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Modernization of Railways in the Warmińsko-Mazurskie Voivodeship

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Summary

This article presents the current state of railway infrastructure – a description of modernized and refurbished lines, plans for further refurbishment, and the rolling stock management procedures currently underway. The use of railways in the Warmińsko-Mazurskie Voivodeship in transport of passenger and goods is low, and most initiatives are due to centrally managed railway companies (PKP IC, PKP PLK) rather than the local marshal's office. This is due, on the one hand, to the lack of major industrial plants as customers for the railways and, on the other hand, to the relatively low income of the local population, who rarely use rail services. The most crucial investments made in the region are the modernization of Olsztyn Główny and Ełk stations, the construction of a new Olsztyn Główny station, and the modernization and electrification of line LK 38 between Ełk and Korsze.

Keywords: Olsztyn, Mazury, modernization of railways in Poland

1. Description of the railway network in the Warmińsko-Mazurskie Voivodeship

Warmia and Mazury are a region where the railway network was managed and developed by the German state until 1945. After the end of the Second World War, the region was divided, with the land allocated to Poland and the Soviet Union (now Russia, as Kaliningrad Oblast). As train services changed dramatically (especially in the Soviet part), e.g., connections to Berlin were eliminated, many trunk lines became local lines. For example, the Königsberg – Korsze – Prostki line, which was built in 1867–1871 to transport grain from Tsarist Russia to the port of Königsberg, became a local line along more than half its length (Korsze – Bartoszyce – Sągnity). In the political reality of the time, cross-border traffic was out of the question, as the Soviet part of the former East Prussia had become a major military base, with entry restricted even for Soviet citizens; however, these restrictions began to ease as early as the late 1950s. In the Soviet part of former East Prussia, trains completely changed their outbound direction from Königsberg from west to east (i.e., Berlin was replaced by Moscow), and the vast majority of lines became local lines, with only the line running east from Königsberg via Vilnius and Minsk to Moscow retaining its status as a trunk line. Only freight trains, possibly military trains, the latter providing communication between Soviet military bases in Poland and East Germany and the USSR, ran to neighboring Poland. The railway network in the region was converted to a gauge of 1524 mm (1520 mm since around 1970), and some branch lines were dismantled, including all local and narrow-gauge railways (Kleinbahnen).

East Prussia remained one of the least developed regions of Germany until 1945 (approximately 80% of the population lived in rural areas). The displaced German population in the Polish part of the former East Prussia was replaced by, e.g., displaced persons from the Eastern Borderlands (including the Ukrainian population). Since the former owners were unable to pass on their knowledge, for example, how to use their drainage systems or agricultural tools, this further exacerbated the economic problems in this impoverished region. Looting of former German property by the Soviet army after 1945 was a separate issue; this included dismantling railways and confiscating rolling stock, which was transported to the East. This forced the Polish state to rebuild many railway lines and acquire rolling stock to operate them. After 1945, the authorities of the People's Republic of Poland (communist one) did not invest in the Mazury or Warmia

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regions, apart from the main centers, i.e., Olsztyn and Elbląg[2]. Where efforts were made to maintain production in the few existing industrial plants rather than to build new ones, the hitherto strongly agricultural character of the region was preserved. A significant part of the local population continues to make a living from tourism due to the region's beautiful landscape (the Mazury Lake Region). The situation was similar on the railways – while traffic was maintained on most lines, new investments were minimal. Electric traction on the route to Olsztyn was not introduced until the second half of the 1980s:

- LK 216 Olsztyn – Działdowo – in November 1986;
- LK 353 Olsztyn – Iława – in October 1988; and Olsztyn – Korsze – in December 1990;
- LK 220 Olsztyn – Elbląg – in December 1994;
- LK 38 Białystok – Ełk – in December 1990.

Until the early 1990s, the region continued to rely on diesel and steam traction. Speeds of 80–100 km/h on individual lines were the result of technical parameters from the German era, rather than the post-1945 investments made by the PKP. Thus, the region became a kind of open-air museum as far as railways were concerned, just like some other areas annexed to Poland after 1945, including selected regions of Lower Silesia or Western Pomerania and Lubuskie.

One peculiar quality of the Warmia and Mazury region was the relatively dense railway network, which did not undergo any major reductions until the early 1990s (Fig. 1). Since many lines had low operating speeds, often as low as 20–30 km/h, rail travel became an unattractive option in the wake of the strong increase in car ownership after 1989. The liquidation of many unprofitable plants and the withholding of state

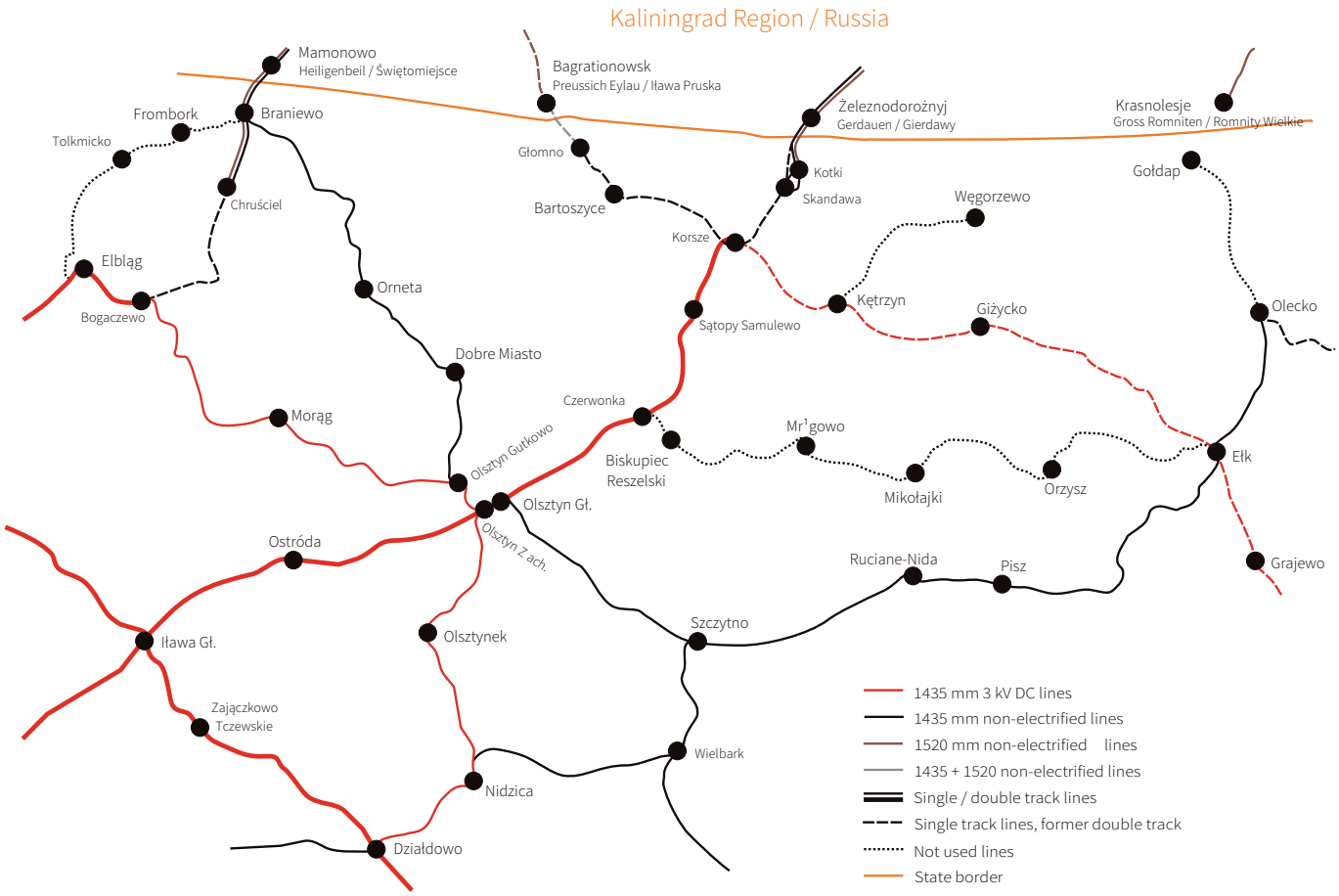

Fig. 1. Diagram of the railway network in the Warmińsko-Mazurskie Voivodeship [author's own elaboration]

