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Service activities relating to drinking water supply systems and wastewater systems — Guidelines for benchmarking of water utilities

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National foreword

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Service activities relating to drinking water supply systems and wastewater systems — Guidelines for benchmarking of water utilities

Activités de service relatives aux systèmes d'alimentation en eau potable et aux systèmes d'assainissement — Lignes directrices pour le benchmarking des services publics de l'eau

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 224, *Service activities relating to drinking water supply systems and wastewater systems — Quality criteria of the service and performance indicators*.

Introduction

Benchmarking is a systematic process for the identification, familiarization and adoption of successful practices from benchmarking partners. Typically, it is a continual or recurrent process. The primary aim of benchmarking is the performance improvement of benchmarking partners.

Benchmarking provides a means of improving technical and economic processes. The principal objectives of benchmarking in the water sector are performance improvements with particular emphasis on reliability, quality, customer service, sustainability, and economic efficiency. It provides those responsible in individual benchmarking partners with evidence to compare their processes with the most efficient equivalents among the wider group of benchmarking partners. Conclusions can then be drawn on opportunities or need for performance improvement.

Potential consequential objectives can include communication with stakeholders. Relevant results of a benchmarking project can also be used to address the information needs of stakeholders, such as politicians, the public and supervisory/regulatory bodies. Care is to be taken to ensure that all relevant contextual information and influencing factors are comprehensively described to avoid inaccurate or misleading conclusions being drawn. Benchmarking might thus also support the outward transparency of the performance of services. However, it is intended to be remembered that the ultimate aim of benchmarking is to ensure that the overall operations of the service are as effective, efficient and economical as possible.

Successful benchmarking needs the commitment and conviction of the benchmarking partners' management. Management know-how is needed when interpreting and analysing the results of performance assessment and in drawing conclusions. Additionally, benchmarking is a process which can generate confidential data relating to individual benchmarking partners. Thus, the goodwill of benchmarking partners, the agreement of a code of conduct and trust in the entity that organizes the benchmarking are prerequisites for successful benchmarking. Participation in benchmarking is therefore often voluntary. However, participation can be a requirement, for example, from a regulatory authority.

This document summarizes generally accepted criteria for successful benchmarking of drinking water and wastewater services and can be applied at all levels of detail and for any specific improvement objectives. These have been derived from common experiences where benchmarking has been applied as a two-step process; firstly for performance assessment and secondly for performance improvement (see list of examples of benchmarking projects in Annex B).

This document's content represents an open, shared and international approach by the water industry to the derivation of benchmarking good practice in the water sector. It builds on earlier work published jointly by the IWA[4], Reference [5], AWWA and IWA[6] and DVGW and DWA[7]. The benchmarking process can be used by any type of drinking water/wastewater service provider, including small and medium enterprises. The approach in this document does not prefer any specific national, regulatory, commercial or professional association's benchmarking method. The approach described reflects good practice when taken as a whole.

ISO 24510, ISO 24511 and ISO 24512 provide guidelines for the assessment and for the improvement of the service to users and the management of the water utilities but do not present detailed assessment and improvement procedures. This document gives guidance on benchmarking which is a widely used procedure, combining the performance assessment with steps of performance improvement. As such, it complements ISO 24510, ISO 24511 and ISO 24512.

Service activities relating to drinking water supply systems and wastewater systems — Guidelines for benchmarking of water utilities

1 Scope

This document provides guidelines on good benchmarking practice of drinking water and wastewater utilities. It describes the basic framework and methods associated with benchmarking in the water sector. The guidelines are intended primarily for voluntary benchmarking. Specific objectives set forth by the authorities and which are to be achieved by the water utility are not covered by this document.

This document is applicable to water utilities of any size managed by a public or private entity. It does not favour any particular ownership or operating model.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 24510 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
aggregated performance indicator
performance indicator (3.13) at superior level, which represents one or more levels of detail

Note 1 to entry: A highly aggregated performance indicator gathers information at utility level with a low level of detail (e.g. operating costs of water supply per cubic metre of water delivered). Lower levels of aggregation require more detailed performance indicators (e.g. time commitment per metre of sewer cleaning). This applies also synonymously to *data variables* (3.8).

Note 2 to entry: A synonymous term is “aggregation level”. In this context, aggregation level means the consolidated status of a performance indicator or a data variable relating to the information about the *benchmarking object* (3.4).

3.2
benchmark
single value representing an accepted reference value derived either from comparisons among participants or from literature, used for orientation

Note 1 to entry: The benchmark may be determined collaboratively or individually.

Note 2 to entry: By *clustering* (3.6), different benchmarks can occur for different peer groups.

3.3
benchmarking
systematic process for the identification of, becoming acquainted with and for adoption of successful practices of *benchmarking partners* (3.5)

Note 1 to entry: Typically, benchmarking is a continual process.

Note 2 to entry: Benchmarking at process level means that the object of benchmarking is a process, e.g. operation of sewers, billing or material purchasing.

Note 3 to entry: Benchmarking at utility level means that the object of benchmarking is the water utility and the main tasks, e.g. drinking water and wastewater services.

3.4
benchmarking object
water utilities managed by a public or private entity, utility sectors, functions, processes, tasks, services or other products, which are the subject of *benchmarking* (3.3) and, with clear-cut interfaces, are dissociated from each other and from non-investigated objects

EXAMPLE Sewer construction, pipe network operation.

