PERFORMANCE BENCHMARKING GUIDELINES FOR WATER SUPPLY AND SANITATION AUTHORITIES

2014

FOREWORD

Under the Energy and Water Utilities Regulatory Authority Act Cap 414, EWURA is responsible, among other things, for monitoring the performance of the regulated sectors in relation to efficiency of production and distribution of services. In addition, Section (28)(2)(a) of the Water Supply and Sanitation Act, 2009 obliges the Authority to prepare reports on comparative analysis of the performance of licensees in relation to performance targets specified in the licenses.

The objective of the Performance Benchmarking Guidelines is to provide details and clarifications on how EWURA will benchmark or compare the performance of WSSAs. Benchmarking seeks to identify standards or best practices to apply in measuring and improving performance.

It is expected that WSSAs will appropriately utilize the guidelines to evaluate their position in comparison to other WSSAs and standards and best practices and ultimately take appropriate steps to improve their performance.

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LIST OF ACRONYMS

BOD_5 = Biochemical Oxygen Demand

COD = Chemical Oxygen Demand

EWURA = Energy and Water Utilities Regulatory Authority

MaJIs = Water Utilities Information System

NWASCO = National Water and Sanitation Council of the Republic of Zambia

O&M = Operation and Maintenance

KPI = Key Performance Indicator

WASREB = Water Services Regulatory Board of the Republic of Kenya

W&S = Water and Sewerage

WSSA = Water Supply and Sanitation Authority

1. INTRODUCTION

The Water Supply and Sanitation Act,2009 and the Energy and Water Utilities Regulatory Act Cap 414 establishing the Energy and Water Utilities Regulatory Authority (the Authority) obliges the Authority to monitor the performance for the provision of water supply and sanitation services by Water Supply and Sanitation Authorities (WSSAs) and to take measures necessary to improve their performance. Furthermore, Section (28)(2)(a) of the Water Supply and Sanitation Act, 2009 obliges the Authority to prepare reports on comparative analysis of the performance of licensees in relation to performance targets specified in the licenses.

Performance Benchmarking has been adopted by the Authority as one of the tools for monitoring the performance of WSSAs. Benchmarking (comparative analysis) can be defined as: *"A systematic process of searching for best practices, innovative ideas, and effective operating procedures that lead to superior performance--and then adapting those practices, ideas, and procedures to improve the performance of one's own organization*[1]". Benchmarking seeks to identify standards or best practices to apply in measuring and improving performance.

Benchmarking enables utilities to identify the following:

(i) what they are doing;
(ii) how they are doing it;
(iii) how others do it;
(iv) how well they are doing it with reference to standards and best practices/performance; and
(v) what and how to improve.

This Performance Benchmarking Guideline provides details and clarifications on how EWURA will benchmark and compare the performance of WSSAs. It includes a detailed description of the performance benchmarking approach, key performance indicators and targets, collection and validation of data and information, comparative analysis and dissemination and disclosure.

2. PERFORMANCE BENCHMARKING PROCESS

The process of performance benchmarking involves continuous actions aimed at performance improvement. It has to be noted that the overall objective of the benchmarking process is to trigger implementation of appropriate actions that will enable a WSSA to improve its current performance.

[1] American Water Works Association - AWWA (2005), Water Utility Management – Manual of Water Supply Practices(M5)

Performance benchmarking process starts by identification of key performance indicators and setting of performance level targets. Performance benchmarking is implemented annually using the following five steps:

i. data collection and validation;
ii. data analysis, evaluation and writing of draft comparative performance reports;
iii. discussion of draft comparative performance reports with WSSAs;
iv. writing of final comparative performance reports; and
v. dissemination and disclosure of Performance Reports.

3. PERFORMANCE INDICATORS

WSSA's performance is evaluated using performance indicators. Performance indicators are measures of efficiency and effectiveness of the delivery of services by an undertaking that result from a combination of several variables[2]. A Performance indicator consists of a value which is a ratio between variables expressed in specific units. Performance indicators can be analyzed interpreted and compared by taking into consideration context information and the quality of data for each utility. For example, collection efficiency is a ratio of two variables such as revenue collected and amount billed.

3.1 CATEGORIZATION OF PERFORMANCE INDICATORS

Performance indicators are categorized into the following three groups:-

(i) Protection of the user interests

The purpose of this group of indicators is to assess to which degree the user interests are protected, as far as the service accessibility and the service quality are concerned.

