

ENDO-AND EXOGENOUS DETERMINANTS OF THE PROVISION OF WATER AND SEWAGE SERVICES IN POLAND

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***Abstract.** Water and sewage services as a public service of technical nature are provided in natural, local monopoly. It is related to the specificity of provided services, complicated technical infrastructure and high capital intensity. The main aim of this article is to present ongoing changes in the approach to the water and sewage services and the main determinant of running water and sewage business in Poland. The article discusses the basic legal, organizational, and economical determinants in this scope. The attention was also paid to the most common abnormalities which occur in the market of water and sewage services, concerning the protection of competition and consumers. The analysis was based on publications concerning the water and sewage sector and data from the Central Statistical Office and the judicature the President of the Office for Competition and Consumer Protection.*

***Keywords:** water and sewage services, municipal services, natural monopoly.*

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1. Introduction

The period of political transformation and accession of Poland into the European Union contributed to the changes in the sector of municipal services linked to fulfill collective needs of society. Those changes are clearly noticeable in the field of water and sewage services.

Before 1980 in Poland there were 50 large single – line, state water and sewage enterprises, 80% of which had voivodeship or regional range. At that time organizational and legal determinants allowed the bodies of state administration the freedom with decisions related to fees for water and discharge of wastewater. Greater investments were planned at the central level and financed from the state budget [1, p.723]. The trade was dominated by the

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“engineering” approach, which was focused more on technical solutions and growth of production than on economic rationality and the level of provided services. After 1990 the water supply and wastewater discharge were considered as tasks owned by the borough. The process of decentralization and communalization of large voivodeship enterprises has begun. Boroughs and newly formed units deal with water and sewage services did not have enough resources to introduce essential organizational changes. Currently, the major challenge for the trade is to adjust Polish water and wastewater management to European Union standards.

The article presents the most important determinants of endogenous and exogenous implementations of water and sewage services in Poland. The attention mainly focuses on legal, organizational and economic determinants. General characterization of the economy of the water and sewage management in Poland was based on the data from statistical year books of the Central Statistical Office. Data concerning basic sources of financing for the development of water and wastewater management as a part of the National Program for Municipal Wastewater Treatment comes from National Water Management (NWM). Basic irregularities were also presented which appeared on the market of water and sewage services, which were the basis for the intervention of the Office for Competition and Consumers Protection.

2. General characterization of the sector of water and sewage services in Poland

Polish territory is 322 575 km². The area has 38.5 million inhabitants. The average population density in Poland is around 123 inhabitants /km². 99.7% of Poland is in the drainage basin of the Baltic Sea, 0.2% in the drainage basin of the Black Sea and in 0.1% in the drainage basin of the North Sea. The main rivers which drain waters from Poland to the Baltic Sea are Vistula and Oder. The basins of these rivers comprise 87.9% of Poland.

In the last couple of years in Poland undoubted progress occurred in the field of water and sewage management and water and wastewater management. According to the year book of the Central Statistical Office “Environmental Protection” 2012, 2013 [11] collective water supply systems – waterworks systems – in 2011 services 95.4% of the population and collective wastewater discharge systems – sewerage systems – 63.5% of the population and 87.0% of the urban population and 27.8% of the rural population. Basic data concerning water and wastewater management in Poland are presented in Table 1.

Table 1.

*Basic data concerning collective water supply
and collective wastewater discharge in Poland*

Specification		Years					
		1995	2000	2005	2010	2011	2012
Total population of Poland	in thous.	38284	38254	38157	38529	38538	38533
Total number of cities	-	860	880	887	903	908	908
The rural population	thous.	23675	23670	23424	23416	23386	23336
Water consumption for needs of the national economy and population for the purposes of operating the waterworks	hm ³	*	*	2105,2	2062,4	2033,0	2030,8
Domestic water consumption in households during the year	hm ³	*	*	1219,4	1197,9	1202,0	1200,5
Domestic water consumption in households during the year per 1 inhabitant in the cities	m ³	*	*	37,2	35,0	34,8	34,5
Industrial and municipal wastewater discharged into water or into soil discharged by sewerage network	hm ³	*	*	1273,6	1287,8	1258,8	1248,8
The length of waterpipe network in the cities	thous. km	*	*	54,9	61,0	62,0	63,1
The length of waterpipe network in the countryside	thous. km	*	*	190,7	211,9	216,3	220
The length of sewerage network in the cities	thous. km	*	*	43,3	51,9	54,2	55,8
The length of sewerage network in the countryside	thous. km	*	*	36,8	55,6	63,5	69,8
Waterpipe connections to residential buildings in the cities	thous.	*	*	1757,1	1910,7	1952,3	1990,6
Waterpipe connections to residential buildings in the countryside	thous.	*	*	2752,1	3036,7	3110,7	3186,6
Sewerage connections to	thous.	*	*	1156,5	1412,7	1478,4	1529,5

