

Polish and Ukrainian railway systems – integration barriers and solutions



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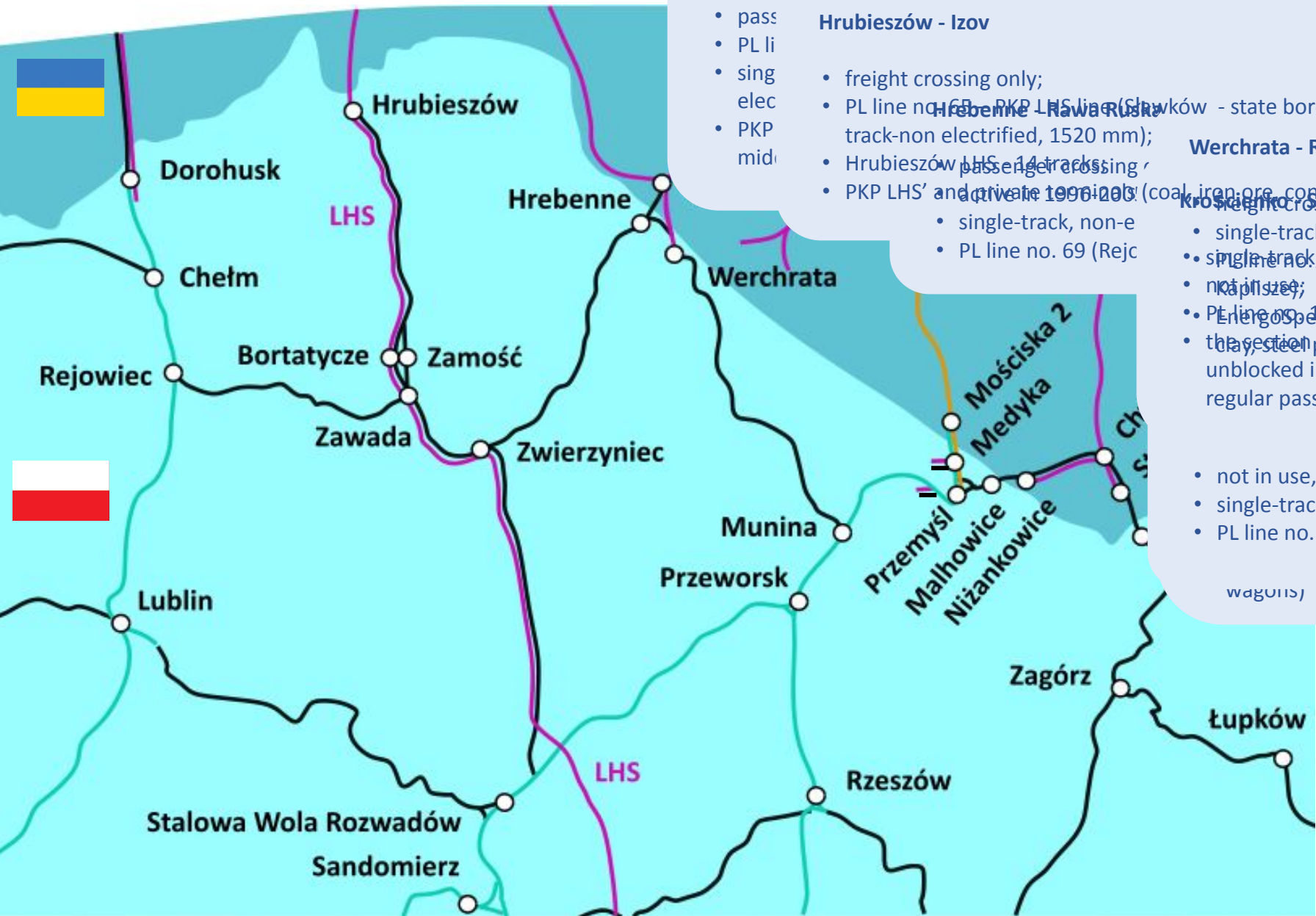
FUND-RAISING AND PROCUREMENTS

Analysis of the opportunities for obtaining external support and preparing application documentation, feasibility studies, advice on preparing tender documentation

The Report: Polish-Ukrainian railway relations – current status, potential, challenges



- **bilingual** report (PL/UA);
- the result of the work of **several transport experts** from both Poland and Ukraine;
- comprehensively presenting the transport situation of Poland's eastern neighbor;
- focus on **the current state of integration between the railways of the two countries**;
- indication of how the problems standing in the way of **further strengthening Polish-Ukrainian rail relations** can be overcome relatively quickly;
- indication of the opportunities for Polish infrastructure companies on the Ukrainian market and **the barriers** that may make it difficult for domestic entities to take part in the future mega-project of rebuilding that country;
- **a significant contribution** to the public discussion on the future of rail transport between the two countries.



