Methanol Futures and Options

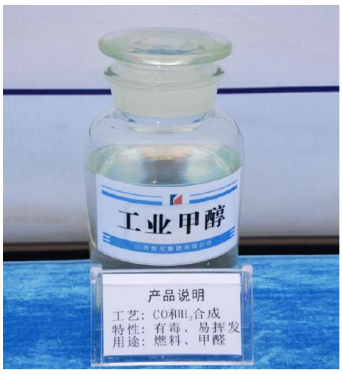
I. Overview of Methanol

(I) Definition and classification

Methanol (also known as wood alcohol and methyl alcohol), with a chemical formula of CH_3OH, is colorless, transparent, and volatile liquid with a faint odor like alcohol. Methanol is soluble in water, highly soluble in gasoline, toxic, and flammable. Methanol is a hazardous chemical as mixtures of methanol vapor and air are explosive. As one of the important chemicals produced from synthesis gas, methanol is an important raw material for chemicals and a type of fuel.

Methanol is generally divided into methanol for industrial use, methanol for fuel use, and denatured methanol, with methanol for industrial use dominating the market. Any methanol which is synthesized from coal, tar, natural gas, and other raw materials and the quality of which meets the requirements of the *National Standard of the People's Republic of China for Methanol for Industrial Use* (GB/T 338-2011) is considered methanol for industrial use. Methanol for fuel use is produced by dehydrating and refining crude methanol into anhydrous methanol. Denatured methanol is produced by adding denaturant to methanol for fuel use or methanol for industrial use.

Figure 1 Methanol Sample



(II) Major uses

As an important raw material for organic chemicals, methanol is widely used to produce a range of organic chemicals, including but not limited to olefins, methanal, methoxymethane, methyl tert-butyl ether (MTBE), and dimethylformamide (DMF). The rapid development of the methanol to olefins (MTO) technology in recent years has created an important downstream demand for methanol. In addition, methanol is a good energy source and vehicle fuel and can be added to gasoline or can replace gasoline to function as a power fuel.

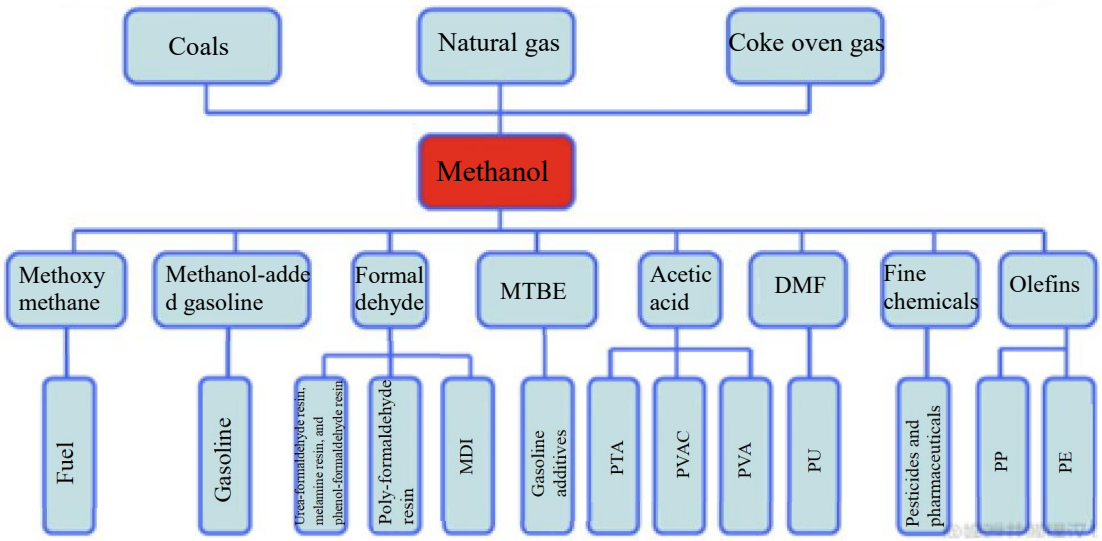
(III) Production process and related industries

In China, methanol is primarily produced from coal, coke oven gas (COG), and natural gas. China has an abundance of coal resources, and coal is the leading raw material for methanol

production. As of 2023, of China's total methanol production capacity, 75% was for coal-made methanol, 11% for natural gas-made methanol, and 13% for COG-made methanol.

Downstream products of methanol include not only methanal, acetic acid, methoxymethane, MTBE, and other conventional products, but also CTO/MTO, methanol fuel, and other emerging products. Methanol plays a pivotal role in linking upstream and downstream industries. Methanol-related industries are shown in Figure 2.

