Creating a national benchmarking system for the utilities of water supply and wastewater sector in Russia

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ABSTRACT

Despite the vast resources of drinking water, Russia today is facing some serious problems in the water supply industry. The authors believe that creating a nation-wide benchmarking for Russia’s water industry will play an important role in the development process for efficiently functioning water utilities. The main objective is to make improvements in quality of the services provided to the population and to rationalize the management methods by using the best practices and existing technologies as well as conducting a comprehensive integrated assessment of the general situation in the sector and at separate utilities. The article describes the steps taken by the management of Lipetsk Municipal Energy Company to organize benchmarking in the housing and communal utilities sector, mostly in water supply and wastewater services.

Key words | benchmarking, efficiency, evaluating and measuring, management, quality, water supply utility

INTRODUCTION

According to the data from the UN Environment Programme, about a third of the world’s population is presently residing in countries which experience a deficit of drinking water; and in less than 25 years, two thirds of the Earth’s population will be living in countries with a severe shortage of drinking water (Freshwater Shortage by UN Environment Programme). In this context, Russia is currently standing alone, differentiating itself from other nations and holding an advantageous position, due to its huge resources of potable water. However, even with all these in view, we must think hard over a number of problems and challenges which exist in this sector. The data provided by the Russian Water and Wastewater Association (RWWA) states that presently depreciation of infrastructure in the water industry is about 70% on average, and around 70–80% in certain municipalities. As a result, there is a high accident and failure rate in water networks, averaging 70 cases per 100 km, with water losses amounting to 30% (mean value nationwide). Scheduled preventive repairs on water networks and facilities have almost entirely made way to emergency and restoration works. New sources of water supply pollution are appearing regularly. In 2012, over 50% of sanitary substandard and chemically abnormal water quality tests were registered in some regions of Russia. To address these and other problems, the national water industry will require investments to the amount of 5 trillion rubles, according to the various estimates (Khramenkov 2013). The government is unable to provide adequate funding, therefore the only source of financing is a tariff for public service. However, the tariff is limited by the marginal index of growth, which forbids resolving the problems at the cost of the tariff. With every passing day, the situation in the water industry gets worse and requires urgent efficient corrective measures. Taking into account the existing limitations in funding, we see benchmarking which was highly acknowledged in many countries, as the most promising and strategic management instrument to revitalize the water industry.

ABOUT BENCHMARKING

For several decades now, throughout the world, the companies have been using benchmarking as an effective tool for
enhancing and perfecting their business activities. The best classical definition of benchmarking belongs to Robert Camp, the founder of this improvement method, who said ‘Benchmarking is a search for best practices that lead to better performance’ (Camp 1989). Gregory Watson gives a more detailed definition: ‘Benchmarking is a process of systematic and continuous measuring: analyzing and evaluating of business operations, and comparison of the results with the leading companies in the industry sector, aimed at obtaining information for improving own performance’ (Watson 1993). Benchmarking is helpful in identifying both the strong and weak sides of a utility. The data received during a benchmarking study provides a company with the tools to work out a competitive internal strategy, while on an industry level, or internationally, benchmarking helps to develop a balanced policy for market regulations and to improve the quality of services provided to the population (Lukyanetz et al. 2012).

A system called ‘enterprise’ can be optimally improved only when the interdependencies of all system components have been taken into account and factored in. Benchmarking might be very helpful in response to this issue (Gunnar & Stefan 2006). Benchmarking is a starting point for improving the performance of a utility, as it is instrumental in determining the vectors of development and the methods to be used in achieving best results.

Thus, benchmarking is not only an advanced technology for competitive analysis, but also (a) a concept intended to develop ambitions to constantly improve one’s performance, and (b) a process of improvement itself. Benchmarking means an incessant search for new ideas, with a consequent adaptation and usage thereof in practice (Danilov et al. 2005).

Benchmarking is extensively used and applied in the water supply and wastewater industry. Such organizations as the International Benchmarking Network (IBN), International Water Association (IWA) and European Benchmarking Cooperation (EBC) are actively engaged in carrying out comparative studies and evaluating analytical research of the water industry throughout the world.

