

White paper on sanctions and russian substitution

Overview of sanctions restrictions on russian pig iron and iron ores

Sanctions imposed and other measures taken

The European Union has notably **refrained from imposing sanctions** on iron ores and pig iron. Iron ores, in particular, have been exempt in the “ninth package”, “sixth package”, “fifth package” and “fourth package” of EU sanctions. Iron ore has been primarily targeted by EU legislation as a key product restriction of which is unfavorable for the EU economy. Pig iron, similarly, was exempted from the eighth package of sanctions. Introduced on 1 April 2022, the eight packages expanded the list of codes that impose limitations on the import of russian steel products. It's worth noting that while the EU refrained from directly sanctioning these products, the UK and the US took a different approach by introducing additional tariffs on pig iron and iron ore. These tariffs imposed by the UK and the US allowed for the continued import of these russian products, however placed russian producers in unfavorable market conditions, effectively making these imports less competitive. As a result, these measures have proven to be effective in significantly reducing the import of pig iron and iron ores to these countries.

The UK has imposed a 35% customs tariff on pig iron and iron ore. In 2022, the total import of pig iron and iron ores to the UK amounted to 3,2 million USD. This is in stark contrast to 2021 when the overall import of pig iron and iron ores from russia to the UK reached 55 USD million.

The US implemented additional tariffs on russian pig iron¹, imposing a 70% duty on 1 April 2023 and imposed 35% ad valorem tariff on iron ores. As a result, the total quantity of imported russian pig iron decreased from 2 million tonnes in 2021 to 638 thousand tonnes in 2022. Notably, in 2023 the US ceased pig iron imports from russia altogether. Despite being one of the largest importers of pig iron globally, the US successfully suspended trade with russia.

According to the Eurostat data, pig iron and iron ores were among the top 50 product groups in EU imports (on the level of 4 digits of HS system) from Russia in 2022, excluding energy imports.

¹ Nonalloy pig iron containing by weight 0.5 % or less of phosphorus with HTS code 7201.10.00

Harmonized System (HS) Code, 4 digits	Description of product groups	2022 to 2021	Imports from russia to the EU in mln USD	Imports from russia to the EU in tonnes	Overall export from russia to the world in tonnes
7201	Pig iron and spiegeleisen, in pigs, blocks or other primary forms	196%	659	1 172 024	3 538 965
2601	Iron ores and concentrates, incl. roasted iron pyrites	25%	457	2 810 210	12 589 246

The primary market for russian pig iron in the EU is Italy. Italy imported 417 thousand tonnes of pig iron in 2021 and 964 thousand tonnes in 2022. However, in 2023 the total volume of imported russian pig iron decreased to 636 thousand tonnes. It's worth noting that in 2023 the rate of pig iron supply to the russia experienced a significant increase.

Iron ores are mainly imported to the Netherlands. In 2022 46% of all russian iron ores imported to the EU, measured by volume in tons, were destined for the Netherlands.

Evasion of Certificates of Origin Regulation

Case #1. Pig iron from occupied territories of Ukraine is being fraudulently sold to consumers in Italy through the use of false **certificates of origin**. An example of this fraudulent activity involves a certificate of origin for an export batch of pig iron imported to Italy from russia. The certificate states that the enterprise Nevinnomyskiy Elektro-Metallurgicheskiy Zavod is the producer of pig iron. However, this named company does not possess any production facilities for the manufacturing of pig iron.

Case #2. Pig iron from occupied territories of Ukraine is being illicitly sold to consumers in Italy through a strategy involving the **re-routing of shipments**. To bypass the customs clearance process and certificate of origin requirements, shipments of pig iron from russia are being diverted from Russia through India on their way to Italy. In 2022 a ship BR VICTORY (IMO: 9145956; MMSI: 356370000; Call Sign: 3FDK6) was loaded with pig iron shipment in Novorossiysk. Instead of proceeding directly to Italy, the ship embarked on a two-month layover to India. Following this, it traversed the Suez Channel to reach Italy, thus avoiding the necessity of presenting a certificate of origin during customs clearance. It has been observed that in 2022, at least three additional ships executed similar trips with this re-routing strategy:

