

WATERWAYS – IN REFERENCE TO THE PREVIOUS COMMENTS

DROGI WODNE – W NAWIĄZANIU DO WCZEŚNIEJSZYCH UWAG

Summary: The comments to the assumptions for development of waterways in Poland, as submitted in the article entitled „Expertise on the development of inland waterways in Poland in the years 2016-2020 with the perspectives up to 2030” have been presented. The conception of implementing another (authorial) solution together with the arguments, supporting the mentioned proposals has been suggested.

Keywords: waterways, conceptions, perspectives for implementation

Streszczenie: W artykule przedstawiono uwagi do zamierzeń rozwoju dróg wodnych w Polsce przedstawionych w artykule pt. „Ekspertyza w zakresie rozwoju śródlądowych dróg wodnych w Polsce na lata 2016-2020 z perspektywą do roku 2030”. Zaproponowano koncepcję realizacji innego (autorskiego) rozwiązania wraz z argumentacją uzasadniającą te propozycje.

Słowa kluczowe: drogi wodne, koncepcje, perspektywy realizacji

Introduction

When formulating the comments, I utilized the elaboration of the Ministry of Marine Economy and Inland Navigation, dating to 2006 entitled “Expertise on development of inland waterways in Poland in the years 2016-2020 with the perspectives up to 2030”. The mentioned expertise was the basis for undertaking the Resolution no 79 of the Council of Ministers of 14, June 2016 (Polish Monitor of 2016, item 711).

The present text refers to the article “Waterways – some remarks” published in the monthly “Gospodarka Wodna” no 6/2019 and to my earlier articles.

I have worked in hydro engineering for almost 60 years, so, based upon my previous experience I confirm the maxim of my older colleagues-professionals about running the national water management “from flood to drought and from drought to flood”.

Similar situation is in the case of water management branch, i.e. inland navigation where – after tens of years of stagnation and event its intentional limitation, we have suddenly to enter the epoch of stormy development of national waterways, being risen to the name of international waterways. I would recommend cold head and common sense.

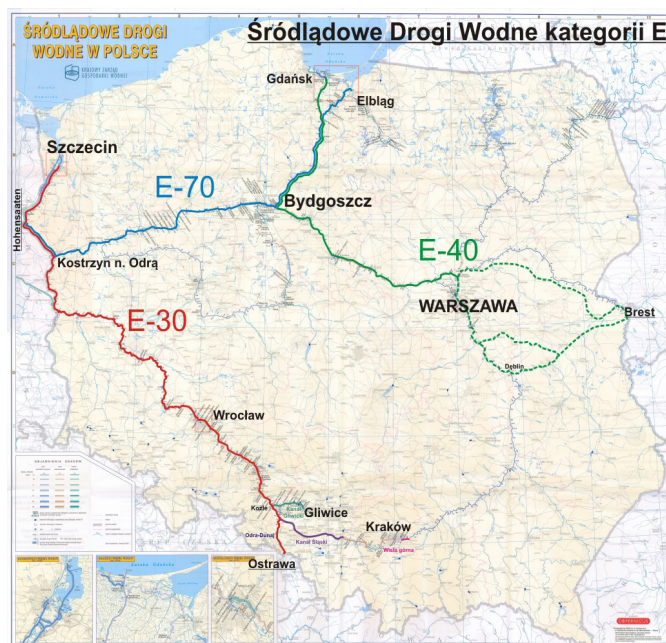
The mentioned “civilization jump” is expected to result from signing the European Agreement on Main Waterways of International Importance (AGN),

The waterways in Poland constitute too important, expensive and disputable matter as to commence it on the grounds of the program, resulting from the signed AGN Convention.

We have difficult meteorological, hydrological, economic and natural conditions in Poland for inland navigation, not to mention non-understanding of the subject and disapproval of many environments.

Our natural water flows have a principal direction from the south to the north – reversely to distinctly occurring differences in terms of annual climate periods on which the navigation seasons are dependent.

Fig. 1. Category E inland waterways in Poland



Source: www.mgm.gov.pl

The greatest rivers: Oder and Vistula are shallow and very unevenly supplied with water. Their catchment areas are situated in the European zone where the abundance in water is the poorest one. The relations of the rivers' lengths and the distances between sources and the river mouths are very disadvantageous.

