

**IJPSC**

**International Journal of Psychology and Strategic Communication**

ISSN: 2941-5691 (Online) 2941-5705 (Print) [30]

DOI: 10.61030/KQLY5228



## **CURRENT TRENDS IN THE DEVELOPMENT OF EU FOREIGN TRADE IN METALLURGICAL PRODUCTS**

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### **Abstract**

The article examines the current trends in the development of EU foreign trade in metal products. The purpose of the article is to analyze the dynamics and establish current trends in the development of EU foreign trade in metal products. To achieve the goal, the methods of analysis and synthesis, induction and deduction, comparison, graphic method were used. An assessment of the internal market of metal products in EC was carried out. The dynamics of EU foreign trade in metal products were analyzed and the problems of EU cooperation with leading partner countries were identified. The forecasts are substantiated and the prospects for the development of EU foreign trade in metal products are determined. The practical significance of the study lies in the possibility of their use for further analysis of the current state of EU foreign trade in metal products with the aim of increasing its volumes with key partners on the world market.

### **Keywords**

foreign trade in metal products, export, import, metallurgical industry, metal products, steel, decarbonization, demand.

### **Problem statement**

In today's world, metal is one of the most used commodities, and the metallurgical complex is at the heart of most value chains, supplying the necessary raw materials and materials for economic activities such as metal products, engineering, construction, energy, mining, etc. Given that the metallurgical industry is one of the powerful sectors of the EU and makes a significant contribution to its economy, this topic requires in-depth research.

### **Relevance of the chosen topic**

European metallurgy is a world leader in innovation and environmental sustainability. In turn, steel, as the main engineering material, is also an important factor in the development and implementation of innovative technologies that mitigate CO<sub>2</sub>, increase the efficiency of resource use and promote sustainable development in the EU, especially within the framework of the "Green Deal" and the trend of decarbonization. At the same time, the EU is one of the main suppliers of crude steel to world markets. But in recent years, negative trends have been

observed in the development of the EU metallurgical sector, including in foreign economic activity indicators. Therefore, the study of modern trends in the development of EU foreign trade in metallurgical products is an urgent issue today.

### Analysis of recent research and publications

Many outstanding foreign and domestic scientists, as well as Europeans, were engaged in the study of this topic Commission, European Steel Association, etc. However, a number of important issues remain poorly researched, in particular regarding the features of functioning and prospects for the development of this market in modern conditions.

### Purpose of the article

The purpose of the article is to analyze the dynamics and establish modern trends in the development of EU foreign trade in metal products.

Achieving the set goal made it necessary to solve the following tasks:

- carry out an assessment of the internal market of metal products in EC;
- to analyze the dynamics of EU foreign trade in metal products;
- to provide forecasts of the development of EU trade in metal products with leading partners.

### Presentation of the main research material and results obtained

The range of metal products is quite diverse in terms of shapes, sizes and manufacturing methods, and can be used in various spheres of activity. The main reason for this is that steel is easily processed, interacts well with other metals, can change its properties when forming metal alloys, is quite widespread in the world and can be recycled. In order to characterize the export-import relations in the trade of metal products of the EU and partner countries, metal products are divided into sheets, rolled products and semi-finished metal products.

The European steel industry is one of the most important strategic sectors of Europe - the backbone of the EU economy and its society. In 2023, in terms of domestic added value, the EU metallurgical industry was in third place (152 billion euros), after the manufacture of beverages (208 billion euros) and the pulp and paper industry (175 billion euros). Metallurgical branch alone with the most economical important in EU. At the same time, she supports the existence of other important industries, such as the production of electric transport, What actively is developing in EU, computer equipment, production highly accurate tools, etc. In addition, Europe ranks second place by volumes crude steel production in the world - share of the region in 2023 amounted to 13.8% or 256 million tons of crude steel in the EU accounted for 6.8% or 126 million tons, which is 7.5% less than the previous year. At the same time, 55% or 69.8 million tons were produced in an oxygen furnace, and 45% or 56.4 million tons were produced by the electric method. It is worth noting that during 2014-2023, the share of crude steel production in the EU in the oxygen furnace decreased from 59% to 55%, and the share of production by the electric method - increased from 41% to 45% (EUROFER, 2024).