3.5
benchmarking partner
participant in a *benchmarking* (3.3) project

3.6
clustering
grouping of *benchmarking objects* (3.4) according to different kind of criteria [*context information* (3.7) or *explanatory factors* (3.10)] in order to create rather homogenous sets of peers

EXAMPLE Clustering by utility size, delivered volume, served population, network delivery rate (m^3/km/year).

Note 1 to entry: For different *performance indicators* (3.13), different clustering might be appropriate; by clustering, specific benchmarks can/will occur for each peer group.

Note 2 to entry: The result of clustering is a comparison of performance indicators less influenced by the clustering criteria.

3.7
context information
information on characteristics and framework of drinking water and wastewater services

Note 1 to entry: There are two possible types of context information:

— information describing pure context and external factors that are not under the control of the water utility (e.g. demographics, topography, climate);

— characteristics that can only be influenced by management decisions in the long term (e.g. age of the infrastructures).

3.8
data variable
technical or economic parameter for the description of *benchmarking objects* (3.4) as basis for the calculation of *performance indicators* (3.13)

EXAMPLE Energy (kWh/year); COD (kg/year); costs ($/year) ; treated (waste-) water quantities (m^3/year).

Note 1 to entry: The basis for resilient performance indicators is a clear definition of the parameters within a structured data model taking into account the data confidence (e.g. reliability, accuracy).

Note 2 to entry: Each variable should

— fit the definition of the performance indicator or *context information* (3.7) it is used for,

— refer to the same geographical area and the same period of time or reference date as the performance indicator or context information it will be used for, and

— be as reliable and accurate as the decisions based on it require.

3.9
deviation from benchmark
result of the comparison of *performance indicators* (3.13), as the difference of an observed value, from the benchmark applied

Note 1 to entry: See Figure 1.

3.10
explanatory factor
reason for deviations of *performance indicators* (3.13) of various *benchmarking partners* (3.5)

Note 1 to entry: Explanatory factors can be differentiated into modifiable components (e.g. energy consumption) and non or only long-term modifiable components (e.g. water source). Non- or only long-term modifiable components result from the *context information* (3.7) of the water utilities. For the interpretation of performance indicator results, explanatory factors are essential. They can be derived from the context information. Under certain circumstances, a standardization is possible and sensible for the establishing of comparability, e.g. standardization of different depreciation rates.

3.11
improvement potential
deviation of a *performance indicator* (3.13) from the benchmark

Note 1 to entry: The deviation can be reduced through improvement actions.

3.12
performance category
classification of the general objectives of drinking water and wastewater services

Note 1 to entry: Main categories comprise reliability, quality, customer service, sustainability and economic efficiency.

Note 2 to entry: Assessment criteria can be grouped by performance categories.

3.13
performance indicator
parameter, or a value derived from parameters, which provides information about performance

Note 1 to entry: Performance indicators are typically expressed as ratios between variables. These ratios may be commensurate (e.g. %) or non-commensurate (e.g. $/m^3$).

Note 2 to entry: Performance indicators are means to measure the efficiency and effectiveness of a water utility in achieving its objectives.

3.14
performance indicator comparison
comparison of values of *performance indicators* (3.13) against values of the same indicator from other utilities, previous values of the same indicator or the benchmark

3.15
performance indicator system
controlled compilation of *performance indicators* (3.13), which are related to each other either logically or mathematically and which, overall, are aimed at a common, superior objective or *benchmarking object* (3.4)

3.16
process
set of interrelated or interacting activities that use inputs to deliver an intended result

Note 1 to entry: In *benchmarking* (3.3), organizational and technical processes and combinations of both of them are considered. A process within the meaning of benchmarking comprises a combination of one task with one plant/one object (e.g. operate sewer network, treat wastewater, treat water, provide domestic connection, further train staff, purchase material).

3.17
reference parameter
data variable (3.8) used in the denominator of a *performance indicator* (3.13)

Note 1 to entry: The reference parameter is aligned with the specific *benchmarking object* (3.4) described by the specific performance indicator [e.g. treated (waste) water quantity, influent loading, influent or connected inhabitants plus population equivalents].

Note 2 to entry: In case of *benchmarking* (3.3) of the whole drinking water or wastewater service, the denominator should represent one dimension of the system (e.g. number of service connections, total water main length, annual costs). This allows for comparisons through time, or between systems.

4 Benchmarking — Objectives, work steps and characteristics

4.1 Objectives

The primary objectives of benchmarking lie in determining improvement potential and working out and implementing realisable actions to improve performance. The comparison of specific organizational units can either be done internally within the water utility or externally with other water utilities or any other organization/s. External comparisons can facilitate mutual improvement and best practice exchange. Potential consequential objectives can include communication with stakeholders (see also Clause 5).

Public or private water utilities, utility sectors, functions, processes or tasks with clearly defined start and finish boundaries (e.g. new construction of pipelines, maintenance measures, replacement of meters for customers, meter reading and accounting for consumption, quality control) can be examined. Benchmarking objects should be completely defined by the determination of all data variables and performance indicators necessary for their accurate comparison across benchmarking partners. The systematic identification of influenceable causes for existing differences is the focus of benchmarking. Benchmarking extends beyond performance assessment (see ISO 24510:2007, Clause 7). It delves into identification and implementation of best practices. The first information on this is supplied by the performance indicator comparison, which flows into a cause analysis (see Figure 1).

