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# Current condition and description of inland waterway transport

1. The presence of inland waterways decides about the existence of inland navigation as a component of the national transport system. The fact that the presence of inland waterways depends on natural conditions is a major constraint on the possibility to flexibly adjust them to the changing transport needs. Therefore, it is predominantly the quality and spatial distribution of inland waterways that determine the chances of developing inland navigation.

2. Poland has relatively small water resources. The average annual surface water outflow in Poland is ca. 62 billion cubic metres, which gives the annual per capita resources of 1,600 cubic metres of water, i.e. almost three times less than the European average. One of the main methods to increase the possible uses of water resources is their retention. The total capacity of all storage reservoirs in Poland amounts to 2.75 billion cubic metres, which represents only ca. 6% of average annual outflow, while in other European countries the figure is several to several dozen per cent. The actual artificial water retention capacity in Poland, determined by topographic, demographic and economic conditions, is estimated at 15% of average annual outflow. The use of all artificial retention capacities in Poland would help boost the disposable water resources by ca. 4 billion cubic metres.

3. Despite rather unfavourable quantities of water resources and highly variable river discharge, which are difficult to compensate due to highly insufficient reservoir retention, the total length of inland waterways considered as navigable in 2014 was 3,655 km, of which less than 6% were inland waterways of international importance. Other waterways are of regional importance, and their actual navigation conditions in most cases do not meet the parameters assigned during their classification. The geographical distribution of two main Polish rivers, i.e. the Vistula and the Oder, is favourable for transport, since it corresponds to national directions of the largest freight streams, and thanks to waterways running latitudinally it offers convenient links to water systems of the neighbouring countries.

4. Due to many years of investment neglect, failing to ensure the appropriate maintenance of inland waterway or - the more so - their development, the Polish inland waterway transport operates mainly on local sections of the Oder (90% of national waterway transport) and the Vistula, as well as on waterways in Western Europe, primarily in Germany. In 2014, the Polish inland waterway transport carried 7,629,000 tonnes of cargo, which represented less than 0.4% of its share in the transport services market. One fourth of the cargo was transported between foreign ports. In 90% of cases, the distance on which cargo in the national transport was carried was shorter than 50 km.

5. The possibility to boost the inland waterway transport in Poland depends on improvement of operating parameters of waterways. The *Transport Development Strategy by 2020 (with 2030 Perspective)* of 22 January 2013 and the *Implementing Document for the Transport Development Strategy* of 24 September 2014 provide for, *inter alia*, investments allowing to restore operational parameters specified in the so-called Classification Ordinance<sup>1</sup> and increase the length of navigation routes with the parameters of at least class III navigability.

The above objectives served as the basis for formulating selection criteria for projects eligible for co-financing from the EU funds under the 2014-2020 financial perspective. Priority investments defined in the Implementing Document include 25 projects, of which the highest ranks were given to investments planned on the Oder River Waterway. It is the projects related to modernisation of the Oder River Waterway that have the greatest chance for implementation, since due to the limited amount of European funds, only some projects from the list can be carried out.

<sup>1</sup>Ordinance of the Council of Ministers of 7 May 2002 on the classification of inland waterways (Journal of Laws 2002 No 77, item 695).

6 Strategic EU documents rate the mitigation of the degrading transport impact on the environment as one of the most important objectives of the transport system sustainability. This objective may be achieved by supporting environmentally friendly technologies and modes of transport, including the development of inland waterway transport and combined transport. The measures proposed to create a competitive and resource-efficient transport system include the shift of 30% of road freight for over 300 km to other modes of transport, i.e. rail or waterborne transport by 2030, and more than 50% of road freight by 2050. Under the EU strategy, by 2050 all core seaports should be (where possible) linked to the inland waterway system, and by 2030 a fully-fledged multimodal TEN-T core network meeting the requirements of Regulation of the European Parliament and of the Council (EU) No 1315/2013<sup>2</sup> should be established and its high quality and capacity should be achieved by 2050. It is also recommended that core TEN-T corridors have the infrastructure of three modes of transport, i.e. rail, road and inland waterway.<sup>3</sup>

When planning the European core transport corridor network, the European Commission drew on experience of the United Nations Economic Commission for Europe (UNECE) which outlined the scheme of the European transport network in their agreements on various modes of transport.