Dorohusk - Jagodin

- pass
- PL li
- sing
- elec
- PKP mid

Hrubieszów - Izov

- freight crossing only;
- PL line no. 68 (PKP LHS line (Stryków - state border; single track-non electrified, 1520 mm);
- Hrubieszów LHS passenger crossing
- PKP LHS' and private 1996-2003 (coal, iron ore, containers, wood)
- single-track, non-e
- PL line no. 69 (Rejci

Werchrata - Rawa Ruska

- single-track, non-electrified (1520 mm);
- single-track, non-electrified (1435 mm), 116 (state border - Kapinsze);
- PL line no. 108 (Stróż (Krośnice) coal, construction aggregates, the section of railway line no. 108 from Zagórz to Krośnice was unblocked in March 2022 (for refugees transport), but there is no regular passenger traffic on the line

- not in use, possibly passenger & freight crossing;
- single-track, non-electrified, 1435 mm;
- PL line no. 102 (Przemysł - state border)

- 1435 mm, 3 kV DC
- 1435 mm, non-electrified
- 1520 mm, 3 kV DC
- 1520 mm, non-electrified

Main assumptions

Obstacles of various nature need to be overcome in passenger and freight transport crossing state borders. This also applies to the border between Poland and Ukraine.

The cooperation was limited even though **both countries remained in the OJSD organization** (which brought together the railway companies of the Eastern Bloc) for almost half a century.

Any particular impetus to network unification hasn't been given by **the enlargement of the European Union**, as shown by the experience of the Baltic States.

BUT: It's nothing unusual – we can see the same when analyzing the Iberian Peninsula (60 years of both Spain and Portugal in the EU).

We have to come to terms with the diversity of infrastructure and rolling stock between Poland and Ukraine and seek ways of neutralizing the obstacles it creates.

In order to eliminate barriers effectively, it **is first necessary to be aware of their origin**. The apparent difference (1520 / 1435 mm) in track gauge is not the only one, and by no means the most time-consuming to overcome.

Railway and customs bureaucracy



Limited territorial scope of the operators and for the rolling stock

- the licensing of a railway undertaking has **traditionally covered territory of a single state**, EU regulations hardly overcome this boundary, but within the Union. Solution: agreement of carriers, the establishment of PL-UA transport and logistics company.



Passport and customs issues

- the crossing of the border by goods means **two customs checks**, sometimes also phyto-sanitary one; in passenger transport – **2 checks by the service of 2 countries** (when transferring from one train to another or while running on the border section).



Differences in prices

- especially **excise duties and availability of goods on both sides of the border** and/or relatively high duties. In some cases the passenger carriers couldn't withstand the wear and tear on the rolling stock caused by petty smugglers hiding goods in cars and the customs services looking for contraband.



Customs complexities difficult for carriers

- resulting from **the lack of economic integration**. An issue of excise duty on fuel in the tank of a UA rail bus emerged, which became the reason for the suspension of its operation on the route Chełm – Dorohusk – Jagodin – Kovel – Zdolbuniv.



The possibility of unilateral ad hoc reduction in traffic

- the case for transit through UA from RU and China **at the beginning of 2022** and lasted until 10 February to the detriment of the LHS line receiving the transit.

Technical differences – large and small



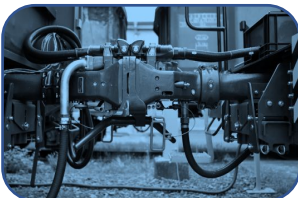
The difference in track gauge

POL – 1435 mm, former USSR countries – 1520 mm (1524 mm also possible); in POL also there's over 567 km of broad gauge lines (394,5 km – LHS).



