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# MUNICIPAL ENERGY REFORM PROJECT IN UKRAINE (MERP)

OVERVIEW OF USE OF BENCHMARKING RESULTS IN  
REGULATORY PROCESS EU COUNTRIES IN WATER &  
WASTEWATER AND DISTRICT HEATING SECTORS

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# REPORT

## Overview of use of benchmarking results in regulatory process EU countries in water & wastewater and district heating sectors

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## Executive summary

1. Overview of use of benchmarking results in regulatory process EU countries in water & wastewater and district heating sectors (thereafter - Report) aims to **provide assistance** national regulatory institution of Ukraine at **developing a mechanism of usage of utility benchmarking indicators**.
2. The Report covers variety of target efficiency establishment practices, resulting from usage of benchmarking indicators, used by regulatory institutions, at regulating Drinking water supply and sewerage services and District heating services.
3. The summary of findings is presented below.
4. The findings, in generally, indicate that:
  - a) the form of usage of benchmarking indicators by regulatory system for price establishment is greatly differs, but are tailored to individual country's situation in every case;
  - b) the form of usage the tool of benchmarking is dynamic, and evolving in line with regulatory institution's professional approach and sector's needs.
5. In Lithuania, performance indicators in District heating and Water and sewerage sectors for regulating the utilities are used are collected from entities, averaged according to relevant groups and publicly announced every year before 1<sup>st</sup> July. The form of announcement is a short **summarizing report**, available at regulator's **website**, since 2010. The dynamics of relevant averaged KPIs, over years, is not tracked / not disclosed in the aforementioned report, however, this is more of technical issue – relevant reports for previous years might be found within the same website.
6. As for assignments of efficiency, established by regulating institution for individual entities, based on benchmarking analysis, **in Lithuania averaged KPIs values of relevant group/sub-group are used at setting long-term base prices for an entity** in question. The general rule applied is that target efficiency of KPIs for the whole next regulatory period shall be not worse than the one of the relevant group or the one already achieved by the entity, if the latter is better performance. Individual KPIs are used, and there is no case for establishment any complex / uniting efficiency factor, out of all the KPIs monitored.
7. A **reference model** in District Heating, introduced by Estonian Competition Authority in 2014, can be considered as a **composite efficiency indicator**, tailored to 3 different sizes of entities, allowing

entities to freely choose their micromanagement decisions for efficiency at the same time supplying consumers with final efficient price. On the other hand, the reference price as result of composite efficiency indicator also sends some signals to consumers on their informed decision to choose alternative heating solutions. It signals as well those responsible for planning the systems in relevant territories accordingly.

8. The reference model and all the performance indicators of efficient operations are publicly disclosed and clearly argued, in the form of **report**, at Estonian Competition Authority's **website**.
9. In Latvia, the regulator is under development of publicly available system of KPIs benchmarking for all the entities regulated, in both sectors in question. Before the KPIs go public, the regulator collects the indicators, operates **internal data base** and uses in **individual manner**. It must be admitted that SPRK was mandated with municipal sectors' regulation relatively recently.
10. In Bulgaria, the regulator has a rich data base for KPIs in water and sewerage sector, and collects data periodically. In 2014, there was a **report** published on **website** of KVER on dynamics of all KPIs all over the sector, as of 2012, however, not grouping entities according to any criteria – the sector is seen as one.
11. As for efficiency factor at price setting exercises, KEVR uses **individual approach** to every entity, active in Water and sewerage sector, and **assignments for efficiency** are established to every entity separately, **according** to so-called **business plan** of the relevant entity. There are no evidences on usage of comparative analysis results, however, taking into consideration the rich data base, the comparative analysis might be applied in future.
12. As for **heating** sector, the possibility for KEVR to use benchmarking analysis is set legally, also, extensive reporting obligation speak in favor of using benchmarking. For the time being, the decisions by KEVR are developed on **individual basis** for every entity, and envisaged savings (efficiency gains) mainly depend on long-term **business plans** approved by the regulator.
13. The Report does not cover other target efficiency establishment practices, used by regulatory institutions at regulating Drinking water supply and sewerage services and District heating services, which and which will be covered in other reports.

## Overview of diverse possibilities of using benchmarking indicators in the regulator process

14. “Benchmarking - the comparison of similar processes or measures across organizations and/or sectors to identify best practices, set improvement targets, and measure progress”, as is provided in Effective Utility Management Primer<sup>1</sup> for Water and Wastewater Utilities, by United States Environmental Protection Agency.
15. As the previous Report (Sub-task 2.1) provided, the benchmarking can be used to measure process, performance and competencies against “best practices” and the peers of the measured subject.
16. This way, benchmarking is able to accurately assess the status/level of regulated sector and its entities and to significantly contribute to implementation of necessary incentives. To this, accurate measures are necessary.
17. Further on, regulatory benchmarking practice can be implemented as a part of both ex-ante and ex-post regulatory process. Benchmarking regulatory process is able to create an asymmetric risk for the regulated industry – the best performing companies to be rewarded, for their higher than average efficiency, and the worst performing companies not to be guaranteed to recoup the full cost of equity, as long as performance is ensured at the acceptable level.
18. And the last but not least to mention here – benchmarking regulatory practice is able to reduce request for regulatory resources to deliver regulatory result. This is especially targeted to the situations, when regulatory personnel resources are limited (if compare to number regulated companies or regulatory decisions to be produced), technical experience is not sufficient (if compare to companies’ abilities to involve discussion into technical complex issues), regulatory objectives are broad and long-term nature (changing technical status of the sector means heavy long-term investment and changing economic & managerial attitudes request permanent impact).
19. Benchmarking within regulatory system will rescue at least part of regulatory resource, and allow market forces to step in – the objective of profit for an entity under usual conditions is at least not less powerful than administrative requests.

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<sup>1</sup> EPA Effective Utility Management Primer for Water and Wastewater Utilities, [http://water.epa.gov/infrastructure/sustain/upload/2009\\_05\\_26\\_waterinfrastructures\\_tools\\_si\\_watereum\\_prime\\_rforeffectiveutilities.pdf](http://water.epa.gov/infrastructure/sustain/upload/2009_05_26_waterinfrastructures_tools_si_watereum_prime_rforeffectiveutilities.pdf)

20. The factor, which shall be kept in the regulatory account in the benchmarking case, is the entities' ownership of regulated entities. It is usual and documented in literature practice that privately owned companies mostly run for higher profit, and to gain the most, might be minded to sacrifice quality side. On the contrary, state / municipality / etc. owned companies mostly are targeted to preserve the level of costs, giving considerably less focus on profitability, and thus way tend to overinvest into "security", "reliability", "resilience", etc. at the same time delivering part of "approved by regulator" costs, in fact, to activities far away from regulated ones.
21. As for transitory period, taking into consideration the findings of the Report, it might be considered:
- due regulatory focus delivered to investment planning and thus ensuring real possibilities of entities to achieve the established targets,
  - relatively short list of key performance indicators, each targeting the strategic objectives of the state within the sector,
  - grouping of entities and application of average value for relevant KPI as target efficiency, for the base price period,
  - agreement with the sector (provided in relevant legal acts), that in the case extra-profitability or extra-return (above WACC / return on capital / return on costs / return on output / etc.), the sharing exercise will take place in terms of additional investment into upgrade of technical means and / or future reduction of revenue level.
22. The target model / target composite efficiency might be considered at later stages of the sector development, regulatory system progress, and public acceptncy growth.
23. The reporting requirements established to regulated entities shall be wider in scope than the exact set of KPIs, and this shall be minor space for compromises. Extensive reporting delivers numerous positive impacts to the sector itself and to regulator, and some of them worth mentioning:
- monitoring complete picture of the sector, regulating institution is able to understand better the functioning of the sector, the challenges entities face and, most probably, to detect emerging pitfalls and get ready for them from regulatory point of view;
  - tailoring regulatory decisions, including tailoring the initial benchmarking regulatory system, is inevitable in all cases, and as well requests much data, at least for forecasting not-yet-announced not-sure-so-far decisions; regulatory database is reliable source of information to verify;

- collecting, analyzing and periodically reporting publicly on the development of the sector increases transparency of the sector, credibility and confidence of regulatory system by investors and creditors,
- periodical monitoring and public reporting also enables regulator, *inter alia*, to get in contact with stakeholders and thus upgrade the system.

24. The reporting requirements established to regulated entities shall meet the substantial regulatory requirements, and relying on international practice, reporting once-a-year is sufficient (LT, EE, LV, BG, PL, UK). Alongside, the regulator is the one to ensure everyone in the sector reports, and does this correctly (explanatory notes, for eg.) and timely, including the regulator itself (annual review of sector development, including annual KPI values' announcement).