‘The biggest problem is finding the time to do a study. If changes need to be made quickly, you will be better off choosing other tools,’ says Martin Leeper, manager of corporate quality at Seitz Corporation (George & Weimerskirch 2002). A benchmarking process takes a reasonably long time and includes several stages:

- selecting a study subject;
- creating a set of performance indicators;
- choosing a standard of reference and comparison;
- collecting all the necessary information;
- analysis of data compiled;
- implementing and integrating new knowledge and practices.

RUSSIA’S BENCHMARKING SYSTEM IN THE MAKING

In Russia, benchmarking is currently used for improving business processes by such leading water utilities as Mosvodokanal Open Joint Stock Company (OJSC) in Moscow, Vodokanal of Saint-Petersburg Municipal State Unitary Utility, Evrazisky OJSC and Rosvodokanal Group. However, the problem is that they all employ benchmarking only for their own benefit, i.e. internally. And the present situation asks for improvements not only within separate organizations, but in the entire economic sector. The need for a wider application of benchmarking was repeatedly voiced at the various industry conferences held in Russia.

Advantages of industry benchmarking over internal benchmarking are obvious: it is much more effective to assess oneself not only by your own past performance, sometimes one should step back and take a look at the company from the outside in order to determine its place amongst the similar utilities and to study the methods for achieving best results. In step with that idea, in 2012, Lipetsk Municipal Energy Company initiated a project for the development of a national water industry benchmarking system in the Russian Federation. The idea was supported by the Russian Water and Wastewater Association which unites 170 water utilities, scientific research and development institutes. Lipetsk Municipal Energy Co. formed a task group involved in developing a system for industry-oriented benchmarking.

INPUT VARIABLES AND OUTPUT INDICATORS

A prerequisite for successful benchmarking and finding out the best practices is utilization of a system of comparative indicators. We have researched the experiences
accumulated by IBN and the European Benchmarking Co-operation, and we have adapted similar systems from international peers to specific Russian conditions. Based on this, the task group of Lipetsk Municipal Energy Company is proposing a set of comparative indicators for water/wastewater utilities. The system is intended to comprehensively characterize the entire activities of a water utility, not only its financial results. The system consists of input and output parameters. Input variables include initial information for computational analysis of output indicators. Initial information is provided by a utility in accordance with the template of input variables to be filled out and submitted for comparison. Output indicators include information received as a result of input data processing. The monitoring results contain output indicators obtained through initial data processing by a benchmarking task group. This means that reference cross-comparison is carried out relying exclusively on the output indicators. In addition, the values of output indicators are calculated in such a manner that they allow comparison of the key parameters of the utility's operations regardless of its scope of business, ownership, territorial belonging, climate conditions, and other outside factors; however, those factors may be important in the process of interpreting the comparison results. When benchmarking is carried out by a task group, it helps to achieve uniformity and consistency in calculations and exclude the possibility of liberal interpretation in computation methods.

At present, the set of indicators for nation-wide benchmarking in Russia's water industry include 88 input variables, 44 output indicators for water and 37 output indicators for wastewater. Input variables serve not only as a basis for computation, but they also allow us to correctly interpret the results obtained.

Below are some of the input variables to be collected and used for consequent analysis:

- total resident population of a municipality;
- number of customers serviced by utility;
- number of water quality tests;
- number of water tests in compliance with existing standards and requirements;
- number of customer complaints about service quality;
- total length of water mains (km);
- length of worn-out water networks (km);
- mains and network failures;
- net volumes of produced, purchased and supplied water (m$^3$);
- technological and commercial water losses (m$^3$);
- personnel: actual staff size and average number (FTE);
- electricity consumption for production and distribution (kWh);
- production costs (Russian rubles)

Based on input variables, we can calculate different performance indicators which comprise a list of output parameters. The proposed output parameters are grouped into several principal sections to characterize:

- quality of services provided;
- reliability and fail-safety of a utility;
- sustainability;
- personnel performance;
- accessibility and availability of services;
- efficiency of energy resources used;
- economic indicators.

