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Department of Sociology, Economic
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International Economics and Business

GRADUATION THESIS
on
Russian-Chinese cooperation in oil and gas

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Department of Economic Theory and International Relations
Field of study 38.04.01 Economics,
Master's degree programme International Economics and Business

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«_____» _____ 20____

ASSIGNMENT
FOR THE GRADUATION THESIS OF

Master's degree student Li Yixuan, group 22ЭЭБма1, full-time mode of study

1 The topic of the graduation thesis: «Russian-Chinese cooperation in oil and gas»
was approved by the university order
dated «___» _____ 20__ no. _____

2 The deadline for the Master's degree student to complete the graduation thesis is
11.06.2024.

3 The input data for the graduation thesis is the regulatory and legal framework,
scientific literature and reference books, and Internet data.

4 The list of issues to be studied includes China's energy production and energy
demand structure, current state of the oil and gas trade between Russia and China,
obstacles to Sino-Russian oil and gas cooperation, prospects for strengthening and
developing Sino-Russian oil and gas cooperation.

5 The list of visuals contains tables and figures.

6 The date of setting the assignment is 28.11.2023.

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The assignment was accepted by Master's degree student _____ / Li Yixuan /
(signature) (full name)

Schedule for completing the graduation thesis

№ п/п	Content of the thesis	Deadline for completion	Due date, signature of the academic adviser
First year of study			
1	Substantiating of the research topic and methodology, subject and object of research	1.09.2022 – 31.10.2022	
2	Framing the scientific concept of research	1.11.2022 – 18.12.2022	
3	Collection of scientific literature for the thesis	19.12.2022 – 15.01.2023	
4	Substantiating the relevance, concept, and novelty of the research	16.01.2023 – 19.02.2023	
5	Framing of a detailed plan and layout of the research	20.02.2023 – 12.03.2023	
6	Studying new literature sources within the topic of the thesis	13.03.2023 – 26.03.2023	
7	Conducting theoretical research within the first chapter of the thesis	27.03.2023 – 30.04.2023	
8	Preparing the first chapter of the thesis	1.05.2023 – 30.06.2023	
Second year of study			
9	Conducting analytical research within the second chapter of the thesis	1.09.2023 – 22.10.2023	
10	Preparing the second chapter of the thesis	23.10.2023 – 24.12.2023	
11	Conducting analytical research within the third chapter of the thesis	25.12.2023 – 25.02.2024	
12	Preparing the third chapter of the thesis	26.02.2024 – 21.04.2024	
13	Preparing the introduction and conclusion	22.04.2024 – 12.05.2024	
14	Completing the graduation thesis	13.05.2024 – 26.05.2024	
15	Handing in the thesis for compliance control and antiplagiat	27.05.2024 – 9.06.2024	
16	Getting acquainted with the feedback and review	10.06.2024	
17	Presenting the written thesis	11.06.2024	

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The assignment was accepted by Master's degree student _____ / Li Yixuan /
(signature) (full name)

Summary

The graduation thesis comprises 90 pages, 3 chapters, 19 figures, 1 table, 65 sources.

ENERGY COOPERATION, ENERGY RESOURCES, CHINA, RUSSIA, ENERGY TRADE

The object of this research is international energy markets.

The subject is current state and prospects of Russian-Chinese cooperation in oil and gas.

The research purpose is to analyze the current state and development prospects of China-Russia oil and gas cooperation.

The methodological framework of the paper is formed by system approach, analysis and synthesis, statistical and comparative methods. To display identified economic dependencies graphical method was applied.

The results of research include: economic development of China and Russia was studied; the importance of energy trade to China's economy was introduced; primary energy production in China and the energy demand structure of China were examined; the current state of Russian-Chinese energy cooperation was overviewed; the obstacles to oil and gas cooperation between Russia and China were examined; required directions for China and Russia in oil and gas sector were determined.

The novelty of the work is trends and prospects for the development of energy trade cooperation of China and Russia in oil and gas are revealed.

The theoretical and practical significance of the research is that the conclusions made in the thesis form the basis for further research of energy cooperation of China and Russia. The results of the research can be used in the teaching of educational disciplines «World Economy», «International Economic Relations», «International Trade».

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Introduction

China and Russia are both major powers in the world today and the two largest economies in transition. China and Russia have a long history of economic and trade exchanges. Even during the period of Sino-Soviet relations, the economic and trade exchanges between the two sides have not been completely interrupted. After the disintegration of the Soviet Union, strengthening foreign economic and trade cooperation was regarded as an important task of Russia's long-term development strategy, and Sino-Russian economic and trade relations began to gradually recover and develop. Since then, the strategic cooperation between China and Russia has been continuously upgraded. The Eastern focus involves strengthening ties with China. Asian markets have become a strategic focus of export diversification, with the fastest progress achieved in relations with China. Russia is known for its abundance of oil and natural gas in Siberia and her Far Eastern Region; however, energy cooperation between these two countries did not appear to be significant until recent decades. Russian-Chinese cooperation boomed in 2013, including export contracts and Chinese companies buying stakes in Russian projects. However, in the specific cooperation process between the two sides, there are still some problems such as the lack of actual cooperation level and cooperation potential, unreasonable trade structure, and imperfect policies and regulations. Correctly understanding and handling these issues is of great significance to promoting the stability, health and sustainable development of China-Russia good-neighboring relations.

The Chinese economy is in rapid development period of industrialization and urbanization is rapidly advancing, high economic development but also improve the oil and other energy resources consumption. And Russia with China, in the North is bordered by the world power, rich in energy resources, its oil production accounted for the world second total output, the oil reserves of the world's total reserves of 13 per cent. At the same time, Russia's natural gas, coal and other oil and gas mineral resources is quite sufficient; Russia has become the world's major energy exporter, but also become China's energy imports preference. China's rapid economic development continues to increase energy demand. Russia's territory spans the Eurasian continent and is rich in oil and gas

resources. Therefore, Russia has been taking advantage of this unique energy advantage to improve Russia's overall integration by implementing energy diplomacy centered on its own economic interests. Oil and natural gas are the lifeblood of the economic development of modern industrial society, related to the security issues of various countries, and affect the global political, military, diplomatic and other aspects of international relations. Sino-Russian energy cooperation has been around for nearly two decades. During this period, Sino-Russian energy cooperation has continued to move forward, and many cooperation results have been achieved.

Oil and gas, as an energy source, are considered a relatively scarce resource globally, and many productions cannot do without it. Russia has a unique advantage in oil reserves, while China's oil reserves are relatively small and cannot fully meet its production needs.

At present, existing literature on China and Russia mainly focuses on the current status and existing problems of oil development, international background, competitiveness research, and other perspectives. Whether from a quantitative or qualitative perspective, these topics have certain feasibility and credibility.

Overall, scholars have not only analyzed the constraints of current oil cooperation between China and Russia, but also put forward targeted suggestions and measures. Energy is the most important economic pillar for Russia, and the petroleum industry accounts for a considerable proportion of Russia's energy industry. For Russia, the Asia Pacific region, especially China, has become its largest customer for oil and gas export trade.

The detailed analysis of the comparison of energy national strength and cooperation prospects between China and Russia strongly confirms the importance of energy cooperation between the Russian Federation and China for the future development of the two countries. This article provides corresponding measures and opinions on dealing with the issue of energy cooperation between the two countries.

The object of this research is international energy markets. The subject is current state and prospects of Russian-Chinese cooperation in oil and gas.

The research purpose is to analyze the current state and development prospects of China-Russia oil and gas cooperation. In order to achieve it we need to complete the following tasks:

- introduce the importance of energy trade to China's economy, examine primary energy production in China and describe the energy demand structure of China;
- overview the current state of Russian-Chinese energy cooperation;
- examine the obstacles to oil and gas cooperation between Russia and China;
- determine required directions for China and Russia in oil and gas sector.

The novelty of the work is trends and prospects for the development of energy trade cooperation of China and Russia in oil and gas are revealed.

The theoretical and practical significance of the research is that the conclusions made in the thesis form the basis for further research of energy cooperation of China and Russia. The results of the research can be used in the teaching of educational disciplines «World Economy», «International Economic Relations», «International Trade».

Chapter 1 The economic development in Russia and China

1.1 Overview of economic development of China and Russia

Since the 21st century, the world situation has been turbulent and major country relations have been frequent. In the ever-changing world, as permanent members of the Security Council and the largest neighboring country, China and Russia adhere to the consensus reached by the two heads of state, adhere to the principles of consolidating and deepening bilateral relations, strive to achieve the goal of common development and revitalization, and firmly defend international fairness. The determination of justice and world peace and stability revolves around five main lines: political mutual trust, pragmatic cooperation, security cooperation, cultural exchanges, and international cooperation. We will continue to promote equality, mutual trust, and win-win cooperation within the bilateral framework and on the world stage, and promote the continuous development of bilateral relations. Climb to a higher level, achieve new development, and establish a new model of international relations based on mutual respect, fairness and justice, and win-win cooperation through practical actions [11, p. 168].

In the past 2023, China's per capita GDP will exceed 12000 dollars, the US per capita GDP will exceed 60000 dollars, and Russia's per capita GDP will continue to be above 13000 dollars. As shown as figure 1.1. China's per capita economy has declined, while Russia continues to maintain a high-speed development rate, which means that the per capita GDP of China, the United States, and Russia has reached tens of thousands of US dollars for the first time. China's per capita GDP has reached one sixth of that of the United States, close to Russia's per capita GDP. The economic development momentum of China and Russia is good. From Figure 1.1, it can be seen that the overall economies of China and Russia are improving. In the special international situation, Russia's economy is growing instead of declining, which is a miracle. The speed of China's economic development has slowed down, and the main reasons for these characteristics will be analyzed later.

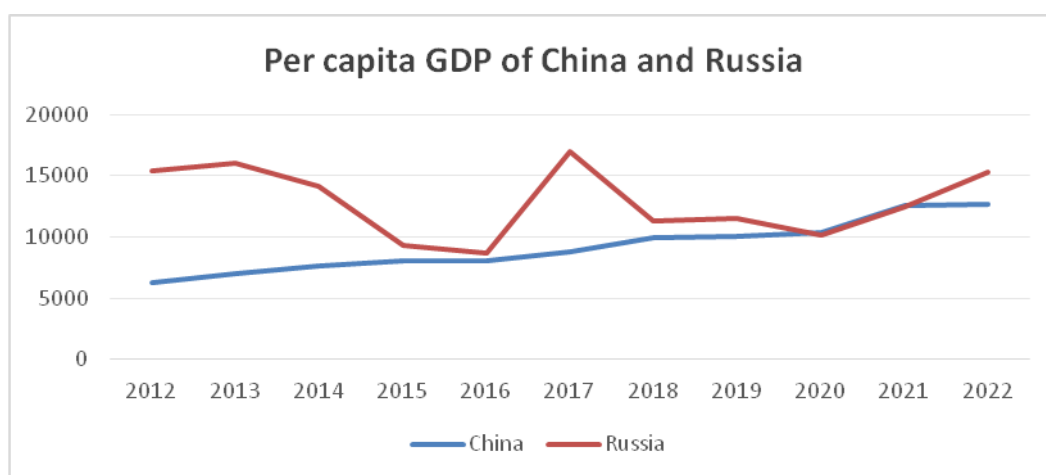


Figure 1.1 – Sino-Russian per capita GDP comparison, dollar [6]

But in 1990, China's per capita GDP was only 317 US dollars, while Russia's per capita GDP was 3480 US dollars, about 11 times China's per capita GDP.

As shown in Figure 1.1, in 2017, Russia's gross domestic product increased by approximately 1.5 % year-on-year. This is the first year of growth since 2014. In 2018, the real GDP grew by 2.3 %, with a total of approximately 1.647 trillion dollars, accounting for approximately 8.04 % of the US economy during the same period. From 1990 to 2003, China's per capita gross domestic product increased from 317 US dollars to 1288 US dollars, an increase of about three times, and low-income countries have entered the ranks of middle and low-income countries. Russia's per capita gross domestic product has not increased or decreased, rising from 3490 to 2975, with the lowest point during that period being only 1330. During this period from 2004 to 2023, the per capita gross domestic product of Russia shifted from decline to growth, increasing from 4102 per capita to 13000 per capita, an increase of 205 %. At the beginning of the 21st century, Russia's highest per capita GDP was in 2014. During this period, due to factors such as rising oil prices, Russia's per capita GDP reached as high as 16000. Since the beginning of 1990, Russia's per capita gross domestic product has increased from 3480 to 13000, an increase of 273 % [11, p. 170].

During this period, China's per capita gross domestic product grew the fastest, from 1509 in 2014 to 12000 in 2023, an increase of 795 %, although China entered the ranks of

middle-income countries around 2017. However, after 2022, due to the impact of the COVID-19, China's GDP growth has slowed down since 2022. If calculated at 317 US dollars in 1990, China's per capita gross domestic product increased by 3742 %.

From 1990 to now, Russia's per capita GDP has increased by 273 %, while China's per capita GDP has increased by 3742 %.

In 2023, Russia's total exports to Asian countries reached 306.6 billion US dollars, and its imports reached 187.5 billion US dollars. In 2023, Russia's exports to European countries decreased by 68 % to 84.9 billion dollars, while imports decreased by 12.3 % to 78.5 billion. At the same time, the trade import and export volume between Russia and African countries has also rapidly increased in 2023.

Due to the strict monetary policy of the Russian central bank, inflation pressure is gradually easing in the first half of 2024, and inflation expectations are showing a multi-directional trend, but overall they are still at a relatively high level. Due to the continuous increase in domestic demand, which exceeds the possibility of expanding supply, the speed of inflation returning to the target level will be slower than the February forecast of the Russian central bank. The seasonally adjusted annualized inflation rate in March decreased to 6.1 % (February: 6.8 %). Since early March, there has been no significant change in the annualized inflation rate, with the inflation rate continuing to tighten at 7.8 % as of April 22. According to data provided by the Ministry of Economic Development of the Russian Federation, the inflation rate in 2017 decreased from 3.3 % in 2016 to 3 %, and the price level decreased by 0.1 percentage points. The Ministry of Economic Development of the Russian Federation has announced that in the first half of 2024, inflationary pressures are gradually easing, and inflation expectations are showing a multi-directional trend, but overall they are still at a relatively high level. Due to the continuous increase in domestic demand, which exceeds the possibility of expanding supply, the speed of inflation returning to the target level will be slower than the February forecast of the Russian central bank. The seasonally adjusted annualized inflation rate in March decreased to 6.1 % (February: 6.8 %). Since early March, there has been no significant change in the annualized inflation rate, which was 7.8 % as of April 22 ss shown in figure 1.2.

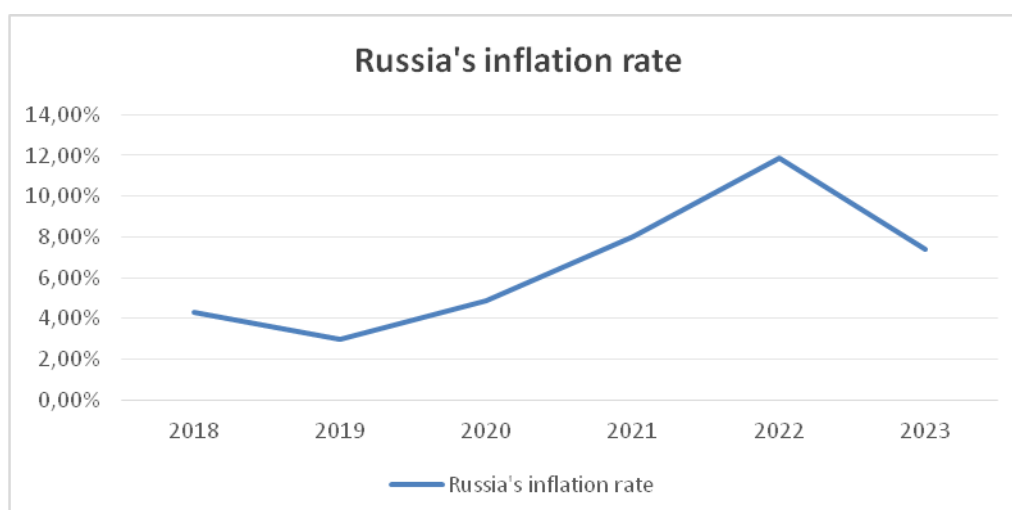


Figure 1.2 – Russia's inflation rate [6]

At the same time, the living standards of the people are also improving. Despite facing unprecedented challenges, the Russian economy continues to show good growth momentum. The Russian economy grew by 3.6 % in 2023, with growth rates reaching 4.6 % and 7.7 % in January and February of this year, respectively. The people's lives have not been affected by the international situation.

Since 2018, inflation in major economies around the world has shown an overall upward trend. Except for Argentina, which continues to experience severe inflation, the inflation rate in other countries is close to 3 %, which is about 0.2 percentage points higher than the average level in the same period last year. According to the International Monetary Fund's forecast, the global inflation rate will reach 3.5 % in 2018. Since the beginning of 2018, the outlook for inflation has become increasingly blurred. Although the economy maintained stable growth in the first half of the year, the level of inflation is still fluctuating and seems to lack momentum.

At present, Russia's key interest rate has risen to 16 %, reaching the highest level since the spring of 2022 and the highest level since the inflation rate of 13.3 % in 2008. Previously, the Russian Minister of Economic Development stated that the economic pressure brought about by Western sanctions and the decline in international oil prices has led to high inflation in Russia. The main reason for the fifth consecutive interest rate hike

is that both the inflation expectations of residents and the price expectations of enterprises have risen again. The situation encountered by the Russian central bank is that the domestic economy is increasingly deviating from the track of balanced growth. The development of this process in the second half of the year exceeded previous predictions. This year, Russia's GDP growth for the whole year will exceed the predicted 3 % in October, but inflation will also rise to the upper limit of 7 % to 7.5 %. In the past few years, due to the economic situation, Russia's inflation rate has been relatively high, at 7.42 % in 2023, 11.9 % in 2022, 4.9 % in 2020, and 4.3 % in 2018. Since the beginning of this year, the impact of the decline in the ruble exchange rate on price increases has been decreasing, and current inflation is occurring in consumer categories with weaker dependence on the ruble. For example, the annualized price increase of services other than residential public utilities exceeded 14 %, mainly influenced by strong demand under high inflation expectations.

Next is inflation in China. Due to the impact of the 2008 financial crisis, the global economy fell into a downturn, and since then, the country's inflation rate has been negative. In 2010, the world economy gradually emerged from the recession caused by the financial crisis. In 2016, China's inflation rate reached its highest level in nearly a decade. The economies of developed countries such as the United States, the eurozone, and Japan are beginning to show positive changes in their recovery. As a major trading partner of the United States, the United States, the European Union, and Japan, consumer demand has gradually recovered, and import growth has rebounded. In the past two years, the rise in electricity, water, natural gas, raw material prices, and wages has increased the costs for businesses, leading to cost driven inflation. The growth model driven by investment and exports has exacerbated the shortage of domestic energy and fuel resources, and promoted price increases. In response to the international financial crisis, China has implemented economic stimulus policies, excessively issuing currency, resulting in excess liquidity and price increases. The market economy system is not sound, and social hot money is speculating and speculating on some agricultural products. In the context of excess liquidity, agricultural product prices are rising and inflation is intensifying. Due to the quantitative easing policy of the United States, international commodity prices have risen

significantly and spread to China, leading to imported inflation. In some countries, droughts and floods have led to a decrease in grain production, and the rise in international agricultural prices has had an impact on the rise in domestic prices in China. Foreign investment expects the appreciation of the Chinese yuan, which will lead to a large influx of foreign investment into China, while a passive excess of the yuan will lead to price increases. Overall, from 2008 to 2023, China's inflation rate showed an upward trend and then gradually decreased as shown in figure 1.3.

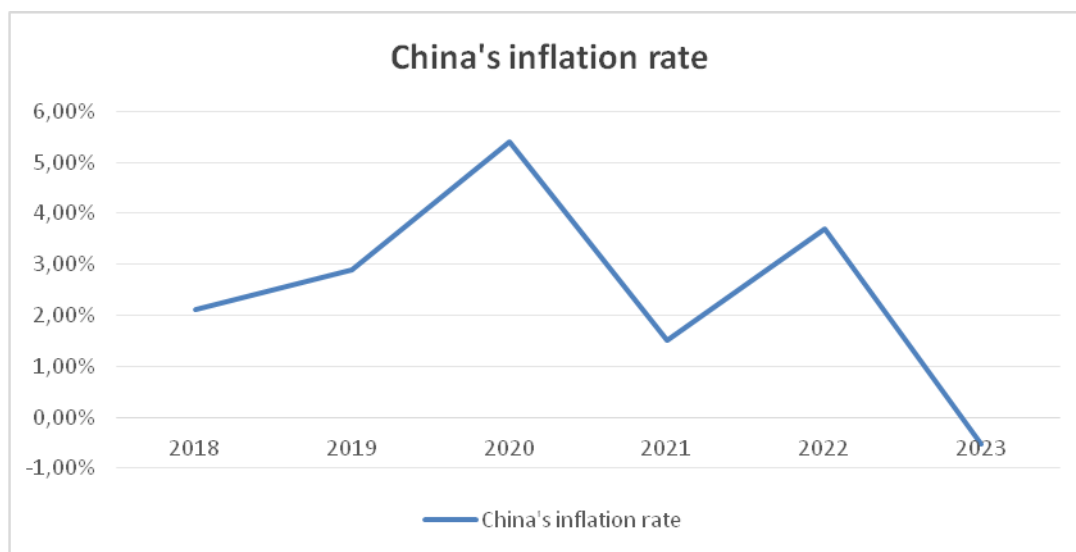


Figure 1.3 – China's inflation rate [6]

In 2023, China's inflation will continue to operate at a low level, and the market and government's attention to inflation will continue to rise. In this context, this report conducts an in-depth analysis of various potential influencing factors on inflation in China in 2024, and provides qualitative and quantitative judgments on inflation trends and subsequent core focus directions for market reference.

