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The current state of inland navigation in Poland and its future development under European Union transport policy

Marianna Maruszczak

Maritime University of Szczecin, Faculty of Engineering and Economics of Transport
1-2 Wały Chrobrego St., 70-500 Szczecin, Poland
e-mail: m.maruszczak@am.szczecin.pl

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Abstract

This article presents the activities of the European Union (EU) and Poland to develop inland waterways as an environmentally-friendly transport method. The paper presents positive aspects of transferring part of the load from other methods of transport, such as railways or cars, to inland vessels. It shows the level of development of inland navigation in the EU and indicates favorable natural conditions for doing so. The article addresses the issues of the insufficient state of waterway infrastructure in Poland and presents measures to improve it. It also identifies the main EU and government programs seeking to standardize a common transport space of the EU by developing inland navigation.

Introduction

Inland waterway shipping is used to transport cargo with vessels such as riverboats, barges, and pushing sets within small inland water reservoirs, such as rivers, canals, and lakes. These vessels are propelled by both water currents and their own propulsion systems. The inland waterway transport fleet is characterized by a high loading capacity, which means that a single trip can deliver a large amount of goods. The largest permissible units moving on rivers can take on board more than 500 TEU, which corresponds to the capacity of the same number of trucks, assuming that one vehicle carries one 20 ft container (VBW, 2011). Inland waterway transport is one of the most environmentally friendly types of transportation because one liter of fuel can be used to ship 127 tons of goods over a distance of 1 km; when it comes to rail transport, 97 tons can be transported, and road vehicles can transport merely 50 t (White Paper, 2001). Figure 1 shows the effectiveness of various means of transport.

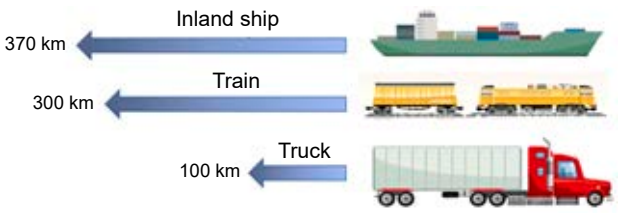

Figure 1. The distance for shipping one ton of cargo by various means of transport with the same energy input (Umweltbundesamt, 2012)

In the era of reducing emissions of harmful compounds into the atmosphere, its low energy consumption gives inland waterway transport a unique advantage. Figure 2 compares the amount of CO_2 emitted by individual transport methods. European Union (EU) transport policy strives for optimal and sustainable use of various transport modes in order to minimize negative environmental impacts. The effect of this is to promote inland waterway shipping as an environmentally friendly transport method due to its relatively low energy consumption, and thus low emission of harmful substances into the atmosphere. Additionally, it enables the elimination of traffic congestion as a result of transferring transport from motor vehicles to river methods of transportation.

Figure 2. Carbon dioxide emissions released by the different means of transport in gr/tkm (Umweltbundesamt, 2012)

All these factors reduce external transport-related costs borne by society (White Paper, 2011).

Due to their natural occurrence, the density of river routes is much lower than that of circular roads, which are based on an artificially-prepared roads, which allows the delivery of goods to the door of every potential customer. For this reason, the location of investments such as logistics centers, warehouses, factories, etc. may be located away from waterways because road transport is already so well-developed that it does not generate problems in the delivery of cargo. However, one should look at the original history in which river transport generated economic development. In regions where these natural roads existed, civilizations developed, along with goods exchange and transport. Water transport has been, and still is, an important element of the transport system because it is capable of moving large amounts of cargo which boosts trade. It can be seen that the majority of large agglomeration centers in Poland, Europe, and around the world are located in the basins of the main rivers, where ports and logistics centers are located (Skupień, Kuciaba & Gąsior, 2016).

Inland waterway shipping in the EU

Inland waterways shipping despite its enormous potential encountered on its way a serious barrier in the form of changes in transport demand. After World War II, the European economy was focused on a massive reconstruction; to achieve this, the rapid transport of large amounts of metal ores and industrial and mining goods was required, which was carried out mainly by inland waterways. Changes in customers' needs and demands were observed in the early 1980s. In most EU Member States, the structure of shipping changed from a large share of bulk to highly-processed goods, and this directly affected the change in demand for transport services.