In non-branch-specific areas (e.g. logistics, material management), companies outside drinking water and wastewater services can also be taken into consideration as benchmarking partners.

Benchmarking projects can be differentiated according to the type of benchmarking object and the level of detail, e.g. benchmarking at process level or benchmarking at utility level.

4.2 Performance assessment and performance improvement

Benchmarking consists of two basic consecutive elements: performance assessment and performance improvement.

Performance assessment as a process should be managed to achieve a clear and precise purpose and refer to the objectives of a wastewater or drinking water utility (see ISO 24511:2007, 7.1 and ISO 24512:2007, 7.1). The fulfilment of the objectives and the degree of success of the actions can be measured by means of performance indicators (for example, performance indicators are employed for the assessment of performance within the water utility and/or in comparison with other benchmarking partners).

Performance assessment and performance indicator comparisons are elementary components of benchmarking, which differs from simple performance indicator comparisons by additional and continuing work steps, involving "analysis" and "implementation" (see Table 1), leading to performance improvement.

The analysis at utility and process level comprises the examination of causes for deviations of performance indicators of different participants on the one hand and of individual performance indicators of participants to the benchmark on the other hand and the determination of improvement potentials and action plans for improvement (see Figure 1).

Performance improvement in a benchmarking project is dependent upon decisions and actions aligned with the context and overall objectives of the water utility (e.g. improvement objectives and action plans need to be relevant, achievable, and adapted to available resources within individual water utilities). It might be the case that only performance assessment will be completed in the course of the benchmarking project.

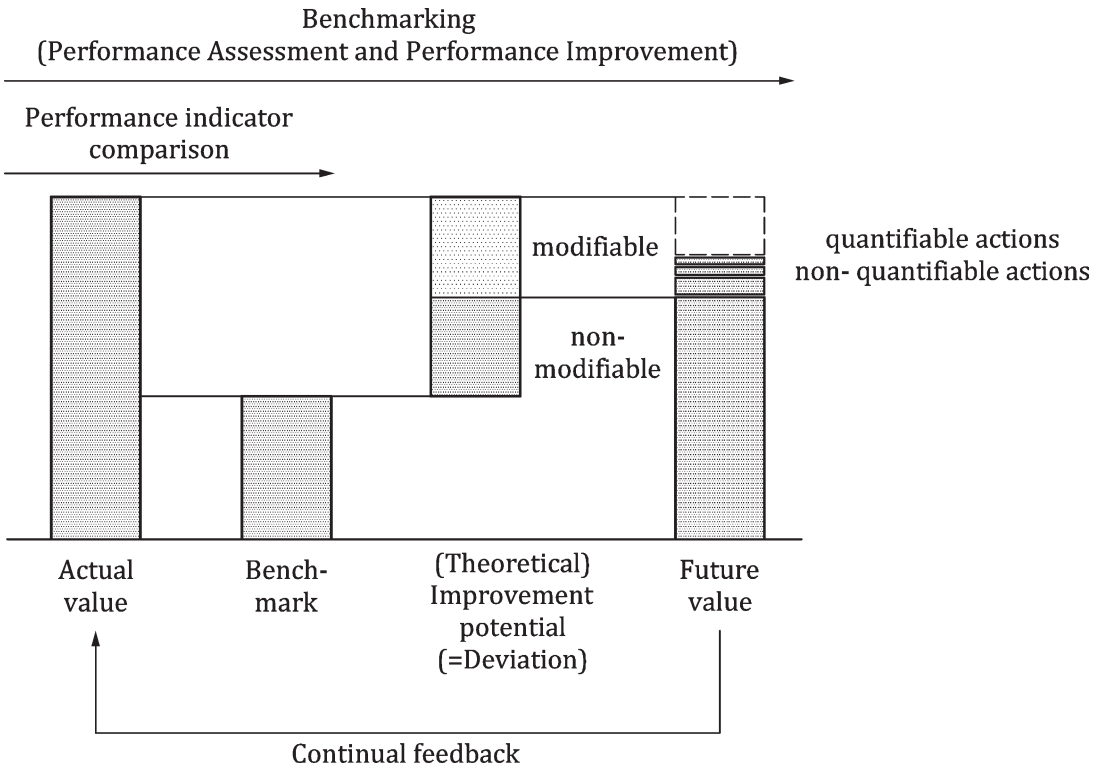


Figure 1 — Benchmarking elements

4.3 Benchmarking work steps

The process of benchmarking can be broken down into five work steps, which comprise several individual activities. Table 1 illustrates these relationships.

Benchmarking is flexible in its execution. Some of the activities described in Table 1 may be capable of parallel execution (e.g. by workshops). Activities can be matched to the requirements and objectives of the benchmarking objects and benchmarking partners.

