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**Criteria for choosing the location of investment projects for building new
or modernizing existing intermodal terminals to be co-financed in the future EU
financial perspective**

Abstract: The article presents information on intermodal transport in Poland. Particular attention is paid to the point infrastructure dedicated to such transport. The locations of construction of new intermodal terminals along with the criteria for their selection have been proposed.

Keywords: Railway infrastructure; Intermodal transport

Introduction

Along with maritime transport and inland navigation, rail is the most ecological branch of transport. The European Union puts emphasis on increasing freight transport in transport corridors with environmentally friendly transport modes.

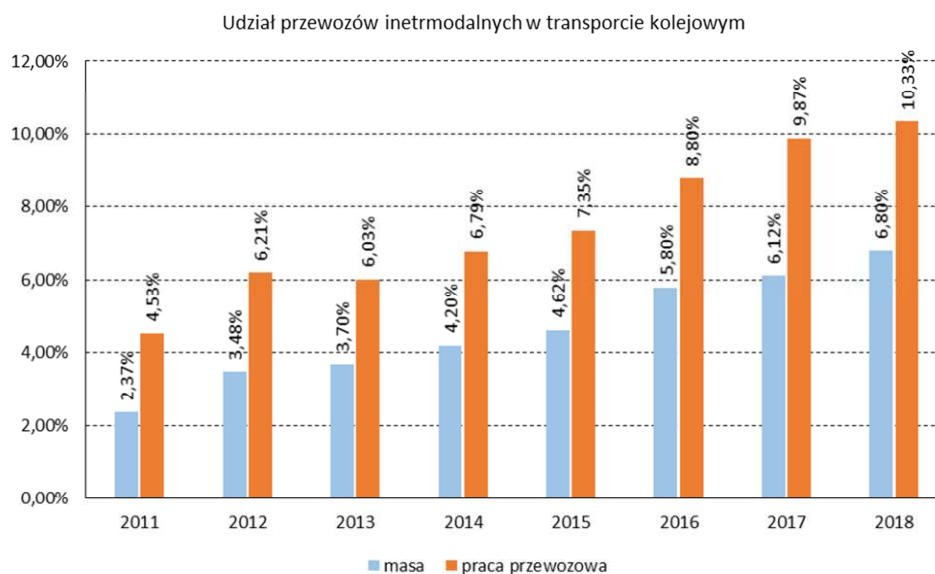
In Poland, in recent years, with the co-financing from European funds, the linear railway infrastructure included in the main transport routes has been modernized. To a lesser extent, this concerned point infrastructure dedicated to intermodal transport. The new EU financial perspective creates conditions for co-financing the development of rail infrastructure, including intermodal transport infrastructure from European funds also in the years 2021-2027.

Location and number of intermodal terminals in Poland

Freight transport by rail in the intermodal transport segment has recorded a steady increase in the share of both freight weight and transport performance in recent years. However, their share in total rail transport is still relatively small, in 2018 it slightly exceeded 10% in the volume of transport work. However, it should be noted that in Poland, bulk transport (hard coal, iron ore, aggregates) has a significant share in rail transport. In other European

countries, bulk cargo transport is much smaller, thus the share of intermodal transport in total rail freight transport may be correspondingly higher.

In 2018, this transport segment increased compared to 2017 by more than 15% in the mass of cargo and almost 14% in transport performance.



1. Share of intermodal transport in rail transport by transported mass and transport performance. Source: data of the Office of Rail Transport for 2011-2018

Detailed results of intermodal transport in rail transport are summarized in Table 1. The data below shows that intermodal transport in rail transport has increased almost threefold in the mass of loads and more than twice in transport work over the last 8 years.

Tab.1 Intermodal rail transport by transported mass and transport performance in 2011-2018

Year	2011	2012	2013	2014	2015	2016	2017	2018
Mass [thousand tons]	5 906,2	8 055,8	8 633,2	9 610,3	10 386,4	12 829,8	14 687,8	17 018,40
Work [thousand tons-km]	2 447 102,3	3 044 869,1	3 066 986,5	3 401 655,4	3 718 045,3	4 441 179,7	5 410 204,2	6 161 630,0
Average transport distance [km]	414,3	378,0	355,3	354,0	358,0	346,2	368,3	362,1

Source: Own study based on data from the Office of Rail Transport, Warsaw 2019

In recent years, the average distance for freight transport by rail oscillates around 350 - 360 km. If we assume that a significant part of intermodal transport in Poland is related to the delivery and delivery service of port terminals, especially those located in the Tri-City sweets, it can be concluded that terminals located in the central part of Poland have a significant role in servicing the ports.