[2] One example of this is the construction of the Olsztyn Car Tyre Factory in 1967 (the only large industrial plant built in Olsztyn after 1945) and the former Zamech Elbląg, i.e., the transformed former Schichau plant – a shipyard and locomotive factory (until 1945), which during the communist era also manufactured steam turbines for the power industry, gearboxes, ship equipment, and rolling stock; after 1989, it was taken over by Alstom, and it has been owned by General Electric in 2015. The plant manufactures steam and gas turbines and generators for the power industry now.

budget subsidies to the PKP accelerated the closure of local railway lines, with the number of stops and connections on trunk lines being progressively reduced as well. Local authorities in Mazury and Warmia show little interest in railways, e.g., in launching local services or purchasing rolling stock. Indeed, they do only the bare minimum, assuming that railways serve tourists rather than the local population (Fig. 2–5).

Fig. 2. Mrągowo station, line LK 223 [photo by M. Janduła / PLK]

Fig. 3. Olsztyn Zachodni station [photo by P. Mieszkowski / PLK]

Fig. 4. Bajtkowo stop, LK 219 [photo by Ł. Bryłowski / PLK]

Fig. 5. Szczytno railway station (7 July 2023) [photo by N. Lenda / Wikimedia Commons]

One special feature of the railway network in Mazury is that the journey between Olsztyn and Ełk can be made via three routes of comparable length (150–166 km, Table 1), whereby:

Table 1

Comparison of journey times from Olsztyn to Ełk depending on the route

Intermediate stations	Number of tracks	Electrification	Distance [km]	Travel time in 1996	Average speed in 1996 [km/h]	Travel time in 2025 / (2026)	Average speed in 2025 (2026) [km/h]
Czerwonka, Korsze, Kętrzyn, Giżycko	2 (Olsztyn – Korsze) 1 (Korsze – Ełk)	+ (1990) + (2026)	166.286	3–3 h 15 min	51–55	2 h 24 min / (1 h 47 min)	69 (93)
Czerwonka, Mrągowo, Mikołajki, Orzysz	2 (Olsztyn – Czerwonka) 1 (Czerwonka – Ełk)	+ (1990) –	151.795	3,5 – 4 h	38–43	traffic suspended / (2 h 20 min)**	– (65)**
Szczytno, Ruciane Nida, Pisz	1	–	157.507	5 h 30 min	29	2 h 5 min – 2 h 30 min	63–75

[Own elaboration; **after refurbishment].

- The line via Korsze (LK 353 + 38) is a main line and is the only one that is double-tracked and electrified along half its length.
- The line via Ruciane Nida (LK 219) is a backup line to LK 353 + LK 38.
- The line via Mikołajki (LK 223) is local.

This is a conventional breakdown, as the technical condition of LK 219 continued to deteriorate between 1995 and 2010, and it was only between 2010 and 2019 that the previous technical parameters were restored. In addition, the track geometry on LK 353 + 38 (curves with large radii) enables speeds of > 100 km/h (up to 160 km/h), whereas 100–120 km/h is virtually the maximum speed for LK 223. The routing of the latter line between many lakes, which requires the use of small curve radii, makes it impossible to increase the speed.

As Warmia and Mazury are adjacent to the Kaliningrad Oblast, cross-border connections are in operation. In the Kaliningrad Oblast, the 1520 mm gauge is used; however, the 1435 mm track is routed to such places as the city of Kaliningrad and the Krasnowka station (German: Birkenfeld) near Cherniachovsk (German: Insterburg, Polish: Wystruć). Formally, there are three border crossings with single-track (1435 + 1520 mm), non-electrified lines used for freight traffic:

- Braniewo – Mamonowo (German: Heiligenbeil, Polish: Świętomiejsce); passenger traffic took place between 1992 and 2012 (1–2 pairs of connections to/from Kaliningrad);
- Skandawa – Zheleznodorozhny (German: Gerdauen, Polish: Gierdawy);
- Glomno – Bagrationovsk (German: Preussisch Eylau, Polish: Iława Pruska), dual-gauge 1435 and 1520 mm; closed since the 1990s.

Since Russia invaded Ukraine, traffic through the Braniewo and Skandawa border crossings has been systematically restricted (due to Western sanctions on Russia). Over the last three years, the number of trains running between Poland and the Kaliningrad Region has decreased by about 10 times: from 5.5 per day in 2022 to 1 pair of trains per 1–2 days in March 2025 [10].

2. Commencement of railway modernization after the accession of Poland to the EU

Plans to modernize the railway infrastructure in the Warmińsko-Mazurskie Voivodeship after the accession of Poland to the EU in May 2004 appeared in 2011 [67]. In addition to the modernized Warsaw – Gdynia E 65/C-E 65 (LK 9) line running through the Voivodeship, the PLK authorities have turned their attention to LK 38 Korsze – Ełk, which was to be electrified even before 1989. (Figs. 6–8). However, the economic crisis in Poland, caused by the collapse of the centrally planned economy, resulted in PKP halting all investments. Another argument against the electrification of new lines was the decline in rail transport in the 1990s. Indeed, analyses carried out by PKP at the time indicated that it would be more advantageous to de-electrify the Olsztyn – Korsze section and run trains using diesel traction than to electrify the Korsze – Ełk section. The poorly developed power grid in the Warmińsko-Mazurskie Voivodeship was yet another reason against the electrification of that line. Nevertheless, PKP did not intend to give up – its plans included the construction of the Rail Baltica line, which was construed as the modernization of some sections of LK 38 and LK 41 (Białystok – Ełk – Suwałki). Line LK 35 between Ostrołęka and Szczytno was planned to be refurbished, and a short section to the civil airport in Szymany (approx. 1.5 km) was to be built, which would reduce the travel time to/from Olsztyn to about 40 minutes (Fig. 9). The PLK authorities noted that funding would be needed not only for the modernization or refurbishment of the line in question, but also for subsequent maintenance to avoid a gradual reduction in operating speed to 120, 100, and 80 km/h. Modernization of LK 9 (Warsaw – Działdowo) began in autumn 2011 with funding from the Operational Program Infrastructure and Environment. The total cost was equal to PLN 10 billion, and the installation of the ETCS system made it possible to raise the speed to 200 km/h (160 km/h without ETCS), with an axle load of 22.5 t. Before modernization, the maximum speed on LK 9 was 80–120 km/h. A section of LK 9 is also used by trains running between Warsaw and Olsztyn, so it has had a significant impact on reducing the journey time to/from the capital of Warmia and Mazury to around 2.5 hours.

The electrification of the Korsze – Ełk section began with the inclusion of the task in the National Railway Program and the allocation of a total of PLN 1.5 billion for five railway infrastructure investment tasks in the Warmińsko-Mazurskie Voivodeship on the basic list, as well as two tasks worth around PLN 750 million on the reserve list [19]. According to PLK, this will reduce the journey time from Olsztyn to Ełk by about 40 minutes, possibly from 2 h 24 minutes to about 1 h 47 minutes, and eliminate the need to change locomotives twice (in Korsze and Ełk). Basic list tasks:

- Work on LK 38, Ełk – Korsze section, including electrification (OPI&E);
- Work on LK 216, Działdowo – Olsztyn section (OP EP);
- Work on LK 219, Ełk – Szczytno section (OP EP);
- Refurbishment of LK 221 Gutkowo – Braniewo (ROP);
- Work on LK 353, Jabłonowo Pom. – Iława – Olsztyn – Korsze section (national funds);
- Reserve list:

– Work on railway line E 75, Białystok – Suwałki – Trakiszki (– State border) section (CEF);
– Refurbishment of LK 220, Olsztyn – Gutkowo section (ROP).

