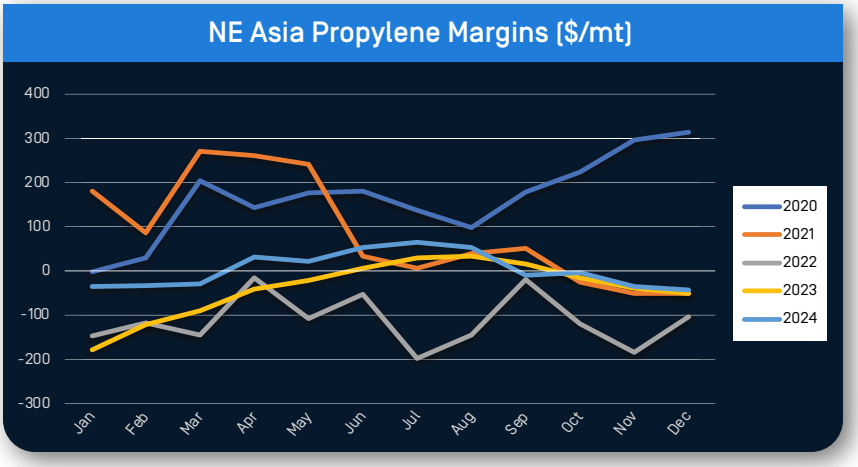
And momentum is building- another 11 new Chinese PDH plants are slated to come online in 2023 with an estimated combined propylene capacity of 6.31 million mt/year. At least five more flexible steam crackers are also under construction and will start up in 2023 with a combined ethylene capacity of around 5.5 million mt/yr, OPIS CMA added.

Already monthly contract prices for Middle Eastern LPG heading to Asia have been climbing upwards. Saudi Aramco raised its liquefied petroleum gas (LPG) contract prices (CP) for February-loading propane and butane to $790/mt, a $185-200/mt increase over its January CP.

The last time Aramco CPs exceeded $700/mt was in July 2022, when the refiner set propane and butane at $725/mt, according to OPIS data.

CMA has also projected a negative $39.34/mt margin for propylene in northeast Asia in 2023,

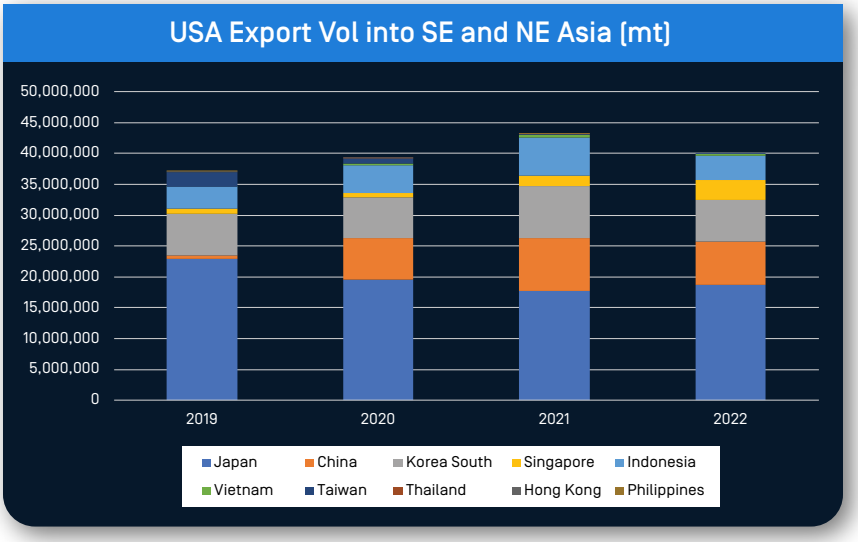




a sharp improvement over the negative $113/mt margin in 2022, albeit still steeply in the red.

But in a market so beaten down in 2022, industry players were quick to temper optimism with caution. Hair-trigger Covid-control policies have seen Asian economies vacillate between different degrees of opening up over the past two years, creating demand uncertainty.

"The rising number of Covid-19 cases in China (post-lifting of control measures) might lead to a labor crunch and this is anticipated to affect the entire supply chain of finished goods. PDH and crackers might not be able to operate at high run rates," the Singapore-based consultant said.



A constant monitoring of the China's Covid-19 stance against its previous zero tolerance policy would be needed for market participants to have a better market demand outlook, another China-base market source said.

Outside of Asia, LPG exports from the US also lurk to put the damper on any potential demand recovery.

The US exported 40.6 million mt of LPG to Asia during the first 10 months of 2022, with November and December figures still yet to be published at press time, according to customs data.

Market participants expect the total volume for the year to be around 48-50 million mt, just slightly below the 53.4 million mt exported over 2021 but still 24% higher than the volume recorded just three years ago in 2019.

Illustrating the potential for further export growth on the US-to-Asia route, a Singapore-based trader noted there were around 330 very large gas carriers (VLGCs) on waters in 2022, and this figure was likely to grow up to around 400 ships on waters for 2023.

Given the potential for LPG exports from the US to Asia, questions have to be asked over the ability of Asian buyers to absorb the incoming flows, the trader added.

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NAPHTHA OUTLOOK

Weak Demand and Growing Supply to Continue Drag on Asia Naphtha

After having ended 2022 in the red, Asia's downtrodden naphtha market could continue to take a beating from poor downstream demand and growing supplies in the coming year, market participants said.

CFR Japan naphtha prices fell by 12% over the course of 2022, from $738.125/metric ton (mt) on Jan. 3 to $649.25/mt on Dec. 30, to become the only clean petroleum product in Asia that ended the year lower than when it started, OPIS data showed.

Unlike for most other oil products, the boost Asia naphtha received from the Russia-Ukraine war supply chain fall-out was short-lived. CFR Japan naphtha peaked at $1165.50/mt on March 9 and was 24% lower just a month later at $888.50/mt on April 8.

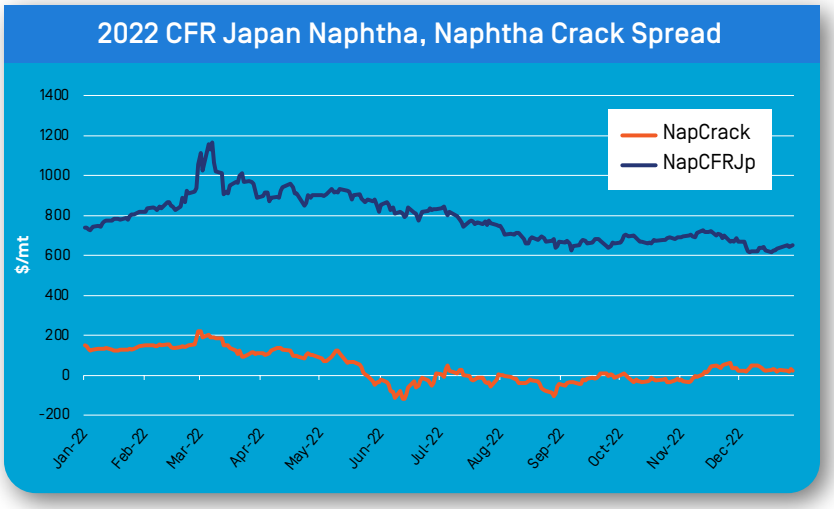
One reason for the slide was that Asia naphtha tracked crude lower — Brent crude similarly reached a 2022 peak of $130.31/bbl on March 9 and was 22% lower a month later. But Brent still managed to end 2022 higher than when it started — $83.88/bbl on Dec. 30 versus $78.64/bbl on Jan. 3.

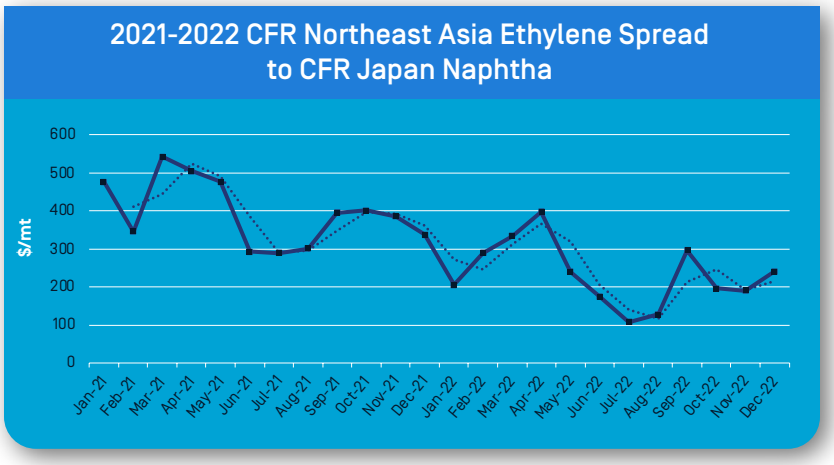
More crucially, the Asia naphtha bear run was propelled by poor downstream demand in the region, particularly in China where recurring bouts of Covid and energy restrictions in 2022 crimped not only consumer activities but also petrochemical plant operating rates, market participants said.

And it is this state of downstream demand that market players are still worried over for 2023. China has, in effect, rescinded its zero-Covid policy in late-December but downstream petrochemical margins have remained anemic so far.

The average CFR Northeast Asia ethylene spread to CFR Japan naphtha averaged just $235.12/mt in 2022, 67.5% lower than in 2021, according to OPIS data. With the typical breakeven spread pegged at $350/mt for non-integrated producers, and $250/mt for integrated producers, industry sources see little financial incentive for petrochemical producers to ramp up naphtha consumption.

Indonesia's Chandra Asri Petrochemical has been running its cracker at 70% capacity after restarting the unit in early December from an unscheduled shutdown. It has an ethylene production capacity of 900,000 mt/year.





Days into 2023, olefins margins in north Asia have only deteriorated. The ethylene/naphtha spread hit a 13-year low on Jan.16 when it shrank to less than $100/mt.

The short-term outlook for naphtha cracking demand at the start of 2023 remains downbeat. The first quarter of the year is packed with delayed cracker restarts and plant shutdowns.

Taiwan's Formosa Petrochemical Corporation, Asia's single largest naphtha buyer, has kept its No.2 Mailiao cracker, with a capacity to produce 1.035 million mt/year of ethylene and 518,000 mt/year of propylene, offline in January, extending its downtime into the seventh month.

South Korea's YNCC has repeatedly delayed the restart of its No. 3 cracker from November 2022 to February 2023. The cracker has the capacity to produce 470,000 metric tons (mt)/year of ethylene.

One positive is that the extended cracker turnarounds and plant maintenances are expected to taper down in the second half of the year.

In Northeast Asia excluding China, the total cracker capacity lost from both scheduled and unplanned outages is estimated at 22.72% in H1'23 and 16.15% in H2'23, according to Chemical Market Analytics (CMA) by OPIS. In Southeast Asia, total cracker capacity loss is highest in Q1'23 at 20.43% before shrinking to 12.75% for the second half of the year, CMA data shows.

