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German National Report “Performance Assessment of Water Supply Systems”

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1. Introduction

Water supply in Germany is organized into regional or local monopolies operated under a concession from the local authorities and cities which are responsible under the German constitutions for ensuring water supply to their citizens. This proven self-regulation of the water industry in Germany is founded on a tried and tested division of labour between the legislative / supervisory authority and the supply industry. Ensuring security, reliability and quality of supply using the technical rules and work of their technical and scientific associations, (DVGW, DIN, CEN).

The German supply system ranks in international comparisons as very effective but falsely as less efficient due to the highest water prices in Europe. It is without validity to assess performance of water supply systems only in terms of one or a few key indicators. General and detailed assessment systems are needed to enable water suppliers to compare and to improve quality and efficiency. Both these factors should be reviewed and enhanced by regional, national and international comparisons. It is not merely necessary to achieve efficiency, it is also essential to demonstrate achievement. Such performance assessment systems are found in Germany due to their growing importance.

2. Overview German water supply systems; Context information

2.1 Water suppliers profile data Germany

Because of the constitutional responsibility of the local authorities, the water supply structure in Germany is divided in many water works. Of the total of about 7000 companies, about 1600 utility companies deliver 83% of water to the public. So 5400 small and very small utilities deliver the remaining 17%.

About 1600 companies are recorded in the BGW statistics (Federal Association of German Gas and Water industries). Company structures in public water supply of Germany is indicated in Table 1. There was an increasing tendency a few years ago to reorganize merge and build cooperatives.

In Germany, water charges cover the cost. As a principle, water prices are subject to price monitoring by the Cartel Office of the Länder which controls unfair practices. On an average the total water charges with fixed and variable components are 3.4 DM per m³ consumption. All water consumption is metered.

2.2 System profile data Germany

The total amount of water abstraction of the BGW-recorded German companies is about 5.6 billions m³/year (1997). 66% of this amount is ground water, 7% is spring water and 27% comes from surface water.

About 78% of the supplied water is delivered to households, 14% to industry and 6% to other consumers. The per capita consumption amounts to 130 l/day (residential) and 164 l/day (total) with enormous regional differences.

The total length of distribution mains results in 398.000 km with an average connection density of 32 SC/km mains. The average delivery rate amounts to 10.000 m³/km main and year.

2.3. National profile data Germany

Germany has a total land mass of 357.000 km², with a population of 80 Mio. Inhabitants. The population density is 225 people/km².

The yearly average rainfall is 790 mm/year. Only 3% of the available resources are used for the public water supply sector.

2.4 Legal framework and technical standards Germany

Most important framework in the German law is included in:

- Federal Water Act with the basic principles for water resource management.
- Federal States Water Acts, which regulate - among others - the ownership of waters, supervision and maintenance of waters, licensing and control procedures for users of waters.
- Federal drinking water ordinance with the requirements for drinking water quality and based on the regulations of the EC Drinking Water Directive
- "Ordinance on Conditions of Water Supply, AVB Wasser" which lays down the relationship between company and customers, obligations, duties and rights, is laid down with the

It regulates questions of liability, the basis of prices for connections and water use, technical requirements, quality of supply, operation pressure, quality of equipment, water metering, etc.

The requirements in terms of technology, safety and reliability of planning, construction, operation, maintenance of water supply systems, their plants, equipment and products are set by more than 200 technical standards and rules, (DVGW, DIN, CEN). In addition, DVGW-guidelines formulate requirements for qualification of utility companies and their staff. One German priority is to maintain and strengthen the autonomy and self-regulation of the water supply industry.

Table 1: Structure of public water supply industry of Germany (1997)

Type of companies	Number		Delivery	
	Total number	Share in %	Average rate of company Mio m ³ /year	Share in (approx.) %
"Regiebetrieb" Community-run service under the administer of that community	80	5,0	0,5	1
"Eigenbetrieb" Community- owned company with its own administer	770	48,3	1,8	23
Intermunicipal associations	272	17,1	4,2	19
Water and groundwater associations	62	4,0	5,4	6
Community- owned company in the form of a limited Ltd.	217	13,6	6,0	21
Private companies	59	3,7	6,1	6
Privately and Publish owned companies	97	6,1	12,3	20
Other private companies	35	2,2	7,6,	4
	1592	100	3,8	100

3. Performance assessment processes Germany

3.1 Use of standardised procedures for performance assessment

In Germany there exist standardised procedures for a annually performed metric self-assessment of the following:

- Approx. 30 large-scale companies (annually supplied volume of 10 to 200 Mio m³) since 1975
- Approx. 270 medium and small-scale utilities
- Approx. 20 bulk supply companies

The performance assessments are carried out yearly with support of a private consultancy company. Data and results obtained by each company are kept strictly confidential and only available to the participating companies. The companies are themselves responsible for data reliability and accuracy.