(ii) Sustainability of the operator

The purpose of this group of indicators is to assess to which degree of sustainability of the WSSA under the economic and financial, infrastructure, operational and human resources point of view.

(iii) Environmental sustainability

The purpose of this group of indicators is to assess to which degree the environmental aspects associated with the WSSA's activities are being considered.

[2] Enrique Cabrea Jr, Peter dane, Scott Haskins and Heimo Theuretzbacher - Fritz (2011), Benchmarking of Water Services, IWA Publishing, London, UK

3.2 KEY PERFORMANCE INDICATORS

There are many performance indicators that are used by WSSAs to monitor the achievement of their activities and objectives as stipulated in the Business Planning Guidelines. However, only key performance indicators which address overall performance and common objectives of WSSAs, have been selected for use in the benchmarking process. Key Performance Indicators have been assigned Service Level Benchmarks which are best practice for each of the specified indicators within the African Region (For example the Water Operator's Partnership Report of 2008, Impact Report from WASREB (2012), NWASCO report (2013), and benchmarks set by the Ministry of Water. The Key Performance Indicators are presented in Table 1. Formulation details for each benchmarking indicator are provided in Appendix 1. Key Performance indicators and Service Level Benchmarks may change subject to developments in the water sector.

Table 1: Key Performance Indicators

Indicator No.	Key Performance Indicators	Service Level Benchmark
Protection of the User Interests		
	User service accessibility	
KPI 1	Proportion of population served with water (%)	100%
KPI 12	Proportion of population connected with sewerage network (%)	100%
KPT 2	Average hours of supply (hrs)	24hrs
	Quality of service supplied to users	
KPT 3	Water quality compliance (%)	≥98%
	4.1 E-coli	
	4.2 Turbidity	
Sustainability of the Operator		
	Operator's financial and economic sustainability	
KPI 4	Metering ratio (%)	100%
KPI 5	Non Revenue Water (NRW) (%)	≤ 20%
KPI 6	Revenue collection efficiency (%)	≥ 95%
KPI 7	Working ratio (ratio)	≤ 0.67
KPI 8	Operating ratio (ratio)	≤ 1.0
	Operator's Cost Indicators	
KPI 9	Personnel expenditure as % of collection from water & sewerage services and other	≤ 30%

Indicator No.	Key Performance Indicators	Service Level Benchmark
	related income	
	Operator's human resource Efficiency	
KPI 10	Personnel/1000 (W&S) connections (ratio)	≤ 5.0
Environmental sustainability		
KPI 11	Wastewater quality compliance (%)	≥ 98%
	12.1 BOD_5 compliance	
	12.2 COD compliance	

4. SETTING AND REVIEW OF KEY PERFORMANCE INDICATOR TARGETS

Key Performance Indicator Targets are set and reviewed in the WSSA's Business Plan in accordance with the Business Planning Guidelines. The Business Plan indicates how the Licensee intends to reach the proposed Targets. Key Performance Indicator Targets are revised every three years in tandem with the review of the Business Plan. Earlier revisions can be conducted, if the Licensee makes a credible case for such a need which will also include a review of the Business Plan.

WSSAs need to work towards achieving set targets and as they improve in performance, they should finally work towards achieving Service Level Benchmarks. While the Benchmark Values for some indicators may initially appear unrealistic, they need to be recognized and internalized as the performance levels that service providers need to achieve in due course of time.

5. COLLECTION AND VALIDATION OF DATA AND INFORMATION

5.1 Data Collection

(a) According to the Water Supply and Sanitation Rules, 2011, submission of data and information by WSSAs to the Authority is made through the following reports;

i. monthly operational reports in accordance with Water Utilities Information System (MaJIs) or any other system established by the Authority latest by 14th of the following month;

ii. quarterly capital investment reports by 30th of the month following the end of a quarter;

iii. draft annual reports prepared in accordance with the format established by the Authority detailing activities and operations of the licensee during the year, to be submitted not later than three months after the closure of

the financial year. It shall be accompanied by draft financial statements; and

iv. final annual report prepared in accordance with the format established by the Authority detailing activities and operations of the licensee during the year, to be submitted not later than six months after the closure of the financial year. It shall be accompanied by a copy of the audited accounts together with the auditor's report and replies thereto.