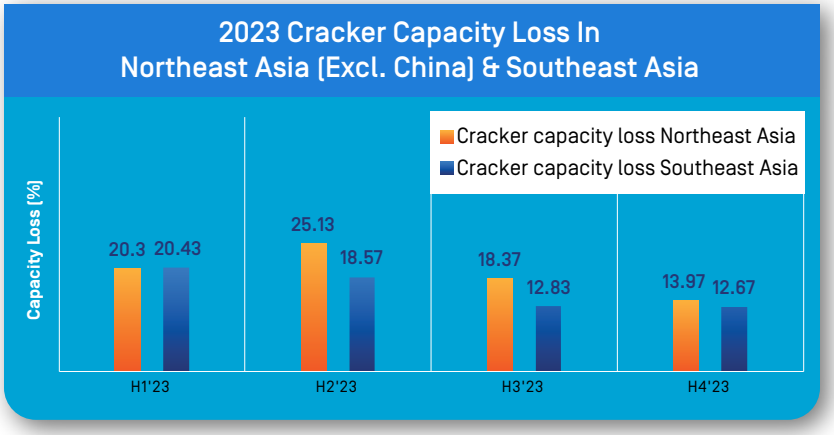
The demand malaise in the downstream petrochemicals sector has manifested itself in the widening price spread between the paraffinic naphtha that is used to produce petrochemicals and the heavy full range naphtha (HFRN) being used to feed splitters.

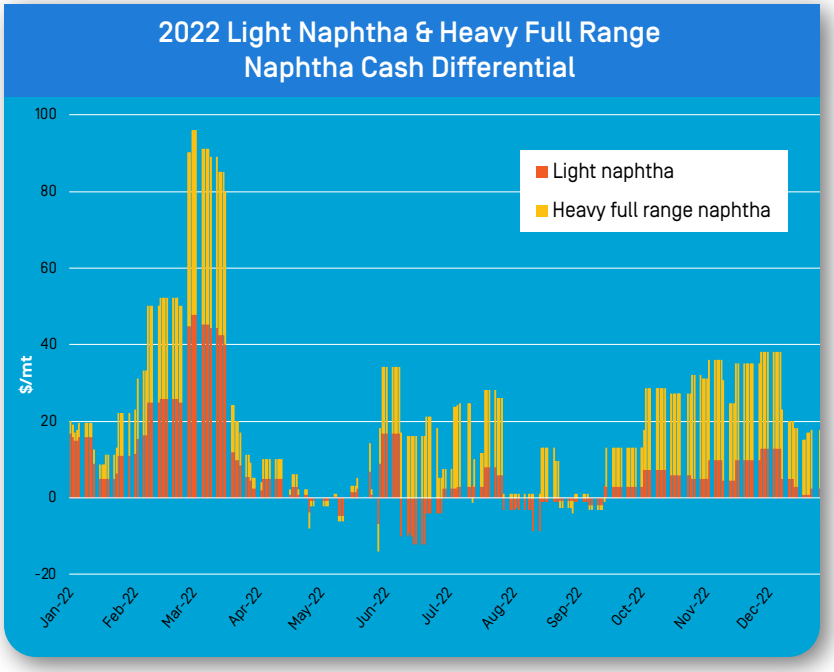
The spread of mainstream light naphtha over the heavy full range grade in north Asia flipped from a premium of around $2/mt in Q1'22 to a discount of over $13/mt in Q4'22, partly because of poor petrochemicals demand for the former, according to OPIS records.

The weakness in the light naphtha grade and strength in the heavy full range grade also share a common cause. Throughout most of 2022, Western sanctions on Russian material, whether imposed or impending, have prodded European buyers to avoid buying Russian oil products.

Russian naphtha has been forced to seek outlets in other regions as a result, inadvertently adding to Asia's naphtha supply length. Naphtha blends of Russia-origin that did manage to find buyers in Asia have unsurprisingly traded at steep discounts to naphtha from non-sanctioned sources, market players said.

And the same sanctions that added to naphtha supply in Asia have also helped to support the cash differentials for HFRN. The Ukraine war and





the resulting trade fallout have provided a huge fillip to gasoline margins globally, boosting demand for HFRN from which gasoline components can be derived.

The screws to hem in Russian oil flows are set to tighten further. On Feb. 5, 2023, Europe imposed an embargo blocking inflows of Russian oil products, possibly diverting 0.7 to 0.8 million mt per month of Russian naphtha in its various guises and blends from Europe to Asia, market sources said.

Asia's demand for heavy full range naphtha would meanwhile depend on aromatics margins and the supply of condensates, which splitters also use as a feedstock, sources said.

Amid the upheaval in trade flows stemming from the Russia-Ukraine war, new refining capacities in the East of Suez will continue to add to naphtha supplies in the region, market players said.

At least nine new refinery projects, with a total 2.9 million b/d capacity, are scheduled to be operational by the end of 2023, all of which are in Asia and Africa, according to the US Energy Information Administration (EIA).

Kuwait's Al-Zour refinery, which has already offered its first naphtha export cargo for loading in November 2022, is poised to become the largest refinery in the Middle East this year when its 615,000 bpd barrels per day (b/d) capacity is fully operational. Refineries in Oman and Iraq are also set to begin operations in 2023.

In mainland China, Shenghong Petrochemical's 320,000 b/d refinery kickstarted commercial operations in mid-November 2022 while PetroChina's new 400,000 b/d Guangdong Petrochemical also began trial operations late-October last year.

Decarbonization, while a long-term goal for the industry, will at least remain a nascent effort for now. The maturity and cost of current technology in recycled plastics and bio-feedstocks is unlikely to significantly impact, much less upend, the Asia naphtha market in the coming year, market sources said.

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GASOLINE OUTLOOK

Gasoline Market Faces Uncertainties, Headwinds Amid Energy Transition, Waning Demand

The gasoline market in Asia faces uncertainties from China's easing of Covid-19 restrictions and the rise in infections, as well as potential disruptions to trade flows from sanctions on Russia. Gasoline market also faces headwinds as energy transition to fossil-fuel alternatives impact demand, while the emergence of higher fuel efficiency technology and biofuel blending curb consumption.

Eyes are on China's easing of Covid-19 restrictions, which could on one hand ease the swelling of domestic inventories build-up, but on the other hand, rising COVID-19 infections stemming from the easing may result in volatile domestic demand and higher exports.

In the beginning of 2023, the Chinese Ministry of Commerce has issued its first batch of oil products export quotas for 2023 totaling 18.99 million metric tons (mt) under the general trade route to seven state-controlled oil firms, a 46% increase over the first batch issued for 2022, according to sources.

Market sources expect China's gasoline exports to be lower during the first two months of 2023 with domestic travel set to resume en masse ahead of and during the Lunar New Year holiday in late-January for the first time in almost two years.

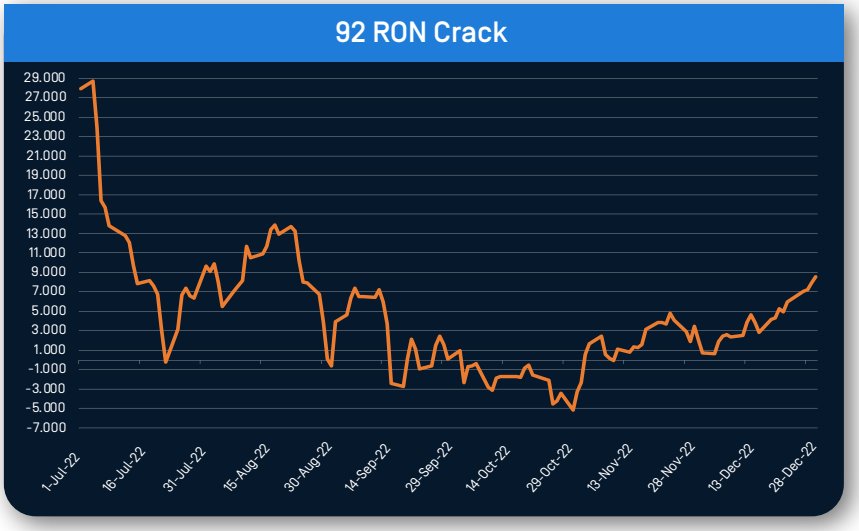
"Oil firms will be stockpiling gasoline and exports may see a drop during January and February," a trader said.

"It is hard to tell if Chinese gasoline exports will increase tremendously after the Lunar New Year period as domestic demand may remain high with the easing of policy. As seen in India, after Covid-19 restrictions were lifted, domestic demand spiked as people chose private transportation over public ones," a Singapore-based analyst commented.

"On the other hand, if the Chinese authorities re-impose Covid-19 measures due to a surge in domestic Covid-19 cases, then local refiners may have to resort to exporting surplus inventories at cheap rates which will drag gasoline prices lower," the analyst added.

On profitability, gasoline cracks, or refining margins are expected to remain under pressure as increasing demand for middle distillates leads to an increased gasoline output, market sources opined.

In Q4 2022, 92 RON gasoline refining margins fell to an average of plus $1.327/bbl compared to an average of plus $7.671/bbl in the previous quarter, according to OPIS data, in a sign of the fuel's decreasing profitability amid waning demand.



In India, gasoline demand in the first 11 months of 2022 has risen to the highest, since data dating back to 2011, according to data from the country's Petroleum Planning & Analysis Cell (PPAC).

"Demand will continue to remain strong in India, especially when more people opting to

travel via personal transport when they can to avoid being infected by the Covid-19 virus," an India-based trader said.

Over in Australia, the country will continue to rely on more gasoline imports with the closures of both Kwinana and Altona refineries in the country in 2021.

The country now only has two operating refineries - Viva Energy's 128,000 barrel per day (b/d) Geelong and Ampol's 109,000 b/d Lytton refineries - and this increases its reliance on refined product imports.

Australia imported an average of 5.098 million bbl per month of gasoline in H1 2022, up 24.2% from an average of 4.105 million bbl per month in H2 2021, according to the latest data from global oil association the Joint Organisations Data Initiative (JODI).

Similarly in New Zealand, domestic refining capacity has been closed and transformed into import terminal.

Trade flows are feared to be disrupted with the G7 imposing a price cap for Russian oil and an outright ban of Russian oil by the European Union (EU). One of the three agreements discussed stipulated that most of the 27 EU nations will not be able to buy refined oil products coming by sea from Russia from Feb. 5. 2023.

"With the limitations imposed on fuel imports from Russia, European gasoline importers with Russian accounts will be seeking cargoes from the Middle East and from India," according to a Singapore-based trade analyst.