Fig. 2. The graphic shows a map of Poland's inland waterways on a scale of 1: 700,000



Source: www.mgm.gov.pl

Routes of the waterways, as indicated for Poland, supplemented by Silesian Channel

The justness of implementing waterways of international class IV (non officially with option of their rising up to class V a) in the directions marked with symbols E 30, E 40 and E 70 is doubtful.

The route E 30 is the Oder River, with the anticipated prolongation to the south from the Danube River. Water resources of the Oder River with old and new reservoirs even in the segment of being modernized Cascade of the Upper Oder from Koźle to Malczyce will not assure the required transit depth. Preliminarily, it is anticipated to perform the cascade on the whole route. Beginning of the program E 30 from reconstruction of recently modernized Cascade of the Upper Oder is nonsense.

Prolongation of waterway of the Oder River by Silesian Canal cannot be justified by transit of goods. For delivery and exportation of the local goods, it would be better to build terminal ports for the Cascade of the Upper Oder and Cascade of the Upper Vistula linked with the direct railway line.

The eventual implementation of the Silesian Canal should be decisively postponed in time. The Cascade of the Upper Vistula should be supplemented with a barrage in Niepołomice and then, probably the lateral canal up to Szczucin could be purposeful.

In AGN program, the waterway of the Oder River (E 30) became linked with waterway of the Vistula River (E 40) with a fragment of waterway E 70.

The waterway E 70 (Warta – Noteć – Bydgoszcz Channel – Brda – Vistula – Nogat – Vistula Lagoon) is an old imperial route constructed directly after Poland's partitions with the aim to link the imperial capital cities - Berlin and Królewiec. After few modernizations of the mentioned route in the segment of the Noteć – Bydgoszcz Channel, it has nowadays a historical- touristic meaning (with limitations). Building of a new road with parameters of class IV on the mentioned route, being connected with the implementation of the cascade, will have natural limitations and will not find the economic justification, in spite of the fact that from the west, the branching of Mittellandkanal, linking the whole network of waterways from France, is approaching the border of Poland (the Oder River).

Waterway E 40 from Gdańsk to the Dnieper River has not any historical traditions. Gdańsk became a rich city owing to mediation in exportation of cereals and wood, being flown down by the Vistula River.

The waterway running from the Bug River to the Dnieper River got the importance when after the partitions of Poland, the whole Lower Vistula was found in the hands of Prussia. The different canals as being then constructed between the river catchments of Bug, Narew, Niemen and Prypeć either do not exist or do not have any economic meaning.

The water way of the Dnieper River flowing in the opposite direction as compared to the rivers in Poland, i.e. from the north to the south, runs by ca. 700 km eastwards from the Vistula River Valley. Theoretically, from Brześć to the Dnieper River, there is a waterway via the Muchawiec, Royal Canal

and Prypeć. From the mouth of the Prypeć to Kherson at the Black Sea, the Dnieper River is canalized, forming a huge waterway.

From Orsza above the Dnieper River to Witebsk over the Dźwina River, there is only 100 km; therefore, the canal connection may create a competitive – for E 40 – waterway from Riga to Kherson. The both ways have the same distance in a straight line – 1200 km but Riga is better situated in direction to the north-south of Europe. It may limit the importance of route E 40.

The Valley of the Bug River and the Muchawiec in the Vistula catchment and the Prypeć in the Dnieper catchment is a natural direction of linking the Vistula River with the Dnieper, as being mentioned in the AGN Convention.

The recent elaboration concerning a segment of waterway from the Vistula by the Bug valley to the mouth of the Muchawiec in Brześć, i.e. up to the border of Poland, dates back to 1962.

For several years, there has been a complete blocking of the Bug valley by different form of nature protection what may result in non-availability of the Bug valley for navigation on the mentioned segment of E 40.

So, there is a successive (after the Noteć River) "gap" in the routes, suggested by AGN for Poland.

The route which does not appear in the AGN program

For Poland, the most important water way should run absolutely centrally in parallel direction from the mouth of the Nysa Łużycka River to the region of Brześć over the Bug. The importance of other segments of water ways will results from their relation with the main direction which should appear under one symbol.

From the Nysa Łużycka River to Brześć near the Bug River, there is a continuous waterway, created by the segments of the Oder, Warta, Noteć, Bydgoszcz Canal, Vistula and Bug rivers. In the discussed line, there are successively fragments of E 30, E 70 and E 40 routes.

The Noteć between the Oder and Vistula and the Bug River between the Vistula and the Dnieper, as indicated below, being practically non-available for navigation call in question the implementation of E 70 and E 40.