Following the existing agreements, i.e. the European Agreement on Main International Traffic Arteries (AGR), the European Agreement on Main International Railway Lines (AGC) and the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC), in 1996 the Working Party on Inland Water Transport, attached to the UNECE Inland Transport Committee in Geneva published the European Agreement on Main Inland Waterways of International Importance (AGN). The inventory of main standards and parameters of the E waterway network, included in the Blue Book published in 1998 based on the AGN, identifies three inland waterways crossing Poland's territory, i.e.

- E-30 - linking the Baltic Sea to the Danube river in Bratislava, covering on the territory of Poland the Oder river from Świnoujście to the border with the Czech Republic;
- E-40 - linking the Baltic Sea in Gdańsk to the Dnieper river in the area of Chernobyl and further on through Kiev, Nova Kakhovka and Kherson to the Black Sea, covering on the territory of Poland the Vistula river from Gdańsk to Warsaw, the Narew river and the Bug river to Brest;
- E-70 - linking the Netherlands to Russia and Lithuania and covering on the territory of Poland the Oder river from the mouth of the Oder-Havel Canal to the mouth of the Warta river in Kostrzyń, the Vistula-Oder waterway, and from Bydgoszcz the Lower Vistula and the Szarpawa or the Gdańsk Vistula.

The recommendations resulting from the AGN for Polish waterways classify them as:

- Strategic bottleneck - the Oder river from Widuchowa to Szczecin;
- Main bottlenecks - the following sections:
  1. the Oder river from Koźle to Widuchowa and the Gliwice Canal;
  2. the Vistula river from Warsaw to Płock and from Włocławek to Gdańsk;
  3. the Bug river from Brest to the Zegrze Lake;
  4. the Żerań Canal, from the Zegrze Lake to the Vistula river;
  5. the Vistula-Oder waterway (i.e. the Warta river, the Noteć river, the Bydgoszcz Canal and the Brda river);
- Missing links - the Oder-Danube-Elbe link.

<sup>2</sup> Regulation of the European Parliament and of the Council (EU) No 1315/2013 of 11 December 2013 on Union guidelines for the development of trans-European transport network and repealing Decision No 661/2010/EU (Official Journal of the European Union L.2013.348.120 December 2013).

<sup>3</sup> WHITE PAPER Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system (COM/2011/0144 final), March 2011.

# Advantages of inland waterway transport

## - lower costs



PL	EN
Odległość, na jaką można przewieźć tonę ładunku, przy tym samym nakładzie energii.	Distance of transportation of 1 tonne by using the same energy input.
Statek śródlądowy	Inland waterway vessel
Pociąg	Train
TIR	Truck

## Objectives and priorities of planned investments

In order to create stable conditions for the operation and development of the Polish inland waterway transport, the Ministry of Maritime Economy and Inland Navigation undertakes actions designed for Poland's accession to the European Agreement on Main Inland Waterways of International Importance (AGN). As a result, the Polish waterways will be among the waterways considered as important for integration of the European waterway network (marked as "E" waterways). The AGN will cover both the waterways which already meet the relevant classification requirements and those which will meet such requirements in the future. In order to fulfil the requirements for waterways of international importance, Polish inland E waterways must be built, extended or upgraded. According to the recommendations contained in the AGN, when extending or upgrading inland waterways of class III regional importance and of class IV international importance, the figures corresponding at least to the maximum classification parameters and operating conditions for class Va should be adopted as design conditions.

