

10 Benchmarking – Jointly searching for good practices and building up a database for reference values

(Subject to revision by ACWUA, Mustafa Nasereddin)

A manager in the water industry, wanting to improve energy efficiency with help of these guidelines, faces different challenges. Main challenges are

- How to learn from experiences and techniques already used in partner utilities? How to find good practices?
- How to evaluate the data and the energy performance indicator, if
 - the collection of data just begins and/or
 - there are no information about the performance levels of the industry available?

Benchmarking, an established industry practice, addresses these challenges by providing a management tool for common search of good practices and by building up a database of reference values. Hereby, the task of energy efficiency improvement becomes a task of all the benchmarking participants in the industry rather than of a single utility.

10.1. How does benchmarking work and how does it support energy efficiency?

Benchmarking in the water industry has been established as a management tool in various areas of the water sector. Experts of the International Water Association (IWA) have defined its goals and the main steps. According to those authors it is defined as follows:

'Benchmarking is a tool for performance improvement through systematic search and adaptation of leading practices.' (Cabrera et al 2011)

It consists of two fundamental components: Performance Assessment and Performance Improvement.

10.1. 1 Performance assessment will build up data base of reference values

Before reaching performance improvement (the goal of benchmarking) performance assessment is necessary and meaningful. Performance assessment in benchmarking is based on the evaluation of performance indicators (as used for the energy check). But in a benchmarking initiative values of performance indicators are rather compared to values of other partners than internally to previous values to monitor development. By doing so it is possible to find improvement potential by detecting performance gaps. It might be the case, that others perform already much better

than own plants. These plants can be used to establish benchmarks. Those partners might have installed already “good practices” from which the undertaking wants to learn.

The idea of an initial assessment followed by an improvement of the performance in the benchmarking process is expressed in Figure xxx.

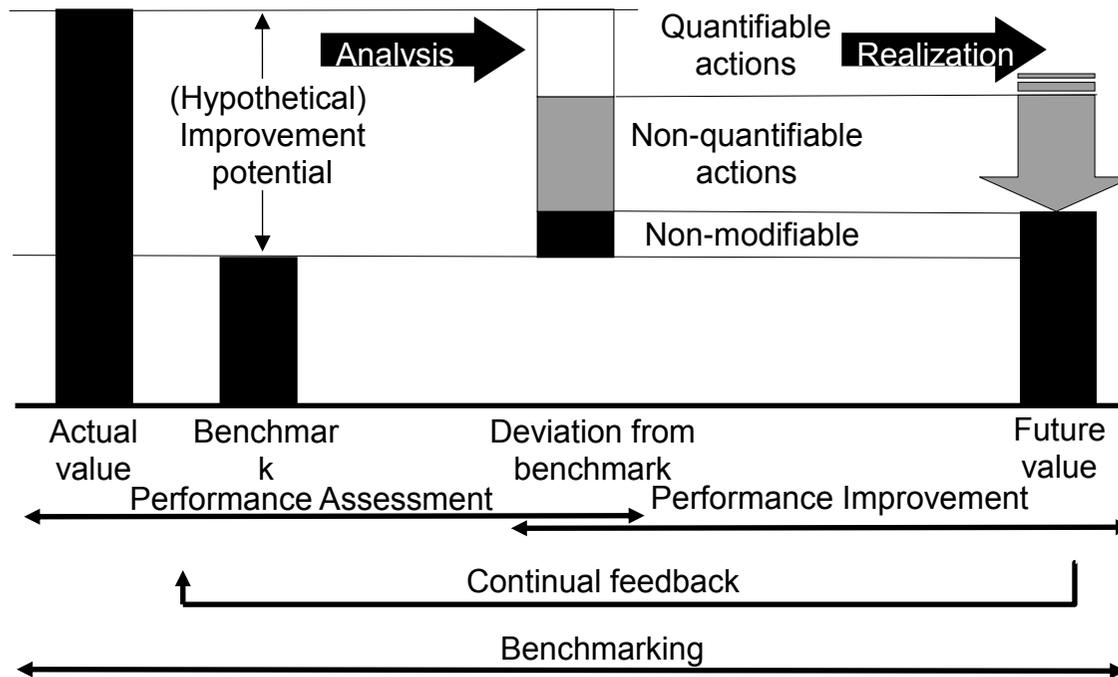


Figure xxx: Assessing and improving the performance in Benchmarking – The benchmarking cycle according to DVGW/DWA 2008 (simplified figure)