Figure 2 Methanol-Related Industries



(IV) Quality standard

As the current national standard for methanol, the *National Standard of the People's Republic of China for Methanol for Industrial Use* (GB/T 338-2011) applies only to methanol for industrial use and classifies methanol into premium grade, A grade, and qualified methanol based on 11 quality indicators, including but not limited to chromaticity, density, boiling range, potassium permanganate test, and water miscibility test. Specifications are set out in Figure 3.

Table 1 National Standard of the People's Republic of China for Methanol for Industrial Use (GB/T 338-2011)

Item	Indicators		
	Premium Grade	A Grade	Qualified
Chromaticity, in Hazen units (Pt-Co color units) ≤	5		10
Density, ρ_{20}/(g/cm^3)	0.791~0.792	0.791~0.793	
Boiling range * (0 °C, 101.3kPa)/ °C ≤	0.8	1.0	1.5
Potassium permanganate test / min ≥	50	30	20
Water miscibility test	Pass (1+3)	Pass (1+9)	-
Water, ω/% ≤	0.10	0.15	0.20
Acid (expressed in HCOOH), ω/% ≤ or alkali (expressed in NH_3), ω/% ≤	0.0015 0.0002	0.0030 0.0008	0.0050 0.0015
Hydroxyl compounds (expressed in HCHO), ω/% ≤	0.002	0.005	0.010
Evaporation residue, ω/% ≤	0.001	0.003	0.005
Sulfuric acid scrubbing test ≤	50		-
Ethanol, ω/% ≤	Agreed by the supply and demand sides	-	
Note: Please refer to Appendix B if it is necessary to calculate the mass fraction of methanol			
* Including 64.6 °C ± 0.1 °C.			

(V) Storage and transportation

Given that methanol is a hazardous chemical, an operating license for hazardous chemicals is required in accordance with the *Measures for the Administration of Operating Licenses for Hazardous Chemicals* to engage in methanol business, the storage of methanol must meet the conditions as required in the operating license, and the transportation of methanol requires the qualification for transportation of hazardous chemicals from the public security authority and transport administration authority.

Methanol for industrial use must be contained in dry and clean tanks, vessels, iron barrels, or other containers, which are cleaned and dried on a regular basis. Methanol must be stored in dry, well-ventilated, and low-temperature warehouses for hazardous chemicals, protected from sunlight, and isolated from heat sources, carbon dioxide, water vapor, and fire. Methanol should be stored at a temperature no higher than 30℃ for a maximum period of 6 months. The storage space should be equipped with devices for leakage emergencies and suitable absorption materials.

For methanol for industrial, long-distance transport often uses trains with tanks, while short-distance transport trucks with horizontal storage tanks. The screws of tanks, vessels, and iron barrels should be sealed by rubber washers before carrying methanol to prevent leakage.

Strict measures should be taken to guard against open flames. Carriers carrying methanol should be equipped with a grounding device. Containers of methanol for industrial use should be affixed with a secure mark, bearing the producer name, product name, serial number of the standard, and signs of "Flammable Liquid" and "Toxics" in compliance with GB190.

