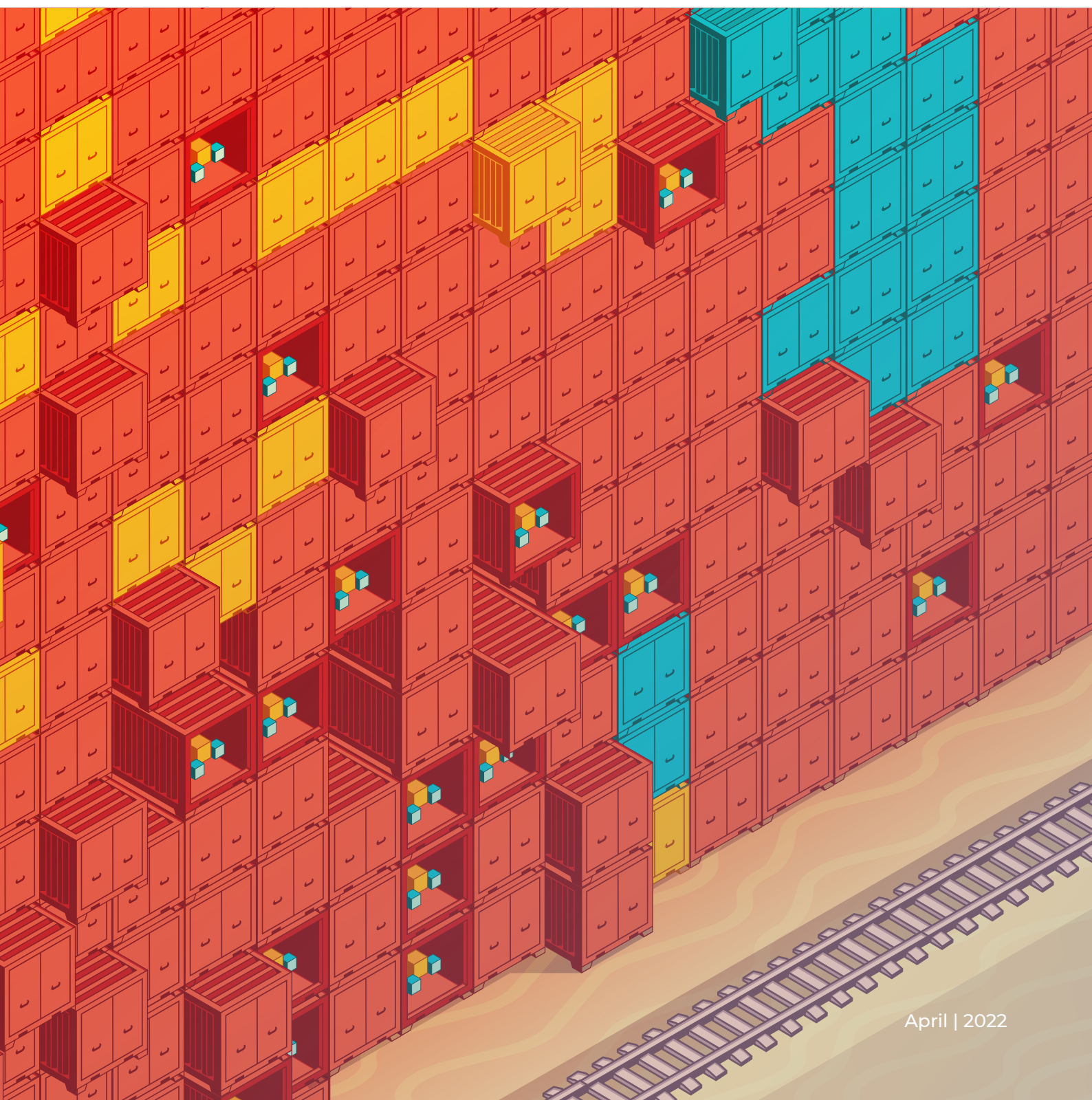


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## ROAD FREIGHT TRANSPORTATION FROM THE EU TO CHINA: CURRENT STATUS AND PROSPECTS

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# COMPETITIVE ADVANTAGES AND FEATURES OF ROAD FREIGHT TRANSPORTATION IN EURASIA

