PTA Futures and Options

I. Overview of PTA

(I) Definition

Purified terephthalic acid, or PTA, is white crystals or powder with low toxicity and high combustibility at ambient temperature. If exposed to the air, PTA will burn and even explode in case of fire when certain conditions are satisfied. PTA has an ignition point of 384 - 421℃ and a density of 1.55g/cm^3. It is soluble in alkali solution, slightly soluble in hot ethanol, and insoluble in water and ether.

Figure 1 PTA

(II) Major uses

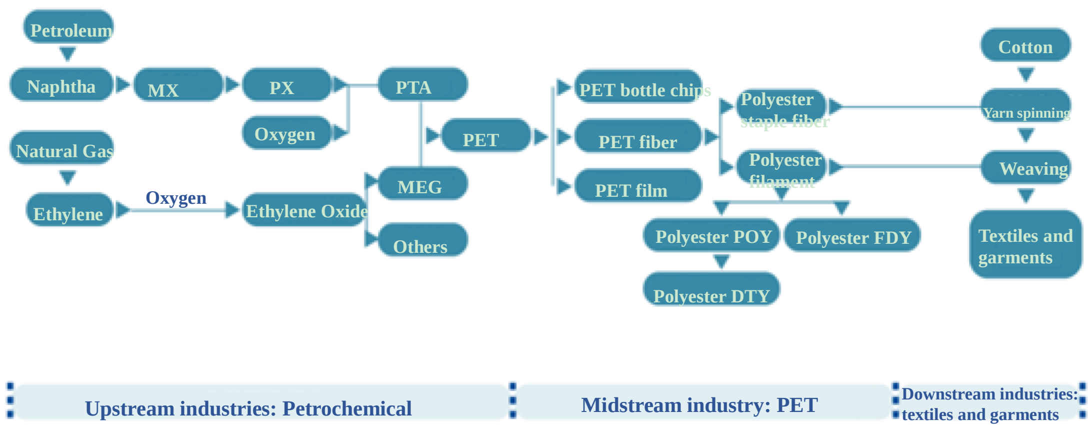
As one of the important organic raw materials, PTA is mainly used to produce polyester (PET). Over 90% of PTA in the world is used for such purposes. By form, PET is divided into PET fiber (polyester filament and polyester staple fiber), PET bottle chip, and PET film. It takes 0.855 metric tons of PTA and 0.335 metric tons of mono ethylene glycol to produce 1 metric ton of PET.

(III) Production process and related industries

PTA is one of the end products of petroleum. The production process is as follows: Petroleum is refined through a certain process to produce naphtha (also known as light gasoline), from which mixed xylene (MX) is extracted; from such MX, p-xylene (PX) is extracted; such PX is solved in acetic acid solution(with PX accounting for about 65.5% of the total mass of the components in the formula), which is oxidized by air (with oxygen accounting for about 33% - 35%) under the effect of catalyst to produce crude terephthalic acid; such crude terephthalic acid is refined with hydrogen, purified, crystalized, separated, and dried, producing PTA.

Products from PAT-related industries from top to bottom include, but are not limited to, crude oil, naphtha, MX, PX, PTA, PET, textiles and garments, beverages, and packing materials. Given the simple composition of raw materials for the upstream and downstream industries of PTA, raw materials represent a big share of the costs of each process. In particular, the raw material costs of PTA are determined by upstream crude oil, naphtha, MX, and PX, the demand for PTA is decided by midstream PET and downstream textiles and garments, beverages, and packing materials, and the supply of PTA in the physical market is influenced by the operation of PTA facilities and other factors in the midstream industries. In terms of consumption of materials, 1 metric ton of PET requires 0.855 metric tons of PTA and 0.335 metric tons of mono ethylene glycol.

Figure 2 PTA-Related Industries



(IV) Quality standard

The *Purified Terephthalic Acid (PTA) for Industrial Use* (GB/T 32685-2016), a national standard for PTA, was issued in June 2016 and became effective on January 1, 2017.

Table 1 Specifications of the Purified Terephthalic Acid for Industrial Use (GB/T 32685-2016)

Item		Indicator	
		Premium Grade	A Grade
Appearance		White powder	
Acid value (expressed in KOH) (mg/g)		675±2	
4-Hydroxybenzaldehyde / (mg/kg)	≤	25	
4-Hydroxybenzoic acid / (mg/kg)	≤	150	180
Ignition residue / (mg/kg)	≤	6	10
Total heavy metals (Mo, Cr, Ni, Co, Mg, Ti, and Fe) / (mg/kg)	≤	3	5
Fe / (mg/kg)	≤	1	2
Moisture *w*/%	≤	0.2	
DMF (5g/100mL)/Hazen (Pt-Co)	≤	10	
b value		Agreed by the supply and demand sides	
Particle-size distribution: 250μm and above, φ/% Below 45μm, φ/% Average particle size /μm		Agreed by the supply and demand sides	
Particle-size distribution: Or 250μm and above, ω/% Below 45μm, ω/% Average particle size /μm		Agreed by the supply and demand sides	