Intermodal terminals are used to handle the handling of intermodal units. Over the past few years, due to the dynamic development of this segment of transport, intermodal operators have modernized or built new terminals.

In individual provinces, the number of terminals is as follows:

- Lower Silesia – 3,

- Lublin – 3,
- Lubusz – 1,
- Łódzkie – 6,
- Lesser Poland – 2,
- Masovia – 3,
- Subcarpathia – 3,
- West Pomerania – 1,
- Pomerania – 4,
- Silesia – 4,
- Warmia-Masuria – 1,
- Greater Poland – 5,
- West Pomeranian – 2.

The figure 1 below shows the arrangement of intermodal terminals against the background of the main corridors of the TEN-T network in Poland.

The presented data shows that most of the terminals are located in the western part of the country, the Vistula River is a kind of "border". There is not a single terminal in the Kuyavian-Pomeranian, Opolskie and Świętokrzyskie provinces. In the case of the Kuyavian-Pomeranian province, this is related, among others, to the proximity of Tri-City ports and the service of senders/recipients of intermodal shipments by road transport. For the Opolskie and Świętokrzyskie provinces, it is related to the proximity of terminals located in the neighboring provinces.



2. Location of intermodal terminals against the background of the Polish rail network. Source: own study based on the map of PKP PLK S.A. and UTK data (as at 26/03/2019)

Existing intermodal terminals differ in technical parameters such as:

- length of loading tracks,

- area of storage yards,
- reloading capacity per unit of time (e.g. daily or per year),
- equipped with reloading devices.

Table 2 summarizes the basic parameters of sample intermodal terminals located in the provinces of Eastern Poland, including terminals handling transshipments at the 1435/1520 mm track contact.

Tab.2. Parameters of selected intermodal terminals in Eastern Poland, including the 1435/1520 mm track junction

Terminal	EUROPORT Małaszewicze Duże	Logistic Centre PKP Cargo in Małaszewicze	T1 Żurawica Terminal (container railway)	T2 Medyka Terminal (container railway)	PCC INTERMODAL – Kolbuszowa Terminal	Terminal in Elk - Nelport Gróbarczyk, Kaniewska, Mieczkowski sp.j.	ANDREX LOGISTICS CHRYZANÓW TERMINAL
City/Service station	Małaszewicze	Małaszewicze	Żurawica	Medyka	Kolbuszowa	Elk	Nowosady / Zabłotczyzna
Terminal operator	EUROPORT	PKP CARGO CL Małaszewicze	PKP CARGO CL Medyka - Żurawica	PKP CARGO CL Medyka - Żurawica	PCC Intermodal	Nelport	Andrex-Logistics
Number of tracks and length - 1435 mm	2 x 250 m	2 x 608 m 1 x 450 m	4 x 220 m	4 x 430 m	1 x 510 m	1 x 590 m	1 x 660 m
Number of tracks and length - 1520 mm	2 x 250 m	2 x 608 m 1 x 450 m	4 x 180 m	1 x 1032 m	-	-	1 x 660 m
Storage area	1300 TEU	1872 TEU	60 TEU	b.d.	400 TEU	1000 TEU	3000 TEU
Transshipment possibilities	80 000 TEU / year	223 380 TEU / year	23 800 TEU / year	20 000 TEU / year	16 000 TEU / year	6800 TEU / year	200 000 TEU / year
Cargo handling equipment	1 crane 1 reachstacker	1 wheel crane, 3 container cranes, 2 self-propelled handling equipment	2 container cranes	3 container cranes	2 reachstackers	3 container cranes, 2 reachstackers	1 container crane

Source: own study based on data from UTK and intermodal terminal operators

As can be seen, existing terminals have significant differences in the length of transshipment tracks and a significant dispersion in the volume of transshipment capacity. It can be stated that these two parameters are important for determining the capacity of terminals, i.e. the ability to service a specific number of intermodal trains. The length of transshipment tracks determines the issues of shunting service of the terminal (dividing the train composition before entering the transshipment front in the case of tracks with a length of

less than 600 m). It should be emphasized that the train service and reloading devices determine the reloading capacity of terminals.