The rapid growth of railway freight traffic between Europe and East Asia, associated with the long-term efforts of states and businesses to develop trans-Eurasian routes and the coronavirus crisis, has made the sustainability of shippers' transition to railway use a top priority. The accelerated modal shift has presented a unique opportunity, but also a challenge for railways and infrastructure in the 1520 mm gauge space. In 2021, goods worth a total of \$40.7 billion were transported through Eurasia by rail, equal to 5.8% of the total annual trade turnover between China and the EU. The ever-increasing demand for a Eurasian rail alternative to maritime transport is facing capacity constraints at border crossings — infrastructure bottlenecks.

Given these conditions, road freight transportation is characterized by favorable flexibility and is gaining a certain degree of popularity as the segment attempts to find its niche in the cargo flow between China and the European countries. Despite the colossal distance between the regions, road transport has its advantages, which makes the road alternative suitable in some cases. Road transport provides better accessibility for shippers as it boasts greater reach and freedom of action. For example, road transport allows you to bypass the «bottlenecks» of the railway infrastructure, as well as deliver goods «from door to door» within the supply chain. The system of cargo traceability has already been largely introduced in motor transport, while there are difficulties with this when shipping by rail.

Both rail and road transport are united by a common feature — they are a land-based continental means of transporting goods. Often their routes' use of border crossings and transport hubs coincides. Thus, they largely share the advantages and disadvantages of continental transport corridors, and are also on the other side of the scale in relation to sea and air modes of transport. Both rail and road freight have benefited from the coronavirus crisis and the modal shift in transit container traffic in Eurasia. For example, *ceteris paribus*, both modes of transport feature a similar transit time for transit cargo — up to 14 days from the sender to the recipient, of which about 6 days are accounted for movement through the territory of the EAEU.

At the same time, trucking suffers from a number of restrictions. Some of them are specific to Eurasian continental cargo transportation. Firstly, due to the long distance, the cost advantage of road transport decreases, gradually decreasing after 300-500 km of transportation. Secondly, while rail freight transportation is hampered by restrictions on border crossings and a change of gauge, then road transport has encountered an obstacle in the form of China's «zero tolerance» policy regarding COVID-19 and large-scale traffic jams at border crossings, leveling the time advantage of this mode of transport. Thirdly, road transport, despite plans for decarbonization, is associated with increased CO<sub>2</sub> emissions per unit of cargo transported. This puts it at odds with the climate [goals of the EU](#), which aims to reduce road transport beyond 300 km in favor of railways and waterways; China has similar [goals](#).

It is also important that these two forms of overland shipping complement each other in many ways. The growth in demand for road transport in Eurasian transit traffic is associated with the general attractiveness of continental routes. At the same time, failures in railway logistics present an additional factor hindering the transition to truck transport, especially during peak seasons. Truck transport is able to quickly respond to local surges in supply and demand. Also, grounds for optimism regarding continental shipping routes are provided by the continued growth of mutual trade between the EU and China.

In recent months, against the backdrop of an aggravated international political situation due to the conflict in Ukraine, trucking has faced an unprecedented challenge. Continued congestion at the borders, the actual withdrawal of Russian road carriers from the European market and risks that Russia will take similar steps — the political factor significantly limits the ability of vehicles to engage in overland transport. Under these conditions, rail transportation gains advantages as the most reliable mode of transport, and the aforementioned complementary nature of road and rail transportation is called into question.