## Using benchmarking results in Bulgaria, by KEVR. Drinking Water Supply and Sewerage Utilities

25. The Ordinance for the regulation of prices for water and wastewater services<sup>2</sup> (hereafter – the Methodology for Bulgarian chapter):

- states that KEVR applies “rate of return on capital” (“cost plus”) as basic method for price regulation, and monitors actual values of revenue of regulated entity; regulatory period is not less than 1 year, and next regulatory period might be initiated if significant divergence is observed between regulatory costs and actually incurred costs;
- states that incentive based regulation, which might be applicable to 3-5 years period, is performed via “price cap” and “revenue cap” methods (both are provided in classical way);
- states, that the achieved levels of quality indicators are monitored and target levels for next year are established by KEVR, accordingly reflecting revenue and prices;
- provides that KEVR establishes concrete prices per concrete services (individual approach), taking due consideration to business plan of the entity in question, and reduces amount of “needed revenue” if the entity in question has failed to accomplish quality target set by KEVR, on yearly basis.

26. The Instruction provides:

- several cost types that cannot be included into required revenue for tariff calculation;
- depreciation norms by asset type;
- the rule, that KEVR establishes max allowable loss for 5-years-period, on individual basis, with respect to the factual data on the last 3 years, forecasting data and established targets; .

27. Both texts of the Methodology and the Instruction, taking them as entire legal framework, provide regulatory system , in which all the following elements are present:

- long-term individual prices for particular services established as a result of heavy regulatory touch, and
- annual amendments for individual prices are developed on “Inflation - X”, where establishment of X is not sufficiently detailed, but presumably it is a composite indicator from individual plans;

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<sup>2</sup> The Instructions to formation of prices of water supply and sewerage services under price regulation by price cap provide information very much alike to the one in the Methodology, just to a greater detail

- additional annual (negative) amendments not detailed in formulas, but clearly in wording – penalties for failing with quality indicators.
28. The Comparative Analysis of the Water and Sewerage Sector for 2012, published by KEVR, in fact provides dynamic analysis of relevant indicators for the entire sector – entities of the sector are not grouped / ranged.
29. The relevant decisions of KEVT regarding establishment of the long-term price of the entity in question provide dynamic analysis of indicators of the entity; coefficient of efficiency is calculated as percentage difference between the costs approved by regulator for the first regulatory year and the costs for previous year (“base year”) <sup>3</sup>; no benchmarking / comparative analysis application.
30. The relevant decisions of KEVT regarding annual price amendment of the entity in question provide dynamic analysis of indicators of the entity; efficiency coefficient X is applied to operating expenses; individual prices for individual services are decided upon<sup>4</sup>.
31. The relevant decisions of KEVR regarding business plan of the entity in question approval, regarding regulatory period extensions to relevant entities, provide dynamic analysis of indicators of relevant entity in question; the analysis is made on individual indicator basis, with no composite indicator following; the decisions do not entail comparative / benchmarking analysis<sup>5</sup>.
32. Relying on the explained above, it reasonable to conclude, that Bulgarian water and sewerage sector regulatory system, has:
- extensive statistical reporting requirements, which are respected by the entities;
  - dynamic statistics is heavily used for all the regulatory decisions towards individual entities;
  - efficiency assignments for entities are derived on individual basis, relying on business plans and agreed cost saving rates;
  - benchmarking analysis and efficiency targets relying on benchmarking analysis are not used so far in practice, however, KEVR having at its disposal such a rich statistical database has very good chances to use it efficiently in practice.

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<sup>3</sup> For example, [http://www.dker.bg/files/DOWNLOAD/res\\_c-55\\_12.pdf](http://www.dker.bg/files/DOWNLOAD/res_c-55_12.pdf)

<sup>4</sup> For example, <http://www.dker.bg/files/DOWNLOAD/res-c11-2015.pdf>

<sup>5</sup> For example, <http://www.dker.bg/files/DOWNLOAD/res-bp33-2015.pdf>

## Using benchmarking results in Lithuania, by VKEKK. Drinking Water Supply and Sewerage Utilities

33. The Law on Drinking water supply and sewerage treatment provides, *inter alia*, principles of cost accounting and price setting, which shall be followed by the regulator, the regulated entities, and relevant municipal administrations (here, the list is selective, according the objectives of the Report):
- “cost recovery” principle, for listed objectives, Art. 17 para 1;
  - “polluter pays” principle, Art. 17 para 2;
  - “following efficiency criteria”, derived from comparative analysis<sup>6</sup>, Art.34 para 6;
  - “affordability” principle<sup>7</sup>, Art. 34 para 14.
34. “Efficient costs of supply of services are determined according to the Rules of accounting separation and related requirements in the area of Drinking water supply and sewerage treatment”, Art. 33 para 4 provides. The aforementioned Rules are approved by the regulatory institution.
35. Concept of efficiency is applied as well as the ruling principle for the regulator’s decision to issue a license to engage in drinking water supply and sewerage activity; as the obligation to licensed entity at its daily licensed activities; for non-respecting efficiency principle in licensed activities, the entity might be fined, up to 2% of annual income from licensed activities.
36. Methodology on Price Setting for Drinking Water Supply and Sewerage Treatment provides (thereafter - the Methodology, for the chapter on Lithuania), as a general rule, that comparative analysis / benchmarking analysis results shall be used at setting long-term base price for drinking water supply and sewerage services:
- “42 p. While setting long-term base prices for drinking water supply, sewerage treatment, and surface water treatment it shall be respected”, *inter alia*:

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<sup>6</sup> The term “comparative analysis” in Lithuania is used to exchange the term “benchmarking analysis”.

<sup>7</sup> Before setting a package of new prices in particular territory served by particular entity, it is obligatory to check whether the monthly payment by a household for drinking water supply and sewerage treatment services shall not exceed 4% of monthly income of a household; if the payment exceeds, the regulating institution is obliged to request and the regulated entity is obliged to provide a plan indicating concrete actions of the regulated entity to reduce costs to such a level that the 4% threshold is not exceeded. The action plan shall be provided to the regulating institution and relevant municipal administration.

- “42.3 p. values of relevant indicators determined by comparative analysis (except for services of surface water treatment). The Commission determines the values of indicators of comparative analysis, respecting the Description of comparative analysis for activities of drinking water supply and sewerage, approved by Commission.
- If efficiency of the relevant group of entities is higher than the efficiency of the entity in question, in this case the entity is established with the amount of particular costs, corresponding to the efficiency of his group, taking due consideration to the factors provided in the Description of comparative analysis p.17<sup>8</sup>, taking due consideration to the measures provided by the entity in the action plan to reduce those costs, taking due consideration to the time period for the entity to achieve the group efficiency level of the particular indicator.
- If the efficiency of the entity in question is higher than efficiency of the relevant group of entities, the factual amount of particular costs of the entity is established.”

37. The Methodology provides clearly, that in all the cases the Commission establishes the assignments for efficiency to be achieved in the operations of an entity in question.

38. The average values of relevant Indicators of the group, to which the entity in question belongs, are:

- considered in the aforementioned way with regard to the following varied costs:
  - purchase of drinking water, purchase of sewerage processing, surface water treatment services;
  - purchase of electricity for technological purposes;
- not considered in the aforementioned way with regard to the following varied costs:
  - purchase of technological materials;
  - purchase of technological fuels;
  - state taxes for natural resources;

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<sup>8</sup> Description of comparative analysis for activities of drinking water supply and sewerage, p.17 provides: “Having evaluated the average Indicators of the Group, and having identified, that the Indicator of the Entity is worse than the average Indicator of the Group, to which the Entity belongs, the mandatory costs of the Entity are calculated, taking due consideration to the average Indicator of the Group, taking due consideration to the specifics of the Entity’s activities, quality of the drinking water supply and sewerage treatment services and variety of the services provided, grounds of the costs in question to appear, necessity of the costs in question; the Entity is as well established with assignments for efficiency to be achieved in his operations. If the Indicator of the Entity is better than the average Indicator of the Group, to which the Entity belongs, the mandatory costs of the Entity are not increased to correspond the average Indicator of the Group, but rather the Entity might be established with assignments for efficiency to be achieved in his operations, taking due consideration to the facts aforementioned above and taking due consideration to the best value of the Indicator within the Group.”

- state taxes for pollution;
- considered in the aforementioned way with regard to the following fixed costs:
  - maintenance / repair works and materials for exploitation;
  - maintenance / repair works, outsourced;
  - personnel, salaries;
- not considered in the aforementioned way with regard to the following fixed costs:
  - depreciation (amortization);
  - leasehold of property, electricity (non-technological purposes), heat, fuels, attendance, other distributed costs;
  - state taxes (other than mentioned above);
  - financial costs;
  - return on investment rate.

39. The Methodology provides additional safeguards for efficiency of costs, to introduce efficiency to the areas where comparative analysis does not cover, either where the regulating institution provided so. These additional safeguards act together in collaboration with establishments of comparative analysis indicators (not-interchangeably). The additional safeguards for efficiency are the following:

- for the case of personnel salary costs, additional safeguard is the following: the amount of mandated costs for personnel, salary, is established taking due consideration to average salaries<sup>9</sup> of those working in the drinking water supply and sewerage treatment industry, waste management and regeneration industry, as reported publicly by Lithuanian Statistics Office. If the number of employees of the entity in question is less than the average number of employees within the group, to which the entity belongs, in this case, the average salary per employee for the entity in question might be higher than the average salary in the relevant industries, as reported by Statistics Office. In this case as well, the factual average salary of the entity is applied or the factual average salary of the relevant group is applied, however, the total budget for personnel for the entity shall not exceed the amount, derived as the target number of employees for the entity multiplied by average salary within the relevant group, to which the entity belongs;

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<sup>9</sup> That have been in effect one quarter before the submission of the long-term base price project.