Table 1 — Work steps and activities of benchmarking

	Work step	Main activity	Further activities	Details	Recommendations
Preparation	1. Preparation, planning	— Determination of the objectives — Determination of the group of participants — Definition of the scope and the level of detail (benchmarking object) — Description of the benchmarking object — Definition of the data variables and performance indicators/choice of the performance indicator system — Assessment of comparability	— Assignment of a project team — Selection of a project responsible body (internal or external), see 5.3.2 — Compilation of a common agreement on scope and deliverables — Clarification of the principles of cooperation, confidentiality in the treatment of data, information and project results in benchmarking projects (see checklist in Annex A) — Determination of the project organization including time/budget plan (project management) — Definition of the report and assessment system/examination of the applicability of the methodology and, if necessary, adjustment	— Integration of technical and financial staff — Open, reciprocated commitment for data transparency — Close coordination with the project responsible body	— Analysis of secondary information (e.g. annual report) for selection of partners — For non-sector-specific areas (supply management, logistics etc.), partners outside the sector are possible as well — Decision on the frequency and context of the benchmarking should be taken at start or end of the benchmarking project — Integration of employee representation and, if required, further stakeholders — As accurate as possible, knowledge and documentation of the internal process to facilitate data acquisition — Adaptation of own cost accounting may be necessary — Consider wider comparability of performance indicators
Performance assessment	2. Data acquisition	— Data collection — Data synthesizing — Data validation	— Use and, if applicable, develop procedures to ensure data control and check, internally and externally — Use and, if applicable, develop processes to ensure data collection and accountability, and quality control of these processes	— Determination of economic and of technical parameters — Estimation methods reduce efforts but also the resilience of the results, the concrete value has priority	— Standardized data collection — Onsite visits by the project core team should be foreseen in order to enhance data quality — Ascertain the data quality (pragmatic cost-benefit ratio)

Table 1 *(continued)*

	Work step	Main activity	Further activities	Details	Recommendations
Performance improvement	3. Determination of benchmarks	— Calculation of performance indicators — Performance indicator comparison — Identification of the benchmark — Structured communication of results	— Clustering	— If necessary, existing specifications and guidance values of standards should be observed — Subclustering can be helpful to identify and take into account further influencing factors	— Benchmarks should be robust and not influenced by special factors (such as context, externalities and long-term factors) — Pre-definition of clusters (including context information comparison and business process similarity analysis) to ensure consistent benchmark definition and avoid "one size fits all" benchmark — Workshops should be considered
	4. Analysis	— Causal analysis — Determination of improvement potential — Action plan	— Evaluation of the applied tools and methods such as report and assessment system	— Performance indicators, together with all available information, should be evaluated and classified with regard to the overall objective; context information and explanatory factors need to be taken into account — The execution of workshops for the technical exchange between participants usually generates additional benefit for the individual participant	— Interpretation on the basis of additional information such as qualified guidance values from the legal specifications, sets of standard specifications and rules and the sector data — Classification of values on the basis of earlier projects and/or comparative projects — Creation of an action plan essentially through expert personnel — Execution of workshops
	5. Implementation	— Implementation of the specified actions	— Integration of the actions in operational procedures — Integration of the benchmarking as regularly repeated procedure	— Report for monitoring of implementation — Performance review — Prior to implementation of the action plan, actions should be assessed through cost benefit analysis	— Measuring the results of the implemented actions can be done subsequent to the end of the project or within a new round of benchmarking — Compare post-implementation data to the benchmark and consider additional action if the benchmark goals are not achieved or do not seem to be sustainable

4.4 Requirements on performance indicator systems for drinking water and wastewater services

Performance indicator comparisons and, consequently, performance indicator systems are core components of each benchmarking. In general, the following requirements should be fulfilled by performance indicator systems for benchmarking.

— Taking into account the main performance categories

In drinking water and wastewater services reliability, quality, customer service, sustainability and economic efficiency are main performance categories (see Figure 2). For these, along with the technical sets of rules and standards and management systems, performance indicators furnish information for corporate decisions. Performance indicator systems should record the various performance categories taking into account the respective local conditions and enable an evaluation. Because trade-offs between performance categories can occur (for example, lowering the running maintenance costs versus long-term warranty of the supply security), all features for a holistic assessment should be considered to a balanced degree.

