Supervision and Regulation of Water Supply Department,
Analytical and Benchmarking Unit

Report on Benchmarking for 2017

Prague, 7 February 2019

Report on Benchmarking for 2017

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1. Introduction

The Report on Benchmarking for 2017 presents to the professional as well as general public the results of the implemented projects: Benchmarking of Owners and Benchmarking of Operators 2017. The results are subsequently evaluated. The aim of the Report is to explain the identified shortcomings present in individual groups of owners and operators, to inform on conclusions of the projects and to propose further steps to be taken in order to accomplish the purposes of the regulation.

The Report also describes in detail and explains the changes in some processes used in both the benchmarking projects. These changes have been adopted based on the public consultation of the results of benchmarking for 2016. The structure of the Report for 2017 is identical to that of the Report for 2016.

With respect to the activities of the Ministry of Agriculture (MoA) and the Committee for Coordination of Regulation in the field of Water Supply and Sewerage Systems, the Report aims to provide information necessary for potential modification of the regulation strategy in the field of water supply and sewerage systems or to set objectives for benchmarking for the next year, by which the annual cycle of benchmarking is completed in accordance with the applicable Benchmarking Methodology.

The users of benchmarking results shall note that all the three reports (Benchmarking of Owners for 2017, Benchmarking of Operators for 2017 and Report on Benchmarking for 2017) shall be perceived as a whole and the individual findings shall not be considered separately without the context.

One of the main intentions of the regulation is to enhance the awareness of end final consumers. In 2018, the MoA launched a web application providing the interested persons with the access to selected information from the Comparisons included in benchmarking and the related selected data from ownership records (SDOwR) and selected data from operating records (SDOpR). Once the benchmarking for 2017 is finalised, also the data for 2017 will be accessible through the application.

1.1 Terminology and List of Abbreviations

1.1.1 Terminology

Anomaly - data, relation, status that significantly deviates from the mean or expected value, status, relation, or which is a signal of a violation of the applicable legislation and prevents the accomplishment of objectives of the regulation.

Benchmarking – systematic process to identify, familiarize with and adopt successful management tools, methods and procedures of the compared entities. Typically, it is a continuous or repeated process, the main objective of benchmarking is to improve the activities of the participating compared entities.

Investment activity – processes related to the renewal and development of water infrastructure assets.

Calculation – allocation of costs, or the profit to a calculation unit (m^3).

Calculated item – a part of the calculation combining similar types of costs, or profit (in this case an item in the calculation of water rates or sewerage charges, as defined in Annex No 19 to Decree No 428/2001 Coll.).

Combined model of operation – one of the owners of the water infrastructure assets is their operator who operates the infrastructure assets based on a long-term contract.

Renewal of water infrastructure – replacement of a part of the water supply system, a water treatment plant, a sewerage system or a waste water treatment plant which is an inventory item of the owner´s property or a separate item listed among the selected data from ownership records in order to extend the service life of the construction and related technology (in accordance with Act No 274/2001 Coll.).

Separate model of operation of water infrastructure assets – the owner of the water infrastructure concludes a long-term contract with the operator who ensures the operation of the water infrastructure. The recipient of water rates or sewerage charges is the operator (concession contract) or the owner (service contract), with the operator being selected in accordance with the Public Procurement Act). This model also includes the ownership model.

Indicative indicators – indicators for the calculation of the purchase price (updated cost) of the objects for the Selected data from ownership records of water supply and sewerage systems, for the Plans of Development of Water Supply and Sewerage Systems and for the Plans for Financing the Renewal of Water Supply and Sewerage Systems in accordance with the Methodological Guideline of the Ministry of Agriculture Ref No: 401/2010-15000

Plan for Financing the Renewal of Water infrastructure – a statement comprising the definition of infrastructure assets in a breakdown by selected data from ownership records with the replacement costs, appraisal of the property condition expressed in % of wear and tear, calculation of the theoretical economic life, annual financing needs and their coverage, and documents on drawing down the generated funds including invoices or their copies. It is elaborated in accordance with Annex No 18 to Decree No 428/2001 Coll. Each update is a part of the original Plan for financing the renewal of water supply or sewerage systems.

Comparison – as defined in Annex No 20 to Decree No 428/2001 Coll., „Comparisons of all the items of the calculation of water and sewer rates for the calendar year and the rates and charges actually achieved in the given year", submitted mandatorily by the individual public service providers to the MoA annually, namely always no later than on 30 April for the previous calendar year (in accordance with Section 36(5) of Act No 274/2001 Coll.).

Self-financing capacity of water infrastructure – situation when the revenues generated through the collection of water and sewer rates cover all the costs, or expenditure on its operation, renewal and development.

Mixed model of operation of water infrastructure assets – the owner of the water infrastructure puts infrastructure assets in the business company which later owns and operates them, the owner has an ownership stake in the operator. Self-operation by municipalities is also a form of the mixed model. For the purposes of this analysis both these models are called mixed models.

SWOT analysis – method of identification of Strengths and Weaknesses, Opportunities and Threats related to a certain project, type of business (in this case applying the benchmarking method for the assessment of business entities).

Owner – means the owner of the water infrastructure assets

Ownership model of operation – a subtype of the separate model of operation – the owner of the water infrastructure concludes a long-term contract on operating the water infrastructure with the operator, in which the owner has an ownership stake. Operation of the WIA is commissioned through an in-house procurement.

Decree No 428/2001 Coll. – Decree No 428/2001 Coll. of the Ministry of Agriculture of 16 November 2001, implementing the Act No 274/2001 Coll., on Public Water Supply and Sewerage Systems and on amendments to some related acts, (Act on Water Supply and Sewerage Systems).

1.1.2 List of Abbreviations

MoA -	Ministry of Agriculture
MoF -	Ministry of Finance
MoE -	Ministry of Environment
SDOwR -	Selected data from ownership records
SDOpR -	Selected data from operating records
INOR -	Identification number of operating records
PFR -	Plan for Financing the Renewal of the Water infrastructure Assets
OCF -	Operational coefficient (for calculation see the applicable Benchmarking Methodology)
FCs -	Full costs including line 4.4 funds for renewal
WIA -	Water infrastructure assets
AWSSS -	Act No 274/2001 Coll., on Water Supply and Sewerage Systems
WSSS -	Public water supply and sewerage systems

1.1.3 List and Method of Identification of Assessed Anomalies from the Benchmarking of Owners

In order to be able to draw relevant conclusions from the conducted analyses, it was necessary to set the limit values of indicators used to identify certain anomalies. The limit values are included in the table below.

Benchmarking of Owners:

Water supply system

BENCHMARKING OF OWNERS: VALUES OF SOME INDICATORS IN COMPARISONS MEETING THE DEFINED CRITERIA	AVERAGE – WATER RATE (CZK/M³; FROM COMPARISONS WHERE OCF RANKS FROM 1 TO 1.5 and FROM COMPARISONS REPORTING THE ACHIEVEMENT OF RENEWAL)	MEDIAN_FAILURE RATE PER 1 KM OF DISTRIBUTION NETWORK (PC/KM; FROM COMPARISONS REPORTING FAILURES)	MEDIAN – SHARE OF CALC. PROFIT IN FCs (%; FROM COMPARIS. WITH POSITIVE CALC. PROFIT)	MEDIAN – SHARE OF CALC. PROFIT TO BE DISTRIBUTED IN FCs (%; FROM COMP. WITH POSITIVE CALC. PROFIT)	AVERAGE REPAIR COSTS PER FAILURE (CZK/PC; ARITHMETIC MEAN CALCULATED WITHOUT COMPARISONS WITH ZERO FAILURE)	WATER LOSS PER 1 KM OF CONVERTED LENGTH OF WATER MAIN PER DAY (M3/KM/DAY; FROM COMPARISONS REPORTING WATER LOSSES OF MORE THAN 4 M3/KM/DAY)	VALUE OF NON-REVENUE WATER PER KM OF CONVERTED LENGTH (M3/KM/DAY; FROM COMPARISONS REPORTING WATER LOSSES OF MORE THAN 4 M3/KM/DAY)
Group I (>10 000mil. CZK)	39.947	0.706	11.955	11.955	60 649.552	4.72	5.6
Group II (>1 000mil.CZK)	37.480	0.307	5.965	4.970	130 404.896	6.24	6.78
Group III (>100mil.CZK)	36.018	0.347	7.012	6.500	64 785.475	6.55	7.72
Group IV (>10mil.CZK)	36.309	0.324	36.668	8.185	47 281.646	6.14	6.93
Group V (>1mil.CZK)	44.726	0.627	8.377	8.190	46 336.391	7.5	7.76
Group VI <1mil.CZK)	58.355	1.036	0.067	19.318	4 709.667	12.47	12.47

Sewerage system

BENCHMARKING OF OWNERS: VALUES OF SOME INDICATORS IN COMPARISONS MEETING THE DEFINED CRITERIA:	AVERAGE – SEWERAGE CHARGES (CZK/M³; FROM COMPARISONS WHERE OCF RANKS FROM 1 TO 1.5; FROM COMPARISONS REPORTING THE ACHIEVEMENT OF RENEWAL)	MEDIAN_OF THE GROUP OF THE FAILURE RATE PER 1 KM OF NETWORKS (PC/KM; FROM COMPARISONS REPORTING FAILURES)	MEDIAN_SHARE OF CALC. PROFIT IN FCs (%; FROM COMPARISONS WITH POSITIVE CALC. PROFIT)	MEDIAN – SHARE OF CALC. PROFIT TO BE DISTRIBUTED IN FCs (%; FROM COMP. WITH POSITIVE CALC. PROFIT)	AVERAGE REPAIR COSTS PER FAILURE (CZK/PC; ARITHMETIC MEAN CALCULATED WITHOUT COMPARISONS WITH ZERO FAILURE)
Group I (>10 000mil.CZK)	33.90	0.12	12.88	184 715.55	30.51
Group II (>1 000mil.CZK)	36.49	0.09	4.66	249 984.46	33.19
Group III (>100mil.CZK)	34.29	0.17	3.75	62 856.10	32.31
Group IV (>10mil.CZK)	45.26	0.30	8.64	27 551.70	42.68
Group V (>1mil.CZK)	43.13	0.86	5.63	26 681.26	40.60
Group VI (<1mil.CZK)	9.81	0.00	1.84	0.00	8.95

Below you will find the list of indicators (method of their definition and justification) indicating the occurrence of an anomaly in a breakdown to water supply and sewerage systems.

BENCHMARKING OF OWNERS:	WATER SUPPLY SYSTEM	JUSTIFICATION
1	INADEQUATE GENERATION OF FUNDS FOR THE RENEWAL OF WIA	WIA sustainability goal is not fulfilled
2	ZERO VALUE IN LINE 20	generation and use of funds for renewal are not reported
3	ZERO DEPRECIATION + ZERO REPAIRS + ZERO 4.4 IN THE MIXED OR COMBINED MODEL	funds for renewal are not included in the water rate

BENCHMARKING OF OWNERS:		
	WATER SUPPLY SYSTEM	JUSTIFICATION
4	RENTAL IS LESS THAN OR EQUAL TO ZERO IN THE SEPARATE (WITHOUT SERVICE CONTRACTS) OR COMBINED MODEL	wrong data reporting or unbalanced contractual relations
5	RENTAL IS GREATER THAN ZERO IN THE MIXED MODEL OR SEPARATE MODEL WITH SERVICE CONTRACT	wrong data reporting
6	ZERO FAILURES + REPAIRS HIGHER THAN AVERAGE REPAIR COSTS PER FAILURE IN THE GROUP (THE AVERAGE IS CALCULATED WITHOUT COMPARISONS WITH 0 FAILURE, AS THE ARITHMETIC MEAN OF VOM02 INDICATOR)	wrong data reporting
7	OTHER THAN ZERO FAILURE RATE AND ZERO REPAIR COSTS	failure to report 100 % of all the economically justified costs – lower reporting value of the data; price setting problem
8	OCF > 1 AND FAILURE TO EXECUTE THE RENEWAL	revenue is generated, but the funds for renewal of WIA are not generated
9	HIGH WATER RATE (MORE THAN 1.5 TIMES THE AVERAGE WATER RATE FROM COMPARISONS MEETING THE DEFINED CRITERIA OF THE GROUP; OCF BETWEEN 1 AND 1.5; ACHIEVEMENT OF RENEWAL)	high costs or profitability, a problem regarding the social acceptability of the rate
10	ZERO WATER RATE	rate is subsidised and there is a problem regarding the generation of funds for WIA renewal
11	NEGATIVE CALCULATED PROFIT	subsidised rate, loss incurred
12	CALCULATED POSITIVE OR ZERO PROFIT AND NEGATIVE PROFIT MADE	no profit generated in the given year due to unforeseeable circumstances
13	NEGATIVE PROFIT CALCULATED AND NEGATIVE PROFIT MADE	knowingly subsidised operation and WIA renewal
14	HIGH SHARE OF PROFIT IN FCS (VALUE OF MORE THAN 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITH POSITIVE CALCULATED PROFIT)	high calculated profit
15	HIGH SHARE OF CALCULATED PROFIT TO BE DISTRIBUTED IN FCS (COMPARISONS WITH THE SHARE OF PROFIT TO BE DISTRIBUTED HIGHER THAN 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITH POSITIVE PROFIT AND SHARE OF PROFIT TO BE DISTRIBUTED IN FCS >0)	excessive profitability and outflow of funds from the sector
16	ZERO WATER LOSSES	failure to monitor losses (indicates a problem with systematic care of WIA)
17	HIGH VALUE OF NON-REVENUE WATER PER KM OF CONVERTED LENGTH IN M^3/KM/DAY (EXCEEDS 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS REPORTING WATER LOSSES HIGHER THAN 4 M^3/KM/DAY)	water not generating revenues to cover the related costs (distorted due to e.g. the so-called compound water mains), data on water losses are provided
18	HIGH FAILURE RATE (COMPARISONS WITH THE FAILURE RATE/KM HIGHER THAN 1.5 TIMES THE MEDIAN OF THE GROUP WITHOUT COMPARISONS WITH ZERO FAILURES)	inadequate care of WIA
19	HIGH WATER LOSSES PER 1 KM OF CONVERTED LENGTH OF WATER MAINS PER DAY IN M^3/KM/DAY (EXCEEDS 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS REPORTING WATER LOSSES HIGHER THAN 4 M3/KM/DAY)	inadequate care of WIA

BENCHMARKING OF OWNERS: SEWERAGE SYSTEMS		JUSTIFICATION
z	INADEQUATE GENERATION OF FUNDS FOR THE RENEWAL OF WIA	WIA sustainability goal is not fulfilled
2	ZERO VALUE IN LINE 20	generation and use of funds for renewal are not reported
3	RENTAL IS LESS THAN OR EQUAL TO ZERO IN THE SEPARATE (WITHOUT SERVICE CONTRACTS) OR COMBINED MODEL	wrong data reporting or unbalanced contractual relations
4	RENTAL IS GREATER THAN ZERO IN THE MIXED MODEL OR SEPARATE MODEL WITH SERVICE CONTRACT	wrong data reporting
5	OTHER THAN ZERO FAILURE RATE AND ZERO REPAIR COSTS	failure to report 100 % of all the economically justified costs – lower reporting value of the data; price setting problem
6	ZERO DEPRECIATION + ZERO REPAIRS + 4.4 IN THE MIXED OR COMBINED MODEL	funds for renewal are not included in the water rate
7	ZERO SEWERAGE RATE TOTAL	rate is subsidised and there is a problem regarding the generation of funds for WIA renewal
8	HIGH SEWERAGE RATE (MORE THAN 1.5 TIMES THE AVERAGE SEWERAGE RATE FROM COMPARISONS IN THE GROUP MEETING THE DEFINED CRITERIA; OCF BETWEEN 1 AND 1.5; ACHIEVEMENT OF RENEWAL, POSITIVE CALCULATED PROFIT)	high costs or profitability, a problem regarding the social acceptability of the rate
9	ZERO FAILURE RATE + REPAIRS HIGHER THAN AVERAGE REPAIR COSTS PER FAILURE OF ALL ENTITIES WITH OTHER THAN ZERO FAILURE RATE	wrong data reporting
10	HIGH FAILURE RATE PER 1 KM OF SEWERAGE NETWORK/YEAR (1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITHOUT ZERO VALUE OF THE INDICATOR)	inadequate care for WIA
11	NEGATIVE CALCULATED PROFIT	subsidised rate, loss incurred
12	CALCULATED POSITIVE OR ZERO PROFIT AND NEGATIVE PROFIT MADE	no profit generated in the given year due to unforeseeable circumstances
13	NEGATIVE PROFIT CALCULATED AND NEGATIVE PROFIT MADE	knowingly subsidised operation and WIA renewal
14	HIGH SHARE OF CALCULATED PROFIT TO BE DISTRIBUTED IN FCS (VALUE OF MORE THAN 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITH POSITIVE CALCULATED PROFIT)	excessive profitability and outflow of funds from the sector

1.1.4 List and Method of Identification of Assessed Anomalies from the Benchmarking of Operators

Limit values of some indicators used to identify anomalies:

Water supply system

BENCHMARKING OF OPERATORS: VALUES OF SOME INDICATORS IN COMPARISONS MEETING THE DEFINED CRITERIA	MEDIAN – NON-REVENUE WATER PER 1 KM OF CONVERTED LENGTH OF WATER MAIN PER DAY (EXCEEDS 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS REPORTING WATER LOSSES HIGHER THAN 4 M^3/KM/DAY)	MEDIAN – WATER LOSSES IN M^3 PER 1 KM OF CONVERTED LENGTH OF WATER MAINS PER DAY (EXCEEDS 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS REPORTING WATER LOSSES HIGHER THAN 4 M^3/KM/DAY)	MEDIAN – SHARE OF WATER LOSSES IN PRODUCED DRINK. WATER (EXCEEDS 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMP. REPORTING WATER LOSSES HIGHER THAN 4 M^3/KM/DAY)	AVERAGE – HIGH SHARE OF CALCUL. PROFIT TO BE DISTRIBUTED IN FCS (HIGHER THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)	AVERAGE – HIGH WATER RATE (HIGHER THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)
Group I (>500 000 con. inh.)	5.60	17.71	4.72	17.26	39.95
Group II (>200 000 con. inh.)	5.49	13.47	5.20	9.45	37.00
Group III (>100 000 con. inh.)	10.05	24.03	8.26	2.27	37.22
Group IV (>50 000 con. inh.)	5.64	20.94	5.15	3.40	40.37
Group V (>10 000 con. inh.)	7.74	22.18	6.54	6.96	35.42
Group VI (>1 000 con. inh.)	6.98	26.65	6.15	9.57	35.26
Group VII (>300 con. inh.)	6.70	31.08	6.19	10.83	34.00
Group VIII (<300 con. Inh.)	8.03	39.63	7.72	21.17	34.85

Sewerage system

BENCHMARKING OF OPERATORS: VALUES OF SOME INDICATORS IN COMPARISONS MEETING THE DEFINED CRITERIA:	AVERAGE – HIGH SHARE OF CALCUL. PROFIT TO BE DISTRIBUTED IN FCS (HIGHER THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)	AVERAGE – HIGH SEWERAGE RATE (HIGHER THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)
Group I (>500 000 connected inhabitants)	11.67	37.97
Group II (>200 000 connected inhabitants)	17.92	33.41
Group III (>100 000 connected inhabitants)	9.70	34.18
Group IV (>50 000 connected inhabitants)	6.83	35.72
Group V (>10 000 connected inhabitants)	5.88	34.70
Group VI (>1 000 connected inhabitants)	7.00	34.71
Group VII (>300 connected inhabitants)	16.33	35.71
Group VIII (<300 connected inhabitants)	2.52	37.84

Below you will find the list of indicators (method of their definition and justification) indicating the occurrence of an anomaly in a breakdown by water supply and sewerage system.

BENCHMARKING OF OPERATORS: WATER SUPPLY SYSTEM		JUSTIFICATION
1	HIGH WATER LOSSES IN MIL. M^3 (EXCEED 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS REPORTING WATER LOSSES HIGHER THAN 4 M^3/KM/DAY)	inadequate care for WIA
2	HIGH SHARE OF WATER LOSSES IN PRODUCED DRINKING WATER IN % (EXCEEDS 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS REPORTING WATER LOSSES HIGHER THAN 4 M^3/KM/DAY)	inadequate care for WIA
3	NON-REVENUE WATER PER KM OF CONVERTED LENGTH OF WATER MAIN PER DAY (EXCEEDS 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS REPORTING WATER LOSSES HIGHER THAN 4 M^3/KM/DAY)	share of water not generating revenues to cover the related costs (distorted due to e.g. the so-called compound water mains), data on water losses are provided
5	ZERO WATER LOSSES	wrong data reporting
6	NEGATIVE CALCULATED PROFIT	subsidised rate; loss incurred
7	ZERO WATER RATE TOTAL	rate is subsidised
8	HIGH SHARE OF CALCULATED PROFIT TO BE DISTRIBUTED IN FCS (MORE THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)	excessive profitability and outflow of funds from the sector
9	HIGH WATER RATE (MORE THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)	high costs or profitability, a problem regarding the social acceptability of the rate
10	ZERO LABOUR COSTS + OTHER THAN ZERO NUMBER OF EMPLOYEES	wrong data reporting
11	ZERO NUMBER OF EMPLOYEES + REPORTED LABOUR COSTS	wrong data reporting
12	SHARE OF NON-COMPLIANT PHYSICAL AND CHEMICAL SAMPLES (MORE THAN 20% NON-COMPLIANT SAMPLES)	quality of delivered services is at risk

BENCHMARKING OF OPERATORS: SEWERAGE SYSTEM		JUSTIFICATION
1	NEGATIVE CALCULATED PROFIT	subsidised rate; loss incurred
3	ZERO SEWERAGE RATE TOTAL	Decision on using zero sewerage rate
4	HIGH SEWERAGE RATE (MORE THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)	high costs or profitability, a problem regarding the social acceptability of the rate
5	HIGH SHARE OF CALCULATED PROFIT TO BE DISTRIBUTED IN FCS (MORE THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)	excessive profitability and outflow of funds from the sector
	SHARE OF NON-COMPLIANT SAMPLES OF WASTE WATER DISCHARGED FROM THE WWTP HIGHER THAN 20 %	quality of delivered services is at risk
7	OTHER THAN ZERO VOLUME OF WASTE WATER DRAINED TO THE WWTP AND NO INHABITANTS CONNECTED TO THE WWTP	wrong data reporting
8	INHABITANTS CONNECTED TO THE WWTP, ZERO VOLUME OF WASTE WATER DRAINED TO THE WWTP	wrong data reporting
9	ZERO LABOUR COSTS + OTHER THAN ZERO NUMBER OF EMPLOYEES	wrong data reporting

1.2 Function of the Report on Benchmarking in the Regulation Process – Links to the Supervision and Regulation Vision and Objectives in the Field of Water Supply and Sewerage Systems

The purpose and objective of the Report on Benchmarking is to provide a summary of conclusions from the benchmarking projects to all the stakeholders, to evaluate the results of these projects with respect to the set vision and objectives of the regulation, to propose and define issues that need to be addressed in order to improve the functioning in the field of water supply and sewerage systems, or to propose modifications in methodological procedures of the benchmarking itself.

1.2.1 Vision of regulation in the field of water supply and sewerage systems

Clean production and continuous supply of quality drinking water and drainage and quality treatment of waste water for all who need it at an adequate and affordable price in order to maintain the ability of future generations to satisfy their needs with respect to the infrastructure of water supply and sewerage systems.

1.2.2 Objectives of the regulation in the field of water supply and sewerage systems

	OBJECTIVES	TOPIC
I.	To achieve **self-financing capacity of the infrastructure**	**Renewal** of water infrastructure in terms of achieving its sustainability and reinvesting the funds received from consumers.
II	**To find a balance** between the price of services and the costs of service provision	**Price setting** – setting the price of service which covers the operating costs and the costs of infrastructure renewal and makes the service accessible to all the consumers at a socially acceptable price.
III.	To ensure adequate level of **quality of service**	Continuous supply of drinking water in the required volume and quality and continuous drainage and treatment of waste water in accordance with the statutory parameters.
IV.	To ensure **environmental protection** and minimization of environmental impacts	Reducing negative impacts on the environment (energy performance, compliance with the required limits).
V.	To increase the **transparency of information** of all the stakeholders in the sector	Provision of transparent information on price setting, functioning, needs and challenges of the sector of water supply and sewerage systems.

2. Process of Improving the Collected Data Quality

The quality and usability of each conducted benchmarking definitely depends on the quality of input data, proper selection and structure of indicators monitoring the accomplishment of the set-out targets (or objectives) and the way of making the results of benchmarking projects accessible to individual stakeholders and the method of interpretation of these results. In the previous benchmarking project, too, the quality of data was identified by the SWOT analysis as one of the weaknesses.

The quality of data for the purposes of the aforementioned benchmarking projects carried out by the MoA can be assessed based on four aspects:

1. requisites necessary for interconnection, i.e. the data submitted through two databases shall contain all the requisites necessary for their interconnection,

2. uniform content, i.e. the data processors shall interpret the reported data in the same way,

3. data completeness, i.e. the entities shall learn how to report in a true and complete manner e.g. the failure rate, drinking water losses, all the associated economically justified costs etc. so that the data have a reporting value and are comparable; it is also necessary to add to the SDOpR the data on feed pipelines that had not been submitted to the MoA before, and thus the values of certain indicators were distorted,

4. different structure of submitted data in the Comparisons caused by the applied model of operation. It leads to the impossibility to better assess some of the indicators in a uniform manner, e.g. the amount of calculated profit (in the separate model a part of the profit is hidden in the rental) or the amount of generated funds for renewal resulting from WIA repairs includes also the maintenance or costs of repairs and breakdowns etc.

The MoA has consistently striving to eliminate the above mentioned deficiencies in data quality, namely through face-to-face communication with individual processors of reported data, provision of information in printed articles, presentations at conferences, amendment to Decree No 428/2001 Coll. (particularly to Annex No 20, by which the different approach to provision of information on the cost structure of water and sewerage rates for entities applying the mixed and separate model of operation was removed – information on individual components of the rental paid to the WIA owners has been added). This part of the Decree shall take effect as of 1 September 2019. Some of the information shall be added to the Selected data from operating records (e.g. information on operating results of feed pipelines). Another opportunity to improve the data collection will be the modification of the information system of water supply and sewerage systems used for data collection.

3. Background and Procedures, Changes Against the Previous Year

This chapter sums up the definitions and differences between the individual models of WIA operation, calculation of funds for WIA renewal actually generated from water and sewerage rates, problems faced when assessing line 20 and describes changes made to the applied procedures and indicators that had been adopted based on the outcomes of consultations concerning the submitted comments on the Benchmarking for 2016. A brief

description of differences of the analysed models of operation and their subgroups is provided.

Individual models of operation were identified based on the following information included in the Comparisons: Identification (registration) number (IN) of the WIA owner, identification number of the WIA operator and identification number of the recipient of water and sewerage rates.