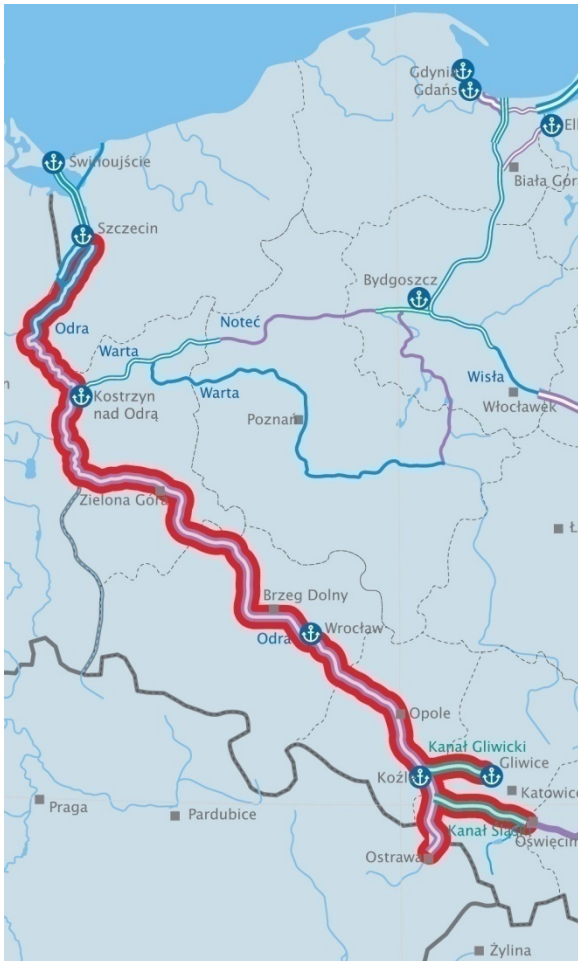
The main objective of the development of inland waterways important for transport is to build or upgrade them to the parameters of at least class IV.

The objective is divided into four priorities covering 11 tasks:

# Priorities

**I** **PRIORITY I:**  
**The Oder River Waterway (E-30)**  
 - achievement of international navigability class and integration in the European waterway network.

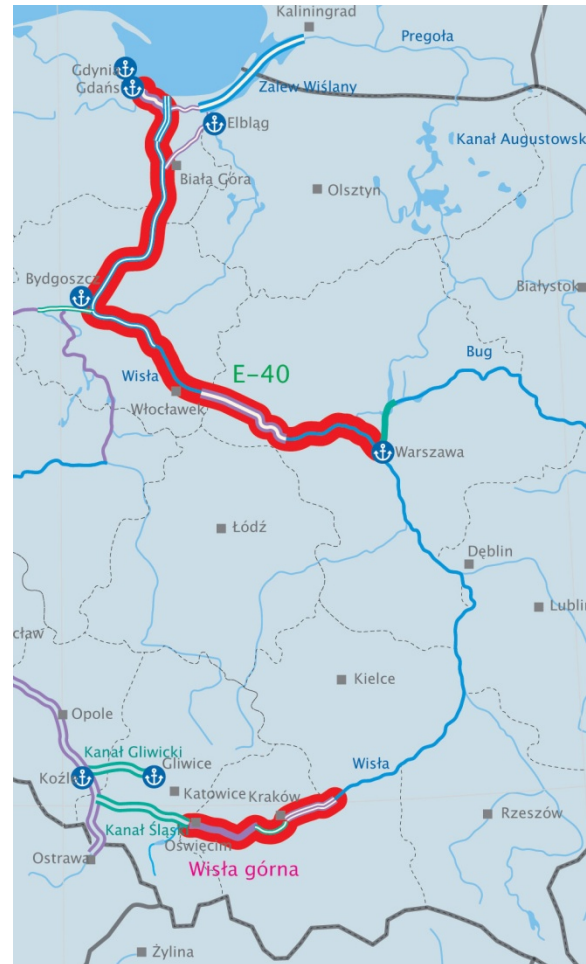
- I.1. Removal of bottlenecks.
- I.2. Adaptation of the Oder River Waterway to the parameters of class Va.
- I.3. Building the Polish section of the missing Danube-Oder-Elbe link.
- I.4. Construction of the Silesian Canal.