"Russia exports around 3 million b/d of gasoline and diesel in 2022, and most of these products were taken by the neighboring countries in Europe. These displaced volumes will need to be fulfilled by some other suppliers eventually," another analyst said.

In the Middle East, domestic gasoline demand is expected to remain strong as market penetration of EVs are lower compared to East Asian regions.

The rising popularity of electric vehicles (EV) as alternatives to the oil-fueled internal combustion engine is expected to result in more gasoline demand destruction in the coming years.

In Southeast Asia, passenger EV sales grew 35% year to year in Q3 2022, according to a report from Counterpoint, with Thailand registering the highest EV sales volume in the region, followed by Indonesia and Singapore.

Annual EV sales in China are predicted to account for over 35% of passenger vehicle sales in 2023, according to a report from Fitch Ratings, with the world's top EV-consuming market expected to grow further in 2023 as such vehicles usually qualify for various parking and charging benefits in many cities in the country.

"Chinese brands, especially BYD, benefitted the most from the acceleration in electrification, as well as Chinese consumers' growing preference for plug-in hybrids and economical EVs, as a result of higher oil prices, a weaker economic outlook, and rising EV penetration in lower-tier cities," the report states.

Similar trends of growing EV sales will likely occur in Japan, South Korea and India, supported by improved model availability and increasing policy support, according to market sources.

*—Reporting by **John Koh**, jkoh@opisnet.com*

MIDDLE DISTILLATES OUTLOOK

Asia Jet Fuel to See Gradual Recovery; Gasoil Faces Uncertainty

The Asia middle distillates market should continue to find bright spots in 2023 following a banner year of refining margin growth but the interdependence between jet fuel and gasoil would have to adapt to easing Covid restrictions in China and ratcheting geopolitical tensions globally, industry sources said.

FOB Singapore jet fuel and gasoil prices opened 2022 at $86.65/bbl and $90.42/bbl respectively on Jan. 3, 2022, which turned out to be their lows for the whole year, OPIS data showed. The former peaked at $174.86/bbl on June 17, 2022, and the latter at $186.21/bbl on June 21, 2022 before closing the year at $116.13/bbl and $116.18/bbl respectively on Dec. 30, 2022.

The Singapore jet fuel and gasoil crack spread against Dubai also ballooned in 2022, averaging around $30.66/bbl and $36.78/bbl respectively, several times higher than 2021's respective $6.89/bbl and $9.09/bbl, according to OPIS data.

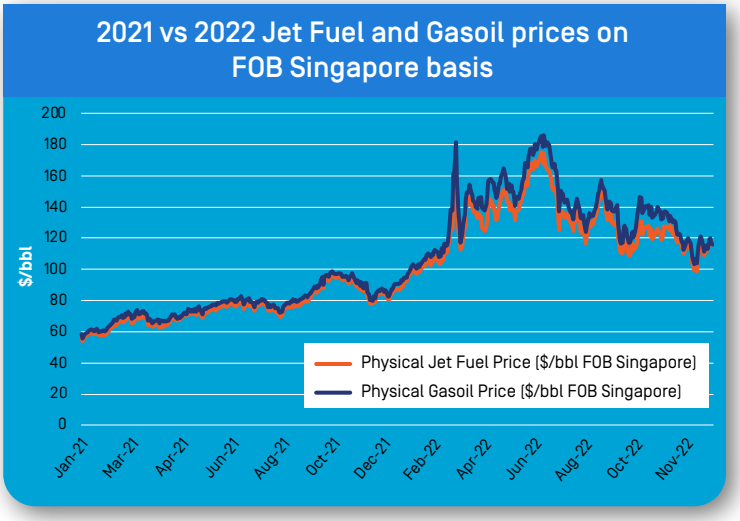
The Ukraine war and Europe's labored attempts to pull the plug on Russian oil imports were key factors in driving up distillates crack spreads globally in 2022. But within the Asia middle distillates complex, the impact of these factors was uneven on jet fuel and gasoil, two products between which refineries have to allocate production resources.

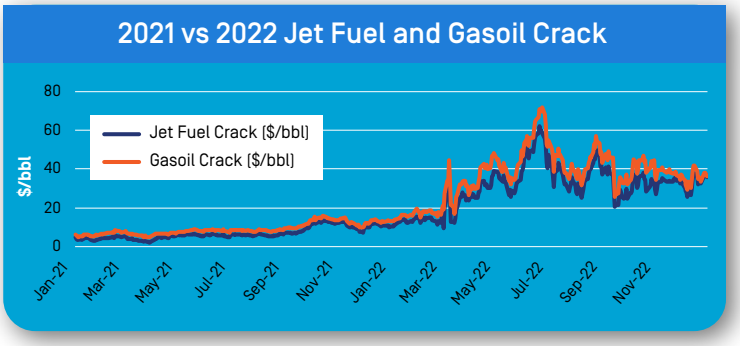
Singapore jet fuel averaged a discount of $6.12/bbl to 10 ppm sulfur gasoil last year, almost three times the discount of $2.20/bbl in 2021, reflecting the relative strength gasoil had gained over jet fuel during 2022, OPIS data showed.

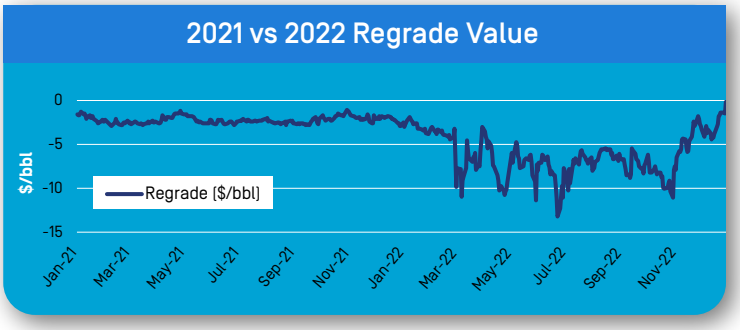
For gasoil, the Ukraine impact was compounded by Asia's spirited post-Covid economic recovery, which jacked up diesel demand within the region. For jet fuel, the Ukraine factor was mitigated by Asia's sluggish post-Covid aviation recovery, which was curtailed by China's closed borders.

But Asia's jet fuel market looks set to finally shake off its pandemic stupor after China, the region's largest aviation market by far, abandoned its strict zero-Covid 19 policy in late-December. The country announced that it would ease most international travel restrictions starting Jan. 8, setting the stage for a restoration of domestic and international flights that would increase jet fuel consumption.

The scope for demand recovery is large. China's apparent jet fuel demand in 2022 was estimated at 20.2 million mt, 37.5% lower than for 2021.







China's easing travel restrictions are expected to be the rising tide that lifts aviation demand throughout Asia. But several industry players cautioned that the pace of recovery would be slow and might only start to accelerate after mid-2023.

Airlines and airports could need time to operate more flights due to manpower and logistics constraints, so flights frequency might only increase significantly in the second quarter of 2023, sources said.

The abrupt abandonment of the zero-Covid policy also led to ongoing Covid outbreaks in China, complicating the country's efforts to reopen its international borders with restrictions imposed by some countries on Chinese travellers.

"If infection numbers remain high or there are additional waves of infections, the Chinese government may re-impose restrictions and even close the borders.

They were quick in removing restrictions but are just as quick in re-implementing them, so it's hard to predict the impacts for now," a Chinese refiner said.

Another supportive factor for jet fuel would be the continual draw of jet fuel from east to west, particularly the US west coast industry sources said. North Asian jet fuel's discount to US west coast jet fuel steepened sharply in 2022, opening the arbitrage window between the two regions.

Decarbonization would remain an ongoing effort in the aviation industry but market players do not expect conventional jet fuel to face significant competition from sustainable aviation fuel (SAF) yet, which is still trying to find its commercial footing.

The International Air Transport Association (IATA) estimated that global SAF production reached 200-450 million liters (L) in December 2022, more than double the 100 million L produced in 2021. In comparison, Singapore Airlines (SIA) alone consumed around 3.1 billion L of jet fuel in Financial Year (FY) 2021-22, according to the airline.

Bullish expectations for jet fuel, if materialized, might end up encouraging refiners to allocate more of their resources towards the product over gasoil.

Unlike for most of 2022, sentiment for Asia gasoil for the coming year is more subdued than for jet fuel, market players said.

One factor is the unravelling of trade ties between Russia and the European Union. Come Feb. 5, the European Union will impose an import ban on refined oil products from major gasoil exporter Russia, a move that has already effected a rewrite in global trade dynamics.

European buyers have been stockpiling as much low-priced Russian gasoil as they can before the ban, leaving them with high inventories and little appetite for Asian cargoes. Post Feb.5, market players expect banned Russian cargoes to find outlets in Latin America and Africa, displacing the US and Asian cargoes that typically supply these regions. With their usual outlets taken over, US and Asian exporters would have to find outlets in Europe.

It is unclear what the exact net gain or loss for Asia would be in this new global order, market sources said.

Within Asia, cargoes from the Middle East and India have a proximity advantage over north Asia when it comes to shipping gasoil to northwest Europe. Outside Asia, US cargoes would compete against north Asian cargoes when supplying Europe. Market players nonetheless expect Asia-to-northwest Europe arbitrage flows to pick up in 2023 amid the reorientation in trade flows.

The pace of China's products exports will also remain the major wildcard it has been in recent years, market sources said.

China exported 8.9 million mt of gasoil from Jan. to Nov. in 2022, around half of what it shipped out over the same period in 2021. Part of this has to do with ensuring domestic supply during last year's Ukraine war-driven diesel market frenzy. But in a country where the government directly sets limits on oil export volumes, authorities were also quick to issue two booster rounds of export quotas last year to help refiners pare own inventories, market sources noted.

The country has already issued effective end-Dec. its first set of product export quotas for 2023 at 18.99 million mt, 46% higher than 2022's first set of export quotas at 13 million mt. The Singapore gasoil crack spread was assessed at $29.27/bbl on Jan. 6 after having ended 2022 at $36.10/bbl on Dec. 28, OPIS data showed.

On gasoil demand, the Asia outlook has turned bearish on recession fears, given the dependency of diesel consumption on economic activity, market sources said.

Asia will also see some loss in gasoil demand due to decarbonization efforts in the region.

Major gasoil importer Indonesia is likely to start its nationwide mandate of blending 35% biofuels into its diesel pool (B35) in February, a hike from the present B30. The limit may increase further to B40 around mid-2023.

And while Malaysia was unable to achieve its nationwide B20 mandate by the end of 2022, it was expected to do so in 2023, market sources said.

The price spread of Singapore jet fuel over gasoil, also known as the regrade, has climbed to near parity in January 2023, OPIS data showed. This is partly due to seasonal factors, since kerosene, a more unrefined precursor of commercial jet fuel, is used as a heating fuel during the Q4 to Q1 winter season in north Asia.