II. PTA Supply and Demand

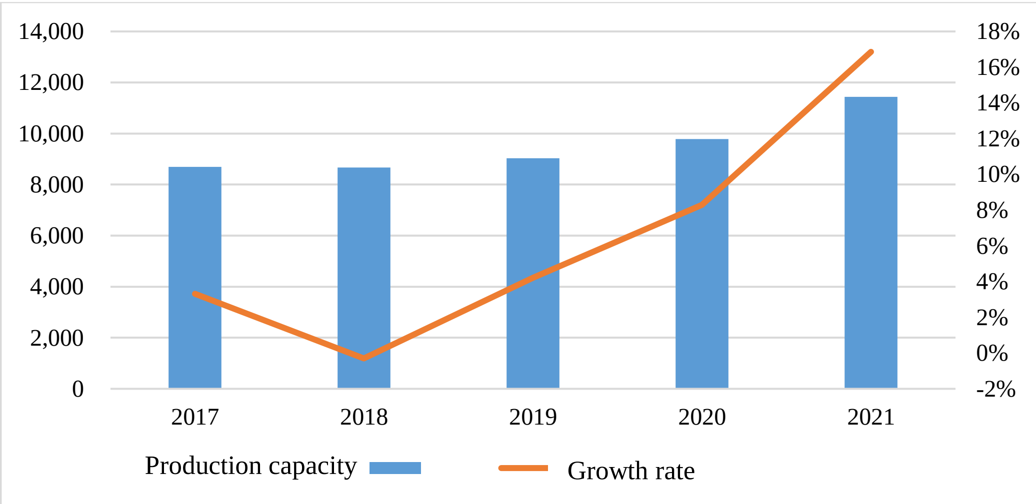
(I) Production capacity and output

1. Development

PTA production capacity has been growing in recent years. In 2021, 114,370,000 metric tons of PTA were produced globally, an increase of 16.9% year on year (YOY). Figure 3 shows the development of the global PTA production capacity from 2017 to 2021.

Figure 3 The World's PTA Production Capacity and Growth 2017 – 2021

Unit: 10,000 mt

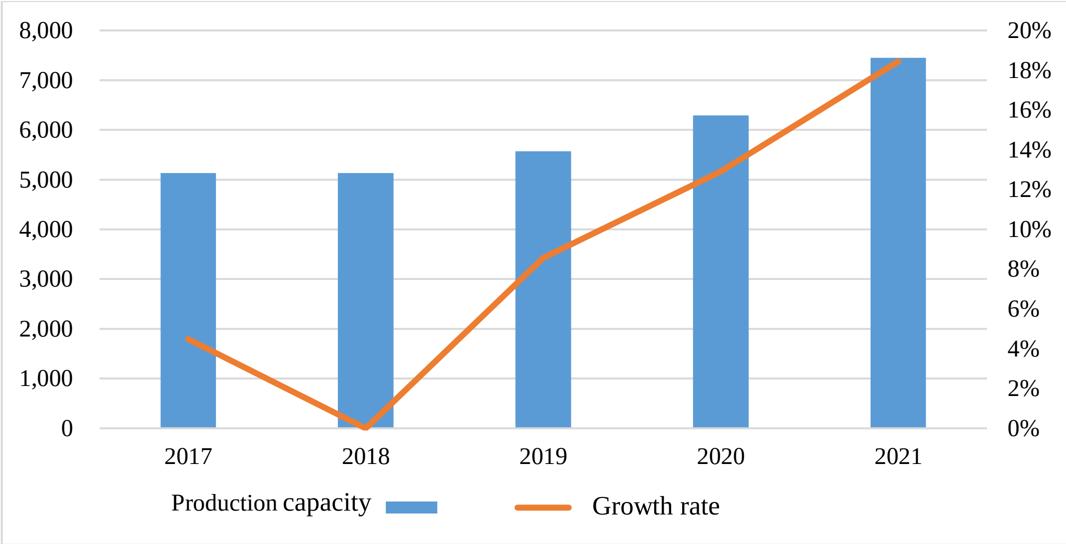


Source: CCF

In 2021, China had a PTA production capacity of 65,630,000 metric tons, a YoY growth of 13.88%. From 2019 to 2021, the expansion of the PTA industry and the implementation of an integrated development strategy for such industry were the major drivers for the rapid growth of PTA production capacity.