MODEL OF OPERATION	Description of the model used for benchmarking purposes
MIXED	• Owner and operator is the same legal entity. • Owner(s) of infrastructure puts its WIA into the *business company* (Joint Stock Company, Limited Liability Company, limited partnership) which owns and also operates these assets. The business company has the right to collect the water and sewerage rates. • The original WIA owners supervise the quality and efficiency of services based on their shareholders´ rights or the business partner´s rights. • The business company is responsible for development and renewal and also for repairs and maintenance. • IN of the owner is the same as the IN of the operator and the IN of the recipient of water and sewerage rates and it is one of the forms of business companies.
OPERATER IS THE MUNICIPALITY (A SUB-GROUP OF THE MIXED MODEL OF OPERATION)	• The municipality operates its WIA on its own name, on its own account and at its own responsibility. • The municipality has the right to collect water and sewerage rates. • Some activities or technical supervision can be outsourced based on a contract. • The municipality bears the responsibility for the quality and efficiency of services. Moreover, it is responsible for the development, renewal, repairs and maintenance of WIA. • IN of the owner is the same as the IN of the operator and the IN of the recipient of water and sewerage rates and it is a municipality, township, town or association established by municipal entities.
SEPARATE	• The owner of WIA and the operator are two different legal entities. • The owner and the operator have concluded *a WIA lease and operation contract.* • The operator is *responsible* for the quality and efficiency of WIA operation. For the provided services, the operator is entitled to a *reward in the form of the right to collect* water and sewerage rates. • The operator shall pay the *rental* to the WIA owner for the use of WIA. • The owner is responsible for WIA development and renewal. • The operator is responsible for WIA repairs and maintenance. • The IN of the owner differs from the IN of the operator. They can be two independent business companies or a combination of a municipal legal entity as the WIA owner and a business company as the WIA operator.
OWNERSHIP (A SUB-GROUP OF THE SEPARATE MODEL OF OPERATION)	• The WIA owner and the operator are two different legal entities. The WIA owner is the establishing entity of the operator and its 100% owner, i.e. has a full control over the operator. • The owner and the operator have concluded *a WIA lease and operation contract,* or the operator operates WIA based on another type of authorisation. (Often these are special purpose business companies or e.g. city/municipal utilities). • The operator is *responsible* for the quality and efficiency of WIA operation. For the provided services, the operator is entitled to a r*eward in the form of the right to collect* water and sewerage rates. • The operator pays to the WIA owner the *rental* for WIA use. • The owner is responsible for WIA development and renewal. • The operator is responsible for WIA repairs and maintenance. • The IN of the owner differs from the IN of the operator and the IN of the recipient of water and sewerage rates is the same as the IN of the operator. They can be two independent business companies or a combination of a municipal legal entity (WIA owner) and a business company or an organisation established by the WIA municipal owner (operator).

MODEL OF OPERATION	Description of the model used for benchmarking purposes
SERVISE CONTRACTS (A SUB-GROUP OF THE SEPARATE MODEL OF OPERATION)	• The WIA owner and operator are two different entities with no connections through the ownership. • *A service contract* is concluded between the owner and the operator. • Under the service contract, the WIA owner pays an *operation fee* to the operator • The operator is *responsible* for the quality and efficiency of WIA operation. • The WIA owner is the recipient of water and sewerage rates. • The owner is responsible for WIA development and renewal and in mostly also covers the WIA repairs carried out by the operator. • The operator is responsible for WIA maintenance. • The IN of the owner differs from the IN of the operator and the IN of the recipient of water and sewerage rates is the same as the IN of the WIA owner.
COMBINED (A COMBINATION OF THE SEPARATE AND MIXED MODEL OF OPERATION)	• The operator operates also a part of WIA covered by its ownership rights, thus incurs depreciation charges of the equivalent WIA value which are included in the water and sewerage rates. • *A WIA lease and operation contract* is concluded between the owner and the operator. • The operator is *responsible* for the quality and efficiency of the WIA operation. The operator is entitled to receive *a reward* for the provided service *in the form of the right to collect* water and sewerage rates. • The IN of the owner differs from the IN of the operator and the IN of the recipient of water and sewerage rates is same as the IN of the operator. In the *Comparisons, the IN of the operator is stated also among the owners of the associated operated infrastructure.*

3.1 Benchmarking of Owners – Calculation of the Actually Achieved Amount of Funds for Renewal in a Breakdown by Model of Operation and Its Sub-groups

As stated above, when assessing the fulfilment of the WIA owner´s obligation to ensure the WIA renewal in accordance with Section 8 (1) of Act No 274/2001 Coll., the project aims to ascertain whether the amount of actually generated funds for renewal equals or exceeds the calculated amount of funds for renewal theoretically needed per year.

The calculation of actually generated funds for WIA renewal in the given year differs in dependence on the applied model of operation and is included in the following table (the numbers correspond with the respective lines in the Comparisons).

MODEL OF OPERATION	CALCULATION OF ACTUALLY GENERATED FUNDS
MIXED	4.1 Depreciation of infrastructure assets + 4.2 Repairs of infrastructure assets* + 4.4 Funds for renewal of infrastructure assets + 13. Negative calculated profit** + 15. Share of positive calculated profit in the development and renewal of infrastructure assets
SEPARATE	4.3 Rental of infrastructure assets + 4.2 Repairs of infrastructure assets* + 15. Share of positive calculated profit in the development and renewal of infrastructure assets
OWNERSHIP (A SUB-GROUP OF THE SEPARATE MODEL OF OPERATION)	4.3 Rental of infrastructure assets + 4.2 Repairs of infrastructure assets* + 15. Share of positive calculated profit in THE development and renewal of infrastructure assets

MODEL OF OPERATION	CALCULATION OF ACTUALLY GENERATED FUNDS
SERVISE CONTRACTS (A SUB-GROUP OF THE SEPARATE MODEL OF OPERATION)	4.1 Depreciation of infrastructure assets + 4.2 Repairs of infrastructure assets* + 4.4 Funds for renewal of infrastructure assets + 13. Negative calculated profit** + 15. Share of positive calculated profit in the development and renewal of infrastructure assets
COMBINED	4.1 Depreciation of infrastructure assets + 4.2 Repairs of infrastructure assets* + 4.3 Rental of infrastructure assets + 4.4 Funds for renewal of infrastructure assets + 13. Negative calculated profit** + 15. Share of positive calculated profit in the development and renewal of infrastructure assets

**Repairs of infrastructure assets* are fully included in the funds for renewal since the MoA has no information on the amount of repairs of renewal nature.

** *Negative calculated profit* decreases the amount of generated funds for renewal.

3.2 Benchmarking of Owners – Renewal and Line 20 Assessment – Funds for Infrastructure Assets Renewal in the Comparisons and Other Aspects Linked to the Benchmarking of Owners and the Potential Use of Data for Monitoring the WIA Renewal

Based on the results of the Benchmarking projects for 2016, targeted communication was launched with the WIA owners who had not generate adequate funds for renewal. Within this communication, they were reminded of the importance of completion of line 20 and its relation to the reporting of the generation of funds for renewal (i.e. the statutory obligation of the WIA owners). The evaluation of their responses revealed that the MoA will have to further concentrate on raising the awareness focusing not only on the WIA renewal in general, but especially on relations between the PFR and line 20 of the Comparisons (Generation and use of funds for infrastructure assets).

Even though compared to the situation in 2016 there was a decline in the number of Comparisons with not completed line 20 (251 Comparisons in water supply systems and 336 in sewerage systems), the existence of different interpretations, methods of calculation and differences in the content of reported data was reconfirmed. The reason behind is mainly the fact that the Decree No 428/2001 Coll. (or the methodological guideline) fails to clearly set the procedure for ascertaining (or calculating) the values reported in line 20 and specify their content. Thus, the data become incomparable and cannot be fully used for the purposes of benchmarking. Another reason for wrong reporting of line 20 can be the poor communication between the owners and the operators, or poor communication between individual organisational branches of the owner in case of the mixed model.

The following tables provide a summary of the numbers of Comparisons in individual groups with a **not completed line 20**. In total, it is 476 Comparisons concerning the drinking water and 666 Comparisons concerning the waste water. The MoA will continue to address these issues.

Water supply systems

GROUP OF COMPARISONS (based on the total value of assests reported in the Selected sata from ownership records)	Number of Comparisons with a not completed line 20	Purchase price of water supply system objects + water treatment plants based on the indicative indicators (mil. CZK)	Billed drinking water total (mil. m^3)
Group II (>1 000 mil. CZK)	3	10 406.93	11.29
Group III (>100 mil. CZK)	28	6 860.77	7.65
Group IV (>10 mil. CZK)	242	7 092.15	7.82
Group V (>1 mil. CZK)	190	1 030.01	1.99
Group VI (<1 mil. CZK)	13	7.41	0.06
Total	**476**	**25 397.27**	**28.81**

Sewerage systems

GROUP OF COMPARISONS (based on the total value of assets reported in the Selected sata from ownership records)	Number of Comparisons with a not completed line 20	Purchase price of sewerage system objects and WWTP in line with the indicative benchmarks (mil. CZK)	Volume of billed waste water including precipitation water (mil. m^3)
Group II (>1 000 mil. CZK)	3	8 568.52	11.97
Group III (>100 mil. CZK)	60	14 319.63	11.25
Group IV (>10 mil. CZK)	456	15 484.63	10.14
Group V (>1 mil. CZK)	139	854.73	1.19
Group VI (<1 mil. CZK)	8	4.51	0.08
Total	**666**	39 232.03	**34.63**

In the light of the issues above concerning the completion of line 20 and a high number of Comparisons with this line not completed, the data reported in line 20 were commented on only in the form of a summary and more detailed analyses of indicators using the data were not carried out.

3.3 Benchmarking of Owners – Indicator "Theoretical Water and Sewerage Rates Covering the Funds for Renewal and Generating Zero Profit"

This indicator expresses the minimum water and sewerage rates necessary to achieve the self-financing capacity of WIA. It provides information on the rates which, with the reported volume of billed water and zero profit, cover the total costs and the potential positive difference between the minimum annual funds for renewal and the actual funds for renewal received from water and sewerage rates. When decisions are made on water and sewerage rates, account shall be taken also of their social acceptability. Since in the Czech Republic the socially acceptable price has so far been announced by the MoE in the framework of the OP Environment as a sum total of water and sewerage rates, it was impossible to review the social acceptability of the theoretical water and sewerage rates covering the funds for renewal and generating zero profit. Only comments on extreme values were provided.

The following table gives an overview of calculation of the Theoretical water and sewerage rates covering the funds for renewal and generating zero profit, which varies in dependence on the model of operation.

Model of Operation	Indicator	Unit	Calculation
Separate model of operation	*Theoretical water and sewerage rates covering the funds for renewal and generating zero profit - separate model*	*CZK/m^3*	*(10 Full costs + positive difference between the minimum funds for WIA renewal and the sum of 4.2 Repairs of infrastructure assets + 4.3 Rental of infrastructure assets) / D. Billed water total*
Mixed model of operation and separate model of operation with service contract	*Theoretical water and sewerage rates covering the fund for renewal and generating zero profit – mixed model or service contract in the separate model*	*CZK/m^3*	*(10 Full costs + positive difference between the minimum funds for WIA renewal and the sum of 4.1 Depreciation + 4.2 Repairs of infrastructure assets + 4.4 Funds for renewal of infrastructure) / D. Billed water total*
Combined model of operation	*Theoretical water and sewerage rates covering the funds for renewal and generating zero profit - combined model*	*CZK/m^3*	*(10 Full costs + positive difference between the minimum funds for WIA renewal and the sum of 4.1 Depreciation + 4.2 Repairs of infrastructure assets + 4.3 Rental of infrastructure assets + 4.4 Funds for renewal of infrastructure) / D. Billed water total*

3.4 Benchmarking of Operators – Selection Procedure of Comparisons Meeting the Defined Criteria

In 2017, in the benchmarking of operators the chapter Optimal Comparisons was renamed Comparisons meeting the defined criteria. It was done in response to the comments raised by professional public on the Benchmarking of operators for 2016. This title better describes the content and possibilities of the assessment of operators based on the submitted reports.

Bellow you will find a description of the procedure for selection of Comparisons meeting the defined criteria which monitor the fulfilment of main objectives of the regulation. One of the most important is the achievement of self-financing capacity of WIA operation, where possible at an adequate price and appropriate quality of provided services. This fact is expressed by the OCF value, price (rate) and water losses, or share of treated waste water.

Criteria monitoring the fulfilment of main objectives of the regulation:

1. 1 ≤ OCF < 1.5

Where no entity in the given group meets the OCF requirement, considered selected will be the Comparison which most closely approximates the OCF requirement.

2. Price (rate)

If the price (rate) coefficient of variation in the group is > 0.2, then the price (rate) of selected Comparisons shall rank from 40% to 60% percentile of the Comparisons meeting the OCF requirement. If the price coefficient of variation in the group is ≤ 0.2, then the price of the selected Comparisons shall oscillate around the average price of the Comparisons meeting the OCF requirement +/- 10 %.

3.1 Water supply systems – non-revenue water (m^3/km/day)

Non-revenue water (m^3/km/day) ≤ average of the group (the average is calculated without the Comparisons with zero non-revenue water in the associated SDOpR).

3.2 Sewerage systems – share of treated waste water (%)

Share of treated waste water ≥ average of the group.

4. Sewerage systems only – unit FCs (CZK/m^3)

Unit FCs ≥ 3.70 CZK (i.e. than 10% percentile of data for the previous year). Note: the data on drinking water do not show a high deviation of the median from 10% percentile.

The values achieved in the Comparisons meeting the objectives of the regulation are visualised by means of a chart, the so-called glyph. This chart illustrates the values of aforementioned criteria and other monitored indicators (hereinafter referred to as the indicators), namely:

Water supply systems

1. Share of generated funds for renewal and development in the value of infrastructure assets.
2. Number of connected inhabitants per 1 employee of the company.
3. Unit FCs.

Sewerage systems

1. Share of generated funds for renewal and development in the value of infrastructure assets.
2. Drained waste water including precipitation water per 1 employee of the company.
3. Unit FCs

The values of indicators and criteria will be calculated and shown as average values of the Comparisons meeting the defined criteria. Apart from these values, the chart will also depict their medians and 10% percentiles calculated for the group. The chart should provide overall information on fulfilling the underlying objectives of the regulator in the group and on the homogeneity of operators in the group in terms of the monitored indicators related to individual Comparisons.

4. Process of Elaborating the Reports on Benchmarking Projects – Data Interlinkage

In accordance with the applicable Benchmarking Methodology, two separate projects were implemented:

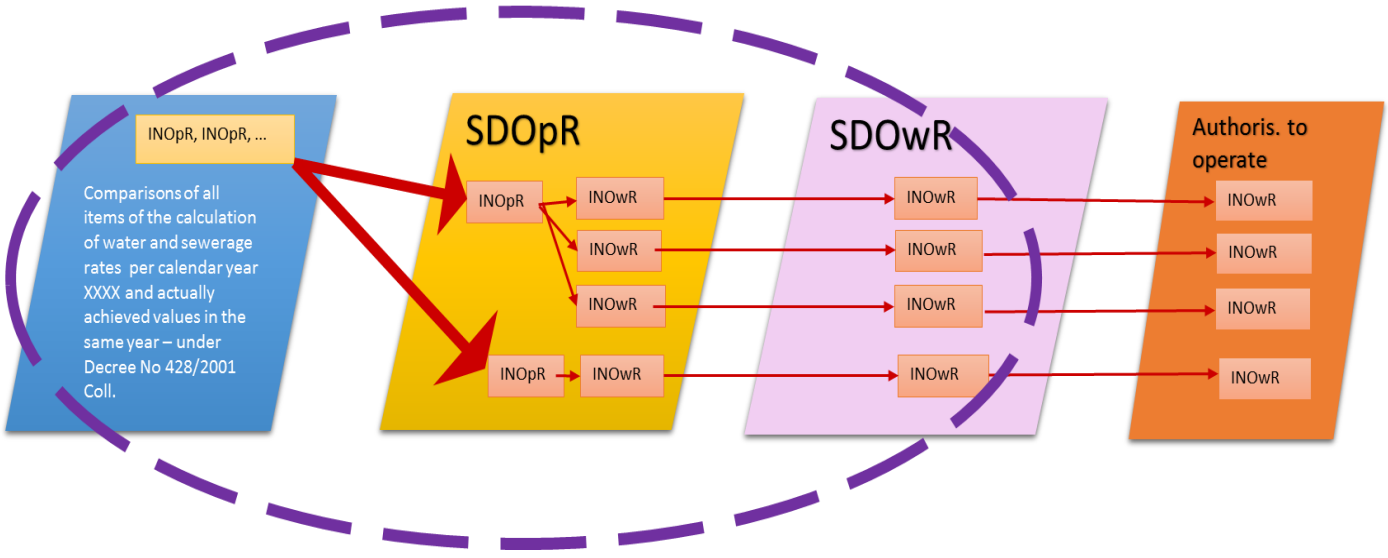
Benchmarking of operators 2017

Benchmarking of owners 2017

The aim was to try to identify anomalies especially in specific entities, or Comparisons, and to map the situation in the sector of water supply and sewerage systems with respect to the fulfilment of the set objectives of the regulation.

The benchmarking projects used the data of 2017. The principle of interlinking the data from the databases of VSVaK (Comparisons), SDOwR and SDOpR was the same as that applied in the benchmarking for 2016. The collection of data was performed under the relevant provisions of Sections 5 and 36 of the Act on Water Supply and Sewerage Systems. The projects included the Comparisons in which the data from the SDOwR, SDOpR and the Comparisons could be clearly identified and interlinked, i.e. where financial information concerning the costs, revenues and the price (rate) was interlinked with the information on particular assets with which the costs and revenues were associated and on their use in the given year.

PRINCIPLE OF INTERLINKING DATA FROM OWNERSHIP AND OPERATING RECORDS AND COMPARISONS OF ALL ITEMS OF THE CALCULATION OF WATER AND SEWERAGE RATES



In pursuit of increasing the reporting value of conclusions of the benchmarking projects, the MoA approached those who compiled 460 Comparisons with wrongly completed data and requested rectification. During the following stage of data preparation, the MoA zeroed in on one hundred largest operators (defined based on the volume of billed water) with whom shortcomings preventing data interlinkage were addressed. This way the share of the analysed market and the number of analysed Comparisons slightly increased as against the previous year.

4.1 Overview of the Number of Cleaned Data

In 2017, both the projects included 1 697 Comparisons for drinking water, i.e. 88.29 % of the total number of 1 922 Comparisons submitted to the MoA and 2 005 Comparisons for sewerage systems, i.e. 89.83 % of the total number of 2 232 received Comparisons.

As to the **share in the market in terms of the volume of billed water, 97.50 % of the drinking water market** and **97.79 % of the waste water market** was analysed (see the table below).

DRINKING WATER	A total of 1922 consumer Comparisons	1697 consumer Comparisons **were included** in the project	WASTE WATER	A total of 2232 consumer Comparisons	2005 consumer Comparisons **were included** in the project
Billed drinking water in mil. m^3	473.197	461.355	Waste water drained to the sewer network – including precipitation water in mil. m^3	510.805	499.502

As shown by the data stated in the following tables, the number of Comparisons included in the benchmarking has been on an increase.

DRINKING WATER	Comparisons submitted to the MoA (pcs)	Comparisons included in the benchmarking (pcs)	Comparisons not used (pcs)	Share in the market
2017	1922	1697	225	97.50 %
2016	1820	1582	238	95.23 %
2015	1818	1371	447	33.39 %

WASTE WATER	Comparisons submitted to the MoA (pcs)	Comparisons included in the benchmarking (pcs)	Comparisons not used (pcs)	Share in the market
2017	2232	2005	227	97.79%
2016	2051	1857	194	92.59 %
2015	1936	1437	499	33.69 %

4.2 Reasons Preventing the Use of Data in the Benchmarking

When interlinking the data from databases (Comparisons. Selected data from ownership and operating records), ten deficiencies were identified which make the interlinkage of the data in line with the procedure above impossible (see the scheme in the introduction to Chapter 4.).

For simplification purposes, the deficiencies were classified into five categories (see the table below). The highest number of Comparisons was eliminated due to reasons related to the Identification number of operating records. Either Identification number of operating records (INOpR) in the SDOpR lacked the matching Identification number of ownership records (INOwR) in the SDOwR, or the INOpR stated in the Comparison lacked INOpR in the SDOpR, which made it impossible to interlink the data from the SDOpR and SDOwR with the Comparison concerned. The closing part of both the benchmarking projects comprises a list of all the eliminated Comparisons and the reason for their elimination from benchmarking.

4.2.1 Water supply systems

Of the total number of 1 922 Comparisons. 225 Comparisons (i.e. 11.71 %) were eliminated. Most frequently (i.e. in 91.11 %) it was because of the failure to submit the SDOpR matching some of the INOpR stated in the Comparison.

Reason for elimination of the Comparison -WATER SUPPLY SYSTEMS	Number of Comparisons eliminated from the Benchmarking 2017
Wrong reporting	3
Assigned INOwR is not in SDOwR	2
INOpR included is not in SDOpR	205
Non existent INOpR of the water supply system	15
Total	**225**

4.2.2 Sewerage systems

In the case of the sewerage systems, of the total number of 2 232 Comparisons 227 comparisons (i.e. 10.17 %) were eliminated. Again, the most frequent deficiency (79.90 %) was a different number of INOpR stated in the Comparisons and the number of INOpR od the given operator submitted within the SDOpR.

Reason for elimination of the Comparison – SEWERAGE SYSTEMS	Number of Comparisons eliminated from the Benchmarking 2017
Extremely low billed volume	36
Wrong reporting	3
Assigned INOwR is not in SDOwR	3
INOpR included is not in SDOpR	155
Non-existent INOpR of the sewerage system	30
Total	**194**

In both the water supply and sewerage systems, the most frequent deficiency preventing the inclusion of the Comparison in further analyses is the missing SDOpR matching the INOpR stated in the Comparison.

4.3 Classification of Comparisons into the Groups of Owners and Operators

The classification of the analysed Comparisons into groups was made in line with the procedure laid down in the Benchmarking Methodology. The number of Comparisons in the respective groups of benchmarking of owners and operators are given in the following tables.

4.3.1 Groups in the Benchmarking of owners

The Benchmarking of owners classifies the Comparisons into groups based on the value of WIA calculated in line with the Methodological Guideline of the Ministry of Agriculture Ref. No: 401/2010-15000. The owners, whose assets are stated in multiple Comparisons, may be included in multiple groups, namely also several times.

DRINKING WATER Classification of Comparisons into groups	Representation by model of operation				
Group / Model of operation	Number of Comparisons in the group	COMBINED	SEPARATE	SEPARATE WITH SERVICE CONTRACT	MIXED
Group I (>10 000mil.CZK)	3	1	2		
Group II (>1 000mil.CZK)	42	21	21		
Group III (>100mil.CZK)	138	13	103	2	20
Group IV (>10mil.CZK)	929	16	468	81	364
Group V (>1mil.CZK)	560	4	171	69	316
Group VI (<1mil.CZK)	25		5	4	16
Total	**1 697**	**55**	**770**	**156**	**716**

SEWERAGE SYSTEMS Classification of Comparisons into groups	Representation by model of operation				
Group / Model of operation	Number of Comparisons in the group	COMBINED	SEPARATE	SEPARATE WITH SERVICE CONTRACT	MIXED
Group I (>10 000mil.CZK)	**5**	3	2		
Group II (>1 000mil.CZK)	**47**	20	26	1	
Group III (>100mil.CZK)	**289**	34	170	10	75
Group IV (>10mil.CZK)	**1 355**	18	423	91	823
Group V (>1mil.CZK)	**295**		27	34	234
Group VI (<1mil.CZK)	**14**		1		13
Total	**2 005**	**75**	**649**	**136**	**1 145**

4.3.2 Groups in the Benchmarking of operators

The Benchmarking of operators classifies the Comparisons based on the number of connected inhabitants. The operators who operate the assets of various owners (i.e. concluded several contracts on lease and operation of assets of water supply and sewerage systems) may be included in multiple groups, namely also several times.

DRINKING WATER Classification of the Comparisons into groups	Representation by model of operation				
Group / Model of operation	Number of Comparisons in the group	COMBINED	SEPARATE	SEPARATE WITH SERVICE CONTRACT	MIXED
Group I (>500 000 con. inhab.)	**3**	1	2		
Group II (>200 000 con. inhab.)	**3**		3		
Group III (>100 000 con. inhab.)	**12**	8	4		
Group IV (>50 000 con. inhab.)	**19**	8	11		
Group V (>10 000 con. inhab.)	**48**	11	33	1	3
Group VI (>1 000 con. inhab.)	**347**	16	242	8	81
Group VII (>300 con. inhab.)	**575**	7	260	52	256
Group VIII (<300 con. inhab.)	**690**	4	215	95	376
Total	**1 697**	**55**	**770**	**156**	**716**

SEWERAGE SYSTEMS Classification of the Comparisons into groups	Representation by the model of operation				
Group / Model of operation	Number of Comparisons in the group	COMBINED	SEPARATE	SEPARATE WITH SERVICE CONTRACT	MIXED
Group I (>500 000 con. inhab.)	2		2		
Group II (>200 000 con. inhab.)	3	3			
Group III (>100 000 con. inhab.)	10	6	4		
Group IV (>50 000 con. inhab.)	16	7	9		
Group V (>10 000 con. inhab.)	53	14	34	2	3
Group VI (>1 000 con. inhab.)	468	29	245	15	179
Group VII (>300 con. inhab.)	774	11	238	52	473
Group VIII (<300 con. inhab.)	679	5	117	67	490
Total	2005	75	649	136	1 145

5. Benchmarking of Owners 2017

5.1 Objective of the Report

The subject matter of the Benchmarking of Owners project are primarily the matters concerning renewal, or monitoring the behaviour of the WIA owners with respect to the fulfilment of the objective of the regulation – achieving the self-financing capacity of WIA.

The underlying objective of the project was to identify anomalies in particular entities (or the Comparisons). The project monitors mainly the ability of WIA owners to generate adequate funds for WIA renewal through water and sewerage rates. For each Comparison, the theoretical water and sewerage rates were calculated which with the reported billed volume of water and zero profit cover the costs and the minimum theoretical amount of funds for renewal. Since the MoE does not set the socially acceptable water and sewerage rates separately, it was impossible to evaluate the social acceptability of rates calculated in such a manner.

5.2 Practical Use of Results of the MoA Benchmarking for 2016 to Fulfil the Objective of Achieving the Self-financing Capacity of WIA

Based on the results of the Benchmarking of owners 2016, the MoA sent, to the WIA owners in whom the anomaly of inadequate generation of funds for renewal from water and sewerage rates was clearly identified with account taken of the values given in line 20. a written "Notice to the owners of water supply and sewerage systems" with information on the potential risk of inadequate generation of funds for renewal of water supply and sewerage systems. In total, approximately 1900 owners had been contacted, of which 69 provided a written explanation or an opinion. The most frequent reason for the anomaly identified in the data for 2016 was a problem regarding the reporting of data in line 20. – Generation and use of funds for renewal in the Comparisons. Another frequently stated reason (62 replies) was the compliance with the price curve defined by the OPE. Yet another explanation consisted in the decision of the municipality not to collect sewerage charges for disposal of waste water and precipitation water by sewers directly discharged into a natural stream or river. The evaluation of replies sent by the contacted owners confirmed again that small entities, in particular, have poor knowledge of matters regarding the renewal and that majority of approached entities has poor understanding of the system of reporting the data on WIA renewal in the Comparisons, or that they can misinterpret the rules for providing support from the OPE.

The following table includes a breakdown of the number of approached WIA owners by the region.