But a sustained rally in the regrade, as suggested by the reversal in relative sentiment between jet fuel and gasoil, might yet prod refiners to consider shifting their production focus on the former over the latter for the rest of the year.

*—Reporting by **Kite Chong**, kchong@opisnet.com; Editing by **Hanwei Wu**, hwu@opisnet.com*

FUEL OIL OUTLOOK

Demand For HSFO In Singapore Remains Steady In 2023, Say Traders

Demand for high sulfur fuel oil (HSFO) in Singapore is expected to remain supported in 2023 as a marine fuel and refinery feedstock, said traders.

"With the European Union (EU) ban in February around the corner, more Russian residues are likely to flow east keeping a lid on prices. However, if Russian refinery and/or crude output is impacted by the EU bans or by the logistical challenges associated with moving the oil east, then the lower exports could boost HSFO prices," said Roslan Khasawneh, Senior Fuel oil Analyst at vessel analytics company, Vortexa.

The pace of strengthening of the HSFO cracks against Dubai crude prices is likely to be gradual as market will need to absorb the excess Russian fuel oil built up in floating, a consensus that most traders shared.

This despite the price of 3.5% sulfur HSFO on a free-on-board (FOB) from Singapore declined 13.01% year-on-year to $377.06/mt for the year from Jan. 3 to Dec. 30, 2022, despite Dubai crude strengthened to $78.75/bbl from $77.49/bbl

over the same period, OPIS data showed. Traders attributed the flows of cheaper Russian HSFO cargoes into Asia resulted in the decline.

"The HSFO market will then see support in 2nd and 3rd quarter from seasonally higher demand for power generation in South Asia and the Middle East," said Ivan Mathews, Head of Asia Refining and Global Fuel Oil Service at consultancy firm FGE.

OPEC+

In addition, the recent OPEC+ production cut of 2 million barrels per day (b/d) from November, which are likely to reduce medium-to-heavy sour grades and thus further reducing HSFO supply in the market, according to traders and analysts' expectations.

"The high-sulfur grade could see upside from higher demand as refinery feedstock. Straight-run HSFO can be used as feed for secondary units such as residue fluid catalytic cracking (RFCC) units and cokers, "added Mathews.

This as market participants expect any further cuts by OPEC+ to support crude prices, could bolster the use for straight-run HSFO as feedstock for secondary units in refineries.

HSFO Bunkers

On the HSFO bunker demand, more scrubber-fitted ships are expected to come online, supporting the demand of HSFO.

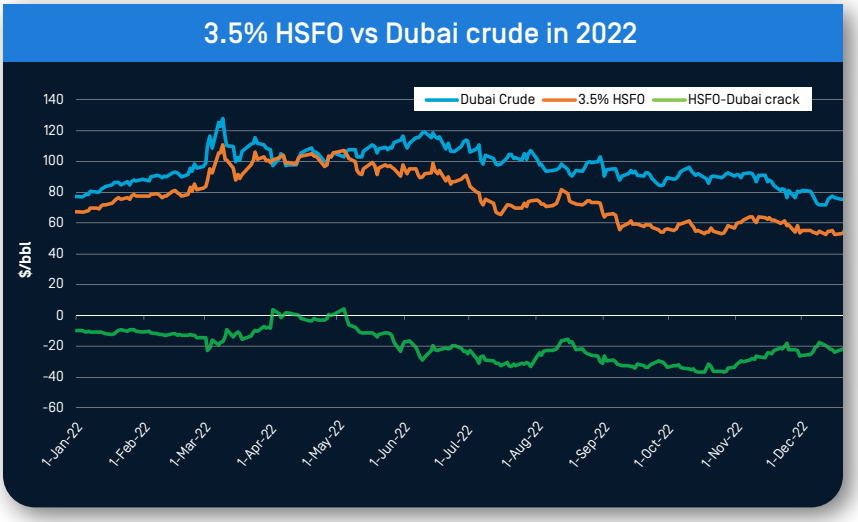
Analysts expect a 400-500 increase in vessels to be fitted with scrubbers in 2023, where they estimated the total number of vessels fitted with scrubbers is around 5,300 in 2022 out of the total commercial fleet of 102,899 as listed in the latest United Nations Conference on Trade and Development (UNCTAD) statistics.

The hi 5 spread, which is a measure on the price differentials between the VLSFO and HSFO strengthened to $195.73/mt on Dec. 30, 2022 from the beginning of 2022 on Jan. 3 at $163.59/mt, OPIS assessment showed.

In 2022, the refining margin of HSFO to Dubai crude price up to Dec. 30 averaged to a discount $19.88/bbl, OPIS data showed.

Refining margins of 3.5% HSFO declined from a discount of $9.64/bbl at the start of 2022 to negative $20.29/bbl on Dec. 30, according to OPIS assessments.

The HSFO margin fell to the lowest of a discount of $36.65/bbl on Oct. 14.



Traders expect HSFO cracks to average around negative $20 to $10/bbl in 2023.

VLSFO

On the other hand, a weak gasoline market is likely to lower RFCC utilization rates, which in turn will boost very low sulfur fuel oil (VLSFO) supply.

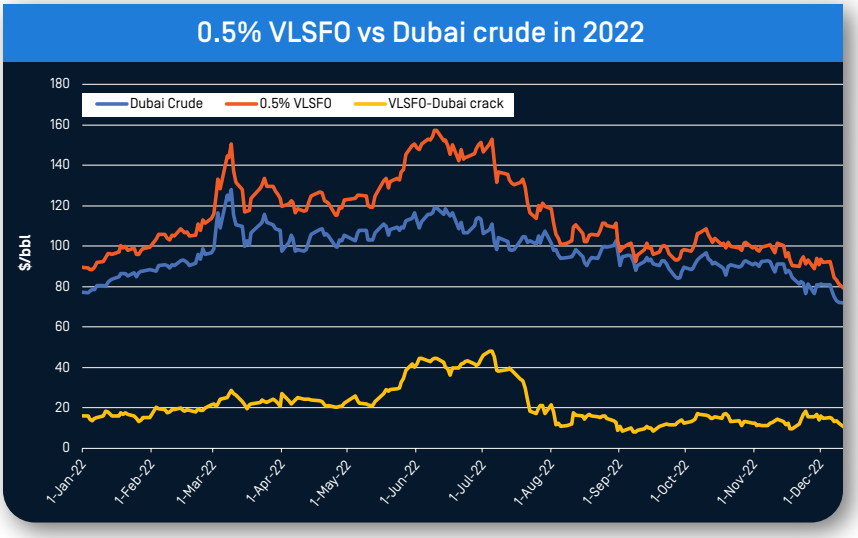
Prices of VLSFO on a FOB basis in Singapore for the year from Jan. 3 to Dec. 30, 2022, slipped 4.1% to $572.79/mt, according to OPIS data.

"The continued ramp-up of the Al-Zour refinery should see more VLSFO barrels being pushed from the Middle East into Asia. In addition, LSFO production in Asia will increase in tandem with higher crude runs in the region. We will likely see higher VLSFO production from China in 2023 as they continue to reduce their VLSFO import dependency and expand their bunker market," said Mathews.

The VLSFO cracks in 2022 to Dec. 30, averaged to $20.46/bbl with traders expecting the VLSFO refining margin to decline to a premium $0 to $10/bbl in 2023.

For 2022, the refining margins of 0.5% declined to $6.74/bbl on Dec. 30, down from $15.72/bbl on Jan. 3, with the lowest at $4.60/bbl on Dec.23, according to OPIS assessments.

The 615,000 b/d Al Zour refinery in Kuwait is designed to produce 235,000 b/d of 1% low sulfur fuel oil (LSFO) and 0.5% VLSFO, when its 3 refinery trains Of 205,000 b/d each are fully operational at full capacity by first half of 2023, according to analysts' estimate.



The 1% LSFO is to satisfy the Kuwait Ministry of Electricity and Water's requirement, while the 0.5% VLSFO is for export.

Kuwait Petroleum Corporation (KPC) sold the first VLSFO cargo — a 100,000mt parcel, from the Al Zour refinery via a tender in November, according to tender documents seen by OPIS.

The Kuwait refinery subsequently sold a 2nd 100,000mt 0.5% VLSFO cargo via a tender on Dec. 16.

"However, LSFO prices could be pushed higher post-winter amid refinery turnaround and improving gasoline demand. Bunker demand may slow in 2023 and with more scrubber ships joining the global fleet, LSFO bunker demand could face some pressure there too, "added Khasawneh.

There is also another downside risk, which is further deterioration of the global economic growth will impact on the demand of the HSFO and VLSFO, analysts cautioned.

"About 90% of the cargoes in the world are transported by vessels and economic activities drive bunker demand but the traditional fossil fuels will continue to be the mainstay for shipping vessels in Asia for 2023," said Simon Neo, Executive Director of fuel consultancy, SDE International.

Delivered HSFO price in Singapore for 2022 up till Dec. 16, averaged to $522/mt, while the delivered VLSFO averaged to $800/mt, OPIS Global Marine Fuels data showed.

So far total marine fuels in Singapore up to November 2022, totaled to 43.75 million mt, according to the latest data from Maritime and Port Authority of Singapore (MPA).

Analysts expect the 2022 marine fuels sale volumes to be lower than 2021's volume, where marine fuels sales hit close to 50 million mt.

Sources : https://www.lw.com/en/people/admin/upload/SiteAttachments/Alert%203042.pdf (page 1, para 3)
https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx (global commercial fleet)

*—Reporting by **Thomas Cho**, tcho@opisnet.com*

PETROCHEMICAL OUTLOOK

PX Overcapacity Looms Over Asia Market In 2023

Prima facie, the market outlook for paraxylene (PX) is bleak for 2023.

Producers have been grousing of PX oversupply in 2022 amid multiple new PX plants commissioned. And there are many more to come in 2023, mostly in China. These PX start-ups clash with a troubled downstream purified terephthalic acid (PTA) industry already suffering from reflux amid weak demand, which subdued production at around 60% of capacity through 2022 in the key China market. PTA producers in turn, shift the blame to a miserable polyester sector. However, there is a ray of hope for PX amidst the doom and gloom — the gasoline blend pool can emerge, again, as saviour.

A wave of new Chinese PX plants were commissioned in 2022, including Sinopec's unit in Jiangxi's Jiujiang City that started up in late-May with 900,000 metric tons (mt) per year of PX, Shenghong Petrochemical with a 2 million mt/year PX unit in October, and Dongying Weilian Chemical with a 1 million mt/year unit in November.