On the other hand, the implementation of a central parallel route, necessary for Poland, should consider the possibility of replacing the Noteć River on the route between the Oder and Vistula and the Bug River on the route between the Vistula and Dnieper with other segments of waterways. In the first segment, between the Oder and Vistula, the replacement route would lead from the mouth of the Nysa Łużycka by the Oder to Cigacice, then by valleys of the Obra canals to the Warta River in the region of Mosiny. The setting up of the further route should result from the comprehensive analysis of advantages and weak points of few possible variants:

- Via Poznań to the region of Solec Kujawski,
- Via the Warta valley and Warta-Gopło Canal to the region of Nieszawa,
- Via valleys of the Warta, Ner and Bzura Rivers.

There may be various modifications, resulting from the detailed analyses.

In variants b and c, we have to consider the performance of lateral way to Poznań.

In the segment of the Vistula River to Brześć, elimination of the route on the Bug River causes the necessity of coming back to the conception of waterway Vistula – Bug River via the Lublin Upland region.

In the primary assumption, it was expected to serve for exportation of coal from the Lublin Coal Basin.

The assumptions to the mentioned conception included running the waterway from Dęblin (water reservoir on the Wieprz River with lifting in

locality Skoki being equal to great waters in the Vistula River) alongside the southern edge of the Wieprz and Tyśmienica valley and then, more to the south from the Żelizna reservoir, Biła Podlaska, Małaszewicze and Brześć.

In the main waterway between the Wieprz and Bug rivers, there is conducted the Wieprz – Krzna Canal which may constitute a source of supply of the peak position of navigation channel in water. The by-pass of Brześć from the south would decisively facilitate the implementation of this difficult crossing of waterways.

There was also analyzed the crossing of the Bug river in the region of once planned Włodawa reservoir with the exit to a new route alongside the valley of the Upper Prypeć. In such case, the beginning of the canal from the Vistula side could be commenced with the mechanical lifter over the Puławy.

The current proposal for combining the Vistula River from Warsaw to Brześć near the Bug River by the navigation route coming from variant III (acc. to "Expertise...") is consistent with the idea of the hydro engineers – designers from the beginning of the seventies of the previous century. The complexity of the problems, occurring when designing the waterway in the segment, defined now as variant III of the combination of Warsaw and Brześć, requires a very reliable and comprehensive study.

A final solution of the route may considerably differ from the present variant III as well as from the conception dating back to 50 years ago.

The Vistula – Bug Canal via the Lublin region should be performed as a model for other segments of waterways and must be adapted to the innovative floating rolling stock. Poland, when practically commencing the new program for implementation of waterways has a chance to outline the hydro-technical and constructional solutions, referring to modern stock with new driving systems.

The Vistula – Bug Canal running through the Lublin region should be implemented even before the completion of links up and down the Vistula River as to stimulate the implementation of the successive segments.

The discussed canal has the justification for route E 40 as well as for the central parallel canal, also in combination with the non-canalized but regulated Vistula River.

The program of international waterways and the current urgent investment of Polish navigation

We should treat the whole matter of development of waterways in Poland very carefully, especially in respect of the conditions, resulting from AGN Convention.