In 2023, China's inflation is running at a low level, which is somewhat lower than market expectations. In 2023, China's inflation is running at a low level, which is somewhat lower than market expectations. In 2023, China's CPI increased by 0.2 % year-on-year, a decrease of 1.8 percentage points from 2022. The core CPI for the whole year increased by 0.7 % year-on-year, a decrease of 0.2 percentage points from 2022. The annual PPI decreased by 3.0 % year-on-year, a 7.1 percentage point decrease from 2022,

and remained in a contraction range throughout the year. Overall, both the consumer and production sectors saw historically low inflation performance in 2023, which significantly dragged down the annual GDP deflator and nominal growth. In addition to the low inflation throughout the year, after the optimization and adjustment of China's epidemic prevention policies at the end of 2022, the market had strong expectations for China's inflation performance in 2023. However, the inflation performance in previous months has fallen short of market expectations, which may further strengthen the market's perception of low inflation.

According to data from the International Monetary Fund (IMF), China's socialist market economy is the world's second-largest economy in nominal GDP, and China is the world's largest economy in purchasing power parity [6].

Until 2015, China had been the fastest-growing major economy in the world, with an average growth rate of 10 % over the past 30 years. Due to the history and political facts of China's economic development, the share of the public sector in the national economy is greater than that of the emerging private sector.

According to data from the International Monetary Fund (IMF), in terms of per capita income, China's per capita GDP (nominal) ranked 69th and per capita GDP (purchasing power parity) ranked 72nd in 2023. In 2023, China's GDP accounted for 64.6 % of the United States due to the impact of the US dollar to RMB exchange rate, which has decreased compared to 2022. If all regions are combined, the total GDP will be 18.8 trillion, accounting for 68.9 % of the United States. Guangdong Province (US 1.92 trillion), which ranks first in Chinese Mainland's GDP, and Jiangsu Province (US 1.82 trillion), which ranks second, can rank 12th in the world, between Russia and Mexico [6].

China is the world's largest manufacturing economy and exporter of goods. China is also the fastest growing consumer market and the second largest importer of goods in the world. China is a net importer of service products. China is the world's largest trading nation and plays a prominent role in international trade. In recent years, it has increasingly participated in trade organizations and treaties. China joined the World Trade Organization in 2001. China has also signed free trade agreements with several countries. Provinces along the coast of China are often more industrialized, while inland areas are less

developed. With the increasing importance of China's economy, people's attention to economic structure and health is also increasing.

Nicholas Stern and Ferguson Green from the Grantham Institute for Climate Change and Environment suggest that in order to avoid the long-term socio-economic costs of environmental pollution in China, the economy should shift towards more advanced high-tech, low-carbon industrial development, better allocation of national resources to innovation and research and development, in order to achieve sustainable economic growth and reduce the impact of China's heavy industry. This is in line with the planning goals of the central government.

In order to guide economic development, the Chinese central government has formulated the Five Year Plan, which details the economic priorities and basic policies. The 14th Five Year Plan is currently being implemented.

Like Japan and South Korea before it, China has steadily grown, improving the income and living standards of its citizens while producing goods for global consumption. The development history of China, Japan, and South Korea is very similar, both developing from labor-intensive industries to high-tech industries. During this process, China's per capita GDP increased from 153 to 12584. Japan and South Korea also achieved economic takeoff in the 1990s, so in terms of geopolitics, China, Japan, and South Korea formed a comprehensive competitive relationship due to the same development trends and industries. However, the relationship between China and Russia is different, with China's industry developing and Russia's resources developed. These two countries can achieve a complementary relationship. In the late 20th and early 21st centuries, China also became an industrial powerhouse, developing from its initial success in low wage industries such as clothing and footwear to increasingly complex computer, pharmaceutical, and automotive production [11, p. 172].

Since the late 1970s when economic reforms began, China has sought to diversify its foreign trade system in order to integrate into the international trade system. In November 1991, China joined the Asia Pacific Economic Cooperation Organization to promote free trade and cooperation in the fields of economy, trade, investment, and technology. In 2001, China served as the President of the Asia Pacific Economic

Cooperation (APEC), and in October of the same year, Shanghai hosted the APEC Annual Leaders Meeting. China has become a free trade country, which provided a prerequisite for the later oil and gas trade between China and Russia.

The vast majority of China's imports are industrial goods and capital goods, especially machinery and high-tech equipment, with the majority coming from developed countries, mainly Japan and the United States. From a regional perspective, nearly half of China's imports come from East Asia and Southeast Asia, and about a quarter of its exports flow to the same destination. About 80 % of China's exports are manufactured goods, with the majority being textiles and electronic equipment, while the rest are agricultural products and chemicals. Among the five busiest ports in the world, three are located in China. In 2023, the import and export volume of China's international balance of payments for goods and services reached 4339.1 billion yuan, a year-on-year increase of 2 % and a new monthly high for the year. In 2023, the total trade surplus of goods reached 4279.4 billion yuan, the second highest in history. Among them, the export of goods trade was 2056.8 billion yuan, the import was 1646.8 billion yuan, and the surplus was 409.9 billion yuan; Service trade exports amounted to 228 billion yuan, imports amounted to 407.6 billion yuan, and a deficit of 179.6 billion yuan. The main projects of service trade are: the import and export scale of travel services is 171.1 billion yuan, the import and export scale of transportation services is 158.8 billion yuan, the import and export scale of other commercial services is 122.6 billion yuan, and the import and export scale of telecommunications, computer and information services is 67.4 billion yuan [11, p. 173].

In terms of US dollars, in December 2023, China's international balance of payments exports of goods and services amounted to 321.6 billion US dollars, imports amounted to 289.2 billion US dollars, and a surplus of 32.4 billion US dollars. According to data released by the General Administration of Customs of China, the trade volume between China and Russia from January to April 2024 was 76.581 billion US dollars, a year-on-year increase of 4.7 %. Among them, China imported 43.847 billion US dollars from Russia, a year-on-year increase of 10.2 %. China's exports to Russia amounted to

32.734 billion US dollars, a year-on-year decrease of 1.9 %. Therefore, Russia's trade surplus is approximately 11.1 billion dollars.

Overall, in 2023, the bilateral trade volume between China and Russia reached 240.1 billion US dollars. The trade volume in 2022 is over 190 billion US dollars. But this has not yet reached its limit. Russian Deputy Prime Minister Andrei Belousov stated last year that this number is expected to reach 300 billion by 2030. At the same time, the proportion of China Russia trade settled in local currency has increased to 92 % [5].

In 2023, China imported 107 million tons of crude oil from Russia (a year-on-year increase of 24 %) and 8 million tons of liquefied natural gas (a year-on-year increase of 23%). In the same year, Russia supplied 22.7 billion cubic meters of natural gas to China through the Trans Siberian Power pipeline, which is approximately 1.5 times that of 2022. Georgi Ostapkovich, an expert at the Institute of Statistics and Knowledge Economy at the Russian Higher School of Economics, said, China is Russia's non competitive economic partner. China's share in our foreign trade has reached 35 %, while just two or three years ago, its share was only 15 %. And this proportion continues to rise. An expert at the Institute of China and Modern Asia at the Russian Academy of Sciences, added, according to statistics, about one-third of Russia's imported goods come from China.

Export growth remains a major component supporting China's rapid economic growth. In order to increase exports, China has adopted some policies, such as promoting the rapid development of foreign-invested factories, which assemble imported components into export consumer goods and open up trade rights. In the 14th Five Year Plan, China places greater emphasis on developing a consumer demand driven economy, replacing high-speed development with high-quality development.

Finally, the impact of the COVID-19 epidemic on China's economy. In 2020, China's population accounted for 18 % of the global population, making it the most populous country in the world. China has experienced rapid development. Over the past forty years of economic growth, by 2020, the total scale exceeded 101 trillion yuan (14.7 trillion US dollars), accounting for 14 % of global GDP in 2010 constant US dollars or 17 % of world GDP in current US dollars. However, after the beginning of the COVID-19 epidemic, the impact of the COVID-19 epidemic on China's economy, energy demand and

industrial production. Then in China, the biggest impact of the COVID-19 and related blockades will occur in early 2020. In the first quarter of 2020, China's economy shrank 6.8 % compared with the previous year (figure 1.1), but since then it has rebounded sharply because of China's rapid efforts to curb COVID-19 in the first three months of 2020. As of the end of 2020, China's gross domestic product grew by 2.3 %, while global GDP decreased by 3.6 % during this period. In the first quarter of 2021, China's gross domestic product grew by 18.3 %, but slowed down to 7.9 % and 4.9 % in the second and third quarters, respectively. The economic slowdown is caused by many factors, including the new COVID-19 and the increase of raw material costs [11, p. 173].

In 2021, the economic growth exceeded 6 %. The World Bank predicts that China will exceed this target and then slow down to 5.4 % in 2022, surpassing the pace of global economic recovery. According to preliminary estimates from the National Bureau of Statistics of China, the Chinese economy grew by 8.1 % in 2022 and 2021. Due to the COVID-19, China's fixed assets investment declined by 16.1 % compared with the same period in 2019. The manufacturing industry saw the largest decline, with fixed assets investment in the manufacturing industry falling 25.2 %. Infrastructure investment (such as roads, highways, railways, bridges, urban systems, but excluding electricity, heating, natural gas, and water supply) also decreased by 19.7 %. In addition, in the first quarter of 2020, industrial facility profits decreased by 36.7 %, with manufacturing (-80.2 %), chemicals (-56.5 %), ferrous metals (-55.7 %), motors (-47 %), and general machinery (-39.9 %) experiencing the largest decline in profits. The most serious situation in 2020. Due to the impact of the COVID-19 and the local blockade, China's GDP only increased by 2.3 %, the lowest level since 1980. By 2023, the epidemic will end, and China will also be seriously injured by the COVID-19 epidemic.

1.2 China and Russia energy strategies

Russia's energy strategy aims to leverage the use of its vast energy resources for both domestic and foreign policy objectives. Energy plays a key part in both its economic

and security strategies. Russia is the world's second most resource-rich country in terms of combined oil and gas recoverable resources.

China's population of almost 1.5 billion and a rapidly growing economy make it the top energy consumer in the world. Its economy is still relatively energy-intensive. Access to reliable and affordable energy to support its economic prosperity is therefore the fundamental goal of China's energy policy [50].

Russia's energy strategy aims to utilize its enormous energy resources to achieve domestic and foreign policy goals. Energy plays a crucial role in both its economic and security strategies. In terms of the combination of exploitable resources for oil and gas, Russia is the second most resource rich country in the world. In 2021, oil and gas revenue accounted for 25 % of Russia's gross domestic product, and the government's share of these revenues accounted for approximately 50 % of the federal budget. In terms of trade, oil and natural gas account for 65 % of the country's exports. This huge resource rent. The production costs and profits after normal returns are crucial to the Russian economy, and in turn, to its ability to maintain political support and military power. Figure 1.4 shows Russia's oil and gas production.

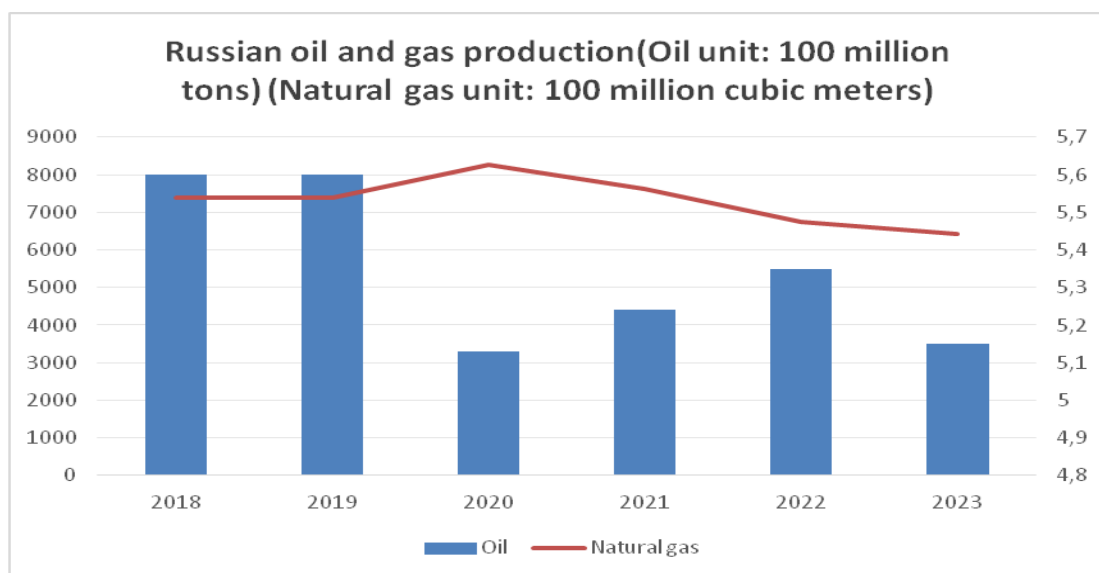


Figure1.4 – Russian oil and gas production [50]

Energy is also used more directly as a tool for political influence. Although oil exports have provided most of the resource rent in history, natural gas exports have

provided significant political influence. The rigidity of pipeline infrastructure and the controllability of flow make natural gas trading and pricing effective political tools in relations with other countries. Over time, Russia's natural gas politics have established important import dependency relationships in some European countries, which have relied primarily on Russia until 2022. However, as Europe abandons Russian natural gas, these dependencies gradually weaken, and when Russia loses its largest market, the inflexibility of its pipeline infrastructure becomes a weakness. Russia's main focus on energy issues is to maintain its position as an energy superpower, and most importantly, to maintain the rental prices of its oil and gas resources, as well as its dependence on infrastructure in other countries. From a historical perspective, the main obstacles to achieving this goal have been resource depletion, access to production technology and capital, and turbulence in the international market. Russia's main focus on energy issues is to maintain its position as an energy superpower, and most importantly, to maintain the rental prices of its oil and gas resources, as well as its dependence on infrastructure in other countries.

From a historical perspective, the main obstacles to achieving this goal have been resource depletion, access to production technology and capital, and turbulence in the international market. After the disintegration of the Soviet Union, all four factors led to a long-term decline in production. It was not until the beginning of the 21st century that Russia's oil production began to increase again, and it was not until 2016 that production returned to its peak in 1986. The rise in global prices during this period meant a significant increase in government revenue from oil and gas, supporting the new Russian economy and providing a foundation for President Vladimir Putin to consolidate his power. Before the invasion, despite early sanctions imposed by the West on oil and gas production technology after the annexation of Crimea in 2014, the long-term prospects for oil and gas production continued to grow.

The main obstacle to Russia's long-term energy strategy is resource depletion, climate change, and global energy transition, which will ultimately lead to a decrease in demand and prices for fossil fuels. It is worth noting that Russia recently officially recognized this important threat. In the medium term, the main threat to Russia's dominant position in natural gas exports to Europe comes from liquefied natural gas, especially

cheap and abundant shale gas from the United States. Russia's new pipeline for exporting natural gas to Europe, Nord Stream 2, was originally planned to be completed and put into operation in 2019. However, due to obstruction by the US government, the completion time of the project has been repeatedly delayed until September 10, 2021, when it was finally laid out, but it has not yet been put into operation. This suggests that the United States may even induce major European countries to exert political pressure on the Nord Stream 2 pipeline to prevent the development of Russian natural gas in the European market and prepare for future US exports of liquefied natural gas to Europe.

The European market has always been a major destination for Russian crude oil and natural gas. With the possibility of the United States becoming a net exporter of oil and gas, the US government is highly concerned about the two major oil and gas markets in Europe and Asia. The United States will inevitably use its partnership with European countries to suppress Russia's existing oil and gas, and use political means to pave the way for its oil and gas exports. China Petroleum has benefited greatly from the cooperation between China and Russia. As one of the world's important oil and gas producers and suppliers, PetroChina has participated in the implementation of a number of major cooperation projects, promoting the stable operation of cross-border oil and gas pipelines between China and Russia, expanding oil and gas trade, and increasing the development of liquefied natural gas in the Arctic region. In the future, PetroChina will continue to expand new directions of cooperation in carbon management, carbon capture and storage utilization, green energy, and other areas, and promote the deepening and strengthening of the comprehensive strategic partnership between China and Russia in the new era through practical actions.

As a major oil and gas resource and exporter, Russia's oil and gas industry plays a very important role in the national economy. About 60 % of the tax revenue of the Russian Federation government comes from the oil and gas industry, and about 40 % of foreign exchange income comes from oil and gas exports. Therefore, maintaining stable oil prices, diversifying oil and gas exports, and reducing export risks are of great significance for ensuring Russia's oil security, participating in international competition, and achieving sustainable development. At present, Russia's oil and gas export channels are too single,

mainly exported through pipelines to Europe and CIS countries. In 2002, Russia exported 173 million tons of oil, reaching 226 million tons in 2003, of which over 70 % were exported to the West. The oil and natural gas mainly produced in eastern Russia are exported to Europe. On the one hand, the transportation distance is long, and on the other hand, some oil transportation pipelines passing through other countries require payment of transit fees, which not only increases export costs, but also poses potential transportation risks due to the transit countries of the pipelines. As the world's second-largest oil consumer, China needs to import a large amount of oil and natural gas. It can be seen from this that conducting oil and gas economic and trade cooperation with China, under long-term agreements, directly pricing and quantitatively supplying oil and gas to China, not only benefits the stability of Russian oil and gas prices, reduces transportation risks, but also expands oil and gas exports, achieves the diversification goal of Russia's export market, ensures the sustained stability of exports, and increases Russia's oil security factor.

China Russia oil and gas cooperation can attract Chinese investment in Russia, promote the growth of the oil producing regions of Siberia and the Far East, and even the entire Russian economy. For a country, the sources of economic growth are multifaceted and complex, and a widely accepted view is that economic growth is related to the growth of per capita capital. Foreign direct investment, as a source of per capita capital growth in the host country, although there is still no consensus on measuring its contribution to promoting economic growth in the host country, it is widely believed that foreign direct investment is beneficial to the growth of the host country's economy and is one of its driving forces. Especially for many developing countries, foreign direct investment has played a role in filling the investment gap and is conducive to economic growth. Since the early 1990s, the Russian economy has experienced a severe recession and only began to improve in 1999. Correspondingly, the investment capacity has significantly decreased, and the phenomenon of capital flight is severe. According to statistics, the average annual scale of capital flight in the past 10 years has exceeded 20 billion US dollars. The decline in investment capacity has had a significant negative impact on Russia's economic growth. Therefore, attracting foreign investment to fill the domestic investment gap has become one of the driving forces for Russia's economic growth. The oil and gas industry, as an

important sector of the Russian economy, although its investment level has remained relatively high compared to other industries in Russia in recent years, it still cannot meet production demand. At present, the equipment in the oil and gas industry is severely aging, and many mining and smelting equipment have exceeded their service life. The pipeline transportation capacity is insufficient, and there is an urgent need to renovate existing old pipelines and build new oil and gas transportation pipelines to expand exports. In order to maintain its current production level and consolidate its position in the world oil market, Russia must invest heavily in renovating and updating old equipment, laying new oil and gas transportation pipelines, and developing new oil and gas fields. Relying solely on the investment capabilities of Russian oil companies is clearly not enough. In order to ensure an increase in underground energy production and the development of new energy bases in Russia, it is necessary to increase investment. According to expert analysis, Russia's investment in oil and natural gas must now increase 5–8 times, because Russia's oil mining output has not increased compared with the previous record, but is in the recovery stage. Senior Russian officials have stated that China's investment in the Russian oil and gas industry can not only alleviate the problem of insufficient investment funds in Russia's oil and gas industry, but also attract investment from other countries, drive the development of related industries such as oil and gas field infrastructure and mining equipment, create new employment opportunities, increase taxes, and stimulate Russia's economic growth. Taking the construction project of the China Russia oil and gas pipeline as an example, if the Taina Line China branch, the Kovikjin project (China Russia South Korea natural gas pipeline project), and the Sakha Autonomous Republic's gas supply project to China can finally be implemented, it will attract nearly 10 billion US dollars in investment from China. The importance of this for Russia's future development strategy is self-evident.

Next is China's energy strategy. Let's first analyze China's internal development and resource coordination issues. China has a population of nearly 1.4 billion and a rapidly growing economy, making it the world's largest energy consumer. In addition, since entering the 21st century, China has gradually transformed from a backward agricultural country to an industrial powerhouse. But its economy is still relatively energy intensive.

From a historical perspective, China has always achieved self-sufficiency, mainly relying on the domestic development of its own domestic oil and gas in the 1970s. Its negative experience of relying on imported resources, including blockades from two Western powers, is of great significance. However, by 1993, domestic oil production had become unsustainable. With the accelerated development of the Chinese economy, China is once again relying on energy imports. In 2023, China's crude oil production reached 208 million tons, an increase of over 3 million tons year-on-year and a significant increase of nearly 19 million tons compared to 2018. The natural gas production has reached 230 billion cubic meters, but China's strong industrial strength has made unable to rely on self-sufficiency in oil and gas consumption. It started to diversify, importing oil and gas from multiple sources, investing in overseas resources, and establishing its own important oil tanker fleet. Figures 1.5 and 1.6 show China's oil and gas production in recent years.