Water/sewerage	Sewerage		Water		Total	
Region	Lacking funds for renewal of assests in thousand CZK	Number of owners	Lacking funds for renewal of assests in thousand CZK	Number of owners	Lacking funds for renewal of assests in thousand CZK	Number of owners
City of Prague	2 493.48	5	927.21	4	**3 420.69**	**6**
Karlovy Vary Region	5 212.25	9	1 049.85	3	**6 262.10**	**11**
Ústí nad Labem Region	8 781.82	22	3 565.98	15	**12 347.80**	**31**
Liberec Region	5 566.21	16	6 171.62	27	**11 737.84**	**35**
Zlín Region	40 706.68	99	6 829.61	27	**47 536.29**	**109**
Pardubice Region	32 763.17	81	6 587.32	51	**39 350.49**	**111**
Hradec Králové Region	30 398.77	98	18 737.33	70	**49 136.10**	**134**
Moravia-Silesia Region	90 224.88	109	19 525.94	42	**109 750.82**	**135**
South Moravian Region	37 803.17	116	14 840.55	64	**52 643.72**	**150**
Olomouc Region	59 955.48	121	24 438.31	60	**84 393.79**	**151**
Pilsen Region	56 490.98	146	39 477.18	152	**95 968.16**	**212**
Vysočina Region	51 698.07	166	48 489.91	140	**100 187.98**	**219**
South Bohemian Region	94 079.01	222	47 470.46	252	**141 549.46**	**316**
Central Bohemian Region	124 154.24	249	53 219.81	208	**177 374.05**	**333**
Total	640 328.20	1459	291 331.08	1115	**931 659.28**	**1953**

The next assessment of the generation of funds for renewal will be carried out by the MoA in 2020 using the received data for 2019, after the already approached owners had the opportunity to respond to the notice by potential modification of water and sewerage rates or by improved reporting of values in line 20 in the Comparisons, or by the use of other sources than water and sewerage rates.

5.3 Identified Anomalies

Identification of anomalies occurring in individual Comparisons forms an important component of the assessment of the situation in the field of water supply and sewerage systems. The report should, based on the identified anomalies, provide basic information on what the regulator shall focus on when creating and managing conditions for functioning of water supply and sewerage systems in order to achieve the long-term objectives of the regulation. These objectives consist mainly in achieving the self-financing capacity of WIA and the balance between the price of services and the costs of service provision. In this respect, in line with the applicable legislation the statutory obligations are borne especially by the WIA owner. The list of identified anomalies is included in Chapter 1.1.3.

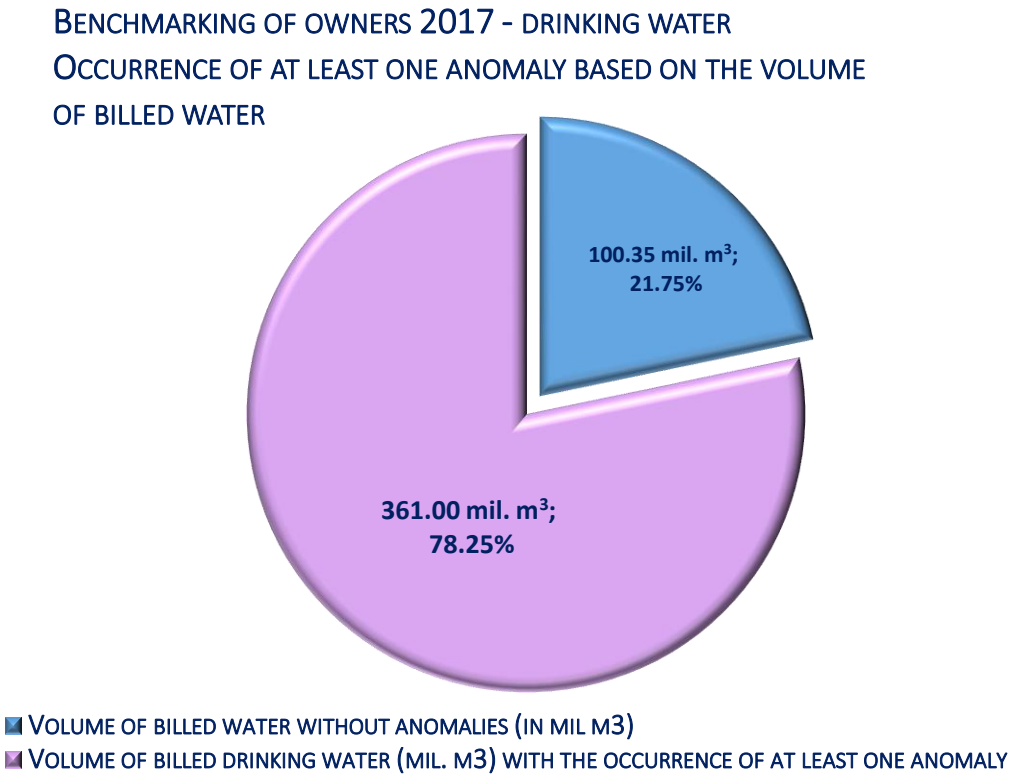
In order to assess the rate of fulfilment of the referred to objectives of the regulation, mainly the ability to generate funds for WIA renewal by water and sewerage rates was evaluated. In order for the owners to ensure the WIA renewal, they should, in dependence on the applied model of operation, focus primarily on proper price setting. The price (rate) should include all the associated economically justified costs in full, especially the rental (in case of the separate and combined model of operation). WIA depreciation, repair costs, funds for renewal (the amount is defined by the plan for financing the renewal for the given year. line 4.4 of the Comparisons) and the calculated profit (calculation in line with the price assessment of the MoF).

A more detailed specification of anomalies and assessment of the frequency of their occurrence is provided separately for water supply and sewerage systems.

5.3.1 Water supply systems

In the Benchmarking of owners, in the part covering the water supply systems. 1 697 Comparisons were assessed which represented 97.5% of the market determined based on the volume of the billed drinking water (i.e. 473.197 mil. m^3). All in all, at least one anomaly is present in 96.11 % of the total number of analysed Comparisons, i.e. in 1 631 Comparisons.

The chart blow illustrates the occurrence of at least one anomaly based on the market share. In terms of the volume of billed drinking water, no anomalies were identified in 21.75 % of the analysed market. It concerns 100.35 mil. m^3 of the billed water.



One of the main objectives of the regulation is to achieve self-financing capacity in the field of water supply and sewerage systems. That is why a part of the analysis of the Benchmarking of owners focused on identifying the facts that indicate the non-fulfilment of this objective. The individual Comparisons were assessed as to whether the setup of the business relationship between the owner. the operator and the customer (with account taken of the applied model of operation and use of the statutory tools such as the calculated profit and the possibility to include the funds for renewal in price calculation) makes it possible for the WIA owner to generate funds for WIA renewal in the theoretically adequate minimum amount.

The following table gives the frequency of occurrence of identified anomalies in the analysed Comparisons. Apart from anomalies associated with inadequate generation of funds for renewal, or suggesting an unbalanced business relationship between the owners and the operators, anomalies were identified that reveal the poor condition of WIA. Newly explored was also the share of the calculated profit to be distributed in the FCs, i.e. what part of the revenues will the recipient of water rates be able to use as a remuneration for doing business, or to cover the economically justified costs. For now, the value of the given indicator was

assessed in relation to 1.5 times the median of the indicator in the group from the Comparisons with positive calculated profit. Also examined was the number of Comparisons in which the owner reckoned on subsidising the operation already when calculating the water rates, or WIA renewal, i.e. whether the owner planned a negative calculated profit. In this context, also those Comparisons were identified which did not reckon with a negative calculated profit, but actually reported it, i.e. the financial result of the provision of drinking water supply service was a loss caused by unforeseeable circumstances.

ANOMALY	FREQUENCY OF OCCURRENCE	VOLUME OF IDENTIFIED ANOMALY	% SHARE OF THE ANALYSED MARKET (461.35 MIL.M3)
HIGH FAILURE RATE (COMPARISONS WITH FAILURE RATE/KM (VOM01) HIGHER THAN 1.5 TIMES THE MEDIAN OF THE GROUP WITHOUT COMPARISONS WITH ZERO FAILURE RATE)	324	201.54	43.68%
HIGH SHARE OF THE CALCULATED PROFIT TO BE DISTRIBUTED IN FCs (COMPARISONS WITH THE SHARE OF PROFIT TO BE DISTRIBUTED HIGHER THAN 1.5 TIMES THE VALUE OF THE MEDIAN OF THE GROUP FROM COMPARISONS WITH POSITIVE PROFIT AND SHARE OF PROFIT TO BE DISTRIBUTED IN FCs >0)	644	122.07	26.46%
HIGH SHARE OF THE PROFIT IN FCs (VALUE HIGHER THAN 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITH POSITIVE CALCULATED PROFIT)	139	120.68	26.16%
HIGH WATER LOSSES PER 1 KM OF CONVERTED LENGTH OF WATER MAINS PER DAY (M3/KM)/DAY (90% PERCENTIL OF THE INDICATOR OF ANALYSED COMPARISONS MONITORING NON-REVENUE WATER AND LOSSES)	74	102.00	26.46%
INADEQUATE GENERATION OF FUNDS FOR WIA RENEWAL	1313	52.98	11.48%
RENTAL IS LESS THAN OR EQUAL TO ZERO IN THE SEPARATE (WITHOUT SERVICE CONTRACTS) OR COMBINED MODEL	147	30.76	6.67%
HIGH VALUE OF NON-REVENUE WATER PER KM OF CONVERTED LENGTH IN M3/KM/DAY EXCEEDS 90% PERCENTIL OF THE INDICATOR OF ANALYSED COMPARISONS MONITORING NON-REVENUE WATER AND LOSSES	97	29.07	6.30%
ZERO VALUE IN LINE 20	476	28.81	6.24%
NEGATIVE CALCULATED PROFIT	817	28.73	6.23%
POSITIVE OR ZERO PROFIT CALCULATED AND NEGATIVE PROFIT ACHIEVED	499	22.70	4.92%
OCF > 1 AND RENEWAL IS NOT ACHIEVED	113	8.10	
NEGATIVE CALCULATED PROFIT CALCULATED AND ACHIEVED	318	6.02	1.31%
0 FAILURE RATE + REPAIRS HIGHER THAN AVERAGE REPAIR COSTS PER FAILURE IN THE GROUP (AVERAGE IS CALCULATED WITHOUT COMPARISONS WITH 0 FAILURES, AS THE ARITHMETIC MEAN OF VOM02 INDICATOR)	150	5.46	1.18%
ZERO LOSSES	260	4.76	1.03%
OTHER THAN ZERO FAILURE RATE AND ZERO REPAIR COSTS	110	2.73	0.59%
HIGH WATER RATE (VALUE HIGHER THAN 1.5 TIMES THE AVERAGE WATER RATE FROM COMPARISONS WITH OCF FROM 1 TO 1.5; ACHIEVEMENT OF RENEWAL)	44	2.03	0.44%
RENTAL IS GREATER THAN ZERO IN THE MIXED MODEL OR SEPARATE MODEL WITH SERVICE CONTRACT	38	1.32	0.29%
ZERO DEPRECIATION + ZERO REPAIRS + 4.4 IN THE MIXED OR COMBINED MODEL	68	0.70	0.15%
FREQUENCY OF OCCURRENCE OF ANOMALIES TOTAL	5631		

The table also shows that the most important anomaly in terms of the volume of billed water is the **high failure rate per 1 km of distribution network**. This anomaly concerns 201.54 mil. m^3 of billed water, it occurred in 324 Comparisons and gives attests to the technical condition of the distribution network. The reporting value of the indicator of the failure rate per km of distribution network has been reduced by shortcomings in reporting. Zero failure rate was reported in the SDOpR related to 657 Comparisons (i.e. 38.72 % of the

analysed Comparisons). Moreover, potential effects of a non-uniform interpretation of the term failure shall be highlighted as well as the fact that the introduction of state-of-the-art failure detection technologies used mainly by large operators' results in a higher number of reported failures, but improvements in the quality of care for WIA. Therefore, the interpretation of a high failure rate is unambiguous either. The anomaly concerned was stated as the most significant one also in the previous year.

Interesting is also the finding that based on the volume of billed water there are significant anomalies in the **share of the profit in FCs** and the **share of the profit to be distributed in FCs (i.e. the profit to be used as a remuneration for conducting business. or to cover the economically justified costs).** The limit value of the indicator of the share of calculated profit to be distributed in FCs used to identify anomalies has been set as the value higher than 1.5 times the value of the median from the Comparisons with positive calculated profit and positive share of calculated profit in FCs. The anomaly of a high share of calculated profit to be distributed in FCs was identified in 644 Comparisons which represent 26.46% share of the analysed market (i.e. 122.068 mil. m^3 of billed water). Or to put it differently, in more than a quarter of the market the profit of the recipient (intended for other purposes than WIA renewal and development) from water rates can be considered above the average compared to the others in the group. In many cases, the operator, the WIA owner and the recipient of water rates is the same entity or they are proprietarily interconnected. Thus, it is primarily the WIA owner who makes the decision on the use of the profit and can either use it to cover the costs of WIA renewal and development, or to cover economically justified costs or to finance other needs.

The other two major anomalies provide additional information on the condition of the assets and the systematic care of the owner for the assets. The first anomaly is **high water losses per 1 km of converted length of water main per day**. In the analysed data set, this anomaly was identified in 74 cases and affects 22.11% share of the analysed market (i.e. 102.00 mil. m^3 of billed water). The second anomaly is **high value of non-revenue water per 1 km of converted length of water main per day, which affected** 6.30% share of the analysed market. 260 Comparisons (i.e. 1.03% share of the analysed market) revealed that **zero water losses** were reported by the related SDOpR. Thus, again lots of small owners in particular fail to pay proper attention to systematic care for the technical condition of WIA, or neglect the monitoring and measuring of the data submitted in SDOpR. The highest frequency of occurrence of this anomaly is in group V where zero water losses were reported by 159 Comparisons.

In terms of frequency of occurrence, the most frequent anomaly is **inadequate generation of funds for renewal** (1 313 Comparisons. i.e. 11.48% share of the analysed market; 52.983 mil. m^3 of billed water). This anomaly is directly linked to a high occurrence of other two anomalies, namely the zero value in **line 20** (476 Comparisons. i.e. 6.24% share of the analysed market; 28.808 mil. m^3 of billed water), which can attest to the fact that the WIA owners fail to monitor the generation and use of funds for renewal, and the **negative calculated profit** (817 Comparisons. 6.23% share of the analysed market; 28.73 mil. m^3 of billed water). The owners use the negative calculated profit to reduce the water rate. Hence, they lose one of the possibilities to generate funds for renewal of WIA through water rates. Apart from using the negative calculated profit, the reason behind the inadequate generation of funds for renewal is also an improper set-up of business relationship between the WIA owner and operator. This issue can be foreseen in 147 Comparisons (i.e. 6.67 % of the analysed

market; 30.756 mil. m^3 of billed water) with **rental less than or equal to zero in the separate or combined model** and in 113 Comparisons (1.76% share of the analysed market; 8.098 mil. m^3 of billed water), which report the value of **OCF higher than 1** (i.e. the water rate covers the FCs as well as the shortage of funds for renewal), **but do not report adequate generation of funds for renewal.** Matters regarding the interrelation between the inadequate generation of funds for renewal and the negative calculated profit are specified in the text below.

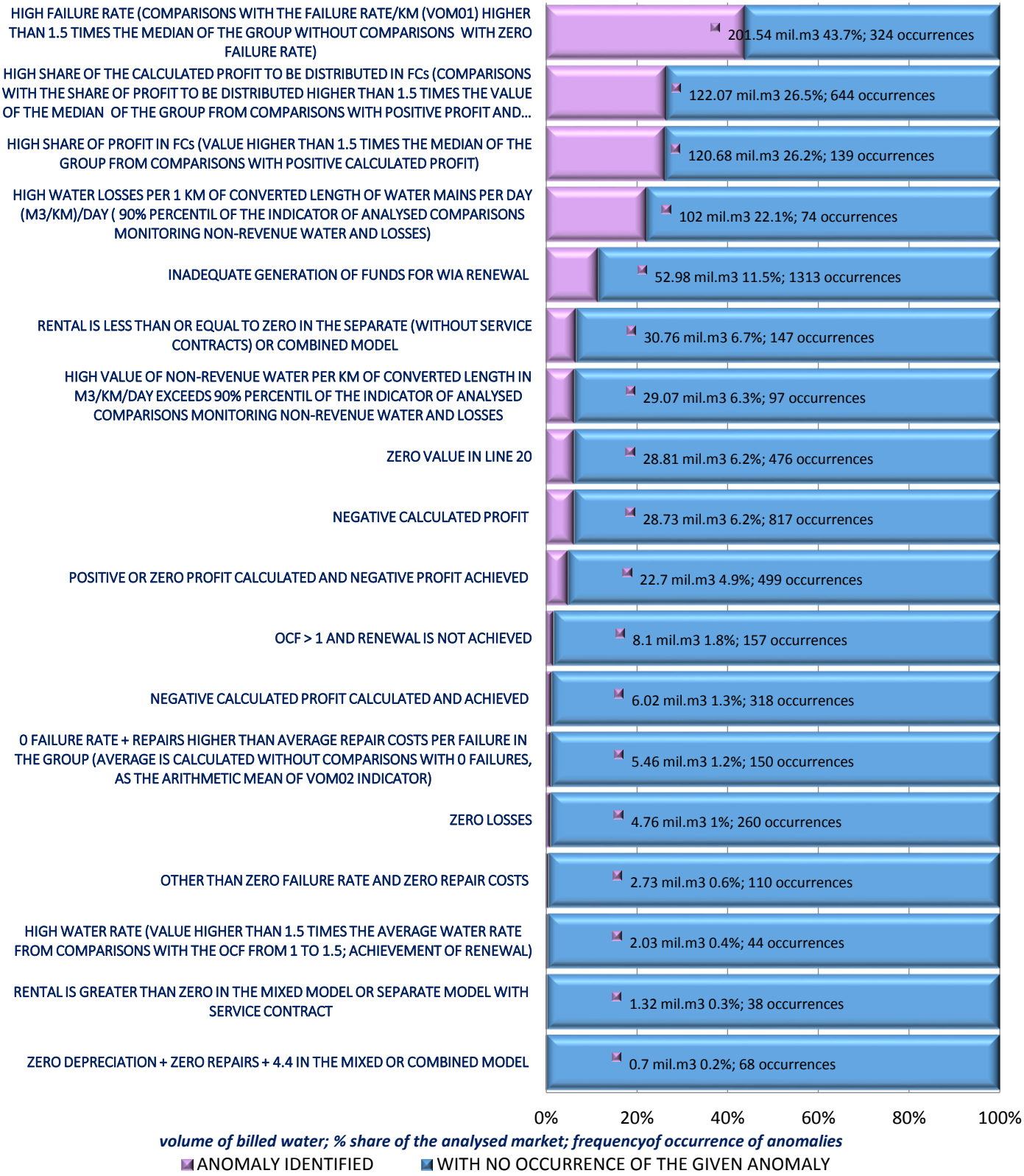
The other monitored anomalies affect a smaller share of the market and point mainly to deficiencies in the submitted data.

In the light of the aforementioned facts, it may be stated that when setting the water rates and negotiating the rental the WIA owners do not pursue the objective of achieving the infrastructure self-financing capacity, often fail to report information on the generation of funds for renewal and their use, and commonly use the negative calculated profit when setting the final consumer price.

The following chart includes the individual anomalies.

OCCURRENCE OF ANOMALIES IN RELATION TO THE VOLUME OF BILLED DRINKING WATER [MIL.M^3]
BENCHMARKING OF OWNERS 2017 - WATER SYSTEMS

1. total market size based on Comparisons 473.197 mil. m^3
2. size of the analysed part of the market 461.355 mil. m^3



5.3.2 Inadequate generation of funds for renewal

The most frequent anomaly with respect to drinking water is just like in the previous years the **inadequate generation of funds for renewal**. The total amount of lacking funds for WIA renewal equals 460.21 mil. CZK. The total revenues generated from water rates in 2017 amounted to 17.8 billion CZK. In order to ensure the minimum theoretical amount of funds for renewal, the revenues generated from water rates should be higher by the amount equalling the lacking funds for renewal (i.e. by 2.5 %). On the basis of the analysed Comparisons, with the application of simplified calculation there is a shortage of funds for renewal in the amount of 1 CZK per 1 m^3 of billed water.

The overview of the amount of lacking funds for renewal in mil. CZK in a breakdown by the model of operation and the group of owners is included in the following table.

LACKING FUNDS FOR RENEWAL OF ASSETS (UP TO THE MINIMUM THEORETICAL VALUE OF FUNDS NECESSARY FOR RENEWAL) (MIL. CZK)/ MODEL OF OPERATION	COMBINED	SEPARATE	SEPARATE WITH SERVICE CONTRACT	MIXED	TOTAL FOR INDIVIDUAL GROUPS
Group I (>10 000 mil. CZK)	0.00	0.00	0.00	0.00	0.00
Group II (>1 000 mil. CZK)	36.88	83.75	0.00	0.00	120.64
Group III (>100 mil. CZK)	21.76	71.12	0.86	32.94	126.68
Group IV (>10 mil. CZK))	5.46	90.70	22.14	68.37	186.66
Group V (>1 mil. CZK)	0.07	8.36	3.73	13.95	26.10
Group VI (<1 mil. CZK)	0.00	0.05	0.01	0.07	0.13
TOTAL FOR INDIVIDUAL MODELS OF OPERATION	64.17	253.98	26.74	115.32	460.21

The issue of inadequate generation of funds for renewal does not necessarily have to be addressed in owners classified into the first group of owners. The table reveals that in 2017 the highest amount of funds for renewal was lacking in group of owners IV (in 769 Comparisons. i.e. 82.7 % of Comparisons in the group). In terms of the model of operation, the largest volume of funds for renewal is missing in Comparisons representing the separate model of operation.

The following tables compare in individual groups of owners the average values of OCF indicators, water rates and unit FCs in the Comparisons with adequate generation of funds for renewal and in entities with inadequate generation of funds for renewal. The average value of OCF in entities with inadequate generation of funds for renewal is below 1 (from 0.63 to 0.75), which points at an improperly set water rate. This rate does not correspond to the unit FCs associated with service provision. This is also confirmed by the fact that with the exception of groups II and III the average water rate is lower than the average unit costs. On the other hand, in the Comparisons with adequate generation of funds for renewal the average value of OCF in individual groups is higher than 1, i.e. the revenues generated from water rates in 2017 covered the FCs and the necessary amount of funds for renewal.

ADEQUATE MINIMUM GENERATION OF FUNDS					
GROUP OF OWNERS	NUMBER OF COMPARISONS	AVERAGE VALUE OF OCF	AVERAGE WATER RATE (CZK/M3)	AVERAGE VALUE OF UNIT COSTS (CZK/M3)	AVERAGE THEORET. RATE TO FULFILL THE RENEWAL REQUIREMENT AND GENERATING ZERO PROFIT (CZK/M3)
GROUP I (>10 000MIL.CZK)	3	1.17	39.95	34.47	34.47
GROUP II (>1 000MIL.CZK)	38	1.08	38.95	36.23	36.30
GROUP III (>100MIL.CZK)	60	1.05	36.97	35.67	35.67
GROUP IV (>10MIL.CZK)	160	1.02	36.42	38.07	38.15
GROUP V (>1MIL.CZK)	114	1.00	36.53	38.63	38.79
GROUP VI (<1MIL.CZK)	9	1.11	43.13	41.92	41.92
TOTAL	**384**	**1.03**	**36.97**	**37.74**	**37.83**

INADEQUATE MINIMUM GENERATION OF FUNDS						
GROUP OF OWNERS	NUMBER OF COMPARISONS	AVERAGE VALUE OF OCF	AVERAGE WATER RATE (CZK/M3)	AVERAGE VALUE OF UNIT COSTS (CZK/M3)	AVERAGE THEORET. RATE TO FULFILL THE RENEWAL REQUIREMENT AND GENERATING ZERO PROFIT (CZK/M3)	AVERAGE AMOUNT OF LACKING FUNDS FOR WIA RENEWAL PER 1M3 OF BILLED DRINKING WATER (CZK/M3)
GROUP I (>10 000MIL.CZK)						
GROUP II (>1 000MIL.CZK)	4	0.63	35.60	31.93	139.27	106.89
GROUP III (>100MIL.CZK)	78	0.75	33.66	32.96	153.47	121.44
GROUP IV (>10MIL.CZK)	769	0.68	29.15	35.03	50.00	18.21
GROUP V (>1MIL.CZK)	446	0.63	26.08	41.58	81.54	42.70
GROUP VI (<1MIL.CZK)	16	0.74	24.92	89.69	132.95	43.95
TOTAL	**1 313**	**0.67**	**28.34**	**38.22**	**117.98**	**82.71**

The issue of inadequate generation of funds for renewal can be addressed by the owner through the use of line 4.4 in the Comparisons in connection with a carefully elaborated PFR (provided it corresponds with the plan of repairs and investments of renewal nature and the price regulations are not violated), modification of the amount of calculated profit set in the water rate calculation, increased repair costs and their inclusion in the water rate (which would especially in small owners mean an improvement in the quality of care for WIA). In the case of separate and combined model of operation, the generation of funds for WIA renewal would increase especially through appropriate increase of the WIA rental. The WIA owners shall realise that if they fail to generate sufficient funds for WIA renewal, they will have to draw the lacking funds from other sources or transfer this obligation to future generations.

An important component of the owners´ price policy is the calculated item of the water rate – **calculated profit**. It has been ascertained that the Comparisons which *do not generate an adequate minimum amount of funds for renewal* often include a *zero or a negative value of calculated profit*.

Of 1 697 analysed Comparisons, in 817 cases (i.e. 48.14 % of Comparisons) there is a negative value of calculated profit. In terms of the volume of billed drinking water it concerns 28.73 mil. m^3. In 139 Comparisons (14.08 mil. m^3 of billed water), the set water rate was sufficient to generate an adequate amount of funds for renewal on condition that the Comparisons contained all the economically justified costs associated with the production and distribution of drinking water to customers in full.

The given values concerned the actually achieved calculated profit. An interesting piece of information is the *planned calculated profit* stating whether the owners reckoned with the negative calculated profit already when calculating the water rate. These are cases when the owners have reckoned from the very beginning with *subsidised costs of provided services*. This fact was discovered in *318 Comparisons (6.02 mil. m^3 of billed water; 1.31% market share)*, most frequently in the groups of owners IV and V. The following table includes the distribution of the use of negative calculated profit by group.

	Negative calculated profit per Comparison		Planned water rate subsidy		Loss incurred	
Group of owners	Number of Comparisons – negative calculated profit	Volume of billed water in mil. m^3 – negative calculated profit	Number of Comparisons – negative profit calculated and negative profit achieved	Volume of billed water in mil. m^3 – negative profit calculated and negative profit achieved	Number of Comparisons – positive or zero profit calculated and negative profit achieved	Volume of billed water in mil. m^3 – positive or zero profit calculated and negative profit achieved
Group I (>10 000mil.CZK)	0	0.00	0	0.00	0	0.00
Group II (>1 000mil.CZK)	3	4.27	1	0.00	2	4.27
Group III (>100mil.CZK)	33	8.94	4	1.40	29	7.54
Group IV (>10mil.CZK)	447	12.78	169	3.53	278	9.25
Group V (>1mil.CZK)	319	2.66	140	1.09	179	1.58
Group VI (<1mil.CZK)	15	0.08	4	0.01	11	0.07
TOTAL	**817**	**28.73**	**318**	**6.02**	**499**	**22.70**

The reason why the owners opt for the planned subsidy of the rate is especially an effort to maintain the water rate at a certain level. Where the owner is forced to subsidise the price (rate) in order for it to be socially acceptable, this may happen in consequence of high market atomization (i.e. the owner bills a far too low volume of water to be able to achieve the economies of scale). In a long-term perspective, however, this approach prevents the fulfilment of the objective of achieving the WIA self-financing capacity and increases the risk of burdening the future generations with expenditure on WIA renewal either in the form of state subsidies or water rate hikes if the WIA owner fails to systematically care for the WIA and finance the WIA from other income.

5.3.3 Occurrence of anomalies in individual groups of owners

In terms of the number of anomalies occurring in individual groups, the most challenging seems to be the group IV. In this group in 96.45 % of Comparisons at least

one anomaly was identified (in 896 of 929 Comparisons in the group). In terms of the billed drinking water, in all the groups more than 60 % of the volume of billed drinking water was affected by at least one anomaly. Even in the case of groups V and VI, the total volume of billed water is affected by at least one anomaly.

