ERAI
Eurasian Rail Alliance Index

Report

THE EURASIAN RAILWAY ROUTE AND PROSPECTS FOR CHINA'S EXPORTS TO RUSSIA

April | 2023

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INTRODUCTION

In 2022, the transport industry in Russia and the EAEU as a whole faced unprecedented challenges in the logistics of goods flows due to large-scale trade restructuring in the wake of sanctions restrictions. Building new logistics required prompt decisions to create new transport routes through friendly and neutral countries that had not acceded to the sanctions against Russia. The search for new supply chains, including multimodal ones, and settlement schemes require a new level of flexibility and new logistics solutions for all involved economic agents. The greatest changes are expected in cargo turnover with Russia's largest trading partners — the European Union and China.

For the Eurasian railway route, which passes through the territory of Belarus, Russia and Kazakhstan, the new international political conditions have become a challenge. Despite the absence of sanctions against rail freight and the route operator, the current working environment has led to a 22% drop in container traffic on the China-Europe-China route by 35% in 2022. However, the sharply increased demand for transit traffic within the EAEU, primarily from Russia and Belarus to China and vice versa, compensated for the drop in transit cargo volumes.

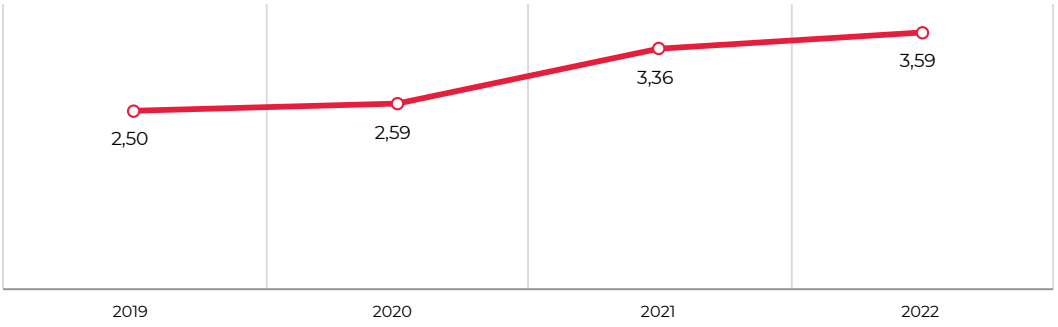
In terms of modes of transport, the greatest impact of the sanctions fell on air and road traffic. Railway and maritime transport were affected to a lesser extent, however, significant transformations of the transport and logistics services market itself — fluctuations in the ruble exchange rate, the withdrawal of large Western carriers, problems with insurance, changes in the configuration of cargo flows in favor of the East — had an impact on the cost of transportation. While the commodity structure of Russia's foreign trade turnover was maintained, there is a significant change in its geography. Products from Western countries are gradually being replaced by goods from Asia. Thus, there is an increase in imports of pharmaceutical products and pharmaceutical raw materials from India and China, as well as major global manufacturers and exporters of these products. Significant changes are taking place in the automotive components market: against the backdrop of curtailing programs for the supply of original spare parts to Russia, the law on parallel imports has opened up new channels for the supply of products.

In connection with the above, the importance of developing trade with China, the largest supplier of products to the Russian market, and its impact on the transport and logistics industry is growing. This review provides an analysis of current exports from China to Russia, the structural features, main changes and growth points identified in 2022, as well as an assessment of the potential of railway freight traffic in this direction.

GENERAL DYNAMICS OF CHINA'S EXPORTS TO RUSSIA

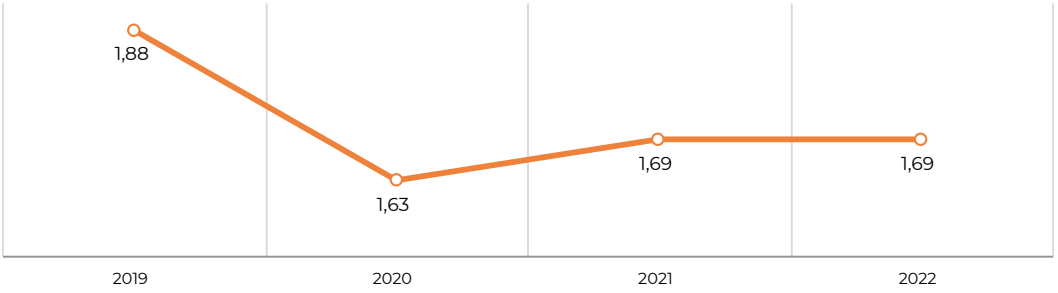
Exports of Chinese products to the world market have grown steadily in recent years, rising from $2.5 trillion in 2019 to nearly $3.6 trillion in 2022. Due to qualitative structural changes and the expansion of high-tech exports, the crisis sparked by the coronavirus pandemic did not affect the value of supplies, but affected the physical flow of goods: in 2020, China's total exports fell to 1.6 billion tons from 1.87 billion tons in 2019. Although the dynamics were positive in 2020 and 2021, in 2022 cargo traffic has not yet recovered to its previous volumes.

