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District heating tariff component analysis for tariff benchmarking model

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Abstract

The aim of this study is to search for possible correlations between tariff components of Latvian district heating (DH) companies and their specific performance indicators. The purpose of the correlation analysis is to find parameters which can be used for the creation of a tariff benchmark model, which might be used in Latvia, as well as in other countries in order to eliminate negative aspects of "stringent" DH regulation currently in use.

The authors focus on significant components constituting the tariff – the dependence of the heat production tariff on the cogeneration support schemes, fuel mix used, capacity load indicator. The authors conclude that actual DH companies and systems are very different – even though they are grouped in a set based on one parameter, at the same time they considerably differ based on other parameters. Therefore, the creation of a benchmark model cannot be based on empirical regression equations only.

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Keywords: district heating; cogeneration; regulation; tariff beanchmarking; tariff setting

1. Introduction

Today, the general trend of price and tariff setting for public utility services, including district heating (DH), is moving towards "softening" of the regulatory regime, where the ultimate result of the process would be a complete price and tariff deregulation and their exposure to competitive pressures where possible. However, there is still no straightforward answer as to the justification and feasibility of DH deregulation [1, 2]. In the evaluation of the DH

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regulation environment in Latvia, in their previous studies the authors identified a range of serious drawbacks having as their main cause a "stringent" regulatory regime and rigid "cost+" method for DH tariff setting [3]: "overinvestment" risk [4], low incentive to increase the efficiency and to optimize costs [5], the tariff setting process is too ponderous and time-consuming [6, 7].

However, although complete deregulation as practised in electricity and natural gas (gas) sectors might probably eliminate the identified drawbacks, it may also cause other adverse effects – "stranded" investment costs or unjustified extra profit incidents. According to the comparatively recent evaluations of results of DH sector deregulation in Sweden [8], the main reason for the expected results not to be achieved was the peculiar nature of DH – unlike gas and electricity, the DH sector consists of many systems, which are not interconnected. Similar conclusions questioning the possibility to organise the market in the DH sector similar to that of the electricity sector, with complete separation of operators, free third party access to the system and competition between producers, are also drawn in Germany's DH sector study conducted by Bundeskartellamt (Independent federal competition authority of Germany) [9]. Therefore, the authors presumed that it would be useful to look for a medium between an "over-regulated" and fully liberalised DH market where tariff setting is based on benchmarking elements instead of thorough examination of all costs.

In the previous study [7], the authors began to explore the regularities between some of the most important parameters characterising the DH and the overall end-use tariffs of heat in the Latvian DH sector, which could be further used for developing a benchmarking model for DH tariff setting. For the purpose of analysis, the companies were divided into several characteristic groups, differentiated by the size of the DH company (amount of energy supplied), type of fuel used, type of heat production technology. Unfortunately, the results obtained did not indicate a marked relationship between the dominant types of fuel used, the generation technology applied, the amount of energy supplied, the network usage intensity and the end-use tariff level in the relevant DH system. The authors concluded that a simplified approach could not be used for the introduction of benchmarking elements in the tariff setting, for example, by trying to find a single tariff cap benchmark for all DH companies, or couple of different benchmarks for the most characteristic DH system groups by categorising them only by the dominant type of fuel used, for example.

It must be noted that the topicality of changing the regulatory regime of district heat supply in Latvia will increase in the coming years due to another factor: after long discussions, a decision has been made to open the gas market. Although the gas market model to be introduced is yet unknown, it is clear that maintaining such a strictly structured heat tariff system will not be possible, since with the entry of new gas traders into the market it can be expected that they will offer gas at prices that could be linked to various references with the help of different formulas. DH companies, in turn, will probably buy gas from various suppliers, creating different gas procurement portfolios. Under such changing circumstances, a regular and complete review of all the approved tariffs would be irrational and probably even impossible.

Nomenclature

I_{subs}	dimensionless value which characterises the intensity of the effect of subsidies received by CHP
η	heat generation efficiency
NPS	price of electricity at Nordpoolspot platform in the Latvian bidding area in the period concerned, EUR/MWh
P_i	subsidised purchase price of electricity for each CHP, EUR/MWh
Q_i	amount of heat transferred to networks of each heat source connected to the respective DH system, MWh
R_{tf}	dimensionless value characterising the proportion of the relevant generation tariff and the heat effective generation benchmark
s_g	share of gas in the total fuel consumption
T_{pr}	heat generation tariff, EUR/MWh
T_s	heat sales tariff, EUR/MWh
T_{td}	heat transmission and distribution tariff, EUR/MWh
t_{ut}	installed heat capacity utilisation indicator, h