II. Methanol Supply and Demand

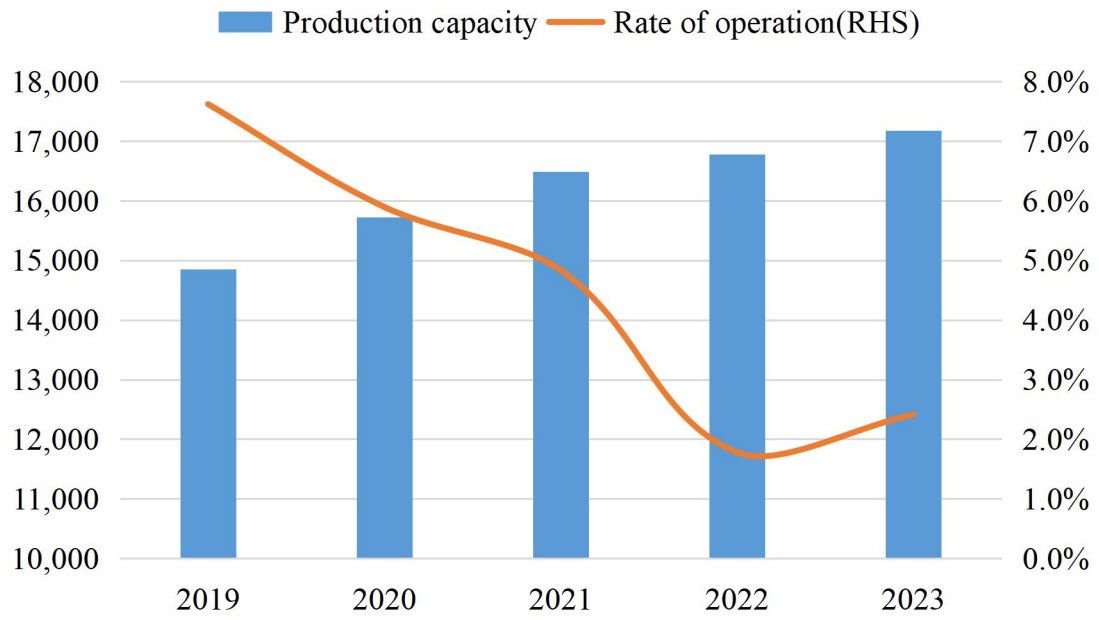
(I) Production capacity and output

1. Development

The world's methanol production capacity has maintained growth in recent years, a major part of which was contributed by China and Iran. In 2023, the world's methanol production capacity was 171,810,000 metric tons, up 2.4% year-on-year (YoY). Figure 4 shows the methanol production capacity of the world from 2019 to 2023.

Figure 3 The World's Methanol Production Capacity 2019-2023

Unit: 10,000 mt



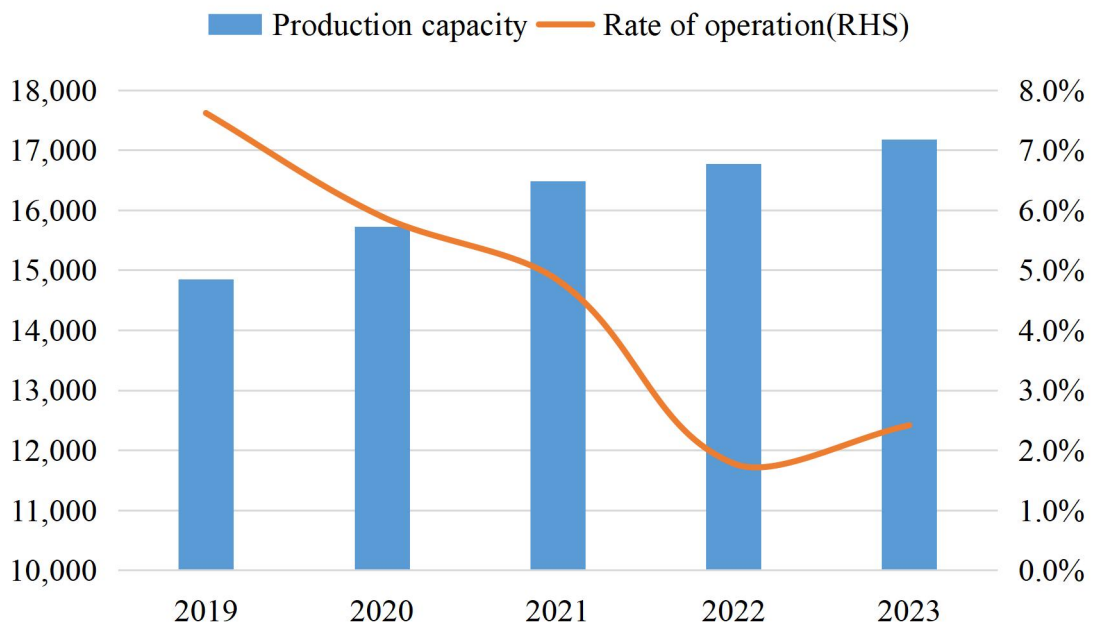
Source: OilChem China

Methanol is both an important raw material for chemicals and a fuel in China. Since the 21st century, China's methanol industry has been on a rapid development track. In particular, since the beginning of 2002, driven by a strong demand for methanol from downstream industries, China's methanol producers expanded production capacity and built new facilities, resulting in an explosion in production capacity and, for consecutive years, a significant rise in output. After rapid development of more than a decade, the industry entered the era of adjustment, transformation, and upgrade in 2015. As a result, the growth of the methanol production

capacity notably slowed down, and producers sought to become bigger through M&A. From 2019 to 2022, the expansion of downstream industries and the implementation of an integrated development strategy for the methanol industry were the major drivers for the rapid growth of methanol production capacity. In 2023, China's methanol production capacity was 101,320,000 metric tons, up 1.9% YoY.