- for the case of Regulatory Asset Base, the Methodology provides list of types of assets, that cannot be included into RAB neither for depreciation nor for rate of return;
- for the case of depreciation/amortization costs, the Methodology provides minimum time period and method of depreciation calculation to be used;
- for the case of rate of return, the Methodology establishes optimal structure of capital to be used, upper limit of credit interest rate to be used, method to derive risk free rate for Lithuanian conditions, method to derive risk premium rate for Lithuania conditions. Despite the general framework of determination of rate of return is traditional for regulated infrastructure industries, however, there is still left in the Methodology a rudiment component for the rate of return, i.e. the upper limit of rate of return for an entity “shall not exceed 5% of mandatory costs’ amount of the business unit or service in question”. This means, that if calculated rate of return derives higher returns (profitability) than 5% upon total mandatory costs, the applied rate of return shall be reduced;
- for the case of losses:
  - assignments for efficiency shall take into due consideration the factual amount of losses of drinking water, for the supply up to inlet, however, in any case effective amount of losses, up to inlet, shall not exceed 20%;
  - assignments for efficiency shall take into due consideration the factual amount of infiltration, however, in any case effective amount of infiltration shall not exceed 20%, and in the case of mixed sewerage - shall not exceed 35%;
  - assignments for efficiency shall take into due consideration the factual amount of losses of drinking water, within the inner system<sup>10</sup> of a multi-apartment house, due to errors of meters for drinking water, however, in any case effective amount of losses, within the inner system of a house, shall not exceed 10%; if there is installed a system for remote metering data reading and transmission in a multi-apartment house, in this case, effective amount of losses, within the inner system of a house, shall not exceed 5%. If the remote system is installed partially in the served territory, in this case effective amount of losses shall not exceed weighted average level, computed for 10% for traditional metering system houses and for 5% for remote metering system houses.

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<sup>10</sup> Внутренняя домовая система

40. Reporting by entities to the regulating institution includes 37 different forms, covering forms supplied for long-term base price settlement, annual reporting on accomplishment of established efficiency targets and progress of fulfillment of long-term action plans. The reporting on the basis of Description of comparative analysis for activities of drinking water supply and sewerage, requiring entities to supply information under 8 different forms for the regulating institution to conduct benchmarking analysis, serves as the basement to establishing average efficiency indicators for relevant activities / costs.

## Using benchmarking results in Latvia, by SPRK. Drinking Water Supply and Sewerage Utilities

41. SPRK provides regulation to those water and sewerage suppliers that exceed 100.000 m<sup>3</sup> annual sales. General number of registered entities, supplying water and sewerage services, account to 150 entities, and 53 of them have annual sales of more than 100.000 m<sup>3</sup>, i.e. are regulated by SPRK.
42. The general guiding principle in tariff establishment: costs necessary for effective service provision are the basis for the relevant tariff.
43. The Methodology for the Calculation of Tariffs for Water Management Services (thereafter – The Methodology for the Latvian chapter) is developed as classical “cost-plus” price making tool, *inter alia* having several specific provisions<sup>11</sup>:
- as long as entity supplies volumes within the range of +/- 10% , if compared to the volume supplied at price setting period, the entity shall not approach the regulator with amendments in price;
  - as long as entity incurs costs within the range of +/- 5% , if compared to the costs established at price setting period, the entity shall not approach the regulator with amendments in price;
  - profitability of the entity for water and sewerage services shall not exceed 7% of the operating revenues within an operating year<sup>12</sup>.
44. In practice, SPRK at setting prices for an individual entity, assesses within the framework the dynamics of change:
- of amount of each cost position, forming a tariff, in accordance with cost positions determined by the Methodology;
  - for quantities included in a tariff for water extraction and processing, water supplied to consumers, wastewater collected from users, and treated wastewater.
45. This assessment of individual dynamics, which is done as a rule by SPRK, might also be supported with comparison to other entities relevant indicators. The principle of benchmarking entities against other entities active in the sector is under development in Latvia currently, since the database and relevant technological maps are under development as well.

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<sup>11</sup> Only those indirectly related to benchmarking are mentioned.

<sup>12</sup> Non-traditional provisions for return on depreciated tangible assets will be discussed in another report, covering Subtask 1.1

46. Technological maps of provision of water supply and sewerage services are being prepared for each tariff determined by the Regulator, according to particular areas of servicing. Technological maps will contain the volume of services supplied to users, indicators of technical volumes, losses in water supply networks, infiltration in sewerage networks, the number of connected users (specifically, the number of connections and not persons), the length of networks in km and segmentation thereof.
47. In parallel, SPRK conducts inspection of all water management service providers in 2015, to determine how the regulated entities separate the regulated water management activities from other economic activities in their accounting system, how cost separation between water supply and sewerage services is carried out, and also, how the regulated entities specifically divide inseparable costs of water supply or sewerage services between these types of activities.
48. Annual reporting by entities is conducted according to 3 forms<sup>13</sup>, and information submission for price setting is conducted under 8 forms<sup>14</sup>.

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49. Below is provided information on Latvian situation with indicators for regulatory performance monitoring.
50. The “General authorization and registration provisions of the water sector” provides the complex of informational obligations upon entities engaged in water supply and sewerage activities:
- obligation to periodically inform regulator about entity’s operations and changes in accordance with the laws and regulatory decisions (Art. 24);
  - obligation to provide information in accordance with the rules on information to be submitted to the regulator (Art. 25);
  - obligation to provide the regulator with information necessary to monitor the quality of public service and respect to general authorization rules. The entity is obliged to provide to the regulator information on the its economic and financial performance, as well as provide access to the regulator for activity checks (Art. 26).

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<sup>13</sup> Annual information supply under “Provisions on information to be submitted to SPRK”

<sup>14</sup> Under “Rules for Inspection of a Draft Tariff”

Picture #1. Map of water and waste water suppliers in Latvia



51. The “Provisions on information to be submitted to SPRK” provide that annually entities engaged in water supply and sewerage service provision shall supply SPRK with:

- Revenues and costs of the activity of water extraction, processing, supply up to inlet meters;
- Revenues and costs of the activity of water supply from inlet meters to final consumers;
- Revenues and costs of sewerage and surface drainage collection, transportation;
- Revenues and costs of sewerage surface drainage treatment;
- Volumes of water supplied and sewerage treated;
- Characteristics and water and sewerage networks:
  - Length of water supply network (km),
  - Annual electricity consumption in the water supply network (kWh);
  - Amount of extracted water per year (m<sup>3</sup>);
  - Amount of water transported over network per year (m<sup>3</sup>);

- Amount of water purchased from other providers (m<sup>3</sup>);
- Amount of water sold to consumers (m<sup>3</sup>);
- Length of sewerage network (km),
- Number of sewerage connections by the end of the year,
- Annual electricity consumption in the sewerage network (kWh);
- Amount of sewerage collected from the users (m<sup>3</sup>);
- Amount of treated sewerage in own treatment plants (m<sup>3</sup>),
- Amount of treated sewerage in treatment plants owned by other entities (m<sup>3</sup>).

52. The benchmarking monitoring tools are under development currently. However, already now there is available interactive map with service providers and effective prices. The map is under improvement to collect & expose the benchmarking data for the entities active in sector. The map can be found at [www.sprk.gov.lv](http://www.sprk.gov.lv) and the visual representation is presented in the Picture #1. Map of water and waste water suppliers in Latvia, above.

## Using benchmarking results in Estonia, by Konkurentsiamet. Drinking Water Supply and Sewerage Utilities

53. Public Water Supply and Sewerage Act (thereafter – the Law for the Estonian chapter) provides, that the price for water and sewerage services shall cover (i) justified operating expenses, (ii) necessary investment for sustainability of systems, (iii) necessary needs for environmental requirements, (iv) quality and safety requirements, (v) justified profitability, (vi) development / expansion needs, including rain drainage, to cover certain target number of consumers (Art. 14).
54. The Temporary Water Service Pricing Arrangements and Conditions (thereafter – the Methodology for the Estonian chapter ) provides Estonian Competition Authority (thereafter – CA for the Estonian chapter), for the sake of efficient cost determination, to use the following methods:
- dynamics of expenses over time and comparison of it with the dynamics of consumer price index,
  - analysis of different cost components on the basis of expert valuation,
  - comparison of operating expenses of an undertaking and the statistical indicators calculated thereof with those of similar undertakings, i.e. benchmarking.
55. The Methodology provides additional safeguards:
- the list of unacceptable and non-inclusive types of costs is provided;
  - for the purpose of rate of return calculation, the structure of capital is fixed in the Methodology, also, limitations on risk-free rate and market risk premium rate are established.
56. There are 70 water and wastewater entities in Estonia that are regulated by Estonian Competition Authority. In 2013 only, 40 prices were determined by CA.