Figure 4 China's PTA Production Capacity and Growth 2017 - 2021

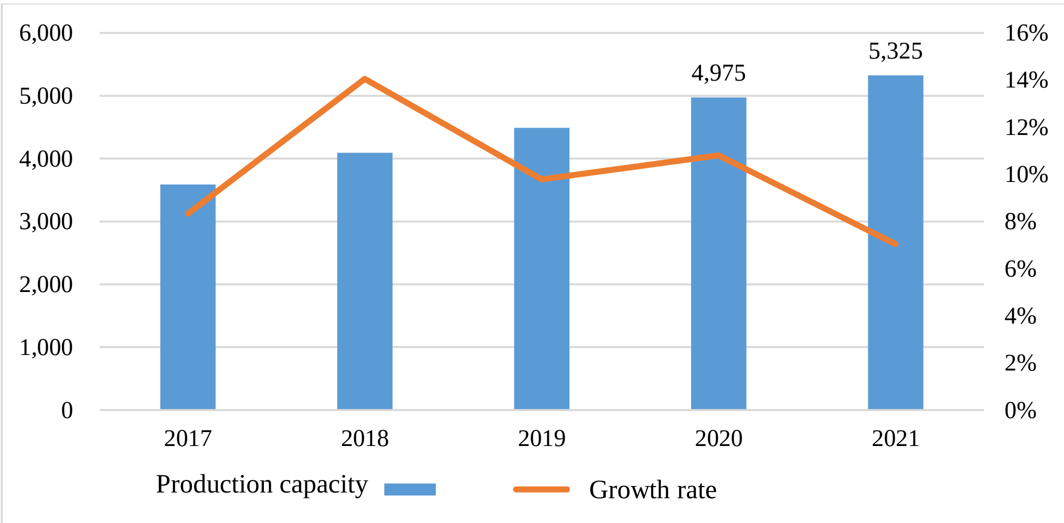
Unit: 10,000 mt



Source: CCF

Figure 5 China's PTA Output and Growth 2017 - 2021

Unit: 10,000 mt



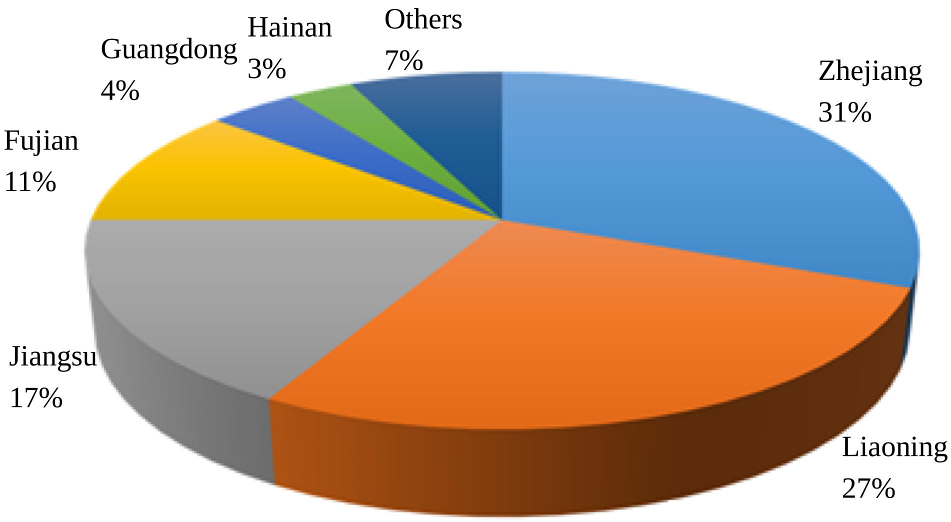
Source: CCF

In 2021, China produced 53,250,000 metric tons of PTA, a YoY growth of 7.04%. From 2019 to 2021, China saw a steady but slow growth in PTA output.

2. Distribution

In 2021, China, South Korea, Taiwan (China), and India were the top 4 PTA producers in the world. Together, they produced about 80% of the world's total. As the world's largest PTA producer, China produced more than 60%.

Figure 6 Distribution of China's PTA Production Capacity in 2021



Source: CCF

Geographically, China's PTA production capacity is highly concentrated. In 2021, China's top 4 PTA producers were Zhejiang with a production capacity of 20,350,000 metric tons, Liaoning with 17,720,000 metric tons, Jiangsu with 11,160,000 metric tons, and Fujian with 7,220,000 metric tons. In aggregate, they accounted for 86% of China's total PTA production capacity.