Consumer demands have increased, and it has become standard to provide goods in a door-to-door manner. Due to the natural disposition and the vulnerability of transport, this is typically performed by roads. This increased demand resulted in a higher number of vehicles and gradually led to road congestion and transport overload. In addition, this also increased the pollution emitted by motor vehicles into the atmosphere. The result of the growth in demand for car transport is also an increased intensity of noise nuisances and a higher number of road accidents. The above-mentioned factors make up the external costs of transport, which are borne by society.

The goal of EU policy is to create a coherent, interoperable, and multimodal transport network with uniform, highly technical parameters. In a document that is an integral part of transport policy, called the White Paper of Transport from 2011, the European Commission developed a plan to create a single European transport area, whose main element is the network of basic trans-European transport corridors, the so-called AWNING. It is assumed that these corridors will allow efficient and low-emission transport of large, consolidated quantities of goods and passengers due to the widespread use of more efficient multimodal means of transport and advanced technologies. In addition, intelligent transport systems are also an integral component of the TEN-T network, the implementation of which contributes to improving network capacity, traffic safety, and reducing environmental pollution caused by transport. In 2013, the layout of the network of corridors passing through the territory of EU Member States was established. This system covers the core network, which is the basis for developing the transport network, on which EU activities are focused. In particular, this includes cross-border sections, missing links, multimodal connections, major bottlenecks, and a comprehensive network, ensuring

accessibility and connectivity of all regions of the Union. According to the assumptions, the development of the core network should focus on constructing missing connections, modernization of existing infrastructure, construction of multimodal terminals in sea and river ports, and on the creation of urban logistics consolidation centers (European Commission, 2013).

The TEN-T network includes river transport corridors, which are natural routes between major economic centers of Europe, which are incidentally the main transport routes. Unfortunately, over the years, they have lost their importance to other modes of transport. Some sections of the river trans-European transport corridors do not even meet international swimming standards. This means a huge backlog of others and the need to meet these standards. Therefore, the European Commission has taken thorough measures to promote and develop inland navigation so that it can meet the current requirements and is also compatible with other transport modes. Maintaining the position of inland waterway transport market requires a lot of work, especially in countries where it is neglected despite an attractive density of waterways. This is mainly the result of different waterway transport systems in individual European countries, which is reflected in diversified investment in their development (Skupień, Kuciaba & Gąsior, 2016). The share of inland navigation in turnover by mode of transport in the EU is only 0.5%. The Netherlands has the largest share of this transport – 3.28%. Poland ranks 18th with a 0.19% commitment. The density of inland waterways in the Netherlands is 150.7 km / 1000 km^2 and in Poland is 11.6 km / 1000 km^2. The EU average is 9.3 km / 1000 km^2 (Bawelska, Brzezińska & Radlińska, 2018). In addition, taking into account that the least ecological means of transport are motor vehicles, the share of road transport in the EU is 31.78% and in Poland is as much as 60% which is the highest in Europe (European Commission, 2018). In this situation, the works involving the inclusion of a waterway in support of new cargo and transport relations through the development of combined transport and the inclusion of inland navigation in the development of coastal transport. Transferring part of car transport to inland waterway shipping would significantly decrease the environmental problems facing the EU.

EU policy aimed at sustainable development focuses primarily on the effective use of resources, reducing carbon emissions, and reducing the consumption of non-renewable fuels. This is reflected in the adoption by the EU in 2007 of the "3 × 20" package, which is committed to reducing greenhouse gas emissions by 20% from their 1990 levels, improve energy efficiency by 20%, and also increase the share of renewable energy sources by 20% (Ministry of the Environment, 2016). The next step in 2014 was to further reduce greenhouse gas emissions by 40% by 2030. The EU expanded its horizons and to consider the future of the 2016 Paris Agreement, and undertook actions to reduce carbon dioxide emissions by at least 60% by 2050. This is directly linked with the need to take action, especially in the transport sector, as it accounts for 24.3% of total greenhouse gas emissions in the EU. It is also the only area of the EU economy in which there has been an increase in greenhouse gas emissions (European Commission, 2016).

