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Modelling of Water Supply Costs

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Abstract

Water supply tariffs' setting is a labour intensive regulatory procedure; currently number of informative and procedural shortages and problems exist. The aim of the current research is improvement of methodology for determination of the substantiated costs for provision of water services. A working hypothesis was advanced to modernize the methodology: the specific costs (€/m³) required for the provision of water services in a specific region is a variable multi-parameter function of key performance indicators. There is preferred a benchmark modelling procedure, which is based on the factual cases (declared indicators of water utilities) and synthesis of the general regularity. The model is developed using two independent modelling procedures. The correlation of the synthesized model with declared specific costs of Latvian water utilities is strong (0.88). The correlation between the respective modelled indications exceeds 0.95; hence, the trustworthiness in the results is high. The prospect is the determination of the price ceilings and then an operative tariff setting, thus significantly improving the methodology.

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1. Introduction

The provision of water services typically is a highly segmented function. Actually only one water utility is functioning in any specific territory (in total even hundreds of utilities in most of countries); consequently, all of them are local monopolies. Therefore, tariff setting usually is the task of the National Regulatory Authority (NRA).

So, according to the Law¹, the Public Utilities Commission of Latvia (PUC)² regulates drinking water and sewerage services (including tariff setting)³. The tariff setting methodology⁴ prescribes that the water utility prepares

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and submits to the PUC a particular tariff draft, which contains justified data on the volume of the service and costs in the previous years as well the prognosis for the next year; the data are detailed in number of cost positions and should be based on documents. The process is similar in many countries; methodologies are based on aggregation of large number of cost items⁵. The differences are in details, some countries need to save the water resource⁶, while the others have quality problems, or have implemented universal service principle by the tariffs.

In the last decade, benchmarking has become widely considered as the tool to motivate the water utilities to raise their productivity⁷. Both the most popular benchmark methods (metric and process benchmarking) compare performance indicators (PIs) of utilities to find the more efficient companies and to share the best practice⁸. Unfortunately, currently there is benchmarking of separate data only "...over time, across water utilities, and across countries"⁹ without reflections and conclusions on impact of benchmarking process on sector management and development. Unanswered remains the question: how to achieve by the benchmarking some regulatory outcome, e.g., evaluation of costs and tariff setting.

2. Shortages of the methodological approach

More detailed analysis identifies number of informative and procedural shortages and problems in the current approach to the tariff setting.

Methodological principles, which are based on careful evaluation of all cost items, cause the need for extremely detailed laborious individual assessment of each position of each tariff draft, since:

- Water utilities are using different business models; e.g., the utility can maintain and repair the infrastructure, can employ its own legal and/or IT specialists or it can use outsourcing¹⁰; comparative assessment is not possible
- National regulations on accounting and bookkeeping are quite general, account layouts really are quite different; especially it relates to the administrative and personnel costs, material accounting, etc.

The regulatory procedure becomes long and hard, in addition it stimulates long-term application of the tariff. Applied tariffs frequently are behind the time and become unjustified because of frequent changes of business scale as well energy, material and service prices, wages, etc.

Another reason of problems is low quality, compatibility and reliability of input data (values of the PIs) since:

- There is lack of regulations on the material, human and other resources needed for an efficient (i.e., economically substantiated) water supply service
- The large number of utilities means a potential considerable diversity in the comprehension on the PIs
- Huge number of used PIs is a strong administrative burden for utilities to provide all of them: "It is not only the small utilities that find it difficult to evaluate such large number of PIs, larger utilities fare no better."¹¹
- Many utilities are multi-sector companies; they provide regulated and non-regulated services; there is low assurance on the absence of the cross-subsidies, particularly on the subsidization of non-regulated services from regulated
- Frequent stochastic changes of the network length, consumption, water losses and other aspects make prognoses inaccurate and unreliable

Moreover, the detailed audit of various cost models and structures (even *due diligence*) of utilities is not a regulatory function; the NRA should examine the validity of costs as a whole instead examination of every cost item (including those with a negligible impact) and their composition. The aim of current research is improvement of methodology for the determination of the substantiated costs for provision of water services in order to enable NRAs to increase their efficiency and to reduce significantly the administrative burden on utilities. This article presents the results of the first stage (water supply) of on-going project.

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