Figure 4 China's Methanol Production Capacity 2019-2023

Unit: 10,000 mt

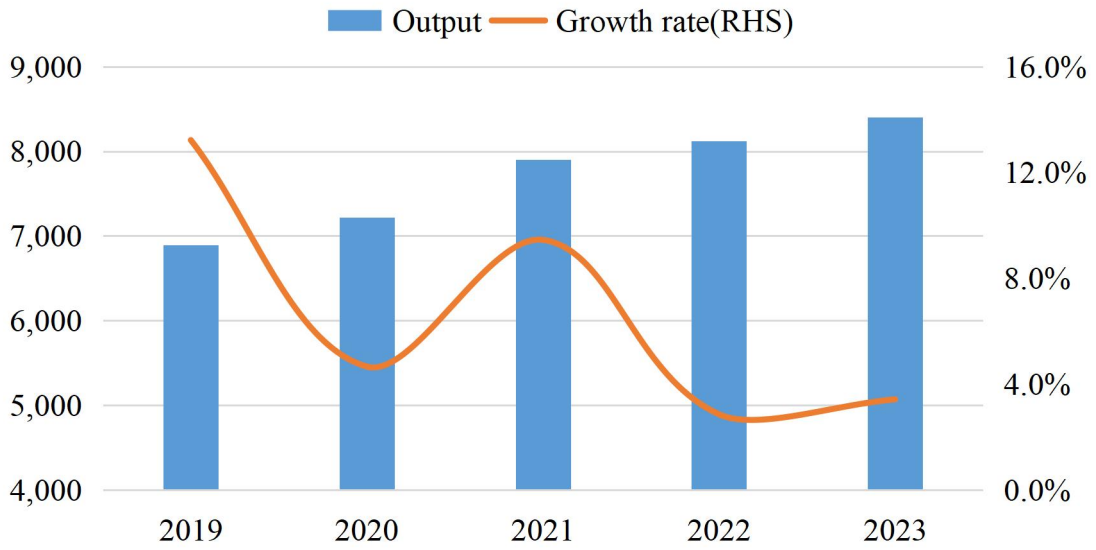


Source: OilChem China

In 2023, China produced 81,220,000 metric tons of methanol. Thanks to the operation of new production capacity and an increase in demand for methanol, China's methanol output was generally on the rise between 2019 and 2023, as shown in Figure 5.

Figure 5 China's Methanol Output 2019-2023

Unit: 10,000mt

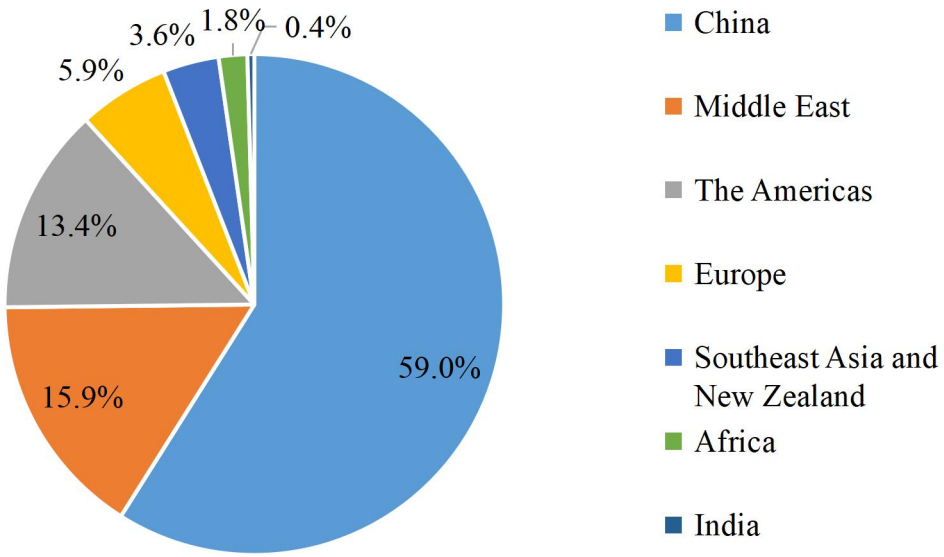


Source: OilChem China

2. Distribution

Most (or 88%) of the world's total methanol production capacity was from China, the Middle East, and the American Region. China's methanol production capacity was the largest in the world, accounting for about 59% of the world's total.