In 2023, more PX plants are expected to saturate the market. Shenghong Petrochemical introduced another

New PTA Plants

	2022	2023	2024
Dongying Weilian Chemical		2,500	
Formosa Chemical Industries			1,500
Hainan Yisheng Petrochemical		2,500	
Hengli Petrochemical Huizhou		2,500	2,500
Jiangsu Hailun Petrochemical			3,200
Jiangsu Jiatong Energy		5,000	
Sinopec Yizheng Chemical Fibre			3,000
Zhejiang Dushan Energy			2,700
Zhejiang Yisheng New Material	3,600		
SASA Polyester Sanayi			1,500
PTA Grand Total	**3,600**	**12,500**	**14,400**

2 million mt/year PX unit, with CNOOC Huizhou Petrochemical adding 1.5 million mt/year, CNOOC Ningbo Daxie Petrochemical 1.6 million mt/year, CNPC/PDVSA Guangdong Petrochemical 2.6 million mt/year, and Zhejiang Petrochemical 2.3 million mt/year.

These new capacities make no sense from the perspective of existing PX producers, who have crimped 2022 production amid poor margins — at least two in the middle east were heard covertly shutting for at least a month each, an unprecedented move considering their feedstock advantages, said a source close to one of these producers.

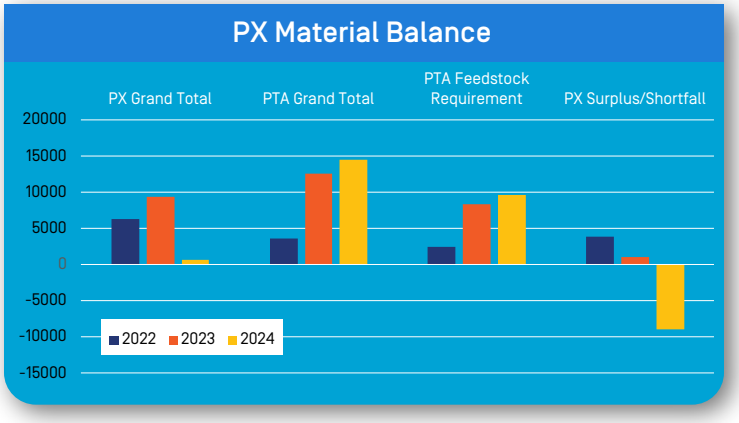
New Chinese PX capacities will saturate the market with a combined production capacity of 13.9 million mt/year of PX, said Dong Li, General Manager of Polyester Division at China-Base Ningbo Group (CBNB), OPIS reported.

In turn, downstream PTA plant start-ups commissioned in 2022, and expected in 2023, include Dongying Weilian with 2.5 million mt/year, Hainan Yisheng with another 2.5 million mt/year, Hengli Petrochemical Huizhou with 2.5 million/year, Jiangsu Jiatong Energy with 5 million mt/year, and Zhejiang Yisheng New Material with 3.6 million mt/year. These PTA capacity additions total 16.1 million mt/year, and will require less than 11 million mt/year of PX to run at full blast, according to OPIS estimates.

Hence, potentially 2.9 million mt/year of surplus PX might flood the market.

New PX Plants

	2022	2023	2024
CNOOC Huizhou Petrochemical		1,500	600
CNOOC Ningbo Daxie Petrochemical		1,000	
CNPC Guangdong Petrochemical		2,600	
Dongying Weilian Chemical		980	
Shenghong Petrochemical	2,000	2,000	
Sinopec Jiujiang	890		
Zhejiang Petroleum and Chemical	2,400		
Idemitsu Kosan		420	
Mangalore Refinery and Petrochemicals	920		
Saudi Arabian Oil Company		800	
PX Grand Total	**6,210**	**9,300**	**600**



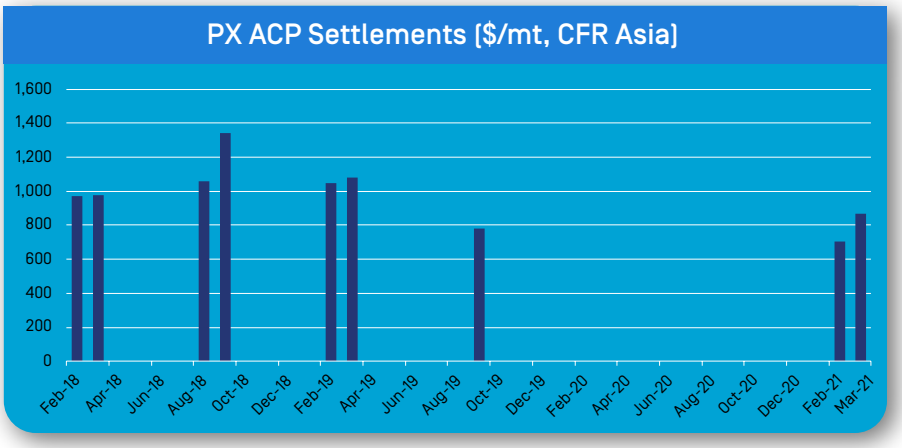
A growing surplus of PX has eroded the bargaining position of PX suppliers, while strengthening leverage for PX users in the key PTA sectors. Playing out on the PX ACP discussion table, no major PX ACP settlements have followed since March 2021, according to OPIS and CMA records.

The lack of settlements represents a gradually diverging view about PX prices between buyers and sellers. In particular, buyers were in no rush to settle the PX ACP at unfavorably high levels, expecting spot prices to be in their favor amid ample supply.

Consequently, Yisheng Petrochemical, one of the world's biggest PX consumers and a key negotiator of the PX ACP chose to abandon this monthly process from 2023, also omitting the PX ACP as a price component, OPIS reported.

"They feel there is no meaning in the PX ACP negotiations," said a petrochemicals broker.

Echoing a darkening PX mood, term contract discussions for 2023 were concluded at flat, and at minus $2 /mt to CFR China



spot prices, instead of at premiums as originally discussed. Even though these term differentials were higher than the minus $5/mt to minus $8/mt range against CFR China prices seen in 2022, suppliers are getting relatively less for their PX as freight has increased sharply year-to-year, market sources said.

OPIS daily price assessments showed PX tipping into a price contango on Dec. 29 in 2022 and potentially signaling poor demand, after almost a year of daily price backwardation since Jan. 2022.

However, this price curve might unexpectedly change by the first-quarter of 2023, as had happened in the second quarter of 2022.

Aromatics traders have been eyeing western gasoline blend pools from as far back as in early Dec. 2022, seeing opportunities to send Asia's PX, toluene and mixed xylenes (MX) west again for March octane, an aromatics industry veteran told OPIS in December.

Using PX as an octane booster was unthinkable in the past under normal circumstances — although PX has octane value, it was historically the most expensive blend stock option among aromatics, according to OPIS data. Nonetheless, gasoline blenders dumped paraxylene (PX) into the mogas blend pool in 2022 to sate appetite for octane in the U.S., two sources in Asia's aromatics trade told OPIS, with one South Korean source emphasizing that "the numbers worked." This will recur in 2023 so long as there is profit. Even without touching PX, MX and toluene exports from Asia for octane can also reduce availability of feedstocks for PX, inadvertently limiting PX supply.

PX originating from South Korea and Brunei have been secured by traders aiming to move cargoes west, said the industry veteran, who predicted a surprising PX shortage of 1 million mt in the first half of 2023.

For early-2023 at least, an additional PX oversupply reprieve might happen through PX start-ups delaying, while PTA ones start punctually or come early.

OPIS historical records show that new PTA plants have generally started up ahead of, or on schedule, compared to PX ones, that by nature employ more complex technology. Almost all of the new 16.1 million mt/year PX capacities mentioned earlier were originally expected to come on stream by 2022, but were delayed to 2023. PTA plants like Jiangsu Jiatong Energy came on stream faster than expected, with a 2.5 million mt/year line starting in 2022 instead of 2023. New PTA plants might outnumber PX plants in the short term, aiding PX digestion.

A wild card that might positively impact demand for fuels, petrochemicals and PX in 2023, comes from China's easing of Covid-19 lockdown measures. After years of heightening controls, and a year of false starts and disappointments in 2022, pent up demand to travel and consume might increase demand for clothing and apparels, bottled beverages and packaging, boding well for polyethylene terephthalate (PET) and polyester. It remains unclear whether China will also burn PX as octane, though higher demand for toluene and MX similarly as fuel and feedstock, can lift prices for PX via a cost push. Chinese origin toluene, MX and PX cargoes that are harder to move west, can also fill a regional vacuum assuming other Asia origin cargoes are exported.

Commenting on the market flux, CBNB's Dong said that as more crude-to-chemicals units start up and produce petrochemicals such as PX, older benzene-toluene-xylenes (BTX) units might be idled. Hence, better integrated PX and PTA plants will be more profitable.

Term PX contract volumes are thinner than the year before, traders told OPIS, freeing up more spot parcels for play.

2023 holds promise for astute PX and aromatics traders, with volatile market conditions serving up a high-risk, high-reward game.

*—Reporting by **Chuan Ong**, cong@opisnet.com*

BENZENE OUTLOOK

Benzene Recovery Hinges On Downstream Consumption

Asian benzene spot prices have been on a rollercoaster ride in 2022, brought on by volatile crude prices, tepid downstream demand and negative margins.

Spot trading activity was turbulent with massive price hikes and plunges seen. Its six consecutive week bull run with a 27% gain was immediately followed by a four-week bear run with losses totaling 30%, leading to a multi-month high and low seen between mid-June to mid-July.

The naphtha/benzene spread, a gauge of the profitability of benzene production, also saw large fluctuations during the same time frame. It surged to $644.13 per metric ton (mt), over triple the healthy spread of $200/mt required then crashed a near 60% to $284.50/mt. Production is deemed uneconomical when it drops below $150/mt. Producers' streak of negative margins started on Oct 31 and lasted seven straight weeks.

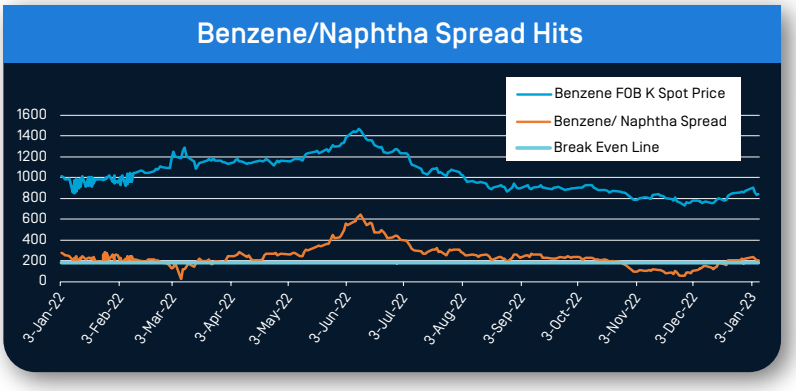
"When it becomes cost-inefficient to produce petrochemicals, it is a big indicator that the global economy is struggling and that has been the case in Q4. Demand from China is almost non-existent as the lockdowns have seen to that, supply is long as no one dares buy. Crude oil and freight rates have been volatile. All these factors have pulled benzene prices and earnings to historical lows," said a South Korea-based producer.