The effects of the promotion of inland waterway transport can be observed in EU countries where this type of transport, compared to other modes of transport, is used to a similar extent, primarily due to low pollution, low noise, and low energy consumption. In addition, linear river transport infrastructure does not require additional attachment sites, as in other types of transport, since waterways mostly result from the natural terrain (Świerczewska-Pietras, 2018). The average density of the network of waterways in the EU is 9.3 km / 1000 km^2. The highest waterway network densities are: the Netherlands (150.7 km / 1000 km^2.), Belgium (49.7 km / 1000 km^2), Finland (24 km / 1000 km^2), Germany (21.5 km / 1000 km^2), Hungary (20 km / 1000 km^2), and Luxembourg (14.3 km / 1000 km^2). The waterway density in Poland is not bad and exceeds the European average with 11.6 km / 1000 km^2 of navigable waterways (Bawelska, Brzezińska & Radlińska, 2018). Table 1 summarizes the above results. This density also translates into a share of inland waterway transport to operate across the EU. According to statistical data published by Eurostat, the Netherlands has the largest share of river transport in terms of transport performance in km compared to other Member States – 43.1%, followed by Romania 29.7%, Bulgaria 26.6%, Belgium 15.6%, and Germany with less than 9%. Most EU Member States have a negligible share of this transport sector in their transport (European Commission, 2017). Such a result may depend on the geographical location of the above-mentioned countries, because their main European rivers, such as the Rhine or the Danube, run through their territory and eventually connect with seaports. This is an important point in the development of this transport sector because the change in demand from bulk and general cargo for

Table 1. The network density and length of inland waterways of selected EU countries in 2016 (Bawelska, Brzezińska & Radlińska, 2018, p. 9)

	AT	BE	BG	CZ	FI	FR	NL	LU	DE	EN	RO	HU	UK	IT
Length (km)	351	1516	470	720	8136	4733	6257	37	7675	3655	1779	1864	1050	1562
Road density (km / 1000 km^2)	4.2	49.7	4.2	9.1	24	7.5	150.7	14.3	21.5	11.7	7.5	20	4.3	5.2

container handling determines their further development and allows them to maintain their market position.

In order to increase the popularity of inland waterways, the EU, through its transport policy included in White Papers, introduced programs and development funds. For inland navigation, the essential development program is NAIADES – carried out in two stages in 2006–2013 and 2014–2020; for research and development, there is the HORIZON 2020 program. The main objectives of the NAIADES program are (Załoga, 2017) to:

- increase inland waterway transport,
- modernize river fleets,
- improve waterway infrastructure,
- improve the quality of service,
- reduce environmental emissions,
- reduce barriers to work,
- integrate inland waterway transport as part of multimodal logistic chains.

Some of the points listed above have already been implemented using financial instruments such as Marco Polo or the TEN-T. The current source of funding for the development of inland navigation may be implemented under the Cohesion Fund or the European Fund for Strategic Investment. The total value of the grant of the aforementioned funds is over 47 billion euros (European Commission, 2015). Examples of actions taken by EU Member States to promote inland waterway transport (Załoga, 2017) include:

- the use of low-emission engines, energy-saving investments,
- training of personnel for inland navigation,
- development of transport and combined transport terminals
- the provision of infrastructure and suprastructure,
- city logistics (waste management using barges),
- exemption from fuel excise tax,
- an industry shift to inland waterways.

Inland waterway state sector in Poland

Polish inland waterways, compared with those of the EU, are unfortunately barely significant. The Polish Statistics Report shows that all modes of transport carried a total of 2,053.3 million tons of goods in 2017, of which only 5778 thousand tons were transported by inland waterways. This means that the share of this transport mode is less than 0.3%. The total transport work done in the amount of 434.9 billion tons – including inland waterways shipping in the size of 877 million ton-km, represents only 0.2% of the total (Statistical Office, 2018). Such a low marginal result reflects the importance of this mode of transport in the Polish transport system. The main reason for the low amount of inland waterways in Poland is the lack of maintenance and development of such. In addition, Polish rivers have a high seasonality, causing them to have a rain-snow regime, as they are supplied mainly from rain and spring thaws. As a result, during the year there are periods of very low and high water levels, and there is a small number of reservoirs. Another factor hindering natural navigation is the freezing of water in rivers, which determines the need to have in its fleet the icebreakers and ice-classed vessels (Piasecki, Poloma & Skowron, 2015). In order to solve or eliminate problems caused by natural factors, actions should be taken to regulate river beds using existing infrastructure and building new hydrotechnical infrastructure. Figure 3 presents the remains of hydrotechnical infrastructure which was in constant use in the nineteenth century. Unfortunately, due to changes in demand and transport needs, these are