Fig. 6. Czerwonka railway station, LK 353 (31 May 2007) [photo by User: Antosh / Wikimedia Commons]

Fig. 7. Kętrzyn railway station (2 August 2015) [photo by M. Graff]

Fig. 8. Korsze railway station (6 May 2017) [photo by M. Graff]

Fig. 9. LK 747 Szymany – Szymany Airport [photo by Wikimedia Commons]

See Table 2 for a summary of railway infrastructure investments in the Warmińsko-Mazurskie Voivodeship.

Table 2

Basic effects of the work – reduced travel time on selected routes

Stations	LK	Description of work	Funding	Travel time		
				current	new	time reduction
Korsze – Ełk	38	Modernization and electrification	OPI&E	1 h 36 min	1 h 04 min	32 min
Olsztyn Główny – Korsze	353	refurbishment	national funds	48 min	43 min	5 min
Olsztyn Główny – Korsze – Ełk	353 + 38	–	–	2 h 24 min	1 h 47 min	37 min
Działdowo – Olsztyn Główny	216	refurbishment	OP EP	1 h 17 min	1 h 01 min	16 min
Warszawa Centr. – Olsztyn Główny	216	–	–	2 h 28 min	2 h 12 min	16 min
Iława Główna – Olsztyn Główny	353	refurbishment	national funds	50 min	44 min	6 min
Szczytno – Ełk	219	refurbishment	OP EP	2 h 54 min	1 h 32 min	1 h 22 min
Olsztyn Główny – Szczytno – Ełk	219	–	–	3 h 33 min	2 h 11 min	1 h 22 min
Olsztyn Gutkowo – Braniewo	221	refurbishment	ROP	1 h 49 min	1 h 18 min*	31 min
Białystok – Ełk – Suwałki	38 + 41	modernisation?	–	no data	1 h 29 min	no data

[Own elaboration; *at a maximum speed of 120 km/h].

In late December 2016, PLK announced a tender, with work totaling over PLN 564 million under the OPEP (Operational Program Eastern Poland) scheduled for completion by 2020. The rail infrastructure manager (PLK) announced tender proceedings for the implementation of two investment projects under the OPEP [45]:

- "Work on LK 216, Działdowo – Olsztyn section"; once completed, journey times will be reduced by approximately 11 minutes and speeds will increase to 120 km/h.
- "Work on LK 219, Szczytno – Ełk section"; journey time reduced to 1 h 10 min (including the removal of 30 km/h speed limits).

The refurbishment of both lines will cover a total of 330 engineering structures, including bridges and viaducts. The investment project is planned to be carried out under the "Design & Build" formula. Contracts were scheduled to be signed at the end of 2017 and completed in 2020.

The Operational Program Eastern Poland covers 8 investment projects totaling PLN 2.1 billion and envisages such things as:

- improved rail accessibility in the eastern voivodeships;
- more efficient transport of goods, economic development;
- creation of the Eastern Railway Main Line;
- procedures were initiated for 7 out of 8 projects, totaling over PLN 1.7 billion.

Between 28 and 31 December 2016, tenders were announced for the implementation of six investment projects worth approximately PLN 1.2 billion:

- Construction work for the task "Work on LK 25, Skarżysko Kamienna – Sandomierz section";
- Execution of construction work for the task "Work on LK 219, Szczytno – Ełk section";
- Execution of construction work for the task "Work on LK 216, Działdowo – Olsztyn section";
- Construction and design work for the task "Work on LK 31, Podlaskie Voivodeship boundary – Czeremcha – Hajnówka section";
- Construction work for the task "Work on LK 52, Lewki – Hajnówka section" – planned;
- Construction work for the task "Work on LK 32, Białystok – Bielsk Podlaski (Lewki) section".

Procedure to be initiated in the second half of 2017; it includes design work for the task "Work on LK: 25, 74, 78, Stalowa Wola – Tarnobrzeg/Sandomierz – Ocice/Padew section".

2.1. Olsztyn – Szczytno – Szymany line (LK 219 + LK 35 + LK 747)

In July 2011, PLK signed a contract for the design and execution of construction work for the task "Refurbishment and modernization of the Olsztyn – Szczytno – Szymany railway line (Olsztyn – Szczytno – LK 219 section and Szymany – Szczytno – LK 35 section), providing a railway connection between the modernized airport in Szymany and Olsztyn – stage I" under the Warmińsko-Mazurskie Regional Operational Program for 2007–2013 [35]. The construction work included:

- the complete replacement of the track superstructure on LK 219's Olsztyn – Szczytno section (44.946 km) and at Szczytno station (about 1 km);
- track work on the Szymany – Szczytno section (LK 35, 9.748 km);
- rail surface replacement at 37 level crossings;
- the renovation of 113 engineering structures;
- the reconstruction of 7 and demolition of 5 platforms at stations and stops in: Klewki, Marcinkowo, Pasym, Grom, Szczytno, Siódmak, and Szymany;
- the refurbishment of three signaling control and 1 crossing guard house;
- the installation of signaling equipment at 18 level crossings (including the construction of self-acting signals);
- the replacement of worn-out signaling equipment at stations (switch drives, relays, generators) and the installation of computerized signaling equipment at Pasym station;
- the replacement of worn-out telecommunications equipment (radio communications) and the installation of new equipment (railway communications system, public address system), as well as the laying of telecommunications cables along the entire section from Olsztyn to Szymany;
- replacement, construction, or demolition of electrical power equipment up to 1 kV (power lines, lighting, back-up power supply, turnout, electric heating equipment).

PLK subcontracted the work to the Italian company Salcef Costruzioni Edili E Ferroviarie S.p.A. (the contract was signed in July 2011) under the formula „design & build". The contractor also prepared project documentation covering the construction of a new railway line to the airport, a functional-utility program for the Szczytno local control center (LCS), and tender documentation for the selection of construction contractors. Totaling PLN 947.1 million gross, the contract was concluded with WYG International Sp. z o.o. from Warsaw, with a completion deadline of 31 May 2015 [20, 43, 59, 65]. Construction work was scheduled to start in 2014–2015 (Figs. 10–12). Round-the-clock track closures and intensive work were implemented from May to November 2012, and a rail replacement bus service was organized for passengers. Test runs on the upgraded track were wrapped up by the end of November, and traffic was restored

according to schedule in December 2012. The target speed of 100 km/h was introduced in 2013 as part of a timetable update. The first stage of the investment was completed in March 2013. PLK prepared a tender procedure for the development of pre-design and design documentation for the second stage of the investment project: construction of a new railway line to Szymany (LK 747, 1.569 km), construction of a platform equipped with a shelter and lighting, and a visual information system at the airport terminal and the Local Control Center at the Szczytno station. Stage II was scheduled for completion in 2014–2015. The distance between Olsztyn Główny and Szymany Airport is 53.230 km. Once the project has been completed, the speed on the Olsztyn – Szczytno section increased from 70 km/h to 100 km/h, and on the Szczytno – Szymany section to 110 km/h [10]. The maximum speed on LK 747 is 60 km/h.