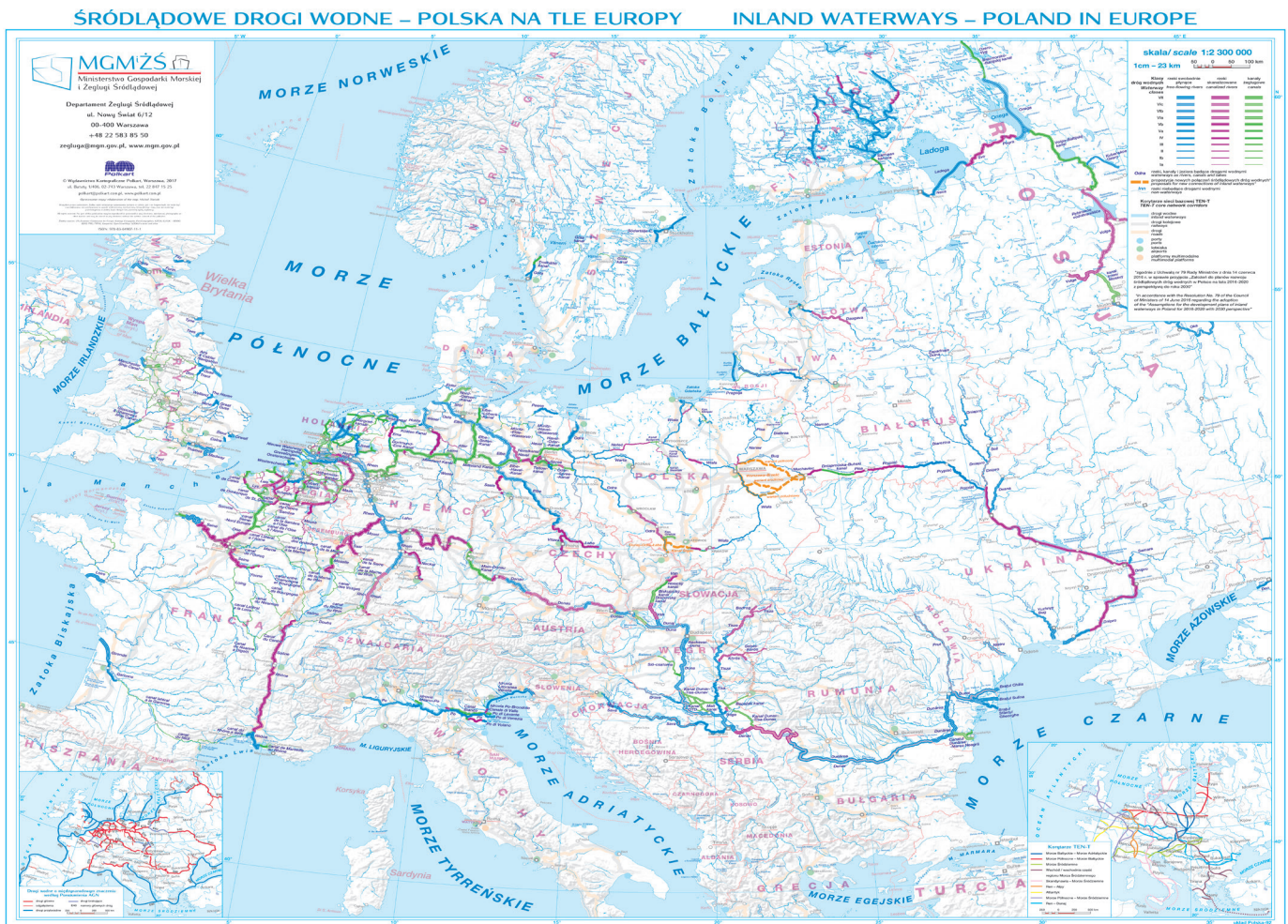
To reach the parameters of class IV, or even the considered class V a, all segments of routes E 30, E 40 and E 70 must be implemented in a form of cascade. It is rather completely excluded on the Noteć and Bug Rivers what indicates the deficiency of the discussed program. It is not possible to approve the program having a lot of limitations and question marks.

It is better to utilize the waterway with lower parameters but with a higher assurance of functioning, with the application of safe and efficient stock.

The inland waterways are not only the river or channel routes and the accompanying different engineering objects with the land, water and environment.

They include also roads and railways, handling and lifting equipment, operating terrestrial and floating service, automatics, communication, monitoring and energy supply. It covers also utilization of waste and environment protection. It refers also to stock for mass loads and containers with modern drives and service.

Fig. 3. Map of inland waterways - Poland and Europe on a scale of 1: 2 300 000



Source: <https://mgm.gov.pl>

And – first of all – it means the people for programming, designing, implementing and servicing as well as for different negotiations.

And the most important question: time and money: who and how much will expend? Who and how much will earn? Who and how much will lose? Who will risk a freezing of assets?

Due to its territorial and environmental range and also, enormous level of costs and doubtful profits, the program of building the international waterways according to AGN Convention concerns all citizens. Meanwhile, information of the discussed intentions is not easily available.

In the situation of the country being underinvested in the field of inland waterways, we should try to utilize those matters which were implemented on the grounds of other projects and to supplement them with the elements resulting from the old projects of new requirements and needs.

First of all, we should implement the objects and programs which do not raise greater doubts. I include the following ones:

- a. Waterway from Gdańsk to the Vistula Lagoon,
- b. Navigation canal from the Vistula River to the region of the planned Central Port near Grodzisk,
- c. A barrage, stabilizing the level of water table in the Warsaw region of the Vistula River,
- d. Navigation canal the Vistula – Bug via the Lublin region,

- e. Water barrage below Przewóz on the Vistula River, ending the Cascade of the Upper Vistula River.