CHINA'S EXPORTS TO ALL COUNTRIES OF THE WORLD, TRLN USD



Source: Customs service of China

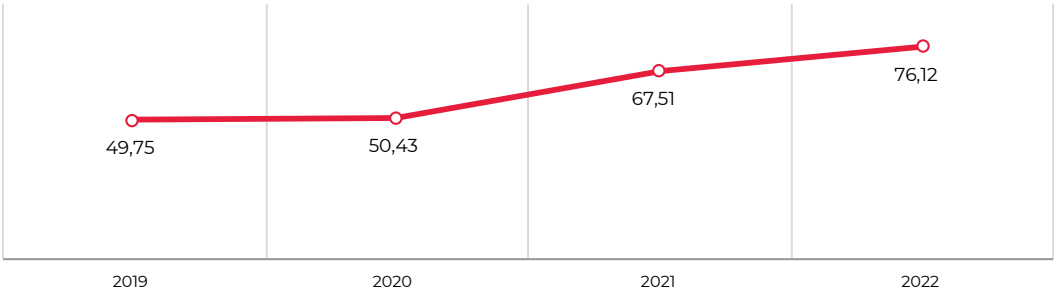
CHINA'S EXPORTS TO ALL COUNTRIES OF THE WORLD, BILLION TONS



Source: Customs service of China

China's exports to Russia in value terms during the crisis also remained at their 2019 level (about $50 billion), and by 2022 grew to $76 billion. Export growth in value terms over the past year was 13%.

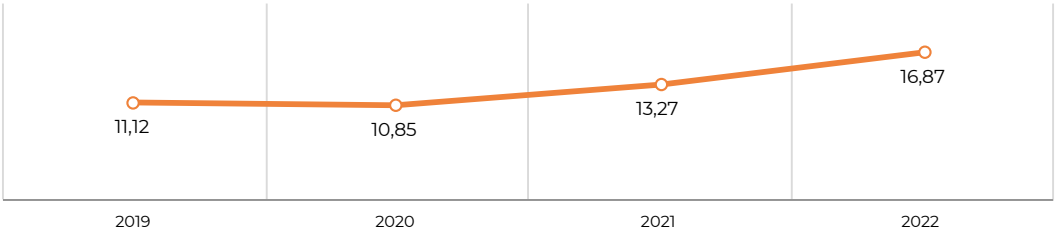
CHINA'S EXPORTS TO RUSSIA, BIL USD



Source: Customs service of China

The volume of goods sent as physical cargo to Russia, unlike exports to all countries, failed to ebb significantly during the pandemic, and by 2022 it increased by 52% compared to the level recorded in 2019, amounting to almost 17 million tons. Export growth in physical terms over the past year amounted to 27%, which is in line with the increase in rail freight traffic with China according to Russian Railways: compared with 2021, it was 28% higher.

CHINA'S EXPORT TO RUSSIA, MILLION TONS



Source: Customs service of China

As China's exports to the Russian market recovered at a faster pace than to the world market, the importance of Russia as a trading partner has also increased, particularly in terms of physical cargo traffic. The share of Russia reached 1% by 2022, up from 0.6% in 2019.

Table 1.

RUSSIA'S SHARE IN THE VOLUME OF CHINESE EXPORTS

	2019	2020	2021	2022
Value (USD)	2.0%	1.9%	2.0%	2.1%
Volume (metric tons)	0.59%	0.67%	0.78%	1%

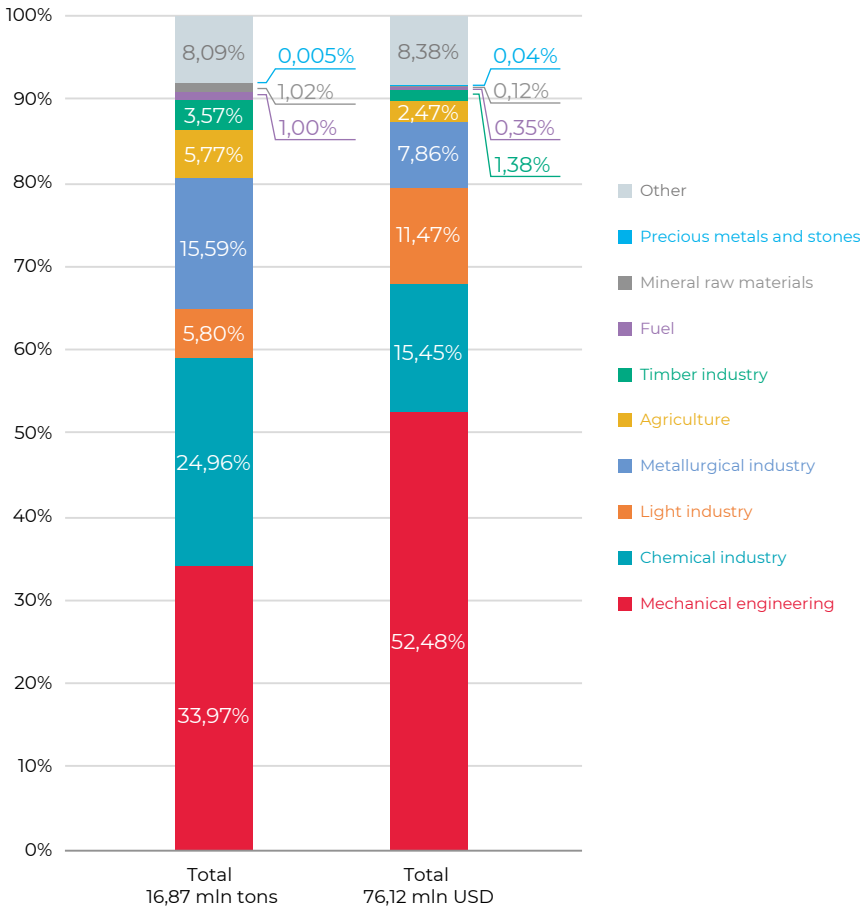
Source: Customs service of China

The current commodity structure and its dynamics in the post-crisis period will determine how high Russia ranks among China's foreign trade partners amid growing demand for a wide range of goods subject to sanctions, as well as how these trends affect the transport industry.