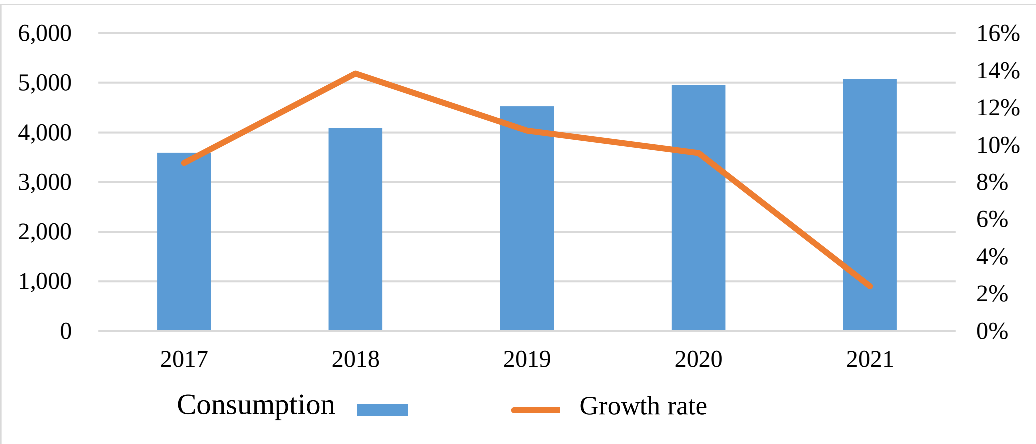
(II) PTA Consumption

1. Development

In 2021, China consumed 50,750,000 metric tons of PTA, a YoY increase of 2.4%.

