Benchmarking in the Austrian Water Supply Sector: Objectives, Development, Structure and First Results of the 2004 Project

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Abstract Over the last few years a large number of benchmarking projects has been carried out in the sector of water supply all over the world. They have arisen from different motivations and pursue various objectives. They reflect specific regional structures and framework conditions. The International Water Association (IWA) has developed an overall indicator system (Alegre et al. 2000) and carried out several national field tests in order to adapt the system to practical applications. This set of performance indicators (PIs) has been used as the general basis and has further been developed within the Austrian OVGW project, which started in form of a pilot project with data of 2002. Within the next weeks, the 2004 project ("stage B") will be finished and first results can be presented now.

Keywords Austria, benchmarking, performance, water supply

Basics

What is Benchmarking? One definition for benchmarking is the following. Benchmarking is a continuous und systematic measuring process which compares the performance of an enterprise with the "best in class" in order to derive measures for improvements.

Performance indicator systems and benchmarking are management instruments for internal purposes as well as for company comparisons on a regional, national and an international level (Merkel 2001). The aim is to arrange a quasi competition which is based in Austria upon the principles of voluntary and anonymous participation.

Figure 1 shows the workflow of a benchmarking process. The first step is a comparison of performance indicators of different water undertakings. The variation of the own value from the optimum value represents a theoretical potential for improvements. However, a best possible homogeneous data collection and largest possible samples of similar participants are crucial criteria for gaining good comparability.

Causes, which are related to local characteristics, stay unchangeable. Some causes are not explainable at the moment and thus have to be analysed. For such causes, which are known concrete measures can be defined. In a next step these measures are realised in order to get a future value in the amount of the optimum level plus unchangeable parts. To complete the benchmarking process, an effectivity check-up in form of a new comparison of performance indicators is necessary.

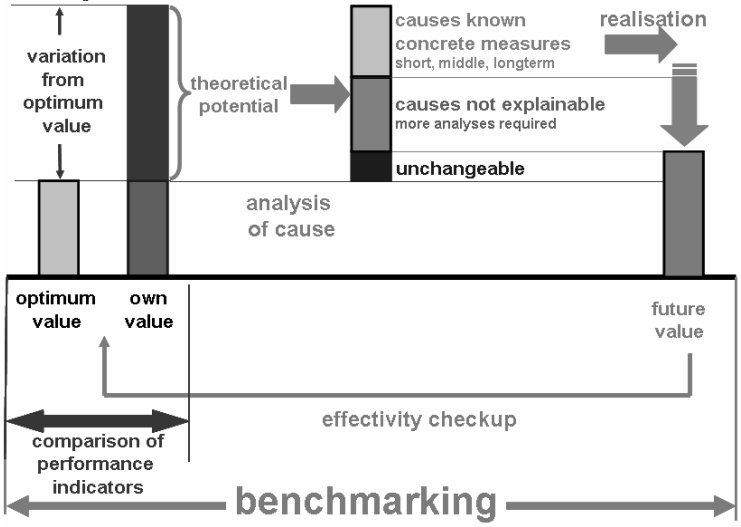

Figure 1 Benchmarking process (Schulz in Hirner & Merkel 2002, amended)

Development and project structure

Similar to many mid-European countries, the Austrian water supply sector is small structured; around 3,000 water undertakings centrally supply 8 million inhabitants in rural, urban and metropolitan areas. Based upon the international and national debates on requirements concerning the improvement of efficiency and the assurance of quality of drinking water services, the Austrian Association for Gas and Water (OVGW) has developed a mid-term strategy for setting up and carrying out benchmarking activities (Figure 2). The pilot study in the year 2002 was followed by the pilot project ("stage A") which was completed in summer 2004. Kick-off for stage B (2004 project), which will be completed in June 2006, was in autumn 2004 (OVGW 2004). Future projects will be organised in time intervals of three years.