— Explanatory factors for the interpretation of performance indicators

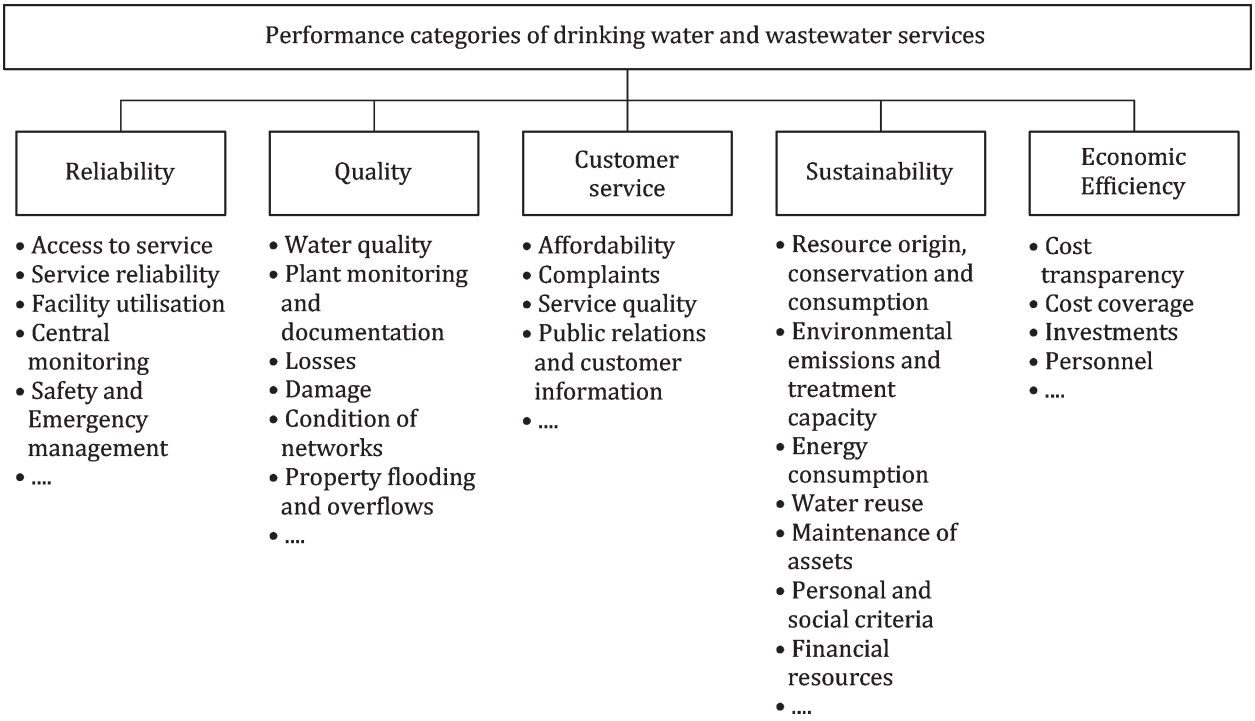
For the interpretation of performance indicators, a performance indicator system should also contain explanatory factors and context information. These are surveyed, in addition to the data variables collected for building performance indicators (e.g. structure of the water utility, of the supply/collection area), or they are derivable from assumptions about performance indicators, e.g. high supply or collection rates result in an increased number of necessary laboratory analyses of the respective water qualities.

— Clear definitions and assessment of the reliability and accuracy of all data

Main components of a performance indicator system are clear, detailed and shared definitions of all data variables, embedded in a coherent data structure (e.g. water balance scheme, finance structure), in order to achieve a uniform understanding with all users of a performance indicator system. In combination with the examination of the reliability of the data source and the accuracy of the data set, these requirements form the basis of the survey of robust performance indicators as an initial basis for the interpretation of the results. Additionally, “confidence grading” (see ISO 24510:2007, 2.8) may be considered.

— Taking into account costs of performance indicator systems

The cost to implement a performance indicator system should be reasonable and considered at an early stage.



NOTE 1 ISO 24511 and ISO 24512 list additional assessment criteria for wastewater and drinking water utilities respectively.

NOTE 2 Examples of performance indicators related to the above service assessment criteria are given, for example, in ISO 24510, ISO 24511 and ISO 24512 or in IWA manuals[4][5].

NOTE 3 Some assessment criteria might be considered in different performance categories.

Figure 2 — Main categories of performance assessment of the drinking water and wastewater services with examples of service assessment criteria

A performance indicator system should be structured hierarchically.

A hierarchical performance indicator system allows a linkage of tasks or processes of the various degrees of detailing for all performance indicators. This enables both a more general survey on a higher aggregation level, as well as a simultaneous consideration of detail. To be effective, a performance indicator system should have clearly defined levels of hierarchy and a capability of linkage of the performance indicator over the individual levels. It is always helpful if the performance indicator system enables a more detailed consideration and/or analysis of the benchmarking object (e.g. break down capability of the process considered into explanatory sub-processes).

For example, the main tasks of a water utility (see Figure 3) can be employed for the structuring of the performance indicator system according to administrative and technical tasks. This often does not correspond with the organizational structure in the water utility but makes the differentiation of the benchmarking objects easier.