According to Tab. 1, in 2023 the EU imported 26 million tons of finished steel products. At the same time, Asia supplied 16.1 million tons of finished steel products, other European countries, the CIS and Turkey - 7.2 million tons, Africa - 1.8 million tons, South America - 265 million tons, Oceania - 144 million tons, North and Central America - 54.8 million tons (EUROFER, 2024).

Fluctuations were observed in the dynamics of import volumes during 2014-2023. In 2023, this indicator amounted to 25.6 million tons, increasing during the period under review by 29.3%, however, compared to 2022, there was a drop of 11.5%, mainly due to a drop in the supply of flat products by 8%. It is worth noting that 78.6% of imports of metal products account for flat rolled products, 21.4% for long products (EUROFER, 2024).

Table 1. Dynamics of imports to the EU by types of products during 2014-2023, million tons

Product type	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Share in 2023
Flat rental	15,165	13,988	20,542	20,782	22,348	20,115	17,166	23,987	21,862	20,116	78,6%
Long rental	4,649	3,929	6,156	6,13	7,865	6,234	5,247	6,34	7,007	5,466	21,4%
Finished products	19,814	17,917	26,698	26,912	30,213	26,349	22,413	30,327	28,869	25,582	100%

\*Source: EUROFER , 2023

The largest share of imports of flat products to the EU in 2023 was hot-rolled wide strip (42,4%), hot-rolled metal coating (20,8%), cold-rolled flat products (14,3%), etc. At the same time, the share of hot-rolled wide strip and hot metal coating in the total volume of imports of flat rolled products to the EU during 2014-2023 increased, on the other hand, a decrease in this indicator was observed for other types of this product. The largest share of imports of long rolled products to the EU in 2023 was wire rod (36%), fittings (29,8%), commercial bars (26,9%), heavy sections (5,8%) ( EUROFER, 2024) .

The main countries from which the EU imported metal products in 2023 (Tab. 2) are South Korea (12% or 3.177 million tons ), India (11% or 2.863 million tons ), Taiwan (9.3% or 2.391 million tons ), Turkey (8.8% or 2.269 million tons ), China (8.6% or 2.206 million tons ), Vietnam (8.5% or 2.165 million tons ), Japan (6.9% or 1.776 million tons ), Egypt (5% or 1.287 million tons ), Ukraine (4.6% or 1.169 million tons ), Indonesia (3% or 0.767 million tons ). At the same time, the volume of imports of metal products to the EU in 2023 decreased from Turkey, China, and Ukraine ( EUROFER , 2024) .

The main exporters of flat products to the EU in 2023 were such countries as South Korea (13.2% or 3.053 million tons ), India (12.8% or 2.726 million tons ), Taiwan (10.8% or 2.374 million tons ), Vietnam (9.7% or 2.120 million tons ), Japan (8.9% or 1.749 million tons ), long rolled products – Turkey (20.4% or 0.833 million tons ), China (8.1% or 0.753 million tons ), Egypt (7.1% or 0.461 million tons ), Switzerland (6.6% or 0.370 million tons ), Malaysia (5.4% or 0.363 million tons ), Algeria (5.3% or 0.337 million t ) ( EUROFER , 2024) .