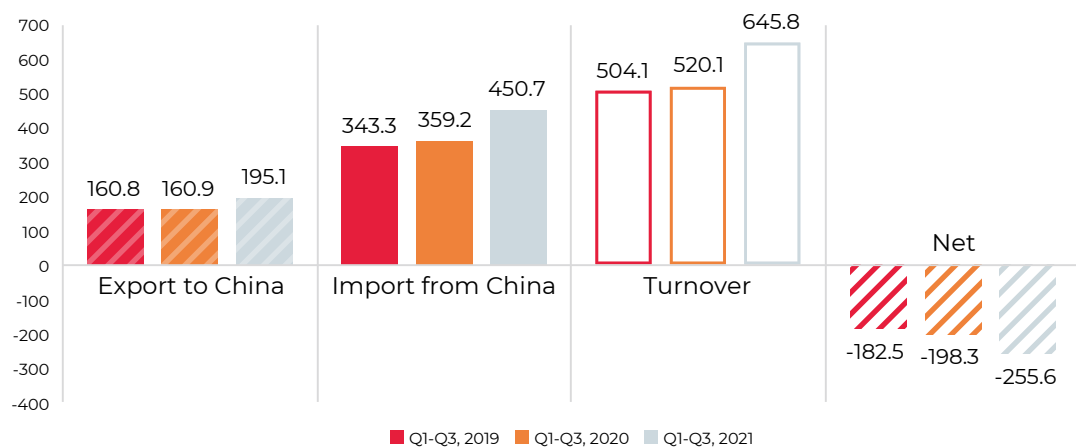
# PECULIARITIES OF THE EU EXPORTS TO CHINA: THE PROBLEM OF BALANCE

In recent years, there has been a gradual increase in the volume of total freight traffic from the EU countries to China. Mutual trade between the European Union and China is the central axis of all trans-Eurasian transit and one of the main segments of world trade. Its dynamics determine the cargo base of trans-Eurasian transportation.

In the first three quarters of 2021, the cumulative trade turnover between the EU and China amounted to a record \$645.8 billion, an increase of \$125.7 billion (+24%) compared to the same period in 2020. At the same time, EU exports to China in the first three quarters of 2021 amounted to \$195.1 billion (+21%), and imports totaled \$450.7 billion (+25%). Thus, it is the growth of EU imports from China, and not exports, that remains the main driver of trade growth.

## EU-27 EXTERNAL TRADE WITH CHINA: Q1-Q3

billion USD

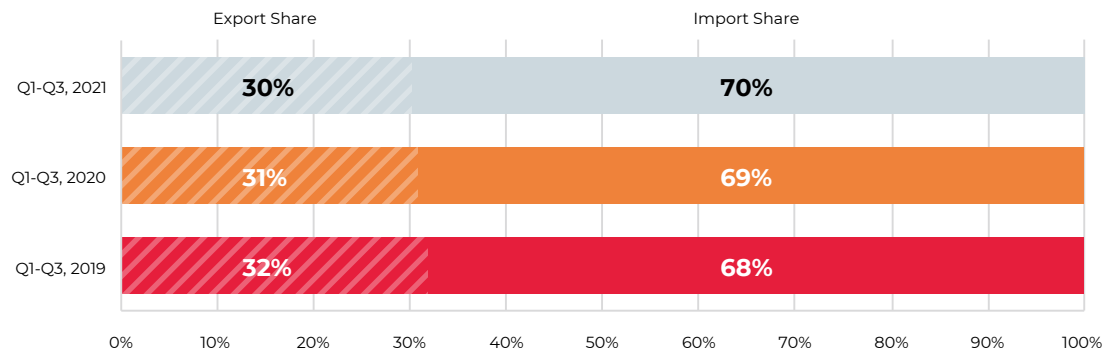


Source: International Trade Center (ITC)

At the same time, the EU's deficit in trade with China is growing from year to year. For the first three quarters of 2021, it amounted to \$255.6 billion, an increase of 29% compared to the same period in 2020. While in 2019 the share of EU imports was 68% of bilateral trade turnover, in 2021 it was already 70%. From a logistical point of view, the growing EU deficit creates a balancing act as China-EU traffic exceeds EU-China traffic.

The presence of imbalances in EU trade with China requires significant efforts on the part of the logistics market to balance cargo flows and the timely return of containers. It was the problem of the balance of cargo flows that was one of the reasons for the rise in sea freight rates — due to the accumulation of containers in the USA and Europe. In this regard, China is now prioritizing the return of empty containers to the country in order to prevent new logistical disruptions. Transport companies, in turn, are concerned about attracting new goods from the EU, including on continental delivery routes.