The Austrian pilot project "Benchmarking and Best Practices of Austrian Water Supply Enterprises – Stage A" (Neunteufel et al. 2004), in which twenty-three water supply enterprises (from 40,000 m³ up to 140 million m³ supplied water per year) have participated, was launched and conducted by OVGW and largely funded by the Austrian Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW). OVGW commissioned three academic institutes to operationally run the pilot project as well as the 2004 project from an external, objective and confidential point of view: Graz University of Technology, University of Natural Resources and Applied Life Sciences Vienna and University of Applied Sciences Wiener Neustadt (Theuretzbacher-Fritz et al. 2005).

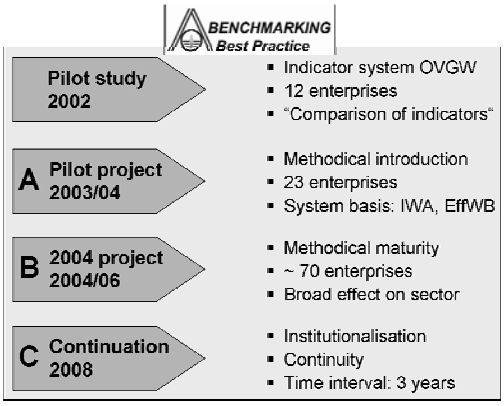

Figure 2 OVGW strategy for benchmarking water supply enterprises (Theuretzbacher-Fritz & Kölbl 2003, amended)

Some of the participating enterprises joined the OVGW benchmarking working group for project supervision and to incorporate practice needs into the indicator system. Thus, the OVGW system can be called a system from water suppliers for water suppliers.

Important for the development of the OVGW system has been the co-operation with the Bavarian (Germany) EffWB project (Rödl & Partner, 2002; Rödl & Partner, 2005; EffWB, 2003), which is also based on the IWA performance indicator system. Due to the similar water supply structure of Austria and Bavaria, a cross border co-operation was defined to develop a compatible system and to conduct trans-national comparisons. The Bavarian-Austrian co operation can be seen as an innovative application and further development of the IWA system generating the chance of large participation (200 participants and more) in these benchmarking activities (Theuretzbacher-Fritz et al. 2005).

In the 2004 project, a presentable amount of 69 water supply enterprises of different sizes (from 20,000 m³ up to 140 million m³ supplied water per year) and various legal structures (most of them publicly owned) has been participating. With about 330 million m³ supplied water per year, these participants represent 45 % of the total amount of supplied water in Austria and about 75 % of supplied water by OVGW members (Figure 3a and 3b).

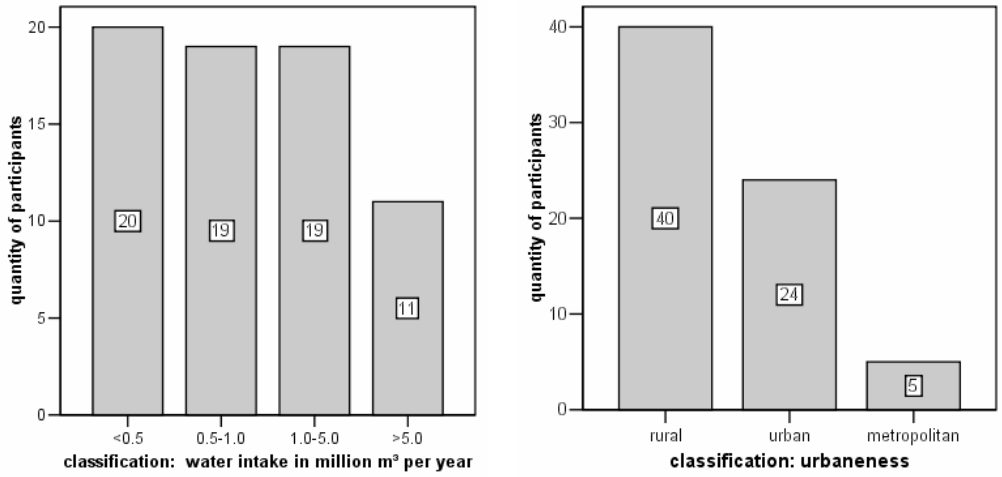

Figure 3a and 3b Structure of participants in the OVGW 2004 project

The OVGW system of the 2004 project consists of 75 performance indicators calculated from 190 variables. In addition to these variables, 90 questions about task fulfilment and outsourcing, 75 questions about organisation, 30 questions about customer service and 90 facts as background information for a high comparability complete the system.