Figure 3. Unused lock in the Lower Oder Valley Landscape Park

neglected and are now part of a Landscape Park. Activation and modernization of old technologies already present on Polish rivers could increase their capacity, which would translate into increased interest in inland navigation and broaden its use. However, this is not an easy task because it requires significant modernization, deepening, environmental, and other works that require significant time and financial expenditures.

Insufficient development of inland waterways in Poland, in terms of their shipping performance, especially mucus dimensions, the depth and width of trails, reservoirs, and bridges affects the amount of shipping, which in turn determines its marginal importance in the Polish transport system. The state of the Polish inland fleet is also important because the poor technical condition of inland waterways means unprofitable investments in new means of transport. Statistical data published in Poland from 2018 shows that the greater part of the fleet has depreciated and requires repairs or replacement. The age of the river vessels exceeds the average lifetime because almost all barges and pushers of more than 72% were produced in 1949–1979. The lack of investment in new river transport modes has a detrimental effect on the environment, and also on the attractiveness of Polish shipowners. A reflection of this can be seen in statistical studies that state that, in 2017, inland shipping transported 5,777.5 thousand tons of cargo with a total transport performance of 877.3 million tkm, which is only 0.5% of the total weight and work done with all modes of transport in Poland (Bawelska, Brzezińska & Radlińska, 2018). The lack of appropriate works and investment behaves like a vicious circle in which, if the state of the river infrastructure is inadequate, fewer shipowners are interested in its operation, which causes less traffic on the rivers, which in turn leads to less maintenance work because this infrastructure is not used. The lack of infrastructure and shipowners also creates a lack of customers willing to transport their products by river. Therefore, there is a low demand that will not cover even the fixed costs of vessels.

The effects of years of neglect are best presented by comparing the condition of Polish river roads with European standards. According to the European Agreement on Main Inland Waterways of International Importance (AGN), which Poland signed March 6, 2017, the only routes having at least class IV navigability are considered to be international, as they allow for the operation of vessels of more than 1000 t. Table 2 shows the distribution of inland waterways navigable by size in Poland.

Table 2. Structure of inland waterways in Poland (Bawelska, Brzezińska & Radlińska, 2018)

Type of inland waterway		Inland waterway class	Length (km)	Participation in total
Total			3653.5	100%
Considered navigable waterways	Regional significance	Ia	1079.9	thirty%
		Ib	892.9	24%
		II	1070	29%
		III	396.6	11%
	International significance	IV	37.5	1%
		Va	55	2%
		Vb	121.6	3%

According to statistics, Poland has less than 3654 km of inland waterways, of which 2417 km are regulated navigable rivers, 644 km are canalized river stretches, 335 km of canals, and 259 km of navigable lakes. Of these, only 6% of their length (214.1 kilometers) satisfies the parameters necessary for modern navigation with minimum shipping and class IV (Bawelska, Brzezińska & Radlińska, 2018):

- Wisła from the Przemsza estuary to link with the Łączyński Canal – 37.5 km (Class IV),
- Wisła up to Płock – 55 km (Class V a),
- Martwa Wisla – 11.5 km (Class V b),
- Lake Dąbie up to the frontier with internal sea waters – 9.5 km (Class V b),
- Odra from the Ognica village to Klucz-Ustowo and continue to Regalica to the estuary of Lake Dabie – 44.6 km (Class V b),
- Western Odra – 36.3 km (Class V b),
- River Parnica and Parnicki Piercing from Western Odra to a border with internal sea waters – 6.9 km (Class V b).