residential buildings in the cities							
Sewerage connections to residential buildings in the countryside	thous.	*	*	598,0	906,3	1015,5	1102,9
Number of cities equipped with waterpipe network	-	854	877	886	901	906	906
Number of cities equipped with sewerage network	-	793	845	881	898	905	906
Number of cities served by wastewater treatment plants	-	643	801	857	873	901	903
Population in cities served by waterpipe network	%	91,1	91,7	94,9	95,3	95,4	95,4
The urban population which uses sewerage services	%	81,9	83,0	84,5	86,1	86,7	87,0

Source: Yearbook CSO 2012, 2013; Yearbook of the Central Statistical Office “*Environmental Protection*” 2012, 2013 [10], [11].

In the cities the development of sewerage systems generally follows with the development of the public water supply systems, however in rural areas observed essential differences in this aspect. These differences are due to the considerable dispersion of rural buildings: 15.1 million of the rural population lives in more than 40,000 villages. Due to technical and economic prejudice about the need for individual solutions to wastewater discharge and treatment to the extent that ensures adequate protection of the environment.

Reducing the amount of pollutants entering the water saw a noticeable improvement of water quality in rivers and lakes.

3. Basic regulations and rules for the provision of water and sewage services in Poland

The basic legal act which is establishing a framework for Community actions in the field of water policy of European Union is called Directive of the European Parliament and of the Council 200/60/EC of 22 December 2000, commonly known as the Water Framework Directive (WFD) [7]. It

introduces an integrated water policy which is aimed at inter alia, to provide people, access to clean drinking water which will enable economic and social development at respecting the needs of environment.

Transposition records of WPD to Polish legislation occurred through the Act of June 7, 2001 for collective water supply and collective sewerage discharge [9], [10]. It specifies:

- the terms and conditions of collective supply of water intended for human consumption and for collective wastewater discharge;
- business practices of water and sewage enterprises;
- the rules for creating the conditions to ensure continuity of supply and proper quality of water; reliable wastewater discharge and treatment and also protecting the interest of recipients of services with taking into account the requirements of environmental protection and optimization of costs.

The Act also includes conditions that must be practiced by water and sewage enterprise and by the recipients of water and wastewater services. The Act regulates the rules for determining the tariffs for collective water supply and wastewater discharge. It assumes, among others: the annual period during which the tariffs are valid and calculation of tariffs based on the essential amount of income after (their) the allocation to individual recipients groups of services taking into account the costs associated with the provision of services in the previous financial year, changes of economic conditions, conditions of providing conditions and costs resulting from the planned capital investments.

4. The specificity of the market of water and sewage services

The needs expressed by the society are implemented by goods and services. The natural features of certain needs can be fulfilled only in collective manner. An example of these types of needs may be: public safety, national defense, the use of public needs, sanitation, water supply and wastewater discharge and others. The greatest importance in meeting the collective needs has public services which are very broadly defined [6, p. 71]. Provision of public goods and services can be fulfilled by both the public sector as well as the private sector. The funding of public services occurs in total or partial with the use of public funds.

Collective water supply and wastewater discharge – services provided by water and sewage units in Poland are considered as an example of a natural monopoly network. This kind of monopoly is local because actions connected with waterworks, water supply, sewerage and wastewater discharge in Poland are the tasks of borough. Boroughs can delegate its tasks in the field of water supply and wastewater discharge to specialized units, namely water and sewage enterprises.

The provision of services in terms of network monopoly is characterized by [5, p. 17]:

- continuity and universality of the provision,
- universality of access, satisfaction of the public needs,
- indivisibility of technical infrastructure solutions and high capital intensity of the investment cycle,
- contemporaneity of production, delivery and consumption,
- significant differences at the time of demand for services,
- low elasticity of demand with respect to price.

Furthermore, about specific features of monopoly – considering the specific nature of the goods found in the sphere of services related to the water supply – decide, among others: the lack of any substitute of water used mainly for household as well as manufacturing processes and a highly limited ability, to use one common network for transferring products by different manufacturers.