**RATIO OF EU-27 EXPORTS AND IMPORTS IN TRADE WITH CHINA**



Источник: International Trade Center (ITC)

# THE CURRENT STATUS OF TRUCKING FROM THE EU TO CHINA

The development of continental routes for the delivery of goods between the EU and China faces three main problems. First, infrastructure must be improved to increase the capacity of transport corridors (debottlenecking). Both rail and road transport face the problem of border crossing capacity, primarily at the borders with China, and the situation with China's coronavirus restrictions has greatly exacerbated the problem. For example, at the end of 2021, hundreds of trucks at a time were waiting in Zabaikalsk to cross the border due to additional checks by China. At the same time, the [launch of traffic](#) on the Blagoveshchensk-Heihe bridge will increase the capacity of vehicles to deliver goods to China.

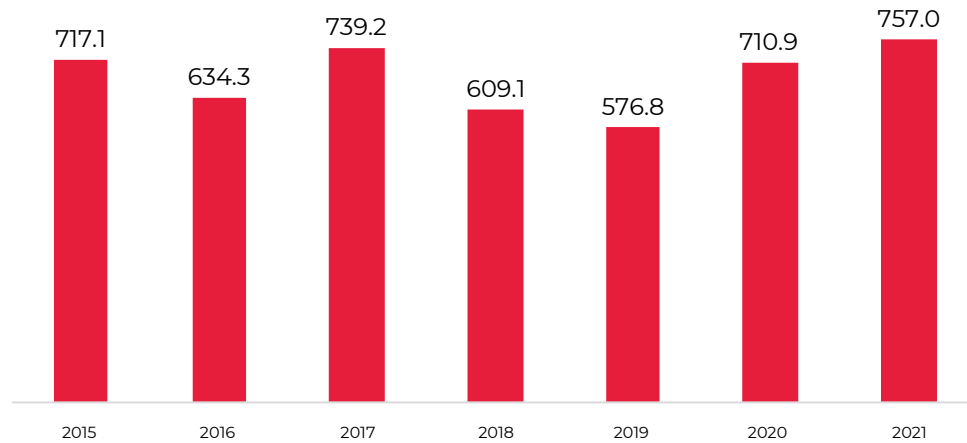
Secondly, the international political environment has had an impact on continental cargo transportation. The countries of the region are characterized by different speeds of economic development and comprise a complex foreign policy landscape. While transportation within the EAEU, due to the development of the Eurasian integration process, has been characterized by stability and an increasing quality of regulation, political difficulties are possible on the Union's outer perimeter. An example of this is the sanctions war between Belarus and Lithuania, as well as the recent accumulation of trucks on the border between Belarus and Poland.

Thirdly, in order for continental cargo transportation to develop, it is important to improve regulation and control, as well as simplify customs procedures: they must introduce a single consignment note, address issues associated with the transfer of responsibility for multimodal transportation, etc. Today, we can note the efforts of the EAEU countries to create digital transport corridors (CTC EAEU): an active negotiation track with China on the harmonization of documentary support for cargo.

In 2016, China became the 70th country to ratify the UN Customs Convention on the International Carriage of Goods Using a TIR Carnet (TIR Convention) — the global standard for international freight customs transit. This made it possible to harmonize the rules for the transportation of goods in trucks and made it possible to organize full-fledged China — EU — China trucking, giving impetus to an increase in freight traffic.

According to Eurostat, EU exports to China via road transport in 2016-2018 showed multidirectional dynamics, but since 2019 an upward trend has been recorded; in 2021 the total volume was higher than in 2017.

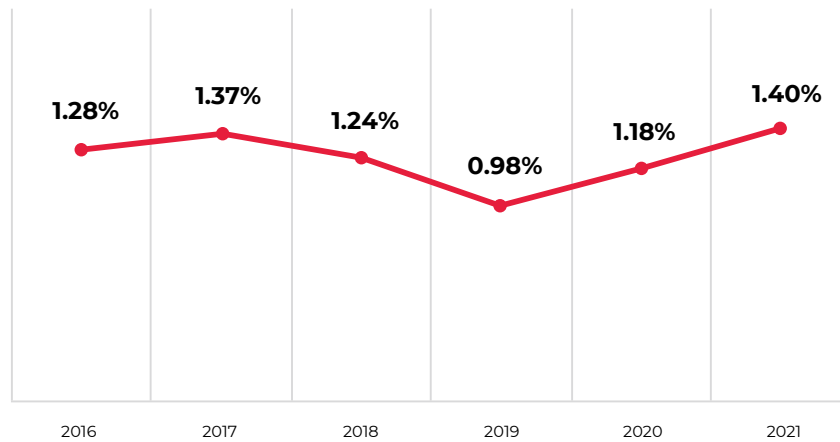
## EU EXPORTS TO CHINA BY ROAD, THOUSAND TONS



Source: Eurostat

The share of road transport in the composition of total EU exports to China by all modes of transport (in terms of physical volume) in 2016-2021 remained low — reaching 1.4% at most, in 2017 and 2021.