Fig. 10. Karwica Mazurska stop, LK 219 (25 June 2011) [photo by Duży Bartek / Wikimedia Commons]

Fig. 11. Szczytno railway station before modernization – view towards Pisz (14 September 2008) [photo by Wesoły Geodeta / Wikimedia Commons]

Fig. 12. Szczytno railway station after modernization – view towards Olsztyn (24 September 2024) [photo by M. Graff]

2.2. Szczytno – Ełk section, i.e. a fragment of LK 219

Plans were also made to refurbish the LK 219 Szczytno – Ełk line (110.467 km), i.e., to increase the speed to 120 km/h. By the late 1990s, as the line continued to deteriorate, the speed limit along most of it was 15–20 km/h. This extended the journey time on the Olsztyn – Szczytno – Ełk route to 6 hours, which made traveling by train completely impractical and resulted in the suspension of passenger traffic on the Pisz – Ełk section and, in February 2007, on the Pisz – Szczytno section (freight traffic continued on the Ełk – Pisz section). Traffic resumed in January 2008 on the Pisz – Szczytno section, and in July 2010 on the Pisz – Ełk section, thanks to the efforts of local authorities. The refurbishment of LK 219 was also planned, with work starting in March 2018. The work was allocated a net amount of PLN 290 million from the OP EP (with 85% EU funding), with a completion date of 2019. [1]. A rail replacement bus service was organized for the duration of the work (LK 219 is a single-track line). A new Pisz Wschodni (Pisz East) stop was built (reconstructed with a junction to a station and restored to the pre-1945 state). The stations of Szczytno, Drygały, Spychowo, Pisz, and 14 other stops (including Bajtkowo, Drygały, Pisz, Ruciane Nida, and Świętajno) were modernized. The investment also included new platforms with increased their height at four stations and 15 stops [38]. The facilities have been equipped with benches, shelters, notice boards, modern lighting, as well as legible passenger information and signage. The platforms also provide access for people with reduced mobility and are equipped with ramps and tactile and guidance paving. In December 2019, the replacement of 113 km of tracks was completed. It was also necessary to replace two large bridges, the larger of which, over the River Pisa, weighs over 200 tonnes. The refurbishment included the replacement of the track surface, the reno-

vation of level crossings, bridges, and culverts, allowing speeds to be increased to 120 km/h for passenger trains and 80 km/h for freight trains. Around 100 level crossings were upgraded with barriers, traffic lights, and acoustic devices warning of approaching trains. The work was divided into two stages: the first covered the Pisz – Ełk section and was carried out between March and September 2018; the second – on the Pisz – Szczytno section – commenced in September 2018 and lasted until August 2019. Passenger traffic resumed in mid-December 2019.

2.3. Construction of the station building and modernization of Olsztyn Główny station

In November 2021, PLK signed a PLN 423 million contract for the reconstruction of platforms, tracks, and subway, as well as installation of lifts and escalators at Olsztyn Główny station [51]. The contract for the rebuilding of Olsztyn Główny station, signed with the contractor Torpol, was valued at PLN 382.1 million net. The investment was scheduled for completion in 2024. The reconstruction of the station was subsidized to the tune of PLN 126.8 million (33%) from EU funds under the Operational Program Eastern Poland. Thus, all four platforms at Olsztyn Główny station have been raised and widened and have gained new notice boards and benches. A total of 28 km of superstructure was replaced, 116 new turnouts were installed, and new signaling equipment was fitted. A Local Control Center was built in Olsztyn [54]. Scheduled train traffic was maintained at Olsztyn Główny station. The historic elements of the old station structures have also been preserved. The contractor dismantled and secured 12 historic steel pillars from the platform No. 4's shelter, which was about 100 m long; these were renovated and had their original color restored [56]. The wooden roof has been restored, preserving the historic character of the structure. To meet safety requirements, the two shelters at the station have swapped places. The work was carried out at night, so there was no impact on passenger services (Fig. 13–16). The investment was supervised by a heritage conservator. Following the station's reconstruction, the new track surface will enable heavier and longer trains to be accommodated. Dozens of specialized machines (excavators, cranes, piling rigs, rollers, tamping machines, and a catenary maintenance vehicle) were used on the construction site, and about 130 of the contractor's employees were involved in the work [34, 36]. All platforms were upgraded, starting with platform No. 4, then 3, 1, and 2. During the work on platforms No. 1 and 2 (demolition and construction), a rail replacement bus service operated for three weeks in September 2023 for travel to Szczytno, Pisz, and Ełk [49, 53]. The reconstruction of Olsztyn Główny station was completed in May 2024. Timetable information is presented on displays at interactive kiosks and via a new public address system. Non-slip paving has been installed on the platforms, and the historic platform shelters have been renovated. Providing access to the platforms from Maria Zientary-Malewska Street was one of the goals of the investment: a new 140-meter-long underground passing (100 meters longer than the current one) has been built, located perpendicular to the tracks. It facilitates access to the station for residents of the Zatorze housing estate [52, 55]. The new subway is wider and higher compared to the old one. Notably, the Olsztyn station handled numerous diesel trains (both freight and passenger) until the late 1990s (and steam-powered trains until the late 1980s), and the local locomotive depot maintained many diesel locomotives (SU/SP45, SU46, SP47, ST44, and SM/SU42) and electric locomotives (EU07, ET22), which required extensive repair facilities, especially since it was older rolling stock (with DC electric traction motors). Today, only light combustion and electric vehicles are maintained (SA106s, SA133s, EN62s), as well as some modernized EN57s, ST48s, SU42s, and ST44s, and a few ET22s and EU07s, which are slowly being phased out by PKP IC and PKP Cargo. The electrification of the Korsze – Ełk section will reduce the need for line diesel locomotives, although it will not eliminate them.

Fig. 13. Olsztyn Główny station in Olsztyn during modernization (January 2023) [photo by A. Puzewicz / PLK]

Fig. 14. Olsztyn Główny station in Olsztyn during modernization (April 2024) [photo by D. Strzemkowski / PLK]

Fig. 15. The new Olsztyn Główny railway station (9 December 2024) [photo by Rdrozd / Wikimedia Commons]


Fig. 16. Platforms No. 1 and 2 at Olsztyn Główny station (24 September 2024) [photo by M. Graff]

The modernization of Olsztyn Główny station has also involved building a new railway station [22], which is the fourth such building in the city. The first one was built in 1872 during the construction of the line connecting Berlin with Eydtkuhnen in East Prussia. The second station Olsztyn Główny was built between 1945 and 1948 on the site of the previous one, which was destroyed as a result of non-combat actions by the Soviet army. The third station was built between 1969 and 1971 and was in use until 2023, when the decision was made to build a new facility – one that would be modern and more suited to the current needs of transport operators and passengers. The construction of the new station was combined with the redevelopment of the space around the station, along with the reconstruction of the transport system (since 2015, the city has had a tram service, reactivated after its closure in 1965). The new station features a trapezium-shaped layout, creating a glazed steel structure with a design reminiscent of a sail (alluding to the Warmia and Mazury Lake Region). The front facade of the station includes a large-format clock and a neon "Dworzec Kolejowy" [Railway Station] sign from the previous station (a requirement of the conservation officer), which is over 18 m long and 1.23 m high. The building's lobby features a mosaic taken from the old station and an information board with the station's history. The new building has three levels, including an underground level, where ticket offices, toilets, a travel area, and luggage boxes are located. The ground floor includes a waiting area and a space for parents with children. Parts of the ground floor and the first floor are dedicated to retail outlets for newspapers and groceries, a bakery and a restaurant, as well as several vending machines for snacks. The first floor also features offices for rail operators and carriers, including SOK, WARS, TK Telekom, PKP IC, and POLREGIO. The new Olsztyn Główny station is free of architectural barriers and fully adapted to the needs of the elderly, as well as persons with disabilities and travelers with large luggage or prams. The building's roof is equipped with 746 photovoltaic panels with a total minimum power of 276 kWp, while the interior features a heat recovery ventilation system and energy-efficient LED lighting. In other words, the building is low-emission and energy-efficient. The square in front of the station was designed as a representative city square crossed by pedestrian walkways with ramps and stairs leading to a subway running beneath the station and connecting to the first building. On the west side, there is a surface car park with 58 parking spaces, including 43 for cars, 4 for disabled drivers, 2 for EV charging, a kiss & ride and deliveries areas, as well as a taxi rank and a bus bay. A shelter for 80 bicycles was built on the eastern side of the square. A recreational area with benches and green spaces has been created in the central part of the square. The cost of constructing the new station was PLN 97 million gross (the investor is PKP S.A.), and the station itself cost PLN 565 million gross (the investor is PKP PLK). The opening of the station was delayed, and the contractor, Torpol, amended the contract with the client several times. The contract for the station's construction was signed in late January 2022, with a completion time of 17 months (i.e. until June 2023), and the deadline was changed several times to: November 2023, February 2024, March/April 2024, August 2024, and finally February 2025, following positive decisions by the Voivodeship and Chief Building Control Inspector in January and February 2025 [31, 64].