Such a small number of waterway sections with international parameters does not allow full use of whole transport even on a single river. Importantly, in the AGN agreement stands that 3 international inland waterways run through Polish territory (Bawelska, Brzezińska & Radlińska, 2018):

- E 30 – connecting the Baltic Sea with the Danube in Bratislava, including Odra from Świnoujście to the border with the Czech Republic;
- E 40 – connecting the Baltic Sea in Gdansk With the Dnieper in the Chernobyl area and continuing to the Black Sea, including in the Polish Wisla from Gdansk to Warsaw, the Narew and the Bug to Brest;
- E 70 – connecting the Netherlands, Lithuania, and Russia, and including Polish territory of the Odra

River from Havela canal to Warta's estuary in Kostrzyn, the Wisla-Odra waterway, and starting in Bydgoszcz Lower Wisla and Szkarpawa.

Analyzing the above waterway sections that run through Polish territory, it may be noticed that the vast majority have not yet been adapted to international standards, which will require large investments in this area. Additionally, in the face of tightening regulations regarding the emission of harmful substances into the atmosphere by EU countries, Poland should make every effort to make transport more environmentally friendly. That is why actions to adapt the river road network to international standards are so important; this will result in an increase in traffic in the inland transport sector, and this involves the transfer of some transport from road to river.

Covering Polish rivers with the TEN-T network is also an opportunity for the development of river transport in Poland. A particularly important element of the Polish TEN-T network is the Oder Waterway because it is directly connected with the European inland waterway network that connects Scandinavian countries with Central Europe. Importantly, the EU indicates that the TEN-T core network corridors should have infrastructure for three transport branches, i.e. rail, road, and inland waterways. Economic and logistics centers are developing along the Oder, which would significantly relieve road transport due to the volume of demand for river transport. The construction of multimodal terminals next to the river, located near economic centers, would allow the use of many means of transport. This will result in the development of river ports and thus the development of regions; however, inclusion in this network is associated with the need to adapt river roads to international standards. In the case of Poland, this is crucial because, as indicated above, Polish river roads only have a navigability class that allows 5% international shipping service. This does not mean, however, that they have fully adapted to this. River waterways inscribed in the TEN-T corridor network are covered by EU standards, which means there is a need to adapt Polish river roads to these standards. Thus, there is an urgent need to undertake many modernization works in this area. This is a huge opportunity for development, especially for the regions through which the TEN-T river corridor network passes. Importantly, this will allow the transfer of many tons of loads from roads to river routes, which will ultimately translate into a reduction in road congestion and external transport costs.

Development perspectives of Polish inland shipping

In 2016, the Council of Ministers adopted Resolution No. 79 on the adoption of "Assumptions for the plans for the development of inland waterways in Poland for 2016–2020 with a perspective by 2030". It is a strategic document that defines the necessary actions for water transport development in Poland. It sets the main four priorities for the investments planned at that time, which include (Resolution, 2016):

- PRIORITY I – refers to the Oder waterway (E 30) and assumes international class navigability by eliminating bottlenecks, adapting to the parameters of class Va rivers, the construction of missing connections between the Danube, Odra, and Leba, and the construction of Silesia Canal;
- PRIORITY II – refers to a significant navigational improvement in Wisla waterways;
- PRIORITY III – relates to the combination Oder-Wisła-Zalew Wiślany and Warsaw-Brest, especially the expansion of waterways E 70 and E 40;
- PRIORITY IV – refers to the partnership and cooperation through inland waterways, including the implementation of River Information Services (RIS).

The assumptions also include investments to be implemented in the short term (by 2020), which will include (Resolution, 2016):

- removing the so-called bottlenecks by modernizing the hydrotechnical construction of waterways,
- preparation of feasibility studies for all planned long-term investments;
- developing the best investment financing methods, e.g., by raising funds from the European Fund for Strategic Investments;
- commencement of construction of water steps on the Oder – below Malczyce in Lubiąż and Ścinawa and on the Vistula – below Włocławek.

In addition, in 2016, the Minister of Maritime Economy and Inland Navigation appointed the Steering Committee for Investments on Inland Waterways, whose main task is to support the ministry in implementing the above-mentioned priorities (Ministry of Maritime Economy and Inland Navigation, 2016).

The committee involves key stakeholders of inland waterway transport in the planning, preparation, and implementation of the Ministry's investment objectives. In 2017, the working group of the Steering Committee for Investments on Inland Waterways developed the scope of a preliminary

feasibility study for investments on the Odra Waterway, which are currently used in the work carried out by the Szczecin and Świnoujście S.A. and the Port of Gdansk Authority SA. In December 2017, the Committee set up three additional thematic working groups for hydrotechnics and the environment, the economy, and for local and regional development and social affairs.