Performance assessment helps to understand the own position in the benchmarking initiative. As it is based on performance indicators, it can be expected that through benchmarking a database of energy related reference values will be maintained. These reference values can be used as benchmarks for the energy check. Currently there is no such database for the MENA water sector available.

In Germany, where benchmarking is conducted since several years, the existing database (of nearly 3,500 WWTPs) is an important source of reference values (see Figure xxx)

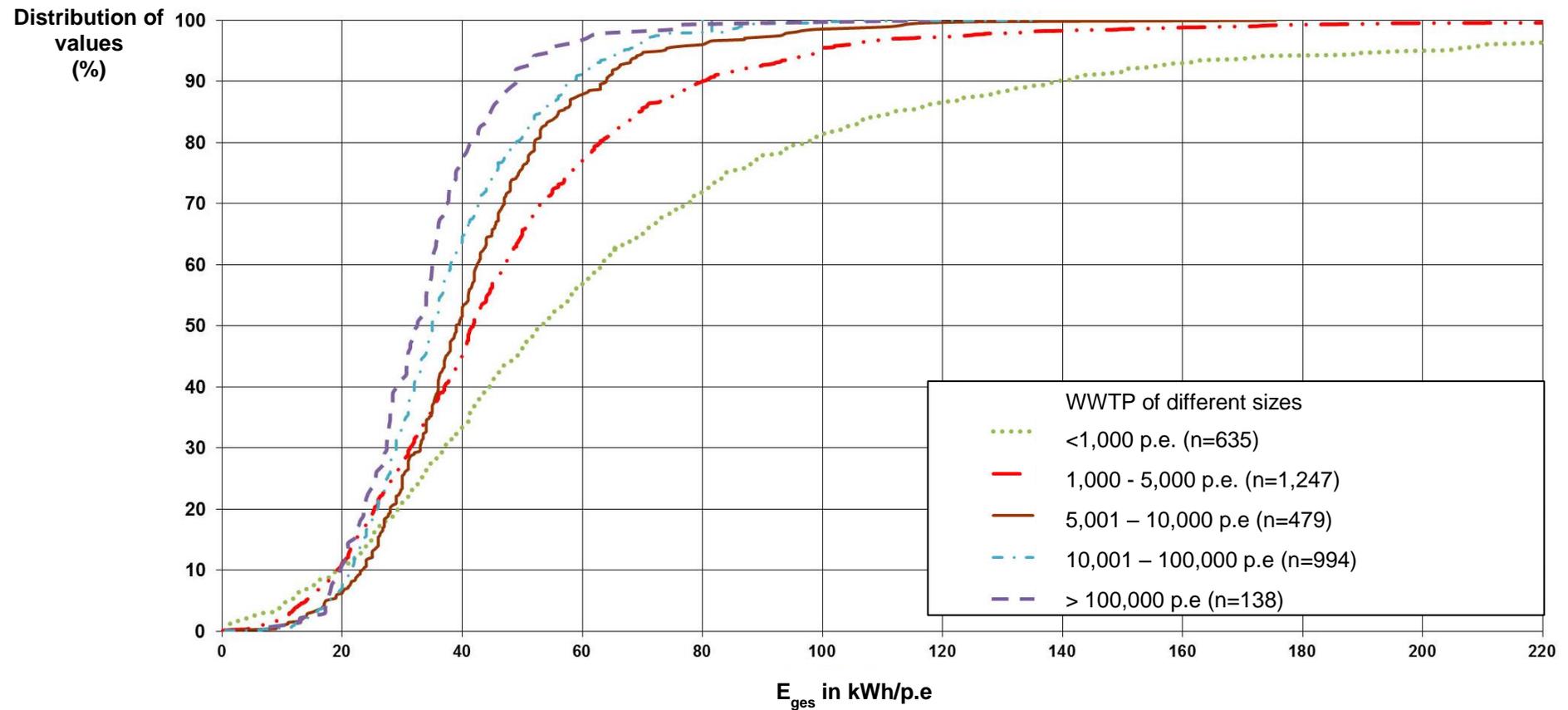
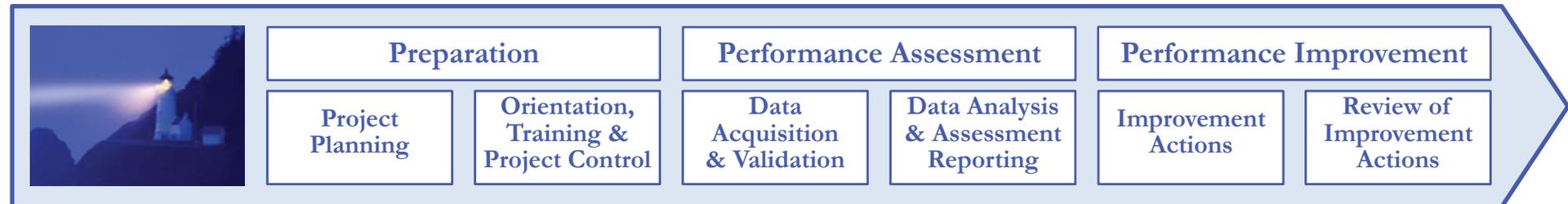