- 1) Vessel KLC ERCIYES, port Marghera, 27 December – 30 December 2022
- 2) Vessel EVER COMFORT, port Marghera, 5 August – 9 August 2022
- 3) Vessel IBRAHIM KONAN, port Venice, 30 April – 03 May 2022

Russia market position

Russia is the world's leading exporter of pig iron and iron ores. According to trademap.org, russia ranked as the second-largest exporter of pig iron and the ninth-largest exporter of iron ores in the world. Key companies responsible for exporting these products, based on customs trade data from

2018, included Ural Steel JSC, Tulachermet JSC, NLMK group for **pig iron** , and Karelskiy Okatysh part of Severstal holding, Lebedinsky GOK and Mikhailovsky GOK (both part of Metalloinvest holding) **for iron ores**.

Assessment of substitution of russian pig iron on the EU market

It's important to differentiate the production of merchant pig iron from the total output of pig iron when considering potential supply alternatives. In 2021, the global market for merchant pig iron (global trade) represented only 1% of total pig iron production. Although nearly all iron and steel producers have free capacities for additional pig iron production, only a few major players dominate the global market. Before the war, Ukraine and Russia together occupied 53% share of the global merchant pig iron market. In essence, Ukraine emerges as the most viable alternative to Russian pig iron in the global market.

Other major commercial pig iron producers and exporters include Brazil (23% of global exports in 2021, equivalent to 2.3 million tonnes) and India (7% of global exports, equivalent to 0.9 million tonnes). Collectively, the top four exporters accounted for 83% of the global pig iron trade.

The volume of pig iron exports from Brazil in 2022 marked a historic high at 3.7 million tonnes. According to statements from the International Iron and Metallic Association (IIMA) of Brazil, there is potential to increase these volumes to at least 5 million tonnes. Brazil had exported such quantities until 2012. However, the export of pig iron from India in 2022 declined to 0.5 million tonnes from the previous year's 0.9 million tonnes. As such, in the short term, India may not be considered as a major substitute for Russian products in the EU. This differs from the longer term, where India is actively investing in the development of iron and steel production and might expand its presence in the global market in the future.

Hence, Ukraine and Brazil serve as alternatives to Russian pig iron.

In the short term, Ukraine has significant potential to increase its pig iron supply to the EU. As of September 2023, five blast furnaces with a total capacity of around 6-7 million tonnes stand idle in Ukraine. The activation of these capacities hinges on overcoming logistical constraints and ensuring stable supply of electricity and water. Based on data from January to July 2023, Ukraine could increase pig iron exports to approximately 1.5 million tonnes this year. Before the war, Zaporizhstal, AMKR and Kametstal collectively exported about 2 million tonnes of pig iron. In essence, Ukraine is well-positioned to entirely replace Russian pig iron on the European market.

Key statistics on pig iron production

In 2021, Ukraine's pig iron production reached 21 million tonnes, with exports valued at 1,6 billion dollars or 3,2 million tonnes. According to estimates made by the association of enterprises "Metalurgprom", Ukraine's pig iron production in 2022 decreased to approximately 6,39 million tonnes, and the estimated export volume for 2022 was 1.3 million tonnes. The primary enterprises engaged in pig iron production in Ukraine include PJSC ArcelorMittal Kryvyi Rih, PJSC Kamet Steel, and PJSC Zaporizhstal.

Over the next 5 years, the significance of pig iron supplies to the EU is expected to diminish. GMK Center's calculations indicate that the introduction of the Carbon Border Adjustment Mechanism (CBAM) will largely replace the pig iron market in the EU with supplies of Hot Briquetted Iron (HBI) by 2028-2030. In this timeframe, the major HBI suppliers in the EU will emerge from Middle Eastern companies, as several substantial projects are underway in the region. Additionally, a number of

projects within the EU have been announced with a focus on the domestic HBI merchant market, which means there will be sources of domestic supply.