Objectives

The main aim of the pilot project was to implement a benchmarking system in Austria's drinking water management in line with the following sub-objectives. The project strongly emphasises the utilisation of benchmarking for internal purposes, serving as a controlling instrument for continual improvement (“learning from the best”). It also provides public transparency of the sector’s performance and shows the sector’s freewill to arrange a quasi competition, based upon the principles of voluntary and anonymous participation. Strong focus is laid on aspects of comparability (homogeneous data collection, data verification including company visits, classification of similar enterprises etc.), on a holistic approach (according to the IWA performance indicator system, Alegre et al. 2000) and on data security and confidentiality. The aim of the 2004 project is the further improvement and the use of the system to achieve a broad effect on the water sector. Due to the higher amount of participating water undertakings a high representativeness is given.

Results

Pilot project

The results of the pilot project were published in two reports, one individually for each company and a public report (Neunteufel et al. 2004). Methodical aspects had priority, whereas factual results were rather insignificant because of the low amount of participants. The results of the pilot project can be resumed as following.

- The project structure stood the test.
- The developed system of performance indicators is working.
- Successful co-operation with the Bavarian project EffWB.
- Positive experience in data acquisition.
- Company visitations are necessary for project success.
- Increase in the amount of participants is necessary for a better comparability.

2004 Project

The acquisition of data for the year 2004 and their verification was started in summer 2005 and finished in December 2005. On the following pages some examples of first results concerning supply safety, supply quality, sustainability, task fulfilment, outsourcing and efficiency are presented. In the figures reduced box plots are used. The gray boxes represent the medium 50 % of the valid data and the black bar shows the median. The numbers inside the boxes indicate the amount of used values for each box plot.

Supply safety

In comparison to many other countries in the world, Austria is very rich in water resources. Only about 2 % of the yearly regenerated groundwater is used for human consumption. Hardly any surface water need not be abstracted for drinking water purposes. A central water supply for 24 hours a day, 365 days a year in perfect quality and with enough pressure is standard.

Figure 4 presents the resources availability ratios (total water intake per year / total yearly abstraction capacity) for three different groups: water abstraction predominantly from wells (> 80 %), from natural springs (> 80 %) or mixed systems.

In the figure, the median of all three groups is below 50 %. Most of the water undertakings have a high amount of unused reserves and guarantee high supply safety. Even on days with maximum demand (peak days) the medians of used water are between 60 and 70 %. There is no significant difference between small and large enterprises.

Supply quality

Indicators of this category describe water quality, water losses, mains failures, cleaning of storage tanks, inspections etc. Water quality is generally very good, only sporadically single microbiological parameters or chemical parameters like iron or manganese did not keep the conditions of the very strict Austrian drinking water directive (BGBL 2001/304).

The median quantity of mains failures is between 4 per 100 km and year in younger networks and about 9 per 100 km and year in older networks.

Figure 5 shows the real losses per connection and day (l / connection / d) for rural, urban and metropolitan water suppliers. The increase of the median from rural to metropolitan networks goes back to more complex influences in cities (buildings, traffic and other infrastructure networks). It should be mentioned that water losses, which are in general higher in older than in younger networks, can be reduced through active leakage controls.