## Using benchmarking results in Lithuania, by VKEKK. District Heating

57. The Law on District Heating provides, *inter alia*, principles of cost accounting and price setting, which shall be followed by the regulator, the regulated entities, and relevant municipal administrations (here, the list is selective, according the objectives of the Report):
- “mandated costs” principle, Art. 32 p. 4;
  - “established efficiency targets” by regulating institution, upon regulated entities, Art.2 p.13, Art.32 p.6.
58. Concept of efficiency is applied as well as the ruling principle for the regulator’s decision to issue a license to engage in district heat supplying activity; as the objective in the area of alteration of usage of district heating service.
59. Description of comparative analysis<sup>15</sup> for activities of district heating is mentioned by the Law in the context of efficiency targets establishment in the area of variable component of the DH price.
60. The modesty of the Law, with regard to regulatory system components, is due to its substantial stagnation since 2008; multiple amendments to the Law (more frequently than twice a year, on average) introduce incremental changes to DH policy, and systematic approach of DH regulation can be found in regulatory legal documents.
61. The Methodology on Price setting for District Heating (thereafter - the Methodology, for the chapter on Lithuania) has experienced major amendments in 2013, therefore here it will be provided relevant regulation before 2013 and after 2013.
62. The Methodology of 2009 provides clearly, that in all the cases the Commission establishes the assignments for efficiency to be achieved in the operations of an entity in question.
63. The Methodology of 2009 provides, that the assignments for efficiency are established following the Description of comparative analysis for activities of district heating, adopted by Commission.
64. Indicators of comparative analysis, estimated by Commission and announced publicly, are the basement for establishment of assignments for efficiency for an entity in question and for determination of relevant costs, while conducting long-term base price setting and variable component of the price setting process.
65. The Methodology of 2009, provided the following:

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<sup>15</sup> In Lithuania, term “comparative analysis” is used instead of term “benchmarking analysis”.

- Commission, following the Indicators of comparative analysis within the relevant group of DH entities, has a right to establish DH entities with assignments for efficiency in the area of heat transmission technical losses;
  - Comment: The right of the regulatory institution was mentioned due to the fact, that normative losses of heat transmission are estimated according to methodology approved by Ministry of Economy; departure from the methodology has been ordinary possible with establishment of efficiency targets, requesting entities reduce their technical losses, and agreed and provided in written during the long-term base price setting procedure;
- At the process of long-term base price setting procedure, for the mandatory costs of the entity in question:
  - on the share of fixed costs (heat production, transmission and sales), it is derived taking due consideration to factual costs of the previous three calendar years, taking due consideration to the reasons causing dynamics of the costs types, taking due consideration to cost changes owing to the implemented measures from the entity's investment program, and taking due consideration to the assignments for efficiency according to the comparative analysis;
    - personnel costs: the number of employees is not a subject to comparative analysis limits, however, the average salary per employee – is. This way, the annual salary budget is compounded as a number of employees attached to relevant activity multiply average salary per employee. Average salary per employee is limited to average salary per employee within the relevant group, to which the entity belongs. If number of employees for the entity is less than the Indicator of the group, the average salary per employee of that entity might be higher than the average salary per employee within the group; however, in any case, the annual salary budget of the entity shall not exceed the amount compounded as the group Indicator on number of employees multiply on the group average salary;
    - for operating costs: the operating costs for heat production, transmission and sales are estimated taking due consideration to the Indicators of the relevant group of entities, to which the entity in question belongs;

- on the share of varied costs (heat production and transmission), it is derived taking due consideration to fuels structure and established assignments for efficiency (in the area of comparative fuels input). Assignments for efficiency are established taking due consideration to factual results of the previous three calendar years, taking due consideration to the reasons causing dynamics of the results, taking due consideration to expected changes owing to the implemented measures from the entity's investment program, taking due consideration to the results of the comparative analysis;
  - for the fuels costs: the fuel costs for production are established in accordance with the established assignments for efficiency (at the established fuels structure) and comparative fuels input (kg/MWh). If estimated assignments for efficiency to the relevant fuels structure is higher than the factual comparative fuels input for the last three years, in this case established assignments for efficiency will be equal to the factual comparative fuels input;
  - for electricity for technology needs and for water for technology needs: these costs are established according to comparative analysis indicators, and crosschecked against norms legally binding (to the reduction side solely).

66. Additional safeguards, foreseen in the Methodology 2009, for efficiency of costs, to introduce efficiency to the areas where comparative analysis does not cover, are the following:

- for credit interest rate payable. As mandatory cost for interest is recognized the interest, paid on liabilities not exceeding 70% of balance value of the asset (in the case of concession – 70% of operated asset value); interest rate limits are established as announced by Lithuanian Bank the interest rate applicable on new loans issued to non-financial corporations and households, for relevant period time;
- for fuels costs. The fuels structure for the entity for the whole period of long-term base price is composed as “optimal fuels structure” (percentage share of fuel types, giving priority line to the equipment burning the cheapest fuel types, one by one), and the composed structure (for the sake of pricing!) can be changed in the only occasion during the long-term base price period – i.e. if new pieces of renewable-burning equipment are installed;
- for rate of return. The maximum rate of return is established at the level of 5%, and this done by the Law of 2008. Therefore the limitations provided in the Methodology of 2009 on the

components of the WACC formula (risk free rate, rate *libor*, rate market) were applied to the extent that could not eventually result with WACC higher than established 5%<sup>16</sup>;

- for purchased heat costs. The purchased heat costs shall not exceed the comparative costs of production of the purchasing entity<sup>17</sup>;
- for the case of Regulatory Asset Base, the Methodology provides list of types of assets, that cannot be included into RAB neither for depreciation nor for rate of return;
- for the case of depreciation/amortization costs. The Methodology provides minimum time period and method of depreciation calculation to be used.

67. Reporting by entities to the regulating institution includes 34 different forms, covering forms supplied for long-term base price settlement, annual reporting on accomplishment of established efficiency targets and progress of fulfillment of long-term action plans. However, formalized process and forms for announcement of benchmarked indicators for the whole sector by Commission followed later, in year 2012.

68. The new Methodology of 2013 provides, that Indicators of comparative analysis, estimated by Commission and announced publicly, are the basement for establishment of assignments for efficiency for an entity in question and for determination of relevant costs, while conducting long-term base price setting and variable component of the price setting process. "If efficiency of relevant group of entities is greater than the efficiency of the entity in question, in this case the entity is established with the target efficiency corresponding the efficiency of the relevant group;

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<sup>16</sup> Here it must be admitted, that in practice, the entire complex of "efficient" WACC application, had the following characteristics:

(1) factual costs for interest paid on bank credits was included into long-term base price, with limitations described in the text;

(2) WACC provided – at least, theoretically – additional financing for the debt capital costs;

(3) 5% of WACC was far from reality market conditions and was not sustainable to ensure new investment necessary, therefore it was provided additional 6% for the 7 years period upon the investment into material long-term asset equipment burning renewables (extra WACC);

(4) factual profit, if exceeding the established WACC for the entity, will be shared according to the steps: extra 2% and more of factual WACC will be shared at the rate of 50:50 for the next year; extra 6% and more of factual WACC will be shared at the rate of 50:50 up to 6% and at the rate of 0:100 above 6%;

(5) in the case of independent regulated producer, extra 9% and more of factual WACC will be shared at the rate of 0:100 above 9%;

(6) Commission kept the right to calibrate the boundary of WACC by additional 1%, with respect to monitored reliability and service quality provided by the entity.

<sup>17</sup> To secure interests of consumers, but also, to prevent withdrawal of profit centers out of regulatory oversight. Comparative costs of production equal mainly to varied costs of production of the relevant entity. In the long term perspective, especially from the point of view of potential competition development in the market, this approach is deeply questionable.

if the efficiency of the entity in question is greater than the efficiency of the relevant group, to which the entity belongs, the entity is established with the factual efficiency of its own.” With this, the general approach of regulatory pressure on efficiency is maintained in the Methodology of 2013.

69. The Methodology of 2013, provides the following direct usage of benchmarked values:

- In the area of fixed costs:
  - for the case of maintenance / repair works;
  - for the case of personnel costs. However, there is reservation focused on total amount of personnel annual budget: there will be taken due consideration to the average salary in the state, announced by the Lithuanian Statistics Office for those engaged in the electricity, gas, steam supply, air conditioning industries; if the entity has the number of employees smaller than the relevant group average, the average salary per employee of the entity might be higher, than the Statistical average of aforementioned industries, and go up to the factual average salary of the entity or up to group benchmarked average, however, total annual budget of the entity for personnel shall not exceed the target number of employees multiply by average salary of the group;
- in the area of varied costs:
  - for the case of fuel costs. The comparative fuels input indicator ( $\text{kg}_{\text{oil equivalent}}/\text{MWh}$ ), corresponding the established fuels structure for the entity, shall be used. The general approach of possible better efficiency of the entity in comparison to the benchmarked group indicator, is valid here as well;
  - for the case electricity for technological needs;
  - for the case water for technological needs;
  - for the case of other varied costs, such as cinder processing (transportation, utilization), chemical materials for the technological needs, services of biomass exchange operator services, laboratory tests, etc.