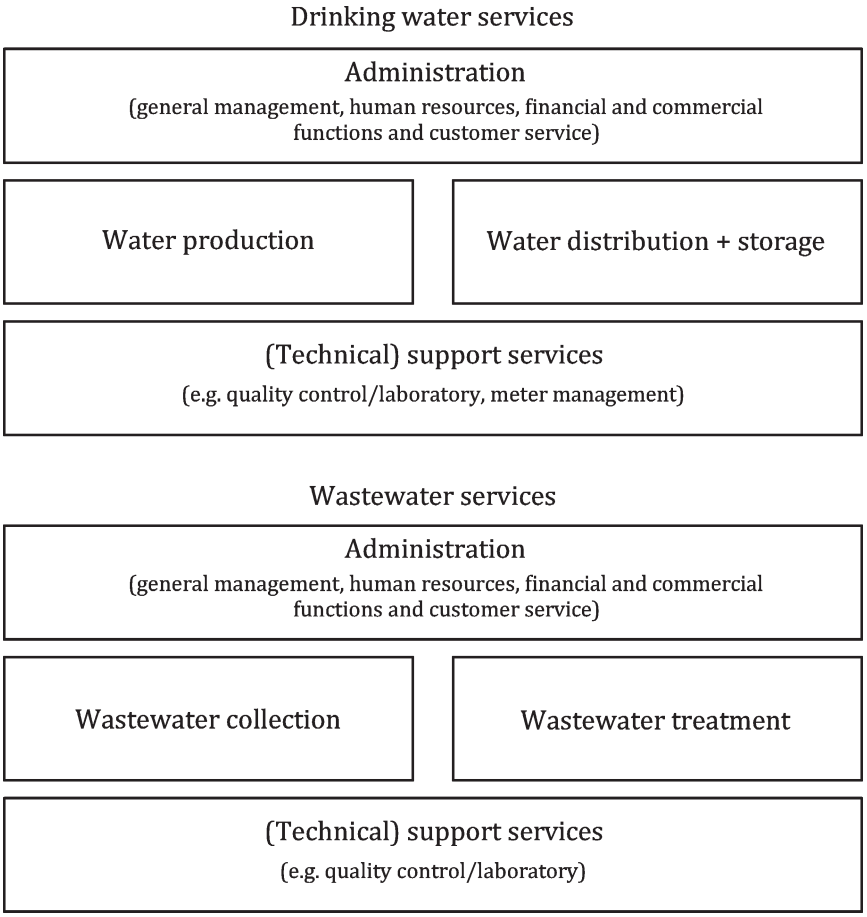
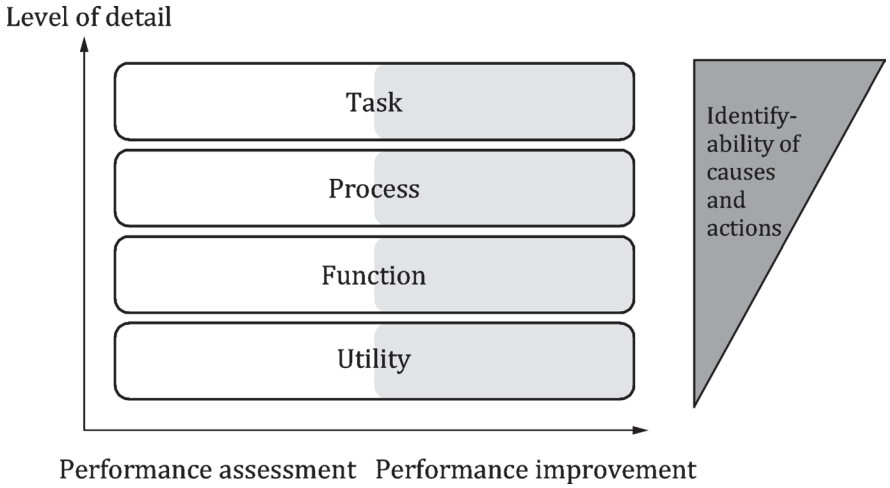


Figure 3 — Example of a task catalogue for drinking water and wastewater services

Alternatively, for example, comprehensive process models of drinking water or wastewater services can be employed for differentiation. By now, various practice-proven performance indicator systems for drinking water or wastewater services exist, which correspond to a large extent with the general requirements formulated above. In order to enable a comparison of own performance indicators with other benchmarking projects, the compatibility of the performance indicator system employed (e.g. the definitions applied therein) should be considered. The participating water utilities can, however, also define their own performance indicators which satisfy the specific questions of the individual benchmarking project.

4.5 Benchmarking at different levels of detail

Benchmarking is possible at different levels of detail (see Figure 4 for an overview and Table 2 for details).



NOTE This figure is based on Reference [6].

Figure 4 — Benchmarking at different levels

Highly aggregated performance indicators at utility level support the summarised evaluation of the performance of a water utility and the depiction of the development of performance indicators. The high aggregation, however, at the same time holds the risk of misinterpretations and crude generalities.

The more detailed the investigation (e.g. at process level) turns out, the more accurately the performance indicators reproduce the benchmarking object (e.g. a process with regard to its quality, its processing time, its resource consumption or its costs). The performance indicators possess a high significance regarding the performance assessment and the analysis of deviations from the benchmark with increasing level of detail. This brings about higher requirements on the comparability of the participants and/or the benchmarking objects under consideration.

The performance indicator 'manpower in full time equivalent', as an example, is a useful comparative value for a first performance assessment for the personnel costs at utility level. On the level of process benchmarking, this performance indicator can be further specified and differentiated, e.g. by the average time needed for reading one customer meter.

Table 2 — Characteristics and properties of benchmarking at utility level and benchmarking at process level

Aspect	Benchmarking at utility level	Benchmarking at process level
Integration in the utility strategy	Component part of the strategic planning process	Implementation of strategic planning framework
Level of detail	Whole utility Comparison of sectors	Processes and tasks and their procedures Comparison of single processes
Approach	Structured, at regular intervals	Systematic single examination in several phases, also at regular intervals
Identifiability of causes	Slight to medium, (important indicator function; gives hints for necessity of additional detailed analysis, e.g. benchmarking at process level)	High, (causes are analysed, potentials are estimated and/or identification of better practices possible)
Possibility of derivation of actions	Slight to medium indication for more detailed considerations	High (formulation of concrete actions)

Benchmarking aimed at a whole water utility and benchmarking concentrated on more detailed levels (e.g. at the level of processes) can form a mutual supplement. A combination of benchmarking at utility level and benchmarking at process level makes sense especially when an identification of relevant

processes (e.g. with the highest optimisation potential) for planned benchmarking projects takes place via benchmarking at utility level.