Figure 7 China's PTA Consumption and Growth 2017 – 2021

Unit: 10,000 mt

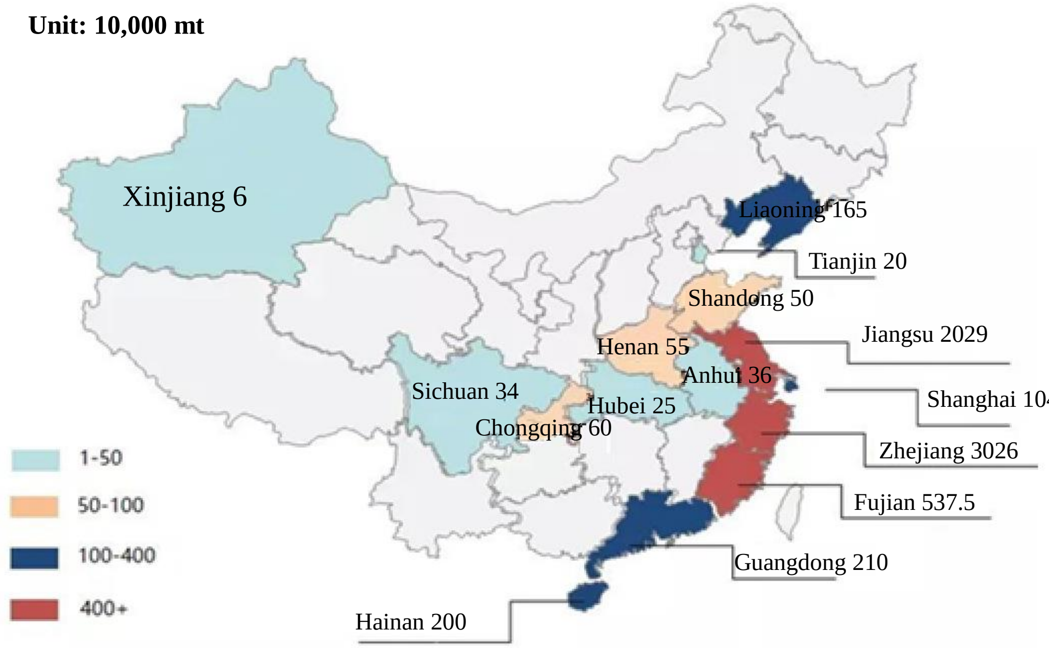


Source: CCF

2. Distribution

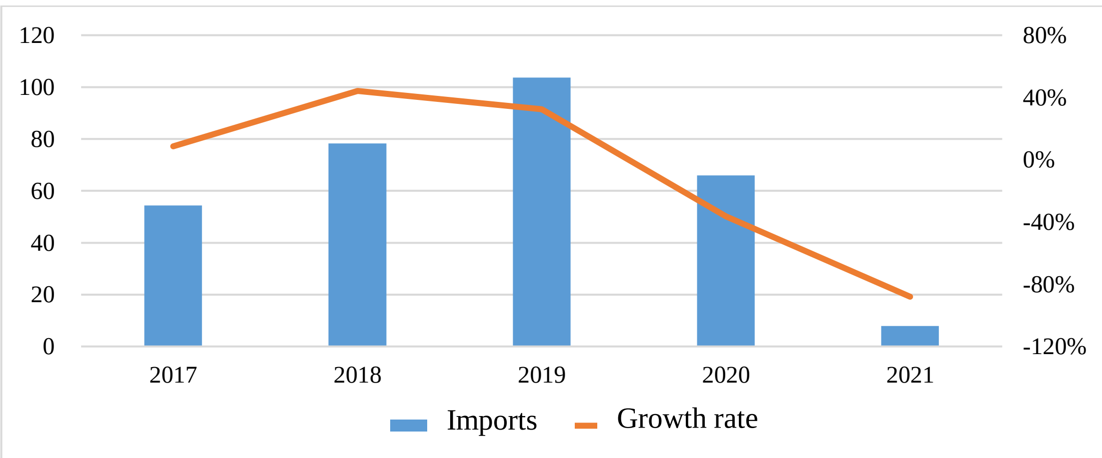
PTA is primarily used for PET production. Therefore, PTA is mainly consumed around the regions where PET is produced, i.e., Jiangsu and Zhejiang. According to the data of CCF, Zhejiang and Jiangsu account for nearly 77% of China's total PET production capacity.

Figure 8 Distribution of China's PET Production Capacity in 2021



Source: CCF

Figure 9 China's PTA Import and Growth 2017 – 2021



Source: CCF

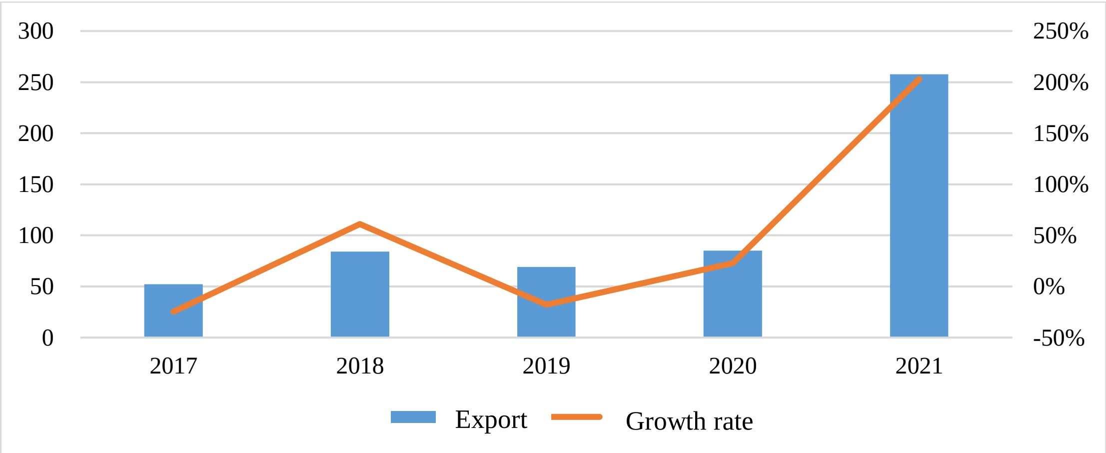
(III) Imports and exports

China is a net PTA exporter. In 2021, China exported 2,576,000 metric tons of PTA, up 203.1% YoY, and imported 79,000 metric tons of PTA, down 88% YoY. The rapid growth of China's PTA exports is driven by: First, China's fast increase in PTA production capacity and cost advantage in new production capacity; Second, a gap in the supply of PTA resulting from the shutdown of some overseas PTA facilities.

China is a major marketplace for the international trade of PTA. Globally, Turkey, Vietnam, U.S., Oman, Lithuania, Germany, Russia, and India are net PTA importers. From 2016 to 2020, U.S., Lithuania, and Germany maintained relative stability in net imports, while Turkey, Vietnam, Oman, Russia, and India saw varying growth in import demands. In terms of export destination, China exported 590,000 metric tons to India, 330,000 metric tons to Turkey, 330,000 metric tons to Oman, 280,000 metric tons to Russia, and 230,000 metric tons to Saudi Arabia, aggregately accounting for 68.3% of China's total PTA exports.