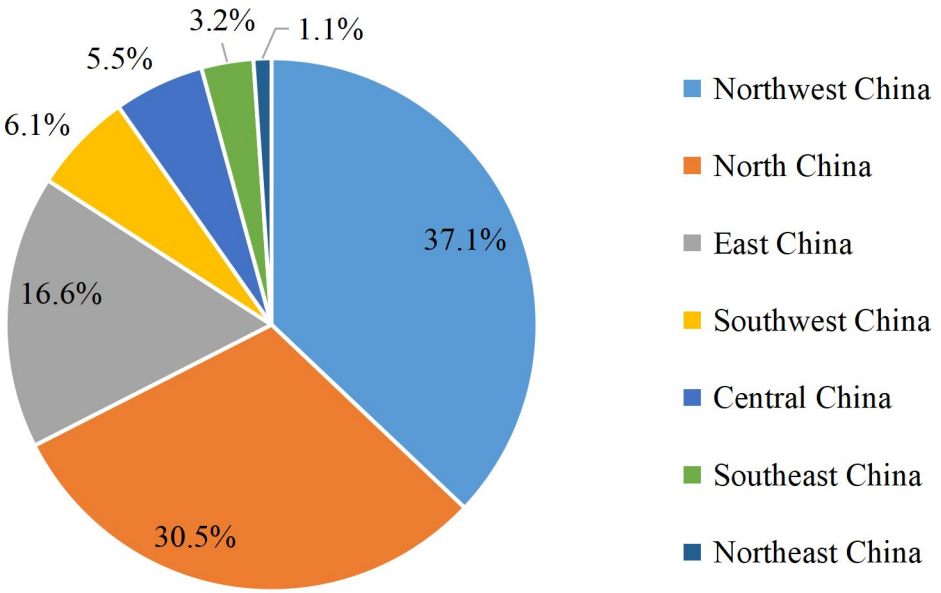
Figure 6 Distribution of the World's Methanol Production Capacity in 2023



Source: OilChem China

China's methanol production capacity is concentrated. In 2023, Northwest China had a production capacity of 37,550,000 metric tons (or 37.1% of the country's total), ranking first nationwide; North China a production capacity of 30,860,000 metric tons (or 30.5% of the country's total), ranking second nationwide, and East China a production capacity of 16,820,000 metric tons(or 16.6% of the country's total), ranking third nationwide; in terms of methanol consumption, East China was the largest consumer, consuming most of the methanol from Northwest China and North China, followed by Southwest China with a consumption of 6,220,000 metric tons, Central China with 5,570,000 metric tons, South China with 3,200,000 metric tons, and Northeast China with 1,100,000 metric tons.

Figure 7 Distribution of China's Methanol Production Capacity in 2023



Source: OilChem China

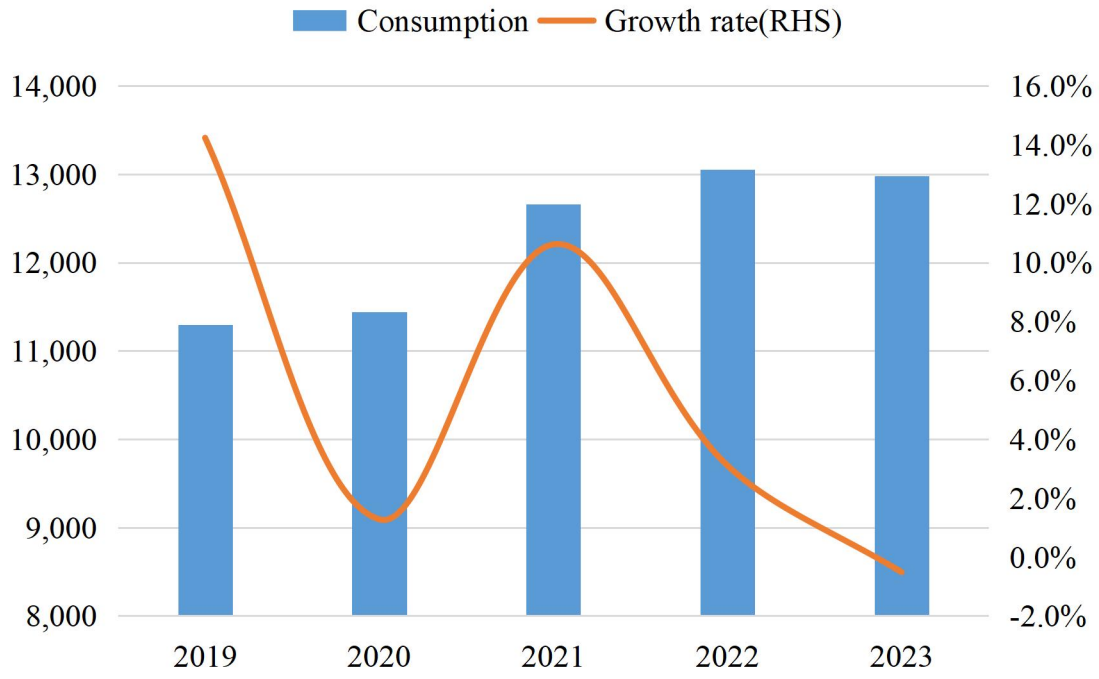
(II) Methanol Consumption

1. Development

In 2023, the world consumed around 129,850,000 metric tons of methanol, down 0.5% YoY, and the rising demand for methanol in the burgeoning MTO market remained the major driver behind the growth of global methanol consumption.