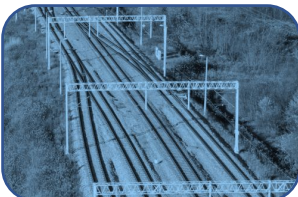
Different vehicle gauges (permissible sizes) of rolling stock

Passenger cars typical of USSR railways used to run in Poland, but nowadays all the infrastructural modernisation work is being carried out on the assumption of the typical UIC gauge used in Europe; however freight rolling stock is diverse.



Different couplings

screw couplings used in Europe (manual coupling and decoupling), Scharfenberg and DAC couplers (automatic), SA-3 type on Polish LHS line.



Different power supply systems for electric traction

3 kV DC in POL (expected 25 kV AC on CPK „spokes”), 25 kV AC 50 Hz in UA (although there are also 3 kV DC lines in the country). This issue ceases to be a major challenge (multi-system locomotives & multiple units), although it does increase the cost of the traction rolling stock.



Different permissible train lengths, axle loads and other technical parameters

22.5 t/axle of max axle load in POL, 24 t/axle in UA; 750 m of max train length in Poland (usually it's 600 m). These are by no means purely engineering parameters – they determine the cost (e.g. how many tonnes can be carried by one locomotive/driver).

Integration of the 1435 / 1520 mm rail system – transshipment & new line

Transfer of passengers and reload of goods



- a **number of terminals** at the Polish-Ukrainian border offer transshipment of goods;
- the **dry port** located in Hurko-Medyka and Żurawica near Przemyśl (for iron ore, steel, and containers) is the most crucial transshipment point;
- **the most complex – the handling of iron ore**, which arrives frozen (air heating up to 30 h);
- the handling of products and semi-finished products carried out in Żurawica as well as containers is less complicated.

Construction of new line (width and standards of the neighbouring country)



- **LHS (Linia Hutnicza Szerokotorowa, formerly Linia Hutniczo-Siarkowa)**, a 394,5 km 1520 mm single-track line connecting POL/UA border with Sławków;
- built in the years 1975-1979;
- managed by a **dedicated company** – PKP LHS (established in 2001);
- intended to serve **the ore import** for the steelworks in Dąbrowa Górnicza from Kryvyi Rih;
- it's construction made possible to avoid energy-intensive operations at the border;
- in the other direction, the line was intended to export sulphur from Poland to the USSR;
- from time to time, ideas of **extending the LHS** have appeared (as well as adding an extra track)

Integration of the 1435 / 1520 mm rail system

Dual gauge and mixed lines



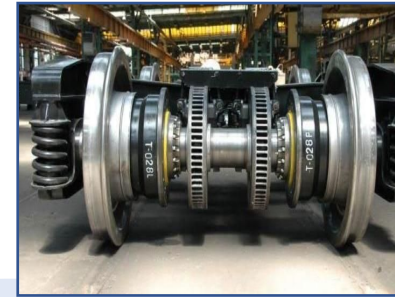
- the usage of **dual gauge** on which trains of two different gauges can run – on the border sections near Chyrov;
- **mixed lines** – two tracks of different gauges fitting into the corridor of a double-track line – the line from Przemyśl (passenger) and from Żurawica (freight) to the border and on to Mostyska and further stations in Ukraine

Changing bogies



- **changing bogies** is the oldest way to overcome the difference in track gauge without passengers changing and without handling goods;
- the switching point for passenger trains in Przemyśl has been closed since 2017; at present switching points for changing bogies are located in Jagodin (Ukraine, trains Warsaw – Kyiv via Dorohusk) and in Mostyska (recently – before the COVID-19 pandemic – used for trains from Warsaw, Wrocław and Kraków to Lviv);
- in freight traffic, the changing of bogies was practised in Żurawica, avoiding the pumping of the contents in the case of tank wagons.