Ad.a. On the grounds of the existing canal and equipment, a modern waterway, linking Gdańsk and Elbląg, should be constructed. The mentioned system has three existing entrances to the sea. After the supplementation of the road Gdańsk – Elbląg with the lifting barrage on the Vistula River at the height of ca. 4.0 ÷ 4.5 m, situated below Przegalin, the beginning of the Cascade of the Lower Vistula River, reaching to Tczew is formed. The start-up of the system Gdańsk – Tczew – Elbląg will facilitate the performance of the Vistula Spit ditch and erection of peak power plant in the region of Tolkmicko. On the other hand, the subject of the Cascade of the Lower Vistula River upwards from Tczew is also the matter of a wider discussion.

Ad.b. The communication system of the Central Port near Grodzisk should be supplemented with shipping canal, utilized as early as during the development of the Port. The importance of the discussed canal will be not overestimated in spite of the initial utility limitations, resulting from the linking of the canal with the natural segment of the Vistula River. After completion of the designing process, it may be too late for supplementation of the discussed investment with the shipping canal.

Ad.c. The stabilization of the level of water table in the Warsaw region of the Vistula River is necessary for the city and its inhabitants. To implement such undertaking, the stabilizing degree at the cross-section Buraków –

Nowodwory, with water lifting in respect of the shore water (NPP – 79.50 m over the sea level) should be constructed. It would be create a recreation-economic complex, including the Zegrze Lake and Żerań Canal. In the cross-section, the power plant (ca. 15 MW power and production of ca. 85 million kWh annually) and road bridge will be erected. The implementation of the discussed investment is consistent with the system of inland waterways in Poland.

Ad.d. As it was given above, the Vistula River – Bug Canal via the Lublin region stays in the conformity with the route E 40 and the central parallel route, leading from the mouth of the Nysa Łużycka River to Brześć near Bug. The performance of the discussed canal may immediately activate navigation between the Vistula and Dnieper Rivers regardless the expected way of targeted development of the Vistula River.

Ad.e. At present, the Cascade of the Upper Vistula River is ended with the Przewóz lifting near Nowa Huta. It is the highest time to activate the discussed Cascade via constructing one or two degrees below with eventual lateral canal coming to the region of Szczucin.

Summing up

The implementation of inland waterways with parameters and routes indicates by AGN Convention in Poland requires canalization of total routes, and in the case of route E 40 – the reconstruction of the existing Cascade of the Upper Oder River. Apart from it, the Noteć River on the route E 70 and the Bug River on the route E 40 may be at all excluded from the possibility

of utilizing for shipping purposes. This calls into question the conditions, specified by the AGN Convention concerning the parameters and routes, possible to be adopted in Poland.

For Poland, the parallel conducted route throughout the centre of the country from the mouth of the Nysa Łużycka River to Brześć may be the most important waterway.

Variant of segment of waterway, replacing the Bur River in the route E 40 as well as in the parallel route includes the Vistula – Bug canal via the Lublin region. In my opinion, the mentioned canal should be implemented prior to the analyzed variants of waterways in Poland.