In the structure of China's deliveries to Russia, engineering products, including electronics and automobiles, are the largest export segment, both in terms of value and physical volume. The second most important segment is chemical products, particularly plastics, rubber and fertilizers. In the cost structure of exports, light industry products, metallurgy, and agriculture also stand out.

Differences in the structures of exports in dollars and in tons are due to the different «contribution» made by types of products to the cost or tonnage. Thus, light industry products account for 12% of the value of China's total exports to Russia, but in physical terms, they account for only 6%. A similar effect is observed for high-tech engineering products such as electronics. However, the products of the chemical, metallurgical and forestry industries, as well as agriculture, contribute more to the physical volume than to the value.

STRUCTURE OF CHINESE EXPORTS TO RUSSIA, 2022

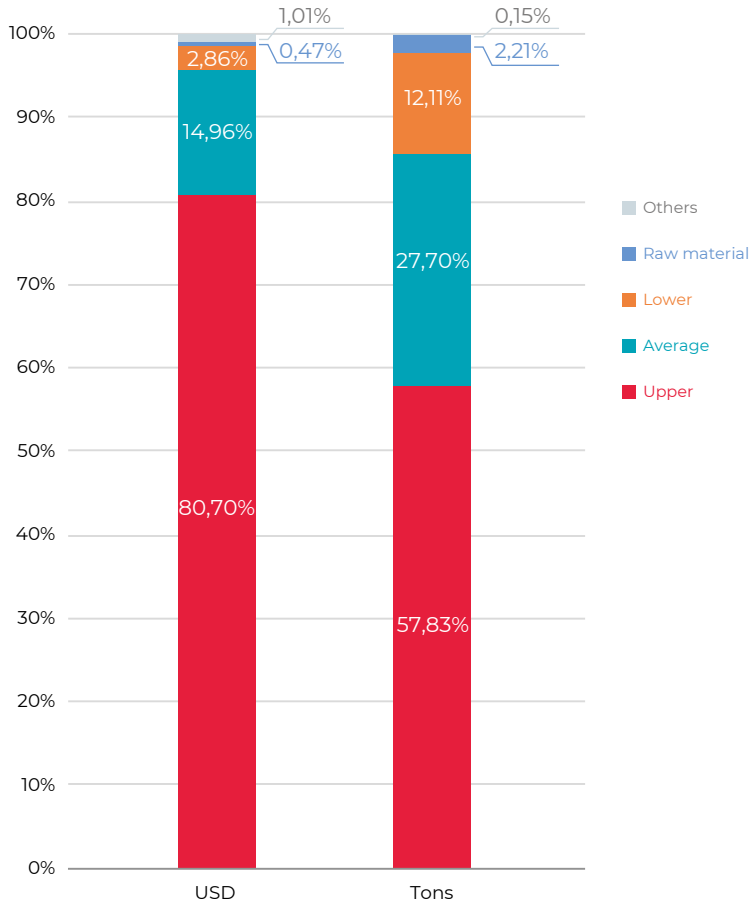


Source: Calculations based on PRC Customs data

The structure of China's exports to Russia is quite diversified, and most of the goods (81% by value and 58% by tonnage) are the result of high-value-added manufacturing. Given the raw material-heavy structure of Russia's exports to China, this causes asymmetry in the cargo flows between countries: despite a relatively even trade balance in value terms, the physical volume of Russia's exports to China is many times higher than the volume of imports from there. Thus, in 2020, Russia's physical exports to China amounted to 171.2 million tons, while imports amounted to 10.9 million tons.

The asymmetry of cargo flows is due to differences in the economic development and production structure of the two countries. China has a more developed manufacturing base, which allows it to export more finished goods to Russia. In turn, Russia is the largest exporter of energy resources such as oil and gas, which dominate its export structure.

EXPORT STRUCTURE OF CHINA IN 2022 BY LEVEL OF PRODUCT COMPLEXITY



Source: Calculations based on PRC Customs data

In order to eliminate the asymmetry of cargo flows between Russia and China, it is necessary to develop mutual trade and investment in various sectors of the economy. This can be achieved through the expansion of trade relations and the creation of conditions for investment in the production of more high-tech goods in Russia. It is also important to improve the transport infrastructure in order to ensure more efficient cargo transportation between the two countries, which would increase the capacity of existing transport corridors.