Table 2. TOP-10 exporting countries to the EU of all finished products during 2014-2023, million tons

Country	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
South Korea	1,397	1,897	2,523	2,884	3,194	2,683	2,622	2,286	2,951	3,177
India	1,391	1,14	1,822	3,568	2,67	2,123	1,872	3,536	2,681	2,863
Taiwan	0, 636	0,412	0,705	1,062	1,511	1,22	0,951	1,7	2,149	2,391
Turkey	1,254	1,295	2,044	3,42	5,833	5,472	3,876	4,588	4,329	2,269
China	3,855	6,17	5,249	3,11	2,781	2,348	1,182	1,442	2,524	2,206
Vietnam	0,030	0,043	0,045	0,279	0,495	0,425	0,285	1,583	1,553	2,165
Japan	0,140	0,135	0,283	0,151	0,197	0,188	0, 252	0, 854	1,461	1,776
Egypt	0, 200	0,037	0,0 84	0,572	0,453	0,208	0,347	0,955	0,787	1,287
Ukraine	2,215	2,5	2,942	2,11	1,821	1,718	1,6	2,543	1,264	1,169
Indonesia	0,002	0,011	0,088	0,160	0,160	0,260	0,228	0,462	0,733	0,767
Others	8,694	11,211	10,913	9,596	11,098	9,704	9,199	10,378	8,438	5,503
Together	19,814	24,851	26,698	26,912	30,213	26,349	22,414	30,327	28,87	25,573

\*Source: EUROFER, 2023

According to Tab. 3, in 2023 the EU exported 16.3 million tons of finished steel products. At the same time, other European countries, the CIS and Turkey supplied 1.7 million tons of finished steel products, North and Central America 4 million tons, Africa - 1.75 million tons, Asia - 1.73 million tons, South America - 585 million tons, Oceania - 118 million tons ( EUROFER , 2024) .

The dynamics of export volumes during 2014-2023 is negative. In 2023, this indicator amounted to 16.3 million tons, decreasing by 42% during the studied period. It is worth noting that 65.5% of the export of metal products is accounted for by flat products, 34.5% by long products. In 2023, the volume of exports of flat products from the EU decreased by 7.5% to 10.66 million tons, compared to the previous year, and of long products - increased by 9.8% to 5.6 million tons ( EUROFER , 2024) .

Table 3. Dynamics of exports from the EU by types of products during 2014-2023, million tons

Product type	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Share in 2023
Flat rental	17,989	16,785	16,471	17,079	15,769	16,031	13,349	12,892	11,517	10,66	65.5%
Long rental	11,374	10,937	10,392	9,182	8,402	7,794	6,539	6,539	5,111	5,614	34.5%
Finished products	29,363	27,722	26,864	26,261	24,17	23,824	19,888	19,431	16,628	16,274	100%

\*Source: EUROFER , 2023

The main countries to which the EU exports metal products (Tab. 4) are Turkey (14% or 2.288 million tons), the USA (13.7% or 2.233 million tons), Switzerland (8.1% or 1.321 million tons), Mexico (6.9% or 1.127 million tons), Canada (3.9% or 649 million tons), Egypt (2.8% or 464 million tons), Morocco (2.7% or 441 million tons), Ukraine (2.6% or 430 million tons), China (2.5% or 414 million tons), etc. At the same time, the volume of exports of metal products from the EU in 2023 decreased to all main recipients, except for Mexico, Canada, Egypt, Morocco and Ukraine (EUROFER, 2024).

Table 4. TOP-10 countries-importers from the EU of all finished products during 2014-2023, million tons

Country	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Turkey	3,923	4,152	3,936	4,458	3,023	3,656	3,186	2,961	2,488	2,288
USA	3,581	3,255	3,044	3,224	3,276	2,473	1,647	2,227	2,35	2,233
Switzerland	1,828	1,703	1,838	1,886	1,871	1,702	1,554	1,701	1,543	1,321
Mexico	716	577	730	870	1,197	1,012	961	1,228	909	1,127
Canada	551	744	619	531	664	713	732	722	538	649
Egypt	320	425	465	475	537	596	643	494	451	464
Morocco	641	582	655	642	598	613	524	431	333	441
Ukraine	226	199	245	237	234	271	287	221	250	430
China	1,059	882	991	1,12	1,085	887	1,042	842	548	414
Serbia Montenegro	363	425	439	429	446	492	430	383	297	381
Others	16,155	14,778	13,902	12,389	11,239	11,409	8,882	8,221	6,921	6,526
Together	29,363	27,722	26,864	26,261	24,17	23,824	19,888	19,431	16,628	16,274