2.4. Electrification of a section of LK 38 – Korsze – Ełk section

Work on the electrification of the Korsze – Ełk section (98.808 km), part of LK 38, started in March 2017 after PLK announced a decision on the PLN 578.5 million contract [46]. At the same time, plans were made to modernize six stations: Stare Juchy, Wydminy, Giżycko, Sterławki Wielkie, Kętrzyn, and Tołkiny, as well as seven

stops: Woszczele, Siedliska, Niegocin, Sterławki Małe, Martiany, Nowy Młyn, and Linkowo. The platforms at the stations will be rebuilt (the new ones will be higher), which includes the installation of shelters, benches, and functional lighting, as well as new signage and train information. The track surface will be replaced, including 61 turnouts, and new signaling equipment will be installed. The reconstruction of 78 level crossings (single level crossings) and a total of 145 engineering structures, including bridges and viaducts, is also planned.

Among other things, an underground tunnel was built in Giżycko along Unii Europejskiej Street, which will eliminate the existing level crossing and replace the pedestrian passageway connecting the center of Giżycko with the municipal beach. The design work was to be completed by 2020, while the construction work was originally scheduled for 2020–2023. Speeds will be increased to 160 km/h for passenger trains and 120 km/h for freight trains from the current 80 km/h, significantly increasing the line's capacity. Five traction substations will be built along the entire section. Initially, the investment task was to be carried out with EU financial assistance under the Operational Program Infrastructure and Environment (funding of PLN 499 million). The work was scheduled for 2021–2024, and further stages of the investment were to be carried out under the future financial perspective in 2021–2027 [3]. As the Korsze – Ełk section is single-track, traffic on the line was stopped, and a rail replacement bus service was introduced. Once all the work has been completed, the journey from Olsztyn to Ełk via Korsze and Giżycko will be shortened by about 50 minutes, and the journey time will be less than 2 h [63]. The investment was carried out in stages: the section from Ełk to Giżycko (47.740 km) was modernized first in March 2022, and the second section, Giżycko–Korsze (51.068 km), is currently undergoing modernization. PKP IC trains connecting Olsztyn with Białystok (TLK Biebrza and IC Rybak) will run on the refurbished LK 219 Olsztyn – Szczytno – Ełk. Ultimately, it was agreed that the task would be implemented for PLN 876 million net as part of the National Recovery Plan. Work on the Ełk – Giżycko section is being carried out by the Budimex/Victor Energy consortium for PLN 643 million; the Korsze – Giżycko section is being modernized by Torpol for PLN 233 million. In early October 2023, PLK signed a contract for the modernization and electrification of the section from Giżycko to Korsze with Torpol S.A. as the contractor [66]. Torpol's bid was selected in October 2022 during the second tender conducted as part of an electronic auction, as the investment costs did not exceed the limit set by the investor, i.e., PLK, which was PLN 1.083 billion gross (Torpol's bid was PLN 1.078 billion gross; for other contractors, the exceedances reached as much as 50%). The deadline was 30 months from the date of signing the contract [25]. Train traffic control will be handled by the Local Control Center at Korsze station [60]. Two new platforms were built at the station in Giżycko – an island platform and a station platform connected by a subway with a ramp (previously, passengers had to cross the tracks at ground level) [48]. New viaducts were built in Woszczele and Sterławki Wielkie. Further, PLK decided to reconstruct 2 passing loops measuring about 2 km in length, located at former stations (pre-1945[3]) between Giżycko and Ełk [8]:

- Woszczele – located approximately between the 110.500 and 112.500 km marks;
- Siedliska – located approximately between the 139.750 and the 141.750 km marks.

The scope of work includes the reconstruction of track systems and platforms, installation of signaling equipment, traction and power supply systems, and telecommunications and geotechnical elements, as well as the construction of engineering structures, new drainage systems, and access roads (Figs. 17–21). Work on the Ełk – Giżycko section was completed in Q4 2024 (completion originally scheduled for September 2023). Test runs on the section from Giżycko to Ełk started in February 2025 [23]. The completion of the modernization of LK 38 on the Ełk – Giżycko section and the resumption of traffic is scheduled for June 2025, and on the entire Ełk – Korsze section for December 2025 [13, 18]. In late March 2025, the local authorities announced that they do not intend to significantly change the range of transport services offered, possibly to maintain the current status until December 2026, i.e., until the end of the contract concluded with POLREGIO in terms of the transport work (train-kilometers) [12].

Fig. 17. Modernization and electrification of LK 38 on the Ełk – Giżycko section [photo by D. Strzemkowski / PLK]

[3] A consequence of the demolition of the line (now LK 38) by the Soviet army.

Fig. 18. Giżycko railway station before modernization (30 July 2016) [photo by M. Graff]

Fig. 19. Gizycko railway station during modernization [photo by M. Dziewiecin / PLK]

Fig. 20. Kętrzyn railway station during modernization [photo by D. Strzemkowski / PLK]

Fig. 21. Stare Juchy on LK 38 during modernization [photo by D. Strzemkowski / PLK]

2.5. LK 223, i.e. the (Olsztyn –) Czerwonka – Mrągowo – Mikołajki – Orzysz – Ełk line

In August 2023, an update of the National Railway Program was adopted at a meeting of the Polish government, enabling the start of further investment projects related to the refurbishment and modernization of the railway network in Poland [7, 61]. One of them is LK 223 (121.270 km) (Olsztyn –) Czerwonka – Mrągowo – Mikołajki – Orzysz – Ełk, a local line in Mazury (Fig. 22, 23), on which passenger traffic was suspended in 2010. The line runs in the vicinity of Lake Śniardwy (near the Okartowo stop), i.e., through the heart of the Mazury Lake Region. While it is a local line, it was used by PKP during the summer for long-distance trains, including the „Mare Balticum" from Berlin to Ełk (DB class 1 and 2 railcars, plus a PKP bar railcar) and the „Mazury" from Warsaw to Mikołajki. Although the local authorities planned to carry out the refurbishment of the line themselves, the high costs (around PLN 500 million) proved an effective obstacle. Thus, a feasibility study will be prepared to analyze the conditions for passenger traffic at speeds of up to 120 km/h and freight traffic [47]. The deadline for the feasibility study for the project „Refurbishment of LK 223, Czerwonka – Orzysz – Ełk section" has been set until the second half of 2025. PLK will apply for funding for the investment under the European Funds for Eastern Poland Program. The reduction in travel time from Olsztyn to selected towns and cities was initially estimated as follows: Mrągowo – 60 min, Mikołajki – 1 h 30 min, Ełk – 2 h 20 min.