Figure xxx: Energy consumption of 3,493 German Waste Water Treatment Plants clustered by size (DWA 2013)

Such reference values are needed especially for energy managers of utilities who don't have enough reference values to compare with.

10.1. 2 Search for leading practices

But Benchmarking does not stop at performance assessment. It has developed standardized steps to start a meaningful analysis to support the search for leading practices.



Taken from IWA (2011)

Figure xxx: Standardized steps of benchmarking in IWA Manual (Cabrera et al, 2011)

Performance improvement is the end. This is derived by both an in deep analysis of the own performance with leads to follow-up actions and by discussing good practices with partner utilities. A guided learning process supports benchmarking partners to identify good solutions of other partners – who have made already experience with, e.g.

- General replacement of old deteriorated components by new components with lower energy consumption
- Optimising duration and intervals of filter backwashing
- Optimising monitoring systems for regulating aeration (e.g. monitoring N-NH_4^+ and N-NO_3^- concentrations to control the process of nitrification / denitification with greater precision than it is possible if just dissolved oxygen and/or the redox potential are monitored)
- Integration of frequency inverters to adopt flow rates of pumps to changing demands
- Dismounting of unneeded pipe fittings to reduce pipe resistance
- Regulation of air dehumidifiers by hygrostats
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10.2. How to start?

Benchmarking is no rocket science and it follows logical steps understandable by common sense. IWA Manual (Cabrera et al, 2011) describes how to start a benchmarking project and what are success factors. Various national „benchmarking“ approaches exist already in MENA region (for areas outside energy efficiency and without creating and transnational database). ACWUA Benchmarking Technical Working Group consolidates all “know –how” for the MENA region and offers additional tools and support.

Nonetheless, two specific points need to be pointed out:

10.2.1 Revise set of KPIs and add context information

KPI's of Energy check are a good base to focus on energy consumption, but probably additional PI's are meaningful, e. g. to cover other energy related aspects like recovery, production, procurement, reliability etc.