5. Changes in management of units that provide water and sewage services

Although the operation of the units which deals with water and sewage services is done in conditions of a natural monopoly, like any organization they have their various “external shareholders” who feel the consequences of actions and are really interested in the results. The influence of various interest groups on the organization which deals with water and sewage business is shown in Figure 1.

People who run public organizations and those whom belong municipal utilities, must cope with the implementation of multiple objectives – often political, to satisfy various stakeholder groups (especially external). Without their support the public organizations cannot exist.



Figure 1. The influence of various interest groups on the organization which deals with water and sewage business.

Source: Own elaboration based on Kożuch B., *Public Management in Theory and Practice of Polish organizations (Zarządzanie publiczne w teorii i praktyce polskich organizacji)*, Wydawnictwo Placet, Warszawa (2004), pp. 96-104.

The interaction between the unit deals with the activities of water and sewage sector and the various interest groups can be seen in several aspects [4]:

- economic and financial aspect of the business units of water and water and sewage sector which should be effective, profitable and the funds saved as its result should serve the development of the unit, modernization of the network and investments in water and sewage equipment and modern technologies;
- aspect of ownership conditions, management and control of local government units;
- the social and economical aspect concerning the final client.

Polish adaptation of water and sewage utilities to European standards is not only associated with the expansion and modernization of the network or the introduction of modern equipment and technology. It is also important to modernize and improve the activities in the sphere of unit management.

In recent years there has been a positive return in current, fairly conservative and not very dynamic engineering system which runs waterworks utilities. We can notice the tendency to look for more efficient and more modern ways of management. Partly it is due to the requirements of legal norms, the need of preparation appropriate analysis, planning renovation and modernization activities according to the expected level of revenues and costs as well as the need to search external funds for investments.

Great importance has also been placed on the growth of the quality, awareness and knowledge of company's management and contacts with utilities and consultants both national and international. A direct consequence of better management is the increase of interest in raising the qualifications of employees which decide about the level, quality, efficiency and culture of the organization, which is the company.

Moving away from the typical monopolistic position towards customers is another important element of the changes in the culture of the organization of water and sewage utilities. Creation of customer service offices not only increases the efficiency and the quality of the service, but primarily it creates a positive image of changes and attitude of the natural monopolist to the surrounding reality and builds public trust to waterworks enterprises.

Modern computer software and information systems allow for the collection and processing of data about the state of operating systems, parameters of devices which characterize the level of provided services, costs incurred within the business and the revenues from activities of the units. They can be a great tool for supporting the process of management and implement the supervisory functions by the owners.

6. Level of the prices and the rules for determining the tariffs for the water supply and the collective wastewater discharge

In accordance with the regulations of the Act concerning collective water supply and collective wastewater discharge, which were previously

discussed, the amount and types of charges levied by the water and sewage utility for the service rendered to customers indicates the tariff. According to the statutory definition it is a publicly announced statement of prices and changes for collective water supply and collective wastewater discharge, with the conditions of use.

Water and sewage utility determines the tariff for one year on the basis of the necessary revenue. To determine the necessary revenue, what must be taken into account is: the costs associated with the provision of services incurred in the previous financial year, which were determined on the basis of the accounting records including planned changes in those costs in the year during which the tariff is in force. Next to be taken into account is: changes of economic terms, the size of services and terms of provisions, costs resulting from the planned capital expenditures based on the plan of development and modernization of waterworks equipment and sewage treatment.

Provision of waterworks and sewerage service is characterized by a high ratio of fixed assets of the individual water and sewage unit to the annual operating costs, co called capital intensity. Capital intensity is closely linked with the ability to conduct own development policy and modernization of the infrastructure by water and sewage unit. Prices for water must take into account the necessary investments in this sector. Improvement of water quality requires, at least partial repair or replacement of old water supply networks and the rising costs of the expansion and modernization of wastewater treatment plants, water treatment plants and water and sewage networks have influence on increase of the amount of tariffs for water supply and wastewater treatment services.

Prices and rates specified in the tariff are differential for individual tariff groups of recipients of the services, are documented on the basis of documented differences in the costs of collective water supply and collective wastewater discharge. The fee for water supply and wastewater discharge shall be determined by multiplying tariff prices and rates, as well as they correspond to the quantity of provided services. The price, mentioned earlier in the regulation, is defined as the amount expressed in monetary units, which the recipient of service is liable to pay to water and sewage utility for 1m³ of discharged wastewater.

Table 2.

The prices of water and wastewater in Poland. Selected statistical results based on data obtained in the survey on 1-30 March 2013 (in PLN).