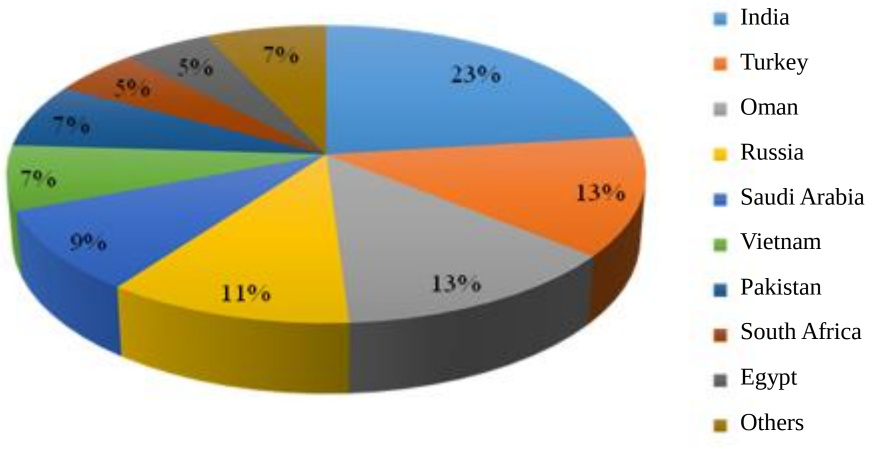
Figure 10 China's PTA Exports and Growth 2017 - 2021

Unit: 10,000 mt



Source: CCF

Figure 11 China's PTA Export Destinations and Percentages in 2021



Source: CCF

(IV) PTA trades

Currently, PTA trades are dominated by direct sales and supported by distribution, with a ratio of about 9:1 between them. Under the direct sales model, producers sell PTA directly to downstream consumers, while under the distribution model, producers sell PTA to traders, who then re-sell the PTA to consumers.

Before the launch of PTA futures, PTA pricing was dominated by a few large domestic PTA producers. They announced first the settlement price of the contracted PTA for each month at the end of such month based on the trading of physical PTA and then the listing price of the contracted PTA for the following month. Now, however, the market price of physical PTA is mainly divided into the "physical trading price" and the "monthly settlement price". According to the statistics of Hangzhou Zhongpu Business Consulting Co., Ltd., the largest physical PTA dealer in China, the price of 95% of the physical PTA trades is determined according to "PTA futures price ± premium/discount", i.e., pricing based on basis trading. The monthly settlement price is primarily used for the monthly settlement of annual contracts between large PTA producers and downstream consumers. According to Hainan Yisheng Petrochemical Co., Ltd., the world's largest PTA producer, the monthly PTA settlement price generally references the monthly average price in the physical market, which is determined according to "PTA futures price ± premium/discount". Therefore, the monthly settlement price is essentially determined with reference to PTA futures price.

In the physical market, PTA is priced primarily by the following methods:

Traditional listing price and settlement price: Under this model, the buyer and the seller conclude an annual contract at the beginning of a year to specify the quantity of PTA to be supplied during the year and related price discounts, and the producer releases the listing price at the beginning of each month and the settlement price at the end of such month, collects payment for PTA based on the listing price, and makes a refund in case of overpayment or requires reimbursement in case of underpayment at the end of the month based on the settlement price.

New listing price and settlement price: Under this mode, when the PTA market is heavily oversupplied, PTA producers transfer some of the PTA pricing power to the market. Under this mode, the listing price of PTA is still determined unilaterally by PTA producers, but the month-end settlement price is the arithmetic mean of the daily prices published by one or more recognized information providers (such as CCF, ICIS, and CCFEI) over a certain period (generally a natural month) minus the amount agreed by the buyer and seller.

PTA futures basis price: As the PTA futures becomes more mature, traders and PET producers often determine PTA price via basis price, i.e., they will conduct settlement in the future based on the futures price plus premium or discount and take a hedging position in the futures market.

(V) Major producers, consumers, and traders

The top 10 PTA producers and their production capacity and market shares as of the end of 2021 were as follows:

Table 2 China's Top 10 PTA Producers in 2021

Ranking	Name	Production capacity (10,000 mt/a)	Proportion
1	Hainan Yisheng Petrochemical Co., Ltd.	1,645	25.06%
2	Hengli Petrochemical (Dalian) Co., Ltd.	1,160	17.67%
3	Zhejiang Dushan Energy Co., Ltd.	500	7.62%
4	Fujian Fuhaichuang Petrochemical Co., Ltd.	450	6.86%
5	Jiangsu Honggang Petrochemical Co., Ltd.	400	6.09%
6	Jiaxing Petrochemical Co., Ltd.	370	5.64%
7	China Prosperity (Jiangyin) Petrochemical Co., Ltd.	290	4.42%
8	Fujian Billion Petrochemical Co., Ltd.	250	3.81%
9	Jiangsu Hailun Petrochemical Co., Ltd.	240	3.66%
10	BP Zhuhai Chemical Co., Ltd.	235	3.58%

Source: CCF

The top 10 PET producers, which are major downstream PTA consumers, and their production capacity and market shares as of the end of 2021 were as follows.