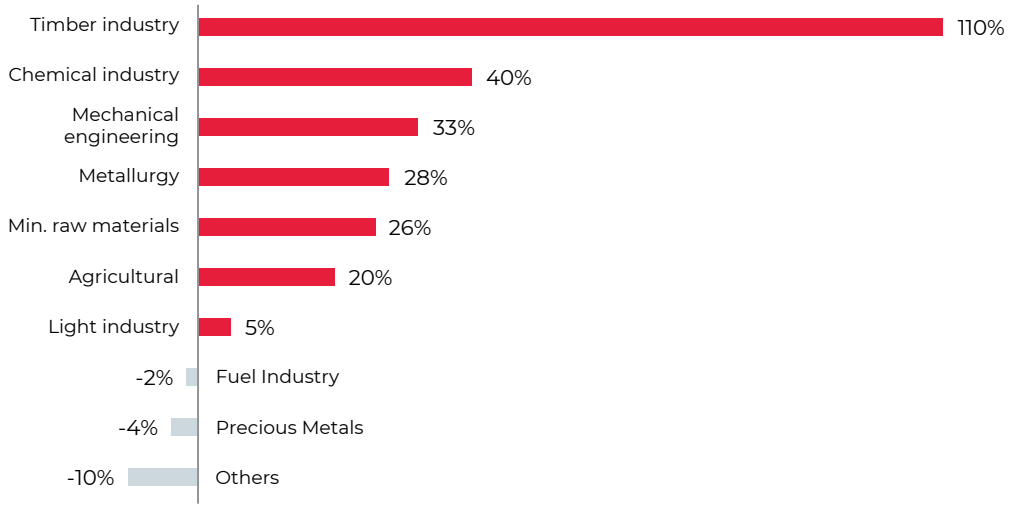
MAIN CHANGES IN CHINA'S EXPORTS TO RUSSIA IN 2022

Exports from China to Russia have been characterized in recent years by the following trends:

- An increase in the technological effectiveness of exports – an increase in the share of such goods as computers, telephones, electronics and other household goods;
- The expansion of agricultural exports such as grain, oil, meat and other products;
- An increase in exports of construction products such as steel, aluminum, glass and other building materials;
- Growth in the export of goods related to the development of environmentally friendly technology, such as solar panels, electric vehicles and other modes of transport;
- Export of goods related to healthcare and medicine, such as medical equipment, medicine and other goods.

The year 2022 made its own adjustments to the configuration of Russia's foreign trade, particularly, a rather radical shift in trade priorities from west to east opened up new opportunities for Chinese manufacturers to compensate for the resulting food shortages. This, in turn, had a significant impact on cargo flows in certain sectors.

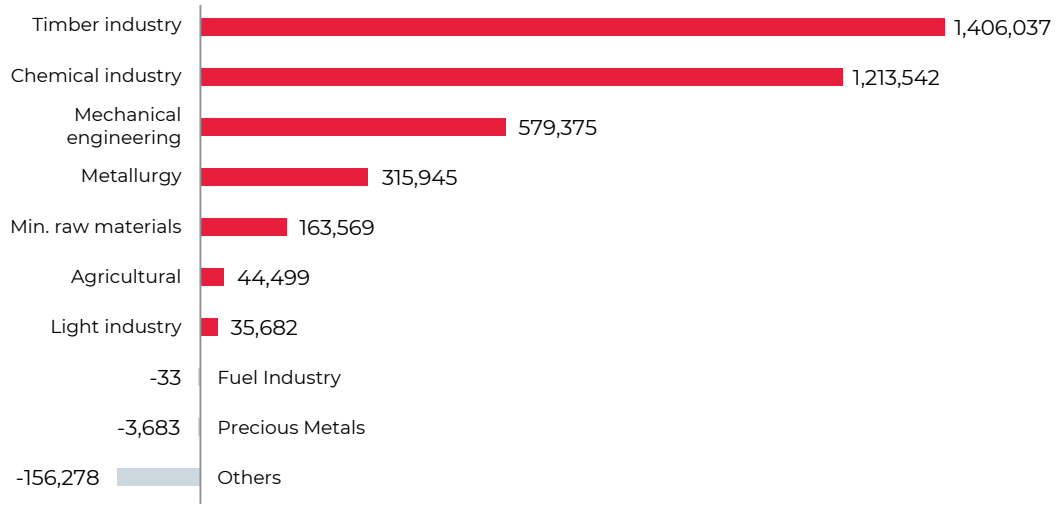
CHANGES IN PHYSICAL EXPORTS FROM CHINA TO RUSSIA BY MAJOR INDUSTRIES IN 2022 IN RELATIVE TERMS



Source: Calculations based on PRC Customs data

The largest growth in supplies was noted in the timber industry: exports to Russia increased by 110%, which is about 315,000 tons. This growth was due to a significant increase in the supply of various types of paper and cardboard, especially laminated and impregnated, as well as sulfate cellulose. China is one of the largest manufacturers of paper and board products in the world, including highly processed and special grades used for packaging, certain types of printing and other purposes. The introduction by the European Union of a ban on exports to Russia of products for the printing industry in April 2022 included a ban on the supply of the above types of paper, as well as raw materials and chemicals for its production. This led, at first, to a deficit emerging in certain categories of products on the Russian domestic market, and then to a restructuring of the import structure in favor of Chinese suppliers.

CHANGES IN CHINA'S PHYSICAL EXPORTS TO RUSSIA BY MAIN INDUSTRIES IN 2022 IN ABSOLUTE TERMS, TONS



Source: Calculations based on PRC Customs data

In terms of absolute growth in China's exports to Russia in physical terms, the leader is engineering products: in total, deliveries increased by 1.4 million tons over the year, or 33% higher than the level recorded in 2021. Imports of trucks with diesel engines, construction equipment, car parts, and containers have increased significantly.