Fig. 22. Mikołajki station on LK 223 (20 May 2008) [photo by Antekbojar / Wikimedia Commons]

Fig. 23. LK 223 in the vicinity of the village of Probark, near Mrągowo (23 August 2012) [photo by Yarl / Wikimedia Commons]

2.6. LK 221, i.e. the Olsztyn – Braniewo line

Work on LK 221, i.e., the Olsztyn–Braniewo line (95.544 km), has been carried out in stages since 2019 (PLK argued that this was due to a lack of funds) [24]. One major downside was the removal of the replacement service between Braniewo and Olsztyn, in violation of the provisions of the transport plan. In October 2021, PLK commenced work on the Olsztyn Gutkowo – Dobre Miasto section (Fig. 24) [41]. The Orneta – Pieniężno section was refurbished. After completion of the work, the travel time between Olsztyn and Dobre Miasto has been reduced by approximately 30 minutes. The work was scheduled to be completed by 2023. On the Olsztyn Gutkowo – Dobre Miasto section, rails and sleepers were replaced along 17 km of line; 7 railway viaducts were repaired as well [5]. Higher platforms were built at Olsztyn Gutkowo and Dobre Miasto stations and at Bukwałd, Cerkiewnik, and Swobodna stops. New lighting, new shelters, and new benches were installed, as well as clear signage and timetable information. Traffic control was moved to the Local Control Center at the Gutkowo station. 11 level crossings were rebuilt, and the refurbishment covered around 50 engineering structures, including bridges, culverts, and viaducts. The project, with a net value of PLN 147 million, was co-financed with EU funds under the Warmińsko-Mazurskie Voivodeship ROP. The contract was awarded to a consortium of Rajbud, Torhamer, and Transtel. Between 2020 and 2021, the track surface was replaced on the Dobre Miasto – Orneta route, and between 2021 and 2023 on the Orneta – Pieniężno section. New track was laid on circa 40 km of the line, and 79 engineering structures – culverts, viaducts, and bridges – were renovated. A fiber optic cable was laid on the Dobre Miasto – Braniewo section to improve communication between signaling devices. The work on the Olsztyn Gutkowo – Dobre Miasto section, totaling over PLN 220 million net, was co-financed with EU funds under the Warmińsko-Mazurskie Voivodeship ROP. Once the work on the Dobre Miasto – Orneta section has been completed by another company, Pomorskie Przedsiębiorstwo Mechaniczno-Torowe Sp. z o.o. – a subsidiary of PLK will carry out the relevant work on the next section: Orneta – Pieniężno. PLK signed a contract with the latter contractor for the following task: "Refurbishment of LK 221 Gutkowo – Braniewo on the Dobre Miasto – Orneta and Orneta – Pieniężno routes. Part II". The execution of the work on the Orneta – Pieniężno route was scheduled for 2021–2023. The value of Stage II was estimated at approximately PLN 69 million, to be financed from the company's own funds. The work on the Orneta – Pieniężno section included the replacement of the superstructure and the renovation of a total of 40 engineering structures – culverts, viaducts, and bridges. The work was carried out using a SUM machine designed for pipelined superstructure replacement, which enables a significant shortening of the work time, while maintaining the required precision [58]. The new sleepers were laid using an overhead crane; it was followed by the operation of a high-performance, 165-m-long ballast cleaner. Among other things, the cleaner flushed crushed stone from the trackbed over a distance of approximately 11 km. As part of the work, the machine sized the ballast, processed it with a mill, and finally added and incorporated the new material into the trackbed. The cleaner's capacity was 800 m^3 of material per hour (or 11 railcars). The reconstruction of the Dobre Miasto – Orneta – Pieniężno section, costing around PLN 138 million, was carried out using national funds. Platforms in Bukwałd, Cerkiewnik, Swobodna, Rogiedle, Lubomino, and Henrykowo were rebuilt, and a new stop – Nowy Dwór – was built near Orneta. The facilities were equipped with benches, shelters, and notice boards, and were made more accessible for people with reduced mobility thanks to new ramps. The reconstruction also included 3 level crossings. The work has enabled speeds on LK 221 to be increased to 100 km/h on the Olsztyn Gutkowo – Dobre Miasto section and 70 km/h on the Dobre Miasto – Braniewo section. Nevertheless, the impact of the refurbishment of LK 221 can be considered moderate. Despite the suspension of traffic on the line for six years and the expenditure of around PLN 500 million, passenger train journey times have actually lengthened rather than shortened [26]. Still, the contractor claims that a tangible effect will come with the completion of track work at Orneta and Pieniężno stations, as well as the signaling system on the Dobre Miasto – Braniewo section. At that point, the journey time on the Olsztyn Główny – Braniewo route should be cut to around 1.5 hours.

Fig. 24. Dobre Miasto station on LK 221 during modernization[photo by D. Strzemkowski / PLK]

2.7. LK 35, i.e. the Ostrołęka – Chorzele – Szczytno line

The refurbishment of LK 35, i.e., the Ostrołęka – Chorzele – Szczytno line (92.460 km) on the Ostrołęka – Chorzele section was carried out under the Mazowieckie Voivodeship ROP for 2014–2020, with work starting in autumn 2019. [30, 32, 37]. Passenger transport services on LK 35 were discontinued in June 2001 due to the progressive deterioration of the line and PKP's lack of funds to carry out refurbishment. Although LK 35 was a line of national importance until 2007, it was even considered for decommissioning in 2010. At the time, the operating speed on the line was 35 km/h, with a journey time of 1 h 40 min (Ostrołęka – Olsztyn). LK 35 runs across the territory of two voivodeships – Mazowieckie (58.373 km) and Warmińsko-Mazurskie (34.087 km). As such, a total of 9 stations and stops were modernized: Ostrołęka, Grabów, Nowa Wieś, Zabiele Wielkie, Jastrząbka, Parciaki, Olszewka, Raszujka, and Chorzele. After the line's refurbishment, the speed was raised to 120/80 km/h for passenger/freight trains (Figs. 25, 26). As part of the work, the existing bridge over the Narew River in Ostrołęka was replaced with a new truss structure weighing 940 tonnes and measuring 245 meters in length. It took 21 days to move the bridge onto the prepared supports. The old bridge, which had been dismantled earlier, consisted of three arched spans. Besides the bridge over the Narew River, 19 smaller structures were also rebuilt, including 5 bridges and 14 culverts. The investment project also considers environmental needs: 4 crossings for small animals were prepared. Traffic control on LK 35 is supervised in the Ostrołęka Local Control Center. After the refurbishment, the travel time between Ostrołęka and Chorzele has been reduced to 50 minutes. The cost of the work was PLN 347 million. In February 2023, PLK announced that the Wielbark–Chorzele section on the border of the Warmińsko-Mazurskie and Mazowieckie Voivodeships would be refurbished for PLN 21 million from the company's own funds [6]. This included replacing the superstructure along approximately 3 km and renovating five engineering structures – bridges and culverts – as well as rebuilding 17 level crossings. Traffic control on the Szczytno – Wielbark – Chorzele section is handled by the Szczytno Local Control Center. Passenger traffic was restored in June 2023 on the section between Ostrołęka and Chorzele and in December 2023 on the Ostrołęka – Szczytno (after the completion of work on the Chorzele – Szczytno section) together with a change of the timetable. It was decided to have a transfer-based service at Chorzele station (rather than an interchange-based one), as the Koleje Mazowieckie [Masovian Railways] and the Warmińsko-Mazurskie ZPR/POLREGIO did not have a sufficient number of diesel-powered vehicles. Four pairs of trains per day were launched, serviced by VT627 (KM) and SA106/133 (POLREGIO) vehicles [9, 14]. While trains from Szczytno did run to Wielbark after the line was refurbished at the request of Ikea, which also financed the renovation, the company ultimately decided not to use the railway services (a similar offer was made by the Przasnysz Economic Zone [27]). Passenger train services were not adapted to Ikea's working hours. The value of the work was estimated at PLN 45 million, which included raising the speed to 60 km/h, with a target of 80 km/h in the future [15]. The refurbishment of the Szczytno – Szymany section was carried out between 2011 and 2019 in preparation for the launch of services on the line to the Olsztyn Mazury civil airport in Szymany.