\*Source: EUROFER, 2024

The main importers of flat products from the EU in 2023 were such countries as Turkey (17% or 1.809 million tons), the USA (15% or 1.593 million tons), Mexico (7% or 0.787 million tons), Switzerland (6% or 0.674 million tons), Egypt (4% or 0.432 million tons), long-rolled goods - Switzerland (12% or 0.647 million tons), the USA (11% or 0.641 million tons), Turkey (9% or 0.479 million tons), Canada (7% or 0.392 million tons), Mexico (6% or 0.340 million tons) (EUROFER, 2024).

In 2023, flat rolled products accounted for 67.3% of imports of finished stainless steel to the EU, long products - 32.7%. In 2023, flat rolled products accounted for 70% of finished stainless steel exports from the EU, long products accounted for 30% (EUROFER, 2024).

Metallurgy is an industry on which most other industries depend. Coal and steel are the basis of economic cooperation between European countries. Metallurgy as a strategic industry attracts significant risks due to the high energy intensity of production, work with hot liquid metal and high level of dependence on raw material suppliers.

The main risks associated with metallurgical production are the following: import of cheap steel from countries outside the EU; high costs of environmental protection; dependence on suppliers of coking coal, iron ore and scrap metal; malfunction of technologies leading to interruption of activity; strict rules of occupational health and safety; steel and aluminum tariffs; inconsistency of the carbon border adjustment mechanism (CBAM); balancing supply and demand (Atlantic Council, 2023; Ecopolitic, 2023; RENOMIA, 2024).

It is worth noting that across Europe the threat is from cheap imports produced by overseas suppliers who can offer low-cost alternatives thanks to cheap labor and lower environmental standards. Trade defense instruments, such as anti-dumping or anti-subsidy measures, are designed to protect European businesses.

Some companies from outside the EU operate with a loss leader strategy and price their products below the cost of production in order to attract customers and penetrate new markets.

However, loss-making strategies can harm the surrounding competition, especially for small and medium-sized enterprises, which may have to keep their prices low in order to attract business.

Practices such as dumping – when a product is sold abroad at a lower price than in the country of origin – and subsidies create unfair competition for EU companies. The EU uses the following trade protection tools to combat this practice: anti-dumping, anti-subsidy, protective (Euronews, 2024).

Global demand for steel will recover by 1.7% in 2024 and grow by another 1.2% in 2025. By the end of 2025, it is predicted that the total global steel production will exceed 1.8 billion tons (Metal Center New, 2024). Steel consumption in the EU will grow by 5.3% in 2025 to 148.1 mt. Germany is expected to remain among the world's top 10 steel-consuming regions. Steel consumption in Germany is forecast to grow by 3.2% in 2024 to

28.9 million tonnes, followed by a 10% increase in 2025 to 31.8 million tonnes. A large part of the projected increase in consumption in Europe is explained by the development of green infrastructure ( MEPS International , 2024 ).

The 2020s will be key years for the steel industry in Europe and even around the world. The industry is at the beginning of a technological transition that is necessary and politically necessary to reduce CO<sub>2</sub> emissions from energy-intensive steel production. This transition to green steel requires significant investment, and it is imperative that adoption ramps up this decade. Consequently, the capacity of new resources must be determined today, so estimating the future demand for steel is an important decision-making variable ( Bronk & Company GmbH , 2024).