The standardised structure and the adopted data for performance assessment of large scale companies are:

- 4 key indicators with: authorised consumption (m³/year), total revenue (DM/year), total costs (DM/year) and cost covering (%).
- ca. 15 water balance data such as water abstraction, import and export, consumption, total and spec. water losses.
- ca. 20 system profile data such as abstraction capacity, peak factors, length of mains, service connection density, network delivery rate, meters.
- ca. 10 water tariff and revenue data.
- ca. 5 cost indicators for administration and customer service (DM/m³).
- ca. 20 cost indicators for water catchment, water import, transmission and storage, distribution, metering. For each function, total costs with a subdivision to detailed running and capital costs (DM/m³; DM/km; DM/meter) are considered.

As can be seen, the procedure is mainly assesses financial data and indicators not personnel and operating indicators. Special benchmarking analyses for investment costs and detailed administration costs have been undertaken from time to time.

As a result, the internal self-assessment of companies with regard to decision-making, formulation of strategy objectives and providing opportunity for benchmarking, based on an overall performance indicator system, could and should be expanded and improved.

The Federal Association of German Gas and Water Industries, BGW, publishes every three years an extensive German water statistic with average and individual data of about 1600-water companies. The statistics contain:

- Average water abstraction and water balance data for the German States and intire-total Germany.
- Average water storage, transmission and distribution data as well as metering.
- Total investment data, subdivided and divided according to main technical functions.
- Financial data.
- Company structures according to the kind of company and its with types of undertakings and types of activities.
- Individual data for each of about 1600 recorded companies.

Some main indicators can be derived from these statistics, such as average total employees/service connection in Germany (3.6 Empl./1000 SCs), or for instance, in the State of Bavaria (3.2 Empl./ 1000 SCs) or for the recorded companies incl. in these statistics.

The Technical and Scientific Association of German Gas and Water Industries, DVGW, carries out inquiries to get more information about special operating indicators, such as occasional service about main rehabilitation rates or failure rates of distribution assets.

For all these activities there is a lack of a standardised overall performance assessment system regarding both quality and efficiency of supply. The IWA Manual of Best Practice with the title "Performance Indicators for Water Supply Services" may provide such an overall assessment system.

3.2 IWA-Field Testing Project, Germany, organisation and objectives

A first edition of the Manual of Best Practice was published in July 2000. The overall Performance Indicators (PI) System was developed in close collaboration with international managers, practitioners and researchers. The second stage of this IWA project is a coordinated fieldtesting of the system with international partners. A German subproject has been initiated in order to co-ordinate the German contributions within the international project.

The German subproject is organised as a joint development project with a grant from BMBF (German Secretary for Education and Research) and is designed under the following aspects:

- Participating companies should represent the structure of German companies with a division into three groups according to their scope of activities: Bulk supply, water supply only and multi-utilities with a water supply division (max. 3 members of each group).
- The German co-ordinating group should provide individual support for the participating companies during the entire project.
- The German results and contributions to the field-testing should be structured and co-ordinated.

At the end of the international project in July 2003, the second edition of the IWA Manual of Best Practice will be published, incorporating the German findings and contributions. Based on this, a German translation shall be produced, if needed, with complementary contributions fitting to the German situation, in order to provide German companies with a ready-to-use version of a PI-standard handbook including software.

In Bavaria, one of the 16 states of Germany, a benchmarking project will be started in 2001 with about 100 participating companies. The first step shall be a metric benchmarking, mainly based on the IWA-performance indicators system. The second step shall be a process benchmarking for catchment, distribution and administrative processes.

3.3 Standards, Certification and Quality Management

Self-management and self-regulation of the water industry in Germany is founded on a division of responsibilities between the legislative/ supervisory authority and the water supply industry. The tasks and responsibilities of DVGW are:

- Setting up guidelines, such as, for inspection frequencies depending upon type and performance of plants or guideline values for real water losses.
- Setting up technical standards for quality of service, for example minimum and maximum operation pressure in networks, and norms for all kinds of products used in the water industry.
- Setting up qualification requirements for companies, water equipment producers, consultancies; and the evaluation of security and risk management of companies.
- Certification of all kinds of industrial products used in water industry.
- Certification and technical expertise with regard to quality management according to ISO 9000 and standard series.

4. Conclusions

Performance measurement and assessment play, or should play, a growing role in the water industry. In Germany, as well as internationally, overall performance assessment systems regarding all aspects of water supply do not exist, even though there currently individual activities are being carried out.

Performance indicators are an appropriate basis for performance based and objective-orientated management. Context information and constraints of any company must be taken into account by experts in order to interpret them.

The IWA-Manual of Best Practice "Performance Indicators for Water Supply Systems" is judged as a powerful management tool for performance assessment procedures. The current field testing should be supported by companies and national associations, and the system should be used to the greatest possible extent.