## SHARE OF ROAD TRANSPORT IN TOTAL EU EXPORTS TO CHINA

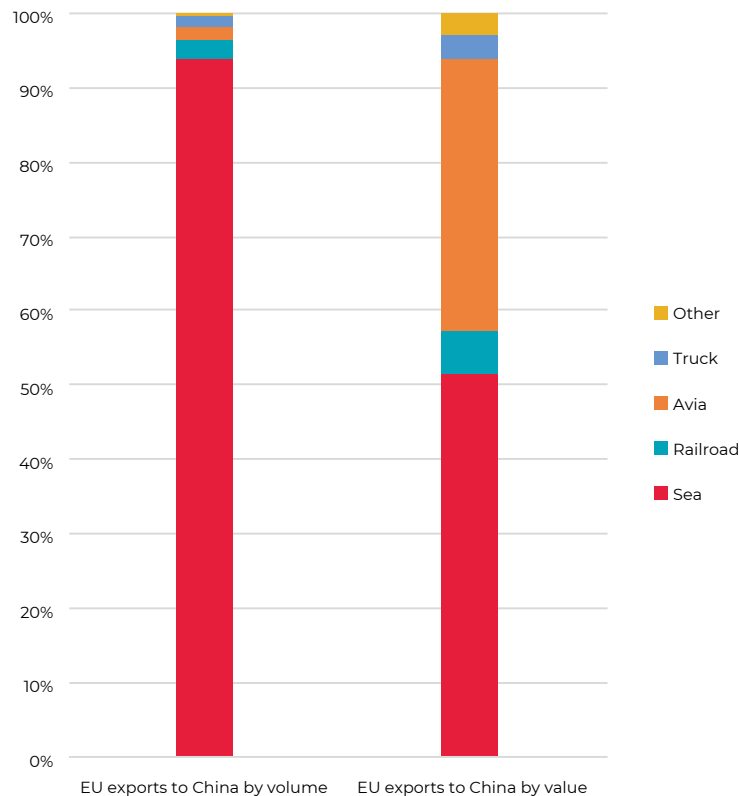


Source: Eurostat

In terms of modal composition in physical terms, according to Eurostat, road transport accounts for 1.4% of EU exports to China, trailing rail transport (2.4%) and lagging far behind maritime transport. Ocean shipping accounts for 94% of EU exports in physical terms, or about 50 thousand tons. At the same time, in terms of transported volumes, truck transport is ahead of air transport.



## EU EXPORTS TO CHINA BY VOLUME (LEFT) AND VALUE (RIGHT) IN 2021



Source: Eurostat

In a similar breakdown in terms of the value of deliveries, road transportation already accounts for 2.5%, significantly less than air freight shipping, which accounts for more than a third of exports by value. Certain transport options are selected for specific types of goods for economic reasons. Air freight is the preferred option for high-value and perishable goods such as chips, flowers, and certain types of food products. Continental shipping routes are only partially capable of transporting such cargo. At the same time, container rail transportation is economically and logistically convenient for electronics, mechanical equipment and other goods that are more expensive than those that are sent by sea — liquid cargo, bulk cargo, and inexpensive goods with a long shelf life.

It should be noted that Eurostat trade statistics by modes of transport only record the mode by which the goods leave the EU; further changes in the mode of transport used during the process of transportation are not taken into account. This limits the verifiability of the data and complicates analysis. Given the complementarity of rail and road transport, and the distance between the EU and China, modal shifts are common. Logistics companies resort to this tool to speed up the movement of goods. The current **problems** in handling containers at the railway stations of the Moscow region (Bely Rast, Vorsino), in addition to seasonal features and ever-increasing freight traffic, are related to the fact that Moscow acts as a hub for changing modality: from road transport to railway and back.