The Chinese automotive industry is developing rapidly, and in recent years, a number of automakers have mastered the production of high quality diesel-fueled trucks. This resulted in China becoming the largest exporter of diesel trucks to the world market after Germany in 2021. Companies such as Dongfeng Motor Corporation, FAW Group, Shaanxi Automobile Group, Sinotruk and Beiqi Foton Motor Co. Ltd., manufacture a wide range of trucks ranging from light to heavy vehicles that can carry over 50 tons. The growth in China's deliveries to Russia in 2022 was recorded in all weight categories and is the result not so much of the replacement of European cars that fell prey to sanctions, but of increased domestic demand for this type of vehicle. This is evidenced by multiple growth volumes — in 2021, Russia imported about 12,700 diesel trucks from all countries, and in 2022 China alone delivered 34,000 trucks to Russia. Among the most popular trucks from China on the Russian market are such brands as Foton, Sinotruk (HOWO), Dongfeng (DFM), JAC and Shacman. These trucks come in a variety of payload capacities and body configurations and can be used to carry a variety of loads.

Table 2.

THE LARGEST COMMODITY CATEGORIES AMONG CHINA'S EXPORTS TO RUSSIA BY ABSOLUTE GROWTH

№	HS4	Category	HS4 type	2021, tons	2022, tons	2022/2021 Absolute growth, tons	2022/2021 Relative growth	Proportion in 2022
			Total	13,271,851	16,870,506	3,598,655	27%	100%
1	2818	Metallurgy	Alumina, aluminum hydroxide, corundum	9,691	856,094	846,403	8,734%	5.1%
2	8704	Machinery	Trucks	113,566	469,103	355,537	313%	2.8%
3	8609	Machinery	Containers	103,436	393,025	289,590	280%	2.3%
4	8429	Machinery	Bulldozers, excavators, heavy equipment	246,290	511,321	265,031	108%	3.0%
5	4011	Chemicals	Pneumatic tires	209,940	381,485	171,544	82%	2.3%
6	4811	Timber	Paper and cardboard, saturated or laminated	34,929	173,323	138,394	396%	1.0%
7	4810	Timber	Paper and cardboard, enameled	75,449	204,457	129,008	171%	1.2%
8	8905	Machinery	Platforms, docks, beacons and similar watercraft	34,037	124,611	90,574	266%	0.7%
9	3907	Chemicals	Polyacetals, polyesters, polycarbonates	318,430	404,925	86,495	27%	2.4%
10	8701	Machinery	Tractors and towing engines	15,973	98,834	82,861	519%	0.6%
11	3904	Chemicals	Polyvinyl chloride	71,365	149,112	77,747	109%	0.9%
12	6902	Other	Refractory building ceramics	43,155	117,368	74,213	172%	0.7%
13	3402	Chemicals	Detergents and surfactants	40,084	103,734	63,650	159%	0.6%
14	3811	Chemicals	Additives for petroleum products	550	61,868	61,318	11,146%	0.4%
15	8705	Machinery	Specialized vehicles	25,760	85,460	59,699	232%	0.5%
16	0805	Agriculture	Citrus	75	59,767	59,692	80,080%	0.4%
17	8901	Machinery	Cargo and passenger ships	30,873	89,012	58,140	188%	0.5%
18	3824	Chemicals	Other chemical products	86,224	135,541	49,318	57%	0.8%
19	2708	Fuel	Pitch and pitch coke	41,435	84,786	43,351	105%	0.5%
20	8427	Machinery	Forklifts and similar machines	69,509	112,859	43,350	62%	0.7%
			Other	11,701,080	12,253,820	552,740	5%	72.6%

Source: Calculations based on PRC Customs data

In addition to trucks, EU sanctions include a ban on the export of special equipment to Russia, including semi-trucks, medium-duty trucks, concrete mixers, bulldozers, tractors, communal street cleaning machines and dump trucks. While Russian manufacturers have expressed their readiness to replace these products, the results of 2022 indicate an increase in demand for imported, particularly Chinese, construction equipment.

A several-fold increase in supply is noted for almost all types of containers, but especially 40-foot containers. In 2022, 87,324 units were imported — 66,449 units more than in 2021. The total number of containers delivered was 115,970 units, more than double the figure for 2021.

Table 3.

DYNAMICS OF CONTAINER EXPORTS FROM CHINA TO RUSSIA BY TYPE, UNITS

HS8 Code	Name of product	2019	2020	2021	2022
	Total	64,798	15,612	49,802	115,970
86090011	Thermally insulated 20 foot containers	12	15	14	135
86090012	Tank-type 20 foot containers	1,339	532	772	281
86090019	Other types of 20 foot containers	5,285	9,003	7,349	26,021
86090021	Thermally insulated 40 foot containers	106	220	488	2,105
86090022	Tank-type 40 foot containers	33	5	17	83
86090029	Other types of 40 foot containers	5,196	4,980	20,875	87,324
86090090	Other types of specialized containers not included in the other categories	52,827	857	20,287	21

Source: Calculations based on PRC Customs data

Containers (including containers for the shipment of liquids or gases), are specially designed and equipped for shipment via one or more modes of transport. They are intended for the door-to-door delivery of goods, not including intermediate repacking along the way. They have a solid construction and are designed for repeated use.