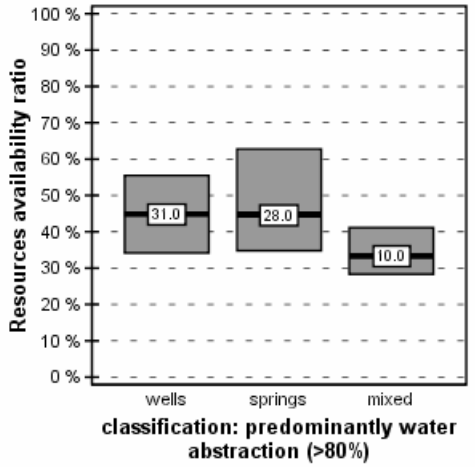

Figure 4 Resources availability ratio

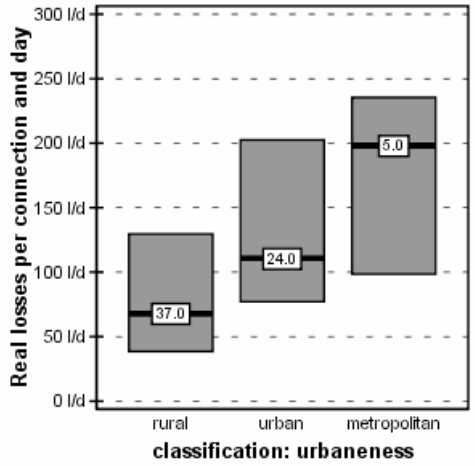

Figure 5 Real losses per connection and day

Sustainability

This category describes long-term effective measures like water resource protection, technical and economical figures on asset management and cost recovery, different social indicators like personnel qualification and personnel training.

Most of the personnel are well qualified and many of them attend special trainings offered by OVGW (with certifications). Larger water undertakings have a higher rate of personnel with university degree. The average total cost coverage ratio (annual revenues / annual costs) is about 110 % depending on the type of bookkeeping (double bookkeeping or simple entry bookkeeping).

Figure 6 demonstrates average mains rehabilitation ratios of the last three years (% per year) for networks of different age. The higher median in the middle group may has already been a result of rehabilitation actions of the last years. Assuming an average durability of 80 years for mains, an average rehabilitation rate of 1.25 % will be necessary. A reason for the lower rates is the fact that many networks haven't reached this age yet. Nevertheless, it is important to consider money reserves for periods with more than 2 or 3 % rehabilitation per year.

Task fulfilment and outsourcing

For the interpretation of efficiency indicators it is necessary to analyse the practices of task fulfilment and outsourcing. A special point of view should be turned to in-house services, which are common in multi-utility companies as well as in municipal water supply undertakings. Especially administrative tasks like billing or personnel administration are typical in-house services. The participating companies had to state for 90 single tasks, whether these tasks were actually fulfilled in the year 2004 and if so, whether it was done by themselves, by in-house service or by an external company.

The ratio of total task fulfilment (administration and technical tasks) goes up with the increase of water intake. The reason for the higher ratio is that larger companies are on the one hand faced with a broader spectrum of duties and on the other hand they have to fulfil more tasks every year than smaller ones (for example renew or build a new storage tank). Especially some smaller companies have a lack of personnel and thus only fulfil the basic duties.

Figure 7 shows personnel costs per m³ water for enterprises with less (< 15 %), medium (15 – 30 %) and high (> 30 %) outsourcing ratios. The indirect correlation between personnel costs and outsourcing ratios shows the necessity of outsourcing data when interpreting personnel efficiency. Some outliers (not shown in diagram) with medium or high outsourcing ratios and also relatively high personnel costs need further analyses and will probably find efficiency potentials.