70. Additional safeguards, foreseen in the Methodology 2013, for efficiency of costs, to introduce efficiency to the areas where comparative analysis does not cover, are the following:

- for the case of Regulatory Asset Base, the Methodology of 2013 provides list of types of assets, that cannot be included into RAB neither for depreciation/amortization nor for rate of return;

- for the case of depreciation/amortization costs. The Methodology of 2013 provides minimum time period and method of depreciation calculation to be used. In the case of missing asset type in the Methodology provisions, the entity shall initiate individual arrangement with the regulating institution regarding depreciation period of the asset unit;
- for the case of operating costs. The Methodology of 2013 provides list of operating costs that are forbidden to be included into mandatory costs base;
- for the case of rate of return, it is foreseen the right to NCC to establish<sup>18</sup> optimal structure of capital to be used, upper limit of credit interest rate to be used; , method to derive risk free rate for Lithuanian conditions, method to derive risk premium rate for Lithuania conditions is provided in different legal act<sup>19</sup>;
- for the case of fuel purchasing costs, extreme values of contracts in the market are ignored (minimum and maximum), and limitations are established at 105% and 90% of the average market price for respectfully more expensive purchases and less expensive purchases.

71. Any assignment for efficiency, in both DH Methodologies, is understood according to the general mathematical expression:

- *if  $KPI_{i,f} \geq KPI_{i,BA}$  , then  $KPI_{i,BP} = KPI_{i,BA} \pm \Delta KPI_i$  and*
  - established assignment for efficiency for indicator *i* depends on other objectives factors' impact during the base price period  $e_{KPI_i} = \pm \Delta KPI_i$  ;
- *if  $KPI_{i,f} < KPI_{i,BA}$  , then  $KPI_{i,BP} = KPI_{i,f} \pm \Delta KPI_i$  and*
  - established assignment for efficiency for indicator *i* depends on gap between the factual value of the indicator and the benchmarked value of the indicator, and on other objectives factors' impact during the base price period  $e_{KPI_i} = KPI_{i,BA} - KPI_{i,f} \pm \Delta KPI_i$  ; where
    - $KPI_{i,f}$  - Indicator *i*, factual of the entity;
    - $KPI_{i,BA}$  - Indicator *i*, benchmarked value;
    - $KPI_{i,BP}$  - Indicator *i*, established value for the entity for the base price period;

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<sup>18</sup> By reasoned formal decision

<sup>19</sup> Methodology to establish rate of return, which is applied to all the sectors regulated by NCC, i.e. electricity, natural gas, liquefied oil gas, district heating, drinking water supply and sewerage, ferry transportation. The Methodology provides unified rules.

- $\Delta KPI_i$  – delta of Indicator  $i$ , expected change due to other objectives factors' impact during the base price period;
- $e_{KPI_i}$  - assignment for efficiency in the area of indicator  $i$ , for the entity for the base price period.

72. As an example, how benchmarking indicators were used in practice, here is the case for the largest DH entity in Lithuania, long-term base price setting exercise at December 2010, with Methodology of 2009. The entity belongs to the group I, and has annual sales of more than 150 GWh of heat. As provided in Table #1 “Examples of Indicators used for long-term base price setting, 2010”.

Table #1. Examples of Indicators used for long-term base price setting, 2010

Indicators (selected)	Factual values, by the entity		Benchmark ed values for the group	Values for long-term base price setting	
	Year			Submitted by entity	Decided by NCC
	2008	2009	2009	2011-2015	2011-2015
Technological losses, at transmission, %	13,7	12,3	15,7	15,6	12,2 <sup>20</sup>
Comparative fuels input, kg <sub>oil equivalent</sub> / MWh	99,7	99,8	97,4	96,6	96,6 <sup>21</sup>
Comparative composite fuels price, EUR/t <sub>oil equivalent</sub>	380	313	344	336	329 <sup>22</sup>
Comparative electricity for technological needs, total for production and transmission, kWh/MWh	34,0	34,2	24,7	21,5	21,9 <sup>23</sup>
Water for technological needs, thou m <sup>3</sup>	8,7	5,9	-	10	10 <sup>24</sup>
Transmission network length per person engaged in transmission, km/person		4,3 <sup>25</sup>	3,87		
Number of consumers per person engaged in heat sales, consumers/person		1475 <sup>26</sup>	3682		
Installed heat power of exploited equipment per person engaged in heat production, MW/person		12 <sup>27</sup>	5,3		

<sup>20</sup> Here, the planned new transmission line (6,8 km) connection and renovation of transmission lines (17,4 km) are taken into consideration, as well as factual value of the indicator – with this, divergence from the benchmarked indicator value is obvious

<sup>21</sup> Voluntary efficiency assignment by the entity is taken into account, crosschecked against its technical possibilities and investment program for the base price period

<sup>22</sup> According to fuels structure and factual prices in the market for different fuels within the structure, as of November 2010

<sup>23</sup> There was change on legal act amendments, regarding costs separation between heat and electricity in the case of CHP. Entity's project was submitted before amendments took place, and NCC decision is respecting the amendments

<sup>24</sup> Water for technological need is partially taken from the river (“free of charge”), any limits were not established

<sup>25</sup> KPI of the entity is by 11% better than the one of the group

<sup>26</sup> KPI of the entity is by 60% worse than the one of the group

<sup>27</sup> KPI of the entity is by 26% better than the one of the group

Number of employees in all DH activities, persons	781	741	-	786	755 <sup>28</sup>
Average salary, EUR/month/person	931	1076	813	990	939 <sup>29</sup>
Average price for DH, ct/kWh		6,32 <sup>30</sup>	5,94	6,86 <sup>31</sup>	6,13 <sup>32</sup>
Average cost for DH, ct/kWh		6,01 <sup>33</sup>	5,61	6,55 <sup>34</sup>	5,87 <sup>35</sup>

73. As an example, how benchmarking indicators are used in practice, here is the case for one of the largest DH entities in Lithuania, long-term base price setting exercise at July 2014, with Methodology of 2013. The entity belongs to the group V, having its annual sales of less than 25 GWh of heat, and belongs the sub-group D, having less than 25% of natural gas in its fuels structure<sup>36</sup>. As provided in Table #2 “Examples of Indicators used for long-term base price setting, 2013”.

Table #2. Examples of Indicators used for long-term base price setting, 2013

Indicators (selected)	Factual values, by the entity				Benchmark ed values for the group 2013	Values for long-term base price setting		
	Year	2010	2011	2012		2013 <sup>38</sup>	Submitted by entity <sup>37</sup> 2014-2019	Decided by NCC 2014-2014
Technological losses, at transmission, MWh/km <sub>s</sub>		387	316	274	244	329	279	274 <sup>39</sup>
Comparative fuels input, kg oil equivalent / MWh		104,5	102,6	105,9		102,7	103,9	90,0 <sup>40</sup>
Comparative composite fuels price, EUR/t oil equivalent		200	262,7	213,2		-	169,4	169,4

<sup>28</sup> Established as factual number of employees of 2009, taking into account additional needs for future period

<sup>29</sup> Since the number of employees is smaller than the group indicator, and average salary is higher than in the group, it is taken as factual salary of 2008 of the entity

<sup>30</sup> As for November 2010, factual

<sup>31</sup> As for November 2010, as would be according the new base price

<sup>32</sup> As for November 2010, as would be according the new base price

<sup>33</sup> As for November 2010, factual

<sup>34</sup> As for November 2010, as would be according the new base price

<sup>35</sup> As for November 2010, as would be according the new base price

<sup>36</sup> In fact, this entity uses biomass to full extent, and shale oil is used in the cases of boiler failures only. This way, for year 2012 biomass constituted 99,5% and shale oil 0,5% fuels factually used, and in year 2013 biomass constituted 99,9% of all the fuel factually used

<sup>37</sup> The project for the long-term base price was submitted by the entity in September 2013, therefore the last factual year is 2012 used for estimations

<sup>38</sup> The project for the long-term base price was submitted by the entity in September 2013, therefore the last factual year is 2012 used for estimations, and year 2013 is provided for informative purposes only

<sup>39</sup> Established as the factual indicator of the entity, since it is less than the group indicator

<sup>40</sup> Taking into consideration to the condensing economizer, installed at the very end of 2013, and not reflected at the moment of project submission by the entity

Comparative electricity for technological needs, total, kWh/MWh		18,9	18,8			19,1	16,7 <sup>41</sup>
Comparative electricity for technological needs, production, kWh/MWh		18,9	18,8		10,8	18,7	16,3 <sup>42</sup>
Comparative electricity for technological needs, transmission, kWh/MWh					5,9	0,4	0,4 <sup>43</sup>
Water for technological needs, thou m <sup>3</sup>		8,5	8,2		53,4	7,9	0,5 <sup>44</sup>
Transmission network length per person engaged in transmission, km/person			1,99		2,38	1,99	
Number of consumers per person engaged in heat sales, consumers/person			627		1246	627	
Installed heat power of exploited equipment per person engaged in heat production, MW/person			1,23		1,38	1,18	
Number of employees engaged in heat activities per one administration employee			4,13		4,36	4,13	
Average salary, EUR/month/person		580	573,7		518,4	603,8	518,4 <sup>45</sup>
Number of employees in all DH activities, persons			42			42	36 <sup>46</sup>
Number of employees in main DH activities, persons			33			33	28 <sup>47</sup>
Number of employees in administration, persons			8			8	8 <sup>48</sup>
Annual material expenses in generation per Installed heat power of exploited equipment, EUR/MW					1629,11	1213,2	
Annual maintenance / repair expenses in generation per Installed heat power of exploited equipment, EUR/MW					490,62	117,4	
Annual material expenses in transmission per length of network, EUR/km					1121,41	2452,9	

<sup>41</sup> Established assignment for efficiency at 16,7 according to relevant sum of comparative indicators of the group (10,8 for production plus 5,9 for transmission)

<sup>42</sup> Reduced to 16,3 for production, in order to equal at the benchmark of 16,7, having 0,4 for transmission as provided by the entity

<sup>43</sup> Taken as provided by the entity

<sup>44</sup> Water for technological needs is taken from the entity's own source, and a small city is supplied with purchased water.