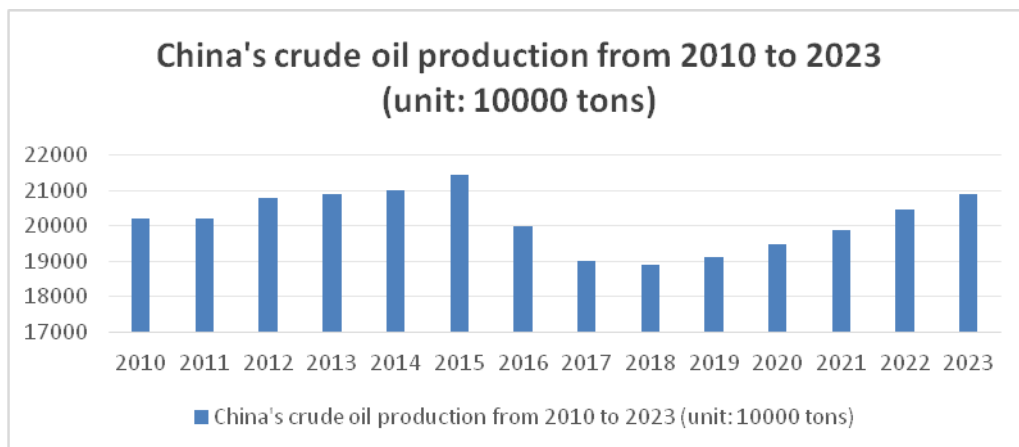


Figure 1.5 – China's crude oil production from 2010 to 2023 [50]

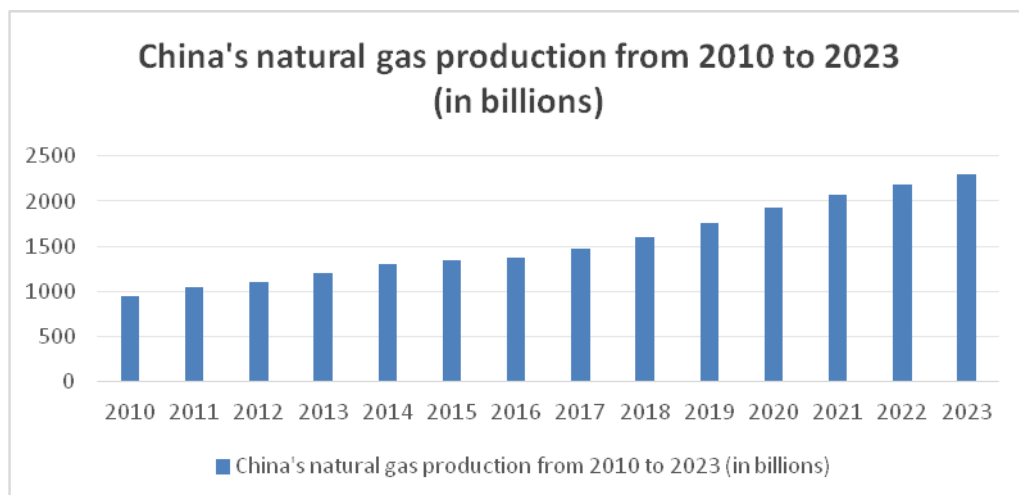


Figure 1.6 – China's natural gas production from 2010 to 2023 [50]

The Chinese economy continues to develop steadily, and although the future energy transformation is moving towards low-carbon decarbonization, the demand for oil and natural gas, as well as the dependence on imported crude oil and natural gas, is still not low. Establishing a more stable supply and marketing relationship with neighboring countries is an important way to ensure the security of oil and gas supply. Similarly, the supply and demand partnership between Russia and China is also beneficial for Russia to obtain a stable and reliable crude oil and natural gas market, and for the sustained and stable development of Russia's oil and natural gas industry. The result of establishing a close supply and demand partnership between China and Russia in the fields of oil and natural gas is inevitably a win-win cooperation between the two countries. The closer oil and gas supply and demand partnership between China and Russia also includes elements of geopolitical games. For a long time, the United States and Europe have regarded China and Russia as enemies with more elements and friends with fewer elements. The actions of the United States and Europe in excluding China and suppressing Russia have never stopped internationally [4].

With coal causing local air quality issues and global climate change, China's energy policy has recently shifted towards curbing coal and ultimately achieving peak emissions by 2030 and net zero emissions by 2060 based on new climate goals. To support and ensure this transformation, China's goal is to become a leader in resources and technology. For low-carbon energy, it will be achieved through large-scale domestic construction of hydropower, nuclear energy, wind energy, solar energy, and electric vehicles, as well as global exports. However, this transformation will take time, and coal and oil will continue to remain in China's energy supply structure. Natural gas also plays an important role in China's future planning. It is considered a bridge fuel that can improve air quality by reducing carbon emissions and replacing coal. China also diversifies natural gas, invests in pipelines, and imports liquefied natural gas. China maintains its preferred self-sufficiency model and actively seeks domestic production, including shale gas. Oil, natural gas, and coal are all listed as strategic minerals in China, and their supply chains have long been the pillars of the securitization process. Russia has abundant energy supply, especially its developed oil and gas resources. The growing demand from China makes the cooperation

and trade in energy between these two neighboring countries look very compatible. However, energy trade between countries is a relatively new phenomenon. Oil trade started relatively slowly in the early 21st century and only achieved real growth after 2013, while natural gas imports did not begin until 2019 [4].

Since the end of the Cold War, due to China's partial backwardness, China and Russia have not cooperated with Russia in the short term. In recent years, the United States has always been a hegemonic country, and the interests of China and Russia complement each other. China and Russia have been competing for regional interests, limited economic exchanges, and different attitudes towards the future global order. The main driving factors for cooperation have always been controversial. The development of Sino Russian cooperation is attributed to a common understanding of threats and efforts to balance US hegemony. This is also attributed to the interdependence of trade, especially in the energy and resource sectors, which drives more trade between the two countries.

In addition, some scholars focus on domestic political factors, such as regime types, normative convergence, and common ethnic identity, which is also the last point in bilateral relations that tends to focus on the Russian side. This may overlook the important aspects and driving factors of China. These themes also appear in energy centered literature, including important discussions on the relationship between strategic considerations and pure commercial interests, as well as competition driven and shaping energy relationships. Another key aspect of energy and trade literature is the balance of relationships, including the degree of interdependence and asymmetry between the two and constantly changing countries. Some critics, many of whom are Russians, are concerned that Russia may just be a resource puppet state, fueling its economic growth. However, energy trade is still considered one of the last areas. Russia's importance to China remains significant as its overall economic importance to China is seen as continuously declining. Many domestic issues also affect energy relations, such as internal conflicts in the energy industry between Russian state-owned and independent companies, as well as broader tensions between national regulation and planning and the free market. These tense situations may lead to conflicts between priorities and goals, such as domestic and foreign policy objectives, economic efficiency, and industrial profitability. Similar

dynamics, although the role played by independent non-state-owned enterprises is much smaller. Nevertheless, China has various broader energy factions, such as an important coal industry, which may have different priorities compared to oil and gas companies. Anti corruption has purified China's interests and concerns in further energy trade with Russia, keeping managers cautious and avoiding providing motives for prosecution. Corruption, especially among Russians, is emphasized as a limiting factor for cooperation and investment. Since the invasion, people have conducted a series of analyses and comments on the impact and future of China Russia relations. Some observers believe that the invasion has strained the relationship between the two countries and made China more selective in its participation and support. Some people believe that China is maintaining partnership with Russia and relations with the West. People generally believe that the constantly changing balance of power is tilting towards Beijing, and this is also true in terms of energy [8, p. 33].

In short, there are many incentives for China and Russia's energy strategies. However, the current international environment forces China and Russia to further deepen cooperation and trade. At the end of the last century, China's backward productivity and good relations between Russia and Western energy demand countries led to limited oil and gas trade between the two countries. However, with the beginning of the 21st century, China gradually became a manufacturing powerhouse, and Russia's relationship with Western countries deteriorated, leading to increasingly frequent oil and gas trade between China and Russia. However, the willingness of China and Russia to strengthen trade on a bilateral basis cannot smoothly promote oil and gas trade between China and Russia. There are many obstacles in this regard. Firstly, Western countries represented by the United States have adopted a ban strategy on Russia's oil and gas transportation. Secondly, sanctions have been imposed on countries engaged in oil and gas trade with Russia, which has made many countries hesitant to engage in large-scale oil and gas pipeline trade with Russia. Secondly, the continuous changes in international oil prices and the instability of oil prices will also lead to rent collection in the oil and gas trade between China and Russia [42, p. 23]. Therefore, cooperation between China and Russia in the field of oil and gas is conducive to improving the oil safety factor of both sides. Reasonable oil prices and

stable oil supply are the core issues of oil security. Firstly, analyze the impact of international oil prices on both countries. High or low oil prices are detrimental to both China and Russia. For importing countries, when oil prices are low, Chinese companies do not prioritize energy efficiency and heavily use oil, increasing their economic dependence on oil and enhancing their vulnerability in oil crises. When oil prices are high, the rise in oil prices directly leads to an increase in China's expenditure, which may worsen its international balance of payments and affect the sustained growth of the national economy; For Russia, although high oil prices can increase revenue in the short term, it will lead to a contraction in oil demand in importing countries, resulting in excess oil production capacity in exporting countries, bearing high maintenance costs for remaining production capacity, and leading to a decrease in total profits. The main factors affecting oil prices include oil supply and demand, government intervention, oil futures trading, and technological development. The short-term trend of oil prices is determined by temporary factors such as the fundamentals of oil supply and demand, government intervention, and the oil futures market. The development of science and technology is the main factor determining the long-term price and market position of oil [47, p. 46].

The instability of oil supply is also detrimental to both importing and exporting countries. Despite the good relationship between China and Russia, external factors have been hindering the development of the two countries. For China, when oil supply exceeds demand, a drop in oil prices will lead to an increase in domestic oil consumption, an increase in economic dependence on oil, and an increased vulnerability to the oil crisis. When oil supply exceeds demand, oil prices rise and foreign exchange expenditures increase, affecting industries with high dependence on oil and affecting the healthy development of the national economy. Especially when the temporary or partial interruption of oil supply leads to a sharp decrease or interruption in the import volume of oil by the importing country, it will also endanger China's political and national defense security; For exporting countries, the instability of supply directly affects their foreign exchange income and the stability of enterprise production. When demand exceeds supply, oil prices rise, and companies will increase investment, expand production scale, increase exports, and achieve high returns in the short term. However, this has led to a long-term

decline in oil prices and a contraction in demand in consumer countries. Therefore, enterprises have overcapacity and have to bear the high cost of maintaining surplus production capacity. When demand is less than supply, exports decrease, and companies are forced to reduce production, generating excess capacity and bearing high maintenance costs for excess capacity, leading to a decrease in efficiency.

In terms of geopolitics, China and Russia are close neighbors, and the transportation distance from Russia's oil producing areas to China is relatively short. The transportation route does not need to pass through other countries. Therefore, China Russia oil and gas economic and trade cooperation has price and security advantages [51, p. 14].

According to a long-term agreement, Russia's pricing and quantitative supply of oil and gas to China are conducive to the stability of China's oil and gas prices and supply. At the same time, China Russia oil and gas economic and trade cooperation is also conducive to the diversification of China's oil and gas import channels. The theory of petroleum security believes that long-term petroleum security mainly considers how to provide multi-channel petroleum supply, reduce petroleum supply risks, and ensure the sustained stability of petroleum supply. That is to say, a country's sources of oil and gas imports should not be concentrated in just one or two places, but should strive to achieve diversification of import sources on the basis of ensuring stable supply, in order to minimize the risk of oil and gas supply crises caused by unexpected factors. At present, China's crude oil import sources and channels are too single, posing significant potential risks to oil supply. From the perspective of the main source composition of China's crude oil imports, half of China's oil comes from Africa, which is very detrimental to China's oil security issues. Whether importing crude oil from the Middle East or Africa, it is transported centrally by sea and requires passage through the Strait of Malacca, posing significant security risks. In a certain region, the dependence of this component on oil is much higher than the recognized safety standard of no more than 30 % [61, p. 28]. Once a crisis occurs in the Middle East, oil exports to China are cut off, or China's shipping routes are cut off, China will soon fall into an oil supply crisis. The economic and trade cooperation between China and Russia in the field of oil and gas can greatly ensure the stability of China's oil and gas supply, promote the diversification of China's oil and gas

import sources, and further enhance China's oil security factor. According to the agreement reached, Russia will steadily supply China with 20 to 30 million tons of oil annually for both oil pipeline projects and railway transportation projects over the next decade. Compared to China's total crude oil imports of approximately 150 million tons in 2010, the potential import volume of 20 to 30 million tons is of great significance in ensuring China's oil security.

The strategic cooperation between China and Russia in oil and gas is beneficial for Russia to integrate into the process of economic integration in Northeast Asia. In recent decades, Russia's Far East and Siberia in Asia have not only been economically disconnected from the Asia Pacific region, but also from neighboring Northeast Asian countries, making it impossible for them to utilize the profits brought by regional division of labor to promote economic development and improve national welfare. Utilizing the abundant natural resources of Siberia and the Far East, actively promoting the integration of Siberia and the Far East into the Northeast Asian economy, and driving the economic development of Siberia and the Far East through bilateral and multilateral cooperation with countries in the Northeast Asian region, is Russia's established economic development strategy for the 21st century. Among the three important countries in Northeast Asia, Japan and South Korea, although they have the most needed funds and technology from Russia, Siberia, and the Far East, and they also aspire to access their abundant natural resources. Both sides have a foundation for economic and trade cooperation. However, due to the significant gap in economic development levels between the two sides, it is easy to form vertical division of labor, putting Russia at a disadvantage in international division of labor and becoming a simple supplier of raw materials. China and Russia not only have strong economic complementarity, but also have similar levels of development. Therefore, promoting bilateral economic and trade cooperation with China, prioritizing the economic integration of Russia's Siberia and Far East regions with China, can form a reasonable international division of labor between the two countries, enabling Russia to achieve maximum integration. The benefits it brings are the only practical choice for Russia to quickly integrate into the economic integration of Northeast Asia. The oil and gas cooperation has a long cycle and a large amount of money, which has a strong

driving effect on trade and investment. It can effectively promote the strategic upgrading of the economic and trade relations between the two countries, shorten the time of China Russia economic integration process, and is currently the most realistic and feasible choice for Russia [62, p. 15].

Establishing a closer oil and gas supply and demand partnership between China and Russia is conducive to achieving long-term friendly economic cooperation and mutual benefit. In 2017, China surpassed the United States to become the world's largest importer of crude oil. In 2018, China surpassed Japan to become the world's largest importer of natural gas. In 2021, China imported 513 million tons of crude oil, with a total amount of 257.331 billion US dollars. By 2022, China has become the world's second largest consumer of oil, with an import of 121 million tons of natural gas and a total amount of 55.81 billion US dollars. With the continuous and stable operation of the China Russia crude oil and natural gas pipeline, as well as the gradual implementation of new oil and gas supply contracts in the future, Russia may firmly hold onto its position as the largest source country for China's crude oil and natural gas pipeline transportation, and bilateral economic and trade cooperation between China and Russia will be further strengthened and expanded.

1.3 China energy demand structure

In 2022, China's GDP accounted for 20 % of the world's total, and its population has also been mentioned. So far, China's energy demand is closely related to population and economic growth, soaring from 12 % of global primary energy in 2000 to 21 % in 2010, currently accounting for 26 % of global annual energy demand. Importantly, China consumes one-third of the world's energy; These developments are crucial for the world's industrial development and technological progress. In the past two decades, China's primary energy supply has almost doubled. This strong growth is primarily driven by coal, which accounts for 58 % of China's primary energy consumption and 54 % of global coal consumption in 2022 [50]. Since 2013, China's energy use has also begun to diversify towards almost all other energy sources, with strong growth in natural gas, hydropower,

nuclear energy, solar photovoltaics, and wind energy. In 2022, China's renewable energy investment accounted for 55 % of the global total investment. Only two Chinese companies account for more than half of the global electric vehicle battery market, with 60 % of electric vehicle sales occurring in China in 2022. Italy also has the world's largest solar and wind power plants. The most significant growth is in solar energy, and the new installed capacity in 2023 alone is expected to be 1.5 times the total installed capacity of solar energy in the United States. However, due to the low utilization efficiency of coal, China's demand for oil, gas, and new energy has been increasing since 2010 [9].

However, this significant progress in renewable energy has not yet squeezed fossil fuels out of China's energy mix: in the coming years, the share of coal and oil will slightly increase, and by 2050, they will gradually decline to 1.5 times their current levels. The predicted energy supply and demand trends for the next few decades are closely related to the population and economic development of the region. China will rely on oil and natural gas for a long time

With the aging population, the decrease in labor force is even greater, which affects productivity and economic growth. The labor market means that wage growth may exceed that of foreign countries. Even with the improvement of automation, a large part of China's manufacturing industry may shift to countries with lower production costs. In the past 20 years, the average annual economic growth rate has been above 8 %, while the per capita gross domestic product has increased by 10 times during the same period. Due to the shift in the above trends and China becoming a more mature economy, the reduction in industrial production activity income and structural difficulties have hindered the growth of domestic demand. It is expected that economic growth will significantly slow down in the next 30 years, with an average growth rate of 2.3 %. Over time, its long-term economic growth rate will be closer to other high-income countries. However, a slowdown in growth does not mean no growth: China's economic growth will shift from high-speed growth to a model of high-quality growth. In the past thirty years, oil has been the second largest contributor to China's energy supply, with its share in primary energy supply increasing from 18 % in 1996 to 21 % in 2022. We predict that this proportion will continue until 2027 and gradually decrease to 11 % by 2050 [50].

In terms of oil, it has been the second largest contributor to China's energy supply in the past thirty years, with its share in primary energy supply increasing from 18 % in 1996 to 21 % in 2022. It is predicted that this proportion will continue until 2027 and gradually decrease to 11 % by 2050. China heavily relies on oil imports to supplement domestic production. In 2022, China's oil production and demand were approximately 4 million barrels per day and 16 million barrels per day, respectively. Due to the annual growth of 5 % in oil demand over the past two decades, the share of imported oil has increased from 37 % to 75 %. Figure 1.7 shows the consumption of oil in recent years. Over the past decade, approximately 50 % of China's imported oil came from Russia and Saudi Arabia. After 2022, the adjustment of oil prices led to a restructuring of China's crude oil imports. According to data from Chinese customs, crude oil imports from Russia increased by 8.2 % in 2022. In 2023, due to the expansion of Russian refineries and the government's relaxation of COVID-19 action restrictions and the reopening of the economy, Russia's crude oil imports to China reached a historic high.

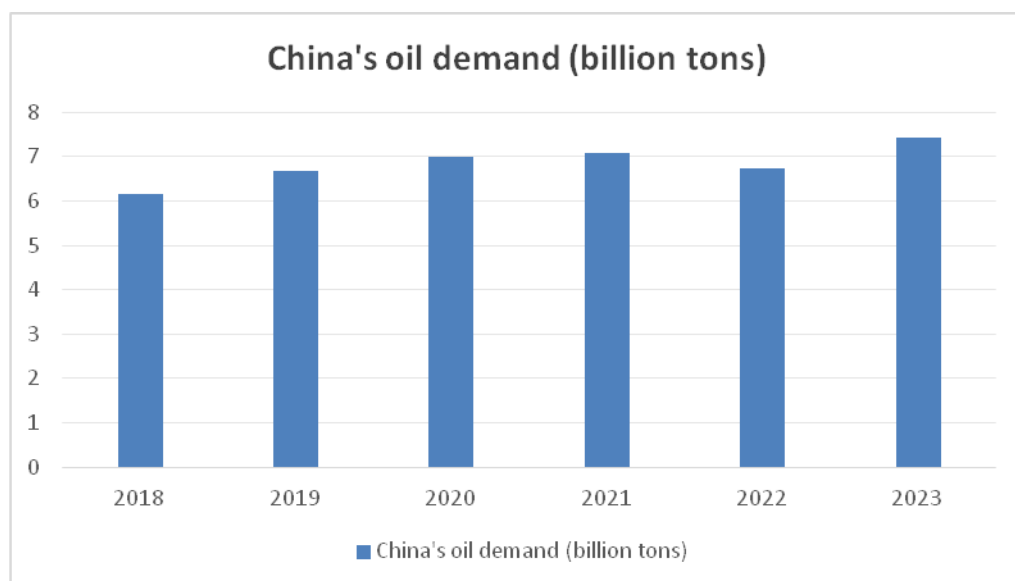


Figure 1.7 – China's oil demand [9]

Due to population and economic growth, the demand for oil continues to grow. As shown in Figure 1.7, from 2018 to 2022, the overall demand for oil showed an upward trend, although there was a temporary decline like in 2022 and 2020. The main reason is that due to the impact of the COVID-19, China's industrial development has stagnated, and

China's oil demand has also declined. As shown in Figure 1.7, the oil demand of the four transportation sectors increased from 615 million tons in 2018 to 743 million tons in 2022, with a compound annual growth rate of 5.8 %. In 2022, the market share of new energy passenger vehicles increased significantly from 14 % in 2021 to 27 %. The second largest demand for petroleum is as a raw material for non energy plastics and non petrochemical production. The demand for petroleum in non petrochemical industries (such as asphalt) has been continuously increasing in the past decade, with petroleum demand doubling. This is mainly due to alternative measures for non energy plastics and non petrochemical raw materials, as well as higher recovery rates.

The third largest sector in the use of oil is the manufacturing industry. China is one of the few manufacturing powers in the world. Starting from the 21st century, with the further development of China's manufacturing industry, the demand for oil in China will further expand, simultaneously maintaining around 9 % of total energy demand. This is not a small amount, as China has a large energy demand and a large base. Oil or its products are also used in construction, electricity, other sectors, and the production of oil itself. Nevertheless, these usage amounts are still significant.

