
**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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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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. (standards.iteh.ai)

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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.

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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 (m³/km/year).

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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 (m³/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

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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. \$/m³).

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](#)).

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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.

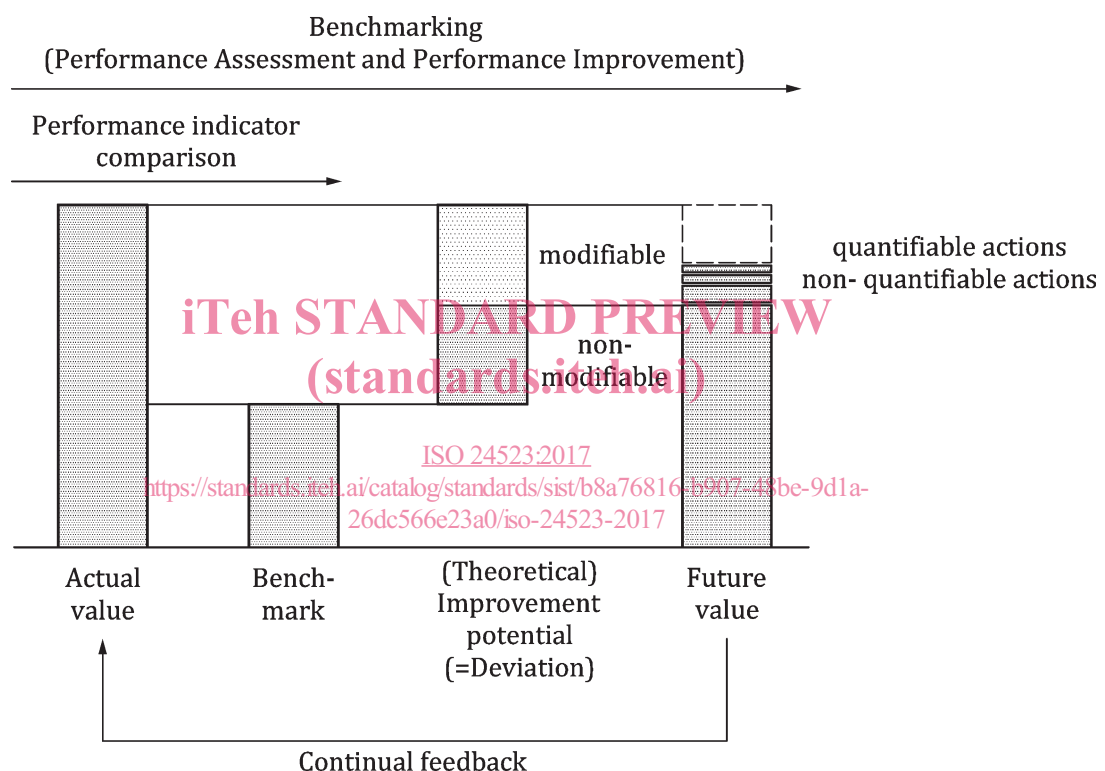


Figure 1 — Benchmarking elements

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.