<sup>45</sup> Established as the same level as the group indicator

<sup>46</sup> Established as the sum of 28 employees in main DH activities and 8 employees in administration

<sup>47</sup> Established according to benchmarking indicators: 17,9 km of exploited transmission network length divided by 2,38 = 18 employees at transmission; 24,66 MW installed generation capacity divided by 1,38 = 8 employees at generation; 1882 consumers divided by 1246 = 2 employees at sales.

<sup>48</sup> Accepted, since does not exceed the group benchmark: 33 : 8 = 4,13 or 28 : 8 = 3,5 ; it is less than 4,36

Annual maintenance / repair in transmission per length of network, EUR/km					64,87	97,1	
Annual amount for material and maintenance/repair expenses			72.646			78.458 <sup>49</sup>	73.482 <sup>50</sup>
Average price for DH, ct/kWh				5,68 <sup>51</sup>		5,74 <sup>52</sup>	4,92 <sup>53</sup>
Average cost for DH, ct/kWh				5,25 <sup>54</sup>		5,34 <sup>55</sup>	4,64 <sup>56</sup>

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<sup>49</sup> Annual amount for material and maintenance/repair cost

<sup>50</sup> Established assignment for efficiency, according to group indicators: 1629,11 EUR/MW x 24,66 MW + 490,62 EUR/MW x 24,66 MW + 1121,41 EUR/km x 17,9 km + 64,87 EUR/km x 17,9 km = 73.482 EUR / year

<sup>51</sup> As for June 2014, factual

<sup>52</sup> As for June 2014, as would be according the new base price

<sup>53</sup> As for June 2014, as would be according the new base price

<sup>54</sup> As for June 2014, factual

<sup>55</sup> As for June 2014, as would be according the new base price

<sup>56</sup> As for June 2014, as would be according the new base price

## Using benchmarking results in Latvia, by SPRK. District Heating

74. In Latvia, there are about 240 entities engaged in DH supply, however, SPRK provides regulation to 58 entities. The regulated entities have a market share of 93%. To be regulated by SPRK, the entity has to have annual sales exceeding 5.000 MWh and installed capacity exceeding 1 MW.
- The Law on Regulator on Public Utilities provide that: “Tariffs shall be determined to the extent that users cover economically justified public service costs and ensure the profitability of the public service, if the sector specific laws do not provide for other tariff setting principles (...)” (Art.20).
75. The Heat Distribution Service Tariff Calculation Methodology (thereafter – The Methodology for Latvian chapter) is very much similar to “cost-plus” type, however, provisions on rate of return calculation are specific
76. The Methodology provides:
- limitations on cost of debt calculation,
  - examples of costs that are not allowed to include into tariff.
77. The Methodology has similar provisions as the Methodology for water, with indirect application of benchmarking efficiency:
- as long as entity supplies volumes within the range of +/- 10% , if compared to the volume supplied at price setting period, the entity shall not approach the regulator with amendments in price;
  - as long as entity incurs costs within the range of +/- 5% , if compared to the costs established at price setting period, the entity shall not approach the regulator with amendments in price.
78. In practice, SPRK at setting prices for an individual entity, assesses within the framework the dynamics of change, the amount of each cost position, forming a tariff, in accordance with cost positions determined by the Methodology. This assessment of individual dynamics, which is done as a rule by SPRK, might also be supported with comparison to other entities’ relevant indicators. The principle of benchmarking entities against other entities active in the sector is under development in Latvia currently, since the database and relevant technological maps are under development as well.
79. Technological maps of provision of district heating services are being prepared for each tariff determined by the Regulator, according to particular areas of servicing. Technological maps will

contain the volume of services supplied to users, indicators of technical volumes, losses in networks, the number of connected users, the length of networks in km and other parameters.

80. Annual reporting by entities is conducted according to 3 forms<sup>57</sup>, and information submission for price setting is conducted under 9 forms<sup>58</sup>.

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81. Additional information of Latvian situation with performance indicators' monitoring is provided below. The Law on Regulator on Public Utilities provides the complex of informational obligations upon entities engaged in public service, i.e. district heating, activities (Art. 25):

- obligation to provide the information requested by the regulator within the specified time and in order;
- obligation to provide the regulator with information necessary to monitor the quality of public service, its economic and financial performance, as well as provide access to the regulator to all the documents, meters and equipment, the regulator might be necessary to conduct inspection and control.

82. The "Provisions on information to be submitted to SPRK" provide that annually entities engaged in district heating service provision shall supply SPRK with:

- Revenues of the activity of heat generation;
- Revenues of the activity of heat transmission;
- Revenues of heat sales;
- Technical indicators for CHP activities (list is not full):

amount of heat transferred from CHP plants, MWh; heat cogeneration capacity utilization hours per year; amount of heat transferred from the hot-water boiler, MWh; Electricity self-consumption of electricity and heat production, MWh; Electricity self-consumption for heat generation, MWh; Fuel consumption in the cogeneration installation – together, MWh; Fuel consumption for heat, MWh; Fuel consumption, natural units; etc.

- The cost of production (structured):
- The cost of heat transmission (structured);
- The cost of heat marketing (structured).

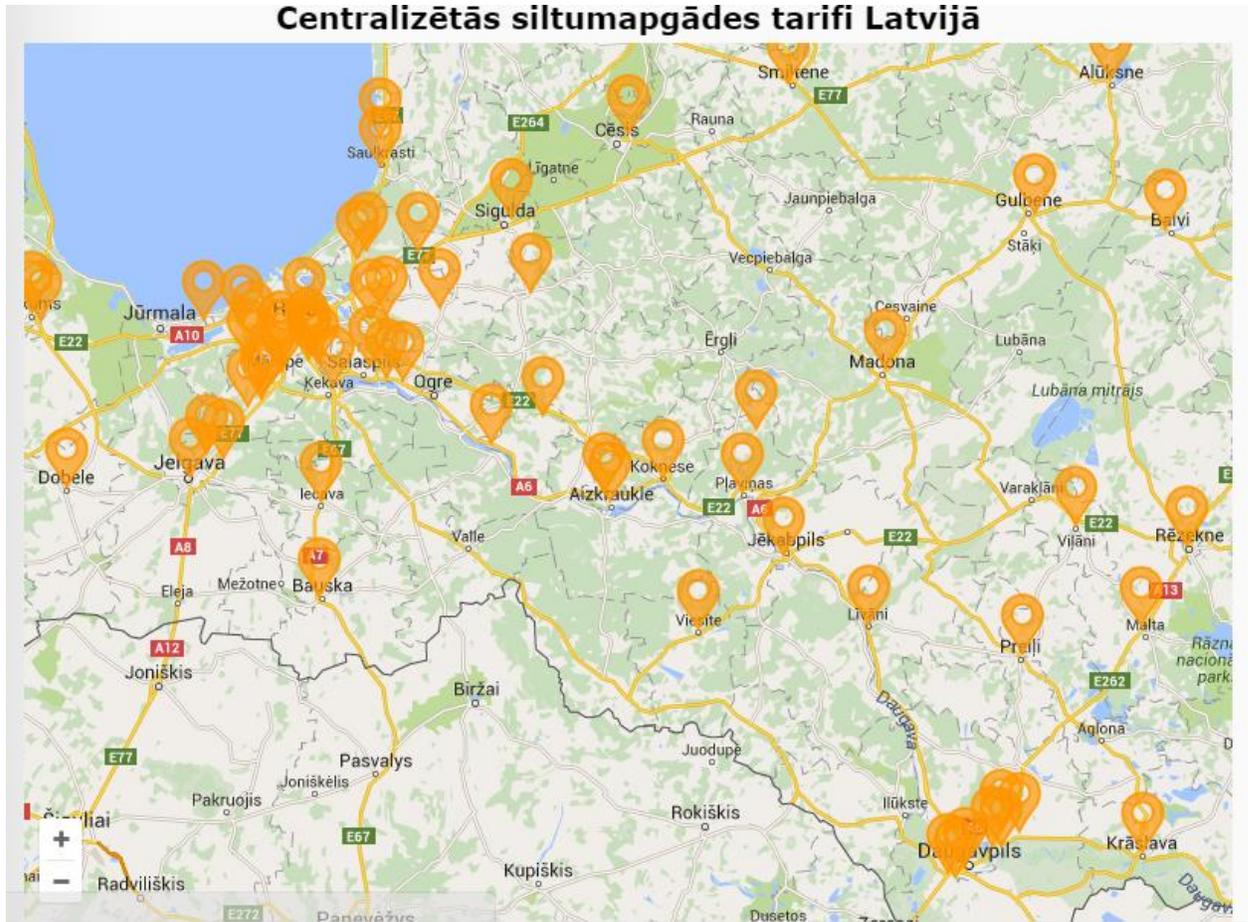
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<sup>57</sup> Annual information supply under "Provisions on information to be submitted to SPRK"

<sup>58</sup> Under "Heat distribution service tariff calculation methodology"

83. The benchmarking monitoring tools are under development currently. However, already now there is available interactive map with service providers and effective prices. The map is under improvement to collect & expose the benchmarking data for the entities active in sector. The map can be found at [www.sprk.gov.lv](http://www.sprk.gov.lv) and the visual representation is presented in the Picture #2. Map of district heating suppliers in Latvia, below.

