

# Technical and economic management system for water supply systems

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## Introduction

Company for the public water supply and sanitation have two basic tasks:

- Performance of the public contract (customer satisfaction, security of supply, corporate image and reduce risks to external influences)
- Economic management (cost of supply and disposal, business success and long-term planning of costs and pricing)

To what extent it is possible to balance these two tasks and manage successfully determines the quality of the management and the long-term value of the investments.

The European Union has created with the water framework directive (Bonn Declaration of September 2004) as well as various standards and policies for the water supply and sanitation basics for maintenance and upkeep.

The performance of a company is expressed in the sum of measures that show up in the implementation of the State of the art, efficiency and essentially taking into account customer satisfaction.

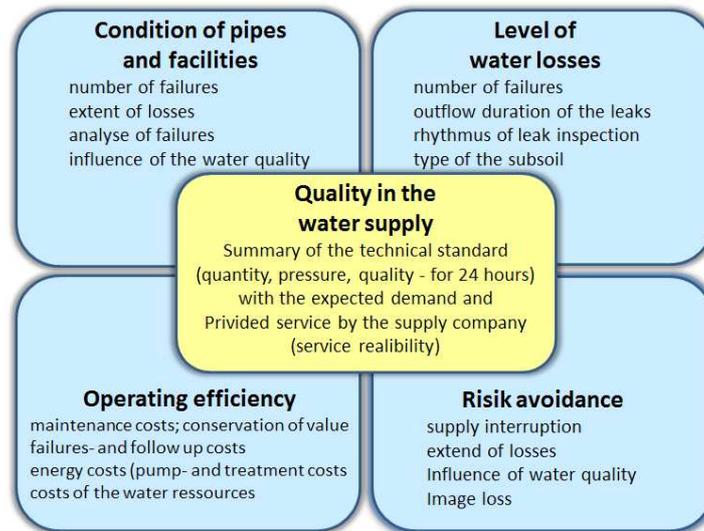
The pillars of performance are as follows:

- Security of supply
- efficiency
- sustainability
- customer service

For the listed areas are regulations and directives of the European Union and individual States adopt, which must be prepared by the national associations for the practical use and implementation.

SVGW, DVGW and ÖVGW worked intensively on these regulations and standards and can be used as a model. Be warned, however, that copies cannot be used to by existing regulations of other countries in their own country! Local laws and influences must be considered.

Through the skilled application of rules and policies, the quality of drinking water is positively implemented in the interests of the customers.



## Security of the water supply

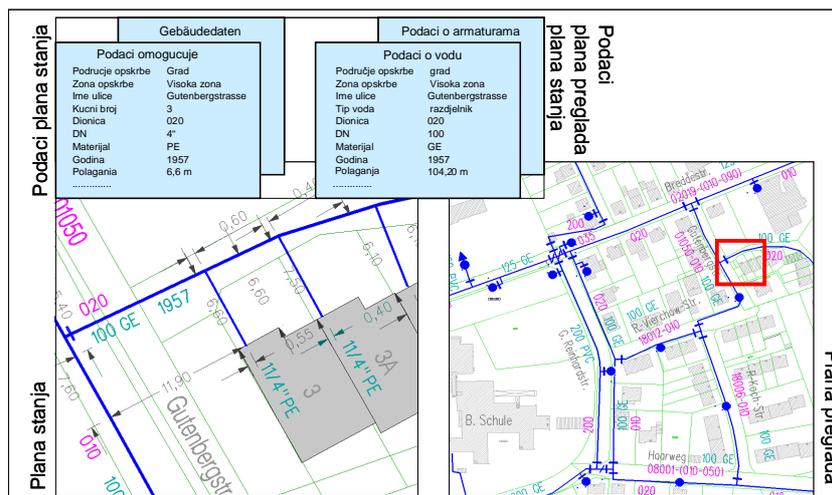
Security of water supply is supported by the implementation of regulations and directives.