Also, for a sound comparison in benchmarking context information should be integrated to the energy performance indicator system. Otherwise it won't be possible to find similar partner utilities and the comparison might end up comparing 'apples to pears' (see Figure xxx). E.g. only plants with similar sizes and same technologies should be compared

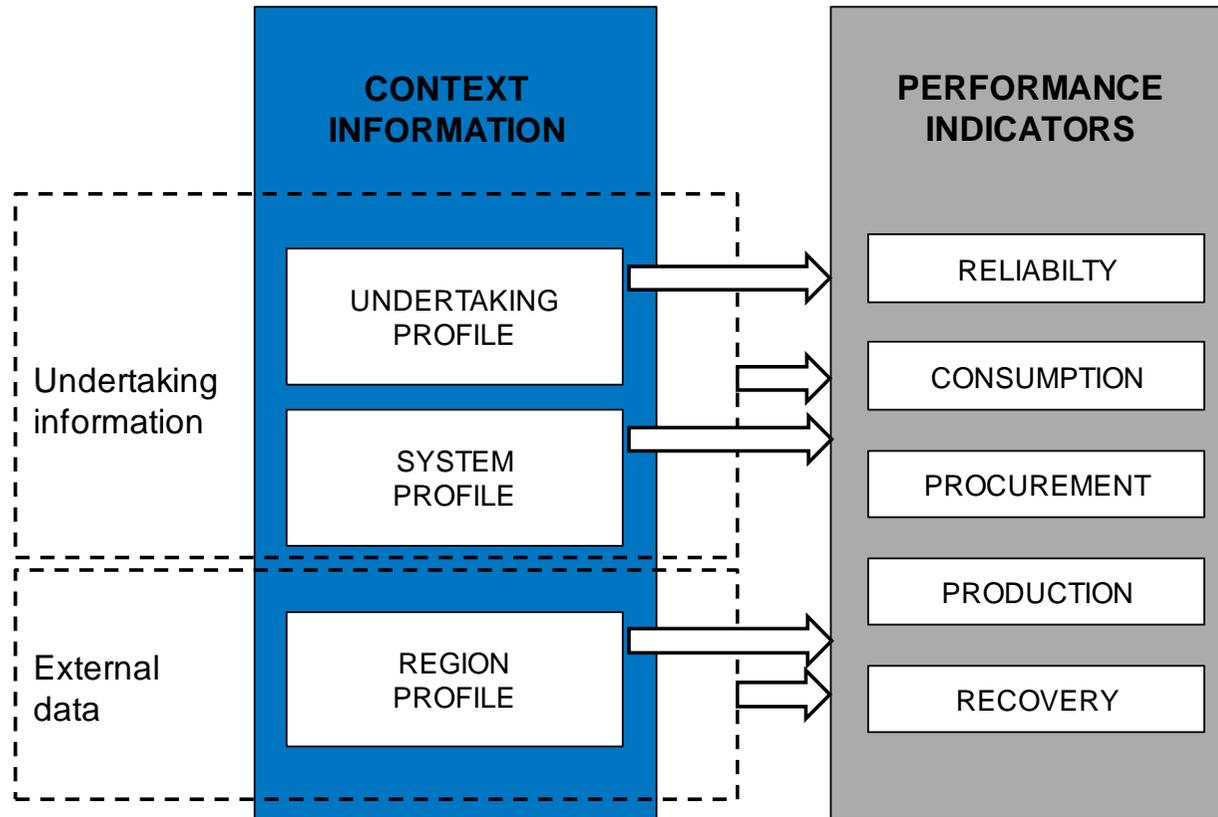


Figure xxx: Context information is part of explanation of performance indicators (based on Matos et al. 2003)

10.2.2 Coordinate with ACWUA Energy task force and ACWUA benchmarking technical working group

Benchmarking can be initiated on local, national or on regional level by every utility. ACWUA Technical Working Group Benchmarking is able to provide support.

Nonetheless, to start benchmarking on regional level ACWUA itself can promote the energy efficiency work of the water sector:

- The ACWUA Energy Task Force has high interest in advancing the search for leading practices (e.g. to update and renew Energy Guidelines and document experiences made) as well as interest in building up a database of reference values
- The ACWUA Technical Working group Benchmarking will start a regional ACWUA Pilot-Benchmarking to advance the common search for good practices in the whole sector. Using developed Energy PI's of these guidelines is an attractive option to coordinate different activities and to advance the energy efficiency activities of the water sector in Arab countries.

The participation of a water utility in such activities will support the advancement of the industry in the region.

References

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