Next is natural gas (natural gas import volume), as shown in Figure 1.8. From 2018 to 2023, China's natural gas consumption increased significantly from 280.3 billion cubic meters to 444.1 billion cubic meters, increasing every year during these six years and maintaining a high-speed growth trend during the pandemic. This is because the surge in China's demand for natural gas is due to government policies such as diversifying energy combinations and reducing air pollution. The arid environment and climate factors are conducive to reducing carbon intensity and improving the combustion efficiency of flue gas, rather than coal. In order to meet the growing demand, China has promoted the construction of a national network of natural gas infrastructure, increasing the total length of long-distance natural gas pipelines by more than 3000 kilometers and increasing gas storage capacity by about 5 billion cubic meters. China has made progress in several large-scale liquefied natural gas projects, including the commissioning of coastal liquefied natural gas receiving stations, and the construction of liquefied natural gas terminals in Beijing Gas and Caofeidian.

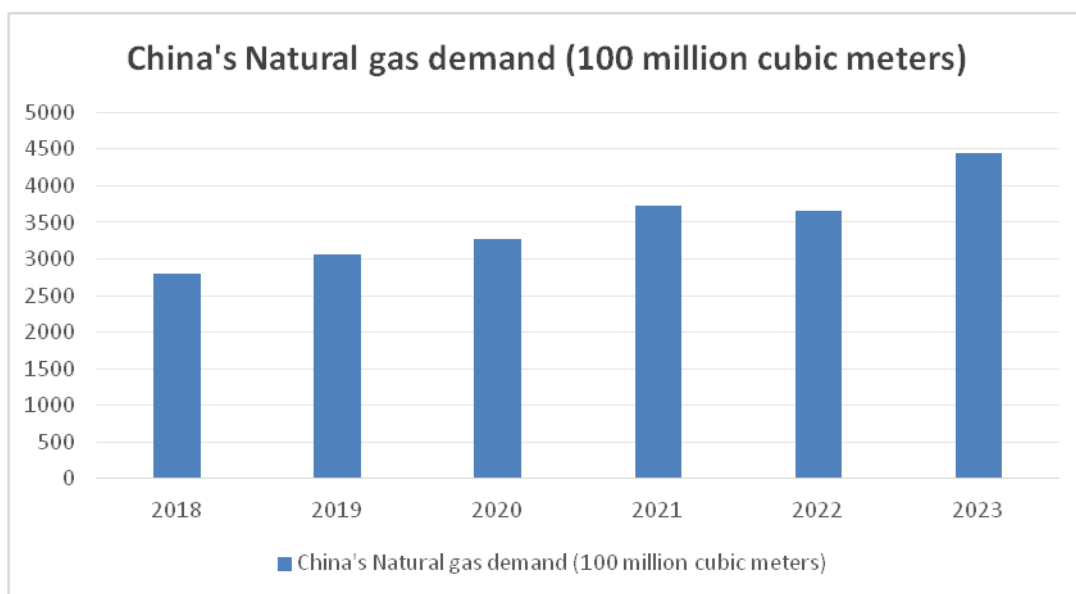


Figure 1.8 – China's natural gas demand [9]

In 2022, China's natural gas demand was 14 EJ. According to the 2023 China Natural Gas Development Report released by the National Energy Administration, natural gas demand increased by 6–7 % in 2023.

Over the years, the usage of different industries has changed. Since 2021, the power sector has surpassed the construction sector as the main user, accounting for 26 % of natural gas consumption in 2022, or 95.2 billion cubic meters. By 2023, the demand for natural gas in the power sector will increase to 11.5466 million cubic meters, mainly replacing coal-fired power generation. However, after this peak, demand is expected to gradually decrease as the proportion of renewable energy in the power sector expands. Some of the self owned uses of the energy sector will be used for the liquefaction and regasification of natural gas for liquefied natural gas transportation. It is expected that natural gas demand in China will decrease in the future, due to its main application in shipping and the decrease in demand due to the increase in hydrogen derivatives such as ammonia and electronic fuels.

The general decline in natural gas usage is evident in specific sectors, with an increasing demand in the construction and non energy sectors, mainly due to the gas substitution of traditional biomass in various applications. Similarly, in the non energy

sector, demand will also increase due to the increased production of ammonia and methanol as raw materials. As shown in Figure 1.8, China's natural gas production has increased in the past twenty years. According to the 2023 China Natural Gas Development Assistance Report, China has increased its natural gas production by over 10 billion cubic meters for six consecutive years. In 2022, China produced 220 million cubic meters of natural gas, an increase of 6 % from 2021. In 2023, the Comprehensive Department of the National Energy Administration implemented the newly revised Natural Gas Utilization Policy to promote the high-quality development of the natural gas industry. Although China's strategic focus is on further developing natural gas infrastructure and improving domestic production capacity, its demand for natural gas still exceeds its domestic production capacity. For example, in 2022, over 40 % of primary natural gas imports. Most of China's imports come from the northeast of the Eurasian continent. In 2022, the import volume of pipelines in the northeast of Eurasia increased by 7.8 % year-on-year, reaching 62.7 billion cubic meters. The import of oil from Russia increased from 10.4 billion cubic meters to 16 billion cubic meters, an increase of 54 %. This is a driving force for this growth, as Russia continues to increase its transportation to China through the Siberian power pipeline, and Russia will strengthen its natural gas transportation with China. Until 2016, China's imports of liquefied natural gas mainly came from Southeast Asia and the Middle East. Since 2017, Australia has been a major supplier of liquefied natural gas to China. However, in the past five years, due to global geopolitical reasons, trade between China and Russia has increased, resulting in more natural gas trade between the two countries.

Chapter 2 Analysis of Sino-Russian oil and gas cooperation

2.1 Oil trade between China and Russia

Since the 11th century, China's oil imports have continued to grow, with an average annual import volume of 3.683 million barrels per day, an increase of 259.32 % compared to the import volume from 1993 to 2000. In 2001, the scale of China's oil imports reached 1.788 million barrels per day. In 2002, the scale of China's oil imports increased to 1.987 million barrels per day. In 2003, it increased to 2.643 million barrels per day, becoming the world's second largest oil consumer and third largest oil importer; In 2004, the import volume of oil increased to 3.445 million barrels per day, and the net import volume of oil exceeded 100 million tons. In 2007, the daily production increased to 417200 barrels. In 2009, production increased to 510000 barrels per day. In 2010, the scale of China's oil imports increased to 5.886 million barrels per day, which was 8.68 times the import volume in 1993 and 3.29 times the import volume in 2001. The proportion of world oil imports has increased to 10.63 %. From 2011 to 2022, China's oil imports continued to maintain a rapid growth trend, with an average annual oil import scale of 966200 barrels per day, an increase of 842.63 % compared to the import scale from 1993 to 2000 and an increase of 162.34 % compared to the export scale from 2001 to 2010. In 2011, China's oil imports reached 629500 barrels per day, about 1.6 times that of India's oil imports and half that of the United States, with an external dependence rate of 55.9 %. In 2012, the scale of China's oil imports reached 667500 barrels per day. In 2014, the production increased to 739800 barrels per day. In 2015, it increased to 833300 barrels per day, with a dependence on foreign imports exceeding 60 %. In 2016, the production increased to 921500 barrels per day; In 2017, the import volume increased to 1.0241 million barrels per day, surpassing the United States for the first time. In 2018, the daily production increased to 1.1028 million barrels, and the dependence on foreign imports exceeded 70 %. In 2019, the production increased to 1.1873 million barrels per day. In 2020, it increased to 1.3032 million barrels per day, and the dependence on foreign imports reached 73.6 %, an increase of 18 percentage points from the past 10 years. In 2021, the import volume has

decreased to 12.724 million barrels per day. In 2022, the scale of China's oil imports continued to decline, reaching 12.156 million barrels per day, accounting for 17.66 % of world oil imports, and the dependence on foreign imports decreased to 71 %. The import volume was 17.93 times that of 1993, 6.79 times that of 2001, and 1.93 times that of 2011; The import volume is 2435 billion yuan, an increase of 41.4 % compared to 2021, accounting for 13 % of the total import volume of goods for the year, and continuing to maintain its position as the second largest imported commodity after chips. As shown in the figure, in 2023, it reached a historic high as shown in figure 2.1. China has also become the second largest consumer of oil in the world as shown in figure 2.2.

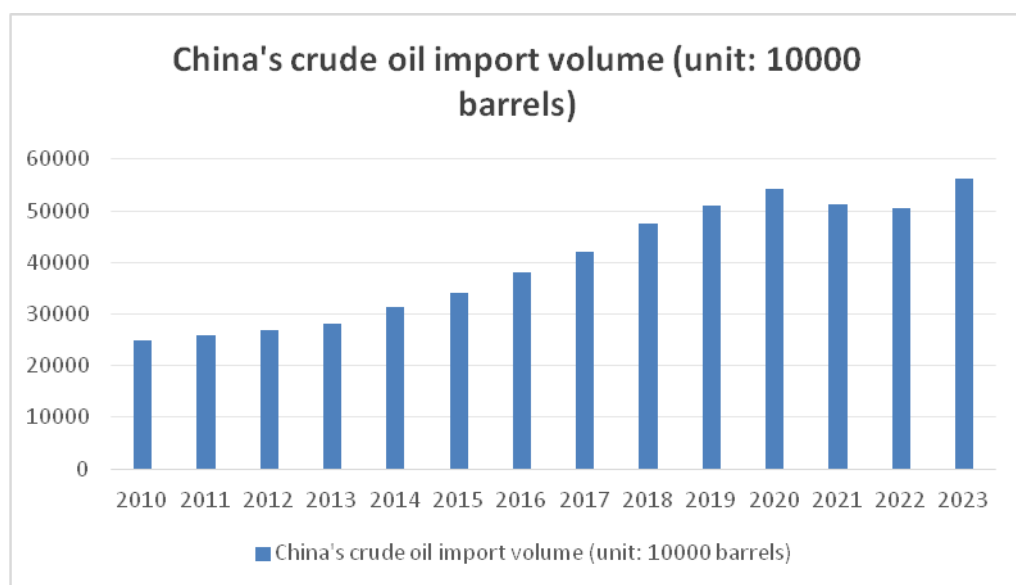


Figure 2.1 – 2010–2023 China's crude oil import volume [4]

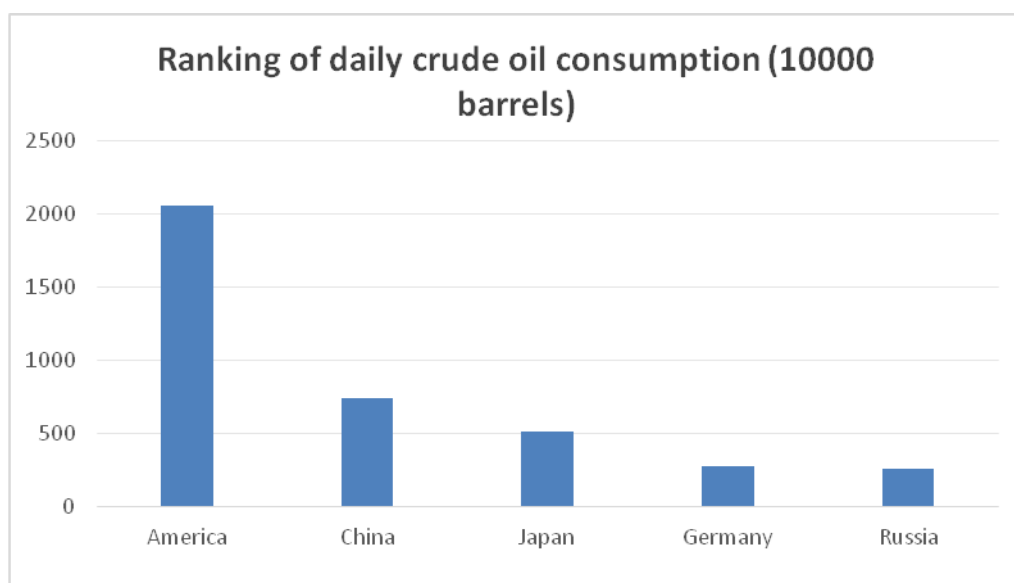


Figure 2.2 – Ranking of daily crude oil consumption (10000 barrels) [4]

From the perspective of import sources, the proportion of China's oil imports to the Middle East in 2022 was 52.70 % (including Saudi Arabia at 17.22 %, Iraq at 10.92 %, the United Arab Emirates at 8.42 %, and Kuwait at 6.55 %). The Commonwealth of Independent States accounts for 18.14 % (Russia accounts for 16.96 %). 9.15 % in West Africa; 7.87 % in the Asia Pacific region; 7.34 % in Central and South America; 2.34 % in North America; Europe 1.61 %; North Africa is 0.77 %. However, with the development of the Silk Road, China's energy imports are more inclined towards countries along the Silk Road. The Middle East is not among the countries along the Belt and Road, so the total oil trade volume of the Middle East countries is gradually decreasing, and the oil trade of the countries along the Belt and Road led by Russia is gradually increasing (figure 2.3).

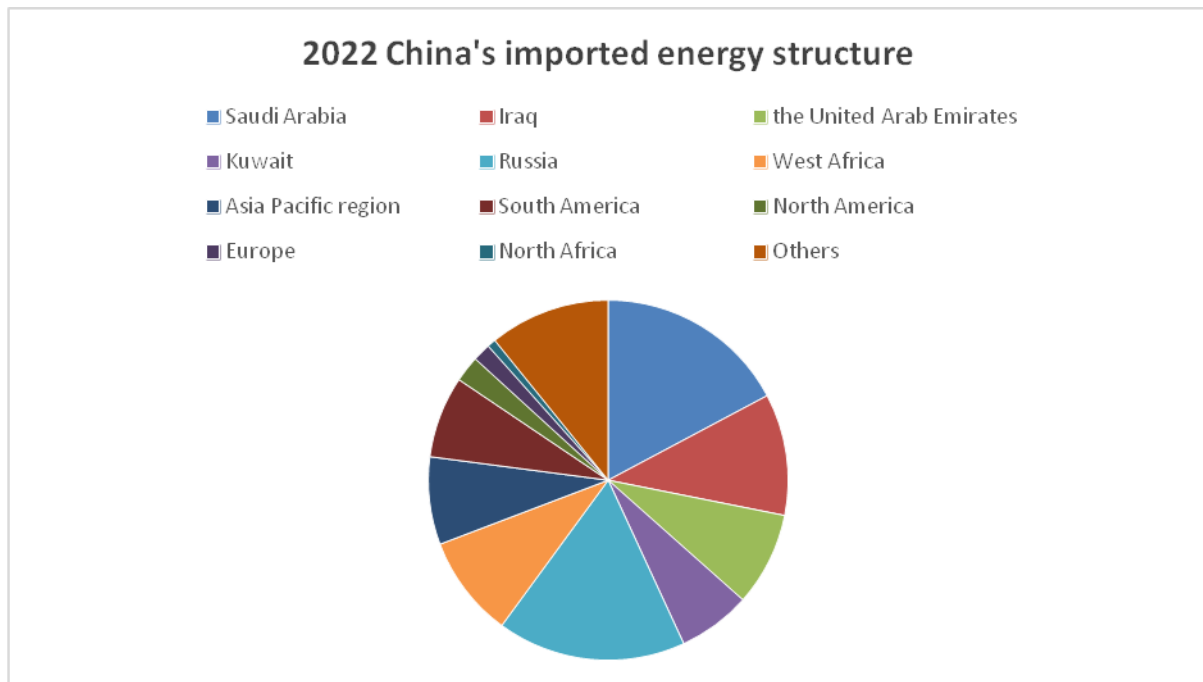


Figure 2.3 – 2022 China's imported energy structure [9]

The energy cooperation between China and Russia in the new era, implementing green, low-carbon, and sustainable development, has become a global consensus and further transformed into global action. China and Russia share a common position on the development prospects of renewable energy, believing that the development of renewable energy is the most important component in achieving the United Nations Sustainable

Development Goals. China has a complete industrial chain for research and development, production, and manufacturing of hydropower, wind power, and photovoltaic power generation equipment. Its technological level and industrial scale are world leading, with high cost-effectiveness of equipment products and strong comprehensive competitiveness. Russia has abundant renewable energy resources and enormous development potential. The Russian market can become an important bridge for China's renewable energy industry to enter the European and even global markets.

Energy cooperation has always been the most important, fruitful, and extensive field of practical cooperation between China and Russia, with a solid foundation. In 1996, the governments of China and Russia signed the Sino Russian Joint Declaration and the Sino Russian Joint Energy Cooperation Agreement, marking the beginning of Sino Russian energy cooperation. After more than 20 years of development, the pace of energy cooperation between China and Russia has gradually accelerated, and the scope of cooperation has expanded from oil and gas to coal, nuclear energy, and other aspects. Faced with the dual test of global pandemic fluctuations and weak economic recovery, China Russia energy cooperation is developing against the trend. In 2021, China's energy products imported from Russia increased by 47.4 % year-on-year, and Russia remains China's largest source of energy imports. In recent years, oil trade between China and Russia has been frequent, and the scale of oil trade between China and Russia has gradually expanded. As shown in the figure below, due to Western sanctions and the huge demand for crude oil from China's industrial development, Russia has expanded its oil trade with China, exporting 59.8 million tons of oil to China in 2017. In 2018, China exported 71.49 million tons of oil, an increase of 19.56 % compared to 2017. In 2019, China imported 75.853 million tons of oil from Russia. Due to the rise in oil prices, the growth in 2019 was not significant compared to 2018. In 2020, China imported 83.57 million tons of oil from Russia and 79.64 million tons in 2021. It is also due to the impact of the COVID-19 epidemic and the rise in the price of Russian crude oil, which led to the reduction of Russian crude oil imports. In 2022, China imported 86.2 million tons of crude oil from Russia, and 107 million tons of oil from Russia in 2023. Since the end of the epidemic, China's industry has recovered, and the growth rate of China's oil industry has

reached 24.12 % this year, with an overall increase in trade volume. The figure below shows the scale of Russia's oil exports from China in recent years (figure 2.4).

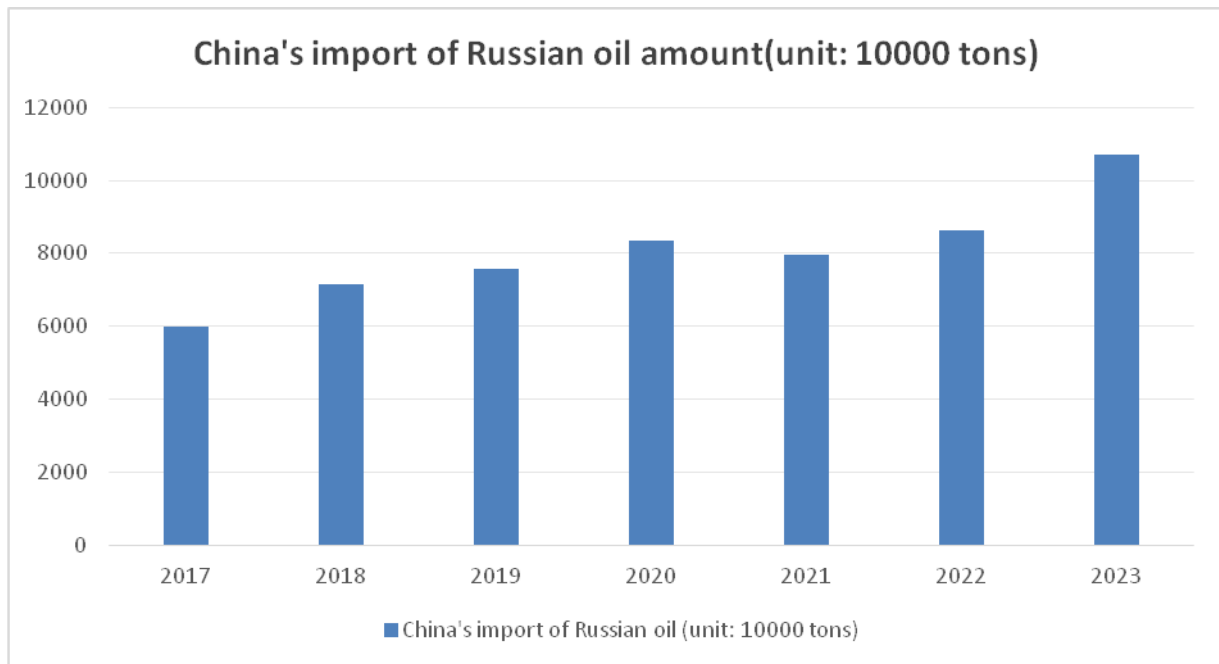


Figure 2.4 – China's import of Russian oil amount [5]

China mainly adopts four trading methods for importing oil from Russia. The first type is production sharing, which means that China and Russia jointly invest in the extraction of oil, and share a portion of the extracted oil between China and Russia according to the contract. However, this trading method now accounts for a relatively small proportion in the bilateral trading methods.

The second type is a long-term supply contract, which means trading at the same price for a long time, regardless of changes in international oil prices. This trading method has certain drawbacks. When international oil prices are high, the two countries may have differences due to price factors, so this trading method is currently less used [35, p. 24].

The third trading method is loan for oil, which mainly appeared in the trade between the two countries after the financial crisis. Russia's domestic economy was severely damaged after the financial crisis, and it urgently needed funds to alleviate the impact of the financial crisis on the domestic economy. The loan for oil model emerged, becoming the main trading method adopted by the two countries at that time. In 2008, China and

Russia signed an agreement, in which China provided Russia with a loan of 25 billion US dollars starting from 2008. Russia transported a total of 300 million tons of oil to China for 20 consecutive years [35, p. 26].

The fourth type is two trading methods, spot and futures, which are publicly sold internationally. Spot trade refers to China directly obtaining pre extracted oil from Russia. With the continuous development of trade between China and Russia and the continuous innovation of trading methods, spot trade has become the most important trading method between China and Russia due to its advantage of simple trading [35, p. 27].