Picture #2. Map of district heating suppliers in Latvia



## Using benchmarking results in Estonia, by Konkurentsiamet. District Heating

84. Competition Authority of Estonia (thereafter - CA) provides price regulation for DH companies in the case the entity, alone or together with undertaking belonging to a group, has annual sales of 50.000 MWh to consumers, not belonging to a group; either in the case of CHP entity. In Estonia, there are 88 entities that have price regulation conducted by Estonian Competition Authority for the time of the Report making.
85. The District Heating Act<sup>59</sup> provides components of efficient pricing for DH services, so that the price for DH shall cover: (i) necessary operating expenses, (ii) necessary investment for operational and developmental obligations, (iii) necessary needs for environmental requirements, (iv) quality and safety requirements, (v) justified profitability.
86. The max price might be approved for three years longest term, and the entity is the one initiating the length of the max price validity, according to the District Heating Act.
87. The Principles of Approval of Maximum Price of Heat (thereafter - the Methodology for Estonian chapter) states, that the basic principle encrypted is “price cap” principle: “In case of the RPI-x method the price to be approved for the next regulation period is determined on the basis of the price in the previous period, consumer price index and the CA assigned efficiency coefficient or cost saving task (x)”.
88. The Methodology states CA carrying systematic analysis of operating expenses of regulated entities by using the following methods:
- dynamics of expenses over time and comparison of it with the dynamics of consumer price index,
  - comparison of operating expenses of an undertaking and the statistical indicators calculated thereof with those of similar undertakings, the so-called *benchmarking*,
  - analysis of different cost components on the basis of expert valuation,
  - analysis of technical parameters like efficiency of heat production, network losses, specific electricity consumption and others.
89. In Estonia, the Methodology establishes certain technical efficiency requests that are followed during the price establishment exercise:

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<sup>59</sup> <https://www.riigiteataja.ee/en/eli/ee/513012015005/consolide/current>

- for the case of Network losses, the following minimum technical requirements are encrypted in the max price for an entity:
  - 2009 not higher than 24%,
  - 2010 not higher than 23%,
  - 2011 not higher than 21%,
  - 2012 not higher than 20%,
  - 2013 not higher than 19%,
  - 2014 not higher than 18%,
  - 2015 not higher than 17%,
  - 2016 not higher than 16%,
  - 2017 not higher than 15%;
  - CA might as well impose requirements that differ from the minimum requirements provided above in the case of CHP;
- For the case of Heat production efficiency, the following minimum technical requirements are encrypted in the max price for an entity:
  - production of heat from natural gas not lower than 90%, for new equipment not than lower 92%,
  - production of heat from liquid fuel not lower than 85%, for new equipment not lower than 90%;
  - production of heat from solid fuel not lower than 80%, for new equipment not lower than 85%,
  - equipment is considered as a new equipment is it is less than 10 years of age (older version), or equipment which has been acquired since January 1, 1995 (newer version of the Methodology).

90. Additional safeguards are foreseen in the Methodology:

- The Methodology provides depreciation method to be used for CAPEX establishment and right for CA to set out limit of years;
- The list of unacceptable and non-inclusive types of costs is provided;
- For the purpose of rate of return calculation, the structure of capital is fixed in the Methodology, also, limitations on risk-free rate and market risk premium rate are established.

91. CA while conducting price assessments, in practice, additionally looks at fixed costs per sold MWh, electricity consumption per/MWh, etc., which means, that in practice, the regulator has internal

set of indicators, which is not formally provided in legislation, and makes decisions accordingly. This situation might lead to formal development of a set.

92. In 2014, CA introduced a new reference model<sup>60</sup>, for cost-effective district heating system. The efficient heating system modeled as a system of an ideal heating boiler and district heating network, using modern optimal technological solutions, allowing produce and distribute heat effectively. CA announces that if entity applies price below the reference model price, the entity shall not co-ordinate price with CA; it is supposed that the entity has already reached the level efficiency and further co-ordination of the price with CA is redundant. The reference model as well serves as an indication to those developing district heating plans to focus attention to places where prices are too high and implement relevant measures lowering the DH price towards the reference one. Also, the model serves for consumers to make their informed decision - to switch to another heating alternative if they wish so. Those entities that cannot supply for the reference price, still shall co-ordinate their price with CA.

93. The reference model is taken as a complex of the following working performance indicators:

- a) bottom-up approach (“empty space”),
- b) 3 different at size district markets: 5.000 MWh annual sales, 50.000 MWh annual sales, and 300.000 MWh annual sales,
- c) boiler, using efficient optimal technology and cheap fuels (biochips for 1,3 MW and 11 MW installments, but also include other varieties of biofuels for the 53MW installment); for optimal base load; additional installment for peak load; life span respectfully, 20 years and 40 years;
- d) investment cost respectfully 707.200 EUR (1,3 MW base load and 2,6 MW peak load); 5.720.000 EUR (11 MW base load and 22 MW peak load); 33.655.000 MW (53 MW base load, 12 MW flue gas washer, 106 MW peak load);
- e) productive efficiency at using biofuels 85%, 85% and 88%; productive efficiency at using shale oil and natural gas 90%, 92% and 92%;
- f) fuels reference price, for biofuels 14,50 EUR/MWh; for shale oil 29,00 EUR/MWh; for natural gas 39,00 EUR/MWh;

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<sup>60</sup> Long Run Average Incremental Cost model based. For argumentation to choose LRAIC model was *inter alia* mentioned Lithuanian practical experience with LRAIC development and introduction for electricity transmission network and electricity distribution network in 2014.

- g) electricity consumption for technological needs 20.000 kWh/MWh, 20.00 kWh/MWh, and 26.000 kWh/MWh (the last one includes flue gas washer); price for electricity respectfully 0,094 EUR/kWh, 0,086 EUR/kWh, and 0,064 EUR/kWh; other variable costs (ash, chemicals, water) at 0,50 EUR/MWh;
- h) operating costs for heat production goes at 5% of investment value;
- i) well insulated district heating network<sup>61</sup>, at 11% annually;
- j) economically efficient network length is respectfully 1.724 m, 17.241 m, and 103.448 m; respectful investment cost goes to 528.741 EUR, 5.312.414 EUR, and 48.081.724 EUR; lifespan 40 years;
- k) investment for the instalment of metering system goes at 3% of network investment value;
- l) operating costs for heat distribution and sales goes at 2% of network & metering investment value;
- m) WACC at 6,1%;
- n) the concluding reference prices for the relevant DH systems, performing efficiently, are the following (for year 2015):
  - i. 52,27 EUR/MWh,
  - ii. 49,09 EUR/MWh,
  - iii. 49,88 EUR/MWh.

94. Since the reference model is developed for 3 different at size district heating markets or the 3 different sizes of entities, it is reasonable to conclude, that for the case of ranging entities in the DH sector for efficient parameters' determination, the regulating institution uses the criteria of size of entity in terms of heat sold, and this is performed for reference efficiency target / reference model.

95. The target model for relevant sizes of entities shall be considered as the composite effectiveness measure or the composite effectiveness target, since, while applying the model, it does not go into micromanagement efficiency issues, but rather leaves the entity with freedom to determine by itself the most effective ways to operate and to supply consumer with overall effective result (price not exceeding the effective / reference price).

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<sup>61</sup> Referring to Swedish and Finnish factual losses ranging respectively at 6-7 % and 7-9%

96. Regarding so called “soft-quality” indicators, in Estonia these might be established by relevant municipal administrations, however, these will not be reflected in pricing directly.