Desired criteria for choosing the location of new intermodal terminals

The currently binding Regulation of the Minister of Development and Finance regarding co-financing of intermodal projects in the 2014-2020 perspective in relation to intermodal terminals specifies that assistance may be granted to entrepreneurs based in the territory of one of the Member States of the European Union or the European Free Trade Agreement (EFTA) on implementation of the intermodal transport project, including:

- construction or reconstruction of intermodal terminal infrastructure, including dedicated infrastructure, in the field of road infrastructure, sidings or railway lines, which are used to connect intermodal terminals with the road network or rail network;
- purchase or modernization of devices necessary to operate intermodal terminals.
- These are very general statements that do not allow the promotion of the desired features from the point of view of the transport policy and territorial cohesion of the new intermodal terminals.
- Therefore, we propose that the draft regulations on public aid in the implementation of projects in the field of intermodal terminals include provisions regarding the desired criteria that must be met by the locations of new intermodal terminals. These are among others:
 - Location of the terminal in an area with significant economic potential now or in the future,
 - Location of the terminal in an area where the terminal infrastructure is not located,
 - The availability of land for the construction of a terminal with an appropriate area and shape (the possibility of building transshipment fronts for trains with a length of 750 m),
 - Access to the road network, in particular to national and express roads,
 - Access to the TEN-T comprehensive rail network,
 - Access to 1520 mm track.

An important criterion should also be the distance from seaports, especially in Gdańsk and Gdynia. The development of intermodal transport in Poland in recent years is associated with the significant dynamics of the increase in container handling at these ports observed in previous years and forecast for the following years. The distance of the terminals from the ports is important for the use of rail transport in port transport services.

Proposed locations for new intermodal terminals

The desired criteria presented in the point above for the location selection of new intermodal terminals can have a significant impact on the choice of location for new intermodal terminals. Table 3 presents the initial locations proposed by the authors along with an assessment of the fulfillment of the proposed criteria.

The proposed initial locations are in the Podlasie, Lublin, Świętokrzyskie and Subcarpathia provinces. These voivodships are located in the area of "Eastern Poland", a kind of "white spot" in Poland related to the access to intermodal infrastructure.

It should be noted that the choice of the initial location for the construction of the intermodal terminal is only the beginning of the entire investment process. One of its elements is pre-project documentation along with relevant application documents related to co-financing of investments from European funds.

Co-financing of investments from European funds may be important especially in the case of construction of intermodal terminals in the area of "Eastern Poland". This area is now

significantly less economically significant than the rest of Poland. However, centers such as Białystok, Kielce, Lublin, and Stalowa Wola have significant demographic and educational intellectual potential. They also now have significant economic potential, which may be even greater in the future. One of the conditions for this increase is the development of transport infrastructure, including transshipment infrastructure.

Tab. 3. Preliminary locations of intermodal terminals together with an assessment of the fulfillment of the proposed criteria

Criterion	Terminal				
	Białystok	Chełm / Dorohusk	Lublin	Kielce/Skarżysko Kamienna	Huta Dereżowska
The location of the terminal in an area with significant economic potential now or in the future	YES	YES	YES	YES	YES
The location of the terminal in an area where the terminal infrastructure is not located	YES	YES	YES	YES	YES
Availability of land for the construction of a terminal with an appropriate area and shape (the possibility of constructing transshipment fronts for trains with a length of 750 m)	YES	YES	YES	YES	YES
Access to the road network, including primarily national and express roads	YES	YES	YES	YES	YES
Access to the TEN-T comprehensive rail network	YES	YES	YES	YES	YES
Access to the 1520 mm track	NO	YES	NO	NO	YES
Distance from seaports and Gdansk and Gdynia	>300 km	>300 km	>300 km	>300 km	>300 km

Source: own study

Conclusions

The new EU financial perspective for 2021-2027 will create conditions for further co-financing the development of transport infrastructure. However, the available funds may be smaller than in previous perspectives. It is important to plan the spending of such funds so that the effects of transport investments co-financed from European funds bring significant benefits to the entire transport system.

The development of intermodal transport in the area of "Eastern Poland" creates conditions for increasing the dynamics of economic development of this area and leveling the level of economic development with other regions of Poland. The development of intermodal infrastructure in this area may, however, be associated with increased business risk, which may lead to a decrease in the propensity to invest capital in the development of transshipment infrastructure in this area. Therefore, it is important to introduce preferences for co-financing investments in intermodal infrastructure located in "Eastern Poland".

Source materials

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