5 Notes and recommendations for benchmarking projects

5.1 General

Successful benchmarking projects are often based on voluntary participation, the confidentiality of the project results and on the comparability of the benchmarking objects. Issues arising from the potential confidentiality of benchmarking outputs (particularly performance indicators) are discussed further in this clause.

5.2 Comparability of benchmarking objects

The right partners for comparison should be found for benchmarking projects. A high number of participants is not always a guarantee for the quality of the results because, possibly, practicable approaches for improvement cannot be identified and or defined. The quality is mainly influenced by the systematic approach, which is the basis of the benchmarking, as well as the suitability of the coordinator (project responsible body). A comparability of the benchmarking objects (water utilities, sectors, processes, etc.) only exists if the context information at the respective level of consideration is taken into account through the design of clusters, for instance. The recording of such context information is fundamental to ensuring a specific interpretation of performance indicators. In particular, these include hydrological, topographical, urban residential, geographical and geological conditions, which materially influence the processes of drinking water or wastewater services. When comparing rural and urban water utilities, different structural characteristics should be taken into account. A further difference results from the different utility tasks (e.g. distant/remote supply, local supply).

5.3 Notes for project organization, project management and data management

5.3.1 Project organization

The project should be supported and attended by internal decision makers and employees' representatives. Fundamentally, all employees of a water utility affected by the project should be involved in a sensible way.

The responsible decision-makers in the water utility take on the control function in the project. The operative responsibility for the project should be additionally clearly defined.

Along with the internal functions, an external project structure is essential for the specific coordination of the participating water utilities. An external operational project team, consisting of the respective people operatively responsible and/or internal project managers of the water utilities could be planned. Typically, these form the interface with the project management of the overall project and, at the same time, ensure the flow of information into the water utilities. For the overall control of the project, a project steering group, consisting of decision-makers of the water utilities involved has also proved its value.

5.3.2 Project management of the overall project

An important role in benchmarking projects is attached to the project's management (i.e. that of project responsible body/coordinator). In general, it takes on the central communication and monitoring tasks and is available as a contact point for the others involved in the project.

Project management and organization can be performed either by the benchmarking partners or assigned to an external adviser with the required competence in this field. An assignment to a competent third party, if only for reasons of personnel capacity, which the participants have at their disposal, is frequently helpful. In any case, a general acceptance of the project management by all involved, combined with a neutral exercise of functions, is important.

5.3.3 Data management

A further element, which should be given much attention in the context of benchmarking, is the handling of the data. Data management typically necessitates the employment of electronic data processing with the recording, archiving, assessing of data and the presentation of results. In particular, attention should be paid to the following:

a) project internal data transparency and traceability;

b) flexibility for additional evaluations;

c) documentation of the calculation methods;

d) data security with regard to the archiving and further processing;

e) simple processing for the employees involved;

f) ensure confidential handling of data.

5.4 Requirements on the personnel involved

Personnel involved at the participating water utility should cover technical, financial and administrative knowledge.

It is necessary that the participating water utility involves at least one technical representative with a more thorough knowledge and experience.

In any case, the persons immediately responsible for the object and result, such as technicians/foremen or plant engineers, should be involved. Such individuals should have a complete overview of all the main technical and ancillary facilities, as well as the knowledge and also the capability of intervention with the organizational procedures.

Furthermore, personnel from the water utilities should be involved who possess knowledge of the individual accounting procedures which are connected with the benchmarking objects, as well as on the water utilities' requirements for cost accounting, for example with internal cost allocation.

Analogous to the technical personnel involved, a person involved in the project should possess an extensive financial knowledge (for example, with regard to the uniform handling of depreciations and interest rates), the indexing of historical costs or the handling of operating provisions and overhead cost allocations.

6 Results and their application

6.1 Principle of confidentiality

In the interest of participating water utilities, project data should be handled confidentially. The confidentiality with regard to third parties is an essential prerequisite for the necessary openness of the benchmarking partners in the exchange of opinions and data. Thus, confidentiality is often an important prerequisite for the success of benchmarking projects.

An extensive, external exploitation and dissemination of the results gained from a benchmarking (for example, through publication) is only permissible if the participating water utilities agree on the approach.

Issues should be specified according to the checklist in Annex A.

6.2 Use and presentation of results in public

Anonymised and aggregated performance indicators can be used for a presentation of the results (for example, in a sector portrait). The results should be comprehensible by the public at large, adapted

to the situation, not misleading, with clear messages. With the external employment of the results, it should be noted that a comparison of values of just highly aggregated performance indicators, e.g. in the sense of a ranking, is not particularly objective. This can lead to clearly false statements and/or conclusions, because the different factors with regard to the specific situation of the participating water utilities cannot be observed and evaluated.