In the future, the two countries should adapt to changes in the situation and the requirements of the times, and expand energy cooperation on a larger scale, deeper level, and wider field. On the existing basis, we will continuously explore new cooperation models and paths, deepen upstream, midstream, and downstream cooperation in the traditional energy industry chain, and jointly address the structural energy shortage and cost increase issues faced by energy transformation. Actively tap into the potential for green and low-carbon cooperation, strengthen cooperation in fields such as photovoltaics, wind power, hydrogen energy, energy storage, and green finance, and lead the global energy green and low-carbon transformation.

Secondly, the global strategy of China Russia petroleum has historical significance. As early as the Cold War, China did not want Russia to develop its oil and gas resources in the Far East, nor did it expect Russia's resources. At that time, China's East Asian policy focused on improving relations with Japan and striving to attract more funds from Japan to accelerate the development of its oil and gas industry [28, p. 15].

But since the 1990s, with the continuous expansion of China's oil gap and the gradual opening up of Russia's Far East region, the complementary relationship between China and Russia's oil supply and demand has become the basic starting point of China Russia's oil and gas strategic cooperation. Russia's proven oil reserves account for 5 % of the world's total reserves, ranking 8th in the world.

Due to Russia's low exploration level (only 8–10 % of its oil resources are located in Siberia, the Far East, and the Arctic), a large amount of oil resources are buried underground waiting to be discovered. Its ultimate conventional recoverable oil resources

may reach 36.2 billion tons, second only to Saudi Arabia and ranking second in the world. Most of Russia's proven oil resources are distributed in West Siberia, and there are also many proven reserves in the Far East and East Siberia [29, p. 11].

These three regions are very attractive to China, especially because they are all very close to China, which makes oil cooperation between China and Russia economically feasible. Not only that, Russian oil also has an advantage, which is that the two countries are adjacent and can be transported to China without passing through a third country.

At present, China Russia oil trade mainly adopts three transportation modes. The first type is sea transportation, which has a large volume of oil transportation and relatively low freight rates. In 2016, China imported 29 million tons of crude oil from Russia by sea. Due to the continuous use of sea transportation in oil transportation in recent years, Russia has begun to attach importance to the construction of sea ports, and more and more oil is being transported to China by sea.

The second type of railway transportation, which transports oil by rail, is fast and has a large volume, with less time and weather restrictions. Compared to sea transportation, it also has its own advantages and is a relatively convenient mode of transportation. Most of the oil from China and Russia is transported from Russia to China through two railways. One is from Irkutsk in Russia to manzhouli in China, and the other is from Omsk via Kazakhstan in Xinjiang, China.

The third type is pipeline transportation, which uses pipelines to transport large amounts of oil and has high safety. The first China Russia crude oil pipeline, from Kovorodno in Russia to daqing in China, officially transported crude oil to China in early 2011. The second line of the China Russia oil pipeline was also put into use in 2018. With the continuous improvement of crude oil pipelines between China and Russia in recent years, pipeline transportation is mainly used in the oil trade between the two countries, so the proportion of using railway transportation and sea transportation is small. Pipeline transportation not only innovates the previous transportation methods for transporting oil between the two countries, but also increases the safety of transporting oil.

Compared with Kazakhstan's pipeline for transporting oil to the east, the Russia China pipeline is not affected by the instability of third country situations, and the length

of the pipeline can be shortened by more than half, with much lower construction and transportation costs. In addition, for China, Russia, as a neighboring country to the north, will always be the first element that China's national security must consider. Especially as China faces increasing security pressures from the east and southeast, utilizing Russia's power to maintain a balance of power over certain countries in the Asia Pacific region is of great significance for China's survival and development. From this perspective, strengthening oil and gas cooperation with Russia is also of great significance, even surpassing oil and gas cooperation with the Middle East.

China and Russia are working hard to expand their oil cooperation and strive to quickly transport Russian oil to China through oil pipelines. On September 7, 2001, the leaders of China and Russia officially signed the General Agreement on Feasibility Study of the China Russia Oil Pipeline in St. Petersburg.

According to this agreement, China and Russia plan to lay a 2400 kilometer oil pipeline from Angarsk to Daqing, which will begin operation in 2005. After the pipeline is completed, it is expected to supply China with 20 to 30 million tons of Russian crude oil annually.

It can be seen that China and Russia have a strong desire to expand oil cooperation and have certain development potential. At the recent meeting of the Russia China Energy Cooperation Subcommittee held in Moscow, the Russian Energy Minister stated that large-scale cooperation projects are still the direction of our cooperation. The starting point of the Russian Federation government is to implement these projects in a diversified manner. The ultimate goal of diversification is to supply oil and gas to China.

But it should also be noted that while strengthening oil cooperation with Russia, investors have also encountered problems such as excessive tax burden on Russian investment enterprises, which makes it difficult for investors to bear and seriously dampens their enthusiasm; In the bilateral talks between China and Russia, there is still a lack of clear game rules, market rules, and mutual trust, resulting in the potential for oil and gas cooperation between China and Russia not being fully explored [31, p. 41].

In order to further tap into the potential of China Russia oil and gas cooperation, China not only needs to increase its support for China Russia oil and gas strategic

cooperation, make every effort to coordinate with Russia, create a good investment environment for Chinese investors, but also continue to promote the development of China Russia strategic cooperation partners from a strategic perspective. This is an important prerequisite for China's sustained and secure acquisition of Russian oil and gas.

From the current situation, China Russia relations have a solid political foundation, which is the establishment of a strategic partnership between China and Russia. However, unfortunately, this relationship lacks substantial content support, which means that economic and trade relations are seriously lagging behind political relations.

The bilateral trade between China and Russia is not only limited in quantity, but also highly volatile and unstable. Trade relations are mainly based on commodity trade, with ancient barter trade accounting for a certain proportion. There are very few scientific and technological cooperation and production cooperation that play an important role in stabilizing economic and trade relations. In today's world where the economy is moving towards regional grouping, global integration, economic politicization, and political economy, and in the favorable environment of the continuous development of China Russia strategic partnership, if there is no breakthrough in China Russia economic and trade relations.

In the long run, this will not only be detrimental to the strategic partnership between China and Russia, but also have a more serious impact on future oil and gas cooperation between China and Russia. If there is no mutual infiltration of economic interests, political enthusiasm will be difficult to maintain. Therefore, we should strive to strengthen the foundation of China Russia relations and increase efforts to promote bilateral economic and trade cooperation.

Since the Belt and Road initiative was put forward, the speed of win-win cooperation between China and Russia has become faster and faster: cross-border energy channel construction, energy infrastructure interconnection... The energy cooperation model is constantly innovating. The stable operation of major energy supply projects such as the China Russia crude oil pipeline, the China Russia East natural gas pipeline, the Yamal liquefied natural gas project, and the Tianwan nuclear power plant 1–4 units has

provided sustained and reliable impetus for the growth of energy trade between the two countries [45, p. 3].

The China Russia crude oil pipeline is an important channel for oil and gas imports from Northeast China. The starting point of the China Russia crude oil pipeline is the Skovorodino branch station of the East Siberian Pacific crude oil pipeline in Russia. After crossing Heilongjiang, reach Mohe in Heilongjiang Province, passing through 13 counties and cities in Heilongjiang Province and Inner Mongolia Autonomous Region. The endpoint is the first stop of the Mohe crude oil pipeline from China to Daqing. The pipeline is approximately 63.4 kilometers long within Russia, and the Heilongjiang crossing section is 1.5 kilometers long. The Mohe to Daqing section in China has a total length of 965 kilometers, and the first phase of the project is designed with a transportation capacity of 15 million tons per year, with a contract period of 20 years [49, p. 104].

The China Russia crude oil pipeline project is one of China's four major energy strategic channels. On April 27, 2009, construction began on the Russian section of the China Russia crude oil pipeline. On May 18th, construction of the Chinese section of the pipeline began. On January 1, 2011, the pipeline was officially put into production. In May 2017, China imported over 100 million tons of crude oil from Russia through the China Russia crude oil pipeline. After the completion of the pipeline, it operated smoothly and the scale of crude oil trade between China and Russia continued to expand. According to statistics, in 2016, Russia became China's largest source of crude oil imports, with China importing 52.48 million tons of crude oil from Russia. In 2017, China imported 59.7 million tons of crude oil from Russia. The dual track China Russia crude oil pipeline is a major project to deepen cooperation in the energy sector between China and Russia. On August 13, 2016, the construction of the second line of the China Russia crude oil pipeline with a total length of 941.8 kilometers and a diameter of 813 millimeters began. This pipeline project is laid in parallel with the vast majority of the Sino Russian crude oil pipeline desert line, which was put into operation in 2011. The starting point is the Mohe Oil Pipeline Station in Mohe County, Heilongjiang Province, passing through two provinces and regions of Heilongjiang and Inner Mongolia, and the endpoint is the

Linyuan Oil Pipeline Station in Daqing City, Heilongjiang Province. Increase in oil transportation volume.

As the second major land-based energy transportation channel between China and Russia, following the China Russia crude oil pipeline, the completion of the large order for the China Russia East Line undoubtedly becomes another important achievement in deepening the comprehensive strategic partnership. The total value of the contract exceeds 400 billion US dollars.

On November 29, 2021, the third China Russia Energy Business Forum was held in Beijing through a combination of online and offline methods. During the forum, a total of 15 outcome documents were signed and the Sino Russian Energy Cooperation Investment Guidelines (Russian Part) were released, providing comprehensive information service guidance for Chinese enterprises to conduct energy business in Russia, including legal systems, regulatory policies, industry prospects, business processes, and cooperation opportunities.

2.2 Natural gas trade between China and Russia

The natural gas trade between China and Russia is mainly divided into two parts, natural gas and liquefied natural gas. China's natural gas trade accounts for the majority of its energy structure. Among fossil fuels, natural gas has obvious clean and low-carbon characteristics, which is of great significance for promoting high-quality economic development and energy transformation in China.

With the transformation of China's economy and energy, natural gas imports have become a new normal. In the past decade, China's natural gas import scale, import methods, and import sources have undergone significant changes. Secondly, the Far East region of Russia is rich in oil and gas resources, and China has embarked on a scientific path of green and healthy development. Therefore, China's demand for natural gas has significantly increased, while Russia has a large surplus of natural gas, which can promote the development of natural gas in both countries [33, p. 13].

At present, China has entered Xinjiang to the eastern region from Central Asia,

Heilongjiang to the southeastern region from Russia, Yunnan to Sichuan and Chongqing from Myanmar, and the four major natural gas import channels in the eastern sea, forming a diversified natural gas import and supply pattern in the northwest, northeast, southwest, and eastern sea areas.

The overall situation of China's natural gas imports and the cooperation between China and Russia in natural gas. In 2003, China began importing natural gas, but the import scale was very small. China still has a high proportion of coal.

In 2006, China's natural gas imports gradually achieved economies of scale. Between 2006 and 2009, China's natural gas imports mainly relied on sea transportation to import liquefied natural gas from Australia, with a relatively single source and method of import. In the past decade, China's natural gas imports have gradually shown diversified characteristics, gradually achieving a synchronous development pattern of pipeline natural gas and liquefied natural gas import trade. During the 12th Five Year Plan period, China's natural gas import channels began to take shape, and during the 13th Five Year Plan period, they were further improved, forming four major import strategic channels: the East China Sea, the China Myanmar Southwest Pipeline, the Central Asia Northwest Natural Gas Pipeline, and the China Russia Northeast Pipeline. Overall, this ensures a stable supply of natural gas. In recent years, China has increased its efforts in air pollution control and actively promoted the coal to gas project in some key areas and industries. Millions of households and industrial facilities have changed their energy consumption patterns, replacing coal with clean natural gas and significantly improving the ecological environment. Due to limited domestic natural gas production capacity in China, it is difficult to meet the strong domestic consumption demand. Therefore, large-scale import of natural gas has become an inevitable choice to solve the shortage of natural gas supply and demand. In 2011, China's natural gas imports reached 30.5 billion cubic meters, and since then, the import scale has continued to increase. In 2012, China's natural gas imports increased to 40.8 billion cubic meters; In 2013, it increased to 51.5 billion cubic meters; In 2014, it increased to 57.5 billion cubic meters; In 2015, it increased to 59.4 billion cubic meters; In 2016, it increased to 73.5 billion cubic meters; In 2017, it increased to 92.8 billion cubic meters. While continuously increasing natural gas imports, China's

dependence on foreign natural gas imports is constantly increasing, posing new challenges to China's energy security situation. In 2018, China's natural gas imports increased to 121.3 billion cubic meters, and its dependence on foreign imports reached 44.0 %. In 2019, it increased to 132.5 billion cubic meters, and although the dependence on foreign imports slightly decreased, it remained at a high level of 43.3 %. In 2020, it increased to 139.1 billion cubic meters, and the dependence on foreign imports remained at a level of 41.7%. In 2021, it reached 163.1 billion cubic meters, with a historical high of 44.3 % dependence on foreign imports. In 2022, China's natural gas imports decreased to 151.6 billion cubic meters, a decrease of 7.05 % compared to 2021. Its proportion in world natural gas trade has reached 15.65 %, but its dependence on foreign imports has decreased to 40.1 % (figure 2.5).

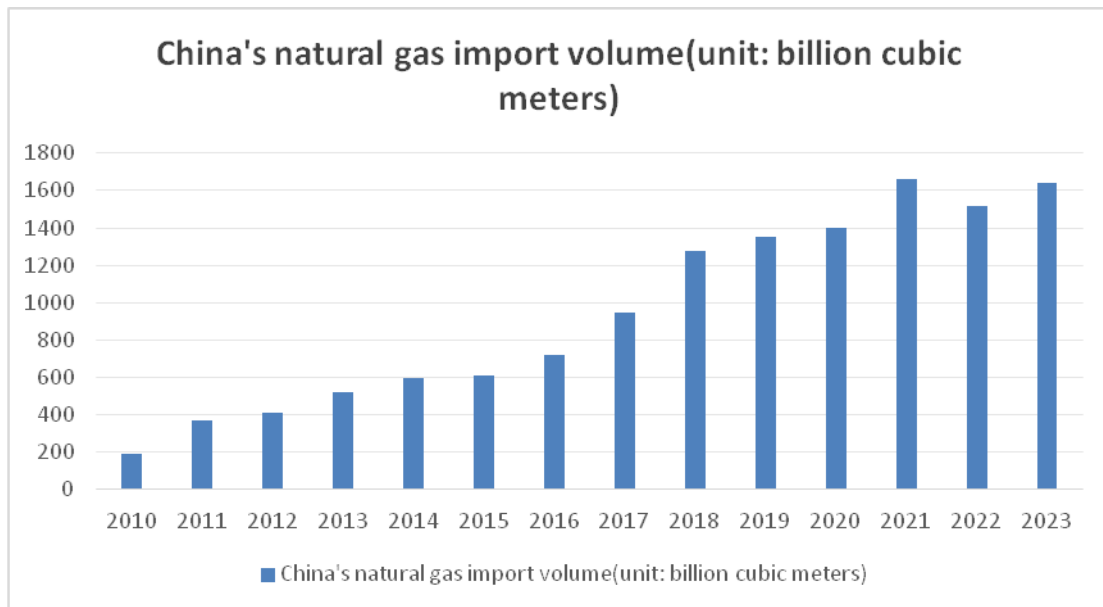


Figure 2.5 – 2010–2023 China's natural gas import volume [9]

However, if natural gas is converted to weight units, the increase or decrease in China's natural gas imports may differ to some extent from the above description. According to data from the General Administration of Customs, China imported 109.25 million tons of natural gas in 2023, a decrease of 9.9 % compared to the same period last year. Among them, the import of liquefied natural gas was 63.44 million tons, a decrease of 19.5 % compared to the same period last year. Pipeline natural gas imports reached

45.81 million tons, an increase of 7.8 % compared to 2022. The Russia-Ukraine conflict has led to changes in the geopolitical pattern, the international natural gas price has repeatedly hit new highs, domestic natural gas importers have reduced the import of liquefied natural gas, coupled with many complex factors such as the resale of some resources in the long-term natural gas trade agreement to Europe, which has led to the decline of China's natural gas import scale. From the perspective of natural gas import sources, China's main natural gas importing countries currently include Australia, Turkmenistan, Russia, the United States, Qatar, Uzbekistan, Kazakhstan, and Myanmar. The import sources show obvious diversification characteristics, and a diversified import pattern has been basically established. Compared with pipeline natural gas imports, liquefied natural gas imports are not constrained by long-distance pipeline infrastructure construction, have flexible operations, and are easy to configure. They only need to pass through the receiving station to complete unloading, storage, and distribution functions. In addition, the construction period of receiving stations is usually shorter, making it easier to adjust supply and demand fluctuations. Therefore, importing liquefied natural gas has become the main supply force for China's winter market. China's import of liquefied natural gas is generally based on signing long-term trade agreements, with a pricing method of no collection, no payment+offshore price. China has shown a certain high demand for natural gas [4].

At present, China has formed a trade pattern with Russia, Myanmar, and Central Asia as the source countries for pipeline natural gas imports.

In 2016, all four routes of the China Central Asia natural gas pipeline were completed, marking a significant connection of the Northwest China pipeline natural gas channel. Since 2018, China has been importing pipeline natural gas from Russia with an annual transportation capacity of 38 billion cubic meters, forming an import path for pipeline natural gas in the northeast direction of China. The operation of the China Russia natural gas pipeline marks the formation of a diversified trade pattern in China, with Russia and Myanmar as the sources of pipeline natural gas imports, reducing the risk of offshore natural gas imports. In the past decade or so, China's pipeline natural gas imports have generally shown a gradual increase trend. In 2011, China's pipeline natural gas

imports reached 13.6 billion cubic meters, and have since maintained a continuous growth trend. In 2012, China's pipeline natural gas imports increased to 20.7 billion cubic meters. In 2013, it increased to 26.4 billion cubic meters. In 2014, it increased to 30.2 billion cubic meters. In 2015, it increased to 32.4 billion cubic meters. In 2016, it increased to 36.7 billion cubic meters. In 2017, it increased to 39.9 billion cubic meters. In 2018, it increased to 47.8 billion cubic meters and then began to decline. In 2020, it decreased to 45.1 billion cubic meters and then rebounded again. In 2021, it rebounded to 53.2 billion cubic meters. In 2022, China's pipeline natural gas imports increased to 58.4 billion cubic meters, 4.29 times the import volume in 2011. The proportion of natural gas imports in the world's pipelines has reached 13.71 %. From the perspective of import source structure, in 2022, Turkmenistan accounted for 56.24 % of China's pipeline natural gas import structure, the Russian Federation accounted for 25.13 %, Kazakhstan accounted for 7.52 %, Myanmar accounted for 6.84 %, and Uzbekistan accounted for 4.27 %. As shown in figure 2.6.

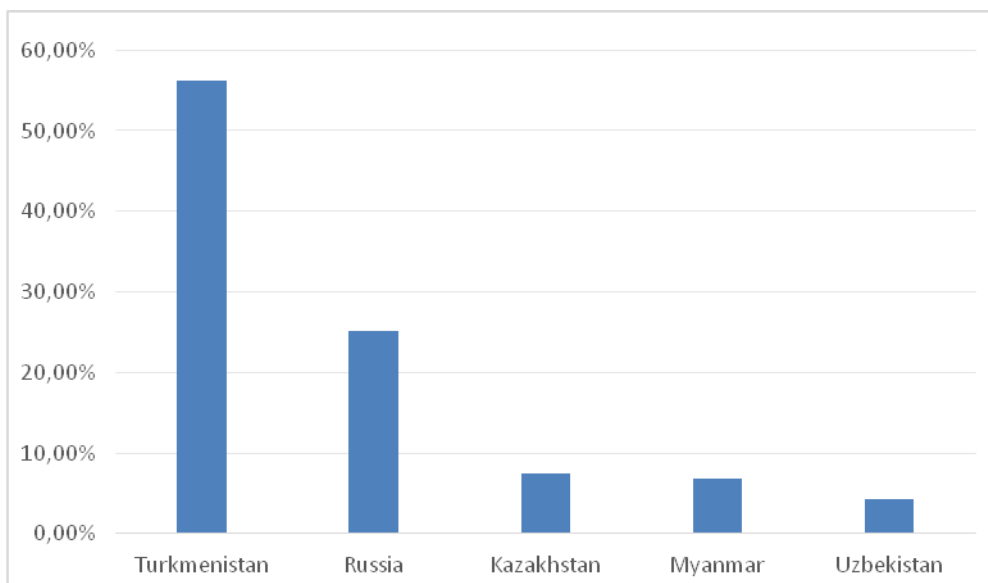


Figure 2.6 – 2023 China's natural gas import volume [9]

Among them, imports from Russia increased significantly, with a year-on-year increase of 154 % compared to 2021. Pipeline natural gas has become an important channel for trade between China and Russia, and China's infrastructure exports have led to a continuous increase in the number of transportation pipelines between China and Russia, resulting in lower accident rates. Due to sanctions from Western countries, Russia is also

more willing to export natural gas to countries such as China and India in response to Western sanctions.

Russia is one of the countries with the richest natural gas resources and the strongest production and export capabilities in the world. Its traditional export target is Europe, but in recent years, Russia's position in the European natural gas market has been repeatedly threatened. So Russia is eager to open up a natural gas market to the Asia Pacific region, especially China.

Russia is an active supporter, an important participant and a key partner of the Belt and Road construction. China Russia natural gas trade will not only drive the development of Russia's energy industry, but also provide China with a more diversified supply channel of imported LNG, which will help accelerate the optimization of China's energy structure. With the promotion of the Belt and Road strategy, China and Russia have made a series of new achievements in natural gas cooperation, and the prospect of practical cooperation is increasingly broad.