(b) Draft and final annual reports shall include a summarized report on Key Performance Indicators (Performance Report Card) in a format as shown in Appendix 2. The Performance Report Card consists of:

i. key performance indicators;
ii. input data and confidence grading in terms of reliability and accuracy;
iii. actual achievement of the performance;
iv. targeted performance levels;
v. a brief plan of actions including time schedule for achieving the targeted performance level for each indicator; and
vi. improving data reliability and accuracy.

(c) The data and performance indicators will be validated by:

i. comparing aggregated monthly data and performance indicators from MaJIs with annual report data;
ii. comparing aggregated data from quarterly reports versus the data reported on the Performance Report Card;
iii. comparing with data and performance indicators from previous years; and
iv. ascertaining incoherent data by means of site visits or audits.

5.2 Data Quality

Data quality is measured in terms of reliability of the source and the accuracy of the data (confidence grading). WSSAs shall indicate the quality of each of the variable which constitute a key performance indicator as shown in the performance score card (Appendix 2).

5.2.1 Data Reliability

The reliability of the source of data accounts for uncertainties in how reliable the source of data may be, such as the extent to which data source yields consistent, stable, and uniform results over repeated observations or measurements under the same conditions each time. Reliability of the data will be analysed as shown in Table 2 below.

Table 2: Data Reliability Bands

Reliability Bands		Definition
A	Highly Reliable	Data based on sound records, procedures, investigations or analyses that are properly documented and recognized as the best available assessment methods
B	Reliable	Generally as in "A" but with minor shortcomings, for example documentation is missing, the assessment is old, or some reliance on unconfirmed reports; or there is some extrapolations from such reports/analysis from records that cover less than 30% of the service providers system.
C	Unreliable	Generally as in "A" or "B" but data is based on extrapolation from records that cover more than 30 percent (but less than 50 percent) of the service provider's system.
D	Highly unreliable	Data is based on unconfirmed verbal reports and/or cursory inspections or analysis, including extrapolations from such reports/inspections/analysis.

5.2.2 Data Accuracy

The accuracy accounts for measurement errors in the acquisition of input data, i.e. the closeness of observations, computations or estimates to the true value. Accuracy of the data will be analysed as shown in Table 3 below:

Table 3: Data Accuracy Bands

Accuracy Band	Associated uncertainty
1	(0 – 5%): Better than or equal to +/- 5%
2	(5 – 20%):Worse than ± 5%, but better than or equal to + / -20%
3	(20 – 50%):Worse than ± 20%, but better than or equal to + / -50%
4	(>50%):Worse than ± 50%

5.2.3 Confidence Grading

Confidence grades can only be estimated directly for the variables. Based on these, Performance Indicators confidence grades can either be assessed quantitatively or, at least, qualitatively. For example, a variable measured with an estimated uncertainty of ±15% and from a highly reliable source will have a **confidence grade** of **A2**. Data source reliability and data accuracy should be assessed for every input variable. WSSAs should aim for a grade of at least **B2**.

6. COMPARATIVE ANALYSIS

The essence of the benchmarking process is to provide organizations with the ability to compare their performance in relation to similar organizations or similar processes. The comparative analysis will ultimately rank performance levels for individual indicators both numerically and graphically. Comparative analysis will involve the following steps:

6.1 Performance Clusters

The linchpin of comparative analysis is the appropriate clustering of utilities into rather homogenous groups. EWURA will cluster WSSAs according to their service coverage and their ability to meet their operation and maintenance costs in Categories AA,A, B and C as defined in the Water Supply and Sanitation Regulations, GN No. 90 of 26th April, 2013. Performance comparison using water supply indicators will be done for all utilities while performance in provision of sewerage services will be done only to utilities with sewerage services. In addition, the performance of District, Small Towns and National Projects WSSAs will be compared separately.

6.2 Performance Indicator's weights

The key performance indicators are assigned weights depending on their relative importance in promoting efficiency and/or quality of service. Weights have been assigned to Key Performance Indicators as shown on Table 5 below.