Automatic changeover



- **SUW2000** – a design by R. Suwalski was developed in Poland between 1990-1992, a prototype was made in 1993, upgraded in 2008 (the SUW 2000 II);
- the system worked from 2000 to 2005 (POL/LIT border in Mockava) and in Dorohusk (POL/UA border, was used by a Warsaw – Kyiv train);
- from 2003 to 2013 SUW was used on the Wrocław – Kraków – Przemyśl – Kyiv trains (but due to the limited number of bogies, the train benefited a bogie change every other day);
- a total of 80 switching sets (bogies) for freight and passengers rolling stock were manufactured and 6 switching devices were installed;
- officially, PKP Intercity discontinued the operation of SUW 2000 in 2015 (Lviv Express from Wrocław) due to the problems of the technical partner;
- in 2019 PKP Intercity acquired the rights and patents, the name **PolSuw** was adopted; the carrier announced a return of the use of the system with the intention of running trains from Warsaw to Odessa;
- the use of SUW/PolSUW in freight transport could reduce the transit time of a goods train (32 wagons) through a border station from 12-14 to 4 h, but the implementation costs of the technology are high compared to the benefits.

An exemplary timetable of the process of passing a goods train consisting of 32 wagons (with exchange of bogies) across the border

160 minutes – the procedures involved in transferring a train between railways (such as declaration, processing of commercial documents)



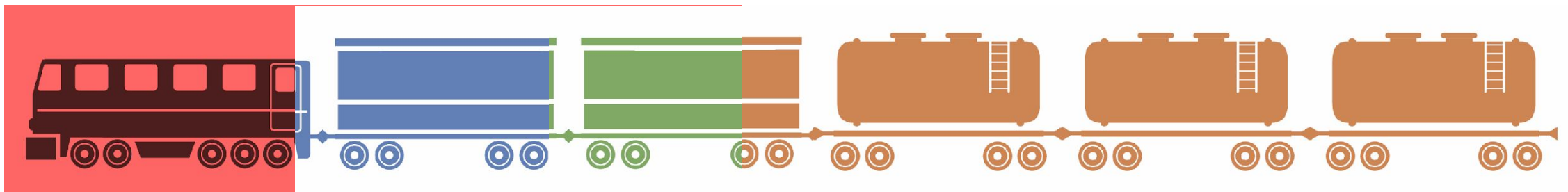
140 minutes – customs and administrative checks