Russia is continuously refreshing the amount of natural gas it delivers to China, and there is still a lot of potential for future natural gas cooperation between the two countries. China's rapidly growing demand for oil and natural gas matches Russia's massive reserves in both.

Firstly, as mentioned earlier, China has a relatively large demand for natural gas. According to the prediction of the National Energy Administration of China, it is expected that the proportion of natural gas in China's energy structure will increase to 14 % by 2050. Currently and for a long period of time in the future, China's demand for natural gas will maintain a steady growth trend. According to Sinopec's forecast, the current growth in natural gas demand in China is still dominated by recovery. From January to September 2023, China's natural gas supply scale was 291.4 billion cubic meters, a year-on-year increase of 7.7 %. Among them, Russia's import of natural gas from China has increased compared to 2022, ranking second among China's natural gas importing countries [9].

Secondly, Russia is a reliable natural gas supplier. From a territorial perspective, China's most advantageous partner is Russia. Perhaps this is the only country where China can directly, quickly, and without transferring large amounts of energy through other

countries. The main characteristic of cooperation in the natural gas field between China and Russia is undoubtedly that Russia has favorable conditions for exporting natural gas, and China's future economic development requires reliable natural gas suppliers. For Russia, Gazprom has three demands for cooperation on the Siberian Power pipeline [12, p. 17].

At first, balance the pressure from Europe. The shale gas revolution in the United States and the development of global trade in liquefied natural gas (LNG) have posed challenges to Russia's long-term contracts in Europe. With the emergence of the Russia-Ukraine conflict, Russia and Europe began to diverge in energy cooperation. In order to get rid of Russia's energy constraints, the EU strives to stop using Russian gas in 2027. Although the rise in natural gas prices in the short term can compensate for the losses caused by the decline in export volume, the huge long-term impact cannot be ignored. Therefore, Russia needs to plan ahead and find new reliable partners. Russia can leverage its long-term contract with China to balance the pressure on Europe.

Secondly, balance competition from Central Asian countries. With the promotion of diversified natural gas export strategies among Central Asian countries, Russia's position in the Central Asian natural gas market has declined. Russia needs to balance the influence of Central Asian countries in exporting to Europe and Asia through cooperation with China [51, p. 16].

Thirdly, develop the economy of the Far East region. Gazprom bears the social responsibility of domestic regional economic growth, and developing the Far East is Russia's national strategy. The settlement of large-scale natural gas pipeline projects in the Far East is obviously crucial for the development of the region.

In recent years, the natural gas trade between the two countries has steadily increased. The data shows that from 2020 to 2023, a large amount of natural gas was transported through the Eastern Gas Pipeline (the Siberian Power natural gas pipeline). In 2020, 4 billion cubic meters of natural gas will be supplied to China. Due to the impact of the COVID-19 epidemic, China's domestic demand for natural gas will be small in that year. From 2021 to 10 billion cubic meters, from 2022 to 15.5 billion cubic meters, and from

2023 to 20 billion cubic meters. According to the plan, the gas transmission capacity of the pipeline will reach 38 billion cubic meters by 2025 as shown in figure 2.7.

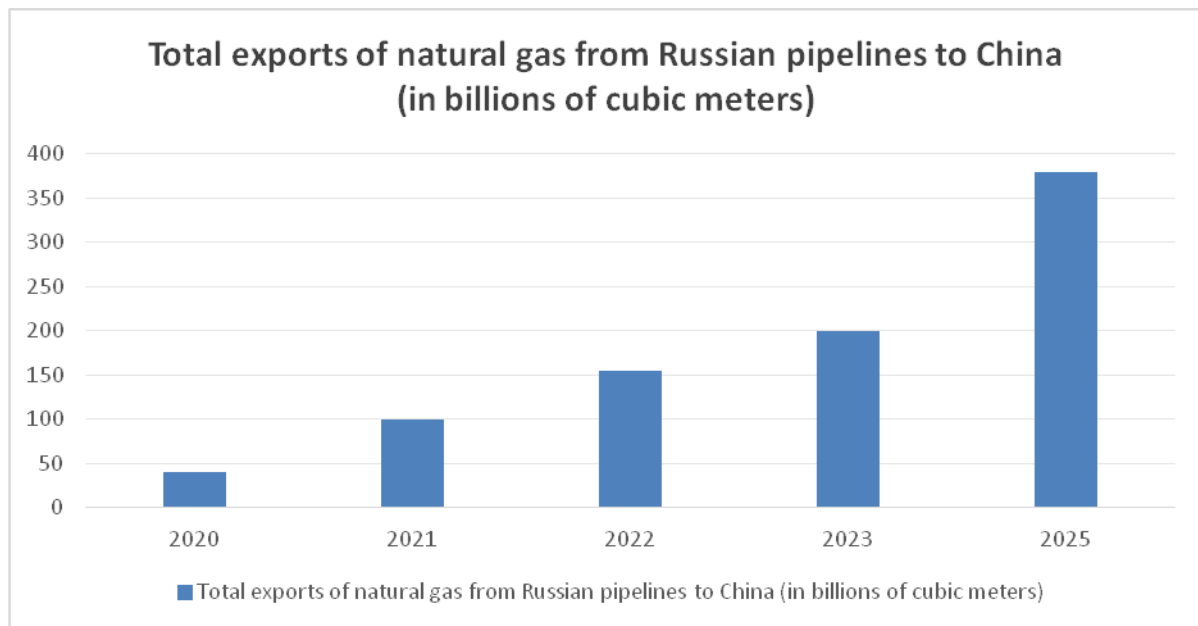


Figure 2.7 – Total exports of natural gas from Russian pipelines to China [5]

At now, energy cooperation between China and Russia, represented by natural gas, has shown outstanding characteristics. On the one hand, there has been an improvement in quantity. In 2023, Russia's natural gas supply to China increased by 46.6 % year-on-year. At present, the daily gas supply has exceeded the contracted quantity. In the same year, Gazprom signed an Additional Agreement to the Eastern Gas Purchase and Sales Agreement with China National Petroleum Corporation. According to the agreement, Russia will increase its natural gas supply to China by the end of 2023. Russia has increased its natural gas supply.

On the other hand, there is a guarantee of quality. The key to energy supply is stability. At present, Russia's energy exports to China continue to have stable characteristics, maintaining a stable, continuous, and uninterrupted energy supply. Gazprom stated that it continues to ensure the export of natural gas to China through the Siberian Power natural gas pipeline. Alexei Miller, President of Gazprom, stated that the company has the necessary resources, technology, and capabilities to provide reliable and effective clean energy for China's economic growth.

Under the strategic guidance of the two heads of state, practical cooperation between China and Russia has continuously yielded fruitful results. In March 2023, China and Russia signed two strategic documents, with energy cooperation remaining a key focus. Among them, the Joint Statement of the People's Republic of China and the Russian Federation on Deepening the Comprehensive Strategic Partnership for the New Era stated that the two sides will build a closer energy cooperation partnership, support their enterprises in promoting energy cooperation projects such as oil and gas, coal, electricity, and nuclear energy, and promote the implementation of initiatives that help reduce greenhouse gas emissions, including the use of low emission and renewable energy. The Joint Statement between the President of the People's Republic of China and the President of the Russian Federation on the Development Plan for Key Areas of China Russia Economic Cooperation before 2030 confirms that the two sides will consolidate a comprehensive energy partnership, strengthen long-term cooperation in key energy areas, promote the implementation of strategic cooperation projects, expand cooperation forms, strengthen cooperation in energy technology, equipment and other fields, jointly maintain energy security between the two countries and the world, and promote global energy transformation. The two documents provide solid political guarantees for the two countries to further deepen energy cooperation and achieve mutual benefit and win-win results.

The energy cooperation between China and Russia is becoming increasingly close. At present, both sides are discussing the construction of the Siberian Power 2 pipeline; Gazprom plans to export liquefied natural gas to China via the Arctic route, and in the future, Gazprom is expected to become China's largest natural gas supplier. Russian Deputy Prime Minister Novak stated that in the future, Russia's pipeline natural gas supply to China may increase to 100 billion cubic meters per year.

From an economic development perspective, Gazprom is a leading international natural gas reserve, production, and supplier, while China is a potential world's largest natural gas consumption market. Gazprom stated that in the long run, global natural gas demand will continue to grow, mainly driven by China, and the potential for mutually beneficial and complementary energy cooperation between the two countries remains enormous. In summary, both parties undoubtedly have a solid foundation for cooperation.

At present, the Siberian Power has been completed, and the Siberian Power 2 project has also landed. The Russian side stated that once the pipeline is completed, the gas transmission capacity will be comparable to Nord Stream 1.

Next is the trade of liquefied natural gas between China and Russia.

Russia has only recently entered the global LNG market. Before 2020, Russia mainly relied on pipeline natural gas. Now Gazprom is actively developing the liquefied natural gas field. Since 2009, Russia has opened its first liquefied natural gas plant until mid-2022. There are three industrial production plants in Russia that produce LNG: Sakhalin-2 LNG, Yamal LNG (Novatek), and Kryogaz Vysock LNG (Novatek) [12, p. 20].

Liquefied natural gas trade between China and Russia. The close relationship between Russia and China is closely related. China regards Russia as a reliable LNG supplier. The export growth of liquefied natural gas to China can alleviate the pressure of domestic natural gas demand growth in China.

At present, China has become the main buyer. According to a unilateral report, China's cooperation with Russia's LGN ranks third among China's importing countries. China imported 8 million tons of liquefied natural gas from Russia in 2023, and Russia's supply of liquefied natural gas to China is guaranteed. The two sides have signed a long-term contract. In 2014, China's CNPC and Novatek signed a 20-year contract (2018–2038) to supply 3 million tons of liquefied natural gas annually from Yamal LNG Company. Chinese companies will also produce LNG. Arctic LNG-2 Factory: In 2021, China's Shenergy Group signed a 15 year annual sales contract with Novatecom for over 3 million tons of liquefied natural gas. In January 2022, China's Zhejiang Energy and Natural Gas Group signed a 15 year contract with Novatec to supply 1 million tons of liquefied natural gas. At present, Russia's share of liquefied natural gas imports in China is still negligible, currently only 5.9 %. However, there is enormous potential for trade in liquefied natural gas between China and Russia. This is mainly due to the slow start of liquefied natural gas in Russia, as well as the well-established trade of natural gas pipelines between China and Russia.

China has participated in many liquefied natural gas projects in Russia, first of which is the Sakhalin 2 LNG project. The Sakhalin 2 LNG project, located on Sakhalin Island in

the Far East of Russia, completed its investment decision in 2003 and was completed and put into operation in early 2009 after experiencing environmental turmoil. The production scale is about 10 million tons/year, with Gazprom holding 50 %, Shell holding 27.5 %, Mitsui and Mitsubishi holding 12.5 % and 10 % respectively. Most of the LNG produced by the project is sold to Japan through long-term contracts. After the outbreak of the Ukrainian crisis in early 2022, Shell announced its withdrawal from the Sakhalin 2 LNG project. On June 30, 2022, Russian President Putin signed a decree allowing a Russian company to take over Shell's shares.

Secondly, the Yamal LNG project. After 2014, Novatek leveraged its breakthrough in LNG business to become a rising natural gas producer and exporter, especially with the success of its leading Yamal LNG project, which made it a rising star in the LNG industry. At the end of 2013, the Russian government amended its export law, granting the Yamal LNG project independent export rights, breaking Russia's long-standing natural gas export monopoly, and winning strong support from China in the context of the Crimean crisis at that time. The project operator Novatek holds 50.1 % shares, Total holds 20 % shares, PetroChina holds 20 % shares and the Silk Road Fund holds 9.9 % shares. The project was put into operation at the end of 2017, with a designed production scale of 16.5 million tons per year.

Finally, there is the Arctic LNG 2 project. The Arctic LNG 2 project, operated by Novatek, is located on the Gydan Peninsula in the Arctic of Russia. The investment decision was completed in 2019 and is currently under construction. The project is designed to produce 19.8 million tons of LNG annually and is the world's first LNG project built using a gravity based platform (GBS). It was originally planned to start operation in early 2024. In November 2023, the United States imposed sanctions on the Arctic LNG 2 project, which was declared to have encountered force majeure in December 2023. The first production line of the Arctic 2 project was put into operation by the end of 2023, but the first batch of goods has not yet been delivered [53, p. 112].

Liquefied natural gas is one of the five pillars of China's new energy strategy, known as four reforms and one cooperation. It is to cooperate with other countries in energy, especially emphasizing China's foreign energy investment. The Russian liquefied natural

gas project has aroused great interest among Chinese domestic investors, lenders, equipment suppliers, and contractors. Firstly, entering the Russian liquefied natural gas project as a long-term division contract signed by China to produce and supply liquefied natural gas, thereby providing a reliable channel for transporting natural gas to China. Secondly, the participation of Chinese companies in Russia's LNG projects. Most of these projects provide enormous opportunities for China in the Arctic region of Russia, and their role in international cooperation in the Arctic is in line with China's task of building the Arctic region. Thirdly, Russian LNG has high commercial value and abundant profits. At present, China is fully and deeply involved in Russia's LNG projects. Two large liquefied natural gas projects in Russia, Yamal LNG and Arctic LNG-2. Both projects are located in the Arctic region of Russia, and the Yamal Nenets Autonomous Region is the largest autonomous region in Russia. PWM is the world's natural gas production area, and China is the largest foreign investor: the China CNPC Silk Road Fund holds 20 % and 9.9 % of Yamal's shares, respectively. The Yamal liquefied natural gas project is a breakthrough for China in the field of liquefied natural gas in Russia.

China has become the largest investor in this project, with the Export Import Bank and Development Bank of China in 2016. China has opened two 15 year loan quotas, worth 9.3 billion euros and 9.8 billion euros respectively. It is estimated that China has provided about 60 % of the funding for the Yamal liquefied natural gas project in the form of investment and loans. Both China and Russia are participating in the Yamal project, and China has provided and is currently providing technical assistance for the liquefied natural gas plant. Obtained billions of dollars in equipment orders, providing services and services.

The supply of liquefied natural gas project modules has filled the gap in the development of China's marine engineering. Representing the country's accession to major world power clubs, creating high-tech products, tire manufacturing, and large and complex modular structures in the marine field. Significant progress has been made in this regard. Therefore, Chinese companies participating in Russian liquefied natural gas projects help China develop its gross domestic product and enter the global market in the field of professional production.

China's participation in Russia's liquefied natural gas project, the technology needed to develop Arctic resources, the unique experience in implementing and managing large-scale liquefied natural gas projects, and the development of cooperation models with foreign partners.

After Russia's accelerated sanctions in 2022, as an important energy country, imposing sanctions on it has had a significant impact on the global energy market, posing a challenge to providing energy to countries around the world. Against the backdrop of imposing sanctions on Russia's energy industry, Russia is facing the challenge of fundamentally changing its energy model. Western companies withdrawing from the Russian market, Russia needs to seek more cooperation and space from the Asia Pacific region. At present, Russia and China maintain political and economic independence, and China opposes US foreign policy and does not participate in sanctions against Russia. Not afraid of Western sanctions on Russian thermal power plants in 2014. It is possible to break through Russia's energy sector, and China can become Novatek's senior foreign partner in large-scale LNG projects. The Yamal liquefied natural gas project Arctic Liquefied Natural Gas 2 has become China's largest overseas financial institution donor (investor and lender), an important equipment supplier service, technical support, and service. From an implementation perspective, the Russian liquefied natural gas project ensures reliable supply of liquefied natural gas to China at competitive prices, and diversifies the sources of liquefied natural gas imports into the Chinese market. As a major investor, China is expected to generate operating income from growth, and its liquefied natural gas plants will participate in Russian LNG projects as contractors and technical partners. China's technological progress has enabled it to develop technology.

Russian President Putin stated at a geological conference held in January 2024 that Russia will further increase its LNG production, expected to reach 100 million tons by 2035, accounting for approximately 20 % to 25 % of the global LNG market. Putin's statement demonstrates Russia's ambition in the LNG field, with China being the world's second largest economy after the United States and also the world's largest energy consumer. With the continuous deepening of the Belt and Road initiative, the China Russia comprehensive strategic partnership of coordination has been breaking new

ground, and the China Russia relationship is at its best in history. In addition to enhancing pipeline gas cooperation, the trade volume of LNG between China and Russia has also been continuously increasing, reaching 3.63 million tons in 2019 and 2020, 7.25 million tons in 2021 due to the signing of new contracts, and 6.16 million tons in 2022. In 2023, Russia exported approximately 8 million tons of LNG to China, a year-on-year increase of 23 %. Russia became the third largest LNG supplier to China, accounting for 12 % of China's total LNG imports. At the same time, China has become the largest importer of LNG to Russia as shown in figure 2.8.

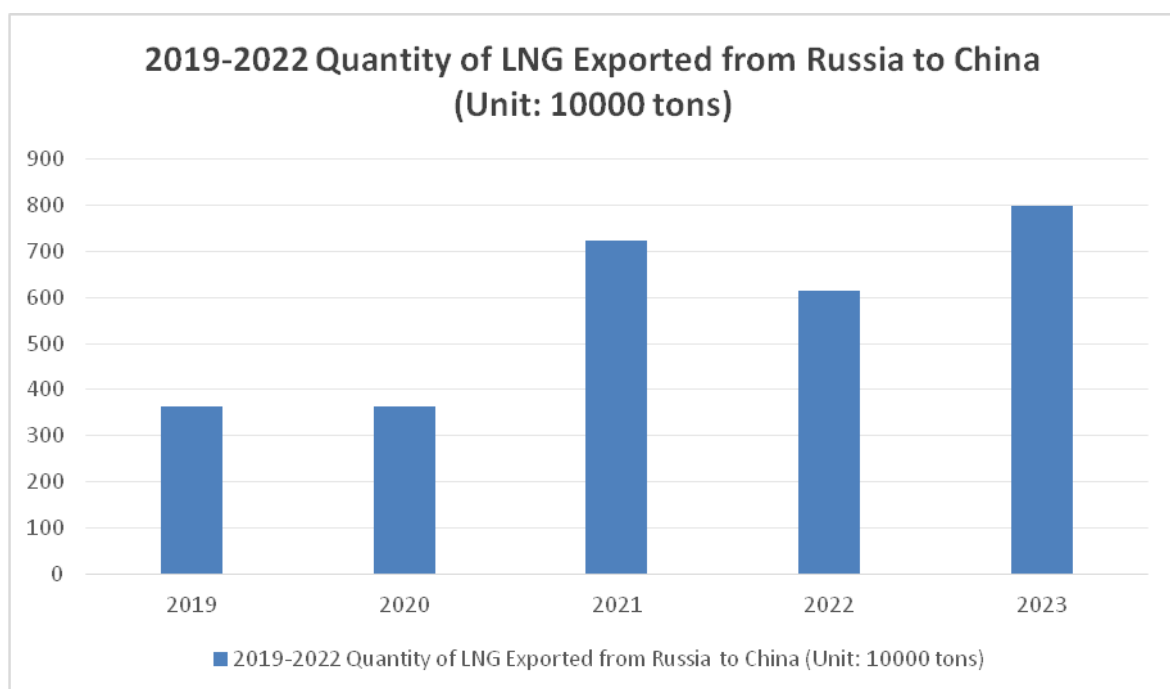


Figure 2.8 – 2019–2023 Quantity of LNG Exported from Russia to China [13]

As part of the development strategy of the LNG industry, Russia actively develops the Northern Sea Route transportation hub to gain geopolitical dominance and international relations initiative, making the Arctic Route a competitive sea route and significantly reducing the cost of LNG shipping from Russia's Arctic region to the Asian market. In terms of LNG product transportation, the implementation of national strategies has opened up Arctic freight routes, shortened shipping distances, and improved the competitiveness of Russia's LNG industry. At the same time, the Russian government

supports the construction of nuclear powered icebreakers and ice grade LNG transport ships, providing support from the national level for Russian LNG exporters.

2.3 Investment cooperation in Sino-Russian oil and gas

There are some China-Russia oil cooperation projects.

Firstly, the Dongfang Oil project is a flagship project of Rosneft, aimed at developing oil and gas resources in the Russian Far East region. The project is jointly implemented by Rosneft, Dongfang Oil Co., Ltd., and Krasnoyarsk Krai, with an estimated investment amount of 11.8 trillion rubles and a termination period set for 2036 [15, p. 146].

The project is located in the Tamil Peninsula, including the developed oil and gas fields in the Vankol Cluster and the new oil and gas fields in the northern Krasnoyarsk Territory. According to the official website of the Russian government, the total investment of the project will reach 11.8 trillion rubles.

In recent years, the cooperation between Russia and China in the field of energy has become increasingly close. During the visit of Russian Deputy Prime Minister Alexander Novak to China, the two sides discussed the prospects of the Oriental Oil project and reached some cooperation agreements. It is expected that by 2030, the oil production of the project will exceed 100 million tons, which will help stabilize the domestic oil market and enhance the economic mutual benefit between China and Russia. Overall, the Dongfang Oil project is not only an important strategic deployment of the Russian oil company, but also a key link in energy cooperation between China and Russia, and is expected to play an important role in the coming years.

Next is the China Russia oil pipeline project. The China Russia crude oil pipeline starts from the Skovorodino distribution station of the Russian Far East pipeline, passes through 13 cities, counties, and districts in Heilongjiang Province and Inner Mongolia Autonomous Region of China, and ends at the Daqing terminal station. The total length of the pipeline is 999.04 kilometers, with 72 kilometers in Russia and 927.04 kilometers in China. According to the agreement between the two sides, Russia will supply 15 million tons of crude oil to China annually through the China Russia crude oil pipeline, with a

contract period of 20 years. The China Russia crude oil pipeline entered the trial operation phase on November 1, 2010. On February 17, 2009, after 15 years of negotiations on the China Russia oil pipeline, the agreement was finally signed. In 2008, the deadlock in negotiations was broken, and the financial crisis arrived that year. The Chinese side proposed to provide loans. Loan for oil. This is a turning point in the oil negotiations between China and Russia. Afterwards, both parties will finalize the details. This is the first time there has been a loan for energy model. Since then, this model has been applied to many international energy cooperation projects. On February 17, 2009, a contract for 300 million tons of crude oil was signed [19, p. 4].