PRIORITY I: The Oder River Waterway

**II** **PRIORITY II:**  
**The Vistula River Waterway**  
 - significant improvement of navigation conditions.

- II.1. Construction of the cascade of the Vistula river from Warsaw to Gdańsk.
- II.2. Upgrade of the upper canalised section of the Vistula river and construction of a dam in Niepołomice



PRIORITY II: The Vistula River Waterway



**PRIORITY III:**  
**The Oder-Vistula-Vistula Lagoon link and Warsaw-Brest link - expansion of waterways E-70 and E-40.**

- III.1. Preparation for the upgrade of the Oder-Vistula-Vistula Lagoon international waterway (E-70).
- III.2. Preparation for construction of the Polish section of the Vistula-Dnieper international waterway (E-40) from Warsaw to Brest.



**PRIORITY IV:**  
**Development of partnership and co-operation for inland waterways.**

- IV.1. Implementation of the River Information Service system (RIS)
- IV.2. Development of national partnership for inland waterways.
- IV.3. Development of international co-operation for inland waterways.



*PRIORITY III: Expansion of E-70 and E-40 waterways*

## Approximate scope of investments

### The investment projects on Polish waterways should cover:

#### In the short run:

1. Updating of national strategic documents to adjust them to new objectives related to the use of inland waterways, possibly including the *Implementing Document to the Transport Development Strategy by 2020 (with 2030 Perspective)*.
2. Drawing up the documentation for all investments to be implemented in the long run, including among others the feasibility studies, functional-utility projects, strategic environmental impact assessments, etc., including also hydrological analyses allowing to compensate water resources necessary for navigation on waterways, indicating possible needs with regard to construction of additional reservoirs providing water for navigational purposes. The documents should not refer to individual investments, but should cover the entire waterways and recommend optimal solutions.
3. Updating of Water Management Plans to include the planned investments on Polish inland waterways.
4. Due to the limited amount of funds for financing investments on inland waterways in the years 2016-2020, searching for additional sources of financing, among others from the Connecting Europe Facility (CEF), which is to contribute to sustainable growth by means of creating modern trans-European high capacity network, or within the framework of public-private partnership, in particular with regard to co-financing of dams, where hydropower plants will be built.
5. Upgrade of hydraulic engineering facilities on waterways in the most limiting places to restore long route navigation, especially on a free flowing section of the Oder river.

6. Change in the water management system at impounding reservoirs of the Oder river catchment area for optimal use of their usable capacity to supply the waterway.
7. Construction of dams on the Oder river downstream of Malczyce in Lubiąż and Ścinawa and on the Vistula river downstream of Włocławek.

#### In the long run:

1. Adaptation of the Oder River Waterway to the parameters of class Va, along with construction of the Polish section of the Danube-Oder Canal and construction of the Silesian Canal.
2. A cascade of the central and lower section of Vistula river from Warsaw to Gdańsk.
3. Upgrade of the remaining sections of navigation routes E-40 and E-70.
4. Upgrade of the upper canalised section of the Vistula river to the parameters of class Va waterway and construction of dams in Niepołomice and Podwale.
5. Implementation of a harmonised river information service system (RIS) on all waterways of international importance.

### The specific scope of investment tasks on the Oder River Waterway includes:

#### In the short run:

1. On the upper Oder river:
  - a. The completion of the polder Racibórz maintaining commitments to ensure the appropriate durability of the projects financed under the Operational Programme Infrastructure and Environment 2014-2020.
  - b. Agreeing with the Czech Republic the schedule of construction of the Danube-Oder canal on both sides of the border and carrying out planning and design work.