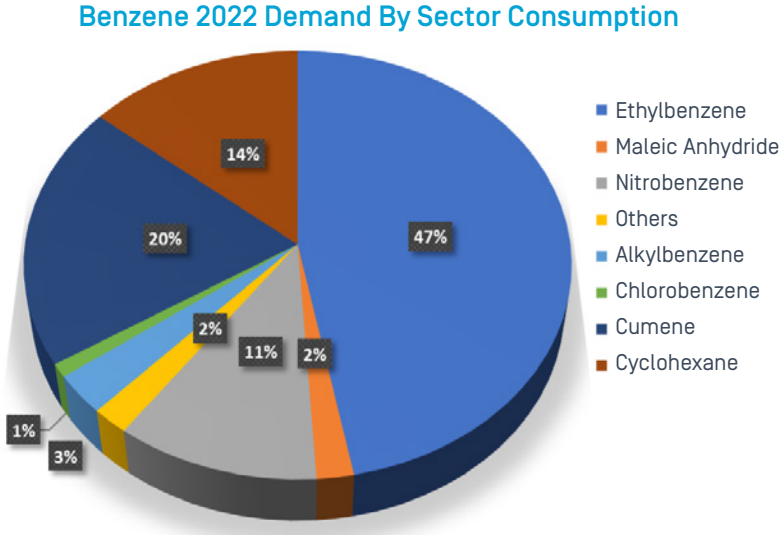
Strong gasoline blending margins in the US amid its seasonal driving season had motivated refineries to swing toluene, a feedstock of benzene, into the octane blending pool. Thereafter, the arbitrage between US and Asia opened as prices were driven by a shortage of aromatics in the US, helping digest the excess spot volume.

A pullback in crude, naphtha and US gasoline prices, coupled with unworkable blending margins using aromatics, had dampened demand for Asian cargoes, especially with the long sailing time. Amid swelling inventory, suppliers started trying to offload volume by offering the spot market down.

Collapsing demand from the biggest benzene-consuming sector, styrene monomer (SM), amid persistent negative margins had encouraged some regional benzene producers to push their maintenance schedule forward to alleviate inventory pressure.

As negotiations for 2023 term supply between most Korean producers and Chinese end-users failed to conclude before year-end because of differing market outlooks, most expect spot demand to increase in Q1.





Beijing's scrapping of its zero-Covid policies has caused infection numbers to surge, raising concerns about new variants. Appetite for domestic petrochemical consumption will remain thin amid immobility as consumers continue to limit their exposure to positive cases.

However, most participants polled held a bullish outlook for the year stemming from benzene production cutbacks, increased derivative consumption upon the commencement of new plants and strong gasoline blending demand.

A raft of maintenance planned for Q1 in Asia helped boost the value of January and February loading molecules as some buyers returned to the spot market to restock ahead of the Lunar New Year holidays which start on Jan 22.

Supply

According to OPIS calculation, cargo availability in the benzene sector is expected to drop 31,250mt in January, 50,240mt in February, and 172,200mt in March.

Turnarounds beginning Q1				
Plant	**Location**	**Process**	**Capacity ('000mt/year)**	**Shutdown**
YNCC	Yeosu, South Korea	Pygas	No.2: 150	Jan-Mar
YNCC	Yeosu, South Korea	Pygas	No.1: 120	Mar-Apr
LG Chem	Yeosu, South Korea	Pygas	225	Jan-Mar
Nippon Steel	Oita, Japan	Coal	205	Feb-Apr
Sinopec ZRCC	Ningbo, China	Reformate	140	End Feb- Mid May
JFE Chem	Kasaoka, Japan	Coal	100	Mar-Apr
Hanwha Total	Daesan, South Korea	Pygas	225	Mar-Apr
GS Caltex	Yeosu, South Korea	STDP	515	Mid Mar-May
GS Caltex	Yeosu, South Korea	Reformate	250	Mid Mar-May
Turnarounds beginning Q2				
Plant	**Location**	**Process**	**Capacity ('000mt/year)**	**Shutdown**
Hanwha Total	Seosan,South Korea	Reformate	250	26 Apr-6 Oct
Idemitsu Kosan	Chiba, Japan	Reformate	427	Apr-May
FCFC	Mailiao, Taiwan	Reformate	500	Apr-May
SKGC	Ulsan, South Korea	Pygas	117	May-Jun
Lotte Chemical	Pasir Gudang, Malaysia	Pygas	157	May-Jun
Mitsubishi Chem	Mizhushima, Japan	Pygas	222	May-Jun
S-Oil	Ulsan, South Korea	Reformate	No.2: 330	Jun-Jul
Turnarounds beginning Q3				
Plant	**Location**	**Process**	**Capacity ('000mt/year)**	**Shutdown**
PTTGC	Map Tha Phut, Thailand	Reformate	No.2: 400	Mid Jul-Mid Aug
Mitsui Chem	Chiba, Japan	Pygas	145	Jul-Aug
CPC Corp	Linyuan, Taiwan	Reformate	No.3: 258 Jul-Aug	

Turnarounds beginning Q4				
Plant	**Location**	**Process**	**Capacity ('000mt/year)**	**Shutdown**
Nippon ST & Sumikin	Hirohata, Japan	Coal	71	Oct
CPC Corp	Linyuan, Taiwan	Reformer	No.7: 203	Nov-Dec

"There has been a resurgence in demand for January and February cargoes as buyers expect some tightness. Already some of my term buyers are asking for an increase in volume as they don't want to be subjected to the volatility of the spot market. Most of our contracts are concluded at rollover premiums making it easier for end-users to calculate their production costs," said a South Korea-based producer.

The volatility in the energy markets might encourage some producers to increase or reduce operating rates which would be dictated by the benzene-naphtha spread. Benzene producers are expecting profit margins to remain healthy because of Lunar New Year restocking activity and the US driving season.

While the Asian benzene market might buckle under growing supply as new plants' capacity will total 3.65mil, consumption is expected to increase by about 4.7mil, according to OPIS data. However, many raised doubts that the new facilities will maintain high output pressured by a slowdown in economic growth.

New Benzene Capacities

China's step away from their Covid-19 zero stance with support measures for economic recovery could lead to a benzene demand rebound from H2 of 2023 on expectations that the construction and automotive sectors would improve.

The bullish sentiment was tempered by China's privately-owned Shenghong Petrochemical start-up of its crude oil-to-chemical (COTC) project. The greenfield refining complex, with a capacity of 1.37mil mt/year of benzene, together with a 450,000mt/year phenol unit, started commercial operations in Dec 2022. According to OPIS calculations, approximately 20% of the yield will be required to operate the derivative at full.

"Once Shenghong's aromatics operations go into full swing, both domestic and regional markets will face supply pressure. On top of that, Petrochina Guangdong has also started up. Until both these companies start SM operations in Q1 and Q3, they will be selling their surplus," said a Singapore-based trader.

Petrochina Guangdong Petrochemical's latest greenfield integrated refinery commenced production at its 800,000mt/year benzene unit H1 December with commercial supply available in the latter half.

"If supply continues to grow while downstream consumption remains limited, producers may re-evaluate their production plans and cut operating rates, especially if margins get squeezed again," added the Singapore-based trader.

Downstream Additions

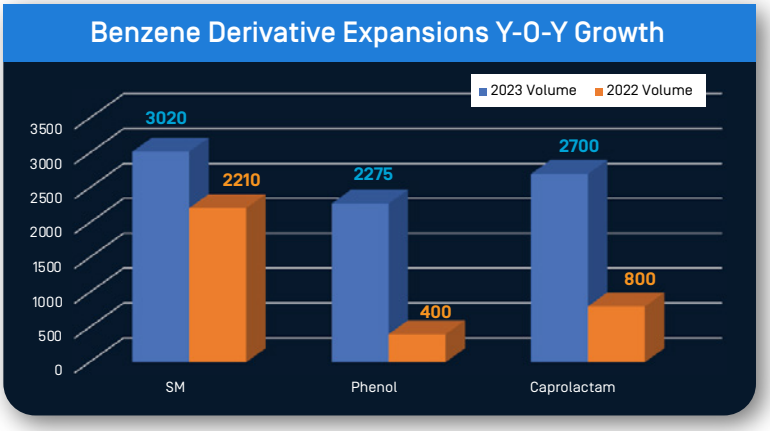
Benzene consumption is expected to improve as new derivative plants will be commencing operations in 2023.

In 2022, SM manufacturers were struggling with negative margins for most of the year as prices were crippled by a supply glut and falling demand resulting in shutdowns and production cutbacks.

Consumption of benzene in Japan is expected to see a decline of 300,000mt/year following the mothballing of Taiyo Oil's 370,000mt/year SM plant based in Ube, Yamaguchi. The timing of the plant closure remains unknown. At the same location, the company operates a 397,000mt/year ethylbenzene plant.

Benzene consumers were cautiously optimistic that demand might improve in H2 2023 as the Chinese government has released mandates and financial assistance to property developers to prop growth in the industry. This would mean that demand for styrene and its derivative could improve, encouraging higher run rates.

SM: (China-based)		
Zibo Junchen, Zibo	500,000mt/year	Q1
ZPC Phase II, Zhoushan	600,000mt/year	Q1
Petrochina Guangdong, Zibo	800,000mt/year	Q1
Anqing Petrochemical Phase II, Anqing	400,000mt/year	Q2
Sinopec Luoyang, Luoyang	120,000mt/year	Q2-3
Shenghong Refining and Chemical, Lianyungang	450,000mt/year	Q3
Chambroad Petrochemicals, Binzhou	600,000mt/year	Q4
Total New SM Capacity	3.56mil mt	
Total benzene consumed basis 100% run rate:	Approximately 2.93 mil mt	



Phenol

Phenol expansions in China started in 2022 with the start-up of three new plants, expanding domestic capacity by just under one 1mil mt/year. However, utilization of benzene was capped by production cutbacks and shutdowns to cope with unfavorable market conditions. The price spread of spot phenol against benzene was constantly below the breakeven of 1,500-1,700 yuan/mt in H2.

With six additional plants planning to start operations in 2023, China's appetite for domestic benzene consumption might improve especially in H2 as the Covid-19 situation will start to stabilize, according to a market analyst.

Two producers, Guangxi Huayi and Qingdao Haiwan, would need to purchase benzene within H1 to feed their new phenol plants of 180,000mt/year and 200,000mt/year, respectively.

As phenol is a precursor to plastics, polycarbonates and epoxide resins, demand is highly reliant upon the health of the automotive and construction industries. According to market analysts, the new vehicle market in China will remain flat due to the termination of government subsidies for electrified vehicles.