GROUP	% SHARE OF THE VOLUME OF BILLED DRINKING WATER WITH THE OCCURRENCE OF AT LEAST ONE ANOMALY	VOLUME OF BILLED FRINKING WATER (MIL. M^3) WITH THE OCCURRENCE OF AT LEAST ONE ANOMALY	VOLUME OF BILLED WATER IN THE GROUP	FREQUENCY OF OCCURRENCE OF ANOMALIES
GROUP VI (<1 MIL. CZK)	100,00%	0,156	0,156	105
GROUP V (>1 MIL. CZK)	99,99%	5,471	5,471	2 352
GROUP IV (>10 MIL. CZK)	91,74%	29,267	31,901	2 788
GROUP II (>1 000 MIL. CZK)	83,59%	168,322	201,376	66
GROUP III (>100 MIL. CZK)	75,17%	43,492	57,855	316
GROUP I (>10 000 MIL. CZK)	69,44%	114,294	164,596	4
TOTAL	**78,25%**	**361,000**	**461,355**	**5 631**

The following table specifies in more detail the anomalies and their distribution in groups, in which the occurrence of anomalies exceeded the total number of one hundred. It concerns the groups of owners III. IV. V and VI. These four groups supply more than 2.14 mil. inhabitants with drinking water. They are supplied through water mains of the total converted length of 14.9 thousand km and the value of WIA according to the SDOwR equals 69.4 billion CZK.

ANOMALY NOTE: VOLUME OF BILLED WATER TOTAL 461.35 MIL. M3	Group III (>100 mil. CZK) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED DRINKING WATER (MIL.M3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP III	Group IV (>10 mil. CZK) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED DRINKING WATER (MIL.M3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP IV	Group V (>1 mil. CZK) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED DRINKING WATER (MIL.M3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP V	Group VI (<1mil. CZK) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED DRINKING WATER (MIL.M3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP VI
VOLUME OF BILLED WATER IN THE GROUP IN MIL. M3		57.85		31.9		5.47		0.16
INADEQUATE GENERATION OF FUNDS FOR WIA RENEWAL	78	17.85	769	21.48	446	3.38	16	0.07
NEGATIVE CALCULATED PROFIT	33	8.94	447	12.78	319	2.66	15	0.08
POSITIVE OR ZERO PROFIT CALCULATED AND NEGATIVE PROFIT ACHIEVED	29	7.54	278	9.25	179	1.58	11	0.07
ZERO VALUE IN LINE 20	28	7.65	242	7.82	190	1.99	13	0.06
HIGH FAILURE RATE (COMPARISONS WITH THE FAILURE RATE/KM (VOM01) HIGHER THAN 1.5 TIMES THE MEDIAN OF THE GROUP WITHOUT COMPARISONS WITH ZERO FAILURE RATE)	33	19.07	210	7.65	65	0.62	2	0.00
NEGATIVE CALCULATED PROFIT CALCULATED AND ACHIEVED	4	1.40	169	3.53	140	1.09	4	0.01
HIGH SHARE OF THE CALCULATED PROFIT TO BE DISTRIBUTED IN FCs (COMPARISONS WITH THE SHARE OF PROFIT TO BE DISTRIBUTED HIGHER THAN 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITH POSITIVE PROFIT AND SHARE OF PROFIT TO BE DISTRIBUTED IN FCs >0)	24	9.43	115	4.07	489	4.71	3	0.03
0 FAILURE RATE + REPAIRS HIGHER THAN AVERAGE REPAIR COSTS PER FAILURE IN THE GROUP (AVERAGE IS CALCULATED WITHOUT COMPARISONS WITH 0 FAILURES, AS THE ARITHMETIC MEAN OF VOM02 INDICATOR)	3	1.68	94	3.08	49	0.65	4	0.04
ZERO LOSSES	4	1.29	80	1.80	159	1.48	16	0.08
RENTAL IS LESS THAN OR EQUAL TO ZERO IN THE SEPARATE (WITHOUT SERVICE CONTRACTS) OR COMBINED MODEL	6	1.68	72	2.26	59	0.46	4	0.01
OCF > 1 AND RENEWAL IS NOT ACHIEVED	14	4.56	70	3.19	28	0.34	1	0.00
OTHER THAN ZERO FAILURE RATE AND ZERO REPAIR COSTS	3	0.73	63	1.41	43	0.58	1	0.00
HIGH VALUE OF NON-REVENUE WATER PER KM OF CONVERTED LENGTH IN M3/KM/DAY EXCEEDS 90% PERCENTIL OF THE INDICATOR OF ANALYSED COMPARISONS MONITORING NON-REVENUE WATER AND LOSSES	12	5.67	53	2.87	27	0.35	2	0.01
HIGH WATER LOSSES PER 1 KM OF CONVERTED LENGTH OF WATER MAINS PER DAY (M3/KM)/DAY (90% PERCENTIL OF THE INDICATOR OF ANALYSED COMPARISONS MONITORING NON-REVENUE WATER AND LOSSES)	13	7.87	40	1.95	18	0.22	0	0.00
HIGH WATER RATE (VALUE HIGHER THAN 1.5 TIMES THE AVERAGE WATER RATE FROM COMPARISONS WITH OCF FROM 1 TO 1.5; ACHIEVEMENT OF RENEWAL)	5	1.31	25	0.67	13	0.05	1	0.00
RENTAL IS GREATER THAN ZERO IN THE MIXED MODEL OR SEPARATE MODEL WITH SERVICE CONTRACT	3	0.31	21	0.83	13	0.18	1	0.00
ZERO DEPRECIATION + ZERO REPAIRS + 4.4 IN THE MIXED OR COMBINED MODEL	1	0.00	20	0.30	43	0.28	3	0.01
HIGH SHARE OF PROFIT IN FCs (VALUE HIGHER THAN 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITH POSITIVE CALCULATED PROFIT)	23	10.65	20	0.54	72	0.77	8	0.07
TOTAL	316		2788		2352		105	

An issue faced in all four groups is the **inadequate generation of funds for WIA renewal**. In groups IV and V. this anomaly is reported by the Comparisons which constitute more than 60% share in the billed water in the group (i.e. in group IV altogether 21.48 mil. m^3 of 31.9 mil. m^3 and in group V altogether 3.38 mil. m^3 of 5.47 mil. m^3). In group VI, it is less than 45 % and the smallest share is reported in group III with 30.86 %. Due to the inadequate generation of funds for renewal, all the groups have **zero line 20**. This fact indicates problems faced in the process of renewal (from elaborating the PFR. investment plans and repair plans to the delivery of renewal) or in ascertaining the values that shall be completed therein.

The use of the **negative calculated profit in calculating the water rate** by infrastructure owners attests to their efforts to maintain low water rate, or not to exceed the socially acceptable rate. This approach, unfortunately, can only be pursued by those owners who can subsidise the operation and renewal from other sources than the water rate. If the WIA owner sets his business relationships with the operator and customer in a way that demonstrably makes the generation of adequate amount of funds for WIA renewal impossible and has no other sources, then in a long-term perspective there is an increasing risk of burdening the future generations with expenditure on WIA renewal either in the form of state subsidies or water rate hikes. The negative calculated profit is mostly used in group IV (169 Comparisons), where it affects 11.08% share of the volume of billed water in the group (i.e. 3.53 mil. m^3 of 31.9 mil. m^3 of billed water), and in group V (140 Comparisons), where it affects 19.84% share (i.e. 1.09 mil. m^3 of 5.47 mil. m^3 of billed water).

The inappropriately functioning process of WIA renewal is also shown by the values of anomalies of **high failure rate**, **high water losses per 1 km of converted length of water main per day, zero water losses, high value of non-revenue water per km of converted length per day,** and last but not least also **zero failure rate as well as reported repair costs higher than the average repair costs of one failure in the group,** or **other than zero failure rate and reported zero repair costs**. Based on the occurrence of the zero water loss anomaly, conclusions may be drawn that especially the owners in groups V (159 Comparisons). IV (80 Comparisons) and VI (16 Comparisons) fail to monitor the water losses or fail to monitor the condition and renewal of WIA. These are owners who supply the drinking water to more than 921 thousand inhabitants and whose WIA value based on SDOwR is 31.11 billion CZK.

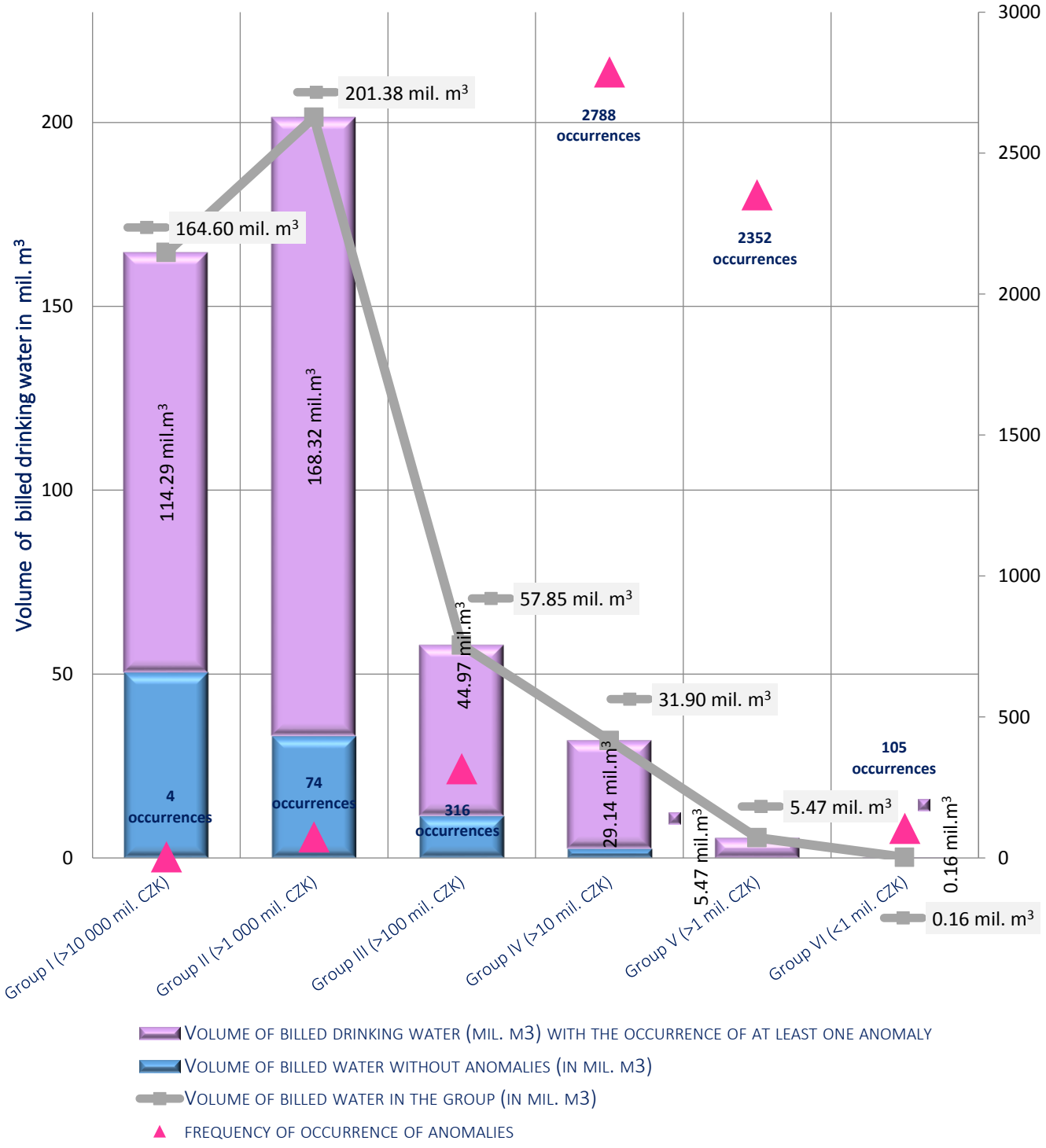
As indicated by the frequency of occurrence of *high share of calculated profit to be distributed in* FCs. the funds generated in this way could be reinvested in renewal at least in the community-type owners, especially in groups V (489 Comparisons) and IV (115 Comparisons).

Other anomalies are linked to the business relationship between the owner and the operator, or wrong reporting.

In order to provide a comprehensive overview, the following chart is presented which illustrates the share of billed water affected by at least one occurrence of an anomaly in a breakdown by group.

BENCHMARKING OF OWNERS 2017 - DRINKING WATER OCCURRENCE OF AT LEAST ONE ANOMALY IN THE GROUP - CONVERTED TO THE VOLUME OF BILLED WATER (MIL. M³)

1. total market size based on the Comparisons 473.197 mil. m³
2. size of the analysed part of the market 461.355 mil. m³ (97.5%)

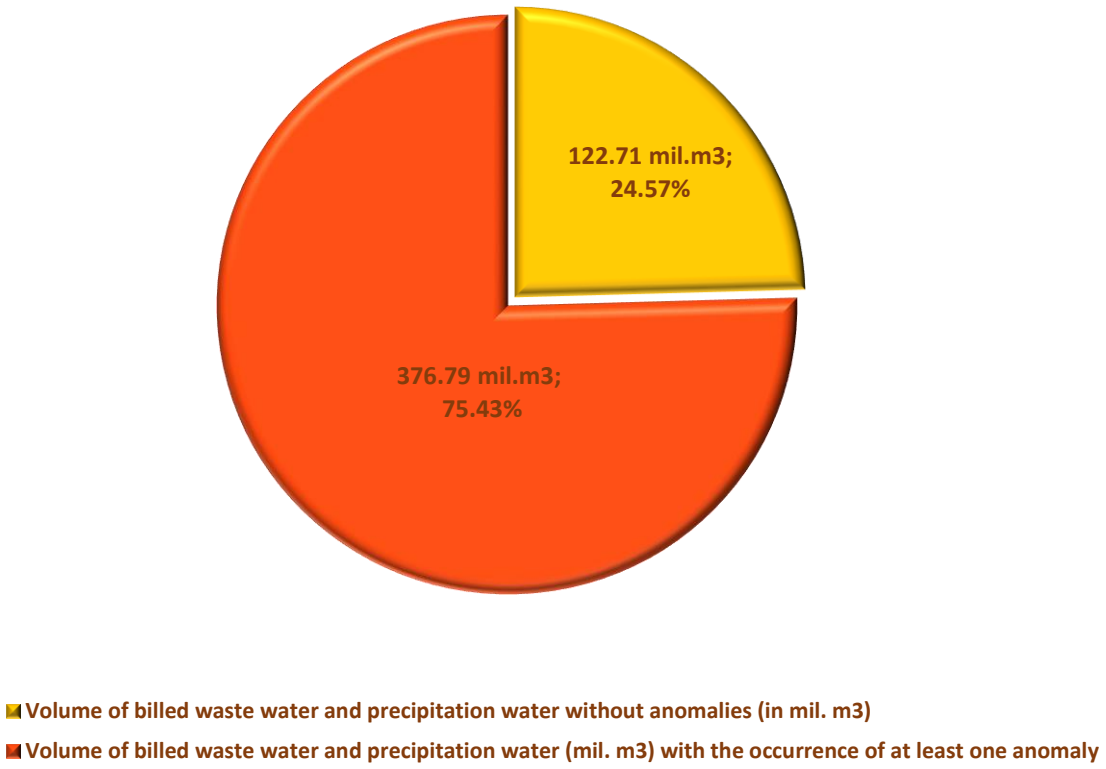


5.3.4 Sewerage system

In the Benchmarking of owners, namely in the part covering the sewerage systems. 2 005 Comparisons were assessed which represented 97.79% market share determined based on the volume of billed drained waste water and precipitation water (i.e. 499.502 mil. m^3). In total, at least one anomaly is present in 97.81 % of the total number of analysed Comparisons, i.e. in 1 961 Comparisons.

The chart below illustrates the occurrence of at least one anomaly based on the market share. In terms of the volume of billed waste water and precipitation water, it is obvious that only 24.57 % of the analysed market is not affected by the occurrence of anomalies.

BENCHMARKING OF OWNERS 2017 - SEWERAGE SYSTEM
OCCURRENCE OF AT LEAST ONE ANOMALY BASED ON THE VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER



In the framework of the Benchmarking of Owners, the analysis focused mainly on identifying the facts that may prevent the fulfilment of the main objective of the regulation – achieving the self-financing capacity of WIA. For the sake of a more realistic assessment of the rate of fulfilment of the aforementioned objective in individual Comparisons (assessment of business relationships between the owners. operators and customers), assessed was mainly the adequacy of the generation of funds for renewal. In order for the WIA owners to secure the funds for renewal, they should focus first and foremost, in dependence on the model of operation applied, on setting the sewerage rate. This rate should fully cover all the associated

economically justified costs, especially the respective rental (in the case of the separate and combined model of operation). WIA depreciation, repair costs, funds for renewal (in line with the PFR) and calculated profit (calculation in line with the price assessment of the Ministry of Finance).

The following table gives the frequency of occurrence of anomalies identified in the analysed Comparisons. Apart from anomalies related to the inadequate generation of funds for renewal, or indicating an unbalance set-up of business relationship between the owners and the operators, anomalies revealing a poorer condition of WIA and a decision of the WIA owner not to collect the sewerage rate were identified.

ANOMALY	FREQUENCY OF OCCURRENCE	VOLUME OF IDENTIFIED ANOMALY	% SHARE OF THE ANALYSED MARKET (499.5 MIL.M^3)
HIGH FAILURE RATE PER 1 KM OF SEWER NETWORK / YEAR (VALUE OF 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITHOUT ZERO VALUE OF THE INDICATOR)	181	213.630	42.769%
HIGH SHARE OF THE CALCULATED PROFIT TO BE DISTRIBUTED IN FCs (WITHOUT THE PART FOR DEVELOPMENT AND RENEWAL) (VALUE OF MORE THAN 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITH A POSITIVE CALCULATED PROFIT)	337	175.756	35.186%
INADEQUATE GENERATION OF FUNDS FOR WIA RENEWAL	1 716	69.645	13.943%
RENTAL IS LESS THAN OR EQUAL TO ZERO IN THE SEPARATE (WITHOUT SERVICE CONTRACTS) OR COMBINED MODEL	95	45.617	9.133%
ZERO FAILURE RATE + REPAIRS HIGHER THAN AVERAGE REPAIR COSTS PER FAILURE OF ALL ENTITIES WITH OTHER THAN ZERO FAILURE RATE	526	40.198	8.048%
NEGATIVE CALCULATED PROFIT	1 124	36.766	7.361%
ZERO VALUE IN LINE 20	666	34.626	6.932%
POSITIVE OR ZERO PROFIT CALCULATED AND NEGATIVE PROFIT ACHIEVED	577	25.657	5.137%
NEGATIVE PROFIT CALCULATED AND NEGATIVE PROFIT ACHIEVED	547	11.109	2.224%
RENTAL IS GREATER THAN ZERO IN THE MIXED MODEL OR SEPARATE MODEL WITH SERVICE CONTRACT	18	5.849	1.171%
ZERO DEPRECIATION + ZERO REPAIRS + 4.4 IN THE MIXED OR COMBINED MODEL	222	2.468	0.494%
OTHER THAN ZERO FAILURE RATE AND ZERO REPAIR COSTS	61	1.643	0.329%
HIGH SEWERAGE RATE (MORE THAN 1.5 TIMES THE AVERAGE SEWERAGE RATE FROM COMPARISONS IN THE GROUP WITH THE OCF FROM 1 TO 1.5; ACHIEVEMENT OF RENEWAL)	43	0.886	0.177%
ZERO SEWERAGE RATE TOTAL	61	0.661	0.132%
FREQUENCY OF OCCURRENCE OF ANOMALIES TOTAL	6 174		

In 61 Comparisons, **zero sewerage rate collected caused by zero rate** was reported. The owners mainly in groups IV and V decided not to bill the sewerage rate (e.g. in case of the drainage of waste water already treated by domestic waste water treatment plants directly to a water recipient) and to cover all the costs and funds for renewal from other sources than the sewerage rate.

The most significant anomaly identified based on the volume of billed waste water and precipitation water per Comparison is the **high failure rate per 1 km of sewer network**. The frequency of its occurrence is only 9 % of the analysed Comparisons, i.e. 181 Comparisons. More than 90 % of the volume of billed water affected by this anomaly is reported in 21 Comparisons from groups I and II. The largest number of Comparisons with this anomaly is in

group of owners IV. The reporting value of this indicator is impacted by the fact that the failure rate reported in 1 452 Comparisons (72.42 % of analysed Comparisons) was zero. Moreover, potential effects of different interpretation of the term failure shall be highlighted as well as the fact that the introduction of state-of-the-art failure detection technologies used mainly by large operators' results in a higher number of reported failures, but in improvements in the quality of care for WIA. Therefore, the interpretation of a high failure rate is not so clear.

Another significant anomaly providing additional information on whether the calculated profit is used to generate funds for WIA renewal is the **high share of calculated profit to be distributed in FCs.** It can be stated that in the case of 337 Comparisons (175.76 mil. m^3 of billed water) the profit is not planned to be used for WIA renewal. This anomaly occurred most frequently in the groups of owners IV (161 Comparisons) and III (112 Comparisons).

Discrepancies in reporting the failure rate and the repair costs are highlighted by the anomaly of **zero failure rate and also repair costs higher than the average repair costs** (526 Comparisons; 40.2 mil. m^3 of billed water) and the anomaly of **other than zero failure rate and zero repair costs** (61 Comparisons; 1.64 mil. m^3 of billed water). Unfortunately, due to the lack of information on the age and condition of assets and non-uniform interpretation of the term failure, it is impossible to decide whether the failure rate per 1 km of network corresponds with the age of the assets. In terms of the frequency of occurrence, the highest number of problems with monitoring the failure rate and reporting the repair costs is faced by the owners in group IV.

Based on the frequency of occurrence, the most frequently occurring anomaly is the **inadequate generation of funds for WIA renewal.** It was identified in 1 716 analysed Comparisons. The volume of billed water in these Comparisons was 69.65 mil. m^3, i.e. 13.94 % of the analysed market. In 1 124 Comparisons (i.e. 36.77 mil. m^3 of billed water), **negative calculated profit** was reported. It concerns 7.36% share of the analysed market and the WIA owners concerned shall realise that they lose an important possibility for generation of funds for WIA renewal. Sometimes, this decision is made by the owner who avails of revenues from other non-regulated activity and while in the case of other owners this might be a consequence of high market atomization. It is very irresponsible of the owners to rely, on a long-term basis, on obtaining such funds for renewal from aid schemes.

A problem to monitor the generation and use of funds for renewal was faced by the processors of 666 Comparisons (i.e. 34.63 mil. m^3 of billed water; 6.93% share of the analysed market), which lacked the required information **in line 20 on the generation and use of funds for renewal**. Considered an incorrect approach to addressing the generation of funds for renewal can be the owners who **fail to include the WIA rental** in the sewerage rate (in the separate or combined model of operation), or when its value is negative. This anomaly occurs in 9.13% share of the analysed market (45.62 mil. $m^3$of billed water; 95 Comparisons). In the case of the mixed or combined model of operation, the owners **did not include** in the sewerage rate the **depreciation, repair costs or funds for renewal in line 4.4** in a total of 222 Comparisons (2.47 mil. m^3 of billed water; 0.49% share of the analysed market). The referred to facts reveal an issue directly associated with the fulfilment of the objective of achieving the self-financing capacity of water supply and sewerage systems and it is most likely that the owners do not carry out systematic scheduled care for WIA that comprises the planned renewal, regular maintenance and investment activity, or that these activities are not considered to be a priority by the owner.

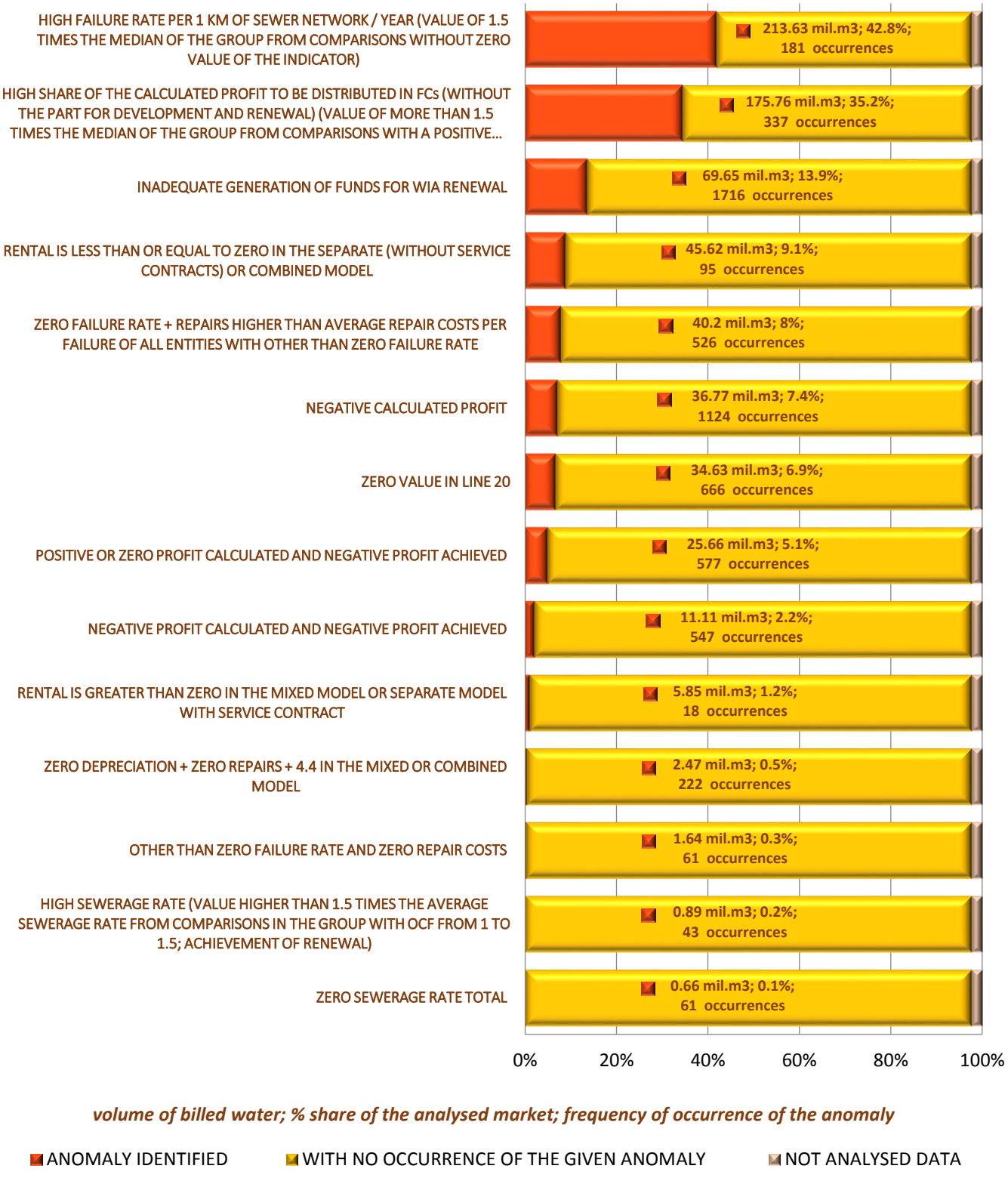
Mistakes in reporting, or unclarities in elaborating the Comparisons are also illustrated by the occurrence of anomaly consisting in a positive value of rental in the calculation of the sewerage rate in the case of the applied mixed model of operation or separate model with service contract. This was identified in 18 Comparisons (5.85 mil. m^3 of billed water; 1.17% share of the analysed market). It may concern a wrongly reported cost item, or the rental of other than infrastructure assets.