2. On Gliwice Canal - completion of renovation and upgrade works on locks to restore their efficiency and operability within the current waterway class and launch of design and upgrade work on canal stations to class V (if justified, since the future Silesian Canal will run laterally to the existing canal).
3. On the canalised section of the Oder river, start of selective reconstruction of existing locks to achieve class Va parameters along with upgrade of the lock's outer harbours, in accordance with the upgrade plan, which should begin with locks that are in the worst condition, as an extension of compulsory renovation.
4. On Central Oder river flowing freely to the mouth of Lusatian Neisse:
  - a. Completion of construction of Malczyce dam.
  - b. Start of construction of successive Lubiąż and Ścinawa dams due to high riverbed erosion downstream of Brzeg Dolny, with simultaneous upgrade of river engineering facilities of both of these locks.
  - c. Planning and possible launch of the stage of selective canalisation of the Oder river flowing freely downstream of Ścinawa dam in the agreed order and linking the adopted construction schedule to river engineering works on the other sections, together with upgrade of facilities for individual new locks, and reconstruction of arcs with radiuses less than 650 m.
  - d. Repair and upgrade of river engineering facilities in the most limiting places in order to improve the navigation conditions on the Oder river as soon as possible.
5. On the border section:
  - a. Start talks on canalisation of the border Oder river. Renegotiate the existing intergovernmental agreement for elements related to the canalisation and agree on a common concept of the border Oder river canalisation.
  - b. Start and carry out upgrade and repair of existing river engineering facilities in accordance with the concept of the border Oder watercourse regulation in the most limiting places, agreed with Germany.
  - c. Implement harmonised river information services (RIS) on the border section of the Oder.
6. Within the Szczecin water node, rebuild a railway drawbridge over Regalica river at km 733.7, which restricts access and sometimes prevents inland waterway vessels from entering the mouth ports of the Oder.

**In the long run, the following is necessary:**

1. On the upper Oder river - complete construction of the Oder-Danube link.
2. On Gliwice Canal - carry out a staged reconstruction of canal stations to class V, along with construction of new locks next to the existing ones (if justified).
3. On the canalised section of the Oder - complete reconstruction of the remaining locks and rebuild the riverbed (removal of too small arcs and the necessary dredging works).
4. On the central Oder flowing freely to the mouth of Lusatian Neisse - complete construction of a lock cascade and adjust the geometry of the riverbed to the requirements of class Va.
5. On the border Oder river, depending on the outcome of negotiations with Germany:
  - a. Start canalisation in accordance with the established concept and schedule, adjusting to the works on the national section through selective extension of the border section to successively improve navigation conditions.
  - b. Further upgrade of river engineering facilities, supported by dredging downstream of the last dam in the direction of Szczecin (along with Dąbie lake).
6. Rebuild bridges by adjusting their navigation spans to the requirements of waterway class Va.



## The specific scope of investment tasks on the Vistula River Waterway includes:

### For the Lower Vistula Cascade - in the short run:

1. Construction of another dam downstream of Włocławek - urgent due to unstable condition of existing dam.
2. Selection of the concept of canalisation of the Vistula River Waterway.
3. Preparation of the documentation necessary to start the Lower Vistula Cascade investment project.

### In the long run:

1. Construction of subsequent dams of the cascade.
2. Construction of at least two major logistics centres (for example Bydgoszcz, Warsaw).

### For the Warsaw-Brest water link in the short run:

1. Preparation of a concept and preparation of documentation for the Warsaw-Brest link of central Vistula cascade.
2. Preparation of documentation for the construction of dams on the waterway between Dęblin and Terespol.

### In the long run:

1. Preparation of documentation for the Warsaw-Brest link.

# Estimated cost, potential sources and mechanisms of financing investments and their benefits

## Preliminary cost estimate

	by 2020	2021-2030	Total
Oder Waterway (with Danube-Oder-Elbe Canal and Silesian Canal)	2.9	27.8	30.7
Vistula cascade, along the Warsaw-Gdańsk section	3.5	28	31.5
Oder-Vistula link	2.5	4	6,5
Vistula-Brest link	–	8.1	8.1

*Preliminary programme implementation costs (PLN billion)*

The estimated costs of construction and upgrade of selected Polish inland waterways to adapt them to the parameters of navigation routes of international importance vary depending on the adopted concept and variant and amount to:

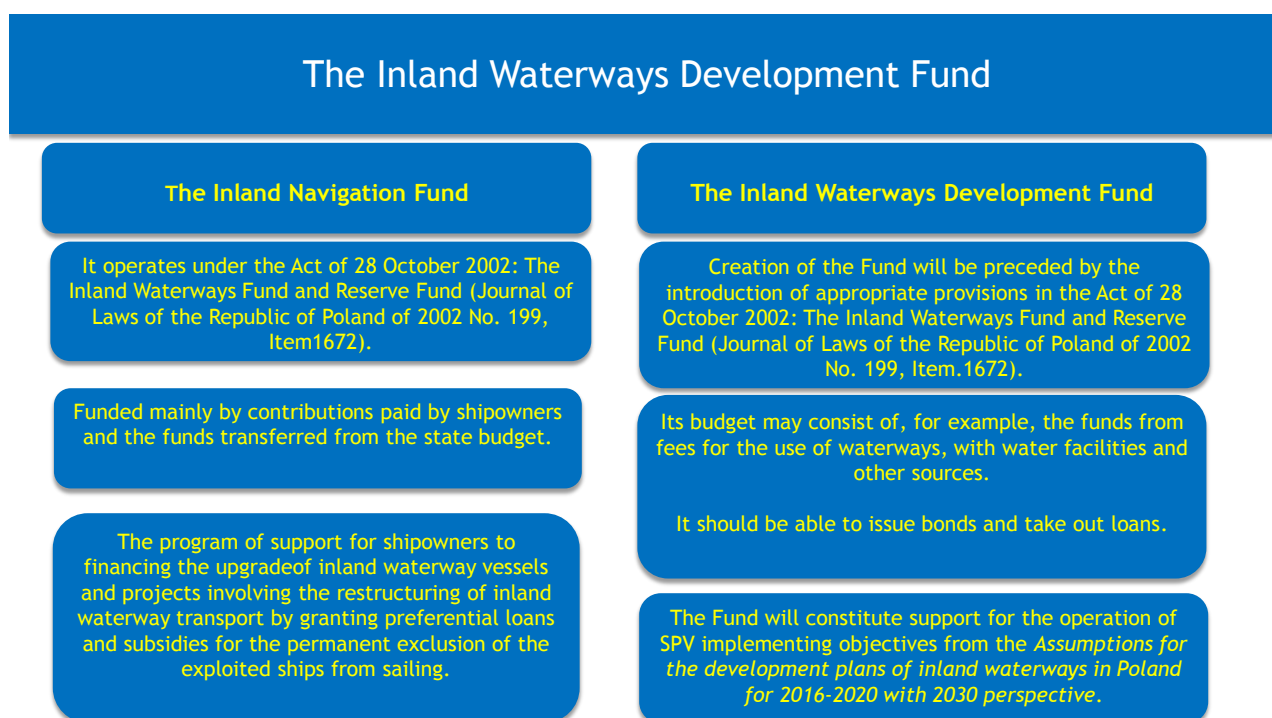
- Oder Waterway, together with Gliwice Canal and Oder-Danube link - between PLN 16.5 billion and PLN 22.6 billion.
- Central and lower section of the Vistula river from Warsaw to Gdańsk - about PLN 31.5 billion.
- Silesian Canal - about PLN 11.0 billion.
- Warsaw-Brest waterway - between PLN 8.1 billion and PLN 25.5 billion.

## Potential sources and mechanisms of financing investments

Ministry of Maritime and Inland Navigation in order to complete the tasks included in the *Assumptions for the Development Plans of Inland Waterways in Poland for 2016-2020 with 2030 Perspective* identified potential sources of financing some of which are the funds from: the Cohesion Fund, the European Regional Development Fund, the Fund "Connecting Europe Facility" (CEF), the European Fund for Strategic Investment (EFSI), special-purpose assets e.g. funds of the National Fund for Environmental Protection and Water Management or funds from the Inland Navigation Fund as well as the state budget, local governments budget, investors from the sectors concerned and the funds allocated for the implementation of objectives included in the *Strategy for Responsible Development*.