The Russian section of the oil pipeline was completed last month, and the Chinese section was also declared fully completed. According to the loan for oil agreement reached between the two countries, from January 2011 to 2030, which is the next 20 years, China will receive 300000 barrels of oil per day, with a total supply of 300 million tons. Correspondingly, China will provide Russia with 25 billion in long-term loans. This pipeline has made Russia, along with Saudi Arabia and Angola, one of China's three major crude oil suppliers. In order to form an upstream and downstream industrial chain, both parties will jointly establish a Sino Russian Dongfang Petrochemical Refinery in Tianjin. At 5:48 am on January 1, 2011, the China Russia crude oil pipeline was officially put into operation, and Russian crude oil began to enter the first storage tank located in Xing'an Town, Mohe County, China, marking the official completion of the strategic route for crude oil import in the northeast direction of China. The China Russia crude oil pipeline oil transportation contract with an annual output of 15 million tons and a term of 20 years has officially begun to be fulfilled.

At 11:50 on the same day, Yao Wei, the General Manager of the Pipeline Branch of China National Petroleum Corporation, issued an official oil transportation order at the Mohe Initial Station, and the Mohe Daqing Line (Mohe Daqing) of the China Russia crude oil pipeline in China immediately entered the transportation state.

The China Russia crude oil pipeline starts from the Skovorodino distribution station of the Russian Far East crude oil pipeline, crosses the Chinese border, passes through Heilongjiang and Inner Mongolia, and ends at the Daqing terminal station in Heilongjiang.

The pipeline has a total length of nearly 1000 kilometers, with a designed annual oil transportation capacity of 15 million tons and a maximum annual oil transportation capacity of 30 million tons [12, p. 17].

Due to the completion of the previous trial operation, which had filled more than 550000 tons of crude oil in the 900 kilometer pipeline of the Mohe Line, the Daqing Linyuan Terminal Station officially began receiving oil after about 15 minutes of valve opening at the Mohe Station under the pressure of the Mohe Initial Station and Jiagedaqi Station.

Zhou Dadi, a researcher at the Energy Institute of the China Development and Reform Commission, believes that China's oil imports are not just a matter of increasing by 10 to 20 million tons or tens of millions of tons. China's oil imports are over 200 million tons, and may increase to 300 million or 400 million tons in the future. The increase mainly relies on imports, so we still need to continuously explore new sources of oil imports and achieve diversification of crude oil imports.

The China Russia crude oil pipeline, which opens up a major strategic measure for China to promote the diversification of oil resource supply, is a major route for importing crude oil from the Far East region of Russia by land to the inland areas of northern China. In mid December 2008, China and Russia officially signed a long-term framework agreement for crude oil trade cooperation, which stipulated that from January 1, 2011 to December 31, 2030, China would import a total of 3.0×10^8 t of Russian produced crude oil through the Russian Far East crude oil pipeline, with an annual import of 1500×10^4 t. According to this agreement, PetroChina timely constructed the Mohe Daqing section of the China Russia crude oil pipeline project (MoDa Line), which officially began operation on January 1, 2011. On October 16, 2011, Chinese President Hu Jintao held talks with Russian President Medvedev in Moscow and issued a joint statement on the 10th anniversary of the signing of the China Russia Treaty of Good Neighborhood, Friendship and Cooperation. The statement emphasizes that both sides are committed to developing a comprehensive strategic partnership of equality, trust, mutual support, common prosperity, and generational friendship. The trade volume between China and Russia will increase to 100 billion US dollars by 2015 and 200 billion US dollars by 2020. The two sides will

comprehensively promote cooperation in oil, natural gas, nuclear energy, and other fields, build a strategic and long-term energy partnership on the basis of mutual benefit, and actively explore new ways of technology and innovation cooperation, expand and deepen regional cooperation. On June 21, 2013, at the 17th St. Petersburg International Economic Forum Energy Roundtable, attended by Russian President Putin and Chinese Vice Premier Zhang Gaoli, Zhou Jiping, Chairman of China National Petroleum Corporation, and Xie Qin, President of Rosneft, signed a long-term trade contract for increasing crude oil supply from Russia to China. According to the supply contract, Russia will gradually increase its supply of crude oil to China on the basis of the 1500×10^4 t/a oil pipeline between China and Russia, reaching 3000×10^4 t/a by 2018. The supply contract period is 25 years and can be extended for 5 years. The annual import of Russian oil from Russia to China is shown in Table 1.1-3; Starting from January 1, 2014, an additional 700×10^4 t/a of crude oil was supplied through the China Kazakhstan crude oil pipeline (West Line), with a contract period of 5 years and an extension of 5 years. The Russian side also promised to supply 910×10^4 t of crude oil to the Sino Russian joint venture Tianjin refinery annually after its completion and operation. In the future, China's import of Russian crude oil will reach 4610×10^4 t/a. This additional supply contract is the largest single contract in China's foreign crude oil trade, and will play an important role in ensuring national energy security and promoting China's economic development. In order to implement the opinions of the above agreement, PetroChina will further integrate the crude oil resources in Northeast China, and on the basis of considering the supply-demand balance and optimized configuration of domestic crude oil in Northeast China and imported Russian crude oil, plan to construct the second line project of the China Russia crude oil pipeline. This will further enhance the security and reliability of China's oil resource supply, as well as expand the diversification of Russia's oil trade. Effectively filling the supply gap of oil resources in old oilfields such as Daqing Oilfield and Liaohe Oilfield has played an important role in promoting the revitalization of old industrial bases in Northeast China and the development of the Russian Far East region.

Russian crude oil enters the second line of the China Russia crude oil pipeline and begins to be transported from the Mohe River to Daqing Linyuan, marking the official

commercial operation of the second channel for importing Russian oil through China's Northeast energy transportation channel. The annual amount of Russian oil imported from this channel will increase from the current 15 million tons to 30 million tons.

The total length of the China Russia crude oil pipeline second line project is 941.80km, starting from the Mohe Oil Pipeline Station in Mohe County, Heilongjiang Province, passing through Heilongjiang and Inner Mongolia provinces, and ending at the Linyuan Oil Pipeline Station in Daqing City, Heilongjiang Province. The project officially started construction on August 13, 2016, crossing 500 kilometers of pristine forest uninhabited areas and permafrost areas, experiencing long winters and extreme cold temperatures as low as minus 50 degrees Celsius, creating a Chinese speed of welding 800 kilometers in 180 days for pipeline construction in high latitude extremely cold areas.

According to the project plan, after the second line project is officially put into operation for oil transportation on January 1, 2018, the import of Russian crude oil from the Northeast Oil Pipeline will increase from 15 million tons per year to 30 million tons. The construction of the China Russia crude oil pipeline second line project will be conducive to further improving the national Northeast oil and gas strategic channel, optimizing the domestic oil supply and demand pattern, boosting the industrial economy of Northeast China, and promoting the healthy and sustainable development of China's economy and society. With the construction and operation of the first and second lines of the China Russia oil pipeline, the Northeast Energy Channel, one of China's four major energy channels, will be further improved. As far as the Northeast region is concerned, old oil fields such as Daqing Oilfield and Liaohe Oilfield have entered the middle and later stages of their production life. The water content of the produced liquid has significantly increased, the cost of oil recovery has significantly increased, and crude oil production has been decreasing year by year. By constructing the China Russia second line pipeline and expanding the introduction of Russian crude oil, the shortage of oil resources in the region can be filled in a timely manner, effectively completing the resource supply of more than 20 Northeast refineries in Jilin, Fushun, Dalian, and other regions. We will also further strengthen oil cooperation between China and Russia.

China Russia Natural Gas Cooperation Project. Firstly, the Yamal liquefied natural

gas project is a large-scale energy cooperation project located in the Arctic region of Russia, mainly involving the exploration, development, liquefaction, transportation, and sales of natural gas. The following is the detailed information of the project [12, p. 22].

The Yamal liquefied natural gas project is located on the Yamal Peninsula in northern Russia, known for its abundant natural gas resources. The project is led by Novatek of Russia and jointly developed with CNPC, Total of France and China the Silk Road Fund.

Project scale: Resource reserves: The South Tambeyk condensate gas field where the project is located has extremely rich natural gas reserves, reaching 1.3 trillion cubic meters, accompanied by 60 million tons of condensate oil. Production capacity: The project plans to build three liquefied natural gas production lines with an annual output of 5.5 million tons. After all are completed and put into operation, they can produce 16.5 million tons of liquefied natural gas and 1 million tons of condensate annually.

Cooperation: Investors: Novatek holds 50.1 % shares, PetroChina holds 20 % shares, Total holds 20 % shares, and the Silk Road Fund holds 9.9 %.

The Yamal liquefied natural gas project not only meets Russia's domestic energy demand, but also exports liquefied natural gas to multiple countries including China, promoting international energy trade. The project utilizes Arctic shipping routes to transport liquefied natural gas, which shortens transportation distance, reduces costs, and also helps to develop economic activities in the Arctic region. With the commissioning of the third production line, the production capacity of the Yamal liquefied natural gas project will further increase, and it is expected to continue to expand its influence in the international energy market in the coming years. The Yamal liquefied natural gas project is not only an important component of Russia's energy strategy, but also a model of energy cooperation between China and Russia. Its successful operation not only ensures energy security, but also promotes the development of international energy trade.

Secondly, the China Russia East Gas Pipeline Project is an important achievement in energy cooperation between China and Russia, aimed at transporting Russian natural gas to China through pipelines to meet China's growing energy demand and enhance energy security. The following is the main information of the project:

In May 2014, China National Petroleum Corporation (CNPC) and Gazprom signed

the China Russia East Gas Supply Purchase and Sales Contract. The contract period is 30 years, with a total gas supply exceeding 1 trillion cubic meters and an annual gas supply of 38 billion cubic meters.

On December 13, 2017, the construction of the China Russia East Line began to accelerate comprehensively. On December 2, 2019, the China Russia East Gas Pipeline was officially put into operation for ventilation, marking the initial success of the project. On July 28, 2020, the construction of the southern section of the China Russia East Gas Pipeline was officially launched in Haimen, Nantong, Jiangsu. On September 16, 2022, State Grid Corporation of China announced the operation of the natural gas pipeline Anping, Hebei - Tai'an, Shandong section of the China Russia East Line.

After the project is completed, the maximum annual gas transmission capacity can reach 38 billion cubic meters, benefiting a population of 400 million along the route. The pipeline passes through nine provinces and cities in China, including Heilongjiang, Jilin, Inner Mongolia, Liaoning, Hebei, Tianjin, Shandong, Jiangsu, and Shanghai.

This project helps to reduce China's dependence on traditional offshore energy imports and improve the diversity and security of energy supply. As a clean energy source, the widespread use of natural gas helps to improve air quality in northern China and promote green development. The project not only helps to drive the economic and social development of the regions along China and Russia, but also transforms Russia's resource advantages into economic advantages. After the entire project is put into operation in 2023, it will be fully completed and more efficient energy transmission will be achieved.

The China Russia East Gas Pipeline Project is an important milestone in energy cooperation between China and Russia. It not only enhances China's energy security, but also contributes to environmental protection and economic development. This cooperation not only embodies the principle of mutual benefit and win-win results, but also is an important part of the Belt and Road initiative.

Finally, there is the Siberian Power 2 project. The Siberian Power 2 natural gas pipeline will start construction in 2024, with an annual gas transmission capacity of 50 billion cubic meters. Planned to be completed by 2028. According to the initial plan, the natural gas pipeline should pass through Altay to areas in eastern China with lower levels

of natural gasification. The new route passes through Mongolian territory and reaches areas that have already received natural gas through liquefied natural gas.

On January 22, 2021, Gazprom announced the establishment of the Eastern Alliance Gas Pipeline company in Mongolia for the Siberian Power 2 project. On July 18, 2022, Mongolian Prime Minister Oyun Erden stated that the country expects the construction of the Siberian Power 2 natural gas trunk pipeline from Russia to China via Mongolia to begin in 2024. On September 20, 2022, the Rossiyskaya Gazeta reported that the route change of the Siberian Force-2 gas pipeline is beneficial to China. On October 12, 2022, Russian President Putin stated that Russia will continue to expand energy exports in rapidly growing markets and will soon carry out construction work on promising projects, including the Mongolian section of the Siberian Power 2. In November 2022, Russian Deputy Prime Minister Alexander Novak stated that Russia is continuing negotiations with China on the implementation of another major gas supply project - the Siberian Power 2 project. This route supplies Russian natural gas through Mongolia, with an annual supply of 50 billion cubic meters.

The project is led by Russia and plans to transport a large amount of natural gas resources to China through a newly constructed natural gas pipeline. This project not only helps to meet China's growing energy demand, but also enhances the energy cooperation relationship between China and Russia. The project is expected to start construction in 2024 and is scheduled to be completed in 2028. At present, relevant engineering preparations have been carried out, including preliminary work such as design and surveying.

Importance to China: This project will provide stable and sufficient natural gas supply to China, ensure energy security, and reduce dependence on external markets. Importance to Russia: Russia can increase its natural gas exports to China through this project, alleviate the pressure caused by losing the European market, and also achieve economic benefits through this project. Global impact: This project helps to balance the global natural gas market, stabilize prices, and create a supply-demand balance between the two major countries of Russia and China [12, p. 23].

Although the project faces some challenges, such as price negotiations, overall, the

Siberian Power 2 project has significant strategic significance and will have far-reaching impacts on the energy markets of China, Russia, and even the world. In summary, the Siberian Power 2 project is not only an important component of China Russia energy cooperation, but also a key factor in the stable development of the global energy market.

Chapter 3 Future trends of Sino-Russian oil and gas cooperation

3.1 Problems in Sino-Russian oil and gas trade

Problem 1: The threat from the United States and the transformation of Russia's trade structure.

The European Union holds a relatively special position in the foreign trade of Russian countries. The EU is a strong and friendly country in Russia's economic cooperation. In 2014, the total circulation of goods in Russian countries matched the total circulation of goods in the European Union. In 2014, the total circulation of products between Russia and European countries increased by 0.8 %. Since the Russo Ukrainian War, the import and export restrictions implemented by the European Union have seriously affected trade between the EU and Russia. Both exports and imports were significantly lower than before the outbreak of the Russia-Ukraine conflict. Seasonally adjusted values show that during the same period, the EU's share of imports to Russia decreased from 9.5 % in February 2022 to 1.9 % in December 2023, while its share of exports to Russia decreased from 3.8 % to 1.4 % as shown in table 3.1.

Table 3.1 – Changes in Russia's exports to the European Union and natural gas exports [30, p. 12]

Year	2022	2023	Reduction (%)
Russian exports to Europe (in billions of US dollars)	2653	849	68 %
The daily natural gas volume transported from Russia to Europe through pipelines (unit: 10000 cubic meters)	17480	7760	55.60 %

Although the EU is currently Russia's second largest trading partner, Russia has maintained a long-term trade surplus with the EU, which has injected some vitality into

Russia's sluggish economy and had a positive impact on partially easing the country's external debt pressure. However, it should also be noted that compared to the economic potential and international status of both sides, the current level of trade relations between Russia and the European Union is relatively small or of lower scale and quality. This is mainly due to a series of problems in the trade field between the two sides, manifested as a series of restrictive measures imposed by the EU on Russian exports and a series of requirements for entering the EU market, mainly involving anti-dumping, quantity restrictions, technical trade barriers, granting Russia market economic status, and several other issues related to Russia's accession to the World Trade Organization. Since 1992, the European Community (EU) has imposed unilateral quantity restrictions on Russia's exports. Before the operation of the European Unified Market in 1993, quota issues belonged to national governance. After the establishment of a unified market, the national quota governance was changed to the unified quota governance of the European Union. According to EU Regulation 519/94 issued in 1994, the EU has abolished over 4700 import quotas implemented by each member state over the past 30 years, totaling 6400 types, and replaced them with unified quota restrictions. In Russia's export products, the two main categories are steel products and textiles, which are subject to import quantity restrictions at the EU level. This requires Russia to shift its strategy and look east, but the process is often difficult. There is a fierce competition within the United States regarding whether to relax export controls on oil and natural gas. Even in the face of proposals from European allies to relax US restrictions on European crude oil and natural gas exports. This attitude is still unclear. This also makes the EU's call for its member states to reduce their dependence on Russian natural gas appear very weak in the Ukraine crisis. Since the mid-1990s, the energy production of the European Union has been declining. For meet the demand for energy resources in economic development, EU has to import a large more oil, gas, and other natural resources, which largely makes the EU's economic development dependent on external energy imports. In 2022, nearly 39 % of the EU's natural gas and 33 % of its oil come from Russia. Some EU member states, such as Italy, Germany, and the UK, have a dependence on Russian natural gas of up to 80 % as shown in figure 3.1.

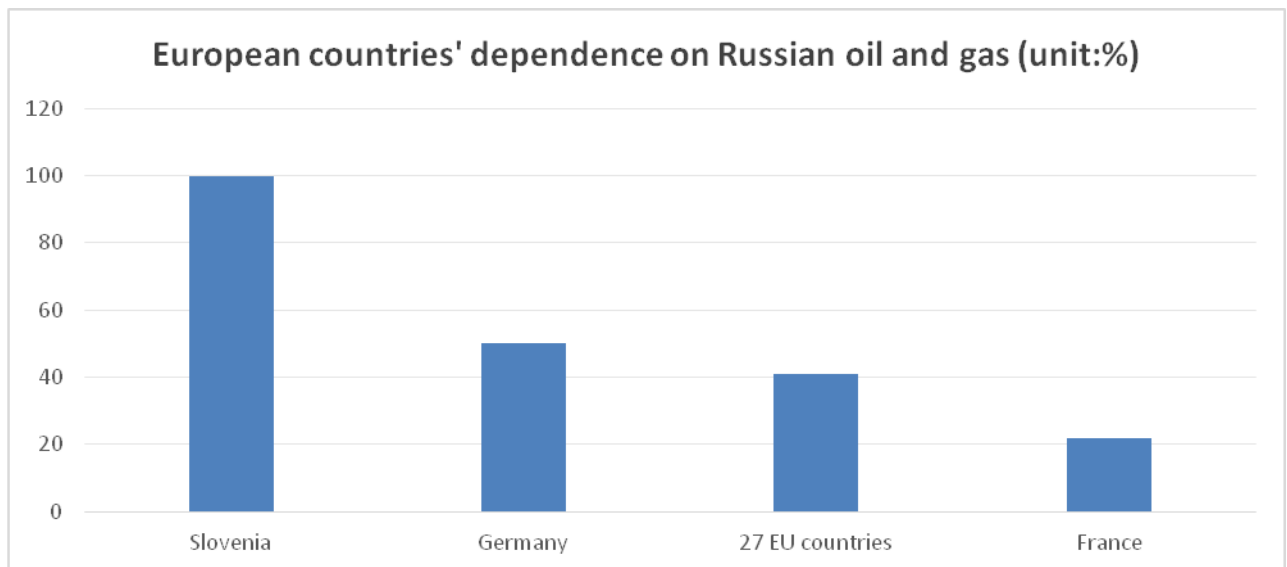


Figure 3.1 – European countries' dependence on Russian oil and gas [30, p. 12]

Problem 2: Improve the political security of China Russia oil and gas trade

There are three parts to the political security of Sino Russian trade, one is the external political security of enterprises and countries. The United States is attempting to prevent cooperation between China and Russia through various means, including threatening to impose sanctions on Chinese military enterprises. The current strategy of the United States is to impose sanctions on China, and the sanctions bill is very aggressive because the sanctions against Russia have failed, so the focus is on imposing sanctions on China and then forcing China to abandon the Russian market. If you do not comply, you will face comprehensive lockdown sanctions [42, p. 56].

Obviously, this approach by the United States is not appropriate enough. Especially when US Secretary of State Anthony Blinken visited China, it was reasonable to ease the bilateral relations, at least to maintain harmony on the surface, rather than creating tension at this time. The US State Department announced that the US is attempting to prevent cooperation between China and Russia.

From the series of rude behaviors of American politicians, it can be seen that the US policy towards China is moving towards a dual track strategy. On the one hand, it attempts to approach China in a friendly manner to avoid military conflicts, and on the other hand, it uses all means to suppress China to maintain its advantage over China. Nowadays, the United States is attempting to sanction Chinese military enterprises under the pretext of

Sino Russian cooperation, essentially seeking excuses to curb the rise of China's military power.

During the visit of Russian Foreign Minister Lavrov to China, China and Russia reached a consensus on strengthening security in the Eurasian region, which is a common goal of both countries. China and Russia will initiate relevant dialogue and welcome other countries to join. Obviously, this is a direct response to the United States, which has played a protective role in Sino Russian geopolitics and Sino Russian enterprises.

However, due to international factors, sanctions will impose significant restrictions on Chinese and Russian companies, especially Chinese companies, which may lead many companies to fear sanctions and not invest in Russia. This will have a blow to oil and gas related enterprises.

The second issue is the internal political security of the enterprise state. In the process of the construction of the Belt and Road, the political risks that may be borne by Russia's investment in Russia are mainly as follows: First, Russia's proposition on Ukraine and its way of handling relations with Western countries may continue to hinder its economic development for many years in the future, and will continue to be subject to sanctions, especially the crucial oil and gas enterprises, which must be the focus of sanctions.

Secondly, especially the impact of war is easily disrupted by security issues, and personal and property safety urgently needs to be guaranteed. Although Russia has invested a lot of energy in security issues, it also aims to create a favorable business environment for oil and gas trading companies in China and Russia, in order to attract more Chinese companies to invest in Russia.