These groups are responsible, among others, for preparing and conducting cost-benefit analyses, strategic environmental assessments, and social communication of the project (Ministry of Maritime Economy and Inland Navigation, 2018). The establishment of such a commission allows for efficient, accurate, and rapid operations in inland navigation. The members of the Commission are specialists operating in the shipping sector: people with extensive experience, familiar with the market and realities, who know best what to develop, immediately improve, and what to do next. In addition, the Commission was appointed to prepare feasibility studies for investments in inland waterways that result from previously set assumptions; therefore, the Commission has a huge impact on the appearance and progress of works on Polish river routes.

In accordance with the set priorities, work began on the Odra Waterway. Telematics solutions are one of the interoperable elements of TEN-T corridors. In 2005, the EU introduced the River Information Unification Directives, or River Information Services (RIS). Pursuant to the RIS Directive, the Commission established technical guidelines and specifications for RIS. Among other things, the Directive implies the implementation by the EU Member States of an interoperable, open, and extensible river information system that will be compatible and consistent with transport management systems and commercial activities. System managers are required to provide RIS users with the data needed to plan their trips, including electronic navigational charts for waterways. Notifications to skippers should be provided in standard form, coded, and downloadable. The system should be compatible with the European Hull Database (EHDB), which contains selected information about inland waterway vessels, including their unique European ship identification number, name, dimensions, and an electronic copy of the ship's certificate (Directive, 2005). In Poland, the obligation to implement the RIS system covers only a part of the waterways of the lower section of the Odra River from Ognica to Szczecin, classified as Vb class waterways, which has a total length of 97.3 km. This represents 80% of the total length of Vb class roads in Poland and only 2.5% of all Polish river roads (Urząd Żeglugi Śródlądowej, 2019).

Polish transport policy is consistent with the EU's plans for a unified European transport system; therefore, in the documents developed by the Central Statistical Office, there is detailed information about projects aimed at activating inland navigation in Poland. One study described inland waterways transport in Poland from 2014–2017 (Bawelska, Brzezińska & Radlińska, 2018), as well as a detailed description of the revitalization project of the international waterway E 70. This project connected Western Europe from Antwerp, through northern Poland, to the Kaliningrad region and further with the Neman River waterway system to Klaipeda. The section of the waterway passing through Polish territory includes 6 provinces, representing 41% of the country's area (Bawelska, Brzezińska & Radlińska, 2018). So far, the Polish section of the E70 waterway can be classed as Ib and II; therefore, it is necessary to modernize by expanding it to a minimum of class IV navigability. Furthermore, the program takes into account the sustainable development of regions along this waterway through the development of various forms of inland navigation. The main areas of work included in the program will be to restore navigation (Bawelska, Brzezińska & Radlińska, 2018).

Another perspective of the development of Polish inland waterways are EU programs to precisely support this mode of transport, such as the Navigation and Inland Waterway Action and Development in Europe – NAIADES I and II. The first is to introduce a system of RIS, while the second is the overarching program of activities to promote inland navigation from 2014–2025. It focuses on introducing long-term structural changes in the IWT sector to make it more modern, innovative, and attractive. It aims to improve the quality of shipping by improving infrastructure quality, which is currently a serious barrier to its development. This relates directly to the so-called "bottlenecks" caused by the inadequate technical parameters of locks, bridges, and fairways. Moreover, inland waterway transport is an extremely environmentally friendly solution, as it emits the lowest amounts of harmful substances compared with other transport modes, as shown in the first part of the article. For this reason, the European Commission aims to create an innovative and environmentally-friendly transport sector. Additionally, steps have been taken to include inland waterway shipping into the multimodal logistics chain, which increases the demand for skilled workers (Tyc, 2015).

Therefore, in December 2017, the ministers of Environment, Ministry of Economy and Water, and the Ministry of Energy signed agreements for the construction of a water barrage on the Vistula below Włocławek. In August 2019, following the publication of a financial analysis of the construction of the Water Step in Siarzewo, together with all estimated costs, offers for investment implementation were accepted (Ministry of Maritime Economy and Inland Navigation, 2017). Therefore, one can expect construction works on the indicated section to begin. The construction of the barrage will significantly improve the navigability of the Vistula and will affect the water level in the river, which will allow larger vessels to cross safely.