The occurrence of the given anomalies proves that the sewerage rates are heavily subsidies and the generation of funds for WIA renewal is postponed. This situation is serious not only with respect to the assessment of the fulfilment of objectives of the regulation (self-financing capacity and WIA renewal), but in the long run it also increases the risk of an excessive burden of future generations with the costs of WIA renewal, or the risk of increased requirements for the provision state subsidies, or indebtedness of WIA owners where they use loans as a source for WIA renewal financing.

The following chart includes individual anomalies by the volume of affected billed water in the total volume of billed water in the analysed market.

OCCURRENCE OF ANOMALIES IN RELATION TO THE VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER [MIL.M³]
BENCHMARKING OF OWNERS 2017 - SEWERAGE SYSTEM

1. total market size based on the Comparisons 510.81 mil. m³
2. size of the analysed part of the market 499.50 mil. m³ (97.8 %)



5.3.5 Inadequate generation of funds for renewal

Among the important data revealed as a result of the conducted analysis is the total amount of lacking funds for WIA renewal generated from the sewerage rate. These funds totalled 808.21 mil. CZK. The total sewerage rate accounted for 16.8 billion CZK and should have been higher by the lacking funds for renewal, i.e. 17.61 million CZK (i.e. by 4.81 %). It concerns an increase in the calculated items directly affecting the amount of generated funds for renewal (in a breakdown by the model of operation. see 3.2). According to the analysed Comparisons, approximately 1.6 CZK of funds for renewal is lacking per 1 m^3 of billed water.

Overview of the amount of lacking funds for renewal in mil. CZK in a breakdown by the model of operation and group of owners is included in the following table.

Lacking funds for asset renewal (up to the minimum theoretical amount of funds for WIA renewal; mil. CZ / model of operation	Combined	Separate	Separate model with service contract	Mixed	Total for individual groups
Group I (>10 000 mil. CZK)	0.00	0.00	0.00	0.00	0.00
Group II (>1 000 mil. CZK)	2.90	37.03	10.44	0.00	50.37
Group III (>100 mil. CZK)	86.72	145.68	9.18	84.84	326.42
Group IV (>10 mil. CZK)	6.56	143.43	29.80	234.67	414.46
Group V (>1 mil. CZK)	0.00	1.19	1.99	13.71	16.89
Group VI (<1 mil. CZK)	0.00	0.00	0.00	0.06	0.07
Total for individual models of operation	**96,18**	**327.33**	**51.41**	**333.29**	**808.21**

Just like in drinking water, the problem of inadequate generation of funds for renewal is not faced by the owners from group I. The highest amount of lacking funds for renewal (414.46 mil. CZK) is reported by the owners in 1 228 Comparisons from group of owners IV (90.63 % of Comparisons in the group), and a similar situation is faced by owners of group III in 213 Comparisons (73.7 % of Comparisons in the group), where the amount of 326.42 mil. CZK is lacking. Since in both the groups this anomaly occurs in owners applying the separate model of operation, the main solution of the problem will lie especially in a better set-up of business relationships between the owners and the operators. On the other hand, with respect to the whole set of analysed data, the problem of inadequate generation of funds for renewal is seen predominantly in the mixed model of operation (1 024 Comparisons. i.e. 89.4 % of Comparisons with the mixed model of operation), mainly in the groups of owners III. IV and V.

Information on setting the sewerage rate can also be derived from the OCF indicators and the amount of calculated profit which inform about potential price subsidies and losses in operation incurred in the given year. The following table provides a comparison of the average value of OCF indicators, water rate and unit costs of entities with adequate generation of funds for renewal and entities with inadequate generation of funds for renewal in a breakdown by group of owners. The average value of the OCF in entities with inadequate

generation of funds for renewal is below 1 (from 0.35 to 0.75) which point at the fact that the rate fails to cover the unit FCs and minimum theoretical amount of funds for renewal. In all the groups of owners concerned, the average sewerage rate is lower than the average value of unit FCs. If the sewerage rate were to include also the minimum amount of funds for renewal, on average it would increase the most in Comparisons of group of owners III.

Conversely, in the entities with adequate generation of funds for renewal the average value of OCF in individual groups is higher than 1 (from 1.00 to 1.15), i.e. the revenues generated from the sewerage rate in 2017 covered the FCs and the necessary amount of funds for renewal.

ADEQUATE MINIMUM GENERATION OF FUNDS					
GROUP OF OWNERS	NUMBER OF COMPARISONS	AVERAGE VALUE OF OCF	AVERAGE SEWERAGE RATE (CZK/M3)	AVERAGE VALUE OF UNIT COSTS (CZK/M3)	AVERAGE THEORETICAL RATE TO FIULFILL THE RENEWAL REQUIREMENTS AND GENERATING ZERO PROFIT
GROUP I (>10 000MIL.CZK)	5	1.15	35.23	30.74	30.74
GROUP II (>1 000MIL.CZK)	42	1.11	35.29	32.02	32.08
GROUP III (>100MIL.CZK)	76	1.05	33.77	32.27	32.27
GROUP IV (>10MIL.CZK)	127	1.00	45.51	47.88	47.99
GROUP V (>1MIL.CZK)	35	1.01	40.43	44.15	44.15
GROUP VI (<1MIL.CZK)	4	1.01	14.32	14.66	14.66
TOTAL	**289**	**1.03**	**39.71**	**40.26**	**40.32**

INADEQUATE MINIMUM GENERATION OF FUNDS						
GROUP OF OWNERS	NUMBER OF COMPARISONS	AVERAGE VALUE OF OCF	AVERAGE SEWERAGE RATE (CZK/M3)	AVERAGE VALUE OF UNIT COSTS (CZK/M3)	AVERAGE THEORETICAL RATE TO FIULFILL THE RENEWAL REQUIREMENTS AND GENERATING ZERO PROFIT	AVERAGE AMOUNT OF LACKING FUNDS FOR WIA RENEWAL PER 1M3 OF BILLED WASTE WATER (CZK/M3)
GROUP I (>10 000MIL.CZK)						
GROUP II (>1 000MIL.CZK)	5	0.75	30.64	31.25	49.56	18.69
GROUP III (>100MIL.CZK)	213	0.70	30.39	33.58	64.07	33.01
GROUP IV (>10MIL.CZK)	1228	0.47	22.86	32.93	60.78	31.89
GROUP V (>1MIL.CZK)	260	0.35	13.11	22.95	36.42	16.18
GROUP VI (<1MIL.CZK)	10	0.44	11.34	18.28	19.43	4.24
TOTAL	**1716**	**0.48**	**22.28**	**31.41**	**57.22**	**29.45**

One of the options how to ensure the delivery of renewal (achieving the self-financing capacity of WIA) is to use line 4.4 in the Comparisons in combination with a carefully elaborated PFR. The PFR should, among other things, follow from the plan of repairs and investments of renewal nature. In the case of separate and combined model of operation, the generation of funds for WIA renewal would increase also through an appropriate increase of the WIA rental. The WIA owners shall realise that if they fail to generate adequate amount of funds for WIA renewal, they will have to draw the lacking funds from other sources or transfer this obligation to future generations. Another option is to use the positive calculated profit as a source for generation of a part of the necessary funds to finance the renewal from the sewerage rate.

Essential for the achievement of the regulator´s objective of achieving the self-financing capacity of the infrastructure and a balanced price setting (appropriate coverage of all the operating costs and WIA renewal) is the price setting. The regulatory framework of price setting makes it possible for the owner and the operator to include **all the economically justified costs, funds for renewal and appropriate profit in the price (rate)**. Especially in small owners and small systems, the price (rate) set in this way could become socially unacceptable and make the service unaffordable. Moreover, the owner may have other reasons based on which a decision on subsidising the price is adopted. In such a case, a negative calculated profit is used when making the calculation.

In comparisons that do not generate the adequate minimum amount of funds for renewal, *a zero or negative value of the calculated profit* is often seen. Of 2 005 analysed Comparisons, in 1 124 cases (i.e. 56.1 % of Comparisons) there is a negative value of the calculated profit. In terms of the volume of billed water, it concerns 36.77 mil. m^3. In 97 Comparisons (10.81 mil. m^3 of billed water), the set sewerage rate is high enough to generate an adequate amount of funds for renewal on condition that the Comparisons included the full amount of all the economically justified costs associated with production and distribution of drinking water to customers.

As mentioned above, some of the owners already in the sewerage rate calculations **reckon with subsidising the price, i.e. using the negative calculated profit** which they do achieve. This situation was detected in 547 Comparisons (11.11 mil. m^3 of billed water). It most frequently occurred in the groups of owners IV and V. The following table comprises the distribution of the use of negative calculated profit in a breakdown by group and planned and unplanned losses incurred.

GROUP OF OWNERS	NEGATIVE CALCULATED PROFIT IN COMPARISONS		PLANNED SEWERAGE RATE SUBSIDY		LOSS INCURRED	
	NUMBER OF COMPARISONS – NEGATIVE CALCULATED PROFIT	VOLUME OF BILLED WASTE WATER IN MIL. M^3_NEGATIVE CALCULATED PROFIT	NUMBER OF COMPARISONS – NEGATIVE PROFIT CALCULATED AND NEGATIVE PROFIT ACHIEVED	VOLUME OF BILLED WASTE WATER IN MIL. M^3_NEGATIVE PROFIT CALCULATED AND NEGATIVE PROFIT ACHIEVED	NUMBER OF COMPARISONS – POSITIVE OR ZERO PROFIT CALCULATED AND LOSS INCURRED	VOLUME OF BILLED WASTE WATER IN MIL. M^3_POSITIVE OR ZERO PROFIT CALCULATED AND LOSS INCURRED
GROUP II (>1 000 MIL.CZK)	5	6.83			5	6.83
GROUP III (>100 MIL.CZK)	81	10.59	29	2.48	52	8.11
GROUP IV (>10 MIL.CZK)	824	17.57	403	7.78	421	9.80
GROUP V (>1 MIL.CZK)	206	1.68	110	0.81	96	0.86
GROUP VI (<1 MIL.CZK)	8	0.10	5	0.04	3	0.06
TOTAL	**1124**	**36.77**	**547**	**11.11**	**577**	**25.66**

In many cases the subsidies are the consequence of the highly atomized sector. In the long-term perspective, however, this approach prevents the fulfilment of the objective of achieving the self-financing capacity of WIA and increases the risk of burdening the future generations with expenditure on WIA renewal either in the form of state subsidies or price hikes if the WIA owner fails to systematically care for the WIA and finance the WIA from other income.

5.3.6 Occurrence of anomalies in a breakdown by the group of owners

GROUP OF OWNERS	% SHARE OF THE VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER WITH THE OCCURRENCE OF AT LEAST ONE ANOMALY	VOLUME OF BILLED WASTER WATER AND PRECIPITATION WATER (MIL. M^3) WITH THE OCCURRENCE OF AT LEAST ONE ANOMALY	VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER IN THE GROUP (IN MIL. M^3)	FREQUENCY OF OCCURRENCE OF ANOMALIES
GROUP VI (<1 MIL. CZK)	100.00%	0.12	0.12	50
GROUP V (>1 MIL.CZK)	99.72%	2.78	2.79	1 032
GROUP IV (>10 MIL.CZK)	96.87%	34.51	35.63	4 303
GROUP III (>100 MIL. CZK)	91.38%	69.54	76.10	714
GROUP II (>1 000 MIL.CZK)	84.80%	154.30	181.97	72
GROUP I (>10 000 MIL.CZK)	56.94%	115.52	202.90	3
TOTAL	75.43%	376.79	499.50	6 174

In terms of the volume of billed water, anomalies affect all the groups. At least one anomaly in more than 50% of the volume of billed water is present also in group I. More than 95 % of the volume of billed waste water is affected in the groups III. IV and V. All the Comparisons in the group VI are affected by at least one anomaly.

In terms of the frequency of occurrence, it may be stated that the most problematic groups with respect to the fulfilment of objectives of the regulation are the Comparisons of **owners from the groups III. IV a V.** The total value of WIA of the referred to groups is 228.43 billion CZK, the volume of billed water was 114.53 mil.m^3 and the number of connected inhabitants was 2.19 mil.

As indicated by the table below, the largest problem faced by these high-risk groups is the **inadequate generation of funds for renewal from the sewerage rate**. Groups IV and V report an incorrect set-up of the sewerage rate for more than 65% share of the billed water in both these groups (79.02% share. i.e. 1 228 Comparisons with 28.156 mil. m^3 of 35.63 mil. m^3 of billed water and for group V 66.10% share. i.e. 260 Comparisons with 1.844 mil. m^3 of 2.79 mil. m^3 of billed water). In the group III, the referred to shortcoming affects almost 40% share of the billed water in the group. It may have been caused mainly by the planned use of **negative calculated profit** (i.e. subsidising the price from other sources that the sewerage rate). The anomaly was seen in the groups V and IV, where it affects more than a quarter of the volume of billed water in each group. In terms of the frequency of occurrence, the highest occurrence of negative calculated profit is observed in calculations of users in the group IV (403 Comparisons) followed by the group V (110 Comparisons). Since these are small owners it would be worth the while to find out in which cases the sewerage rate is socially acceptable and the planned use of negative calculated profit is most likely a consequence of market atomization. On the other hand, in all the three groups there were Comparisons reporting the achieved negative calculated profit. *More than a quarter of the volume of billed water in the groups of owners IV and V was sold at a loss* (421 Comparisons. i.e. 9.795 mil. m^3 of 35.63 mil. m^3 of billed water in the group IV and 96 Comparisons. i.e. 0.861 mil. m^3 of 2.79 mil. m^3 of billed water in the group V).

Another reason complicating a detailed assessment of the delivery of renewal is the provision of incomplete information on the generation and use of funds for renewal – **zero value in line 20** (generation and use of funds for renewal). It was present in all three groups and affected the largest share of billed water (i.e. 42.74 %; 139 Comparisons) in the group V. More frequently it occurred also in the group IV, namely in 456 Comparisons.

An interesting fact is the **occurrence of a high share of calculated profit to be distributed**. It affected more than 45 % of billed water in the group III (112 Comparisons) and almost a quarter of billed water in the group IV (161 Comparisons). It represents the part of the profit not used to finance the WIA renewal or development. In other words, the owners could potentially use it as a source of funds for renewal. Other reasons behind the low generation of funds for renewal may lay in low rental, low depreciation, repairs or failure to fill in line 4.4 of Comparisons, which indicates the non-existence of the PFR.

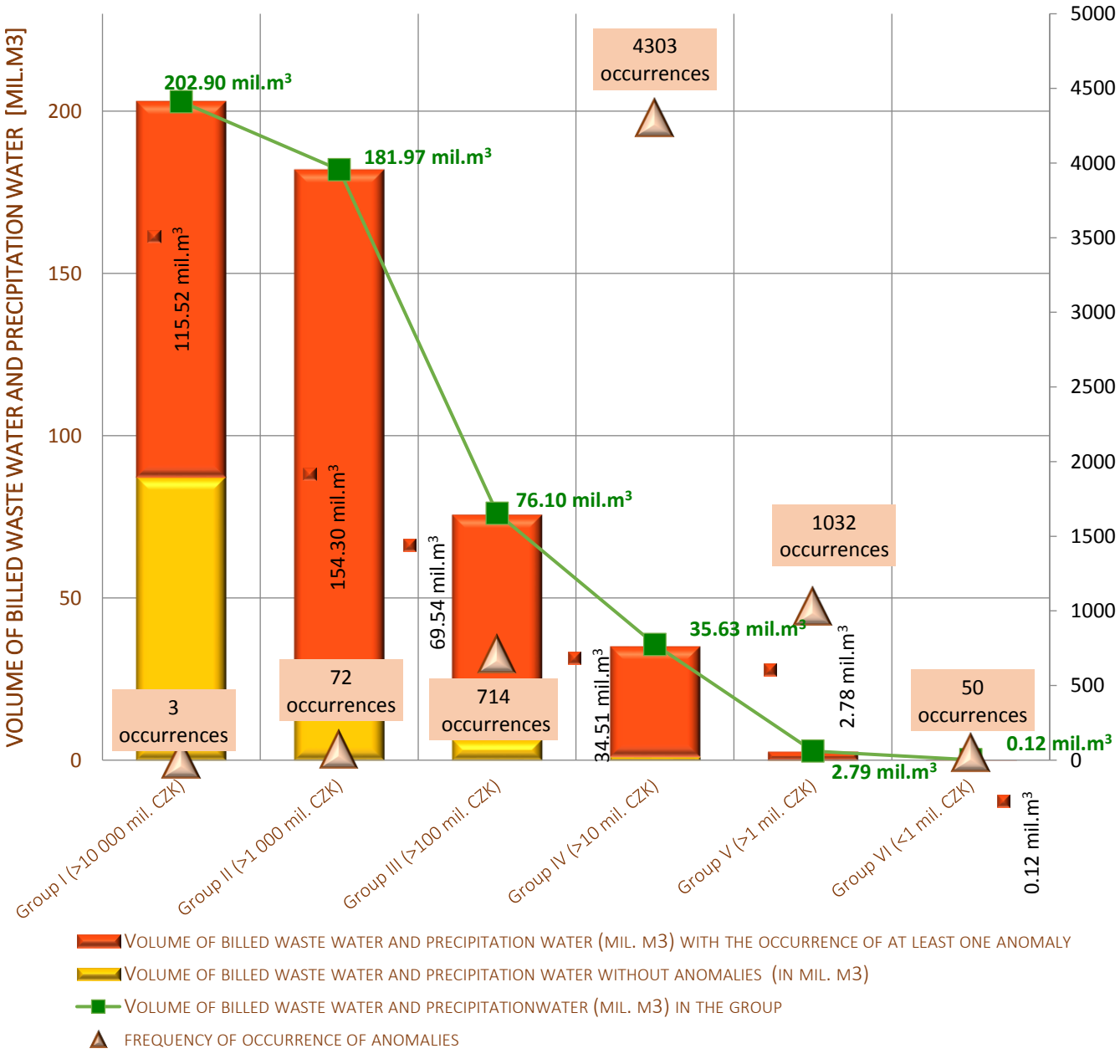
Ranking among other shortcomings in the referred to high-risk groups is the failure to report the failure rate and a high failure rate per km of sewerage network.

ANOMALY	Group III (>100 mil.CZK) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER (MIL. M^3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP III	Group IV (>10 mil. CZK) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER (MIL. M^3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP IV	Group V (>1 mil. CZK) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER (MIL. M^3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP V
VOLUME OF BILLED WATER IN THE GROUP IN MIL. M3		76,10		35,63		2,79
INADEQUATE GENERATION OF FUNDS FOR WIA RENEWAL	213	30,384	1 228	28,156	260	1,844
NEGATIVE CALCULATED PROFIT	81	10,590	824	17,574	206	1,676
ZERO VALUE IN LINE 20	60	11,247	456	10,138	139	1,192
POSITIVE OR ZERO PROFIT CALCULATED AND NEGATIVE PROFIT ACHIEVED	52	8,112	421	9,795	96	0,861
ZERO FAILURE RATE + REPAIRS HIGHER THAN AVERAGE REPAIR COSTS PER FAILURE OF ALL ENTITIES WITH OTHER THAN ZERO FAILURE RATE	84	17,912	406	14,637	31	0,545
NEGATIVE PROFIT CALCULATED AND NEGATIVE PROFIT ACHIEVED	29	2,478	403	7,779	110	0,815
HIGH SHARE OF THE CALCULATED PROFIT TO BE DISTRIBUTED IN FCs (WITHOUT THE PART FOR DEVELOPMENT AND RENEWAL) (VALUE OF MORE THAN 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITH A POSITIVE CALCULATED PROFIT)	112	34,618	161	5,288	38	0,688
ZERO DEPRECIATION + ZERO REPAIRS + 4.4 IN THE MIXED OR COMBINED MODEL	2	0,156	128	1,759	88	0,538
HIGH FAILURE RATE PER 1 KM OF SEWER NETWORK / YEAR (VALUE OF 1.5 TIMES THE MEDIAN OF THE GROUP FROM COMPARISONS WITHOUT ZERO VALUE OF THE INDICATOR)	51	16,922	103	2,383	6	0,084
RENTAL IS LESS THAN OR EQUAL TO ZERO IN THE SEPARATE (WITHOUT SERVICE CONTRACTS) OR COMBINED MODEL	15	2,146	58	1,465	11	0,101
OTHER THAN ZERO FAILURE RATE AND ZERO REPAIR COSTS	6	0,402	46	0,949	9	0,291
ZERO SEWERAGE RATE TOTAL	0	0,000	36	0,491	24	0,167
HIGH SEWERAGE RATE (MORE THAN 1.5 TIMESTHE AVERAGE SEWERAGE RATE FROM COMPARISONS IN THE GROUP MEETING THE DEFINED CRITERIA; OCF FROM 1 TO 1.5; ACHIEVEMENT OF RENEWAL)	5	0,269	20	0,504	13	0,052
RENTAL IS GREATER THAN ZERO IN THE MIXED MODEL OR SEPARATE MODEL WITH SERVICE CONTRACT	4	5,235	13	0,606	1	0,008
TOTAL	714		4 303		1 032	

The comparisons of high-risk groups (III. IV and V), in which at least one anomaly was identified. reported in the associated SDOwR the length of the sewerage network of more than 16 thousand km and treatment of waste water done by 1 436 pieces of WWTP. According to the results of analyses, in 2017 the owners in these groups lacked 757.73 mil. CZK for WIA renewal. It means that their total revenues from sewerage rates (3.3 billion CZK. i.e. 19.65 % of the total sales in 2017) should be increased by this amount. The relevance of these results depends on whether in the calculation of the sewerage rate the owners reflected also the full amount of associated economically justified costs. In order to give a more comprehensive picture, a chart depicting the situation in individual groups is presented.

BENCHMARKING OF OWNERS 2017 - SEWERAGE SYSTEM OCCURRENCE OF AT LEAST ONE ANOMALY IN THE GROUP - IN RELATION TO THE VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER [MIL.M3]

1. total market size based on the Comparisons 510.81 mil. m³
2. size of the analysed part of the market 499.50 mil. m³ (97,8%)



5.4 Conclusions of the Project Benchmarking of Owners for 2017

5.4.1 SWOT analysis

Based on the implemented benchmarking projects, thorough analysis of data submitted to the MoA, information derived from the findings of conducted checks of WIA owners and operators and received complaints, the following SWOT analysis was carried out.

STRENGTHS	WEAKNESSES
1. Developed WIA network and for the time being enough natural water sources in the prevailing part of the territory of the Czech Republic. 2. Legislative framework stipulating the rights and obligations of the WIA owner. 3. Legislative framework stipulating the relationship between the owner and the operator. 4. A functioning mechanism governing the investment process of owners. 5. High % of inhabitants connected to public water supply and sewerage systems. 6. A price setting system introduced by law which makes it possible to cover all the costs from water and sewerage rates – a prerequisite for achieving the self-financing capacity of water supply and sewerage systems. 7. A possibility to use in the price assessment the tool "contract between the owner and the tenant on leaving a part of the profit to the tenant". 8. Organised data collection is stipulated in the legislation (selected data from ownership records. and operating records. "Comparisons", reporting to the CZSO, mechanisms of collection of data on the quality of drinking water and values of treated waste waters). 9. Existence of aid schemes for the development of WIA.	1. High degree of market atomization (according to the MoA records 6 795 owners. 2 878 operators). 2. Especially in case of small owners, a priority use of water sources in their own cadastre and in case of insufficient capacity of own sources the use of local water supply systems, often at the expense of cost-effectiveness and unstable level of the quality of supplied water. 3. Diverse structure of business relationships in individual models of operation has an effect on the possibilities of the owner to make decisions on the way of generating the funds for renewal, their amount and time of accumulation which may be related to the duration of the contract concluded between the WIA owner and operator. 4. Weak negotiating position of the owner vis-à-vis the operator caused by poor knowledge of the rights and obligations of the WIA owner (especially in case of small owners). 5. Violation of legislation by the owners and operators (Act on Prices. Decree No 428/2001 Coll., Act on Water Supply and Sewerage Systems No 274/2001 Coll., Concession Act No 139/2006 Coll., effective from 1. 1. 2014 to 30. 9. 2016. Act No 134/2016 Coll., on Public Procurement). 6. Non-existence of legislation stipulating the minimum amount of rental or water and sewerage rates necessary to achieve the self-financing capacity of WIA. Inadequate supervision over the compliance with the legislation (price setting. plan for financing the renewal and its implementation. calculation of unjustified costs. service contracts). 7. Subsidising the price (rate) by the owner by means of the calculated profit item - a trend prevailing in

	municipal owners. This procedure prevents the achievement of self-financing capacity of the sector. Thus, in the case of ownership model of operation, the operation as such is subsidised – especially in owners with a low number of connected inhabitants. 8. Disputable quality of data submitted to the MoA, (occurrence of logical mistakes. incomplete data. incomparable data caused by non-uniform interpretation of terms. e.g. renewal. failure etc.) and lacking information for the check of fulfilment of the PFR (e.g. age and wear and tear of WIA. invested subsidies. volume of planned repairs etc.) 9. The selected data of ownership and operating records did not comprise information on water supply channels and interceptor sewers, which directly impacts the reporting value of some indicators of benchmarking (e.g. the value of WIA replacements costs. minimum annual amount of funds for renewal. length of water mains and sewers. volume of non-revenue water. losses and failures and their value converted to km of network etc.). 10. Benchmarking in assessing the availability of the minimum funds for renewal does not factor in the funds for renewal stated in the Comparisons of operators. 11. Deficiencies in databases of selected data from ownership and operating records and in the database of authorisations to operate prevent thorough checks of completeness of databases and correctness of data therein. 12. Poor knowledge and lack of experience of owners as the WIA investor (efficient investment of funds in WIA with respect to the life cycle of the assets). 13. Valuation of the assets based on the indicative indicators follows the methodological guideline which is outdated and shall be amended. The calculated replacements costs of WIA do not equal the actual replacement costs. 14. Current provision of the price assessment of the MoF does not allow for the use of line 4.4. – Funds for renewal in full extent as stipulated by the relevant regulations of the MoA. 15. When assessing the generation of funds from water and sewerage rates and coverage of the minimum theoretical amount of funds for renewal, whether

	or not the owner is the VAT payer cannot be considered.
OPPORTUNITIES	**THREATS**
1. Achieving the socially acceptable self-financing capacity of infrastructure (compliance with the EU directives. setting up of responsible financing of the sector with the aim not to burden the future generations). 2. Creating more detailed conditions for managing the funds intended for the PFR. 3. Introduction of the PFR as an investment tool of the WIA owners for the purpose of achieving more effective investment activities. 4. Elaborating a detailed methodology for completion of line 20 in Comparisons which provides information on the generation and use of funds for renewal 5. Increasing the information of all the stakeholders in the sector on their rights and obligations. 6. Introducing auxiliary tools for the modification of the relationship between the WIA owners and operators, particularly the recommended requisites regarding the content of the service contract and contract with a professional agent. 7. Achieving the price (rate) that would help achieve the highest possible degree of self-financing capacity and does not exceed the socially acceptable price. 8. More possibilities to use the economies of scale in case of reduction of market atomization which would also result in enhancing the professional level of WIA operation. 9. Enhancing the quality of data, cooperation with entities. Introducing precise definitions of some of the terms such as renewal, repair, failure etc. 10. Increasing the level of knowledge of owners on investment process in terms of the extension of the life cycle of WIA. 11. Introduction of a new information system (Water Supply and Sewerage System IS) which will facilitate data entry through web interface is planned.	1. Deteriorating water balance in the Czech Republic and decreasing water supplies. 2. Non-existence of contracts of water supply systems related in terms of operation in all the mandatory owners of WIA under the Act on water supply and sewerage systems No 274/2001 Coll. 3. Non-uniform interpretation of terms (renewal. repair. failure etc.) and a low level of quality of the existing data, including the lack of knowledge of e.g. information on the age and wear and tear of WIA may lead to wrong decisions made by the regulator. 4. Non-existent legislation governing the possibilities of the use of profit from regulated activities and direct limitations of possibilities to use the profit obtained from the ownership stakes of WIA owners in the operators (Civil Code and Act on Business Corporations). The ideal situation – use of the profit from the regulated activity is by law conditioned by the achievement of the self-financing capacity of WIA. 5. Effects of EU support on price setting when negative calculated profit has to be used in the price (rate) calculation for a certain period of time. Thus, water and sewerage rates are distorted. 6. Different rules governing the accounting for of the acquisition and depreciation of fixed assets purchased from subsidies applicable to business entities and municipalities, which results in the impossibility to use the information on the purchase price of the assets from the accounting records. 7. The provision of Section 6 (6) of Act No 274/2001 Coll., which makes it possible for the municipalities, government agencies or associations of owners of water supply and sewerage systems who are legal persons to obtain the authorisation to operate without the trade licence on condition they do not operate a water supply system or a sewerage system for profit making purposes, prevents the use of the calculated profit for the generation of funds for renewal. The referred to provision is interpreted in a different manner by the owners and complicates the

	achievement of self-financing capacity of WIA (objective of the regulator). 8. Extremely long time necessary to achieve the self-financing capacity can lead to a repeated pressure of the sector for subsidies (for renewal) or to water supply and sewerage rate hikes which can be socially unacceptable. This procedure can cause a heavy economic burden of future generations, or deterioration in the quality of services. 9. The use of funds from water and sewerage rates (as public funds) for other than the determined purpose in consequence of the non-existence of detailed rules for their management.