The growth in the supply of containers from China to Russia may be due to the following factors.

Due to the rapid reorientation of Russian export flows from west to east in 2022, in particular from the European market to China, the aforementioned imbalance in Russia-China-Russia cargo flows has intensified. According to experts, the shortage of containers in 2022 totaled approximately 77,000 units. China is the world leader in the export of containers, and the production of containers as well as their delivery is subsidized by the state. It has become a key supplier of containers for Russia.

The withdrawal of a number of Western transport and logistics companies from the Russian market, along with other factors, has reduced the number of containers available to Russian shippers. This, in turn, has stimulated the purchase of additional containers by Russian market participants to meet the sharp increased demand. In addition, a certain stimulating effect on the supply of containers was provided by the tariff measure taken in the spring of 2022 by the Eurasian Economic Commission (EEC). At the initiative of the Eurasian Union of Participants in Rail Freight Transportation, in order to prevent the reduction of the container fleet after the withdrawal of some Western logistics companies from the EAEU, in April 2022, the import customs duty on certain types of containers was lowered to zero; it had previously been 10%. The measure applies to the main imported item — code 8609 00 900 9 TN VED EAEU (other containers), a category under which both 20-foot and 40-foot containers are declared, including used ones.

Containers currently produced in Russia and the EAEU are all purchased by domestic businesses; there aren't enough to meet demand. The largest mass manufacturer of large-tonnage containers in Russia is Abakanvagonmash (part of JSC RM Rail), which produces about 6,000 units under contract for PJSC TransContainer. However, in the face of growing demand, the company plans to modernize its factories in order to increase container production. In particular, the initiative is included in the agreement on the joint implementation of the investment program for 2022–2025 between RM Rail and the government of the Republic of Khakassia.

In second place, both in terms of absolute and relative growth, are chemical industry products, including tires, plastics, detergents, petroleum product additives, dyes, adhesives and various chemical compounds. In total, the physical volume of chemical industry exports increased 40%, or 1,213,542 tons.

The metallurgical industry also shows significant growth. Although the total volume of freight traffic in the industry increased 28% (579,375 tons), the dynamics of metallurgical product supplies is not unambiguous. The Chinese import product which demonstrated the most relative growth is alumina (subheading 281820) — 842,000 tons, in relative terms, the volume was 46,153% what it had been in 2021. At the same time, supplies of such metallurgical items as non-alloyed rolled products with coating fell significantly, as well as wide stainless steel sheets, structures made of ferrous metals, ferrous metal fasteners and many other types of products.

Table 4.

THE LARGEST COMMODITY CATEGORIES AMONG CHINA'S EXPORTS TO RUSSIA BY ABSOLUTE GROWTH, TONS

№	HS4	Category	HS4 type	2021, tons	2022, tons	2022/2021 Absolute growth, tons	2022/2021 Relative growth	Proportion in 2022
			TOTAL	13,271,851	16,870,506	3,598,655	27%	100%
1	281820	Metallurgy	Alumina	1,822	842,759	840,937	46,153%	5.0%
2	870423	Machinery	Diesel trucks weighing over 20 toms	97,077	417,385	320,308	330%	2.5%
3	860900	Machinery	Containers	103,436	393,025	289,590	280%	2.3%
4	842952	Machinery	Full-slewing excavators	78,603	228,722	150,119	191%	1.4%
5	890590	Machinery	Docks, cranes, beacons and similar craft	3,334	105,045	101,711	3,051%	0.6%
6	401120	Chemicals	Tires for busses and trucks	109,590	184,824	75,233	69%	1.1%
7	390410	Chemicals	Pure polyvinyl chloride	68,402	142,789	74,386	109%	0.8%
8	890190	Machinery	Cargo ships, except tankers and refrigerator ships; cargo-passenger ships	15,483	89,012	73,530	475%	0.5%
9	481092	Wood and paper	Multilayer coated paper and cardboard	27,015	93,243	66,228	245%	0.6%
10	870121	Machinery	Wheeled tractors for diesel semi-trailers		65,431	65,431	—	0.4%
11	842951	Machinery	Single-bucket front loaders	107,169	167,200	60,031	56%	1.0%
12	381121	Chemicals	Petroleum based lubricating oil additives	345	60,265	59,920	17,367%	0.4%
13	390729	Chemicals	Other polyethers		57,046	57,046	—	0.3%
14	481141	Wood and paper	Self-adhesive paper and cardboard	13,984	70,767	56,783	406%	0.4%
15	401180	Chemicals	Tires for industrial and construction equipment	32,674	88,254	55,580	170%	0.5%
16	390761	Chemicals	Polyethylene terephthalate with a viscosity number from 78 ml/g	223,110	273,884	50,774	23%	1.6%
17	690220	Other	Refractory building ceramics with over 50% alumina and silica	20,712	70,391	49,679	240%	0.4%
18	382499	Chemicals	Other mixed chemicals	69,690	117,605	47,915	69%	0.7%
19	340239	Chemicals	Other organic anionic surfactants		47,581	47,581	—	0.3%
20	870510	Machinery	Auto-cranes	19,536	64,627	45,091	231%	0.4%
			Other	12,279,869	13,290,651	1,010,782	8%	78.8%

Source: Calculations based on PRC Customs data

Alumina (or aluminum oxide) is a white refractory substance; a compound of aluminum and oxygen which is one of the most important industrial minerals. It is widely used in the production of aluminum alloys, foil, cables, foundry equipment, window frames, automotive parts, etc. It can also be used in the production of cosmetics, pharmaceuticals, antacids, antiseptics and other chemicals. In this study, the mineral is assigned to the metallurgical industry, since for the most part it is used as a semi-finished product for the production of aluminum.