Description/ recipient of services	Households		Industry (production)		Services including trade		Public investments	
	for water	for waste- water	for water	for waste- water	for water	for waste- water	for water	for waste- water
Numerical amount of the test	241	243	221	227	207	207	241	243
The average value	3,91	6,28	3,88	6,60	3,90	6,16	3,91	6,28
The maximum value	15,64	34,27	8,21	18,40	8,21	18,40	15,64	34,27
The minimum value	1,85	1,78	1,85	2,33	1,85	1,78	1,85	1,78
Price range	13,79	32,49	6,36	16,07	6,36	16,62	13,79	32,49
Median	3,60	5,49	3,70	6,03	3,73	5,78	3,60	5,49

Source: Chamber of Commerce “Polish Waterworks” (<http://www.igwp.org.pl/informacje-ekonomiczne>).

According to data published by the Chamber of Commerce “Polish Waterworks” (CCPW), the average price for water supplied to households in Poland in March 2013 was amounted to 3.91 zł, while the average price for discharged wastewater from household developed at the same period at 6.28 zł. Data concerning the average price for water and wastewater in households, in industry and services are presented in Table 2.

7. The major sources of financing development of water and sewage infrastructure

Construction, expansion and modernization of water and wastewater management is the responsibility of municipalities, financed from their budgets with the possibility of assistance from European Union and national environmental funds. Municipalities are responsible for the

amenities of the agglomeration in the collective sewerage system and wastewater treatment plants with a suitable degree of purification. When agglomeration is located in an area of several municipalities, the municipality may conclude inter – municipal agreements relating to, among others, entrust one of their duties to other municipalities.

In Poland, the National Program for Municipal Wastewater Treatment (NPMWT) is a program aimed at coordinating the activities of municipalities and water and sewage utility in the construction, expansion and modernization of sewer and wastewater treatment plants.

In order to obtain funding by municipalities for investment concerning wastewater management from environmental funds and EU funds is their inclusion in NPMWT. It should be emphasized that the implementation of NPMWT is the most expensive task among all the tasks arising from EU directives in the field of environmental protection. Particularly important in its implementation is the financial support from EU funds.

Comparing actual costs incurred during the realization of NPMWT in period of 7 years (2003-2010) in the amount of 33 782 670 thous. zł, with the projected cost of the project IV updates NPMWT till year 2015 i.e. 37 530 863,6 thous. zł, we see that the financial challenge facing Poland for the years 2011- 2015 is huge.

Funding of investments related to water and wastewater management in Poland since year 2004 is carried out with significant share of EU funds. To 30 December 2011 a total investment worth 32.9 billion zł was made, involving 19.3 billion zł funds from the EU, including:

- from 2004-2006 – projects worth 15.6 billion zł, involved 10.2 billion zł of EU funds;
- from 2007-2011 – projects worth 17.3 billion zł, involved 9.1 billion zł of EU funds [project IV NPMWT].

The programming period 2004-2006 – pre-accession funds were derived from the following funds: the European Regional Development Fund – Integrated Regional Development Programme, the Cohesion Fund (ISPA), the European Agriculture Guidance and Guarantee Funds – funds for private farming.

The programming period 2007-2013 includes funds from: the European Regional Development Fund – Regional Operational Pro-

grammes of individual voivodeship, the Cohesion Fund – Infrastructure and Environment Programme. Only with these two major sources were subsidized projects worth 31.9 billion zł in the amount of 18.9 billion zł.

Presented value of projects and refinancing does not include funds from: the EEA Financial Mechanism, The Norwegian Financial Mechanism and the Rural Development Programme.

National measures including those from the National Funds for Environmental Protection and Water Management to implementation of tasks in the field of water and wastewater management in Poland between years 2004-2011, stood at 18.5 billion zł and were only preferential loans.

8. The most common anomalies in the water and sewage market

Analysis of the case – law of the President of the Office for Competition and Consumer Protection (OCCP) concerning the functioning of water and sewage utilities and international comparisons which were made, show that the functioning of water and sewage sector, both in Poland and in many other EU countries, generic problems and is the object of various government interventions.

In the water and sewage sector, in the field of the protection of competition, the most important thing is the prohibition of abuse of dominant position. If water and sewage utility do not have any competition, they can fracture above prohibition by using their economic advantage over contractors to enforce them to unfavorable contract term, as well as to block competition in the markets related to the collective water supply and collective wastewater discharge markets [5, p. 73]. Another frequently observed abnormality is unlawful charging of customers by costs of buildings some networks. In accordance with regulations they have the obligation to finance only the construction of connections and space where the main water meter and the measuring device should be located. Very often however, contractors are charged with additional costs, which do not arise from the law.