The pipe network represents the largest value of investment in a supply system and is the focus of security of supply. The pipe network consists of supply pipes, house service connections, fittings such as valves and hydrants as well as other special fittings, measuring instruments and devices. An extensive training programme for the staff of the company is required for the management and maintenance of systems and equipment.

In addition to the quality management of the work in the company, also used products must have a quality check, because only the process "product and processing" as a whole, provides long-term quality for the fulfilment of the tasks. Based on the rules and regulations and quality management are also requirements of the company to create, so that all work can be carried out according to state of the art.

Specific information about the pipes and fittings that are visually hidden and have direct access are the basis for all work on the cable networks. Here, there is the principle that pipes must be immediately documented in the course of laying a measured and their parameters. This is not the case, so a concept must be developed, e.g. in the course of construction or repairs detected the location, connections and information of the system and documented.

The data of the system are now run in a geographic information system GIS and allow immediate access to the graphical and alphanumeric factual information for the planning, construction, management and information.



### Condition of supply systems (condition monitoring)

There are different operating data in addition to the inventory data of pipe systems, the statement about the condition of the system E.g. measurement of inflow- or similar discharge quantities, documentation of repaired the damages (pipe breaks), documentation of the supply disruptions and customer complaints, and many others. The evaluation of these operating data used for defined processes that allow for more statements about strengths and weaknesses of the management network.

Significant examples to the condition assessment:

- level of water losses
- damage dynamic of the pipe network
- hydraulic capacity of the pipe network
- Functioning of the installations such as valves and hydrants
- Remaining supply of the existing water storage in the case of damages

Failure data Water		Failure number: ....	
<b>Place of the failure</b>	Supply area Street name Pipe number House number	<b>Measure:</b>	Repair Separate Replacement Partly replacement Repair clamp .....
<b>Registration</b>	Day of information Day of repair Issue of water	<b>Information:</b>	Leak detection Issue of water Information .....
<b>Defecton:</b>	Transport pipe Distribution pipe Service pipe Pipe drilling Fitting .....	<b>Location:</b>	Measuring Correlation Acoustic .....
<b>Type of the defect</b>	Corrosion Diagonal burst Connection .....	<b>Selected information:</b>	
<b>Condition of the pipe</b>	Material Embedding Isolation Corrosion Controlled length Depth of the pipe	good good good good good	medium medium medium medium medium ..... m ..... m



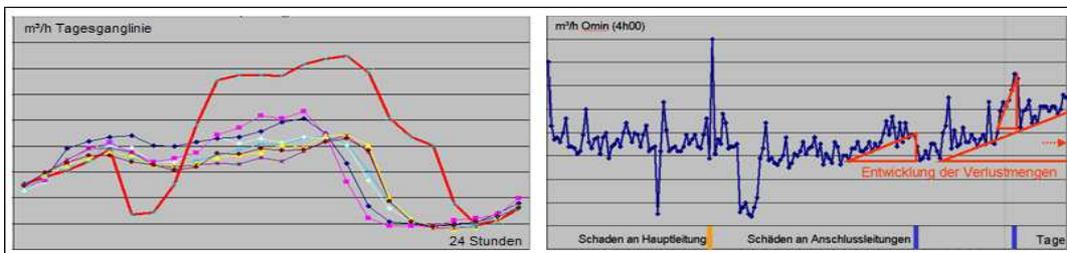
Inventory data and condition data of the supply system and the facilities are bases for determining the value of the investment and the remaining life for the calculation of the maintenance are you renewal expenses.

### Inflow-monitoring

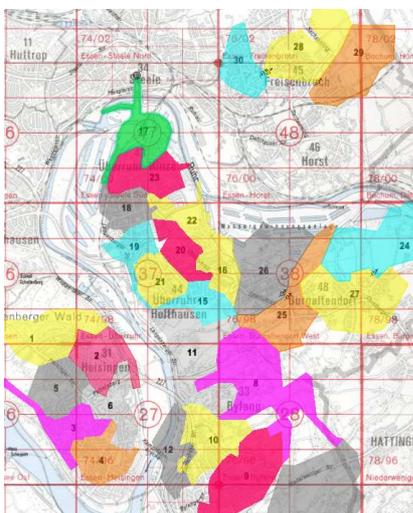
The monitoring areas are monitored by permanent or cyclical inflow measurements and analysis of registered lines.