"China is the main importer of phenol. Massive new phenol plants started operations and with more to come, I am expecting to see import volumes drop. On the bright side, their demand for benzene will keep benzene prices from crashing," said a China-based benzene producer.

*—Reporting by **Hazel Kumari**, hkumari@opisnet.com*

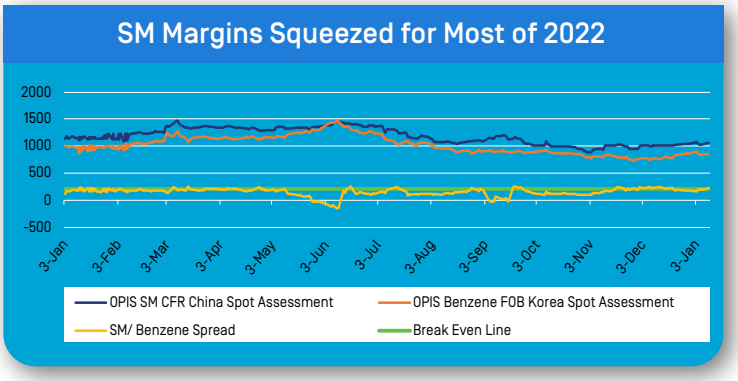
STYRENE MONOME OUTLOOK

Asia Styrene Monomer Riddled With Uncertainties in 2023

Performance in the Asian styrene monomer (SM) market this year has been lacklustre as tepid derivative demand, lengthening supply and weak global economics had pushed prices to below breakeven margins for producers.

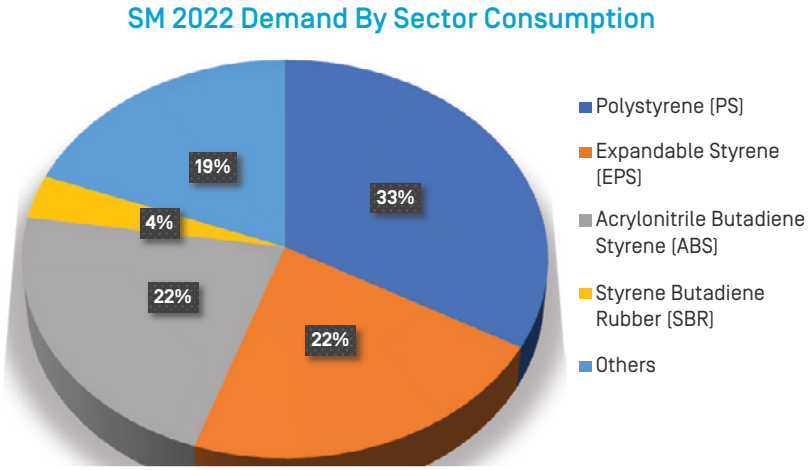
Benzene-based standalone plants faced negative margins for most of 2022, brought on by high benzene costs and weak SM import demand from key regions: China, the US, and Europe. Even with a general decline in petrochemical spot prices, SM values were dropping at a faster pace as compared to benzene.

The breakeven costs for SM producers stood at $200-220 per metric ton (mt) but the average daily spread was below $195/mt for most of the year. Producers only broke even in April and December when the daily average was at $201.79/mt and $218.68/mt, respectively. They were hardest hit in April when the daily mean earnings fell to $62.65/mt.



On that basis, several SM producers have shut down or reduced output to limit their losses. The average operating rate for the year was hovering at the mid-60s to low-70s%.

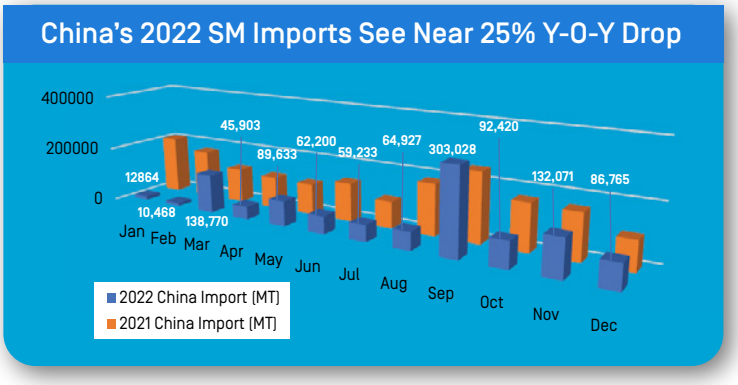
Against the backdrop of high inflation rates and recession fears, consumers' purchasing power has seen a drastic drop globally as they turned cautious about spending on non-essential items. Demand from the derivative sectors, especially expandable polystyrene (EPS) and unsaturated polyester resins (UPR), declined as end-users struggled with mounting supplies and low prices, leading them to reduce operating rates.



Following the start-up of new SM plants, the recent rise in domestic China's spot supply has capped demand for import volume. In the first three quarters of 2022, SM import shipments saw a nearly 35% year-to-year drop whilst its export equivalent surged by 133%.

Within the year, five new plants had commenced operations in China in line with downstream integrated expansion plans, resulting in a total of 2.21mil/year of additional supply amid limited derivative growth.

Going into 2023, northeast Asia's SM supply and demand will remain in disequilibrium up to at least H1 of 2023 as weak global macroeconomics especially in



China, coupled with rising capacity, will exert downward pressure on prices leading to production cuts across the polymers chain.

SM supply is set to face further increments on the back of five additional units coming onstream, even as global demand sags. China's Sinopec Luoyang, Zhejiang Petrochemical Phase II, Zibo Junchen New Material and Sinopec Anqing Phase IIs' start-up, coupled with Liangyungang Petrochemical achieving on-spec production on Jan.1, would boost domestic supply by 1.81mil/year.

However, four plants have planned turnarounds between February and March which would result in an estimated total production loss of 250,000mt, could cap SM price declines.

The broader Chinese market SM facilities operations could remain at low levels of 60-70% as weak market fundamentals will encourage producers to either halt or lower output.

"Out of three lines, we only have SM coming out of one and shut the rest because of hefty losses and even then, we have lowered operating rates at our one line to only service our term customers. I think next year will be no different for us," said a China-based producer.

Contentious term negotiations caused by producers proposing a change in price-linked formula, coupled with the influx of supply, had encouraged end-users to reduce contractual supply resulting in limited conclusions.

Several buyers polled were not willing to compromise on contractual costs citing "another bumpy year" ahead. As such, a pick-up in spot demand is expected in Q1 on the back of -Lunar New Year restocking activity could lend support to spot prices.

"Producers were trying to push for cost-linked formulas, but we are already struggling with the weak downstream sales and cannot afford to help them with their losses. We have rejected their proposal and instead will look into the spot market as this will also give us some flexibility when it comes to operational adjustments," said a China-based end-user.

However, a spate of benzene maintenance in Asia planned for Q1 had given rise to concerns that standalone SM plants' margins will be eroded further because of rising feedstock costs. SM prices face headwinds as five plants restarted in December following the completion of maintenance.

"Looking at the shutdown schedule for 2023, benzene will be tight in Q1 and already prices for January and February have increased. SM buyers are going to feel the impact in Q1 and most will rely on their domestic producers instead of importing to cap their exposure to the volatilities," said a Korea-based trader.

The slowdown in domestic demand motivated some producers to look at expanding their downstream capacities to alleviate the oversupplied situation. A total of ten Chinese producers were looking to expand or integrate polystyrene (PS) and acrylonitrile-butadiene-styrene (ABS) production due to relatively healthy earnings, according to market participants.

Some players expressed hopes that demand will pick up as the Chinese government had released a ten-point plan, moving away from their COVID-Zero policy. However, most agreed that a full return to pre-pandemic levels would require a lengthy period and they would likely start seeing the improvements in the latter half of the year.

In addition, the property sector is expected to receive a boost as the authorities had announced a sixteen-support policy and state banks' commitment of $256 billion for mergers and acquisitions of land or assets, brightening the market outlook amongst SM players.

As the government has been encouraging developers to prioritise the completion of housing projects, demand for EPS and UPR would surge, propping consumption of SM. EPS and UPR are typically used in the construction industry for insulating applications and bathroom components, respectively.

"Some of the economic pressures we faced are looking to ease up next year. China is finally opening. It is going to

ease some of the financial crunches and hopefully boost SM consumption. Because of the property boosts, we are hopeful the future for SM would improve soon," said a Korea-based producer.

Export trades from China are poised to continue rising as floundering domestic demand would push producers to find alternative regions to offload their material but high freight rates will erode margins.

Freight rates for petrochemical products saw a record boom in H2 2022 as geopolitical tensions coupled with firm demand from the clean petroleum product (CPP) market had limited tonnage spot availability. The uptrend will most likely continue into 2023, evidenced by hikes in ship owners' contractual affreightment (COA) offers.

Carbon intensity ratings proposed by the International Maritime Organization (IMO) will be enforced which would cause increased shipping operations costs, especially for short-haul voyages.

"Freight is going to see another jump that's for sure. We have hiked our contractual offers by 25% for every voyage to account for the price difference against the spot. Demand for our ships is going to firm, especially once China fully opens up," according to a Singapore-based shipowner.

Besides surging freight costs, exporters will also have to face the potential struggle of securing a vessel for their spot-loading cargoes. Sailing time for all voyages has increased due to a change in trade lanes because of the sanctions against Russia amid elevated oil and petrochemical demand.

As import demand into China slows down, sellers found a new avenue to market their spot volume to, India. India is poised to replace China as the top importer of SM as demand soared on the back of the government's plan to boost the supply of affordable housing for citizens.

Demand is expected to continue rising as the construction industry was projected to achieve an average annual growth of 6.2% from 2023 to 2026.

Recently, the Bureau of Indian Standards (BIS) caved into pressure from domestic end-users and extended its deadline on derivative ABS import certification until Mar 12. Polymer production costs will increase upon the statutory implementation of BIS standards which would hamper domestic processors' competitiveness against international players.

As India is primarily net short on SM as its overall consumption amounts to 900,000-1mil mt/year whilst its first SM plant with a capacity of 387,000mt/year will be commissioned by 2026-2027, derivative production relies heavily on imports from the Middle East, southeast and northeast Asian suppliers.

Indian import volumes totalled over ¾ of a million tonnes within Q3 of 2022, lower than China by 75,000mt which stood at 825,000mt, according to trade data.

"China's COVID-ZERO policies have ended up diminishing demand for SM. Just looking at trade numbers, it's a huge year-on-year decline. We have been diverting our spot to India instead as the demand remains strong and will improve because of the lack of domestic supply," said a China-based producer.

Renewable SM

In November 2022, SK picglobal and INEO Styrolution signed a memorandum of understanding (MOU) for renewable SM. Within 2023, SK picglobal will start production of renewable SM to supply to the latter for production of PS and ABS as part of both companies' commitment to net zero emissions by 2050.