A large number of violations are consequences of efforts that water and sewage utility makes to protect its own interests. However, very often, water and sewage utility makes it with violation of applicable laws. An

example of such behavior can be disabling the responsibility of water and sewage utility for the deterioration of the service quality caused by certain events or penalties determined for damage of the measuring device. Among the analogous behavior the following should be mentioned:

- making the verification of the correctness of the main water meter at the request of a recipient of services from the recipient to pay the deposit as a whole cover of the costs of such action;
- imposing recipients the obligation to cover the cost of replacement or repair the water and sewage equipment or measuring device in the case of damage. The recipient is not required by law to cover the costs of that;
- forcing customers to less favorable terms of payment than those restricted by regulations, in particular a shorter period of payment or contribute additional safeguards;
- restrict the possibilities to dissolve the contract and cut water supply if the recipient is not eventuate from the contract.

These behaviors are the instances of imposing onerous terms which bring the water and sewage utility unjustified benefits.

A common abnormality is exclusion, by traders of their own responsibility for interruptions in water supply. By law, the entrepreneur is responsible for the situation which was caused by his fault and is obliged to repair the damage resulting from his actions or omissions.

Another common mistake is the method of determining the charge for levied water in case of loss or damage to the water meter because of the recipient's fault. In such situations, the entrepreneur should demand payment for the water that was actually levied. When you cannot accurately measure the amount of levied water, then it should be determined on the basis of the average consumption in the last three months when the water meter was working properly or alternatively on the basis of the average consumption in similar period from the previous year.

The irregularities found by the OCCP also apply to situations in which the municipalities or utility companies solve contracts with consumers, thereby ceasing to provide services. May do so in four cases: the unlawful implementation of connection, lack of payment for two full accounting periods counted from the date when the consumer received the

reminder, illegal consumption of water and in situations when the quality of implemented sewerage did not meet the legal requirements or the damage was found or omission of the measuring device.

Monopolistic positioning of water and sewage utilities enables them to impose the unfair prices to customers. These types of violations are very rare because it is extremely difficult to make it clear whether the specified price is unfair. However, the water and sewage sector precise tariff regulation, which – taken as a reference point – make it easier to define unfair prices. In particular, will be the prices which are not determined in accordance with applicable law or in other way they infringe the principle of the equivalence of benefits to the determinant of at least part of the recipients [5, p. 87].

Decisions regarding the water and sewage sector were accounted in some years nearly half of all decisions issued by OCCP, on average accounting for about one-third of all decisions concerning abuse of a dominant position. Only in 2013, the President of the OCCP issued 39 decisions related to abuse of a dominant position and 24 decisions concerning the violation of collective interests of consumers, putting more than over 600 thou. zł of total penalty on entrepreneurs to provide water and wastewater receiving.

Conclusions

The last twenty years of providing water and sewage services in Poland is the period which completely changed the face of this sector. Many of the changes are a consequence of the economic reorganisation of the country after 1989. The greatest influence however, was the accession of Poland to the European Union. Poland was obliged to implement EU directives, which resulted in a change of law and a huge demand for investment capital.

A number of problems in the water and sewage sector in Poland is mainly connected with the specific provision of such services and also with the existing regulations, which are not always precise enough to describe the rights and obligations and balance the interests of consumers and producers.

One of the fundamental problems in this market is the fact that the municipality may appear at the same time in two roles: organizer and

supervisor of water and sewage services in its area. In addition, big fragmentation and the ownership structure of water and sewage sector can have a negative impact on the efficiency of its operation. Increasingly, there are calls concerning the consolidation of small utilities and return to regional units. Taking into consideration the very high number of irregularities disclosed during an inspection by the OCCP, also seems necessary the establishment of adequate, separate institution regulating water and sewage operations at the central or regional level.

Despite many barriers and interest of various interest groups, Polish water supply utilities are developing not only by modernizing and expanding machines and water sewage network but also by introducing modern methods of management and customer service departing from the typical monopolistic behaviors.

In addition, high impact to the modernization and development of water and wastewater management has the ability to raise funds from the EU funds for investment related to the implementation of EU directives. The process of modernization and construction of water and sewage infrastructure, which is realized currently in Poland although it is difficult and costly, it brings many benefits. It is expected not only to improve purity of water but also improving the living conditions, health status of Polish society and the rational use of natural resources. It will help to improve the image of Poland in the world in the field of compliance environmental requirements.

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