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97. Additional information on entities’ ranging practice in Estonia is provided below. While making the analysis of the DH sector in 2013, CA grouped the entities against the following criteria (for the purposes of the specialized analysis):

- Amount of annual sales: (i) Up to 10.000 MWh annual sales, and (ii) More than 10.000 MWh annual sales;
- Effective price for MWh: (i) Up to 45 EUR/MWh, (ii) 45-55 EUR/MWh, (iii) 55-65 EUR/MWh, (iv) 65-75 EUR/MWh, (v) 75-91 EUR/MWh;
- Fuels used: (i) Shale oil, (ii) Natural gas, (iii) Wood chips + natural gas, (iv) Peat + shale oil, (v) Wood chips + shale oil, (vi) Coal, (vii) Wood chips, (viii) Peat.
- While benchmarking size of entities against productive efficiency,
  - size was ranged into (i) up to 3.000 MWh, (ii) 3.001-6.000 MWh, (iii) 6.001 – 10.000 MWh, (iv) more than 10.000 MWh,
  - productive efficiency was ranged into: (i) up to 80%, (ii) 80%-84,9%, (iii) 85%-89%, (iv) more than 90%;
- While benchmarking fuels used against productive efficiency,
  - Fuels used – as provided above,
  - productive efficiency was ranged into: (i) up to 80%, (ii) 80%-84,9%, (iii) 85%-89%, (iv) more than 90%;
- While benchmarking size of entities against factual losses in the networks,
  - size was ranged into (i) up to 3.000 MWh, (ii) 3.001-6.000 MWh, (iii) 6.001 – 10.000 MWh, (iv) more than 10.000 MWh;
- With the information provided above, it is reasonable to conclude, that in Estonia, in practice, entities’ ranging criteria is the amount of the heat sold per annum by an entity.

98. This specialized analysis of 2013 enabled CA to conclude that smaller entities have significantly higher price<sup>62</sup> than larger entities, due to fuels structure, shape of generation equipment and network losses, but also, due to density of consumers in the relevant territory.

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<sup>62</sup> 70,99 EUR/MWh v. 57,96 EUR/MWh respectfully

99. During 2013, CA has conducted 122 price decisions to entities, operating all over the country; 89 entities or 73% are less than 10 GWh of annual sales, including 56 entities less than 3 GWh of annual sales.

## Using benchmarking results in Bulgaria, by KEVR. District Heating

100. The Ordinance for the regulation of prices for District heating services<sup>63</sup> (thereafter – the Methodology for Bulgarian chapter):

- states, that KEVR is mandated to apply different methods to regulating entities, defining performance indicators, conducting comparative analysis, establishing basic criteria;
- names the following list of methods that might be applied:
  - “rate of return on capital”,
  - “price cap” and “revenue cap” for 2 to 5 years,
  - target quality indicators for energy and target quality indicators for service,
  - establishment of comparative basic criteria;
  - as for performance indicators, provide, that adjustments of prices/revenue for each pricing period depends on performance indicators of quality both energy and service, as for last year; if the entity in question fails to accomplish quality performance indicators set by KEVR, the amount of revenue / level of price is reduced accordingly.

101. The Methodology provides:

- concept of “efficiency coefficient” as “a target value, representing relative reduction in the cost of entity to implement relevant licensing activity”,
- list of cost types that cannot be included into required revenue for tariff calculation;
- depreciation method to be used;
- limitation on working capital size and composition;
- long-term individual prices for particular services established as a result of heavy regulatory touch,
- possible cases for amendments of established prices within the period are due to:
  - changes in prices of fuels or other variables,
  - in the case of “rate of return on capital”, changes in circumstances which could not be foreseen at the establishment of prices and leads to substantial modification of the approved pricing elements and the financial condition of the energy company,
  - in the case of “price cap”, changes of Inflation coefficient I, (non)achievement of quality indicators, (non)implementation of investment plan,

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<sup>63</sup> The Instructions to formation of prices of water supply and sewerage services under price regulation by price cap provide information very much alike to the one in the Methodology, just to a greater detail

- in the case “revenue cap”, changes in estimated sales quantity and factual costs derogation from estimated costs, both per coefficient Z.

102. The relevant decisions of KEVR regarding business plan of the entity in question approval, regarding regulatory period extensions to relevant entities, provide dynamic analysis of indicators of relevant entity in question; the analysis is made on individual indicator basis, with no composite indicator following; the decisions do not entail comparative / benchmarking analysis<sup>64</sup>; the decision on business plan entails budgetary assessment (revenues and costs), therefore this decision is of high importance for the whole chain.

103. The relevant decisions of KEVT establishing the price of the entity in question provide individual assessment of the entity’s needs and arguments<sup>65</sup>; benchmarking / comparative analysis application is not presented in relevant KEVT decisions.

104. The Methodology is supported by the Instruction on formation of prices for heat and electricity from cogeneration by using the “rate of return on capital” regulation, which established a set of indicators to be delivered by entities applying for a new price establishment; also, excel files are available for entities to fill in at applying for a new price. It must be admitted that efficiency coefficient, that would be based some way on benchmarking / comparative analysis results, is not provided here (productive efficiency is present, from technical side of separation between heat and electricity).

105. Annual reporting by heating entity, is guided with the Instructions for Completing the Forms for Annual Reporting, and the forms are available on the website as excel sheets.

106. Relying on the explained above, it reasonable to conclude, that Bulgarian heating sector regulatory system, has:

- extensive statistical reporting requirements, which are respected by the entities;
- dynamic statistics is heavily used for all the regulatory decisions towards individual entities;
- efficiency assignments for entities are derived on individual basis, relying on business plans and agreed cost saving rates;
- benchmarking analysis and efficiency targets relying on benchmarking analysis are not used so far in practice, however, KEVR having heavy statistical reporting requirements in place has good chances to use it in future.

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<sup>64</sup> For example, <http://www.dker.bg/files/DOWNLOAD/res-bp58-2015.pdf>

<sup>65</sup> For example, [http://www.dker.bg/files/DOWNLOAD/res\\_c-37\\_13.pdf](http://www.dker.bg/files/DOWNLOAD/res_c-37_13.pdf)

## Annex 1.

Norms established for district heating [at establishing assignments for efficiency according to benchmarking indicators, the norms are crosschecked], by DH Methodologies

#	Indicator	Measurement unit	Installed capacity				
			I	II	III	IV	V
			1,5-12 MW	0,9-1,5 MW	0,5-0,9 MW	0,25-0,5 MW	0,02-0,25 MW
1.	Electricity, for technology needs						
1.1.	Gas boiler	kWh/MWh	3,4	3,4	3,4		
1.2.	Biomass boiler (chips, scobs, etc.)	kWh/MWh	7	7	5		
1.3.	Biomass boiler (firewood)	kWh/MWh					
1.4.	Biomass boiler (pellet)	kWh/MWh				1	1
2.	Maintenance / repair works						
2.1.	Gas boiler	thou EUR/MWh	0,15-0,15	0,17-0,5	0,23-0,17	0,29-0,23	0,72-0,29
2.2.	Biomass boiler (chips, scobs, etc.)	thou EUR/MWh	5,79-4,34	4,34-5,79	2,90-4,34		
2.3.	Biomass boiler (firewood)	thou EUR/MWh					
2.4.	Biomass boiler (pellet)	thou EUR/MWh				2,61-2,03	3,19-2,61
3.	Depreciation, amortization						
3.1.	Gas boiler	thou EUR/MWh	1,82-1,82	2,17-1,82	2,72-2,17	3,62-2,72	9,07-3,62
3.2.	Biomass boiler (chips, scobs, etc.)	thou EUR/MWh	7,24-5,44	5,44-7,24	3,62-5,44		
3.3.	Biomass boiler (firewood)	thou EUR/MWh			1,82-2,35	1,45-1,82	3,07-1,45
3.4.	Biomass boiler (pellet)	thou EUR/MWh				9,07-7,24	10,86-9,07
4.	Reserve capacity upkeeping						
4.1.	Gas boiler	thou EUR/MWh	0,98	0,98	0,98		
4.2.	Biomass boiler (chips, scobs, etc.)	thou EUR/MWh	2,03	2,03	1,45		
4.3.	Biomass boiler (firewood)	thou EUR/MWh					
4.4.	Biomass boiler (pellet)	thou EUR/MWh				0,29	0,29
5.	Personnel						
5.1.	Gas boiler	thou EUR/MWh	3,48-1,74	3,48-3,48	3,48-3,48	3,48-3,48	3,48-3,48
5.2.	Biomass boiler (chips, scobs, etc.)	thou EUR/MWh	20,85-2,32	20,85-20,85	20,85-20,85		
5.3.	Biomass boiler (firewood)	thou EUR/MWh			31,28-17,38	41,71-31,28	260,7-41,71
5.4.	Biomass boiler (pellet)	thou EUR/MWh				4,52-8,69	4,52-4,52
6.	Water, for technology needs						
6.1.	Gas boiler	thou m <sup>3</sup> MWh					
6.2.	Biomass boiler (chips, scobs, etc.)	thou m <sup>3</sup> MWh					
6.3.	Biomass boiler (firewood)	thou m <sup>3</sup> MWh					
6.4.	Biomass boiler (pellet)	thou m <sup>3</sup> MWh					

Type of fuel	Efficiency coefficient, %	Comparative fuels input, kg <sub>oil equivalent</sub> /MWh
Gas, natural	Water boiler, non-condensing - 95	90,5
	Water boiler, condensing - 105	81,9
Fuel oil <sup>66</sup>	Water boiler, non-condensing - 86	100
Biomass	Water boiler, non-condensing - 88	97,7
	Water boiler, condensing economizer - 105	81,9

<sup>66</sup> мазут