Neste, Idemitsu Kosan, CHIMEI and Mitsubishi Corporation have gone into partnership to build a renewable plastic supply chain with production commencing in H1 of 2023. Idemitsu Kosan would produce bio-SM in Japan using bio-based raw materials provided by Neste to reduce its greenhouse gas (GHG) emissions. The bio-SM will be supplied to Taiwanese CHIMEI to manufacture ABS which will then be marketed by Mitsubishi Corporation.

*— Reporting by **Hazel Kumari**, hkumari@opisnet.com*

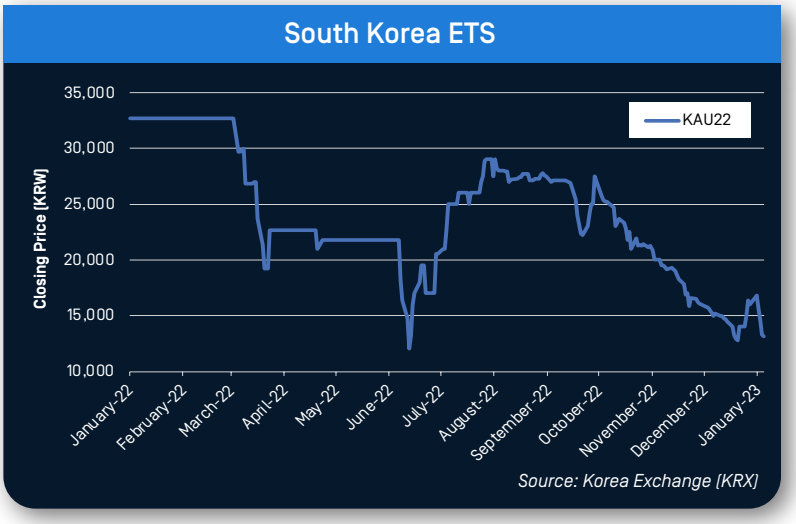
CARBON OUTLOOK

Asia Pacific Poised for More Policy Reforms to Improve ETS

Emissions trading schemes (ETS) are increasingly being recognized as an integral piece to the climate solution in APAC. In 2023, all eyes will also be on regulators tasked with implementing changes to improve the efficiency of markets and slash overall emissions — all while grappling with rising economic headwinds. Stakeholders in some of the key compliance markets are expecting to see major reforms to tackle issues like poor market activity and more stringent emissions limits.

South Korea

Signs of early optimism in the South Korea ETS (K-ETS) are quickly fading — its most active contract, Korean Allowance Units for 2022 (KAU22), started the year at a stronger close of KRW 16,800 ($13.23) on Jan. 2, but quickly declined over the first week to close at KRW 13,150 on Jan. 6.



Prices for the KAU22, which cover emissions in 2022, slumped over 50% last year to close the year at KRW 16,000 as the market continues to battle weak demand amid Covid-19, an oversupply of allowances and market uncertainty.

The market is anticipating major reforms to the K-ETS, such as allowances in line with the country's more ambitious climate targets. For a start, two additional market makers will participate in the ETS, and brokers will be able to hold more units from this year.

"The government is scheduled to release more details about its future plans by H1 2023, by then there probably would be more certainty for market participants," said Maureen Lee, an analyst at Seoul-based advisory Ecoeye.

Lee forecasts a slow recovery in prices at KRW 12,900 to 18,500 up till the second quarter and a full-year range of KRW 16,000 to 20,000.

Some traders also remain bearish unless drastic measures are taken to reduce the oversupply.

"Right now, it is up to Environment Ministry whether to implement the re-allocation of KAUs in line with the strengthened NDC target," said Jhihong Kim, Trader at KB Securities.

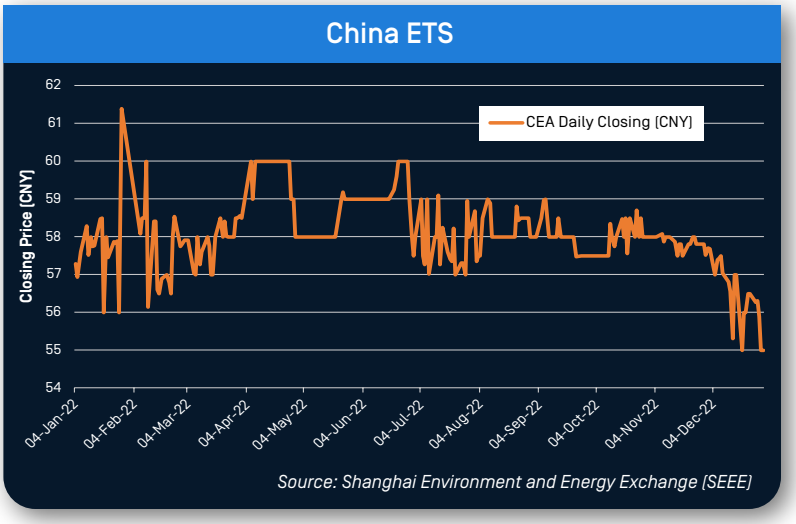
China

The Chinese Emission Allowance (CEA), credits being traded under China ETS, is likely to maintain its current levels around CNY 50/mt ($7.29/mt) in the absence of scope changes though potential upside is possible to keep domestic industries competitive as the EU's Cross Boarder Adjustment Mechanism (CBAM) set to take effect from October, market sources said.

The CEA ended the year marginally higher at CNY 55/metric ton (mt) ($7.99/mt) on Dec. 30, 2022, up 1.44% from a year ago when its first compliance cycle closed on Dec. 31, 2021, range bounded between CNY 42.54-62.54/mt, Shanghai Environment and Energy Exchange (SEEE) data showed.

Policy updates in November including a proposal to tighten emission baselines for the second compliance cycle that will end on Dec. 31, 2023 had boosted market confidence, SEEE noted in end-December.

The authorities prefer to keep the carbon prices in a "controlled" environment avoiding speculation and excess volatilities, market sources said.



Market meanwhile is hopeful for the revival of its national voluntary scheme which issues Chinese Certified Emission Reduction (CCER) credits since its suspension in 2017 after a five-year run. CCER is the sole supplement to the national ETS allowing designated entities to offset up to 5% of their emissions.

New Zealand

The New Zealand ETS starts the year with a less-than-expected price hike for its 2023 auctions as the government seeks to moderate the risk of driving higher carbon prices and increasing household costs without adequate support policies in place.

For 2023, the auction floor price ($23.61 or New Zealand $33.06) and cost containment reserve trigger price (NZ$80.64) have both been adjusted for inflation but still stand significantly below recommendations by the independent Climate Change Commission.

Spot NZU was last known traded at NZ$74.75 as of Jan. 6, down 1.64% from Dec. 23, last known trade in December, data from Jarden CommTrade showed.

Observers have cited concerns that the trigger price lies too close to the prevailing market price for New Zealand Units (NZU), suggesting a high risk for millions of additional units to be released to the system, as was the case in the past two years.

Some have cited concerns that the growing surplus could undermine the government's ability to meet its emission targets.

Industry players have pegged these lower-than-expected increases to price settings as a way to allay industry concerns, with the impact on carbon pricing in the secondary market also anticipated to be weaker.

Australia

Prices for the Australian Carbon Credit Unit (ACCU), credits under Australia's national voluntary scheme anchored by the Emission Reduction Fund (ERF), is in a small contango with the February/July spread traded at a less than a dollar's discount during the first week of 2023 after a bumpy 2022 with major policy changes and methodology reviews expecting to be finalized this year.

In 2022, the ACCU saw its largest single-day decline of 30% on March 4 plunging from A$50 to A$35 as the ERF allowed project developers to exit their fixed delivery contract with the government unleashing millions of carbon credits into the private market.

The spot prices had since been fluctuating between around A$25-A$35 as criticisms being raised over its integrity had hampered demand. A government-appointed independent panel in its early-January report disagreed with allegations around abatement being overstated by some of the methodologies but called for improvement to the scheme such as governance and transparency which the government has agreed to work on.

On the other hand, the government's recent proposal on Jan. 10 to put in place from July more stringent and declining emission baselines under its regulatory Safeguard Mechanism sends a very strong signal supporting demand, sources said. The Safeguard Mechanism obligates large industrial emitters which account for around 28% of the country's emissions to offset their emission limits using ACCU or a newly proposed facility, Safeguard Mechanism Credit (SMC). The latter, however, can only be transferred amongst designated entities.

Mostly traded over-the-counter, market participants are seeking more transparency on price differentials amongst credits generated by various methodologies especially as corporates are willing to pay for projects that generate more co-benefits, sources said. The authority is developing a centralized carbon market exchange targeting implementation this year.

Rest of the region

Clarified rules around carbon credit export are also expected to drive growth in carbon markets in Southeast Asia, a region offering about $10 billion in economic opportunity according to research by Bain and Company.

For one, Malaysia has confirmed no restrictions around the export of carbon credits — with the newly-launched Bursa Carbon Exchange set to commence its first trade via auction in March. On the other hand, some participants are seeking certainty following a halt in carbon credit export from major carbon sink Indonesia imposed in 2022.

Close by, several exchanges are targeting a launch early this year including Singapore-based Climate Impact X's spot exchange and Air Carbon Exchange's regulated voluntary market in Abu Dhabi. Japan is also looking to operationalize its first exchange-based market for trading carbon credits (J-Credits) and its emissions trading system (GX League) this year.

Country	Scheme	Operator/Venue	Instrument	Coverage	Status
Japan	Voluntary	Tokyo Stock Exchange (TSE)/ GX-ETS	J-Credit, J-VER, JCM credits	Companies that endorse the government's GX-League initiative and set voluntary targets	Trial expected from FY2023, full launch expected from 2026.
Malaysia	Voluntary	Bursa Malaysia/ Bursa Carbon Exchange (BCX)	VCUs	Any	Launched on Dec. 9, 2022; First auction expected March 2023.
Indonesia	Compliance ETS	Indonesia Stock Exchange (IDX)	Yet to be announced	99 state-owned power plants, baselines based on installed capacity	Trialed for 32 coal-fired power plants of 25-100 MW capacity in 2021; launch expected in 2023.
Singapore	Carbon Tax	Yet to be announced	Eligible voluntary carbon credits	Facilities that directly emit at least 25,000 tCO2e of greenhouse gas emissions annually	Approved carbon credits voluntary can be used to offset 5% of their taxable emissions from 2024.
Thailand	Voluntary	The Federation of Thai Industries (FTI)/ FTI-X	T-VER credits	Any	Registration for carbon trading opened January 2023.

($1 = KRW 1270.32, CNY 6.86, NZD 1.61, AUD1.48)

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