Table 5: Key Performance Indicator Weights

Indicator No.	Performance Indicators	Weight
Water Services		
KPI 1	Proportion of population served with water (%)	5%
KPI 2	Average hours of supply (hrs)	5%
KPI 3	Water quality compliance (%)	15%
KPI 4	Metering ratio (%)	10%
KPI 5	Non-Revenue Water - NRW(%)	15%
KPI 6	Revenue collection efficiency (%)	15%

Indicator No.	Performance Indicators	Weight
KPI 7	Working ratio (ratio)	10%
KPI 8	Operating ratio (ratio)	10%
KPI 9	Personnel expenditure as % of collection from water & sewerage services and other related income	10%
KPI 10	Personnel/1000 (W&S) connections (ratio)	5%
Sewerage Services		
KPI 11	Wastewater quality compliance (%)	50%
KPI 12	Proportion of population connected with sewerage network (%)	50%

6.3 Data Analysis

Data analysis involves calculation of key performance indicators and comparing performances of WSSAs both for the current year and for the past three years. WSSAs will also be evaluated on the extent to which they have achieved their performance targets and complied to reporting requirement. Performance comparison is done by using tables, graphs and charts. Performance trends and differences are then determined and explained.

6.4 Scores and Ranking

Ranking of the performance of WSSAs will be two fold, that is firstly overall ranking; and secondly ranking based on the attainment of performance targets and compliance to reporting requirements (herein referred as utility ranking). Overall ranking intends to gauge the overall performance of WSSAs by taking into consideration individual efforts as well as external factors such as financing from the government and development partners. The output of overall ranking is identification of the overall best performing WSSA. On the other hand, utility ranking intends to rank WSSAs based on their individual efforts towards attainment of performance targets set in their Business Plans as well as compliance to reporting obligations. Therefore, utility ranking intends to compare the performance of WSSAs by eliminating external factors that impacts individual performance of WSSAs. The details on how the two types of ranking will be implemented are provided below.

6.4.1 Overall Ranking

To obtain the Overall Ranking of WSSAs, EWURA will give scores and rank all WSSAs according to their aggregated scores. The total performance score of a WSSA will be computed as a sum of the performance score for each indicator and the reporting score as follows:

$$\textit{Total Performance Score} = \sum_{i=1}^{n} PS_{X,i} + \textit{reporting score}$$

where

n = the total number of key performance indicators used for ranking, and
$PS_{X,i}$ = Performance Score for utility X in Indicator i

The total performance score will be used to determine the overall ranking of a WSSA. Details on the calculation of performance score and reporting score are as described below.

6.4.1.1 Performance Score for each Indicator (PS)

Performance score for each performance indicator will be calculated as a summation of scores based on best performer, attainment of performance target, confidence grading and attainment of service level benchmarks multiplied by the respective indicator weighting and converted to a maximum of 70% as described below:

$$PS_{X,i} = 0.7\ x\ W_i x (SBP + SPT + SCG + SSLB)$$

Where

$PS_{X,i}$ = Performance Score for utility X in Indicator i
W_i = Weight assigned to Indicator i
SBP = Score Based on Best Performer
SPT = Score Based on Performance Target
SCG = Score Based on Confidence Grading and
$SSLB$ = Score Based on Service Level Benchmark

i. Score based on best performer (SBP)

The maximum score for the best performer on each performance indicator is 70 points. The score for attaining a national average (median) on any performance indicator is 50 points while a WSSA will be awarded a score of 0 points for attaining a minimum performance on any indicator. Intermediate performances are allocated pro rata by interpolating between the minimum, average and best performance. The formulae for calculating the scores based on best performers are as shown below:

$$If\ X_i \le X_{average}\ then\ S_i = 50x\left[\frac{X_i - X_{\min}}{X_{average} - X_{\min}}\right]\ else\ if$$

$$X_i > X_{average}\ then\ S_i = 50 + 20x\left[\frac{X_i - X_{average}}{X_{\max} - X_{average}}\right]$$

Where

X_i = performance attained by utility *i* in indicator *X*
X_{max}= maximum performance attained by WSSAs for indicator *X*
X_{min}= minimum performance attained by WSSAs for indicator *X*
$X_{average}$= average performance attained by WSSAs for indicator *X*
S_i = score based on best performer attained by utility *i* in indicator *X*

Note: For indicators whose values become better as they increase (the more the better) then the X_{min} and X_{max} should be the respective minimum and maximum value of attained performance while for indicators whose values become better as they decrease (the less the better), then X_{min} and X_{max} should be the respective maximum and minimum of actual performance.

ii. Score based on attaining the performance target (SPT)