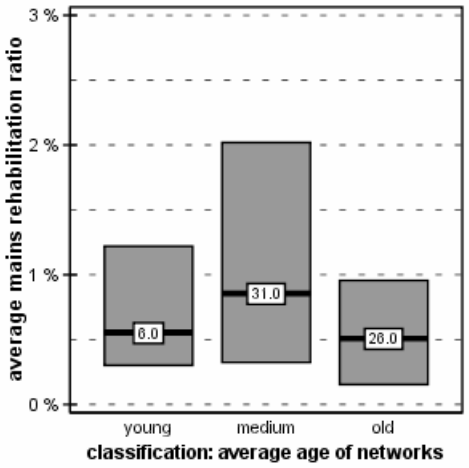

Figure 6 Average mains rehabilitation ratio

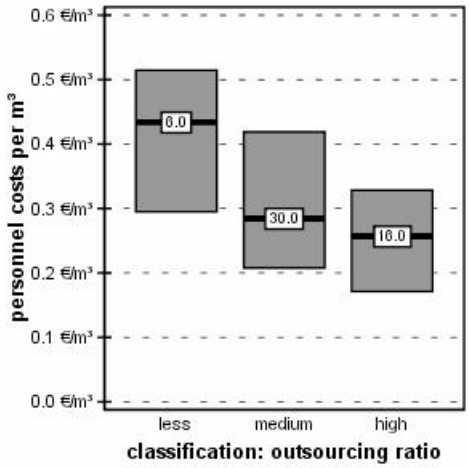

Figure 7 Personnel costs per m³

Efficiency

There is no doubt that efficiency is one of the crucial chapters of the project. Rising efficiency shall be realised by reducing costs and / or increasing output (for example a higher

task fulfilment in future), both under consideration of task fulfilment and outsourcing grades. One part of this chapter is financial analysis and a second one is personnel analysis.

Figure 8 shows the unit total costs (annual running costs + annual capital costs / authorised consumption). Because the mains length is the main cost driver, the chart is classified into three groups of different network delivery rates and into a fourth group of bulk suppliers. There is no significant difference between small and large enterprises, due to criteria like differing task fulfilment and urbaneness compensating scaling effects. Because of the almost perfect raw water quality, treatment plants are only necessary in exceptional cases. Therefore production costs and thus the total costs can be kept low in comparison to many other developed countries.

Figure 9 shows the number of full-time personnel per 100 km mains length for rural, urban and metropolitan water undertakings. Water networks become more complex with increasing urbaneness, which considers network delivery rate and service connection density. This requires more personnel. Other reasons, why metropolitan enterprises have a higher demand of personnel are higher ratios of task fulfilment and lower outsourcing ratios.

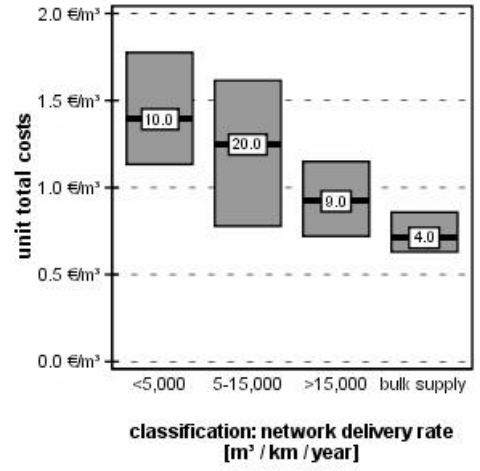

Figure 8 Total unit cost

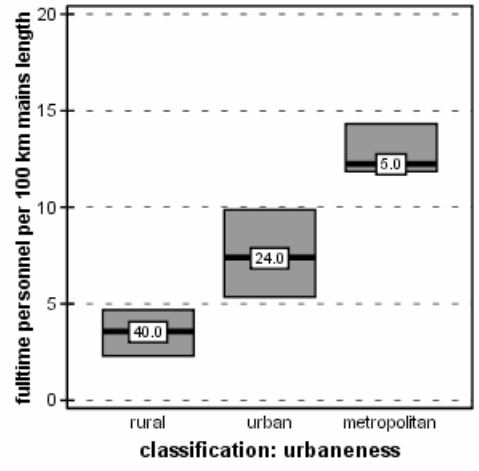

Figure 9 Personnel costs per m³

Conclusions

With a presentable amount of 69 water supply enterprises participating in OVGW 2004 project, a high representativeness is given (about 330 million m³ water intake per year or 45 % of supplied water in Austria) and the sector's freewill to arrange a quasi competition is clearly documented.

In our experience, a voluntary and anonymous participation is an essential precondition for highly motivated participants and therefore good data quality. Company visitations by the project team proved to be necessary as well for project success.

Generally speaking, the results confirm high quality and efficiency of the Austrian water supply industry even if there are potentials for improvements. First feedback from participants was very positive, and we expect a favourable development for further OVGW benchmarking projects. After final presentation of the 2004 project in June 2006 workshops to several topics will be organised and a follow-up project on process benchmarking is planned to be started in autumn 2006.

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