Based on a study by Bronk & Company, global steel demand is set to grow to approximately 2.0 billion tonnes in 2030. This corresponds to an average annual growth rate of approximately 1.06% or 11% in absolute terms compared to 2020. Growth in this decade mainly driven by increased industrialization in developing countries such as India and regions of Africa. China will continue to maintain its status as the world's largest producer and consumer of steel. However, steel demand in China is likely to stop its former exponential growth and is likely to stagnate in the coming years. Western countries also contribute to the growth of world demand ( Bronk & Company GmbH , 2024).

Demand for steel in the main European steel sales areas is forecast to increase to approximately 395 million tons in 2030, which is an increase of approximately 27% compared to 312 million tons in 2020 ( Bronk & Company GmbH , 2024).

Demand for steel in Western Europe will remain almost unchanged at the level of 2023. In contrast, a moderate but steady upward trend is forecast for North America. For Eastern Europe, the forecast also predicts an almost continuous upward trend, so the demand for steel in this region is expected to exceed 100 million tons by 2030 ( Bronk & Company GmbH , 2024).

Europe has a window of opportunity to lay the foundations for greater strategic autonomy and sustainability for its strategic metals through optimized recycling, domestic value chain investment and more active global sourcing. But decisive action is needed in the near future to avoid problems for several materials that risk becoming global shortages at the end of this decade ( Eurometaux , 2024).

Europe is planning a rapid transition from the modern fossil fuel system to clean energy technologies. This energy transition is metal intensive. Electric vehicles, batteries, solar PV systems, wind turbines and hydrogen technologies require significantly more metals than their conventional alternatives to replace fossil fuel needs.

According to the International Energy Agency's various clean energy technology scenarios, the global climate trajectory aligned with the Paris Agreement will require nearly twice as much metals by 2050 as the world continuing its current climate policies ( Eurometaux , 2024).

Bulk base metals such as aluminum and copper dominate in terms of their tonnage used in clean technologies, but several smaller metals such as lithium, cobalt and dysprosium will be in extremely high demand due to the transition.

Europe's 2050 climate neutrality target and 2030 medium-term target mean it is already accelerating faster than other regions of the world and plans to install most of its new clean energy capacity over the next 1-2 decades. Europe will only need direct supplies of metals for the technologies it produces domestically (as opposed to imported products) ( Eurometaux , 2024).

European steel producers may face moderate growth in their core markets until 2030. In addition, global steel demand will remain on a strong upward trend during this decade (+11% or 2 billion tons). This means there is potential for additional sales alongside existing markets for the European steel industry. Despite the fact that the huge costs associated with environmental transformation are likely to make it difficult for European industry to compete on the international stage in the next few years without appropriate competition balancing rules. However, pioneering a green transformation today may well unlock new potential tomorrow ( Bronk & Company GmbH , 2024).

Decarbonization is becoming increasingly relevant for European metallurgists as industry moves to greener means of production ( Fastmarkets, 2024 ). Steel is a vital component of many value chains, especially in the area of clean technologies. Without this metal, it is difficult to build a decarbonized and sustainable economy. According to the European Commission, today the metallurgical industry is responsible for about 5% of CO<sub>2</sub> emissions in the EU and 7% worldwide. In order to achieve the EU's ambitious goal of becoming a community with zero emissions by 2050, the metallurgical industry must transform ( Fastmarkets , 2024 ).

Developed countries, especially in the EU, are seeking to decarbonize the industry by shifting steel production from coal-fired furnaces to electric or water-fired furnaces (green steel). Many clean technologies,

such as wind turbines and electric vehicles (EVs), are based on steel. In this context, the priority is to ensure a successful transition to "green" steel while preserving the competitiveness of the steel industry on world markets ( Dnipropetrovsk Investment Agency , 2023) .