A WSSA will be awarded 10 points for attaining or surpassing the performance target on each performance indicator. Intermediate performances will be allocated pro rata by interpolating between 0 and 10 points. In addition, decreasing performances as compared to actual performance in the previous year will be awarded 0 points. The formulae for calculating scores based on attainment of performance targets are as shown below:-

$$If\ P_n \ge PT_n\ then\ SPT = 10\ else$$

$$If\ P_{n-1} < P_n < PT_n\ ,\ then\ SPT = \left[\frac{P_n - P_{n-1}}{PT_n - P_{n-1}}\right]x10\ else$$

$$If\ P_n < P_{n-1}\ then\ SPT = 0$$

Where

P_n = Actual performance in year n (current year)
PT_n = Performance target for the current year
P_{n-1} = Actual Performance for the previous year

iii. Score based on Confidence Grading (SCG)

A WSSA will be awarded 10 points for attaining or surpassing the Confidence Grading of B2 and 0 points for not attaining the Confidence Grading of B2 on each performance indicator.

iv. Score based on attaining the Service Level Benchmark (SSLB)

A Licensee will be awarded 10 points for attaining or surpassing the Service Level Benchmark on each performance indicator and 0 points for not attaining the Service Level Benchmark.

6.4.1.2 Reporting Score

Reporting score is a sum of the "score based on timely submission of monthly reports" and "score based on timely submission of draft annual reports ". The maximum reporting score is 30% as detailed below:

i. Timely submission of monthly MaJIs reports will be awarded 12% divided equally in 12 months (1% per month); and
ii. Timely submission of draft annual reports using MaJIs reporting system; and draft annual report accompanied by draft financial statements will be awarded 18% divided equally between MaJIs report (5%), annual report (6.5%) and draft financial statements (6.5%).

Late submission of any report will be awarded 0%. Except for MaJIs reports which will be considered as submitted if they are 'locked', other reports will be considered as submitted if they are accompanied by a covering letter dully signed by the Managing Director or his/her Authorized Representative.

6.4.2 Utility Ranking

Utility ranking is determined by summing up scores for attainment of performance targets and scores for timely submission of reports. Scores for attainment of performance targets will be given a weight of 70% while the timely submission of reports will be given awarded 30% as in overall rankong. The total Performance Target and Reporting Score (PTRS) will be computed as follows:

$$Total\ PTRS = 7x\sum_{i=1}^{n} w_i SPT_{X,i} + reporting\ score$$

Where,

$SPT_{x,i}$ = Performance Target Score for utility *X* in Indicator *i*

w_i = weight assigned to indicator *i, and*

n =total number of key performance indicators used for ranking

The methodology for determination of SPT and reporting score is as described in the overall ranking section.

6.5 Presentation of Performance

The total performance scores of each WSSA will be classified as A^+, A, B^+ ,B and C where A^+ represents excellent performance while C represents unsatisfactory performance. The performance levels of WSSAs may be presented in graphs and charts showing percentage scores and each classification will be identified with a distinct color. The details of the classification, color code and interpretation is as shown in table 6 below:

Table 6: Classification of Performance Scores.

Total Score	Classification	Color	Interpretation
100 - 90	A^+		Excellent
89 - 80	A		Very Good
79 - 70	B^+		Good
69 - 50	B		Fair
49 - 0	C		Unsatisfactory

6.6 Draft Comparative Analysis Report

The conclusion of steps 6.1 to 6.5 above is the issuing of the draft comparative analysis report for WSSAs. EWURA will discuss the report with WSSAs in a workshop before coming up with the final report. The objectives of the workshop, among other things, are:

(i) getting a common view on the general evaluation results by presentations of the draft reports by the Authority;
(ii) commenting and making any corrections to the report;
(iii) analyzing reasons for good performance and poor performances;
(iv) delivering examples of good practices (e.g by specific case studies and examples from leading-edge utilities in a certain performance area).
(v) reviewing action plans for improving performance; and
(vi) general exchange of practical experience among WSSAs.

6.7 Final Comparative Analysis Report

The final Comparative Analysis Report will incorporate comments, corrections, reviewed performance improvement actions and best practices as concluded from the evaluation workshop.

7. DISSEMINATION AND DISCLOSURE

Dissemination and disclosure is an essential element of the comparative analysis of WSSAs and this may include official launch of the report. Comparative analysis reports will be shared with various stakeholders, media and the public in the interest of transparency and for enhanced accountability.