In recent years, both EU and Polish governments have taken many actions that have sought and are still heading towards the activation of inland navigation in Poland. Actions to accomplish this include the appointment of the Minister of Maritime Economy and Inland Navigation, followed by the establishment of the Commission, the preparation of "Assumptions for plans for the development of inland waterways in Poland", the signing of the AGN agreement, introduction of RIS, and finally undertaking modernization works on sections of rivers. All these efforts and works should, as a result, give measurable benefits in the form of transferring some transport to greener modes of transport. This slogan has many related benefits, including a reduction in road and rail congestion, reducing road accidents, reducing harmful emissions into the atmosphere, activation of the market related to river ship services, the construction of ports, activation of regions, increase in international traffic in Poland, which will increase tourism opportunities, etc. In addition, activities aimed at including inland navigation into a multimodal logistics chain are associated with expanding the labor market requiring qualified employees and developing inland navigation issues in education.

Conclusions

Polish inland waterways have been neglected for many years, which ultimately led to the degradation of their assigned linear and point infrastructure. This resulted in a decrease in the share of this mode of transport against others, which have been intensively developed over this same period of time. This was largely the result of changes in the structure of demand from bulk cargo to more individualized, single-unit goods. It led to a more flexible means of transport, allowing for door-to-door delivery. After many years, when concern for the environment began to take hold, the potential of inland navigation has finally been noticed. This will allow the transfer of part of the transport using vehicles with high emissions to river units, which are characterized by high capacity, low energy consumption, low emissions, and almost insignificant external costs. The density of the waterway network is essential for the development of inland waterway transport in Poland; since this is higher than the average, it greatly simplifies and expands the possibility of developing such means of transport.

Despite the large negligence and inadequate technical parameters, Poland, along with the EU, undertook the task of revitalization, rehabilitation, and integration of inland navigation in the overall transport system of the country. This task requires a significant amount of time and financial investment. Projects were created to bring the main Polish rivers up to international standards. Some of them have already been completed, while others are ongoing. Importantly, due to the anticipated economic growth, increasing transportation needs by about one-third of what will be the result of the activation of goods related to the enlargement of the EU with new waterways. This creates opportunities for Polish entrepreneurs to develop their businesses and to strengthen the position of Polish transit in Europe.

References

1. Bawelska, A., Brzezińska, J. & Radlińska, M. (2018) *Inland waterways transport in Poland in 2014–2017*. Statistical information, Statistical Office in Szczecin, Warsaw, Szczecin 2018. Available from: https://stat.gov.pl/en/topics/transport-and-communications/transport/inland-waterways-transport-in-poland-in-20142017,2,3.html. [Accessed: July 15, 2019].
2. Directive (2005) Directive 2005/44/EC of The European Parliament and of The Council of 7 September 2005 on harmonised river information services (RIS) on inland waterways in the Community.
3. European Commission (2013) Regulation of the European Parliament and of the Council (EU) No. 1315/2013 of 11 December 2013 on EU guidelines for the development of the Trans-European Transport Network and repealing Decision No. 661/2010 / EU.
4. European Commission (2015) Regulation of the European Parliament and of the Council (EU) 2015/1017 of 06.25.2015. On the European Fund for Strategic Investment, the European Investment Advisory Center and the European Investment Projects Portal and amending Regulation (EU) No. 1291/2013 and (EU) No. 1316/2013 – European Fund for Strategic Investment.
5. European Commission (2016) *Road transport: Reducing CO_2 emissions from vehicles*. Available from: https://ec.europa.eu/clima/policies/transport/vehicles_en [Accessed: April 20, 2019].