Currently, 55% of the steel produced in Europe comes from the integrated blast furnace/basic oxygen furnace (BF-BOF) ( EUROFER , 2024) . According to IEEFA, carbon emissions from this production route are approximately 2.0-2.2 t CO<sub>2</sub> (direct and indirect emissions). Over the past few years, major European steel producers have announced ambitious decarbonization strategies and developed their own green steel brands. Most steelmakers are taking the same approach, seeking to replace BF-BOF capacity with hydrogen-fueled electric arc furnaces and DRI modules.

The EAF-DRI production route is much less polluting, with direct and indirect CO<sub>2</sub> emissions estimated at 1.4 t CO<sub>2</sub> per 1 ton of steel. They can be further reduced by using renewable energy sources and green hydrogen to power DRI modules ( Fastmarkets , 2024). Also, one of the ways to reduce the burden on the environment, that is, to reduce CO<sub>2</sub> emissions, is to expand the use of ferrous metal scrap and DRI/HBI production technology ( METINVEST , 2021) . The scrap-based EAF process results in the lowest carbon emissions of only around 300 kg CO<sub>2</sub> per tonne of steel. This production route has the potential for zero emissions if powered by renewable energy. The green transition to EAF and EAF-DRI steelmaking will require more high-quality scrap to support new EAF capacity. Europe is currently a net exporter of scrap, but as new EAF-based steelmaking facilities become operational, the region could become an importer of certain grades ( Fastmarkets , 2024) .

Another strategy for decarbonization of the EU steel industry is the use of hydrogen. The REPowerEU plan highlights that around 30% of primary steel production in the EU is expected to be decarbonised by 2030 using renewable hydrogen ( European Commission , 2022) . However, currently using hydrogen for existing DRI modules in Europe is quite expensive ( Fastmarkets , 2024) .

In the short to medium term, low CO<sub>2</sub> steel production is likely to be more expensive than current steel production costs. The future costs of hydrogen-based steel production are highly uncertain because they depend on the future costs of renewable hydrogen and electricity. With significant reductions in renewable hydrogen costs and increased CO<sub>2</sub> prices, hydrogen-based steelmaking could become cost-competitive with current steelmaking costs by 2050.

However, the large investments required to deploy low-CO<sub>2</sub> steel plants must be accompanied by investments in the infrastructure needed to implement these solutions (renewable electricity and transmission networks, hydrogen-related infrastructure or CO<sub>2</sub> transport and storage infrastructure) ( European Commission , 2022) .

The Clean Steel Partnership, formally established in June 2021, aims to bring to large-scale demonstration a number of revolutionary technologies for clean steel production by 2030. The partnership estimates that R&D investment needs by 2030 will be around 2.6 billion euros. The partnership will be funded by both Horizon Europe and the Coal and Steel Research Fund, with the EU providing €700 million through this mechanism ( European Commission , 2022) .

European governments plan to provide assistance in various forms: direct grants, soft loans, compensation for operating costs, etc. The European Commission believes that all support measures will contribute to the implementation of the EU Hydrogen Strategy, the achievement of the goals of the European Green Deal and the rapid green transition within the framework of the REPowerEU plan ( Infographic . Ecopolitic, 2023 ) .

## **Conclusions**

The conducted research indicates that metal products have a diverse assortment. Modern manufacturers produce a fairly wide range of metal products that are used in various spheres of life. Metal products are especially important in construction, transport, as well as in the field of security, infrastructure, mechanical engineering, manufacturing of household appliances and metal household goods, etc. The internal market of EU metal products is quite large. The largest producer of crude steel is Germany, and the EU ranks second in the volume of deliveries of metal products to world markets. However, a rather unstable situation has developed in the world and it is currently very difficult to make predictions regarding trade in metal products, especially in the light of recent events. It can be noted that the situation on the European market of metal products should stabilize in the coming years, and the 2020s will be decisive for the transformation of the EU metallurgical industry. In particular, in recent years, there has been a steady trend in the world to reduce the "carbon footprint" and transition to the technologies of the so-called "green metallurgy", which is actively supported by the European government and is a promising direction for the further development of the EU metallurgical industry.

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