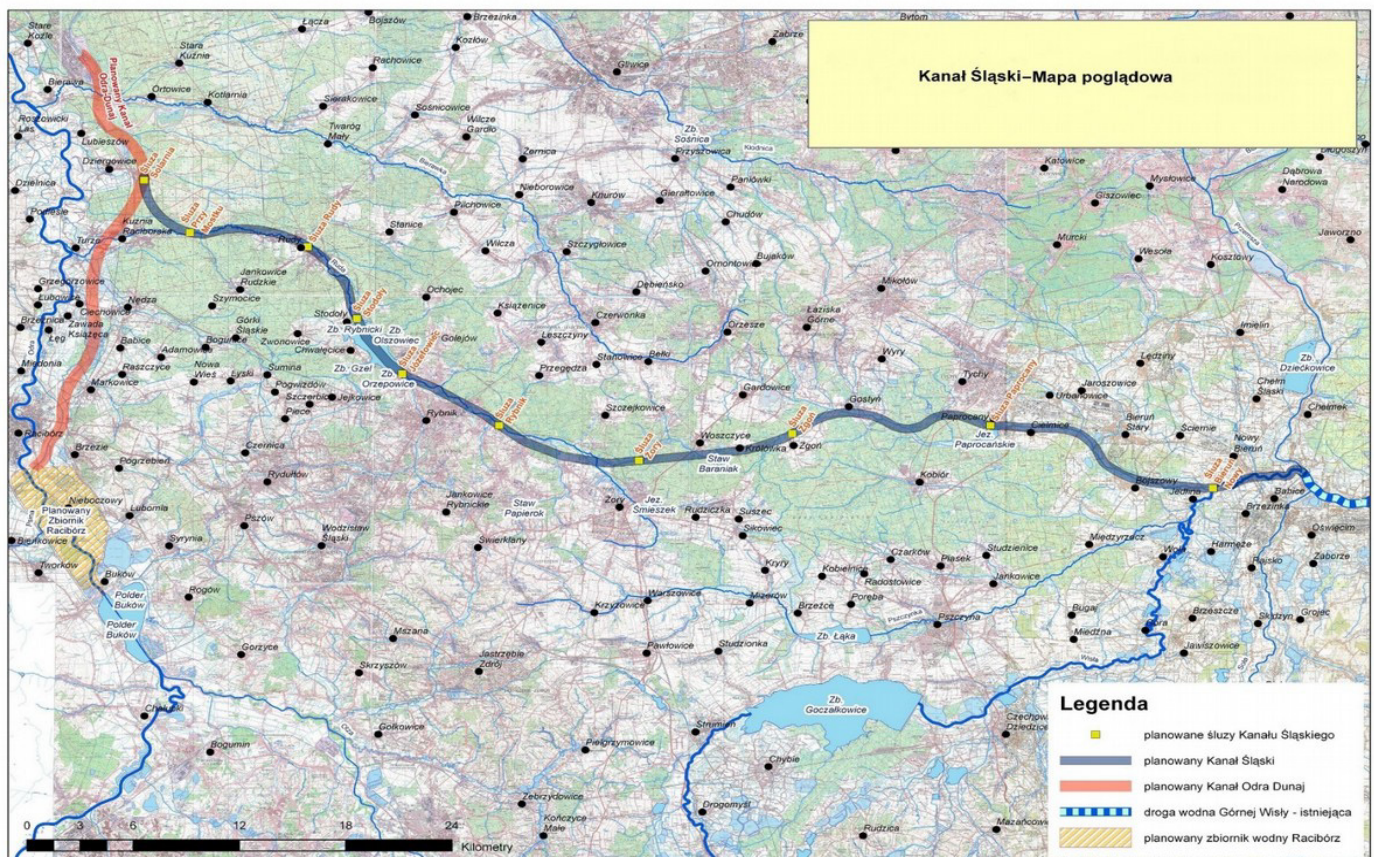
Technical solutions of the canal and shipping stock should become a model for the successive segments of waterways.

The navigation investments, as being absolutely necessary as the priorities should also include as follows:

- Waterway from Gdańsk to Elbląg with lifting on the Vistula River below Przegalin,
- Canal from the Vistula River to the region of the Central Port near Grodzisk,
- The barrage, stabilizing the level of water table in the Warsaw segment of the Vistula River,
- The Upper Vistula River.

The preparations to the development of waterways in Poland should consider the undertaking of production of modern shipping stock with innovative drives and the possibility of completing the auxiliary technological equipment.

Fig. 4. The construction of the channel connecting the Upper Oder with the Upper Vistula is a chance to include the Upper Vistula waterway to national and European inland waterway system



Source: RZGW Krakow

Practical start-up of the navigation route occurs no earlier than after implementation of the last object what does not allow the decisive errors.

The launched program of development of inland waterways in Poland shall directly concern the thousands of households, being found in the range of the conducted work and millions of inhabitants of our country, being "the stakeholders" of the enterprise. Such a big program of development of inland waterways must be commonly acceptable.

References

- [1]. Marek Mazurkiewicz. Gospodarka Wodna Nr 6/2019, str. 34-35
- [2]. www.mgm.gov.pl/pl/zegluga-srodladowa/srodladowe-drogi-wodne/
- [3]. Andrzej Kreft, RZGW w SZCZECINIE: Zakres zadań inwestycyjnych i szacunkowe koszty ich realizacji na Odrzańskiej Drodze Wodnej oraz połączeniu wodnym Koźle-Ostrawa i Kanale Śląskim.
- [4]. RZGW Kraków

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