Figure 8 The World's Methanol Consumption 2019-2023

Unit: 10,000 mt

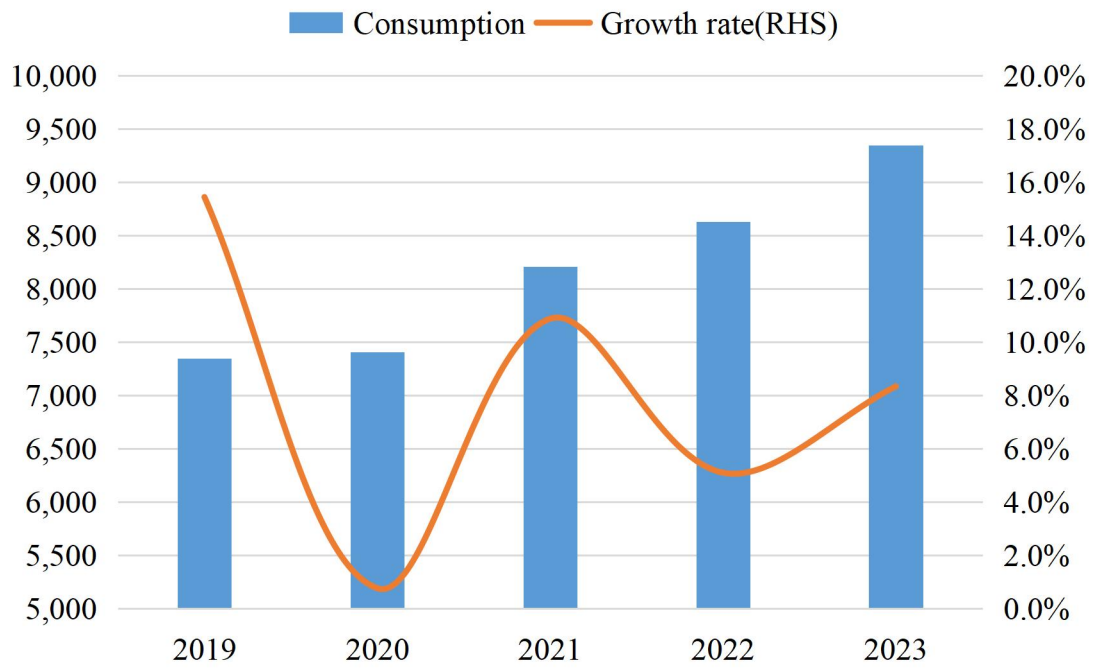


Source: OilChem China

In recent years, China has also seen a hike in methanol consumption, which is aligned with the improvement of its production capacity and output. The quick development of China's MTO industry due to China's breakthrough and innovation in MTO technology has become the biggest force driving up methanol consumption. Now, China is the world's largest and fastest-growing methanol consumer. In 2023, China consumed 93,500,000 metric tons of methanol, up 8.3% YoY.