According to GMK Center calculations, possible domestic supply of HBI in the EU could be up to 6 million tons. Massive commissioning of European projects is expected in 2027-2028. It creates opportunity meet demand for HBI together with 4 mln tons of import. Uncertainty remains in the issue of imports from russia. EU imports 50-60% of HBI from russia. If this import is stopped, there will be additional room for HBI supplies. Ukraine can participate in European DRI supply chains and green steel transition. Ukraine is a traditional and well-known supplier of iron ore products for EU. Ukraine can also supply DR-grade iron ore pellets for DRI/HBI production. Ukraine's key advantages include:

- Significant reserves of high-quality low-cost iron ore, which is suitable for DRI production. Ukraine has 5th largest magnetite ore reserves globally (~5 billion tonnes)
- Competitive zero-carbon energy production (extensive nuclear energy capacities, high renewable energy potential)
- Developed logistics and proximity to Europe - delivery terms from Ukraine are quite short
- Existing steelmaking capacity and capabilities, and relevant infrastructure
- Strong human capital. Ukraine is home to well-educated and mobile workforce, with capabilities in engineering and machine-building. Cost of labour in Ukraine is highly competitive

Moreover, Ukrainian steel company Metinvest plans to construct EAF-based plant in Italy. DR-pellets will be supplied from Ukraine. Potential investment in the project may reach €2 bln. It will be major contribution of Ukraine to "green" transformation of steel sector in EU.

Assessment of the substitution of russian iron ore on the EU market

There are three types of iron ore products: sintering ore, iron ore concentrate (fines), and iron ore pellets. Sintering ore and fines undergo a sintering process in sinter machines, during which sinter is produced. This sinter is subsequently utilized in the blast furnace process for the production of pig iron.

All russian iron ore exports to the EU are in the form of iron ore pellets. Therefore, the issue of substituting russian iron ore supply should be viewed in the context of replacing pellet supplies.

The global iron ore pellets market is relatively small, amounting to 120 mln tonnes in 2021. Several major large exporters dominate this market, including Canada (13% of global trade), US (9%), Brazil (16%), Ukraine (14%), russia (14%), and the EU (16%).

Ukraine used to export approximately 15 million tonnes of iron ore pellets before the war. In 2022, pellets exports decreased to 9 million tonnes, and there is a possibility that pellets exports may further decline to 7-8 million tonnes in 2023. There are three pellet plants in Ukraine: Ferrexpo, Central, and Northern iron ore plants of Metinvest. Although these plants are in operation, they are running at reduced capacity, roughly around 50%. Therefore, Ukraine has significant untapped potential of pellet production and export, contingent on logistic issues, ensuring a stable energy supply, and securing water resources. In theory, Ukraine has the capacity to add 7-8 million tonnes of additional pellet exports.

Key statistics on pig iron ore production

The iron ore production capacity of Ukraine before the start of full-scale war is estimated to be in the range of 160 to 170 million tonnes mined per year. In 2021, Ukraine's iron ore exports were valued at \$6,8 billion, equivalent to approximately 44 million tonnes.

The primary iron ore reserves are concentrated in the Dnipropetrovsk region within the Kryvyi Rih iron ore basin. Key enterprises involved in iron ore mining in Ukraine include Kryvorizk Iron Ore Combine JSC, ArcelorMittal Kryvyi Rih JSC, JSC Sukha Balka, Northern GZK, Pivdennya GZK, Inguletsky GZK, Central Mining and Processing Plant in the Dnipropetrovsk Region, PJSC Poltava Mining and Processing Plant, Yeristiv Mining and Processing Plant LLC, Zaporizhsky Iron Ore Combine JSC.

Actions needed

Imposing sanctions on russian pig iron and iron enables the removal of an additional \$1 billion export income for russia, further weakening ruble exchange rate and depriving russia of additional tax resources to sustain the war. Additional measures should be implemented to stop illicit import of pig iron from Ukrainian territories temporarily occupied by russia. Stringent checks of certificates of origin by Italian authorities are crucial in halting clandestine imports of Ukrainian pig iron, as exemplified by activities involving Nevinnomysskiy Elektro-Metallurgicheskii Zavod, vessels like KLC ERCIYES, EVER COMFORT, and IBRAHIM KONAN).

Data and information sources

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Organizations which provided information for the research:

1. Think-tank GMK Center, LLC
2. Metinvest Holding, LLC

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