Road transport has become a profitable alternative to sea and air transportation during the coronavirus crisis and an alternative to rail transportation due to individual disruptions to the railway. The instability of maritime shipping and rising air transport costs during the pandemic prompted European and Chinese companies to look for affordable alternatives, in connection with which the largest carriers — in particular, the Danish transport and logistics company [DSV](#), [Instafreight](#) (Germany) and [Bollore Logistics](#) (France) — announced plans to expand road links between the EU and China. According to the companies, door-to-door trucking times between China and the EU countries have been optimized to two to three weeks, depending on the distance between origin and destination. However, faced with COVID restrictions on the borders with China and traffic jams on the western borders of Belarus, road transport has begun to lose its advantages in terms of speed and the cost of delivery.

# EU-CHINA ROAD FREIGHT NOMENCLATURE

The product range of EU exports to China is quite diversified. In 2021, 1,171 goods items were exported by various modes of transport: timber, iron ore, oil products, grain, meat, etc. Of these, 823 goods items were delivered from the EU to China using road transport, the largest of which (according to volume transported by road):

- lumber — 164 thousand tons;
- polyacetal — 56 thousand tons;
- fastening fittings and accessories — 35 thousand tons;
- polyethylene — 31 thousand tons;
- cars and trucks — 30 thousand and 9 thousand tons;
- water — 25 thousand tons;
- tractors and haulers — 21 thousand tons.

*Table 1.*

## GOODS EXPORTED FROM THE EU TO CHINA BY VOLUME OF ROAD TRANSPORT IN 2021

Nº	Code	Good	Export by road, tons	Share of road transport in total exports
1	4403	Wood in the rough	164,379	1.2%
2	3907	Polyacetals, polyesters, polycarbonates	56,777	18.5%
3	8302	Base metal mountings, fittings and similar articles	35,002	38.1%
4	3901	Polyethylene	31,675	5.6%
5	8703	Motor cars	30,374	3.7%
6	2201	Water	25,363	23.5%
7	8701	Tractors	21,217	51.4%
8	8708	Parts and accessories of the motor vehicles	14,866	2.1%
9	0203	Meat of swine, fresh, chilled or frozen	14,253	0.8%
10	2703	Peat	12,376	3.7%
11	2915	Saturated acyclic monocarboxylic acids and their derivatives	11,289	18.8%
12	9403	Other furniture and parts thereof	10,897	8.0%
13	2203	Beer	10,416	3.1%
14	8704	Trucks	9,672	33.7%
15	7225	Flat-rolled products of other alloy steel	9,062	2.2%
16	8607	Parts of railway or tramway locomotives or rolling-stock	8,763	14.1%

17	4702	Chemical wood pulp, dissolving grades	8,193	1.2%
18	3105	Mixed fertilizers	7,905	2.9%
19	7205	Granules and powders from ferrous metals	7,150	11.6%
20	3902	Polypropylene	6,783	3.9%
21	3824	Other chemical products	6,684	4.0%
22	4407	Wood sawn or chipped lengthwise, sliced or peeled	6,100	0.3%
23	2515	Marble and other construction limestones	6,099	0.3%
24	2907	Phenols	6,034	31.9%
25	4411	Fibreboard of wood or other ligneous materials	5,473	7.6%
26	0401	Fresh milk and cream	4,687	0.6%
27	9619	Diapers, feminine hygiene products, etc.	3,962	80.0%
28	3908	Polyamides	3,942	4.2%
29	3920	Single-layer polymer films and sheets	3,881	5.7%
30	3811	Anti-knock preparations, oxidation inhibitors, gum inhibitors and others	3,639	5.6%

Source: Eurostat

Almost all commodity items exported by road are also transported by other modes of transport. The exception is wool waste, bisphenol A and its salts, ferrovanadium, recorders and time recording devices, which are only exported from the EU countries to China by road. In general, the wide product coverage of exports and the specificity of goods speak in favor of flexibility when switching to other modes of supply. A high share of road transport is recorded in the export of watches (94%), certain chemicals (cyclohexanone and methylcyclohexanones) (88%), diapers and similar products (80%)<sup>1</sup>.

