**Impact of grid infrastructure on the economic viability of District heating in Brasov-Romania**

*Mostafa Fallahnejad\*, Richard Buechele*

*Institute of Energy Systems and Electrical Drives, Energy Economics Group, Technische Universität Wien*

*Gusshausstrasse 25-29, 370, 1040 Vienna, Austria*

*Tel.: +43 1 58801 370374*

*fallahnejad@eeg.tuwien.ac.at, buechele@eeg.tuwien.ac.at*

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***Abstract*** The district heating (DH) system in the city of Brasov initially was designed to supply steam to the industry consumers and hot water to the residential consumers. By the shutdown of industrial consumers in 1990, the DH system got away from its primary purpose and became ineffective due to oversized pipelines and high heat losses in the grid. The lack of coherent policy in reviving the DH system as well as the loss of customers further deteriorated the situation for the DH system in Brasov.

In the recent years, the Local Counsel has established new actions toward increase of DH efficiency and consequently, increase of welfare in Brasov. These actions were coincided with supportive studies in the progRESsHEAT project – a H2020 project aimed to support the market uptake of existing and emerging renewable technologies. The outcomes of the project, among all, suggest an array of policy recommendations for Brasov’s DH system. In this paper, we study the impact of those policy recommendations that aim at increasing the competitiveness of DH system. Those policies include the provision of long-term loans for investments into the network infrastructure and especially the implementation of heating and cooling planning to define zones that are preferable for DH.

In contrast to the methodology used in the progRESsHEAT project, where the DH areas were defined by areas around the existing distribution network, in this analysis, a GIS-based method and an optimization model are used for determining potential DH areas in Brasov. The GIS-based method uses the heat density map and the plot ratio map of Brasov for determining coherent areas in which DH distribution grid can be constructed economically. It also calculates the center-to-center distances of coherent areas via street routes. The optimization model has a revenue-oriented prize-collecting concept. On the one hand, it aims at maximizing the heat sales revenue in coherent areas and therefore, maximizing DH system coverage and on the other hand, it penalizes construction of transmission lines that connect coherent areas to the DH system. In this way, connection of remote coherent areas to the DH system will not be realized. The approach additionally determines which heat sources in the region will be utilized and each one to which extent. Furthermore, it allows for estimation of length and diameter of transmission lines, their associated costs and the economic corridor for laying the transmission pipelines. As the main constraint, the user-defined maximum allowed distribution and transmission grid costs should not be exceeded.

Finally, we will discuss if the outcomes of this approach correspond to the result of the progRESsHEAT project and if they substantiate the policy recommendations or if additional recommendations can be made.