The above sections are further itemized and contain the following subdivisions:

- quality of water treatment;
- customer and consumer service;
- operating conditions of facilities and networks;
- accidents and losses;
- manpower characteristics, workforce management and policies;
- physical accessibility and economic availability of services;
- other important criteria.

The performance indicator system contains, along with the quantitative variables, some qualitative indicators assessing annual employees’ appraisal procedures, personnel training programs, availability of an automated system for information sharing with the customers.

Another important feature of the system is its hierarchical or multilayered structure, which offers the possibility to make assessments with the help of both deductive and inductive approaches; and is essentially a comprehensive evaluation of every aspect of the utility's activities.
In the process of comparative analysis special attention shall be given to reporting and gathering qualitative data to meet the following requirements:

- **availability**, the information must be readily available or obtained with ease;
- **accuracy**, all data shall reflect the real state of things to the highest possible degree of accuracy;
- **credibility** or **objectivity**, variables shall reflect a real state of things, regardless of subjective factors;
- **definiteness**, the number of criteria must be clearly defined and finite;
- **information content**, each parameter shall carry a specific information load;
- **consistency**, evaluation indicators shall reflect the information covering all the main aspects of the utility’s activities;
- **comparability**, each parameter and variable must be properly evaluated, regardless of the time and place of its documenting;
- **uniformity of measurements**, uniform methods for data collecting/processing shall be applied;
- **information security**, all the collected data shall be made public in an anonymous or depersonalized manner, thus helping to protect the utilities’ informational space and privacy.

These requirements are closely inter-related, and it is highly necessary to fulfill every one of them in order to effectively collect, research and process information.

The presented list of indicators may not be fully comprehensive and exhaustive, yet it is descriptive of the major aspects in the activities of any water utility. In due course of time, the proposed list can be updated and adjusted to take into account a variety of requirements for any particular study; while the study process is expected to be perfected until benchmarking becomes a smoothly running mechanism of continuous improvement and dissemination of best practices and technologies within the industry.

**OBSTACLES TO DEVELOPMENT OF BENCHMARKING IN RUSSIA**

According to the research by IWA Consulting Group (Maslov & Belokorovin 2004), there is a variety of factors preventing the development of benchmarking in Russia, and a major obstacle seems to be an excessive desire for privacy and protection of information coupled with the secrecy complex. All these factors do not allow for proper collection of information in benchmarking (see Figure 1). It is understood that the bulk of closed information, as a rule, accounts for financial and economic performance indicators. Despite the fact that financial reporting of the utilities is published in open sources, the veracity of such information is doubtful as the existing system of financial accounting in Russia does not make it possible to see the actual state of things. This is precisely why the proposed set of indicators keeps to a minimum the requirement to disclose financial information, which will let
the companies participate in a benchmarking study and easily submit the requested data. Improvements in the technical performance indicators will, in turn, bring improvements in the financial sphere.

In April 2013, RWWA held its convention of water utilities in Ekaterinburg. The event was dedicated to the 120th anniversary of the Russia’s first Water Congress. One of the most crucial and widely discussed issues was implementation of national industry-wide benchmarking. The conference participants identified the following principal goals for water industry benchmarking:

- finding out and confirming the interest and commitment of Russia’s water utilities in carrying out comparative analysis;
- overcoming the ‘high security and secrecy’ complex demonstrated by many utilities;
- coordinating and finalizing the list of input variables and output indicators;
- creating a unified informational platform accessible to all the participants.