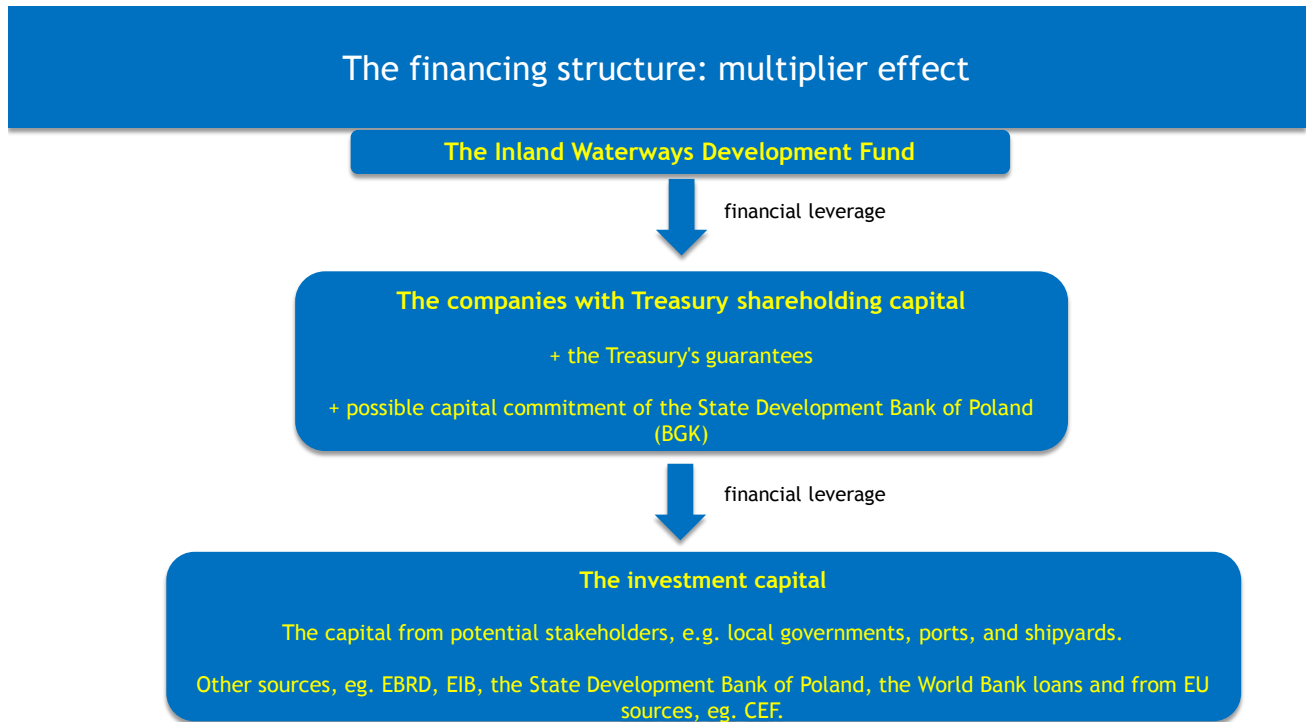
On the basis of the current Inland Navigation Fund, Ministry of Maritime and Inland Navigation has developed the Assumptions for the Inland Waterways Development Fund (the Fund), which, operating similarly to the National Road Fund and the Railway Fund, could form a basis of the financing mechanism of investments carried out on the waterways by complementing the measures planned to be obtained from the above sources.

For the Fund to be operational, its annual revenues will have to be determined. It is expected that its budget may consist of e.g. funds from the fees for the use of waterways, with water facilities and other derived e.g. from budgetary resources dedicated to the development of inland waterways or from state subsidies. To increase capital, the Fund should be able to issue bonds and take out loans.



It is assumed that the Fund will constitute support for the operation of a SPV composed of companies of the Treasury, which could be set up to achieve the objectives outlined in this document. It is assumed that the SPV will be able to obtain funds for external projects, including loans from EBRD, EIB, the State Development Bank of Poland (BGK), the World Bank and from EU sources. It will also be able to raise capital from stakeholders interested in the specific project, including mainly from local governments, ports, and shipyards. These entities will also pursue their statutory objectives.

The potential sources of financing described above will be subject to detailed verification during the planning stage of specific stages of the programme implementation.