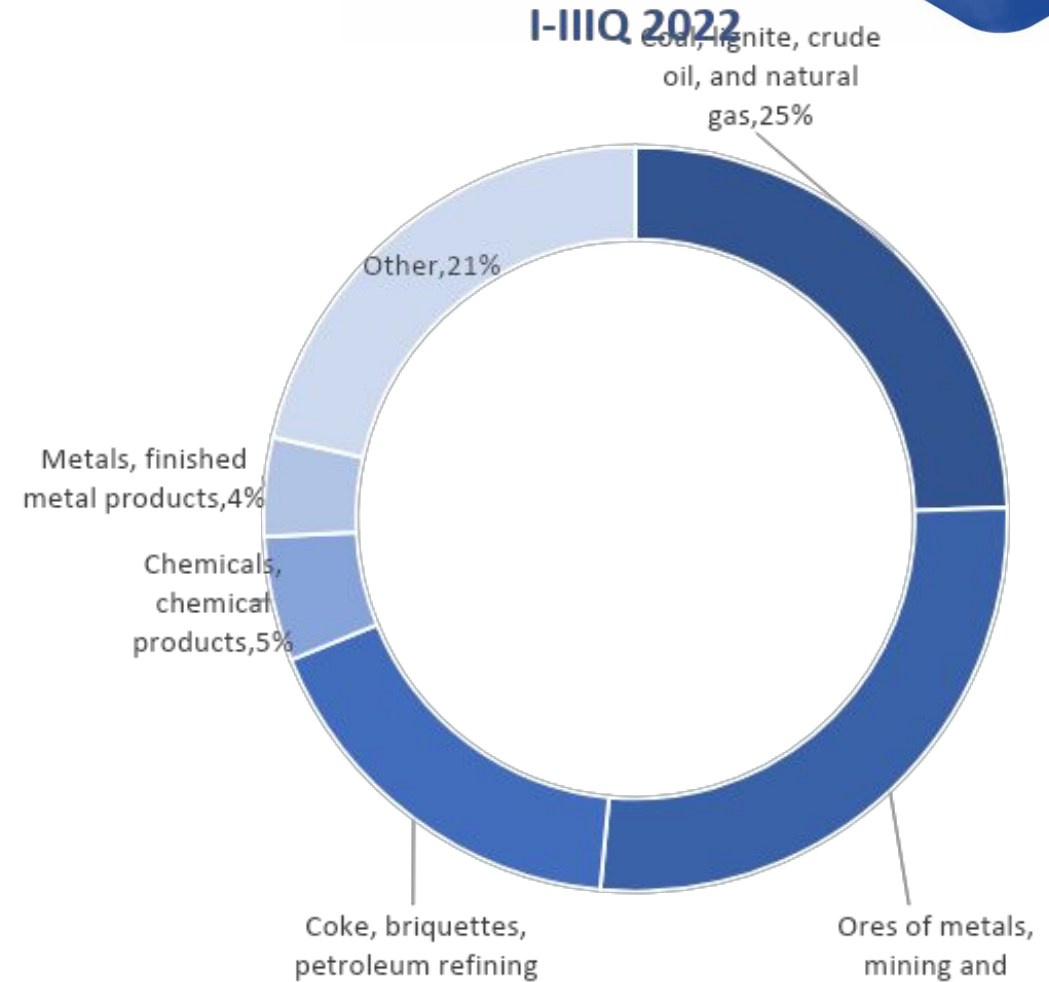
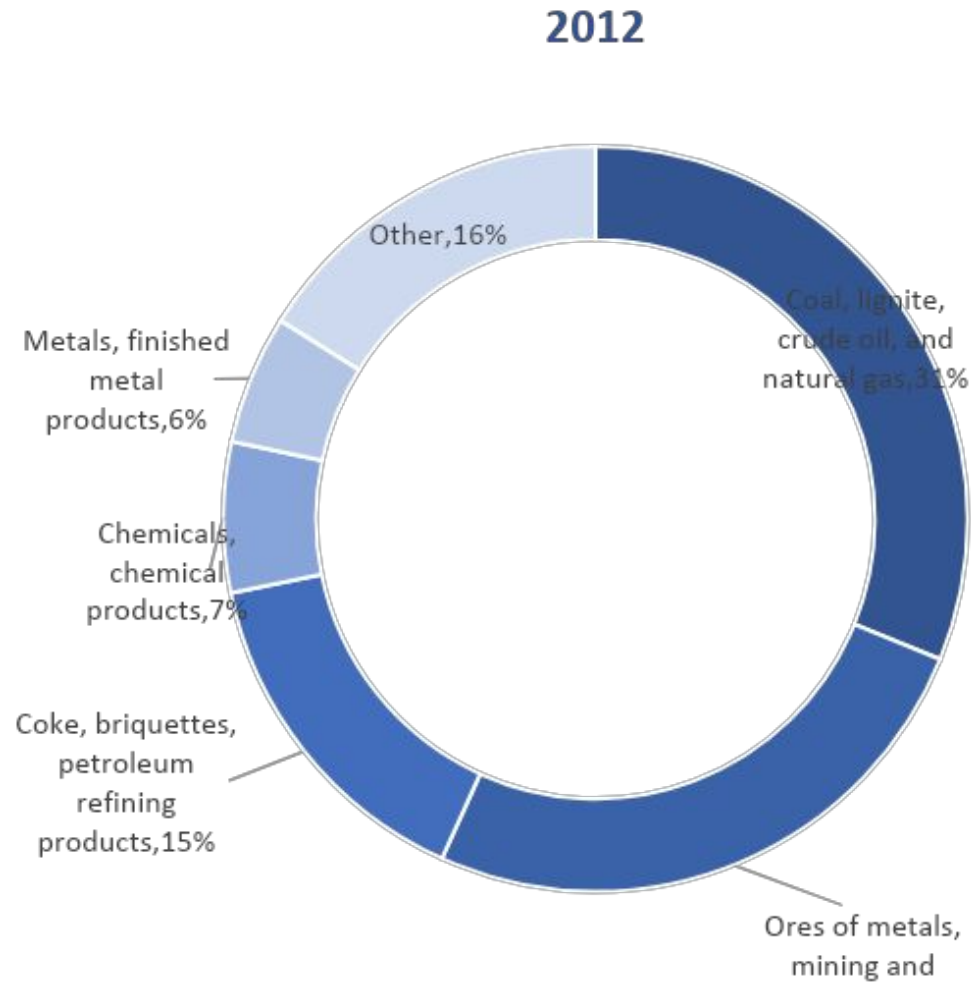
120 minutes – shunting work and brake tests