5.4.2 Conclusions, evaluation and proposed steps to be taken

On the basis of the results of the Benchmarking of Owners, the conducted SWOT analysis, information and complaints received and findings from checks carried out at the WIA owners and operators and with account taken of the set long-term objectives of the regulation, the regulator should focus on stipulating more detailed statutory requirements for functioning of in the field of the water supply and sewerage systems so that the enforcement of the defined obligations of the WIA owner (regardless of the applied model of operation) is more effective.

Bearing in mind the drought impacts on the water balance in the Czech Republic in recent years and not exactly optimistic outlooks, supposing that the technical and capacity requirements are met, it is necessary to create conditions for increasing the connection rate of small owners of water supply systems to local water supply systems. This connection will help ensure the adequate level of quality of services (note: objective of the regulation – provision of continuous drinking water supply in the required volume and quality). If local water sources are used only as supplementary, situations should be avoided when the water supply systems without its own source of water depend on the technically connected systems owned by another WIA owner. At the same time, the quality of checks of produced and supplied drinking water will be improved.

In terms of renewal, the regulator should, in cooperation with the MoF, draw up a clear methodology for processing and applying the PFR so as to make the elaboration of the PFR in line with the actual needs for renewal mandatory, and thus to facilitate its use as an essential part of the investment process of the WIA owner which provides information on the way of financing the renewal. Moreover, the regulator should focus on checking the fulfilment of the PFR and set clear rules for the record keeping (e.g. on a separate account) and for the use of funds obtained for the purpose of WIA renewal, while taking the financial source in consideration. The regulator should subsequently monitor in what manner and to what purposes these funds are actually used. The methodology should clearly set the way in which the funds will be used in the period when they will temporarily not be used for financing the WIA renewal (e.g. in new and reconstructed WIA), and also clearly define the procedure for

reporting the generation and use of funds for renewal from other financial sources than water and sewerage rates (e.g. credits. loans. other income of the WIA owner etc.).

The results of the analysis for 2017 and also the analyses from previous years clearly indicate that the problems related to the low generation of funds for renewal are a direct consequence of high level of market atomization. These problems were identified especially in the owners with a lower value of WIA and a lower number of connected customers. For this reason, the regulator should create conditions in the sector that motivate the establishment of larger ownership units. Apart from the economies of scale, this will help achieve also an enhanced level of expertise in the field of property management and operation. The conditions for reducing the market atomization should encourage the WIA owners to put their assets in specialised legal persons that should be controlled exclusively by the WIA owners.

The process of reducing the market atomization could be boosted by setting the rules for the calculation of the minimum amount of WIA rental (in the case of the separate model) and the minimum water and sewerage rate (in the case of the mixed model).

Moreover, the regulator should also more closely focus on those owners who, already when making the planned calculation of the water and sewerage rate, reckoned with negative calculated profit (i.e. subsidised price). In this case the regulator should concentrate on the causes of such price policy, financial standing of the owners, and the level of fulfilment of obligations in the field of WIA renewal.

A prevailing issue is a lower reliability of information collected by the MoA. The analyses often showed that the processor of information obviously misunderstood what data are to be reported and how. When communicating with the processors of reports, the MoA detected a problem of poor transfer of information not only between the owners and the processors, but also between the processors of individual reports, i.e. the ownership and operating records and the Comparisons. One of the ways to rectify this situation is to provide relevant educational activities in this field across the sector. Another possibility is to improve the individual functionalities of data applications for data collection with a focus on the quality control.

In conclusion, it shall be noted that in order to improve the reporting value of the results of benchmarking that serve as background information for the decision-making process of the regulator, and in order to improve the awareness of the customer concerning the actual price of the services, the MoA should make the supervision over the compliance with the provisions of Section 35a (7) of Decree No 428/2001 Coll. more stringent, i.e. to include (or state) all the actual costs associated with the provision of regulated services in the field of water supply and sewerage systems in the water and sewerage rates. Otherwise, the regulator shall respect the fact that incomplete information may compromise the relevance of benchmarking outputs and thus adversely impact the effectiveness and efficiency of the decisions.

6. Benchmarking of Operators 2017

6.1 Objective of the Report

The Benchmarking of Operators aims to assess whether the WIA operation was carried out in a manner that in the long-term perspective monitors the fulfilment of objectives of the regulation in the field of water supply and sewerage systems. This information concerns especially the price setting, quality of provided services and protection of the environment. The Benchmarking of Operators comprises a suite of indicators monitored separately for each Comparison. Based on the ascertained values of indicators, the activities of the operators for 2017 were described and evaluated from the customer´s and regulator´s perspective in the individual size groups with a focus on economic, production, personal or environmental indicators.

In individual groups of operators, those Comparisons were identified that meet the criteria concerning the fulfilment of objectives of the regulation and identified were also the entities, or Comparisons whose results can be considered anomalies in relation to the mean values (average. or median) of the group.

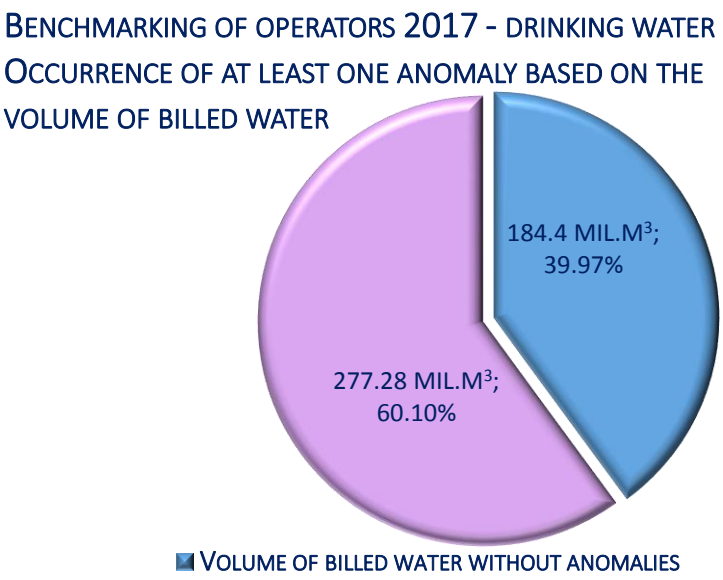
6.2 Identified Anomalies

In the framework of the analysis, evaluation of the results of operation from the customer´s perspective with respect to the fulfilment of long-term objectives of the regulation was carried out. The outcome was the identification of anomalies regarding the production, economic and environmental aspects of the operator´s activities (see point 1.1.4).

A more detailed specification and evaluation of the frequency of occurrence of individual anomalies are given separately for the water supply and sewerage systems.

6.2.1 Water supply system

In this part of the Benchmarking of Operators. 1 697 Comparisons were assessed which represent 97.50% share of the market determined based on the volume of billed water (i.e. 461.36 mil. m^3 of the total of 473.2 mil. m^3). At least one anomaly occurs in 60.10 % of analysed Comparisons, i.e. in 1 262 Comparisons. In terms of the volume of billed drinking water. 60.10% share of the analysed market is affected by anomalies (277.28 mil. m^3 of the billed water).



The following table gives the frequency of occurrence of individual anomalies in the analysed Comparisons.

ANOMALY	FREQUENCY OF OCCURRENCE	VOLUME OF BILLED DRINKING WATER (MIL.M^3) AFFECTED BY ANOMALIES	% SHARE OF THE ANALYSED MARKET (461.35 MIL.M^3)
SHARE OF THE CALCULATED PROFIT TO BE DISTRIBUTED IN FCs (more than 1.5 times the average from Comparisons meeting the defined criteria)	136	108.11	23.43%
HIGH WATER LOSSES PER 1 KM OF CONVERTED LENGTH OF WATER MAINS PER DAY (M3/KM/DAY) (exceeds 1.5 times the average from Comparisons meeting the defined criteria)	78	107.39	23.28%
HIGH SHARE OF WATER LOSSES OF PRODUCED DRINKING WATER (%) (exceeds 1.5 times the median of the group from Comparisons reporting the water losses higher than 4 m3/km/day)	63	71.41	15.48%
NEGATIVE CALCULATED PROFIT	817	28.79	6.24%
HIGH VALUE OF NON-REVENUE WATER PER KM OF CONVERTED LENGTH IN M3/KM/DAY (exceeds 1.5 times the median of the group from Comparisons reporting water losses of more than 4 m3/km/day)	102	27.75	6.01%
ZERO LABOUR COSTS + OTHER THAN ZERO NUMBER OF EMPLOYEES	93	12.75	2.76%
SHARE OF NON-COMPLIANT PHYSICAL AND CHEMICAL SAMPLES (MORE THAN 20% NON-COMPLIANT SAMPLES)	196	5.11	1.11%
ZERO WATER LOSSES	260	4.76	1.03%
ZERO NUMBER OF EMPLOYEES + REPORTED LABOUR COSTS	94	4.64	1.01%
SHARE OF NON-COMPLIANT MICROBIOLOGICAL AND BIOLOGICAL SAMPLES (MORE THAN 20% NON-COMPLIANT SAMPLES)	158	3.26	0.71%
HIGH WATER RATE (more than 1.5 TIMES the average from Comparisons meeting the defined criteria)	77	2.47	0.54%
ZERO VOLUME OF NON-REVENUE WATER	162	1.97	0.43%
SUM TOTAL OF OCCURRENCES	2236		

In terms of the volume of billed water, considered significant can be the occurrence of anomaly **high water losses per 1 km of converted length of water main per day** which affects 23.28% share of the analysed market (78 Comparisons; 107.39 m^3 of billed water). Apart from the group II, this anomaly was detected also in all the other groups. **High share of water losses in produced drinking water (%)** is directly linked to the previous indicator and points at a problem with the technical condition of infrastructure. This anomaly was identified in 63 Comparisons (71.41 mil. m^3 of billed water; i.e. 15.48% share of the analysed market). When examining the volume of losses. 260 Comparisons were identified with **zero water losses reported in the related SDOpR**. These Comparisons are present in the groups of operators V to VIII and represent 1.03% share of the analysed market (4.76 mil. m^3 of billed water). Even though it is an anomaly with only a minor effect on the analysed market, it testifies to a non-systematic approach of operators to the maintenance and repairs of WIA and a failure to monitor the WIA condition.

Another indicator that points at the problems related to the technical condition of WIA, the way of its operation and quality of measurements of the produced and supplied water, is the **high value of non-revenue water per 1 km of converted length of water main per day.** The Comparisons in which this anomaly was identified constitute 6.01% share of the analysed market (102 Comparisons; 27.75 mil. m^3 of billed water). The anomaly was detected in the groups of operators III to VIII. These matters are more thoroughly described in chapter 6.2.4.

Another group of anomalies concerns the price setting and the economic result (profit/loss). In terms of the volume of billed water, in 0.54% share of the analysed market (2.47 mil. m^3) **high water rate** is reported. This high price (rate) can also be the outcome of sector atomization when the fixed costs associated with the WIA maintenance and operation are assigned to a small volume of billed water. It is confirmed by the fact that this anomaly occurs in the groups V to VIII.

In some cases, the high price (rate) is likely to be also the consequence of the amount of calculated profit. This is indicated by the anomaly **high share of calculated profit to be distributed in FCs.** This anomaly occurs in 136 Comparisons and in terms of the volume of billed water affects 23.43% share of the analysed market (108.11 mil. m^3). This anomaly is present across all the groups of operators. A fairly high share of the affected market is caused by the fact that it is composed of predominantly four Comparisons with a high volume of billed water (from the groups of operators I to IV), with the so-called economies of scale and price not much exceeding the average of the group.

817 Comparisons (i.e. 6.24% share of the analysed market; 28.79 mil. m^3) report the use of **negative calculated profit.** This anomaly might indicate that the calculation of water rate does not reckon with the full coverage of all the economically justified costs associated with the WIA operation and management (i.e. the costs of operation and renewal of WIA are subsidised from other sources as planned), or some unforeseen circumstances happened in the given year resulting in an unplanned loss incurred. More information about this problem is provided in chapter 5.3.2.

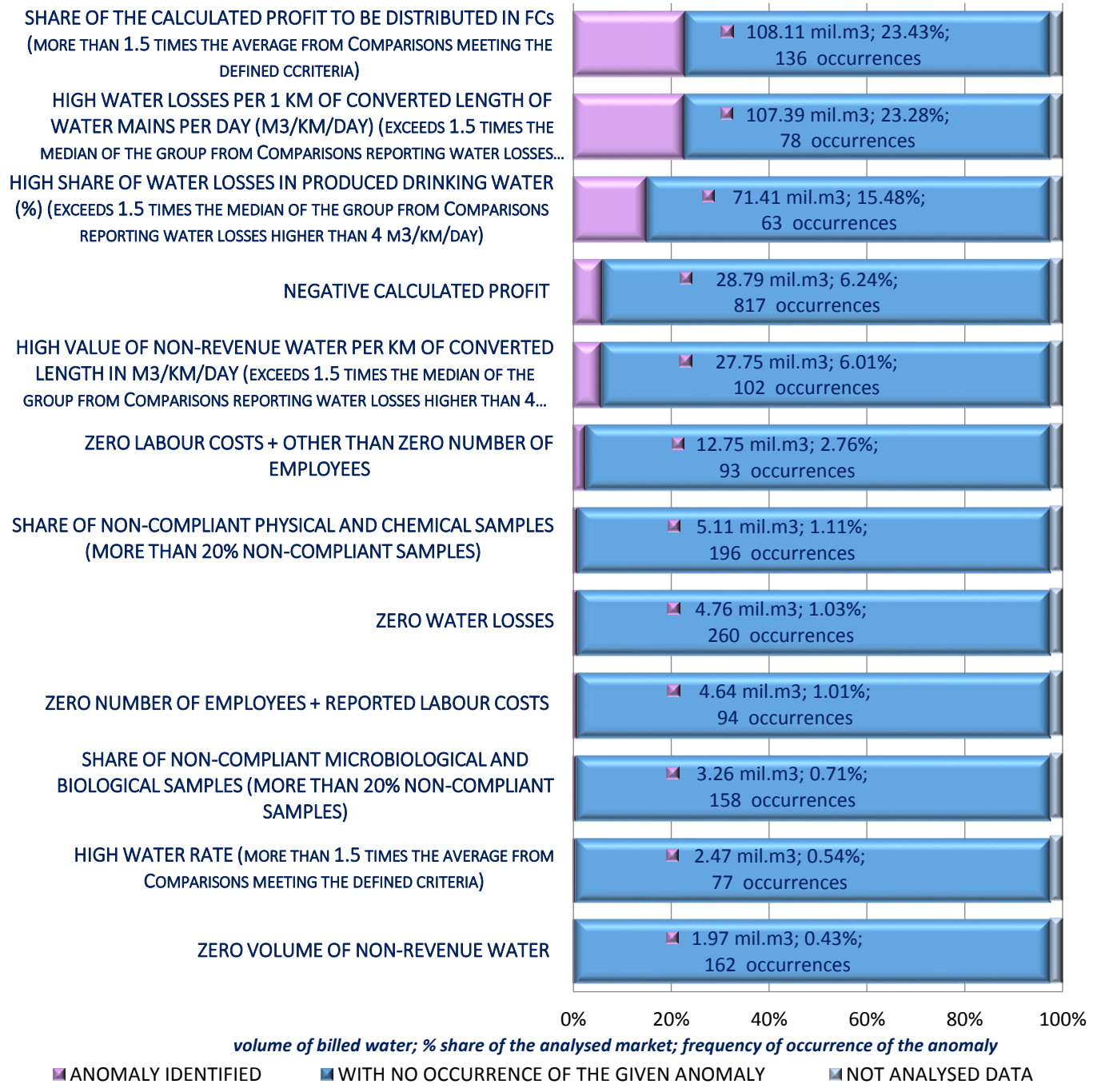
The quality of operation and provided services can be explored also through other indicators, namely the **share of non-compliant physical and chemical samples and the share of non-compliant microbiological and biological samples.** Where the share of one or the other indicator exceeds 20 %, problems may occur either in the process of operation as such, or take the shape of strong fluctuation of the quality of raw water. According to the results of

the analysis, the operators had to address the quality of water predominantly with respect to the physical and chemical limits (1.11% share of the analysed market; 5.11 mil. m^3. occurrence in 196 Comparisons). A low share of the market affected by the referred to indicators attests to a fairly high quality of supplied drinking water.

The other identified anomalies concern the occurrence of wrong reporting, or the failure to monitor certain data. The following chart illustrates the individual anomalies.

OCCURRENCE OF ANOMALIES IN RELATION TO THE VOLUME OF BILLED DRINKING WATER [MIL.M³]
BENCHMARKING OF OPERATORS 2017 - WATER SYSTEMS

1. total market size based on the Comparisons 473.197 mil. m^3
2. size of the analysed part of the market 461.355 mil. m^3 (97.5%)



6.2.2 Occurrence of anomalies in individual groups of operators

GROUP OF OPERATORS	% OCCURRENCE OF ANOMALIES	VOLUME OF BILLED DRINKING WATER (MIL.M^3) AFFECTED BY AT LEAST ONE ANOMALY	VOLUME OF BILLED DRINKING WATER IN THE GROUP (MIL.M3)	FREQUENCY OF OCCURRENCE OF ANOMALIES
Group I (>500 000 con. inh.)	100.00%	164.60	164.60	3
Group VIII (<300 con. inh.)	86.33%	5.94	6.88	1 159
Group VII (>300 con. inh.)	69.08%	8.73	12.64	670
Group III (>100 000 con. inh.)	53.34%	41.78	78.32	9
Group IV (>50 000 con. inh.)	46.79%	28.67	61.27	13
Group V (>10 000 con. inh.)	42.20%	20.35	48.22	42
Group II (>200 000 con. inh.)	9.63%	4.89	50.76	1
Group VI (>1 000 con. inh.)	5.97%	2.31	38.66	339
TOTAL	60.10%	277.26	461.35	2 236

The group with the highest risk with respect to the number of anomalies appears to be the group VIII. It is followed by the groups of operators VII. V and I in which the identified anomalies affect more than 50% share of the volume of billed water in the group. In the group VI the share of the affected volume of billed water is low, but the number of occurrence of anomalies in the group equals 339.

The table below provides an overview of the occurrence of individual monitored anomalies in the groups in which more than one hundred anomalies was detected. It concerns the groups of operators **VI. VII and VIII**. These three groups supply the drinking water to a total of 1.35 mil. of inhabitants to whom 58.18 mil. m^3 of drinking water was billed in 2017 (i.e. 12.61% share of the analysed market. 461.35 mil. m^3). These three groups reported 96.96% (i.e. 2 168 occurrences) of the total number of 2 236 occurrences of all the anomalies.

ANOMALY	Group VI (>1 000 con. inh.) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED DRINKING WATER (MIL.M3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP VI	Group VII (>300 con. inh.) FREQUENCY OF OCCURENCE OF THE ANOMALY	VOLUME OF BILLED DRINKING WATER (MIL.M3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP VII	Group VIII (<300 con. inh.) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED DRINKING WATER (MIL.M3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP VIII
VOLUME OF BILLED WATER IN THE GROUP IN MIL. M3		38.66		12.64		6.88
NEGATIVE CALCULATED PROFIT	119	10.97	279	5.71	410	4.08
ZERO WATER LOSSES	9	0.93	59	1.11	191	2.47
ZERO VOLUME OF NON-REVENUE WATER	4	0.25	34	0.66	124	1.06
SHARE OF NON-COMPLIANT PHYSICAL AND CHEMICAL SAMPLES (MORE THAN 20% NON-COMPLIANT SAMPLES)	25	2.62	59	1.33	111	1.09
SHARE OF NON-COMPLIANT MICROBIOLOGICAL AND BIOLOGICAL SAMPLES (MORE THAN 20% NON-COMPLIANT SAMPLES)	11	1.42	51	1.02	96	0.81
HIGH WATER RATE (more than 1.5 times the average from Comparisons meeting the defined criteria)	13	0.56	12	0.27	49	0.40
ZERO NUMBER OF EMPLOYEES + REPORTED LABOUR COSTS	21	2.31	32	0.84	39	0.18
HIGH VALUE OF NON-REVENUE WATER PER KM OF CONVERTED LENGTH IN M3/KM/DAY (exceeds the 1.5 times the median of the group from Comparisons reporting water losses higher than 4 m3/km/day)	30	4.15	28	0.67	36	1.58
SHARE OF THE CALCULATED PROFIT TO BE DISTRIBUTED IN FCs (more than 1.5 times the average from Comparisons meeting the defined criteria)	32	3.09	56	1.34	29	0.40
ZERO LABOUR COSTS + OTHER THAN ZERO NUMBER OF EMPLOYEES	27	2.87	30	0.56	28	0.20
HIGH SHARE OF WATER LOSSES IN PRODUCED DRINKING WATER (%) (exceeds 1.5 times the median of the group from Comparisons reporting the water losses higher than 4 m3/km/day)	25	4.13	19	0.52	25	0.33
HIGH WATER LOSSES PER 1 KM OF CONVERTED LENGTH OF WATER MAINS PER DAY (M3/KM/DAY) (exceeds 1.5 times the median of the group from Comparisons reporting water losses higher than 4 m3/km/day)	23	1.96	11	0.15	21	0.14
TOTAL	339		670		1 159	

According to the number of occurrences of anomalies, the most affected group is the group VIII. In all three groups with the highest risk, the most frequently occurring is the use of **negative calculated profit**. For example in the group VIII it affects more than 59% share of billed water in the group (4.08 mil. m^3). The results of the analyses reveal that the frequent occurrence of this anomaly (caused by the low rate or the low billed volume) is brought about especially by market atomization and the associated effects of the municipal-type management and decision-making in the mixed and ownership model of operation.

Other anomalies with noticeable effects in the high-risk groups are those pointing at the poor condition of WIA, non-systematic technical care for the operated WIA and a failure to monitor the losses. In the group VIII there are 191 Comparisons with **zero water losses** (35.95% share of billed water; 2.47 mil. m^3 of billed water). In the other two groups, the effect of this anomaly with regard to the affected share of the billed water in the group is less significant. In the group VIII identified as significant was the anomaly **high value of non-revenue water per 1 km of converted length of water main per day** which affects 23% share of the billed water in the group. Such a high share of affected volume of billed water in combination with the effects of reported zero water losses testify to difficulties of operators to properly use the procedures for reducing the volume of non-revenue water and losses in WIA operation and to care for the technical condition of the operated WIA (a matter of collaboration between the WIA operator and owner. which is highly limited due to the economic performance of the operated water supply system. which is yet another manifestation of market atomization). The need to focus on reducing the water losses especially in the group VI is highlighted also by the anomaly of high water losses per 1 km of converted length of water main per day, where it affects 10.69% share of billed water in the group (4.134 mil. m^3) and also the proportion of water losses in produced drinking water (i.e. 5.07 %).

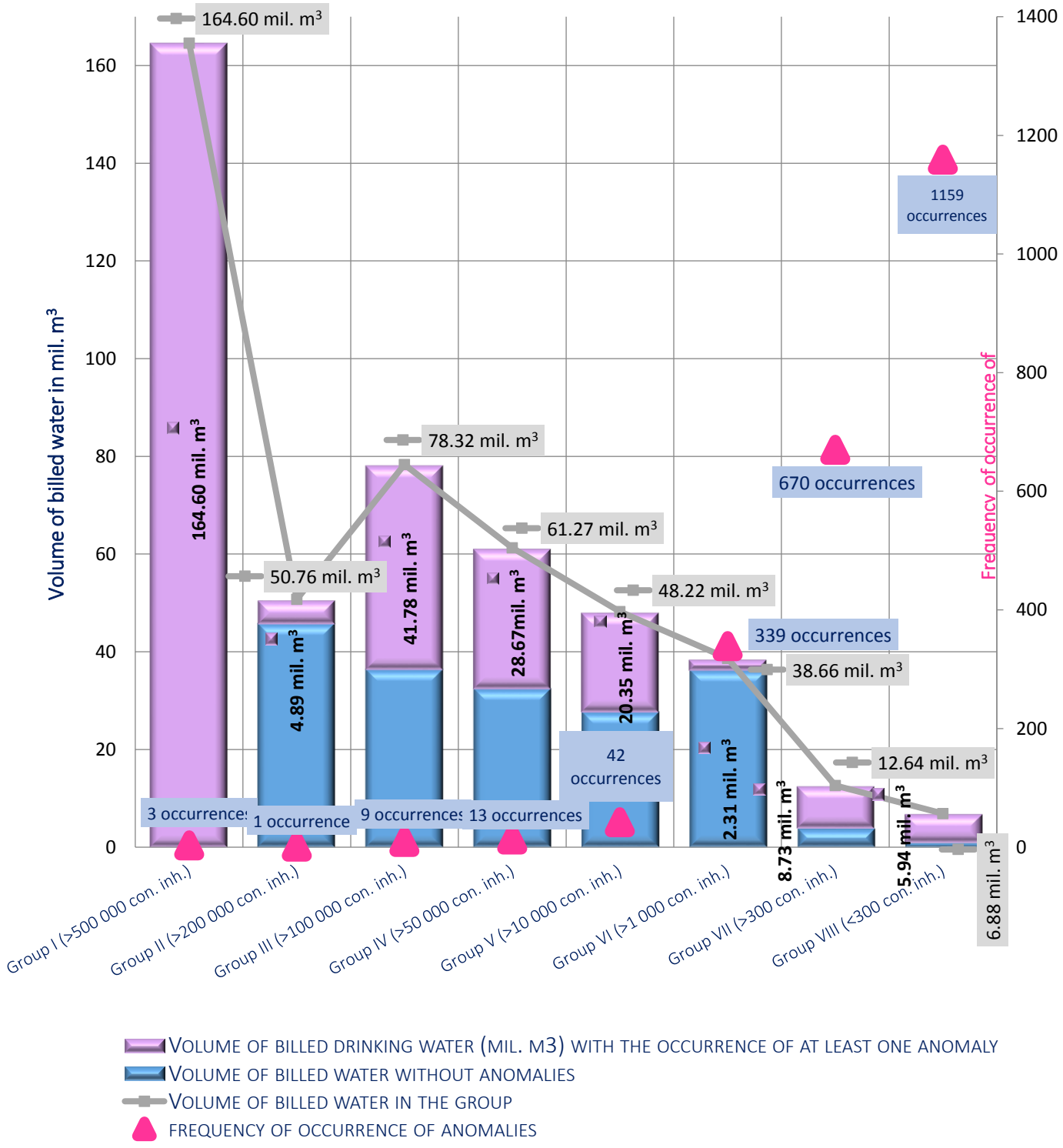
The highest number of issues related to the compliance with the quality of supplied water was observed also in the group VIII. These do not necessarily have to consist only in potentially improper operation procedures since the final quality of water closely depends on the WIA condition. **The share of non-compliant physical and chemical or microbiological and biological samples higher than 20 %** in the group VIII occurred in 111 Comparisons and affected 15.90% share of billed water in the group. In the other high-risk groups, its effect was less significant.