Figure 9 China's Methanol Consumption 2019 - 2023

Unit: 10,000 mt



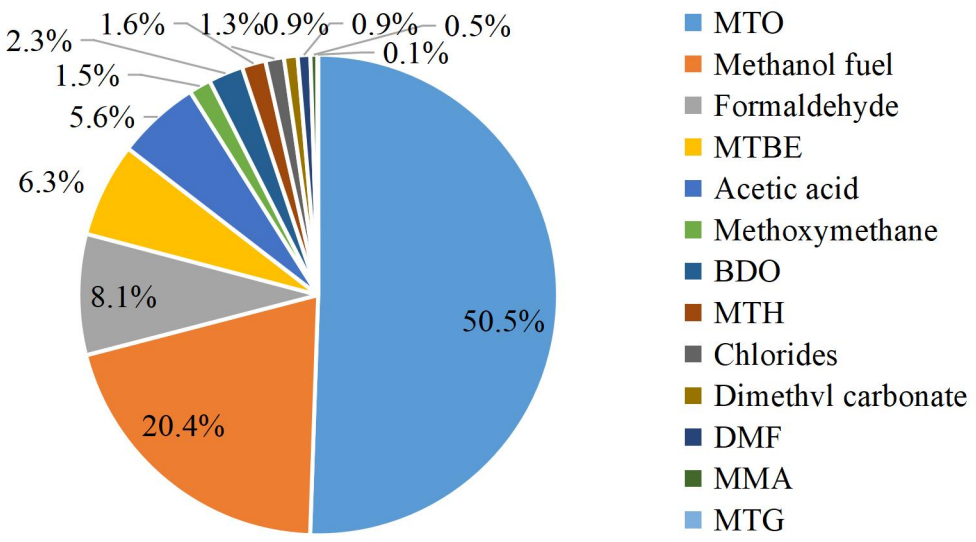
Source: OilChem China

2. Structure

Methanol is consumed in many downstream sectors. There has been no big change in the structure of the world's demand for methanol in recent years. With a stream of MTO projects put into operation in China, the world's MTO projects have been consuming an increasing proportion of methanol since 2017. In 2023, MTO accounted for nearly 30% of the world's total methanol consumption, becoming the world's largest methanol consumer. In contrast, methanal, one of the conventional downstream products of methanol, had witnessed limited growth in methanol consumption and accounts for 16% of the world's methanol consumption. However, in parts of the world outside China, methanal still created the largest demand for methanol, with important contributions from Europe, the US, and the Southeast Asia.

The structure of China's methanol consumption is dominated by new downstream products represented by MTO. In 2014, MTO overtook methanal for the first time, consuming the most methanol; a large amount of methanol was also consumed by methanol fuel, acetic acid, MTBE, methoxymethane, and chloromethanes respectively. In 2023, China's total MTO output of more than 15,000,000 metric tons was equivalent to a consumption of 47,240,000 metric tons of methanol, accounting for 50.5% of China's annual total consumption. See Figure 10 for the structure of China's methanol consumption.

Figure 10 Structure of China's Methanol Consumption in 2023



Source: OilChem China

(III) Methanol Trades

1. Global trades

From 2022 to 2023, around 30,000,000 metric tons of methanol were traded globally. The Middle East was the world's major methanol exporter, with Iran, Saudi Arabia, and Oman together exporting 50% of the world's total. South America and North America were also major exporters. China, West and North Europe, and Southeast Asia were the world's major importers. As the world's largest methanol consumer, China accounted for about 40% of the world's total methanol import. Limited by transport distance and costs, methanol produced locally in Europe was primarily traded within Europe.

2. Domestic trades

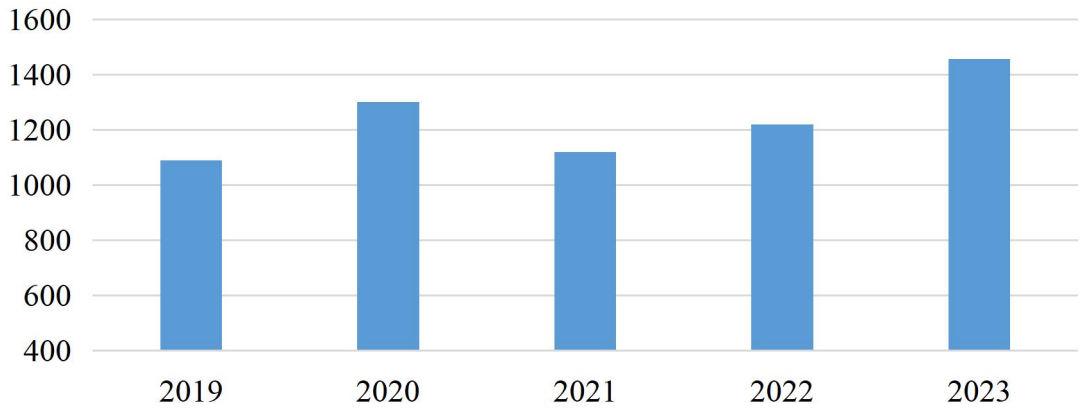
Currently, almost all of methanol produced in China is consumed in the domestic market, with little being exported. Methanol production facilities are scattered across the country, with most of them located in Inner Mongolia, Shaanxi, Ningxia, and other inland regions, while major methanol consumers are concentrated in East and South China. The above distribution of methanol production and consumption capacity determines a general west-to-east trade flow in China. Methanol is mainly transported over a long distance by land (train or truck), which is supported by waterway transport. Given the current situation, the one-way flow of methanol will continue for a considerable period of time. As special tanks are required for the transportation of methanol, it is common for trains to return in an empty condition, wasting transport capacity and further exacerbating the strain of railway transport. In addition, such long-distance transport undermines the stability and flexibility of methanol supply. Considering the high transport cost of methanol, accounting for 15~30% of methanol price, fluctuations in freight will have a noticeable impact on methanol price.