APPENDIX 1: DEFINITIONS OF KEY PERFORMANCE INDICATORS

KPI 1: Proportion of population served with water (%)

The proportion of population served with water is the percentage of the total population living in the service areas that is served through household/premise connections and public stand posts. The number of household/premise connections shall be multiplied by the average members living in a household/premise. The number of public stand posts, kiosks, etc. shall be multiplied by the average number of the population served by one of them. Both results added will provide the number of persons served by the provider.

KPI 2: Average hours of supply

Service hours of water supply is defined as the hours per day a consumer can draw drinking water from the tap at his household connection or the public stand post. This number of hours is not necessarily identical with the operation time of treatment plants or wells, as tanks, part of the distribution system, are used for storage. The average hours service is calculated as the average hours of service in each water supply zone weighted by the total number of water connections in each supply zone.

KPI 3: Water quality compliance (%)

Water quality compliance is the percentage of the total number of water samples tested that passed the tests for drinking water quality standards.

KPI 4: Metering ratio (%)

Metering ratio is the percentage of the total water connections that have operating water meters.

KPI 5: Non Revenue Water or NRW (%)

NRW is the amount of water that the Licensee produces (or purchases from other entities) minus the amount that is sold to consumers, presented as a percentage of water produced. NRW can be the result of physical (leaks, overflow) and commercial (illegal connections, collection of revenue) losses.

KPI 6: Revenue collection efficiency (%)

Revenue collection efficiency is the percentage of bills collected during the financial year.

KPI 7: Working ratio

Working ratio is the proportion of operational expenses to operational revenue. The operational expenses do not include depreciation, interest and debt service.

KPI 8: Operating ratio

Operating ratio is the proportion of operational costs to operating revenues. Operational costs include all the expenses together with depreciation and interests costs (but no debt service payments).

KPI 9: Personnel expenditure (%)

Personnel expenditure (%) is the ratio of personnel expenditure to the total collection from current water and sewerage bills (including collections from other operational water and sewerage related services) expressed as a percentage.

KPI 10: Staffing level

Staffing level is the number of staff to a 1000 water and sewerage connections.

KPI 11: Wastewater quality compliance (%)

Wastewater quality compliance is the percentage of the total number of wastewater samples tested that passed the tests for wastewater effluent quality standards.

KPI 12: Proportion of population connected with sewerage network (%)

The proportion of population connected with sewerage network is the percentage of the total population living in the service areas that is served with sewerage through household/premise connections. The number of household/premise Connections shall be multiplied by the average members living in a household or using a sewer connection.

APPENDIX 2: PERFORMANCE SCORE CARD

Indicator No.	Key Performance Indicator	Performance Target	Achieved Target	Input Data	Reliability	Accuracy	Improvement Actions
KPI 1	Proportion of population served with water (%)			Connected Population			
				Total Population			
KPI 2	Average hours of supply (hrs)			Hours of supply in each zone			
				Number of connections in each zone			
KPI 3	Water quality compliance (%)						
	E-coli			E-Coli samples passed			
				E-Coli samples tested			
	Turbidity			Turbidity samples passed			
				Turbidity samples tested			
KPI 4	Metering ratio (%)			Connections with working meters			
				Total number of connections			
KPI 5	Non Revenue Water (NRW) (%)			Total Water Produced			
				Total Water Sold/billed			
KPI 6	Revenue collection efficiency (%)			Revenue Collection			
				Total amount of bills			
KPI 7	Working ratio (ratio)			O&M Cost Including Depreciation and Interest			
				Total Revenue			
KPI 8	Operating ratio (ratio)			Total Expenses (O&M + Depreciation + Interest payments)			
				Total Revenue			

Indicator No.	Key Performance Indicator	Performance Target	Achieved Target	Input Data	Reliability	Accuracy	Improvement Actions
KPI 9	Personnel expenditure as % of collection from water & sewerage services and other related income			Total Personnel Expenditure			
				Total Collection from water and sewerage sales and other related income			
	Operator's human resource Efficiency						
KPI 10	Personnel/1000 (W&S) connections (ratio)			Total number of personnel			
				Total number of water and sewerage connections			
KPI 11	Wastewater quality compliance (%)						
	BOD_5 compliance			BOD_5 samples passed			
				BOD_5 samples tested			
	COD compliance			COD samples passed			
				COD samples tested			
KPI 12	Proportion of population connected with sewerage network (%)			Connected Population			
				Total Population			