## The benefits of the programme for extension and upgrade of waterways

Infrastructural investments in waterways have high capital intensity and also **high productivity of expenditure**. This means that funds invested in a waterway benefit not only navigation but also other important economic functions, such as:

- Flood prevention (preventing and mitigating the effects of flooding),
- Industrial and municipal (water intakes),
- Agricultural and forest management (maintaining appropriate groundwater conditions and land irrigation),
- Transport (use of the dam as a road crossing),
- Energy (use of flowing water energy to generate power),
- Sports and leisure (on the water),
- Social (operation of many facilities associated with the river).

Along with improvement of operational parameters of waterways, the importance and share of inland waterway navigation in the transport services market grows.

According to the team headed by Professor Michał Pluciński, these services will increase to 20 million tonnes on the Oder Waterway already by 2020, including:

- 13 million tonnes to the Szczecin-Świnoujście port complex (longitudinally - 10 million tonnes of conventional cargo, 1 million tonnes of container cargo, and 2 million tonnes latitudinally to German ports),
- 1 million tonnes of cargo to seaport Police;
- 5 million tonnes outside seaports, i.e. to the Oder ports;
- 1 million tonnes between the Oder ports and Western European ports.

In the long run, it is estimated that cargo transport on waterway E-30 would grow to 25 million tonnes.

According to Professor Krystyna Wojewódzka-Król and Professor Ryszard Rolbiecki, once the first stage of upgrade of the lower section of the Vistula river is completed, transport of cargo by inland waterways may reach ca. 7.8 million tonnes.

Along with further improvement of navigation parameters of the lower Vistula through its canalisation and a further growth of economic activities of businesses generating cargo designed to be carried by water, demand can be estimated at 12 million tonnes of cargo, excluding induced demand in relations with ports and inland transshipment plants of the lower Vistula section.

Inland waterway management also stands for investments that match the contemporary need for socio-economic development, since:

- They are made in the regions with significant underinvestment in such facilities,
- Thanks to their comprehensive nature, they may improve efficiency of the currently inefficient economic sectors,
- They ensure long-lasting economic growth thanks to the gradually generated increasing effects in various areas of the economy,
- They stimulate many other investments in the region thanks to the multiplier effect,
- They need relatively low annual investment outlays which are distributed over many years. In the current difficult budgetary situation, their implementation is realistically achievable.

## Upgrade of inland waterways will contribute primarily to:

- Increased share of inland navigation as the most environmentally friendly mode of land transport in the transport services market, by helping to balance the transport system. Inland waterway transport has the lowest external costs of all modes of land transport.
- Better competitiveness of seaports of the Oder and Vistula mouth, which, unlike most Baltic Sea ports, will have inland waterway transport as a mode of hinterland transport. One ship or inland train on class Va waterways has capacity of 1,500 to 3,000 tonnes. This means that its transport capacity equals the capacity of 60 to 120 TIR trucks.
- Economic activation of areas located along major navigation routes by improving their transport accessibility.
- Improved conditions for the operation of passenger, recreational and tourist navigation.
- Improved flood prevention, thus reducing potential losses attributable to flooding. In the years 1997-2010 alone, total costs of flooding in Poland came to ca. PLN 43 billion.
- Generation of 'clean' energy from hydropower plants. Generation of energy with the use of water power amounts to about 13,700 GWh/year, with about 45.3% of resources coming from the Vistula river, around 9.3% from Oder, 43.6% from the Vistula and Oder basins, and 1.8% from Przymorze area rivers. Poland uses merely 12% of its water resources. According to the information contained in the 2011 study commissioned by ENERGA S.A., eight hydropower plants on the Vistula river that could be built alongside the construction of the lower Vistula cascade would be capable of generating 4.153 GWh per year (3-4% of national output). Assuming an average price of energy as in Q4 of 2015 at PLN 171.87 per 1 MWh, annual sales of energy alone could reach ca. PLN 713 million per year.

In order to achieve the objectives of *Assumptions for the Development Plans of Inland Waterways in Poland for 2016-2020 with 2030 Perspective*, the Ministry of Maritime Economy and Inland Navigation will develop concepts and feasibility studies for each inland waterway and missing link. These documents will be proceeded in accordance with legal requirements and will undergo strategic environmental impact assessments.