The Russian enterprise RUSAL is one of the world's largest producers of alumina, supplying mainly metallurgical alumina of the G-00 grade, the raw material for which is bauxite and nepheline ore. In total, the company has nine alumina refineries: in Russia (Bogoslovsky, Achinsky, Uralsky, Pikalevsky), Ireland (Aughinish Alumina), Australia (QAL), Guinea (Friguia), Jamaica (Windalco) and Ukraine (Nikolaev Alumina Refinery). In early March 2022, the company was forced to stop production at the Nikolaev plant, which had produced about 21% of the company's alumina. In mid-March, the Australian government imposed a ban on the supply of alumina and aluminum ore to Russia. The Australian subsidiary QAL had accounted for 9% of RUSAL's alumina production in 2021. In 2021, in Russia's import of alumina, these two countries accounted for more than half of the supplies, and in connection with their termination, Russian importers were forced to look for new alternatives..

China is one of the world's largest producers of alumina (producing it from both bauxite ores and kaolinite), but its capacities are mainly used to meet domestic demand. In 2021, China's global alumina exports did not exceed 120,000 tons, and in 2022, thanks to Russian demand, it increased to 1 million tons. Apparently, China, which was the tenth-largest supplier of alumina to Russia in 2021, became a leading supplier in 2022. Since, at the same time, in 2021, Chinese companies increased their bauxite imports, we can assume a further expansion of alumina exports to Russia.

Table 5.

DYNAMICS OF ALUMINA IMPORTS (HS CODE 281820) TO RUSSIA, TONS

Provider country	2017	2018	2019	2020	2021
World	4,489,550	4,661,533	4,927,855	4,683,335	4,746,248
Ukraine	1,674,984	1,708,887	1,689,350	1,720,021	1,726,376
Australia	1,080,362	909,394	1,264,162	1,410,460	1,518,730
Ireland	238,656	258,036	391,833	396,790	493,100
Kazakhstan	1,001,650	969,740	531,323	392,123	408,030
Guinea		136,433	250,497	312,657	290,990
Jamaica	201,038	241,895	213,014	251,346	161,092
Brazil	147,424	337,914	500,416	180,804	136,308
Spain	24,372	22,680	19,141	12,563	8,007
Germany	9,840	9,241	10,379	4,308	1,800
China	1,217	64,612	25,442	806	780
Other	109,946	2,701	32,297	1 457	1,035

Source: Calculations based on PRC Customs data

Also, in addition to China, against the backdrop of difficulties with supplies from the usual sources, Russia in 2022 more than doubled its alumina imports from Kazakhstan. Based on the data for 2021 (due to the elimination of supplies from Ukraine and Australia), Russia needs to replace at least 3.2 million tons of alumina.

Thus, alumina is Russia's largest import item from China in physical terms, and a large-scale restructuring of the geography of its supplies is currently underway. China's production facilities and transport infrastructure are of key importance for the reorientation of cargo traffic from the west to the east. Increasing supplies from China can also improve the balance of cargo flows between the countries.

KEY CHANGES IN CHINA'S EXPORTS TO RUSSIA IN 2023

In 2023, the physical cargo flow from China to Russia, when measured by industry, grew in all sectors, including fuel and precious metals and stones, which contracted in 2022.

Table 6.

CHANGES IN PHYSICAL EXPORTS FROM CHINA TO RUSSIA BY MAIN INDUSTRY IN 2023 IN ABSOLUTE AND RELATIVE TERMS, TONS

Industry	January – February 2022	January – February 2023	Absolute growth	Relative growth
Total	1,619,294	2,250,032	630,738	39%
Chemical industry	560,782	816,908	256,126	46%
Metallurgical industry	312,088	544,934	232,846	75%
Timber and wood industry	46,285	129,045	82,760	179%
Agriculture	139,713	159,316	19,603	14%
Machinery	237,092	247,823	10,732	5%
Raw mineral materials	26,802	33,847	7,044	26%
Fuel	31,365	36,739	5,374	17%
Light industry	88,314	91,078	2,763	3%
Precious metals and stones	106	168	62	59%
Other	176,747	190,173	13,426	8%

Source: Calculations based on PRC Customs data

In the first two months of 2023, China's physical exports to Russia increased by almost 40% compared to the same period in 2022, growing by 630,000 tons in absolute terms. In many ways, this increase was due to an increase in the supply of products from the chemical industry (pneumatic tires, certain types of polyethylene, calcium chloride, etc.), the metallurgical industry (alumina) and the timber industry (paper and cardboard). Thus, in early 2023, the main trends in physical cargo traffic from China to Russia remained, with the exception of machinery, the supply of which grew less intensively than in 2022 (5% vs. 33%).