In general, by road transport are cargoes unsuitable for containerization, specific cargoes (for example, tractors and haulers), as well as food products. It should be noted the low representation of electronics and mechanical products — the main cargoes of the Eurasian railway route.

<sup>1</sup> Only significant commodity items were taken into account, the annual volume of transportation of which from the EU to China by road was over 100 metric tons.

Table 2.

### GOODS EXPORTED FROM THE EU TO CHINA BY SHARE OF ROAD TRANSPORT IN TOTAL EXPORTS IN 2021

Nº	Code	Good	Export by road, tons	Share of auto transport in total exports
1	5103	Wool waste	171	100,0%
2	9106	Time recorders	1,831	99.9%
3	9619	Diapers, feminine hygiene products, etc.	3,962	80.0%
4	2809	Diphosphorus pentaoxide; phosphoric acid; polyphosphoric acids	420	68.4%
5	2820	Manganese oxides	1,818	66.3%
6	7614	Stranded wire, cables, plaited bands and the like	1,693	53.6%
7	8701	Tractors and haulers	21,217	51.4%
8	1517	Margarine and related products	1,944	49.4%
9	7410	Copper foil	3,412	48.4%
10	5506	Synthetic fibers prepared for spinning	171	45.2%
11	1501	Pig fat and poultry fat processed	1,602	44.9%
12	3805	Turpentine and other terpene oils	627	44.8%
13	1516	Food modified fats and oils	1,906	42.9%
14	8302	Base metal mountings, fittings and similar articles	35,002	38.1%
15	7907	Other zinc products	512	37.6%
16	2509	Chalk	744	35.4%
17	5702	Woven carpets and floor coverings	295	35.1%
18	8704	Trucks	9,672	33.7%
19	7202	Ferroalloys	901	33.4%
20	2907	Phenols	6,034	31.9%
21	6406	Shoe details, accessories	110	31.4%
22	7013	Household glass products	2,757	28.1%
23	0202	Frozen beef	1,100	26.5%
24	7015	Glass for watches and glasses	144	24.5%
25	2201	Water	25,363	23.5%
26	3102	Mineral or chemical fertilisers, nitrogenous	3,490	23.4%
27	5703	Carpets and floor coverings	225	23.0%
28	7217	Unalloyed steel wire	1,534	21.6%
29	8430	Mining equipment	1,792	20.4%
30	2207	Ethanol	102	20.2%

Source: Eurostat

As can be seen from the presented data, the most significant goods — with a large volume of deliveries and a significant share of vehicles — are:

- metal fastening fittings and accessories — 35 thousand tons (38.1%);
- water — 25 thousand tons (23.5%);

- tractors and haulers — 21 thousand tons (51%);
- trucks — 9 thousand tons (33.7%).

Thus, the activation of road freight traffic during the pandemic was a response to the emerging logistical «traffic jams» facing all modes of transport. At the same time, a logical question arises about the further prospects for the development of the sector after the final exit of international transport from the crisis mode: the normalization of maritime cargo transportation, the “clearing” of bottlenecks in the railway infrastructure and the full restoration of international air transportation.

An additional challenge facing the road freight industry is the growing commitment of economic agents to the goals of sustainable development, which implies the decarbonization of the transport industry. Therefore, environmentally friendly rail transport will become the number one priority. It is driving the revival of railways as the most environmentally friendly mode of transport, one which is prioritized by the EU. China is investing heavily in the development of its own rail network, especially high-speed rail — which may also be suitable for the delivery of goods.

# PROSPECTS FOR EURASIAN TRUCKING

The vast majority of categories of goods exported by the EU to China by road (599 out of 823 commodity items) are also transported by rail: timber, plastics, vehicles, various equipment and machinery, chemical products. In total, the annual volume of deliveries by road in 2021 amounted to 1,243 thousand metric tons (increasing from the level of 634 thousand tons in 2020) — it is by this amount that railway freight traffic can increase if European exporters completely abstain from road transportation to China (favoring the use of rail).