6.3 Notes for the interpretation of results

In addition to the opportunities which can result from the benchmarking, the following risks of misinterpretation should be pointed out.

a) Assessment period

Increases in efficiency are, as a rule, expected in the short-term as a result of a benchmarking. Nonetheless, it should be noted that drinking water and wastewater services cannot do without long-term objectives and investments and therefore many performance indicators (e.g. rehabilitation of pipelines) first achieve an authoritative significance through consideration of annual cost series. Long-term improvement objectives can also be taken into account by according definition of data variables, e.g. by collecting values over ten years.

b) Area of consideration

Improvement objectives, which focus on individual benchmarking objects [e.g. on processes (wastewater treatment, water supply) or tasks (replacement of meters)] may not disregard other improvement objectives and the overall result.

c) Assignment of quality rating and cost pressure

The five performance categories: reliability, quality, customer service, sustainability and economic efficiency should be evaluated to a balanced degree. Economic efficiency should be analysed, taking into account partially long-term and "hard-to-measure" objectives, regarding reliability, quality, customer service and sustainability. The danger of disregarding long-term objectives (e.g. environmental and resource protection, technical/economic maintenance of assets) because of short-term cost savings should be counteracted through an appropriate benchmarking set.

d) Selection of the reference parameters

Many benchmarking objects can be described, with regard to their objective, using various data variables. Experience shows that the selection of the reference parameters (denominator in the performance indicator: e.g. length of pipeline, volume or inhabitants) often has a decisive effect on the positioning of a water utility and the selection of a benchmark. If the relevant cost driver cannot be identified clearly, a benchmarking object should be described by using different and/or additional performance indicators (e.g. using different reference parameters).

e) Comparability of various benchmarking projects

A comparability of the results from different projects is not always easily possible. Depending on the direction of the objective of the individual benchmarking project, different depths of analysis and layouts of the benchmarking object are employed.

7 Project costs

With the execution of benchmarking, project costs accrue for internal and, as far as an external third party is tasked with the coordination, for external services. To be taken into account internally are costs for the provision of the water utility's own personnel, as well as travel, administration and other costs. With continual employment, the internal effort decreases.

Annex A
(informative)

Checklist for clarification of the principles of cooperation and confidentiality in the treatment of data, information and project results in benchmarking projects

The following aspects should be covered on in an agreement on benchmarking projects:

— description of the participating water utilities or groups of participants (e.g. region, utility types);

— appointment of the coordinator and description of its functions;

— declaration or obligation to provide data and information (completeness and accuracy within the meaning of the project) by the participants if they can be generated at a reasonable cost;

— arrangements for project management (dates, deadlines, etc.);

— binding rules on confidentiality of the data inside and outside the project for all participants and the coordinator taking into account compliance with statutory provisions;

— limitations of disclosure to the participants of the benchmarking project;

— way of disclosure inside the project, e.g. anonymous representation in all documents for the project work (types of anonymization of such coding, aggregation) and possible lifting of anonymity in project meetings;

— regulations for disclosure to third parties;

— external use of the name of a participant, combined with its data or with observed practices, requires the consent of the water utility;

— use of aggregated representations and completely anonymous representations (usually possible for coordinator and all participants);

— dealing with non-business-related project results, for example, copyrights for methods.

Annex B
(informative)

Examples for voluntary and industry based benchmarking projects

Table B.1 gives examples of benchmarking projects in the water industry that have utilized the principles described in this document.

Table B.1 — Examples of benchmarking projects in the water industry, related to this International Standard

Region	Project	More information
Austria	ÖVGW Water Supply Sector Benchmarking ÖWAV Wastewater Benchmarking	http://www.trinkwasserbenchmarking.at http://www.abwasserbenchmarking.at
Canada	National Water and Wastewater Benchmarking Initiative (NWBBI)	http://www.nationalbenchmarking.ca/
Europe	European Benchmarking Cooperation (EBC)	http://www.waterbenchmark.org
Germany	Various projects Water Supply and Wastewater	http://www.dvgw.de/english-pages/drinking-water/profile-of-the-german-water-sector/ http://de.dwa.de/tl_files/_media/content/PDFs/StOeP/WEB_brachenbild_ENGL_wasserwirtschaft_2015_a4_25062015.pdf
Australia	Asset Management Customer Value (AMCV) of Water Services Association of Australia (WSAA) (formerly called Aquamark)	https://www.wsaa.asn.au/news/2016-asset-management-customer-value-project

Bibliography

[1] ISO 24510:2007, *Activities relating to drinking water and wastewater services — Guidelines for the assessment and for the improvement of the service to users*

[2] ISO 24511:2007, *Activities relating to drinking water and wastewater services — Guidelines for the management of wastewater utilities and for the assessment of wastewater services*

[3] ISO 24512:2007, *Activities relating to drinking water and wastewater services — Guidelines for the management of drinking water utilities and for the assessment of drinking water services*

[4] Alegre H., Hirner W., Baptista J.M., Parena R. Performance Indicators for Water Supply Services. Manual of Best Practice. IWA Publishing, London, Second Edition, 2006

[5] Matos R., Cardoso A., Ashley R., Duarte P., Molinari A., Schulz A. Performance Indicators for Wastewater Services. IWA Publishing, London, 2003

[6] Cabrera E., Dane P., Haskins S., Theuretzbacher-Fritz H. 2011): „Benchmarking Water Services - Guiding water utilities to excellence", IWA Publishing, London, and American Water Works Association, Denver

[7] DVGW Deutscher Verein des Gas- und Wasserfaches, DWA Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall (2008), „Advisory Leaflet DVGW W 1100/ DWA M 1100 – Benchmarking in Water Supply and Wastewater Disposal", Bonn/Hennef.

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