Table 3 China's Top 10 PET Producers in 2021

Ranking	Name	Production capacity (10,000 mt/a)	Proportion
1	Zhejiang Hengyi Group Co., Ltd.	847	12.90%
2	Tongkun Group	740	11.30%
3	Xinfengming Group	570	8.70%
4	Sanfame Group	350	5.30%
5	SINOPEC	343	5.20%
6	Hengli Group	320	4.90%
7	Hainan Yisheng Petrochemical Co., Ltd.	270	4.10%
8	Shenghong Group	228	3.50%
9	CR CHEM-MAT	210	3.20%
10	Wankai New Materials Co., Ltd.	180	2.70%

Source: CCF

In the physical market, large PTA traders include Xiamen ITG Group Corp., Ltd., Qingdao Jadary Supply Chain Service Co., Ltd., Xiamen C&D Light Industry Co., Ltd., Xiamen Xiangyu Co., Ltd., Huarui Group, Orient Products (Group) Co., Ltd., DH Fund Management Co., Ltd., China Chengtong International Co., Ltd., Zhejiang Materials Industry Chemical Group Co., Ltd., and Ningbo Zhongji Group Co., Ltd.

III. PTA Futures and Option Contracts

PTA Futures Contract Specifications

Product	Purified Terephthalic acid (PTA)
Trading Unit	5 metric tons / lot
Price Quotation	Chinese yuan (CNY) per metric ton
Minimum price fluctuation	CNY2/metric ton
Daily Price Limit	Within ± 4% of the settlement price of the preceding trading day and as provided for in the *Measures for the Administration of Futures Trading Risk Control of Zhengzhou Commodity Exchange*
Minimum Trading Margin	5% of contract value
Contract Month	January, February, March, April, May, June, July, August, September, October, November, and December
Trading Hours	Monday to Friday (except public holidays) 9:00 a.m.-11:30 a.m. 1:30 p.m.-3:00 p.m. (Beijing time) Other trading hours specified by Zhengzhou Commodity Exchange
Last Trading Day	The 10th trading day of the delivery month
Last Delivery Day	The 13th trading day of the delivery month
Grade and Quantity	See the *Rules of Zhengzhou Commodity Exchange for Purified Terephthalic Acid Futures*
Delivery Point	Designated by Zhengzhou Commodity Exchange
Delivery Method	Physical delivery
Product Code	TA
Listing Exchange	Zhengzhou Commodity Exchange

PTA Option Contract Specifications

(Applicable to option contracts with contract month earlier than that of TA2401)

Underlying	PTA Futures Contract
Contract Type	Call Option, Put Option
Trading Unit	One PTA futures contract
Price Quotation	Chinese yuan (CNY) per metric ton
Minimum Price Fluctuation	CNY0.5/metric ton
Price Limit	The same as the price limit of the PTA futures contract
Contract Month	The two consecutive nearby months of the underlying futures contract; the PTA option contracts of the following months will be listed on the second trading day after the open interest (on a single-counted basis) in the underlying futures contract exceeds 10,000 lots after clearing.
Trading Hours	Monday to Friday (except public holidays) 9:00 a.m.—11:30 a.m. 13:30 p.m.—15:00 p.m. (Beijing time) Other trading hours specified by Zhengzhou Commodity Exchange
Last Trading Day	The 3rd trading day of the month immediately preceding the delivery month of the underlying futures contract and other dates specified by Zhengzhou Commodity Exchange
Expiration Date	The same as the last trading day
Strike Price	Based on the settlement price of the previous trading day of PTA futures, six in-the-money option contracts, one at-the-money option contract, and six out-of-the-money option contracts will be listed according to the strike price interval. The strike price interval is CNY50/metric ton when the strike price is less than or equal to CNY5,000/metric ton; CNY100/metric ton when the strike price is greater than CNY5,000/metric ton and less than or equal to CNY10,000/metric ton; CNY200/metric ton when the strike price is greater than CNY10,000/metric ton.
Exercise Style	American style. Buyers may submit an exercise request during trading hours on any trading day before the expiration date and an exercise or abandonment request before 3:30 p.m. on the expiration date
Product Code	Call option: TA-contract month-C-strike price Put option: TA-contract month-P-strike price
Listing Exchange	Zhengzhou Commodity Exchange

PTA Option Contract Specifications

(Application to optional contracts with contract month later than or same with that of TA2401)