According to the European Road Freight Markets [Report](#), multimodal transport needs a strong incentive to improve the efficiency of the transport system. According to the authors of the report, as a matter of priority, a significant proportion of road transport, which today accounts for 75% of cargo, should be transferred to rail and inland waterways. Apparently, the policy of reducing road transport within the EU will also have an impact on external freight traffic.

Can the road haulage industry meet the challenges of the climate agenda and achieve carbon neutrality? Whether door-to-door road freight transport between the EU and China will remain an “alternate” mode of transport, or become an alternative that can compete with other modes of transport, both in terms of cost and environmental friendliness, depends directly on technological efforts, innovations and investments carried out within the industry today.

Plans to transition freight transport from internal combustion engines to alternative modes [are included](#) in the strategies to achieve carbon neutrality of the largest international automakers, which are currently at various stages of moving towards their goals.

In 2017, [Tesla](#) announced its own Semi electric truck, which features a payload capacity of 36 tons and a range of 800-1000 km. PepsiCo was announced as the first customer for Semi, but due to problems with the supply of electronic components, the release of trucks was postponed until 2023.

In 2020, [Hyundai](#) introduced the XCIENT Fuel Cell- the world's first mass-produced hydrogen fuel cell heavy electric truck, with a range of approximately [800 km](#). This is because large volumes of hydrogen are stored in the vehicle itself in pressurized 700 bar tanks (about 10,000 psi). The maximum gross weight of the XCIENT Fuel Cell truck, with trailer, will be over 37 metric tons.

In 2021, the Chinese company [Geely](#) announced the production of the Homtruck electric truck, which will be launched in 2024. Homtruck represents «a significant step towards a zero-emission trucking system». There are three modifications of the truck: all-electric with a battery swap function, hybrid with an internal combustion engine and hybrid with a methanol engine.

The German company [Audi](#) developed a prototype liquefied natural gas (LNG) truck for intra-plant logistics operations, reducing CO<sub>2</sub> emissions by 20% compared to diesel models and 85% reduction in nitrogen oxides.

The international logistics company DHL has announced its intention to achieve zero emissions by 2050, in connection with which it is expanding its fleet of delivery vehicles through the purchase of battery electric vehicles and charging stations. Delivery via electric vehicles is designed for short distances: urban transport and routes passing through busy cities, where it is important to avoid local emissions and at the same time reduce noise levels.

Thus, the use of carbon-neutral freight road transport today is limited by the current level of technological and infrastructural development. While a typical combustion engine truck has a range of about 1,500 km before refueling, the automotive industry offers carbon-neutral alternatives that can provide a range of no more than half that distance, while the infrastructure for them has yet to be created.

Long distances (over 8,000 kilometers one way) are fraught with high greenhouse gas emissions and result in other pollutants, so road transport is unlikely to attract a significant share of the Europe — Asia freight transport in the future, since alternative energy trucks currently being developed cannot yet cover this distance and are not provided with appropriate infrastructure. Apparently, they will find their logistical application where rail transport is not possible, providing for the mobile transportation of goods within the local network of industrial complexes. For carbon-neutral trucks to enter international routes, in particular from the EU to China, further technological innovations are needed to increase their range.

The situation in Ukraine has put road transport in a difficult position. Mutual restrictions on road transport by the EU and Russia as well as congestion at border points is forcing companies to look for alternative and reliable delivery routes. In addition, similar restrictions on the shipping market and the departure of some key foreign players have created an unprecedented situation in which railroads, the most reliable mode of transport, can already realize their competitive advantages. However, road transportation remains the most flexible mode of transport, which is able to quickly switch to alternative routes without significant infrastructure costs. Therefore, the current political situation certainly violates the complementarity between railway and road transport, but does not mean that Eurasian Road transport will disappear.

The abandonment of road transport as such is not possible, especially «door to door» delivery. Cross-border shipping is also likely to retain its niche in the delivery of specialized goods. In addition, the creation and maintenance of international transport corridors is associated with the parallel development of both road and rail infrastructure. Therefore, the overland alternative will always include both modes of transport. However, due to the distance of transportation, the decarbonization agenda and its overall reliability, rail transport appears to be the flagship of the ongoing development of alternatives to sea shipping routes between China and Europe.