6. European Commission (2017) *EU Transport in Figures – Statistical Pocketbook 2017*. Luxembourg: Publications Office of the European Union. Available from: https://ec.europa.eu/transport/sites/transport/files/pocketbook2017.pdf [Accessed: July 15, 2019].
7. European Commission (2018) *EU Transport in Figures – Statistical Pocketbook 2018*. Luxembourg: Publications Office of the European Union. Available from: https://ec.europa.eu/transport/sites/transport/files/pocketbook2018.pdf [Accessed: July 15, 2019].
8. Ministry of Maritime Economy and Inland Navigation (2016) *Ordinance No. 17 of the Minister of Maritime Economy and Inland Navigation of August 5, 2016 regarding the establishment of the Steering Committee for Investments on Inland Waterways*.
9. Ministry of Maritime Economy and Inland Navigation (2017) *Agreement on the construction of the Siarzewo degree signed*. Available from: https://www.gov.pl/web/gospodarkamorska/porozumienie-ws-budowy-stopnia-wodnego-siarzewo-podpisane [Accessed: August 15, 2019].
10. Ministry of Maritime Economy and Inland Navigation (2018) *Order no. 25 Minister for Maritime Economy and Inland Navigation of 18 June 2018, Regarding the appointment of the Steering Committee for Investments on Inland Waterways.*
11. Ministry of the Environment (2016) *Threats and challenges for the international competitiveness of the Polish energy -intensive industry. Impact of state policy on reducing production costs. In the context of the challenges of the EU climate policy*. Warsaw. Available from: https://www.senat.gov.pl/gfx/senat/userfiles/_public/k9/komisje/2016/kgni/materialy/15pos_min_srodowiska.pdf. [Accessed: July 15, 2019].
12. Piasecki, A., Poloma, M. & Skowron, R. (2015) Characteristics of the state and prospects for the development of inland air transport in Poland. *Journal "Logistyka"* 4, CD No. 2 part four.
13. Resolution (2016) Resolution No. 79 of The Council of Ministers of 14 June 2016 on the adoption of "Assumptions for the development plans of inland waterways in Poland for 2016–2020 with 2030 perspective".
14. Skupień, E., Kuciaba, E. & Gąsior, A. (2016) Prospects for the development of inland navigation in Poland in the years 2016–2030. Zeszyty Naukowe Akademii Morskiej w Gdyni, *Scientific Journal of Gdynia Maritime University* 97, p. 111–120 (in Polish).
15. Statistical Office (2018) *Transport – Activity Results in 2017*. Statistical information, Poland Statistics, Statistical Office in Szczecin, Warsaw, Szczecin 2018. Available from: https://stat.gov.pl/obszary-tematyczne/transport-i-lacznosc/transport/transport-wyniki-dzialalnosci-w-2017-roku,9,17.html [Accessed: April 25, 2019].
16. Świerczewska-Pietras, K. (2018) Current Condition and Economic Perspectives for Development of Inland Water Transport in Spatial Systems, with Particular Emphasis on the Regeneration of the E40 waterway. In: *Studies of the Industrial Geography Commission of the Polish Geographical Society* 32(1), pp. 38–53 (in Polish).
17. Tyc, T. (2015) European Commission Programs to support the infrastructure of the inland navigation sector – 2007–2013 and 2014–2020 – an attempt to analyze effectiveness. *Journal "Logistyka"* 3, pp. 5833–5837.
18. Umweltbundesamt (2012) *Daten zum Verkehr. Ausgabe 2012*. [Online] Available from: https://www.umweltbundesamt.de/sites/default/files/medien/publikation/long/4364.pdf [Accessed: August 19, 2019].
19. Urząd Żeglugi Śródlądowej (2019) *RIS Center*. [Online] Available from: https://szczecin.uzs.gov.pl/sbpuz_o_centrum_ris.htm, [Accessed: August 20, 2019].
20. VBW (2011) *Eignung der Binnenwasserstraßen für den Containertransport*. Verein für europäische Binnenschiffahrt und Wasserstraßen e.V. Available from: http://www.transportlogistics.lu/uploads/2/4/1/6/24160459/eignung_der_binnenwasserstrassen_fuer_den_containertransport.pdf [Accessed: July 15, 2019].
21. White Paper (2001) *European transport policy for 2010: time to decide*. Luxembourg.
22. White Paper (2011) *Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system*. TRANS 102, the EU Council, Brussels, 29 March 2011.
23. Załoga, E. (2017) Premises and instruments of inland waterway transport promotion in European Union. *Czasopismo Naukowe Problemy Transportu i Logistyki* 1 (37), pp. 323–333.