Of some interest is the detected **high share of calculated profit to be distributed in FCs (without the part for development and renewal)** and **high water rates**. These anomalies attest to the diversity of approaches to price setting as well as reporting of data in Comparisons in all the three assessed groups. The high share of profit to be distributed in FCs in terms of the volume of billed water was most strongly shown in the group VI where it affected 3.087 mil. m^3 of billed drinking water (7.98% share of the billed water in the group). The highest frequency of occurrence of the high share of profit in FCs is in the group of operators VII (56 Comparisons). The calculated profit to be distributed serves to cover the economically unjustified costs or represents the remuneration of the recipient for service provision. The decision on the use of these funds is to be adopted by the water rate recipient, and though they are generated as a part of the water rate they do not have to be used to improve the WIA condition and operation processes. It should be repeated again that the occurrence of a high share of calculated profit to be distributed in FCs can be influenced by not reporting the economically justified costs in full.

In order to summarise the occurrence of anomalies, the following chart is provided that illustrates the situation in the groups.

BENCHMARKING OF OPERATORS 2017 - DRINKING WATER
OCCURRENCE OF AT LEAST ONE ANOMALY IN THE GROUP
- CONVERTED TO THE VOLUME OF BILLED WATER (MIL. M³)

1. total market size based on the Comparisons 473.197 mil. m³
2. size of the analysed part f the market 461.355 mil. m³ (97.5%)



6.2.3 Comparisons of average values of monitored indicators from the Comparisons meeting the defined criteria

The following table gives the average of values of selected indicators from the Comparisons meeting the defined values for individual groups of operators. Their calculation was made in line with the applicable methodology and procedures stated in point 3.4.

The average values may be used to specify, in a very simplified manner, the characteristics of operators who most closely approximate the fulfilment of individual objectives of the regulation for the whole sector of water supply systems.

INDICATOR	OPERATIONAL COEFFICIENT	WATER RATE (CZK/M3)	NON-REVENUE WATER IN M3 PER KM OF CONVERTED LENGTH PER DAY	SHARE OF GENERATED FUNDS FOR RENEWAL AND DEVELOPMENT IN THE WIA VALUE IN %	NUMBER OF CONNECTED INHABITANTS PER 1 EMPLOYEE OF THE COMPANY	UNIT COSTS (CZK/M3)
GROUP I (>500 000 CON. INH.)	1.17	39.95	6.42	2.45	1 952.84	34.47
GROUP II (>200 000 CON. INH.)	1.09	37.00	5.86	3.45	1 502.14	33.79
GROUP III (>100 000 CON. INH.)	1.04	37.22	4.25	2.27	1 199.70	35.84
GROUP IV (>50 000 CON. INH.)	1.05	40.37	3.18	2.22	1 440.33	38.44
GROUP V (>10 000 CON. INH.)	1.07	35.42	3.35	2.16	1 751.13	33.15
GROUP VI (>1 000 CON. INH.)	1.07	35.26	3.14	1.42	1 777.04	32.23
GROUP VII (>300 CON. INH.)	1.06	34.00	2.03	1.46	2 053.71	30.74
GROUP VIII (<300 CON. INH.)	1.06	34.85	0.92	2.31	560.92	31.53
AVERAGE OF ALL THE GROUPS	***1.08***	***36.76***	***3.64***	***2.22***	***1 441.76***	***33.77***

6.2.4 Non-revenue water and water losses

In managing the water supply systems, in order to increase the effectiveness and quality of operation the operators use among others also the following indicators: **volume of non-revenue water and water losses**. The volume of non-revenue water is a differential indicator between the volume of produced drinking water and the volume of billed water (i.e. the measured volumes). The water losses from pipe network constitute a portion of the volume of non-revenue water after the deduction of the volume of water consumed (note: in line with Decree No 428/2001 Coll. it is the volume of water used by the operator for the needs of operation to rinse the water supply network. sewerage network. water consumed in operations centres etc.). In accordance with Decree No 428/2001 Coll., the water losses are caused by:

1. Leaks due to faulty joints between pipes and fixtures.
2. Water leaks during breakdowns and overloading of water towers.
3. Water losses due to inaccurate water meters.

4. Higher consumption than billed based on the annual reference values.
5. Loss caused by water theft.

In the international context, a more detailed classification of water losses is applied:

1. Apparent (commercial) losses – losses caused by inaccuracy of water meters, higher consumption than billed based on the reference values, losses caused by water theft.
2. Real (physical) losses – leaks due to faulty joints between pipes and fixtures, water leaks during breakdowns and overloading of water towers.

The evaluation of the described parameters is subject to the Benchmarking of Operators, separately for each group of operators. It shall be emphasized that such operators were identified who report deficiencies in the monitoring and reporting of non-revenue water and water losses which may affect the reporting value of the calculated indicators. These operators also clearly do not apply the management of non-revenue water or the reduction of water losses as a tool for increasing efficiency and quality of WIA operation.

The programme for reducing the volume of non-revenue water has demonstrable effects on:

- Effectiveness of the use of water sources and investments in costly expansion of water sources capacity.
- Energy savings and resilience to climate change.
- Improving the quality of services and customer satisfaction.
- Improving the financial viability of the operator.

The analysed data set included Comparisons which either did not comprise any information on non-revenue water or losses (162 Comparisons), in which the value of non-revenue water equalled the value of losses (354 Comparisons), or Comparisons which reported only the values of the volume of non-revenue water (98 Comparisons). The problems with monitoring and reporting the indicators occur in the group of operators IV to VIII and mostly in the operators providing services to less than 300 connected inhabitants.

FAILURE TO REPORT NON-REVENUE WATER AND LOSSES / MODEL OF OPERATION	COMBINED	SEPARATE	SEPARATE WITH SERVICE CONTRACT	MIXED	TOTAL
GROUP VI (>1 000 CON. INH.)		1		3	4
GROUP VII (>300 CON. INH.)	1	1	7	25	34
GROUP VIII (<300 CON.INH.)	2	17	26	79	124
NUMBER OF COMPARISONS TOTAL	**3**	**19**	**33**	**107**	**162**

VOLUME OF NON-REVENUE WATER IS THE SAME AS the VOLUME OF LOSSES / MODEL OF OPERATION	COMBINED	SEPARATE	SEPARATE WITH SERVICE CONTRACT	MIXED	TOTAL
GROUP IV (>50 000 CON.INH.)	1				1
GROUP V (>10 000 CON. INH.)		2		1	3
GROUP VI (>1 000 CON. INH.)	2	35	1	9	47
GROUP VII (>300 CON. INH.)	1	48	22	42	113
GROUP VIII (<300 CON.INH.)	1	56	46	87	190
NUMBER OF COMPARISONS TOTAL	**5**	**141**	**69**	**139**	**354**

REPORTING OF NON-REVENUE WATER AND ZERO LOSSES / MODEL OF OPERATION	COMBINED	SEPARATE	SEPARATE WITH SERVICE CONTRACT	MIXED	TOTAL
GROUP V (>10 000 CON. INH.)				1	1
GROUP VI (>1 000 CON. INH.)	2			3	5
GROUP VII (>300 CON. INH.)		2	1	22	25
GROUP VIII (<300 CON.INH.)		6	4	57	67
NUMBER OF COMPARISONS TOTAL	**2**	**8**	**5**	**83**	**98**

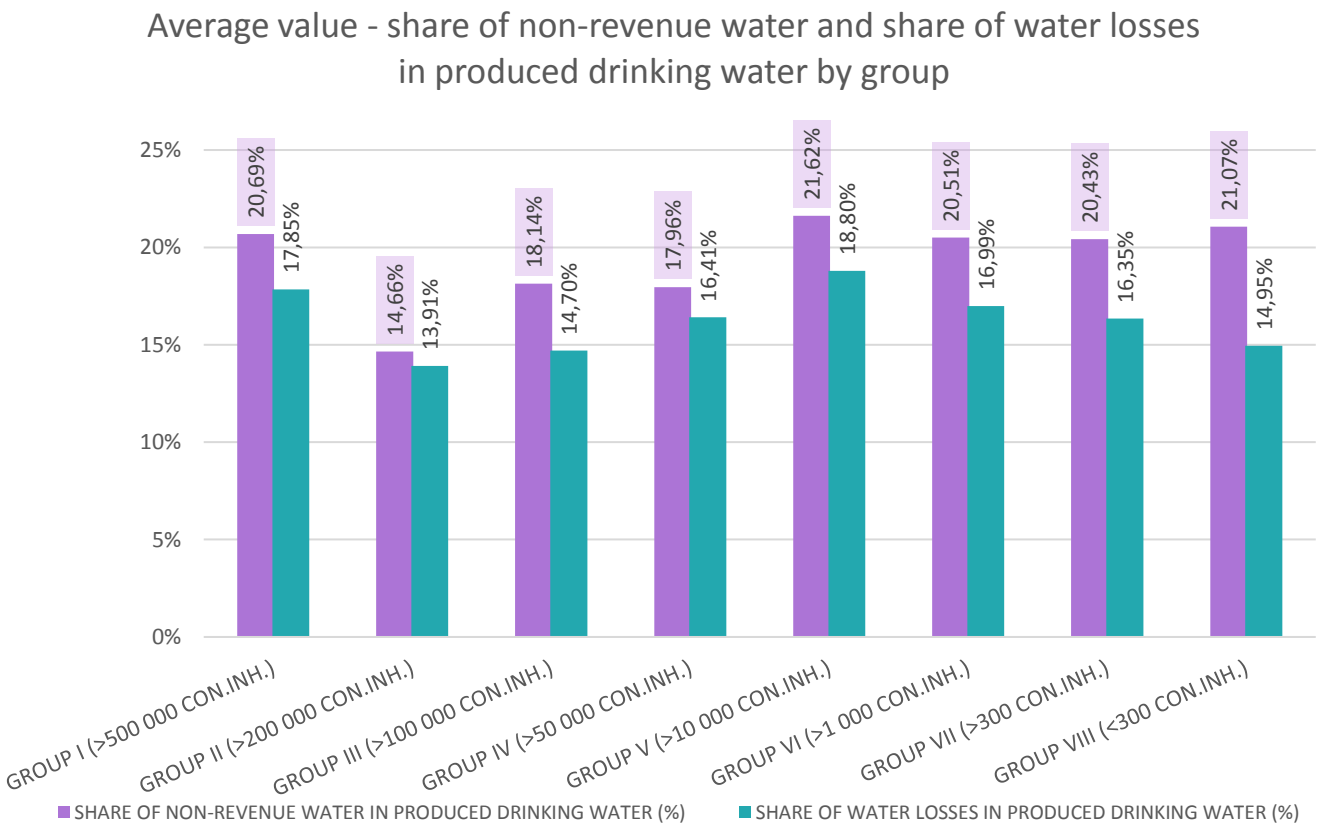
The closer examination of data in the framework of conducted analyses revealed deficiencies in the rules governing the reporting of non-revenue water, namely in the case of water produced and consumed by the operator, whose primary activity is not the production and sale of drinking water. It concerns especially the compound water mains, or non-revenue water consumed by organisational units established by the municipal operator (social services centre. nurseries etc.). These entities in the related SDOpR often report in the non-revenue water also the water consumed in operations not associated with the production and distribution of drinking water, or water that was not billed though it should have been billed (e.g. due to a non-existence of the contract). *The regulator will have to clearly define the rules for reporting the water balance data in SDOpR and billed water in the Comparisons (it has an impact also on sewerage systems in case the municipality decides not to bill the drainage of waste water and precipitation water).*

The following table gives the values of monitored indicators for Comparisons in which the indicators of the volume of non-revenue water and water losses are monitored based on SDOpR.

COMPARISONS MONITORING THE VOLUME OF NON-REVENUE WATER AND WATER LOSSES	PRODUCED DRINKING WATER (MIL. M3)	NON-REVENUE WATER TOTAL (MIL. M3)	WATER LOSSES (MIL. M3)	AVERAGE – SHARE OF NON-REVENUE WATER IN PRODUCED DRINKING WATER (%)	AVERAGE – SHARE OF WATER LOSSES IN PROD. DRINK. WATER (%)	AVERAGE – WATER LOSSES PER 1 KM OF CONVERTED LENGTH OF WATER MAIN PER DAY ((M3/KM)/DAY)
GROUP I (>500 000 CON.INHAB.)	207.02	42.56	37.07	20.69	17.85	5.63
GROUP II (>200 000 CON.INHAB.)	54.60	7.14	6.71	14.66	13.91	5.51
GROUP III (>100 000 CON.INHAB.)	98.27	20.41	17.03	18.14	14.70	5.60
GROUP IV (>50 000 CON.INHAB.)	68.96	12.45	11.45	17.96	16.41	4.22
GROUP V (>10 000 CON.INHAB.)	60.41	13.72	12.04	**21.62**	**18.80**	**6.16**
GROUP VI (>1 000 CON.INHAB.)	44.64	9.53	8.06	20.51	16.99	4.17
GROUP VII (>300 CON.INHAB.)	11.58	2.52	2.04	20.43	16.35	2.79
GROUP VIII (<300 CON.INHAB.)	4.90	1.10	0.74	21.07	14.95	2.75
TOTAL	550.37	109.42	95.13	20.60	16.20	3.35

Based on the average value of the indicator share of non-revenue water in produced drinking water (21.62 %) and share of water losses in produced drinking water (18.80 %) in the group. *considered the most problematic group can be the group of operators V*. It can be assumed that the technical condition of WIA in this group is not good compared to the other groups, which is demonstrated by the average value of the indicator water losses per 1 km of converted length of water main per 1 day of 6.16 m^3/km/day.

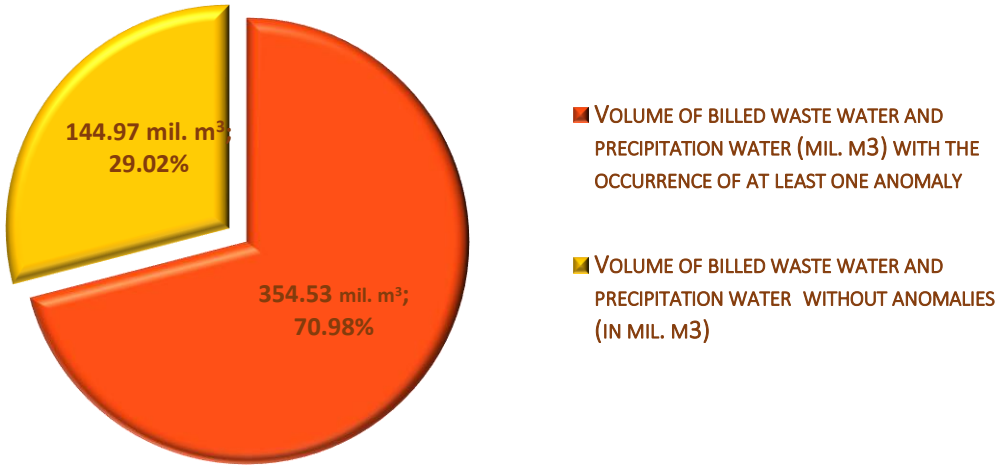
The following chart shows the average values of the share of non-revenue water and water losses in produced drinking water by the group.



6.2.5 Sewerage system

In the framework of the Benchmarking of Operators, in the part concerning the sewerage systems. 2 005 Comparisons were assessed which represent 97.79% share of the market determined based on the volume of billed waste water and precipitation water (i.e. 499.502 mil. m^3 of the total of 510.81 mil. m^3). In total, at least one anomaly occurs in 76.34 % of analysed Comparisons, i.e. in 1 531 Comparisons. In terms of the volume of billed waste water and precipitation water. 29.02% share of the analysed market (144.97 mil. m^3) is affected by anomalies.

BENCHMARKING OF OPERATORS 2017 - SEWERAGE SYSTEM
OCCURRENCE OF AT LEAST ONE ANOMALY BASED ON THE VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER



The following table gives the frequency of occurrence of individual identified anomalies in the analysed Comparisons.

ANOMALY	FREQUENCY OF OCCURRENCE	VOLUME OF IDENTIFIED ANOMALY	% SHARE OF THE ANALYSED MARKET (499.5 MIL.M^3)
HIGH SHARE OF THE PROFIT TO BE DISTRIBUTED IN FCs (MORE THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)	259	87.44	17.50%
NEGATIVE CALCULATED PROFIT	1 124	36.77	7.36%
OTHER THAN ZERO VOLUME OF WASTE WATER DRAINED TO WWTP AND NO INHABITANTS CONNECTED TO WWTP	241	14.35	2.87%
ZERO LABOUR COSTS + OTHER THAN ZERO NUMBER OF EMPLOYEES	81	11.88	2.38%
ZERO NUMBER OF EMPLOYEES + REPORTED LABOUR COSTS	111	5.45	1.09%
SHARE OF NON-COMPLIANT SAMPLES OF WASTE WATER DISCHARGED FROM WWTP HIGHER THAN 20 %	65	4.41	0.88%
HIGH SEWERAGE RATE (MORE THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)	67	1.47	0.29%
ZERO SEWERAGE RATE TOTAL	61	0.66	0.13%
INHABITANTS CONNECTED TO WWTP, ZERO VOLUME OF WASTE WATER DRAINED TO WWTP	13	0.46	0.09%
FREQUENCY OF OCCURRENCE OF ANOMALIES TOTAL	**2 022**		

In terms of the volume of billed waste water including precipitation water, the most significant anomaly is the **high share of the profit to be distributed in FCs** (17.50 % share of the analysed market). Anomalies were found in 259 Comparisons (87.44 mil. m^3). The high share of profit to be distributed in FCs occurs in the groups II to VIII. **The high sewerage rate** which can correlate with the previous anomaly occurs in 0.29% market share (67 Comparisons; 1.47 mil. m^3 of billed water). The occurrence of high rate can also be caused by effects of subsidies on price setting.

Also the anomalies **negative calculated profit** (detected in 1 124 Comparisons; 7.36% market share; 36.77 mil. m^3) and **zero water rate total** (61 Comparisons; 0.13% market share; 0.66 mil. m^3) are closely related to the setting of sewerage rate which attest to the problematic approach to price setting or rather to subsidising the costs of services associated with the drainage and treatment of waste water and precipitation water. The occurrence of zero sewerage rate total in the majority of cases concerned the Comparisons which reported zero price (rate) with a note that the sewerage rate is not billed. In many cases, the zero rate is the result of the fact that the sewers are not connected to the WWTP. In such a case, the sewers serve to discharge the waste water already treated by the domestic WWTP directly into a natural stream or river. It may be assumed that in most of the cases this was originally the storm sewer (not connected to the WWTP and the obligation to treat the waste water is passed on the customer) and the recipients of the sewerage rate decided not to bill the drainage of this water.

Negative calculated profit can also be the outcome of efforts to reduce the price, or attests to unplanned losses incurred. Largely, the main cause is the high market atomization. Particularly the operators and owners of economically inefficient sewerage system shall subsidy the costs associated with the WIA operation and management. The negative calculated profit might indicate the fact that the calculation of the sewerage rate does not reckon with covering all the economically justified costs associated with the WIA operation and management in full (i.e. subsidising the costs of the WIA operation and management from other sources is planned), or certain unforeseen circumstances occurred in the given year leading to unplanned losses incurred. This problem is more thoroughly explored in chapter 5.3.5.

Another interesting approach to price setting is seen in 39 Comparisons in the groups VI. VII and VIII which reported a zero value of calculated profit derived from the actual costs and revenues, and 41 Comparisons in which all the calculated and actually achieved values equal. Both the cases are in reality impossible provided the economically justified costs are reported in full. It means that the calculations were made up and the price setting does not reflect the reality.

The share of non-compliant samples of waste water discharged from the WWTP higher than 20% was found in 65 Comparisons which means that in 0.88% market share the operators faced difficulties in complying with the emission limits of discharged waste water (4.41 mil. m^3 of billed water).

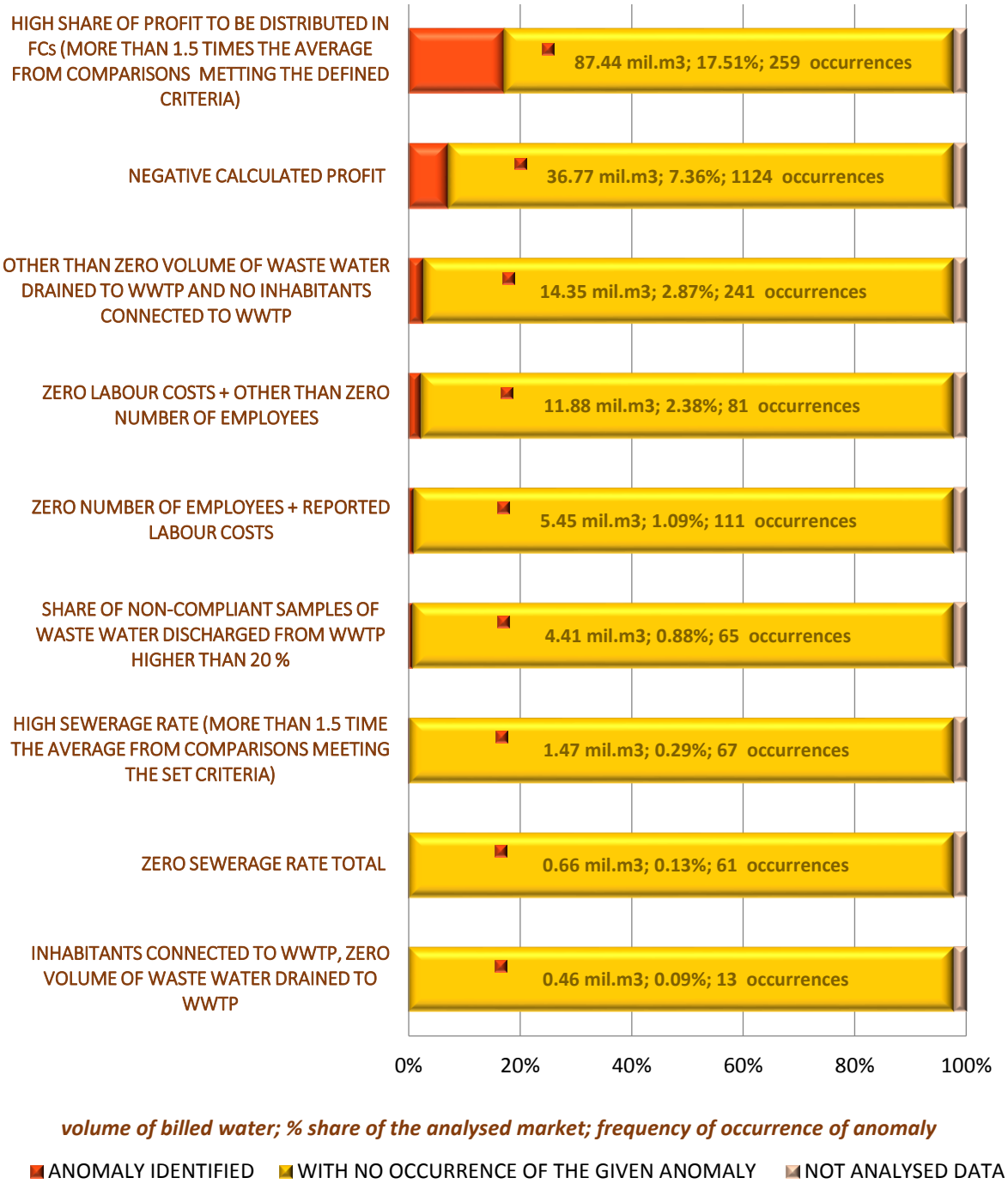
The remaining anomalies concern discrepancies in data reporting. Attention shall be brought to the frequent occurrence of the anomaly – other than zero volume of waste water drained to the WWTP and zero number of inhabitants connected to the WWTP (241 Comparisons; 2.87% share of the analysed market; 14.35 mil. m^3) and problems in the

reporting of the number of employees, namely in 111 Comparisons (zero number of employees + reported labour costs).

The following chart illustrates the individual anomalies (shares. frequencies etc.).

OCCURRENCE OF ANOMALIES IN RELATION TO THE VOLUME OF BILLED WASTE WATER AND PRECIPITATION [MIL.M³]
BENCHMARKING OF OPERATORS 2017 - SEWERAGE SYSTEM

1. total market size based on the Comparisons 510.81 mil. m³
2. size of the analysed part of the market 499.50 mil. m³ (97.8%)



6.2.6 Occurrence of anomalies in individual groups of operators

GROUP OF OWNERS	% SHARE OF THE VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER WITH THE OCCURRENCE OF AT LEAST ONE ANOMALY	VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER (MIL. M^3) WITH THE OCCURRENCE OF AT LEAST ONE ANOMALY	VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER IN THE GROUP (IN MIL. M^3)	FREQUENCY OF OCCURRENCE OF ANOMALIES
GROUP VIII (<300 CON.INH.)	90.79%	6.71	7.39	807
GROUP VII (>300 CON.INH.)	69.47%	13.16	18.94	766
GROUP V (>10 000 CON.INH.)	51.08%	35.63	69.76	30
GROUP VI (>1 000 CON.INH.)	50.85%	30.29	59.56	412
GROUP IV (>50 000 CON.INH.)	40.63%	26.06	64.15	5
GROUP II (>200 000 CON.INH.)	37.86%	25.40	67.08	1
GROUP III (>100 000 CON.INH.)	10.07%	7.73	76.80	1
GROUP I (>500 000 CON.INH.)	0.00%	0.00	135.81	0
TOTAL	29.02%	144.98	499.50	**2 022**

Based on the number of occurrences of anomalies, the most problematic seems to be the group VIII. The other groups in which the anomalies affect more than 50% share of the volume of billed water are the groups II and VII.

The following table gives an overview of occurrences of individual monitored anomalies in the groups in which their frequency was higher than 100. These are the groups of operators **VI. VII** a **VIII**. Entities from these groups provide services to 1.71 mil. inhabitants to whom 85.9 mil. m^3 waste water and precipitation water was billed in 2017 (i.e. 17.2% share of the analysed market).