POTENTIAL FOR EXPANSION OF FREIGHT TRAFFIC FOR RAIL TRANSPORT

The following assessment of the shift in freight traffic in favor of railway transit is based on the author's approach to the analysis and comparison of various statistical data from publicly available sources of information, the PRC Customs Service database and the in-depth statistics of the ERAI portal.

The structure of China's exports to Russia is characterized by a significant share of finished industrial goods, the majority of which are containerized and may be shipped via rail.

To determine how much of the freight traffic from China to Russia can be transferred to the railway and how much railway capacity will need to be used, two main approaches were developed to assess potential traffic, as well as a method for converting weight values of freight traffic into volumetric (TEU).

Of the 1065 commodity items exported from China to Russia in 2022, at least 912 items are suitable for transportation by rail, based on the nomenclature of rail freight presented in the statistics of the ERAI portal. This means that out of 16.8 million tons of cargo transported from China to Russia in 2022, 16.2 million tons is the potential cargo flow for the railway. The increase in these "railway" positions in 2022 amounted to 27% (or 3.5 million tons), which makes it possible to predict an increase in demand and load of railway transport in 2023.

The total amount of potential rail freight traffic from China to Russia totals 2,440,891 TEU per year[1], with its largest items being alumina; trucks and cars, auto parts and tires; bulldozers, excavators, road machines, parts of lifting, road-building and mining equipment; polyacetals, polyesters, polycarbonates, polycarboxylic acids and their derivatives, ferrous metal fasteners; sheet metal; paper and cardboard; electric heaters, etc.

1 To assess potential volumes in TEU, based on the detailed database of the ERAI portal for railway transportation carried out in 2022, the specific weights (weight-to-volume ratio) of various commodity items were calculated. The potential cargo traffic in TEU is calculated for the current range of China's exports to Russia as the ratio of the volume of cargo traffic in 2022 in tons to the average value of the specific weight for each individual commodity item.

Table 7.

POTENTIAL VOLUME OF RAIL FREIGHT TRAFFIC FROM CHINA TO RUSSIA IN TEUS

№	HS4	Industry	HS4 type	2022, tons	Average unit weight, tons/TEU	TEU
			Total	16,191,134		2,440,891
1	2818	Metallurgical industry	Alumina, aluminum hydroxide, corundum	856,094	8.3	103,083
2	4011	Chemical industry	Pneumatic tires	381,485	4.2	89,991
3	8429	Machinery	Bulldozers, excavators, road equipment	511,321	7.6	67,425
4	8708	Machinery	auto parts	360,920	5.5	65,542
5	8703	Machinery	Cars	180,818	2.8	64,781
6	8704	Machinery	Trucks	469,103	7.3	64,579
7	7318	Metallurgical industry	Ferrous fasteners	283,157	6.7	42,571
8	6815	Other	Articles made of carbon and other minerals	118,578	3.3	35,934
9	8415	Machinery	Air conditioners	133,910	3.7	35,762
10	8905	Machinery	Platforms, docks, beacons and similar watercraft	124,611	3.5	35,350
11	8516	Machinery	Electric heating devices	167,782	4.9	34,529
12	8901	Machinery	Cargo and passenger ships	89,012	2.8	31,456
13	3907	Chemical industry	Polyacetals, polyesters, polycarbonates	404,925	13.2	30,785
14	2917	Chemical industry	Polycarboxylic acids and their derivatives	288,055	11.3	25,597
15	8701	Machinery	Tractors and semi-trucks	98,834	4.0	24,615
16	8545	Machinery	Electrical products made of carbon	291,666	11.9	24,429
17	4811	Timber and wood industry	Paper and cardboard, saturated or laminated	173,323	7.1	24,342
18	6402	Light industry	Shoes with plastic or rubber uppers	107,161	4.4	24,219
19	7219	Metallurgical industry	Wide stainless steel sheets	196,591	8.3	23,560
20	8705	Machinery	Special vehicles	85,460	3.7	23,174
			Other	10,868,328		1,569,168

Source: authors' calculations based on data from the PRC Customs Service and the ERAI portal

The structure of China's exports to Russia largely corresponds to the core nomenclature of rail transit between China and Europe: machinery, electronics, cars, plastics and other valuable goods, transported in containers. In total, in 2022, transit cargo traffic in both directions amounted to 410,520 TEUs, which, as noted above, is 35% lower than the same indicator for the previous year.

Table 8.

THE MAIN CARGO SHIPPED IN CHINA-EUROPE-CHINA TRAFFIC IN 2022

Code	Cargo	TEU
	Total	410,520
85	Electrical devices, communication equipment	71,531
84	Mechanical equipment and machinery, computers	56,990
87	Automotive	34,018
99	Other cargo	31,631
39	Plastics and products from them	27,963
94	Furniture, lighting equipment	18,963
73	Ferrous metal products	14,879
48	Paper and cardboard	11,118
40	Rubber and rubber products	10,199
38	Other chemical products	10,065
28	Products of inorganic chemistry	9,534
19	Flour-based finished products	9,238
	Other	104,391

Source: ERAI index

The similarity in the nomenclature of these shipped goods speaks in favor of the possibility of switching cargo traffic from China to Russia to the Eurasian railway route, through the border crossings of Kazakhstan — to further replace the declining volumes of transit cargo traffic between China and the EU.