450 minutes – bogie exchange with the traditional method (30 minutes – exchange at the changeover station)



The freight rail transport performance structure in Poland (2012, I-IIIQ 2022)

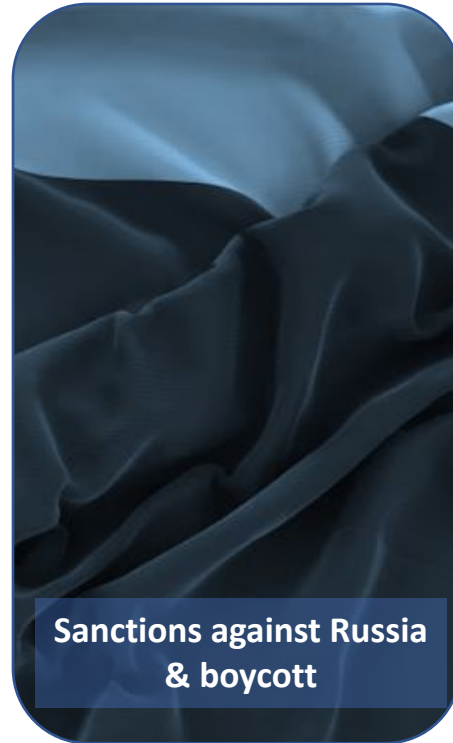


Coal and fuels are still the basis of rail transport. The decarbonisation process is proceeding slower than climate and environmental pressure would suggest, but **coal mining and consumption is declining** faster than government or energy industry programmes and forecasts suggest.

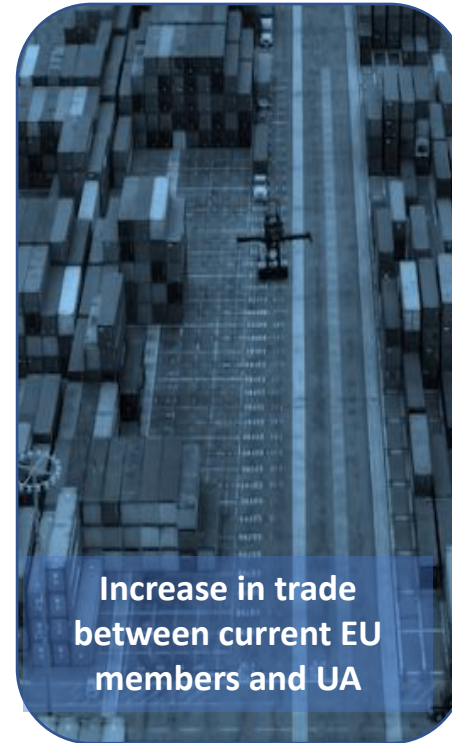
In this situation, it is expected that **the fate of freight POL/UA rail connections will be determined by the ability to compete in intermodal transport**. Several trends are becoming visible here, so far difficult to forecast:



(even if it doesn't use the rail corridor through RUS – but the Trans-Caspian corridor)



(reduction in interest in investment in RUS by European companies)



(POL is a destination and transit country here)



(it'll open up a corridor from POL via UA to RO & BUL useful for traffic from northern Europe and some parts of GER)



a significant increase in the volume of intermodal transport should be expected

Conclusion – what needs to be done?

The increase in intermodal capacity on the LHS line and at the Przemyśl/Żurawica – Mostyska border crossings should be assessed positively. But **also more thorough assessment of the capacity and quality (speed, axle load) of all crossings and the lines leading to them on both sides is needed.** This analysis should lead to the agreement of:

- **Crossings and dedicated lines for freight transport**

Polish experience shows that giving priority to passenger trains – necessary to achieve sensible journey time – is – especially on single-track lines – at the price of a disastrous increase in journey times for goods trains.

- **Manner to overcome the barrier of different track gauges for the various crossings and modes of transport**

Grain shipments have shown that **the capacity on the POL/UA border is very low in certain sections.** In March 2022 UZ informed that only 45 wagons of grain could cross the border daily. So more exports can be handled using stations on the border with Romania and Slovakia or Hungary.



Thank you for your attention



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