Fig. 25. Chorzele railway station – view towards Szczytno on LK 35 (24 September 2024) [photo by M. Graff]

Fig. 26. Tamping machine on the Jastrząbka – Parciaki route on LK 35 [photo by Ł. Bryłowski / PLK]

In February 2025, PLK signed a contract for the preparation of pre-design documentation for LK 35 between Ostrołęka and Szczytno, worth PLN 2.5 million (financed from PLK budget funds) [22, 29]. The objectives of the study include changing the conditions for passenger and freight traffic, adapting the railway infrastructure to the current needs of operators, and increasing the speed and efficiency of freight transport between the northern part of the Mazowieckie Voivodeship and the southern part of the Warmińsko-Mazurskie Voivodeship. IDOM Inżynieria, Architektura i Doradztwo Sp. z o.o. from Wrocław was selected as the contractor for the pre-design documentation for the project "Work on railway line No. 35, Chorzele – Szymany section", with funds for PLN 2.537 million net coming from PLK's own resources. The deadline for completion of the task was set for February 2027. The documentation covers two sections: Chorzele – Szczytno (contract with IDOM) and Ostrołęka – Grabowo, totaling 42 km. PLK intends to rebuild LK 35's connections with some lines, including:

- LK 747 (line to the Szymany Airport stop);
- Wielbark station at LK 225 (Nidzica – Wielbark line);
- Reconstruction of the connection with LK 219 (Olsztyn – Ełk); currently, it is necessary to change the direction of travel in Szczytno on the Olsztyn – Ostrołęka – Olsztyn line.
- Reconstruction of the shared section of LK 35 and LK 29 (Tłuszcz – Ostrołęka line).

2.8. Modernization of the Ostróda station and other stations on LK 353

In August 2023, PLK signed a contract worth over PLN 250 million covering, among other things, work on the Ostróda station located on the Iława-Olsztyn section of LK 353, including the modernization of platforms, tracks, the traction network, and an underground passage, as well as the construction of a Local Control Center (for the Iława – Olsztyn section) [57]. The investment project will be carried out with PLN 260 million in funding from the National Recovery Plan, with completion scheduled for 2026. Both existing platforms will be rebuilt and raised, and accessibility to the platforms at the station will be provided by lifts. A new access route to the platform from 11 Listopada Street will be built, equipped with a ramp. New signage and sound system, as well as timetable displays, will be installed at the station. Bicycle shelters will also be built. Further, the platforms will feature non-slip surfaces and functional lighting, as well as a rebuilt subway, which will be higher and adapted to the needs of people with reduced mobility. A new part of the facility will be created, providing access to the station from the Słowackiego Street. Guidance paths and Braille markings will help blind and visually impaired people find their way around the station. PLK will replace the superstructure at the station, including turnouts, the overhead contact line, and signaling equipment. So far, two platforms and a subway passage have been rebuilt, lifts have been installed, a new signaling control has been built [28, 35], and the stone and brick bridge over the Drwęca River, located within the city limits, has been reinforced. The station in Ostróda will also be adapted to handle longer freight trains. Once this adaptation has been completed, it will be able to accommodate freight trains up to 750 meters long. Stations and stops on the Rudzienice Suskie – Unieszewo section will be modernized as well (installation of a new sound system and clocks), continuing the work carried out in previous years on the line between Olsztyn and Iława. The modernization of the Ostróda station and the transfer of traffic control at Rudzienice Suskie, Samborowo, Stare Jabłonki, and Biesal stations to Ostróda station are financed as part of two investment projects, "Modernization of Ostróda station" and "Digitalization of railway infrastructure through the installation of modern equipment and systems – stage V", under the National Recovery Plan. The investment project is scheduled to be completed by 2026. The value of the contract signed with Torpol for the work is estimated at PLN 254 million. As part of both investment projects, an agreement worth PLN 9.1 million was also signed with Koltech for project management and supervision. The reconstruction of the station in Ostróda and the transfer of control of four stations to the Ostróda station are the next stage of the reconstruction of LK 353 on the Olsztyn – Iława section (carried out by PLK several years ago). The work has enabled train speeds to be increased from 100 km/h to 120 km/h. To date, PLK has modernized 7 stations and stops in the towns of Rudzienice Suskie, Pikus, Samborowo, Lubajny, Stare Jabłonki, Biesal, Unieszewo, and Naterki. In addition, 80 km of the line between Jamielnik and Iława and Olsztyn was refurbished with state budget funding (PLN 83 million) (Fig. 27).

Fig. 27. Naterki station, LK 353 [photo by A. Puzewicz / PLK]

2.9. Refurbishment of LK 216 Działdowo – Olsztyn

In mid-September 2019, PLK signed a contract for the refurbishment of LK 216 Działdowo – Olsztyn (84.054 km) [44]. It was planned to build two new stops in Olsztyn: Olsztyn Dajtki and Olsztyn Śródmieście. The reduction in journey time was estimated at around 15 minutes. PLK will rebuild a total of 13 platforms at stations and stops in such locations as Waplewo, Nidzica, Olsztynek, and Gągławki, which includes the installation of shelters, benches, information boards, and functional lighting. The investment project also provides for the modernization of tracks, level crossings, the replacement of signaling equipment, and the reconstruction of bridges and viaducts. The project entitled „Work on LK 216, Działdowo – Olsztyn section" is being carried out under the OP EP. The value of the contract was PLN 267.6 million net, with 85% co-financing from the EU, and a completion time of 21 months. The work was carried out between 2017 and 2019 under the "design & build" formula. Torpol S.A. was the contractor for the task. In 2020, a new station in Nidzica (a so-called system railway station) was put into operation on the site of the former building, which was demolished.

2.10. Modernization of LK 217 (1520 mm) Braniewo – State border

The modernization of LK 217 (1520 mm) is also envisaged as part of the project entitled „Work on the Braniewo – State Border route, LK 217 Wielkie Wierzno – Braniewo section", scheduled for implementation in 2022–2023. Pomorskie Przedsiębiorstwo Mechaniczno-Torowe Sp. z o.o. has been selected as the contractor to carry out the work, for which PLN 30 million was allocated from the state budget. This will enable freight trains from the Kaliningrad Oblast with higher axle loads to be accommodated. As part of the investment, design documentation will be drawn up for the construction of a new goods border station between the State Border and Braniewo station. The new station will accommodate long freight trains. The facility will be adapted for customs and border control. Construction work is planned for 2021–2027, once EU co-financing has been secured.

3. Railway Stop Program

A total of 40 railway stations and stops have been modernized in the Warmińsko-Mazurskie Voivodeship [20]. Following the reconstruction, the platforms are now higher, and ramps, new signage, and guide paths with a special raised texture have been installed. Bike racks for cyclists have been installed near the platforms. New platforms have been created at the following stations and stops [21, 33]:

- LK 353: Rudzienice Suskie, Pikus, Samborowo, Lubajny, Stare Jabłonki, Biesal and Unieszewo;
- LK 220: Morąg, Morąg Kolonia and Bogaczewo;
- Railway stops: Olsztyn Dajtki, Olsztyn Śródmieście, Olsztyn Szkoła, Olsztyn Jezioro Ukiel, Olsztyn Likusy and Olsztyn Redykajny;
- LK 216 Działdowo – Olsztyn: Olsztynek, Nidzica, Waplewo, Stawigudy and Gągławki, Zakrzewo-Sarnowo and Dobrzyń;
- three new stops – at Nikielkowo near Olsztyn, Kolno and Wietrzychowo.