Permanent flow measurement installs flow meter at tank output or network input, which permanently capture this flow quantities and pass on to the monitoring centre.

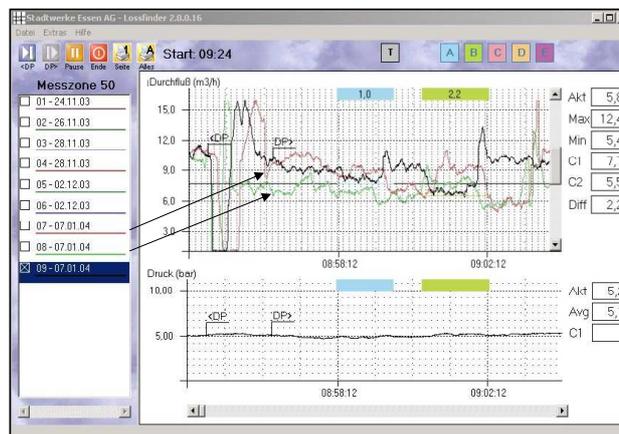
Usually daily volumes and night minimum quantities are used to monitor leaks. Very accurate statements about the origin, development and elimination of leaks can be read by selecting the size of the measuring areas.



In large supply networks is carried out through close a cyclic network division for the purpose of verifying the slide. The feeding in these "measuring zones" via fire hydrants and a mobile measuring the flow and pressure are measured and registered. The results are stored in a database and the amount of the loss amount is determined on basis of supplied inhabitants and the structure of the consumer. After the repair, a repeated measurement can confirm the Elimination of quantity of leaking.



**Messwertvergleich:**  
Zuladen von 2 vorangegangenen Messungen  
aus dem Messdatenspeicher



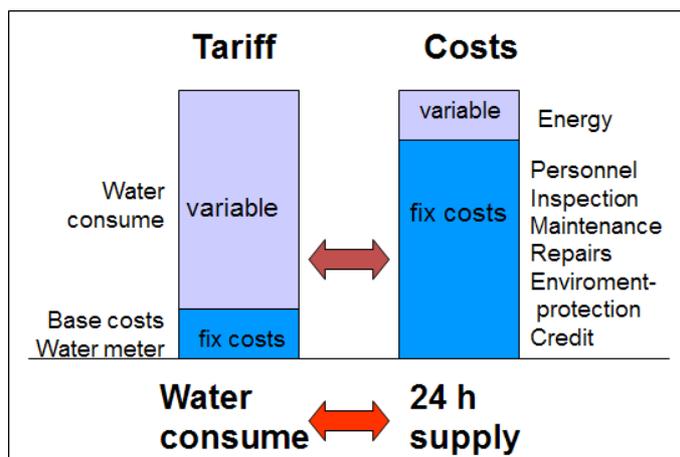
## Efficiency

The profitability of utilities is reflected in the positive balance of income and expenditure. Revenue will be generated from the consumption billing of water consumption and charges for the water supply or water meter fees. Revenues are also creating by new house connections, services to third parties for management, planning, construction works, inspection, maintenance, etc.

The economy of the utility can be at any time positively affected by the increase in water tariffs and water costs. Yes, if...!?!?

The attention of tariffs is given by the monopoly of the water supplier and is taken mainly by the price differences to more or less comparable utilities, but also by more or less legitimate price adjustments in the visor. This creates a pressure of justification operators need to stand up and argue.

The main problem for the water utilities is the disproportionate between wage of income and costs. Here, consumption dependent costs with face extensive fixed costs to about 80%. A serious drop in consumption brings the economic structure of the company out of step.