Overall, despite facing many negative challenges, there is still room for improvement in Russia's market development potential. In recent years, the Russian government has focused on improving the domestic investment environment, establishing relevant institutions to provide organizational guarantees for foreign investment, actively formulating and implementing foreign policies to attract investment, and increasing punishment for corruption. In short, Chinese and Russian corporate politics maintain an optimistic attitude.

Problem 3: There are differences between China and Russia in the pricing mechanism of oil and gas trade [44, p. 30].

In the oil and gas trade cooperation between China and Russia, price has always been an obstacle to the development of oil and gas between the two countries. Russia has abundant oil and gas resources, and its foreign energy trade only pursues maximum benefits. Countries engaged in oil trade with Russia have a high degree of dependence on oil, and even if oil prices are high, countries will still purchase it. Therefore, Russia's total oil and gas exports are basically in a state of only increasing without decreasing. For China, which has been importing oil and gas from Russia for a long time, its pricing power in oil and gas fields is relatively weak. The unequal pricing position in the process of oil and gas trade between China and Russia has led to price differences in trade, hindering the development process of oil and gas trade between China and Russia. Russia is selling oil to China at relatively high and unstable prices as shown in figure 3.2, there is a significant discount for China in the pricing of natural gas sales in Russia in 2024 compared to other countries as shown in figure 3.3.



Figure 3.2 – The price per ton of oil exports from Russia to China in recent years
[44, p. 32]

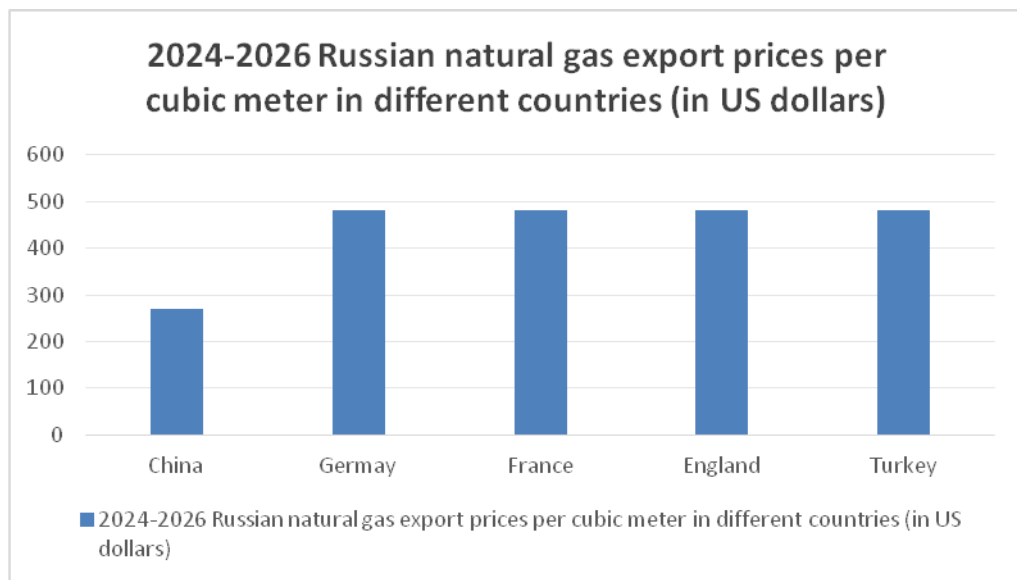


Figure 3.3 – Russian natural gas export prices per cubic meter in different countries
[44, p. 32]

The cooperation between China and Russia in the energy field is mostly carried out by state-owned enterprises under the state, and their transactions are directly managed by the state. When the two energy companies reached an agreement, there were no other obstacles, but both companies were subject to national regulation. If the country participates too much in the decision-making of the two companies, it will inevitably affect the trade between the two countries in the oil fields. Therefore, excessive state intervention can also affect trade between the two countries. Although this price is not a factor that affects both parties, if the country intervenes too much in the decision-making of enterprises, some political factors will seriously hinder the oil trade process between the two countries, and price factors will become obstacles to cooperation between the two sides. With the continuous development of the economies of both countries, both are in a stage of economic growth. The higher the price of purchasing oil and natural gas, the higher the investment cost of this trade. When China engages in oil trade with Russia, it wants to buy at a lower price, but as a seller of oil and natural gas, it wants to sell at a higher price. Both sides stand from their own country's perspective and there is no standard negotiation mechanism that affects the success of oil and gas trade between the two countries.

Problem 4: Currently, Russia's oil and gas infrastructure is still relatively backward.

Russia has a huge land area, but its resources and regions do not match. The eastern region of Russia is rich in oil and gas resources, but the focus of economic development lies in the western region of Russia. The Far East region in the eastern region is rich in oil and gas resources, but due to not being a developed region of Russia's economy, transportation is inconvenient, oil and gas transportation is a problem, there is a small resident population, less labor force involved in oil and gas production, and various oil and gas resource extraction equipment is outdated and insufficient. Due to its complex terrain and harsh climate, the cost of oil and gas exploration and extraction is high [46].

Due to regional influence, the infrastructure in the Far East region is poor, and the construction of oil and gas pipelines is insufficient, which seriously restricts the development of new oil and gas fields, thereby affecting the growth of Russian oil and gas production. Limited technology and equipment have slowed down the speed of oil and gas extraction and reduced oil and gas production. The abundant oil and gas and severe lack of manpower and funds have made it difficult to develop oil and gas in the Far East region. Moreover, the transportation in the Far East region is inconvenient, which increases the investment cost for Chinese investors. The transportation cost of oil and gas is high, the oil and gas extraction equipment in the region is outdated, the infrastructure is outdated, the technology is not advanced enough, the availability of oil and gas extraction is low, and the oil and gas equipment along the route is not regularly maintained or repaired, which affects the efficiency and quality of oil and gas extraction.

3.2 Countermeasures and future trends of China Russia oil and gas trade

Countermeasure 1: Strive to establish a reasonable China Russia oil and gas trade market.

The price and quantity growth rate of China's total import and export volume have been continuously increasing. In China's foreign trade exports, a large portion of goods are those with more labor and lower technological content. In recent years, the proportion of products produced in the secondary industry has been continuously increasing, but secondary industry products with simple post-processing and low technological content

still account for the largest proportion. When China exports high content high-tech products, most of the products used for export are formed through reprocessing by foreign companies. The proportion of Chinese enterprises exporting high-tech products to foreign countries is relatively low [44, p. 32].

Therefore, it is necessary to improve China's foreign trade channels, expand foreign trade regions, and optimize the structure of China's import and export products. To promote the transformation of China's post-processing trade goods towards high-tech content, the Chinese export industry must attach importance to high-tech intellectual property rights and vigorously build high-tech content industries. China can strengthen trade with other regions and vigorously develop the global market. On the one hand, it can increase the trade volume between China and Russia, and on the other hand, it can provide basic guarantees for the oil and gas trade between China and Russia.

And increase political mutual trust between China and Russia. As China and Russia are two separate countries and two ethnic groups, their respective ethnic cultures, educational methods, and thinking patterns are inevitably different. In addition, China and Russia have different socio-economic levels, national development goals, and with the further development of the oil trade between the two countries, conflicts and contradictions are inevitable. In the face of these issues, China and Russia should strengthen the connection between the governments of the two countries, as well as the communication between the people of the two countries. On the one hand, the leaders of the two governments should engage in more dialogue, exchange and negotiate on different opinions, understand and support each other, so that the two sides can form a tacit understanding in oil cooperation and reduce disputes on cooperation issues; On the other hand, we should play the role of civil organizations to promote friendly exchanges between the two sides, and carry out rich civil activities between the people of China and Russia, promote mutual understanding and trust between the two peoples, and then build trust in each other's countries, so as to establish deep friendship between the two peoples, consolidate the trust relationship between the two countries, further improve each other's political mutual trust, and promote the healthy development of China Russia oil and gas trade cooperation.

Countermeasure 2: Strengthen cooperation with Russia in infrastructure construction and accelerate the infrastructure construction of China Russia oil and gas trade [12, p. 23].

Through China's the Belt and Road, the Shanghai Cooperation Organization and other cooperation organizations, policies that are conducive to the development of oil and gas and gas trade will be more conducive to the development of oil and gas trade between the two countries. At present, the oil and gas trade between China and Russia is constantly developing, and we should seize the great opportunity of friendly development between China and Russia. We should not only participate in the infrastructure construction and oil and gas development in Russia's Far East region, but also actively build our own oil and gas pipelines to make the oil and gas trade and transportation between the two countries more convenient, and create a better prospect for the oil and gas trade between China and Russia.

The two countries need to strengthen their infrastructure and provide strong technical support for the extraction, processing, and transportation of crude oil and gas. The backwardness of infrastructure seriously hinders the growth of oil and gas production. As a neighboring country to the south and a partner with certain economic strength, China should seize the opportunity to participate in the construction of the Russian Far East region. It should not only participate in the infrastructure of the Russian Far East region, but also in the construction of its oil and gas pipelines, transportation roads, and hydroelectric buildings along the route, ensuring the living needs of local oil and gas maintenance workers, as well as the maintenance and repair of subsequent oil and gas transportation equipment. Strengthening the construction of the Sino Russian pipeline and the improvement of related infrastructure is conducive to promoting the development of Sino Russian oil and gas trade. At the same time, increasing investment in infrastructure in the Far East region, allowing Chinese funds to integrate into the construction of the region, actively participating in Russia's Far East Development Plan, and jointly developing the rich oil and gas in the Far East region. On the other hand, China should also strengthen its domestic infrastructure construction and strive to achieve infrastructure integration, in order to promote the development of oil and gas cooperation between the two countries.

Countermeasure 3: Improve the legal environment for energy trade between China and Russia [56, p. 12].

In the oil and gas trade cooperation between China and Russia, there is no complete law to constrain each other's rights and obligations, and everything in trade cannot be relied on, which will inevitably cause conflicts between the two countries. Therefore, the construction of laws in each field is also an important guarantee to ensure the healthy development of oil and gas trade between the two countries.

There must be certain differences in the legal systems of China and Russia, so it is necessary to develop a set of laws specifically applied to oil and gas trade that are recognized by both countries and take into account their interests, based on familiarity with their respective laws. In response to the ambiguous gray areas in both countries, relevant departments will be established to handle legal issues related to the gray areas, and the legal provisions in trade cooperation between the two countries will be refined. Rights and obligations will be clearly separated to reduce the occurrence of unclear responsibilities in cooperation between the two countries. All documents and agreements signed in China Russia oil and gas trade will be given absolute binding force in legal form. At the same time, Russia should also improve its own laws related to oil and gas, affirm the authority of its laws in specific fields, reduce the impact of political turmoil and gas on the law, reduce the occurrence of unstable factors, and ensure the absolute authority of the law. Of course, China should also improve its laws and regulations in the field of petroleum, formulate strict cooperation regulations for the extraction of petroleum resources, regulate administrative regulations in the petroleum field, and ensure that all specific issues in the field have legal basis. The cooperation between the two countries can only proceed steadily under the constraints of relevant laws and regulations, so formulating strict laws and regulations is conducive to the cooperation between the two countries in oil and gas trade.

Countermeasure 4: Improve international coordination mechanisms and actively respond to international trade frictions. The prosperity and prosperity of China's foreign trade have greatly increased opportunities for global economic exchange and cooperation. The level of competition in China's foreign trade on a global scale is deepening, and the

number of frictions is also increasing. Similarly, Russia will increase the operational risks of China and Russia's foreign trade. The United States has imposed severe sanctions on China and Russia, causing difficulties in their foreign trade [16, p. 14].

Therefore, in order to address this challenge, China can analyze the factors that lead to trade frictions with target countries, improve global regulatory measures, and effectively reduce the occurrence of friction events. Reducing trade friction must be the cornerstone for two trading countries to reach consensus in communication and cooperation. After joining the World Trade Organization, China should conduct foreign trade in accordance with its cooperation principles and laws and regulations. Using the conflict resolution regulations of the World Trade Organization to resolve trade frictions, strengthening communication and exchange with countries, and achieving a win-win situation. When conducting foreign trade, we should treat every trading country equally to establish our country's image as a major power and obtain as much trade support as possible. The second aspect is to improve the way of handling trade frictions and establish comprehensive friction prediction rules. Keep up with the latest development trends and improve the degree of work targeting. On the one hand, China needs to protect the legitimate rights and interests of foreign trade enterprises in accordance with the law, while implementing countermeasures to address trade frictions, resisting local protection strategies against trade competitors, and establishing a strong image of China in global trade. This can enhance the competitiveness of Chinese export enterprises and aim to significantly reduce trade frictions.

Countermeasure 5: Comprehensively enhance cooperation between China and Russia in the oil and gas.

China and Russia have been establishing peaceful diplomatic relations for a long time, and their long-term coexistence and economic trade have already established a deep friendship between the two countries. Currently, the cooperation between China and Russia in the field of oil and gas is good, and in the future cooperation process, we must still adhere to the principles of mutual benefit, equality and justice, and continuously strengthen the cooperation between the two countries in oil and gas technology and talent. Although the cooperation between China and Russia has begun to take shape, China and

Russia mainly cooperate in the purchase and sale of oil and gas resources. There is less cooperation in oil and gas exploration and development, as well as in oil and gas technology and talent. Although Russia has abundant oil and gas resources, the utilization rate of technology and equipment in the development and utilization process is still too low, resulting in low utilization efficiency of oil and gas energy. In future trade, China and Russia should strengthen exchanges in technology and talent, explore oil and gas related issues together, improve the comprehensive utilization rate of oil and gas, take the path of technological internationalization, and continuously update relevant oil and gas equipment. The cooperation between China and Russia in the field of oil and gas began very early, and the two countries have been cooperating until today. Generally speaking, the two countries have the same interests and demands, and there is a good trade environment politically. The two countries should firmly seize the current good time, fully mobilize various factors beneficial to the development of both sides, formulate long-term development strategies for both countries, invest certain funds in oil and gas development and exploration, give certain preferential policies to foreign oil and gas enterprises, actively promote cooperation in the oil and gas field between the two countries, and comprehensively enhance cooperation in the oil and gas field [46].

Finally, regarding the prospects of China Russia oil and gas trade, the oil and gas cooperation between China and Russia has a deep and solid foundation in laws, policies, economy, and other aspects. After more than 20 years of exploration, the energy cooperation model is also constantly improving, and the prospects of energy cooperation between the two countries are broad.

Firstly, China Russia oil and gas cooperation should not only follow an extensive path of increasing energy supply, but also be accompanied by intensive changes. The Chinese oil and gas market may attract the interest of Russian companies, not only in the demand for primary energy consumer goods, but also in the creation of energy deep processing and equipment, services, technology, oil and gas chemical new product fields, joint development of innovative energy technologies, expert exchanges, establishment of joint ventures, and infrastructure projects. Therefore, in the future, China and Russia will strengthen diversified exchanges and cooperation in the fields of capital, assets,

experience, technology, and talent in the oil and gas industry, and continuously explore new areas of cooperation such as liquefied petroleum gas.

Secondly, cooperation in oil and gas will be further consolidated. According to authoritative institutions in China, Russia, and the West, it is predicted that China's demand for energy such as oil and natural gas will continue to rise in the next 30 years, and China's dependence on oil and gas imports will further strengthen. This provides broader development space for cooperation between China and Russia in the oil and gas field, and has a positive promoting effect on expanding cooperation scale and building new oil and gas pipeline projects. It is estimated that Russian natural gas will account for nearly 50 % of China's natural gas import market in the next 30 years. With the adjustment of China's economic structure, the number of electric vehicles in China has been increasing year by year, which will to some extent suppress the demand for oil and natural gas. In addition, China's abundant reserves of shale gas, well gas, and natural gas hydrates have also slowed down the growth of natural gas demand to some extent. However, currently limited by economic, technological, and ecological factors, in the long run, China Russia energy cooperation remains the most important channel to ensure China's energy supply in the coming decades.

In addition, the oil and gas cooperation between the two countries will also have a certain degree of impact on geopolitics. In the near future, the cross continental oil and gas transportation structure between China and Russia can serve as the foundation for forming an energy security system in the Asia Pacific region. In the medium term, both sides are exploring the possibility of transforming the Shanghai Cooperation Organization into a self-sufficient energy system, as there is a possibility of forming a system consisting of three parts on the European continent: production country, transit country, and consumption country. This system can fully leverage the advantages of the member countries of the Shanghai Cooperation Organization, establish a self-sufficient energy system within the organizational framework, and benefit the people of all countries in the region. In the long run, energy cooperation between China and Russia can become the foundation for forming a unified energy space between Europe, Russia, and Asia.

In short, the oil and gas cooperation between China and Russia has gone through a

long period of development and exploration, accumulated rich experience, formed a solid legal, institutional, and policy foundation, and formed a sound cooperation mechanism. In recent years, practice has shown that in the complex world situation and geopolitical conditions, China and Russia have unwaveringly carried out practical cooperation in the energy field, seeking mutual benefit and win-win results. This is a correct choice that is in line with the national conditions and energy policies of both countries, and is the only way for both countries to achieve peaceful development. In the future, China and Russia will continue to deepen oil and gas energy cooperation, expand cooperation space, innovate cooperation areas, improve cooperation mechanisms, and innovate cooperation methods, with the aim of forming a comprehensive, multi angle, and three-dimensional cooperation model covering energy products, capital, technology, equipment, talent, infrastructure, and other aspects. Within the framework of the comprehensive strategic partnership between China and Russia in the new era, we will seek great cooperation and development. Although both sides still face some contradictions and problems, this does not prevent the two countries from further deepening practical cooperation in the energy field in the future. The complementary advantages and mutually beneficial cooperation between the two countries have broader development prospects in the future.

Conclusion

Master thesis studies the oil and gas trade between China and Russia. Based on the theoretical foundation of Sino Russian cooperation in Chapter 1, the main reasons for the oil trade between China and Russia are analyzed, and an evaluation of the oil and gas trade between China and Russia is made. Chapter 2 mainly focuses on the economic analysis of the oil and gas trade between the two countries. Chapter 3 looks forward to the future development trend of oil and gas trade between China and Russia, analyzes the establishment of a reasonable oil and gas cooperation market between China and Russia, and strengthens the political security of enterprises.

China has become the global energy needs country, energy needs to be timely and effectively met; active seeking energy cooperation is the inevitable choice. Russia is a vast land and energy resources the abundance very rich, coupled with its economic and steady development is largely dependent on energy exports the realities of the Russian imperative is to seek a reliable energy-importing countries. China and Russia energy cooperation can be traced back to the early 90's, although the middle stranded for a period of time, but the two countries energy cooperation still continues.

Modern development of the global economy leads to growth in consumption of energy resources. In this case regional energy resources disproportions for the most number of regions isn't provided with the sufficient level of hydrocarbons. The same way, energy integration processes is a characteristic of the World economy' present stage and testifies a globalization energy market tendency by creating transregional economic relations contributing to the countries' development. From Russia's perspective, China's massive industrial and economic growth creates enormous demand for energy and natural resources. Russia's economy, which relies heavily on these exports, is now highly complementary to China's growth. It is in Russia's best interest to cooperate with China for its own economic growth.

Russia and China are always close in energy cooperation, constantly creating projects that are conducive to development, and have a profound impact on the economic development of the two countries. Deepening energy cooperation is not only an important

basic factor in the relations between the two countries, but also a strategic move for the future of China and Russia, which is of great significance to the national interests of both sides.

In this new era, we should seize the opportunity. Russia and China should establish new cooperation concepts and innovate cooperation models, carry out cooperation in the energy field, release the powerful economic potential of the strategic partnership between the two countries, and make it a deep bond between the two countries. The solid cornerstone of relations and common interests. Sino-Russian energy cooperation will also have a profound impact on the global energy landscape. Energy cooperation that shows bright prospects has become an important symbol and strategic support leading the continuous rise of Sino-Russian relations. Sino-Russian energy cooperation is one of the most extensive cooperation between the two countries. In the energy cooperation, many achievements have been shown to the people of the world, and the future development path is still broad, with endless development potential, opening up Sino-Russian energy cooperation new era.

In terms of the future development environment, globalization requires a stable development environment to support economic development, which involves the stability of the international situation. To put it simply, the current international situation is complex, turbulent, changeable, and full of uncertainty, but peace, development, and cooperation are the trends of the times. The trend of world multi-polarization and economic globalization is deepening, science and technology are advancing with each passing day, and the world economy as a whole maintains growth. Mankind is facing rare development opportunities. Security issues still exist, and non-traditional security threats such as terrorism, the proliferation of weapons of mass destruction, environmental pollution, natural disasters, and infectious diseases have become more prominent. The negative impact of economic globalization has increased, and the North-South gap and the gap between the rich and the poor have further widened. Under these circumstances, China advocates strengthening international cooperation to jointly seize opportunities and respond to challenges. China insists on working with the people of other countries to build a harmonious world of lasting peace and common prosperity.

In short, China and Russia are the two largest countries in the world facing economic transformation. Against the backdrop of deepening economic transformation and deepening reform and opening up, both countries have experienced vigorous development in their foreign trade at different levels. The two countries have different forms of economic transformation and encounter vastly different economic environments, resulting in significant differences in their foreign trade. The level of China's opening-up to the outside world continues to deepen, and the growth rate of total import transactions is relatively high. The development of import and export trade in Russia is relatively stable. China and Russia are strategic partners in cooperation, and the development of Russia's foreign trade has a significant impact on the progress, deeper expansion, and strengthening of the economic and technological cooperation between the two countries. This article explores the various possibilities of oil and gas trade between China and Russia, and there are many shortcomings that need to be further improved. Inspiration can be drawn from the development of oil and gas trade between the two countries to promote a good and fast development of oil and gas trade.

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