4. Renovation of the bridge in Elbląg on LK 254

In February 2023, PLK signed a contract to carry out work on the Elbląg Zdrój – Tropy section of LK 254 (the Lagoon Line, Tropy – Braniewo, 48.202 km), which includes the renovation of the railway bridge (575 m) over the Elbląg River (Fig. 28) [40]. Funding for the work (PLN 12 million) has been provided from PLK's own funds. This is the next stage of work on the section between Elbląg Zdrój and Tropy, which provides rail access to the heat and power plant. Damaged elements of the steel structure, as well as abutments and pillars, will be repaired, and the bridge will receive new corrosion protection and paint. The contractor for the work is PPMT from Gdańsk. In 2022, work was carried out on a 2.5 km section of LK 254: new sleepers and rails were laid, the crushed stone ballast was cleaned and replenished, and the track was tamped. Work was carried out on the section between Elbląg Zdrój and Tropy; two level crossings and access roads on Nizinna Street and Żuławska Street received new surfaces. The value of the aforementioned work amounted to PLN 3.5 million, which came from PLK's own funds. The work was completed in June 2023 [42].

Fig. 28. Railway bridge in Elbląg on LK 254 [photo by A. Puzewicz / PLK]

5. Rolling stock availability and transport services in the Warmińsko-Mazurskie Voivodeship

After the introduction of a new timetable in December 2023, the range of transport services on the lines from Olsztyn to Działdowo and to Ełk via Pisz was reduced (the operator is POLREGIO, and the contracting authority is the local government, i.e., the marshal's office) [11, 16]. According to local authorities, the reason for it this is the transfer of rolling stock to the lines to Braniewo and Chorzele, which have been refurbished. Thus, the number of train pairs running between Szczytno and Pisz was reduced from four to three per day, and from Olsztyn to Działdowo to one pair on weekends. According to the Marshal Office information, the total operational mileage provided by the operator increased by approximately 305,000 train-kilometers per year, which results from the launch of five pairs of trains on LK 221 to Braniewo (three pairs before refurbishment) and four pairs on LK 35 between Szczytno and Chorzele station (some of the trains were reassigned to extended routes reaching Braniewo). The local authorities explain that they have signed a contract with POLREGIO for six years with specific operational mileage, so an increase in traffic on one line may be implemented at the expense of reducing traffic on another line. This is also a result of the financial resources that can be allocated to rail transport and the available rolling stock; the current service range is regarded as optimal. Notably, the authorities of the Warmińsko-Mazurskie Voivodeship have only purchased two electric drive vehicles (one each from the "Elf" and „Impuls" families), the use of which is still low. One example is the long waiting time of about a year for the P5 repair of EN62-001, with the local authority explaining that this was due to a lack of funds for the repair (indeed, they even considered selling the vehicle) [50]. Although the number of new-generation combustion engine vehicles is higher (SA106: 5/3 vehicles, SA133: 6 vehicles [1]), two SA106 vehicles (No. 007 and 015) were sold to the POLREGIO operator in May 2021 (Figs. 29, 30) [62]. In other voivodeships, EN57s are slowly being phased out in favor of modern units such as Flirt, Impuls, or Elf; however, they remain the standard for passenger service in Mazury and Warmia. Despite the extensive railway network built before 1945 by the previous German administrators, the current local authorities seem to view the railway as more of a burden than a help in the development and promotion of the region (Fig. 31, 32). Though other voivodeships are establishing local government transport companies (e.g., Koleje Mazowieckie, Dolnośląskie, and Wielkopolskie), and other operators besides POLREGIO are attempting to take over transport services (e.g., Arriva in Kujawsko-Pomorskie or Podlaskie), there are no such plans in the short or medium term in the Warmińsko-Mazurskie Voivodeship. A similar region – Podkarpackie (Olsztyn can be compared to Rzeszów in terms of population or level of economic development) – is doing much more for railways. One example is the establishment of the Podkarpacka Kolej Aglomeracyjna [Subcarpathian Agglomeration Railways]. This approach cannot be explained by factors such as the lack of developed industry (not heavy industry, but rather related to advanced technologies) or the unemployment rate in the given voivodeship. The economic conditions in both voivodeships are similar, but the development of the railways is quite different; for instance, the number of vehicles purchased to serve local traffic is one measurable indicator (Table 3). One of the likely reasons is the lower population density in the Warmińsko-Mazurskie Voivodeship (by almost half) compared to the Podkarpackie Voivodeship, which is not conducive to the launch of local rail connections. The higher urbanization rate (Warmińsko-Mazurskie vs. Podkarpackie), i.e., the percentage of the urban population, indicates that Warmińsko-Mazurskie has significantly more people living in cities, so there are more sparsely populated regions where railway access is difficult.

Fig. 29. SA133-016 as a passenger train No. 98242 to Ełk at Olecko station (26 March 2011) [photo by M. Graff]

Fig. 30. SA106-015 as a passenger train No. 97225 to Braniewo at Olsztyn Gł. Station. (27 March 2011) [photo by M. Graff]

Fig. 31. Ełk Szyba Zachód stop, LK 219 (14 February 2020), photo by Ł. Bryłowski / PLK

Fig. 32. Morąg station, LK 220 [photo by Ł. Kramer / PLK]

Table 3

Comparison of Podkarpackie and Warmińsko-Mazurskie Voivodeships

Selected parameter	Unit	Podkarpackie	Warmińsko-Mazurskie
Length of railway network: **– electrified lines** **– non-electrified lines**	km	990 461 529	1,098 492 606
Rail network density	km/km^2	4.51	5.48
Rail usage rate in 2023 (number of journeys per resident)	no data	4.1	4.2
2023 number of passengers checked in	million	8.45	5.78
Number of vehicles purchased [2024]: **– electric** **– diesel**	pcs.	37 21 16	12 2 10
Economic and statistical data			
Population	million	2.067	1.353
Surface	thousand km^2	17.8	24.2
Voivodeship capital, number of inhabitants	thousand	Rzeszów 197.7	Olsztyn 166.7
Population density	person/km^2	115.8	56
Urbanisation	%	41.1	58.8
GDP	% of the average for Poland*	71.7	70.4
2023 rate of long-term registered unemployment [4]	%	4.1–4.7	3.1–4.0

[Own elaboration; *PLB 3401.61 billion (Statistics Poland data)].

6. Conclusions

A comprehensive railway modernization program launched with EU support in the Warmińsko-Mazurskie Voivodeship is gradually transforming the image of the railways from outdated to modern. The infrastructure manager has launched a major program of modernization and refurbishment of railway lines, carried out with significant financial assistance from the EU. Thus, a region that had not seen any major investments for years has finally attracted the interest of the central authorities. The railway in Mazury and Warmia is ceasing to be a rolling stock and infrastructure backwater, which it has been since as early as 1945. The holistic image is complemented by purchases of new vehicles and upgrades to the existing fleet (PKP IC), as well as some limited acquisitions by local authorities (the marshal's office). The ability to combine modern facilities at existing stations, which often represent fine East Prussian architecture, with

modernized and refurbished lines and new facilities certainly deserves recognition. It represents a major technological leap – from railway semaphore signals to traffic lights or from mechanical signaling equipment to a Local Control Center. While there is still much to be done, like restoring services suspended in the 1990s or after 2000 (LK 223, 204, 254) and increasing the frequency of services on existing lines, progress is noticeable. The purchase of new rolling stock (diesel and electric) for local transport should certainly be a vital element of railway system modernization in the Warmińsko-Mazurskie Voivodeship – the region ranks among the lowest in terms of the acquisition of new-generation vehicles compared to Poland's other voivodeships.

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