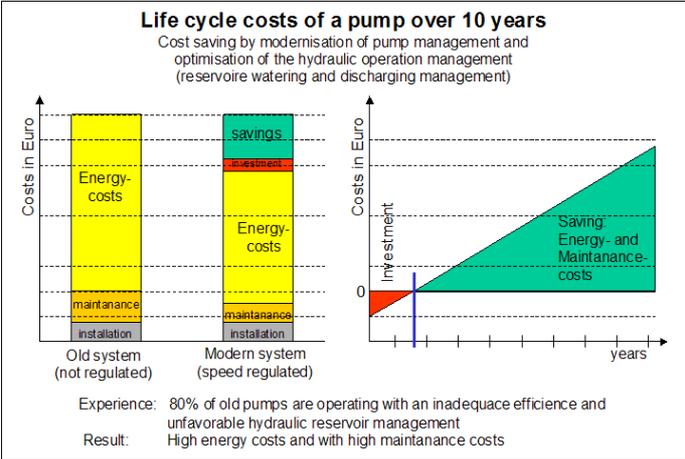
Staff costs and operating costs are key factors for reducing the costs of the company. Here will be given to the reduction of energy costs and their influences.

## Cost reducing potential

Energy costs	Pump costs	Consumption of water
		Water losses
		Efficiency of the installed pumps
		Pump speed controlling
		Dimensioning of the pumps
		Control of pump- and tank management
Costs of the treatment plant		Consumption of water
		Water losses

Water losses cannot be reduced in a short time, but the factors verification and repair on one hand and management renewal, on the other hand.

The optimisation and reduction of the energy costs can be implemented in the short term through customized pumps and pump operation mode.



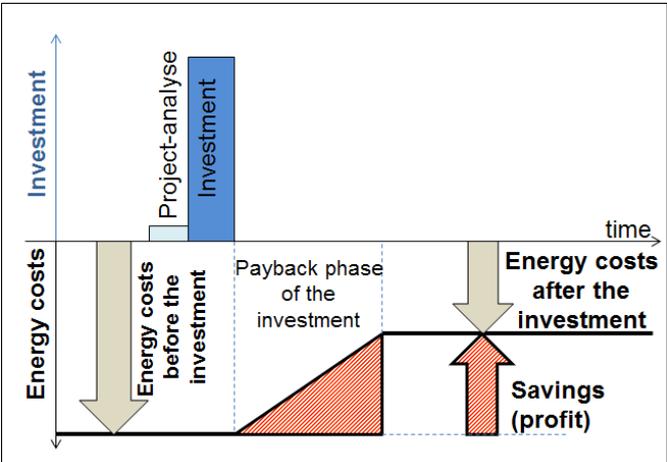
The revenues of the water supply can be positively affected by more intelligent measures like E.g. power generation due to installation of generators in the general supply pipes.

Experience shows that at least the consumption of electrical energy can be met by in-house production. You only have to do it!

This is a net after depreciation of investment (usually 2 years).

In a medium-sized municipality, the current need for practical examples often exceeded 40% of the total energy costs for water supply.

These costs can, in the short term be reduced by up to 50% through efficiency measures and energy production. The financing can be performed through a contracting model, so immediately no costs for the supply companies incurred.



## Customer service

Water supply company's employees are over 24 hours in serving the customers responsible for a sustainable and hygienic drinking water supply by the water to the faucet in the home a day with sufficient quantity and pressure.

Also the maximum prevention of supply disruptions is associated (exceptions are unplanned repairs) and producing of "brown" water, which can be caused by reversal of direction of flow or flow speed.

Employees are to strain, so that in the event of planned or unplanned disruption qualified and customer-friendly answers will be given in dealing with customers. Refers to the overall mood and the overall impression, which a majority of people from the company and the product has customer service or image.

The issue of drinking water is one of the main products of our existence and corresponding appreciation is needed!

A permanent and transparent customer information on benefits, costs and supply security is a prerequisite for understanding the customers required tariff adjustments or changes the rate calculations.

Sustainability means for the drinking water supply to the water supply for the customers and maintain that a reasonable equivalent is supplied drinking water and the cost paid for it.

This broad representation requires a high level of expertise and willingness to provide the food for the customers drinking water from the managers and employees.

Literatur:

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