Underlying	PTA Futures Contract
Contract Type	Call Option, Put Option
Trading Unit	One PTA futures contract
Price Quotation	Chinese yuan (CNY) per metric ton
Minimum Price Fluctuation	CNY0.5/metric ton
Price Limit	The same as the price limit of PTA futures contract
Contract Month	The two consecutive nearby months of the underlying futures contract; the PTA option contracts of the following months will be listed on the second trading day after the open interest (on a single-counted basis) in the underlying futures contract exceeds 10,000 lots after clearing.
Trading Hours	Monday to Friday (except public holidays) 9:00 a.m.—11:30 a.m. 13:30 p.m.—15:00 p.m. (Beijing time) Other trading hours specified by Zhengzhou Commodity Exchange
Last Trading Day	The third-to-last trading day before the 15th calendar day (inclusive) of the month immediately preceding the delivery month of the underlying futures contract and other dates specified by Zhengzhou Commodity Exchange
Expiration Date	The same as the last trading day
Strike Price	The range of strike price is the previous trading day’s settlement price of the underlying futures contract plus or minus 1.5 times the current day’s price limit. The strike price interval is CNY50/metric ton when the strike price is less than or equal to CNY5,000/metric ton; CNY100/metric ton when the strike price is greater than CNY5,000/metric ton and less than or equal to CNY10,000/metric ton; CNY200/metric ton when the strike price is greater than CNY10,000/metric ton.
Exercise Style	American style. Buyers may submit an exercise request during trading hours on any trading day before the expiration date and an exercise or abandonment request before 3:30 p.m. on the expiration date
Product Code	Call option: TA-contract month-C-strike price Put option: TA-contract month-P-strike price
Listing Exchange	Zhengzhou Commodity Exchange

IV. Basic Trading Rules

(I) Margin Requirements

1. PTA Futures

A PTA futures contract has a minimum Trading Margin rate of 5% of contract value.

The Trading Margin rate of a PTA futures contract is set based on its trading periods and varies as follows:

Trading period	Trading Margin rate
From listing to the 15th calendar day of the month preceding the delivery month	5% of contract value
From the 16the calendar day to the last calendar day of the month preceding the delivery month	10% of contract value
Delivery month	20% of contract value

2. PTA Options

Trading Margin will be collected from the seller of a PTA option contract based on the greater of:

(1) Settlement price of the option contract × trading unit of the underlying futures contract + Trading Margin of the underlying futures contract – half of the out-of-money amount of the option contract; or

(2) Settlement price of the option contract × trading unit of the underlying futures contract + half of the Trading Margin of the underlying futures contract

Where,

Out-of-the-money amount of the call option contract = Max (strike price – settlement price of the underlying futures contract, 0) × trading unit of the underlying futures contract;

Out-of-the-money amount of the put option contract = Max (settlement price of the underlying futures contract - strike price, 0) × trading unit of the underlying futures contract.

The Trading Margin of a short straddle or strangle will be the greater of the Trading Margin of a short call and that of a short put plus the premium of the positions in the opposite direction.

The Trading Margin of a covered option spread will be the sum of the premium and the Trading Margin of the underlying futures contract.

(II) Price Limit

1. PTA Futures

A PTA futures contract has a price limit of ±4% of the settlement price of the preceding trading day.

If the Zhengzhou Commodity Exchange (the “Exchange”) adjusts the Trading Margin rate and price limit of PTA futures contracts according to the *Measures for the Administration of Risk Control of Zhengzhou Commodity Exchange* and other rules of the Exchange, such adjusted values shall apply.

2. PTA Options

The price limit of PTA options will be calculated as follows:

(1) Limit up price = settlement price of the option contract on the preceding trading day + settlement price of the underlying futures contract on the preceding trading day × limit up of the underlying futures contract

(2) Limit down price = Max (settlement price of the option contract on the preceding trading day - settlement price of the underlying futures contract on the preceding trading day × limit down of the underlying futures contract, minimum price fluctuation of the option contract).

(III) Position Limit

1. PTA Futures

No position limit is applicable to futures brokerage Members. For a non-futures brokerage Member or client, the position limit of a PTA futures contract is as follows:

<table>
<tr><th>Trading period</th><th colspan="2">Maximum long position or short position held by a non-futures brokerage Member or client (lot)</th></tr>
<tr><td rowspan="2">From listing to the 15th calendar day of the month preceding the delivery month</td><td>Open interest < 500,000</td><td>50,000</td></tr>
<tr><td>Open interest ≥ 500,000</td><td>10% of the long or short position</td></tr>
<tr><td>From the 16th calendar day to the last calendar day of the month preceding the delivery month</td><td colspan="2">10,000</td></tr>
<tr><td>Delivery month</td><td colspan="2">5,000
(0 for individuals)</td></tr>
</table>

2. PTA Options

For the long positions or short positions held by a non-futures brokerage Member or client in a PTA option contract, the position limit is 30,000 lots. The sum of speculative positions and arbitrage positions will not be more than two times the position limit for speculative positions.