(IV) Imports and exports

In recent years, the expanding demand for olefins has markedly boosted methanol consumption. Methanol imported at a low cost became an effective supplement for consumers, especially those in East and South China. China imported methanol mainly from the Middle East, South America, Southeast Asia, and New Zealand. In 2023, China imported 14,550,000 metric tons of methanol, down 19% YoY. Figure 11 shows China's methanol imports from 2019 to 2023.

Figure 11 China's Methanol Imports 2019 - 2023

Unit: 10,000 mt

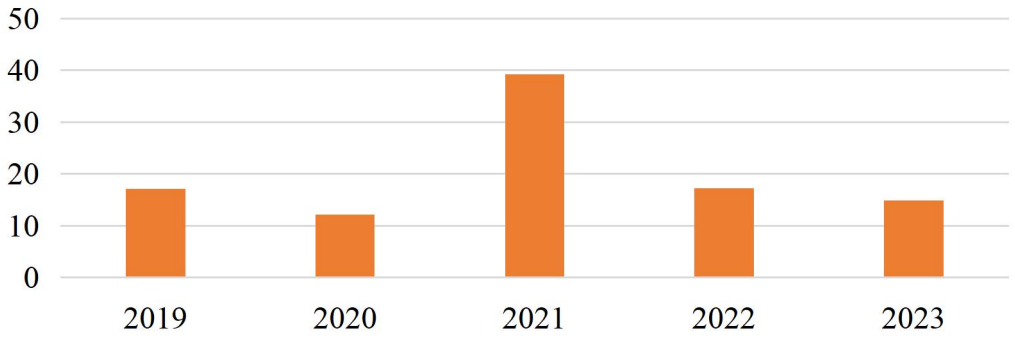


Source: OilChem China

China's methanol export has been small compared with the import. In 2023, China exported 149,000 metric tons of methanol, making up merely 0.15% of its annual consumption. Figure 12 shows China's methanol exports from 2019 to 2023.

Figure 12 China's Methanol Exports 2019 - 2023

Unit: 10,000 mt



Source: OilChem China

III. Methanol Futures and Option Contracts

Methanol Futures Contract Specifications

Product	Methanol
Trading Unit	10 metric tons/lot
Price Quotation	Chinese yuan (CNY) per metric ton
Minimum Price Fluctuation	CNY1/metric ton
Daily Price Limit	±4% of the settlement price of the previous 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 Quality	As specified by the *Rules of Zhengzhou Commodity Exchange for Methanol Futures*
Delivery Point	Designated by Zhengzhou Commodity Exchange
Delivery Method	Physical delivery
Product Code	MA
Listing Exchange	Zhengzhou Commodity Exchange

Methanol Option Contract Specifications

Underlying	Methanol Futures Contract
Contract Type	Call Option, Put Option
Trading Unit	One methanol 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 methanol futures contract
Contract Month	The two consecutive nearby months of the underlying futures contract; the methanol option contracts of the following months will be listed on the second trading day after the open interests (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 stipulated 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 settlement price of the underlying methanol futures contract at the previous trading day plus or minus 1.5 times the current day's price limit. The strike price interval is CNY25/metric ton when the strike price is less than or equal to CNY2,500/metric ton; CNY50/metric ton when the strike price is greater than CNY2,500/metric ton and less than or equal to CNY5,000/metric ton; CNY100/metric ton when the strike price is greater than CNY5,000/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: MA-contract month-C-strike price Put option: MA-contract month-P-strike price
Listing Exchange	Zhengzhou Commodity Exchange

IV. Basic Trading Rules

(I) Margin Requirements

1. Methanol Futures

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

The Trading Margin rate of a methanol 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 16th 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. Methanol Options

Trading Margin will be collected from the seller of a methanol 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-the-money amount of the option contract;

(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. Methanol Futures

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

If the Zhengzhou Commodity Exchange (the "Exchange") adjusts the Trading Margin rate and price limit of methanol 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. Methanol Options

The price limit of methanol 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. Methanol Futures

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

<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＜300,000</td><td>30,000</td></tr>
<tr><td>Open interest≥300,000</td><td>Open interest×10%</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">3,000</td></tr>
<tr><td>Delivery month</td><td colspan="2">1,000
(0 for individuals)</td></tr>
</table>

2. Methanol Options

For the long positions or short positions held by a non-futures brokerage Member or client in

a methanol 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.