The principal objective in the process of creating the system is to make it adaptable to Russia’s conditions and specifics. For example, most Russian utilities tend not to disclose their economic, operational and technical activity indicators, interpreting the process of data collection as industrial espionage. At the moment, this misconception is a stumbling block preventing an adequate and complete comparative analysis. However, the differences between benchmarking and business spying are considerable, and

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**Figure 2 | Interaction scheme for benchmarking in Russia.**

**Table 1 | Benchmarking as a method for periodical examination of water utilities**

<table>
<thead>
<tr>
<th>Ailment</th>
<th>Symptoms</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unreasonably high accounts receivable</td>
<td>Poor bill collection</td>
<td>(1) Improvements in working procedures and methods with non-payers;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) Promotional activities to stimulate timely payments from customers;</td>
</tr>
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<td></td>
<td></td>
<td>(3) Personnel changes in economic security department;</td>
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<tr>
<td></td>
<td></td>
<td>(4) Customer awareness campaigns on prompt bill payment.</td>
</tr>
<tr>
<td>Ineffectual workforce practices</td>
<td>Rapid staff turnover; Low salary level; High accident and injury rate; Low labor efficiency.</td>
<td>(1) Frequent personnel certifications;</td>
</tr>
<tr>
<td>Low reliability in water supply/wastewater operational systems</td>
<td>High rate of failures and breakdowns; High losses in the networks; Slow pace for replacement of worn-out mains and equipment.</td>
<td>(1) Utilization of up-to-date materials and methodology in rehabilitation, replacement and construction of new networks/ facilities;</td>
</tr>
<tr>
<td>Poor quality of water treatment</td>
<td>Increased level of harmful/hazardous substances in water; Consumer complaints of poor water quality.</td>
<td>(1) Use of advanced methods for detecting hazardous substances, decontamination and purification;</td>
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<td></td>
<td></td>
<td>(2) Increase in expenditures to purchase chemicals and upkeep a laboratory;</td>
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<tr>
<td></td>
<td></td>
<td>(3) Application of up-to-date methods and technology for sewage water treatment;</td>
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<tr>
<td></td>
<td></td>
<td>(4) Participation in ‘Pure Water’ federal program.</td>
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making such an analogy is inappropriate for a number of reasons. Firstly, benchmarking is a voluntary process; secondly, benchmarking, unlike spying, is an overt act, to be exercised under an agreement reached beforehand by the parties involved. Moreover, the amount of data obtainable from a peer utility shall be no more than the peer is prepared to reveal. Another fact which speaks in favor of getting rid of the secrecy complex in the sector is that every water utility in Russia usually holds a monopoly in its territory; therefore, there is virtually no competition between the utilities, and the areas of their business interests never intersect.

**ANTICIPATED PROCEDURE FOR IMPLEMENTATION**

The most suitable venue or platform for accumulating and analyzing the collected data appears to be the Russian Water and Wastewater Association. Thus, RWWA may become a consolidated center for exchange of information and experience. The principles of interaction are depicted in Figure 2.

If we can draw an analogy between the water industry and health care, we would compare benchmarking of the sector to a periodic medical examination for a utility. The participants in a study get a chance not only to detect ailments, but also to find ways for an effective and timely treatment. Let us take a look at some actual examples below (Table 1).

It should be noted that benchmarking has a certain competitive aspect: even though the water and wastewater utilities are monopolists in their regions, it is highly unlikely that a lame-duck enterprise would want to remain the same and stay behind. This may lead to healthy competition in the sector, which will result in changes and improvements in the whole communal infrastructure. Taking into account the continuity of the benchmarking process, we may hope for constant improvements in the industry.

Business activities of water utilities in Russia are regulated by the government via setting up and adjusting of tariffs. When the government curbs the tariff growth, it tries to prevent an increase in social tension; at the same time, many of Russia’s water utilities experience a shortage of funding and available cash. On the plus side, benchmarking does not require any substantial funding, therefore the balance between benefits and costs tends to its maximum.

**SUMMARY AND CONCLUSIONS**

We are of the opinion that the water and wastewater industry in Russia is going through very hard times. The utilities of the sector will have to use benchmarking, thus making it an inseparable part of their management practices. And we are certain the proposed system of benchmarking can become a substantial factor in facilitating the improvements within the water industry, ensuring its sustainable long-term growth and development, preserving the existing national water resources for future generations.

**REFERENCES**