ANOMALY	Group VI (>1 000 con.inh.) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER (MIL. M^3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP VI	Group VII (>300 con. inh.) FREQUENCY OF OCCURRENCE OF THE ANOMALY	VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER (MIL. M3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP VII	Group VIII (<300 con. Inh.) FREQUENCY OF OCCURRONCE OF THE ANOMALY	VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER (MIL. M3) AFFECTED BY AT LEAST ONE ANOMALY IN GROUP VIII
VOLUME OF BILLED WATER IN THE GROUP IN MIL.		59.56		18.94		7.39
NEGATIVE CALCULATED PROFIT	183	14.66	479	10.15	456	3.66
HIGH SHARE OF PROFIT TO BE DISTRIBUTED IN FCs (MORE THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)	83	9.99	38	1.19	123	1.91
OTHER THAN ZERO VOLUME OF WASTE WATER DRAINED TO WWTP AND NO INHABITANTS CONNECTED TO WWTP	65	6.41	110	2.74	61	1.92
ZERO NUMBER OF EMPLOYEES + REPORTED LABOUR COSTS	25	2.38	40	0.88	44	0.46
ZERO SEWERAGE RATE TOTAL	3	0.13	15	0.25	43	0.28
SHARE OF NON-COMPLIANT SAMPLES OF WASTE WATER DISCHARGED FROM WWTP HIGHER THAN 20 %	16	2.59	20	0.46	28	0.18
HIGH SEWERAGE RATE (MORE THAN 1.5 TIMES THE AVERAGE FROM COMPARISONS MEETING THE DEFINED CRITERIA)	10	0.63	30	0.53	27	0.31
ZERO LABOUR COSTS + OTHER THAN ZERO NUMBER OF EMPLOYEES	26	2.58	26	0.56	21	0.11
INHABITANTS CONNECTED TP WWTP, ZERO VOLUME OF WASTE WATER DRAINED TO WWTP	1	0.03	8	0.41	4	0.03
TOTAL	412		766		807	

In all the three groups of operators the most frequent is the use of **negative calculated profit** (1 118 Comparisons; 33.15 % of the volume of billed water in these groups). In group VII it affects more than 50% share of the billed water in the group (419 Comparisons; 10.15 mil. m3) and in the group VIII 49% share of the volume of water billed in the group (456 Comparisons; 3.66 mil. m3). Another anomaly illustrating the problems in the area of price setting is the zero sewerage rate total. This anomaly is not so important since in neither of the high-risk groups it achieves the 4% share of the volume of billed water. The necessity to address the price setting in small operators is confirmed also by the occurrence of the *high share of the profit to be distributed in FCs and high sewerage rate*. The effects of the high share of profit in FCs on more than one quarter of the billed water was found in the group VIII (123 Comparisons; 1.91 mil. m^3), in case of the group VI the anomaly affects 6.76% share of the billed water in the group.

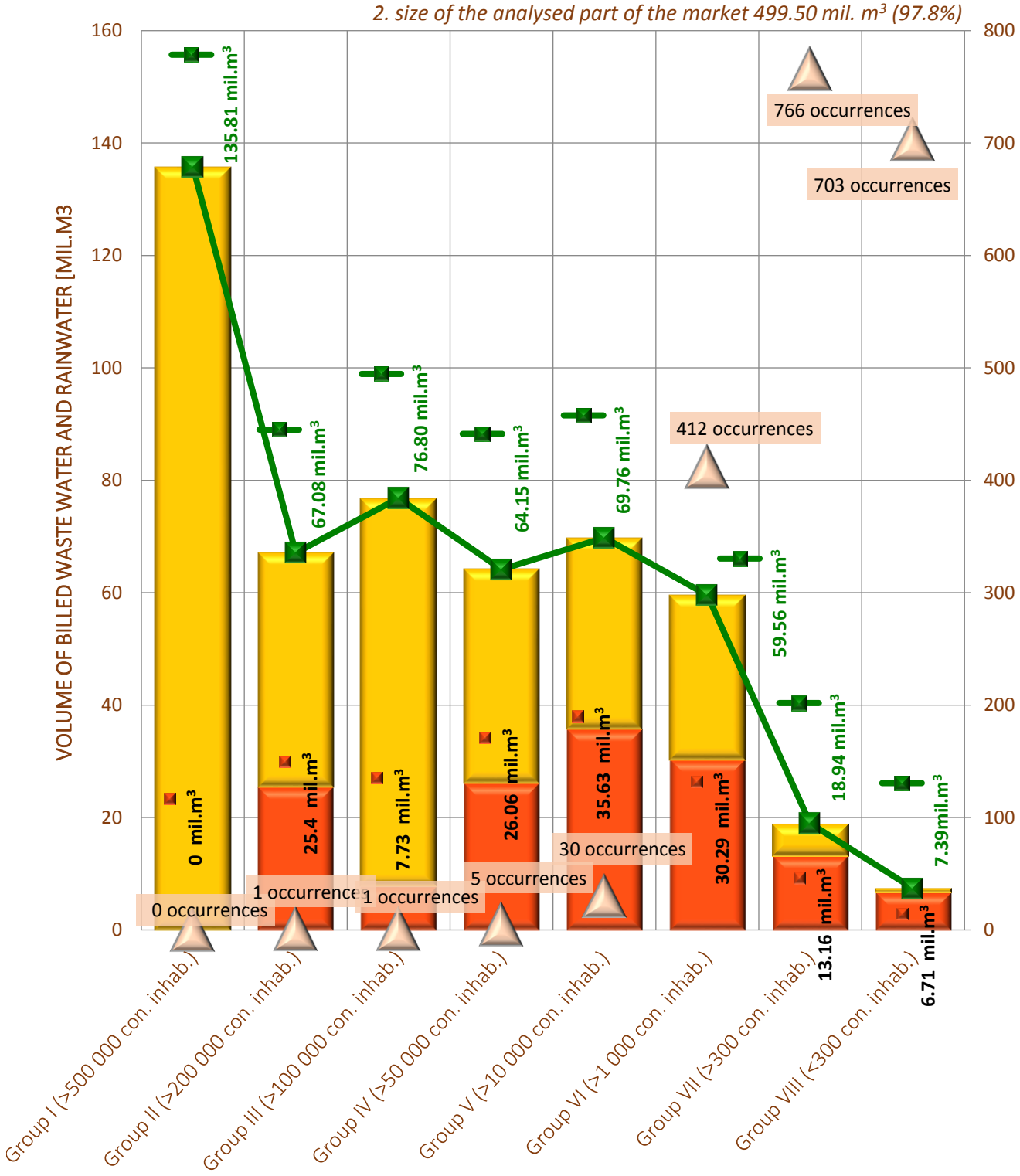
Other anomalies of higher significance reveal the problems with data reporting. Most frequently it is the discrepancy of stating other than zero volume of drained waste water to the WWTP with zero number of inhabitants connected to the WWTP. The highest occurrence is observed in the group VII, namely in 110 Comparisons, i.e. 14.47% share of the billed water in the group. In total, this anomaly affects 12.89 % of the volume of billed water in the high-risk groups. Often occurring is also the discrepancy of reporting other than zero labour costs and at the same time a zero number of employees. This anomaly affects 4.33 % volume of billed water in the high-risk groups and occurs in 109 Comparisons.

Based on the number of occurrences of the anomaly **high share of non-compliance samples of waste water discharged from the WWTP** higher than 20 % which was identified in all the three groups in 64 Comparisons (altogether 3.23 mil. m^3 of billed water), it could be stated that the operators mostly achieved the required quality of discharged waste water.

In order to get a comprehensive picture, the following chart is included which illustrates the situation in individual groups.

BENCHMARKING OF OWNERS 2017 - SEWERAGE SYSTEM
OCCURRENCE OF AT LEAST ONE ANOMALY IN THE GROUP
- IN RELATION TO THE VOLUME OF BILLED WASTE WATER AND PRECIPITATION WATER [MIL.M³]

1. total market size based on the Comparisons 510.81 mil. m³
2. size of the analysed part of the market 499.50 mil. m³ (97.8%)



Volume of billed waste water and precipitation water without anomalies (in mil. m3)
Volume of billed waste water and precipitation water (mil. m3) with the occurrence of at least one anomaly
Volume of billed waste water and precipitation water in the group (in mil. m3)

6.2.7 Comparisons of the average values of monitored indicators from the Comparisons meeting the defined criteria

The following table gives the average of values of selected indicators from the Comparisons meeting the defined values for individual groups of operators. Their calculation was made in line with the applicable methodology and procedures stated in point 3.4.

The average values may be used to specify, in a very simplified manner, the characteristics of operators who most closely approximate the fulfilment of individual objectives of the regulation for the whole sector of sewerage systems.

INDICATOR	OPERATIONAL COEFFICIENT	SEWERAGE RATE (CZK/M3)	SHARE OF TREATED WASTE WATER (%)	SHARE OF GENERATED FUNDS FOR RENEWAL AND DEVELOPMENT IN THE WIA VALUE	DRAINED WASTE WATER INCLUDING RAUN WATER PER EMPLOYEE OF THE COMPANY (THSD M³/EMPL.)	UNIT COSTS (CZK/M3)
GROUP I (>500 000 CON. INH.)	1.12	37.97	99.36	2.29	137.66	33.98
GROUP II (>200 000 CON. INH.)	1.18	33.41	96.90	2.24	103.98	28.58
GROUP III (>100 000 CON. INH.)	1.07	34.18	99.90	1.89	79.07	33.19
GROUP IV (>50 000 CON. INH.)	1.07	35.72	99.89	1.96	69.66	33.46
GROUP V (>10 000 CON. INH.)	1.08	34.70	99.97	2.21	68.61	32.18
GROUP VI (>1 000 CON. INH.)	1.07	34.71	99.92	1.84	77.69	32.08
GROUP VII (>300 CON. INH.)	1.10	35.71	100.00	2.84	65.16	31.17
GROUP VIII (<300 CON. INH.)	1.04	37.84	96.41	1.74	71.70	36.08
AVERAGE OF ALL THE GROUPS	***1.09***	***35.53***	***99.04***	***2.13***	***84.19***	***32.59***

6.3 Conclusions of the Project Benchmarking of Operators 2017

6.3.1 SWOT analysis

STRENGTHS	WEAKNESSES
1. Developed WIA network and for the time being enough natural water sources in the prevailing part of the territory of the Czech Republic. 2. Legislative framework stipulating the rights and obligations of the WIA owners and operators. 3. High % of inhabitants connected to public water supply and sewerage systems. 6. A price setting system introduced by law which *makes it possible to cover all the costs from water and sewerage rates* – a prerequisite for achieving the self-financing capacity of water supply and sewerage systems. 7. A possibility to use in the price assessment the tool "contract between the owner and the tenant on leaving a part of the profit to the tenant". 8. Organised data collection is stipulated in the legislation (selected data from ownership records. and operating records. "Comparisons", reporting to the CZSO, mechanisms of collection of data on the quality of drinking water and values of treated waste waters). 9. Existence of aid schemes for the development of WIA.	1. High degree of market atomization (according to the MoA records 6 795 owners. 2 878 operators). 2. Diverse structure of business relationships in individual models of operation has an effect on the possibilities of the owner to make decisions on the way of generating the funds for renewal, their amount and time of accumulation which may be related to the duration of the contract concluded between the WIA owner and operator. 3. Weak negotiating position of the owner vis-à-vis the operator caused by poor knowledge of the rights and obligations of the WIA owner (especially in case of small owners). 4. Violation of legislation by the owners and operators (Act on Prices. Decree No 428/2001 Coll., Act on Water Supply and Sewerage Systems No 274/2001 Coll., Concession Act No 139/2006 Coll., effective from 1. 1. 2014 to 30. 9. 2016. Act No 134/2016 Coll., on Public Procurement). 5. Non-existence of legislation stipulating the minimum amount of rental or water and sewerage rates necessary to achieve the self-financing capacity of WIA. Inadequate supervision over the compliance with the legislation (price setting. plan for financing the renewal and its implementation. calculation of unjustified costs. service contracts). 6. Especially in case of small owners, a priority use of water sources in their own cadastre and in case of insufficient capacity of own sources the use of local water supply systems, often at the expense of cost-effectiveness and unstable level of the quality of supplied water. 7. Subsidising the price (rate) by the owner by means of the calculated profit item - a trend prevailing in municipal owners. This procedure prevents the achievement of self-financing capacity of the sector. Thus, in the case of ownership model of operation, the operation as such is subsidised – especially in owners with a low number of connected inhabitants. 8. Disputable quality of data submitted to the MoA, (occurrence of logical mistakes. incomplete data. incomparable data caused by non-uniform interpretation of terms. e.g. renewal. failure etc.) and lacking

	information for the check of fulfilment of the PFR (e.g. age and wear and tear of WIA. invested subsidies. volume of planned repairs etc.) 9. The selected data of ownership and operating records did not comprise information on water supply channels and interceptor sewers, which directly impacts the reporting value of some indicators of benchmarking (e.g. the value of WIA replacements costs. minimum annual amount of funds for renewal. length of water mains and sewers. volume of non-revenue water. losses and failures and their value converted to km of network etc.). 10. Deficiencies in databases of selected data from ownership and operating records and in the database of authorisations to operate prevent thorough checks of completeness of databases and correctness of data therein. 11. Non-inclusion of all the associated economically justified costs in full in the calculation and Comparisons keeps/stops the customers from being informed about the actual costs associate with the provided services and results in reducing the reporting value of BM.
OPPORTUNITIES	THREATS
1. Achieving the socially acceptable self-financing capacity of infrastructure (compliance with the EU directives. setting up of responsible financing of the sector with the aim not to burden the future generations). 2. Creating more detailed conditions for managing the funds intended for the PFR. 3. Increasing the information of all the stakeholders in the sector on their rights and obligations. 4. Introducing auxiliary tools for the modification of the relationship between the WIA owners and operators, particularly the recommended requisites regarding the content of the service contract and contract with a professional agent. 5. Achieving the price (rate) that would help achieve the highest possible degree of self-financing capacity and does not exceed the socially acceptable price. 6. More possibilities to use the economies of scale in case of reduction of market atomization which would also result in enhancing the professional level of WIA operation.	1. Deteriorating water balance in the Czech Republic and decreasing water supplies. 2. Non-existence of contracts of water supply systems related in terms of operation in all the mandatory owners of WIA under the Act on water supply and sewerage systems No 274/2001 Coll. 3. Non-uniform interpretation of terms (renewal. repair. failure etc.) and a low level of quality of the existing data, including the lack of knowledge of e.g. information on the age and wear and tear of WIA may lead to wrong decisions made by the regulator. 4. Non-existent legislation governing the possibilities of the use of profit from regulated activities and direct limitations of possibilities to use the profit obtained from the ownership stakes of WIA owners in the operators (Civil Code and Act on Business Corporations). The ideal situation – use of the profit from the regulated activity is by law conditioned by the achievement of the self-financing capacity of WIA. 5. Effects of EU support on price setting when negative calculated profit has to be used in the price (rate)

7. Enhancing the quality of data, cooperation with entities. Introducing precise definitions of some of the terms such as renewal, repair, failure etc. 8. Increasing the level of knowledge of general as well as professional public through the Internet (online presentation of information to the extent of Annex No 4 to the proposal for a Directive of the European parliament and of the Council on the quality of water intended for human consumption (currently subject to the legislative approval process). 9. Introduction of a new information system (Water Supply and Sewerage System IS) which will facilitate data entry through web interface is planned.	calculation for a certain period of time. Thus, water and sewerage rates are distorted. 6. Different rules governing the accounting for of the acquisition and depreciation of fixed assets purchased from subsidies applicable to business entities and municipalities, which results in the impossibility to use the information on the purchase price of the assets from the accounting records. 7. The provision of Section 6 (6) of Act No 274/2001 Coll., which makes it possible for the municipalities, government agencies or associations of owners of water supply and sewerage systems who are legal persons to obtain the authorisation to operate without the trade licence on condition they do not operate a water supply system or a sewerage system for profit making purposes, prevents the use of the calculated profit for the generation of funds for renewal. The referred to provision is interpreted in a different manner by the owners and complicates the achievement of self-financing capacity of WIA (objective of the regulator). 8. Extremely long time necessary to achieve the self-financing capacity can lead to a repeated pressure of the sector for subsidies (for renewal) or to water supply and sewerage rate hikes which can be socially unacceptable. This procedure can cause a heavy economic burden of future generations, or deterioration in the quality of services. 9. The use of funds from water and sewerage rates (as public funds) for other than the determined purpose in consequence of the non-existence of detailed rules for their management.

6.3.2 Conclusions, evaluation and proposed steps to be taken

The results of the conducted SWOT analysis and the outputs from the benchmarking confirmed and specified the conclusions stated in the Reports on Benchmarking of Operators for the previous two years.

Following the set objectives of the regulation (particularly the ensuring of balance between the price of services and the costs of service provision. ensuring adequate quality of services and protection of the environment), it is essential for the functioning of the sector of water supply and sewerage systems to address the following areas: achieving the highest possible level of self-financing (with respect to social acceptability of the price), price setting, condition of the operated WIA (systematic care for the WIA) and reducing negative impacts on the environment.

The achieved level of self-financing is reported by the OCF. If its value is greater than or equals to 1, the associated costs and the respective part of the expenses on WIA renewal for the given year from the water and sewerage rate can be considered as covered. The OCF OKF less than 1 was detected only in the groups of operators which provide services to less than 200 thousand customers. It concerns more than 80 % of the number of all the analysed Comparisons. This situation is the result of effects of multiple factors: market atomization, decision of owners on price subsidising, potential exceeding of the level of social acceptability of prices. The regulator should, in order to accomplish the long-term objectives, seek to identify the appropriate (required) value of OCF, namely with account taken of the necessary amount of funds for renewal, maintaining the water and sewerage rates at the socially acceptable level, and also of the appropriate value of the share of the profit to be distributed in FCs. The referred to procedure will be effective/bring effects only provided that all the associated economically justified costs are included in full in the water and sewerage rates and that these costs are reported in the respective reports.

Although the sector as a whole shows a satisfactory volume of non-revenue water per 1 km of converted length and day as well as the water losses in pipe network, in individual groups there are Comparisons in which the value of the referred to indicators is high compared to the other Comparisons in the group. Reducing the value of non-revenue water and water losses has a positive effect on reducing the overuse of water sources especially in drought periods, improving services and extending the WIA service life. Another aspect of the issue of the financial requirements. That is why the regulation should consider setting the limit/amount of non-revenue drinking water, or drinking water losses which already reveals a non-satisfactory condition of WIA. This way the regulator would push those operators to carry out regular maintenance and planned repairs of the operated WIA who have so far neglected it. The reporting of non-revenue water is also affected by the fact that the non-revenue water is often reported as water consumed in operations not related to the production and distribution of drinking water (especially in the so-called compound water mains). Here, clear rules governing the reporting of water balance data in SDOpR and billed water in Comparisons shall be defined.

Bearing in mind the high portion of owners using the service contracts, the benchmarking of operators should also focus on monitoring the value of cost item 5.2. Other external costs in price calculations and its share in FCs. Since the cost structure of the price for the provision of services or the amount of profit generated by the service providers is unknown, it would be appropriate to extend the MoF rules for regulating the price by these services.

Apart from the aforementioned recommendations, it is also necessary to continue communicate with the processors of individual reports with a view to explaining the content of some of the reported indicators.

In 2018 the MoA launched the web application to enhance the awareness of the customers, owners and operators about the cost structure of the water and sewerage rates. Together with the information on prices, it will also publish selected information from the Comparisons included in the benchmarking and related SDOwR and SDOpR. The application may provide space for interactive disclosure of results of the benchmarking projects to owners and operators.

Also. a platform should be developed that would discuss the findings of analyses with the individual actors of regulation, provide a feedback, enable discussion on the planned amendments to the regulation (especially the legal framework governing the functioning of the sector) and other possible development that would ensure the fulfilment of long-term objectives.

In conclusion, it shall be noted that in order to improve the reporting value of the results of benchmarking that serve as background information for the decision-making process of the regulator, and in order to improve the awareness of the customer concerning the actual price of the services, the MoA should make the supervision over the compliance with the provisions of Section 35a (7) of Decree No 428/2001 Coll. more stringent, i.e. to include (or state) all the actual costs associated with the provision of regulated services in the field of water supply and sewerage systems in the water and sewerage rates. Otherwise, the regulator shall respect the fact that incomplete information may compromise the relevance of benchmarking outputs and thus adversely impact the effectiveness and efficiency of the decisions.

7. Assessment of Conclusions and Their Comparison with the Objectives of the Regulation

The anomalies identified in the both the benchmarking projects indicate the *high degree of sector atomization* as one of the main causes of their occurrence.

Since in 2016 and 2017 the data describing approximately the same share of the market determined based on the volume of billed water (drinking water: 95.23 % in 2016 and 97.5 % in 2017; waste water: 92.59 % in 2016 and 97.79 % in 2017) analysed, a comprehensive year-on-year comparison could be made (see the tables below).

7.1 Benchmarking of Owners

DRINKING WATER									
	2016			2017			DIFFERENCE BETWEEN 2017 AND 2016		
BENCHMARKING OF OWNERS 2017/2016	FREQUENCY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHAR E OF THEANALYSED MARKET (447.10 MIL. M3)	FREQUENCY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHARE OF ANALYSED MARKET (461.355 MIL. M3)	FREQUENCY OF OCCURRENCE DIFFERENCE 2017- 2016	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3) DIFFERENCE 2017- 2016	% SHARE OF THE ANALYSED MARKET DIFFERENCE 2017- 2016
INADEQUATE GENERATION OF FUNDS FOR WIA RENEWAL	1 229	55.16	12.34%	1 313	52.98	11.48%	84	-2.18	-0.85%
NEGATIVE CALCULATED PROFIT	722	24.02	5.37%	817	28.73	6.23%	95	4.71	0.85%
RENTAL IS LESS THAN OR EQUAL TO ZERO IN THE SEPARATE (WITHOUT SERVICE CONTRACTS) OR COMBINED MODEL	147	30.09	6.73%	147	30.76	6.67%	0	0.67	-0.06%
ZERO VALUE IN LINE 20	727	61.86	13.84%	476	28.81	6.24%	-251	-33.05	-7.59%

WASTE WATER									
	2016			2017			DIFFERENCE BETWEEN 2017 AND 2016		
BENCHMARKING OF OWNERS 2017/2016	FREQUENCY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHARE OF THE ANALYSED MARKET (462.86 MIL. M3)	FREQUENCY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHARE OF THE ANALYSED MARKET (499.502 MIL. M3)	FREQUENCY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHARE OF THE ANALYSED MARKET
INADEQUATE GENERATION OF FUNDS FOR WIA RENEWAL	1 603	74.51	16.10%	1 716	69.65	13.94%	113	-4.87	-2.15%
NEGATIVE CALCULATED PROFIT	987	29.5	6.37%	1 124	36.77	7.36%	137	7.27	0.99%
RENTAL IS LESS THAN OR EQUAL TO ZERO IN THE SEPARATE (WITHOUT SERVICE CONTRACTS) OR COMBINED MODEL	109	30.11	6.51%	95	45.62	9.13%	-14	15.51	2.63%
ZERO VALUE IN LINE 20	1 002	70.06	15.14%	666	34.63	6.93%	-336	-35.43	-8.20%

The tables reveal that in 2017 the share of the market affected by inadequate generation of funds for renewal dropped by nearly 1 % in the Comparisons for drinking water and by 2.15 % in the Comparisons for waste water. With regard to the reported negative calculated profit, as against 2016 the situation got worse/deteriorated by nearly 1 % in both the drinking water and waste water. In 2017 in more than a half of these cases (55.44 % of the number of

Comparisons for drinking water as well as waste water) the reason behind was the unplanned losses incurred caused by unforeseen costs or fluctuations in the billed volumes. In the second half of the cases (44.57 % Comparisons for drinking water as well as waste water) it was caused by intentional subsidies of the price (deliberate price reduction) motivated e.g. by efforts to eliminate the risk of exceeding the socially acceptable price. As mentioned above, this is caused first and foremost by a high level of market atomization.

The occurrence of the anomaly zero rental or rental less than zero on the separate and combined model provides information on whether the owners use the funds from WIM rental to generate the funds for renewal. In the Comparisons for drinking water, the frequency of occurrence of this anomaly was the same in both the years. In the case of waste water, the frequency of occurrence of Comparisons with zero or negative value of rental decreased, but the affected share of the market increased by 2.63 %. There cannot be a major change in occurrence of this anomaly year-on-year since it depends on the possibility to make changes in the contractual relations between the WIA owners and operators.

The only indicator in which improvements are reported both in drinking water (decrease of the affected market by 7.59 %) and waste water (decrease of the affected market by 8.20 %) is the occurrence of zero line 20. The frequency of occurrence dropped by more than 33 % year-on-year mainly as a result of targeted education/awareness raising of the MOA in the course of the last two years.

The conclusions for the regulator concerning the WIA owners drawn in the previous year remain the same.

With respect to WIA owners, the regulator should more actively deal with the issues regarding the WIA renewal (related to this process is the anomaly of inadequate generation of funds for WIA renewal. use of negative calculated profit and negative or zero rental). The regulator should define recommendations for the WIA owners regarding the steps to be taken in accomplishing the objective of generating adequate amount of funds for renewal.

7.2 Benchmarking of Operators

DRINKING WATER									
	2016			2017			DIFFERENCE BTW 2017 AND 2016		
BENCHMARKING OF OPERATORS 2017/2016	FREQUEN-CY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHARE OF THE ANALYSED MARKET (447.10 MIL. M3)	FREQUEN-CY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHARE OF THE ANALYSED MARKET (461.355 MIL. M3)	FREQUENCY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHARE OF THE ANALYSED MARKET
OCF<1	1 208	51.64	11.55%	1 339	58.97	12.78%	131	7.33	1.23%
SHARE OF WATER LOSSESS IN THE PRODUCED DRINKING WATER IN % (HIGHER THAN 1.5 TIMES THE AVERAGE VALUE FROM COMPARISONS WITHOUT ZERO WATER LOSSES PER YEAR 2017; 1.5 * 16.75 = 25.125%)	262	33.04	7.39%	298	36.71	7.96%	36	3.67	0.57%
ZERO WATER LOSSES	263	4.12	0.92%	260	4.75	1.03%	-3	0.63	0.11%

WASTE WATER									
2016				2017			DIFFERENCE BTW 2017 AND 2016		
BENCHMARKING OF OWNERS 2017/2016	FREQUENCY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHARE OF THE ANALYSED MARKET (462.86 MIL. M3)	FREQUENCY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHARE OF THE ANALYSED MARKET (499.502 MIL. M3)	FREQUENCY OF OCCURRENCE	VOLUME OF BILLED WATER AFFECTED BY THE ANOMALY (MIL. M3)	% SHARE OF THE ANALYSED MARKET
OCF<1	1 549	76.75	16.58%	1 757	75.09	15.03%	208	-1.66	-1.55%

The achieved level of self-financing capacity of the sector of water supply and sewerage systems can be described by the OCF which tells us whether the revenues from water and sewerage rate cover all the costs associated with service provision, minimum degree of renewal and adequate profit. The achievement of self-financing capacity is one of the requirements of the European Water Framework Directive. As indicated by the year-on-year comparison, the number of Comparisons with OCF < 1 went up by 131 Comparisons in drinking water and by 208 Comparisons in waste water. The market share affected by this anomaly accounts for more than 12 % in drinking water and 15 % in waste water. The high frequency of occurrence of Comparisons in which the failure to achieve the self-financing capacity of WIA operation and renewal can be identified (1 339 Comparisons for drinking water, or 1 757 Comparisons for waste water) indicates a problem faced by small operators. It is again the consequence of a high level of market atomization.

One of the indicators that can be used to evaluate the quality of provided services in the case of drinking water is the indicator of water losses from produced drinking water. The high share of water losses was identified based on the data sets from 2017 net of the Comparisons not monitoring water losses. The limit was set at 1.5 times the average value, i.e. 25.125 %. The market share affected by high water losses increased year-on-year by 0.57 % to 7.96 %. The frequency of occurrence of this anomaly changed year-on-year to a minimum degree too. A similar situation is seen in Comparisons not reporting water losses, i.e. where the operators do not consider the water losses. Their number as well as share of the affected market remained almost unchanged year-on-year too.

The conclusions for the regulator concerning the WIA owners drawn in the previous year remain the same.

For the sake of fulfilling the objective of the quality of services in drinking water and improving the condition of the related WIA, the regulator shall dedicate more attention to matters of drinking water losses.

In responding to recommendations above, it will be necessary to define the required target in terms of quality and quantity, namely based on more detailed analyses focused on particular areas. This target will be a component part of specification of objectives of the regulation and its achievement will be monitored by systematic benchmarking conducted in the upcoming periods.