

Variation of Temperature in Transmission District Heating Network Augmented with a Regulation of a Radiator Temperature in a Building and Substation Heat Metering

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Building and Substation Heat Metering

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Load, Modulation

Research Objective: An external temperature, according to which a temperature of both supply and return lines is regulated, plays a vital role in district heating industry. At the same time significantly branched hot water (up to 150 degrees Celsius) systems gained during the Soviet-era currently dominate in Russia and CIS-countries. However, the latest English-language research on district heating (DH) in former USSR-country is mainly focused on heat energy production [1–4]. This requests cost- and labor intensive computing facilities not commonly available in Russia. Copyright protection is another problem. However, to the authors’ best knowledge, very few publications are found in the literature that address the issue of central prearranged (according to weather conditions) temperature variation within a DH network. A theory of practical modelling of DH system has recently been presented in articles [5-20]. However, several practical questions arise when dealing with supply temperature optimization: (1) it is important to identify transient processes related to the whole system, (2) it is key to predict consumer’s behavior, (3) it is crucial to establish a way to reduce heat losses at the consumer’s side. To answer all these questions, we present an original approach which combines DH plant temperature reset and advanced operation of the substations.

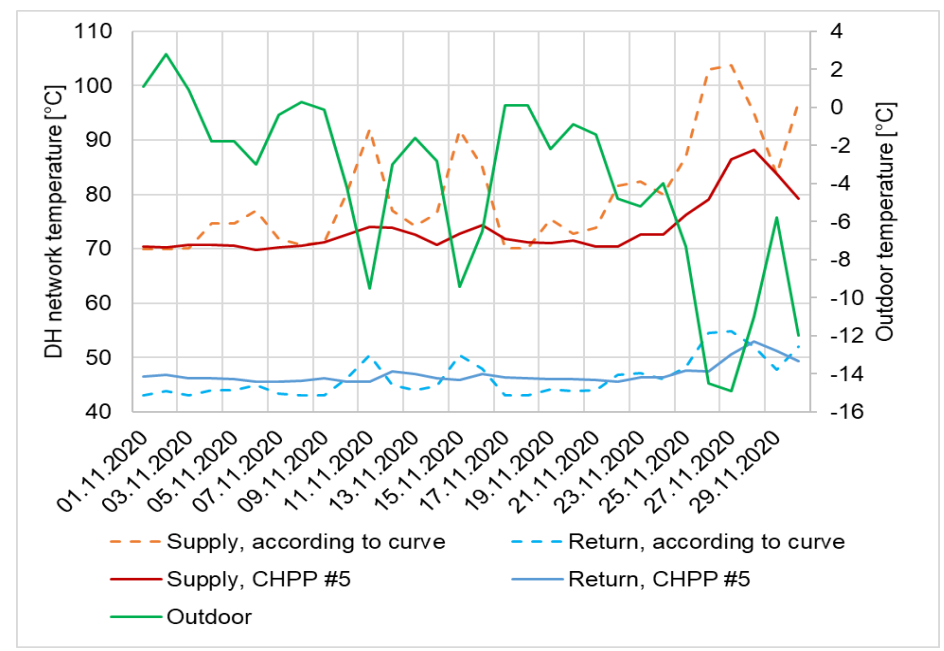
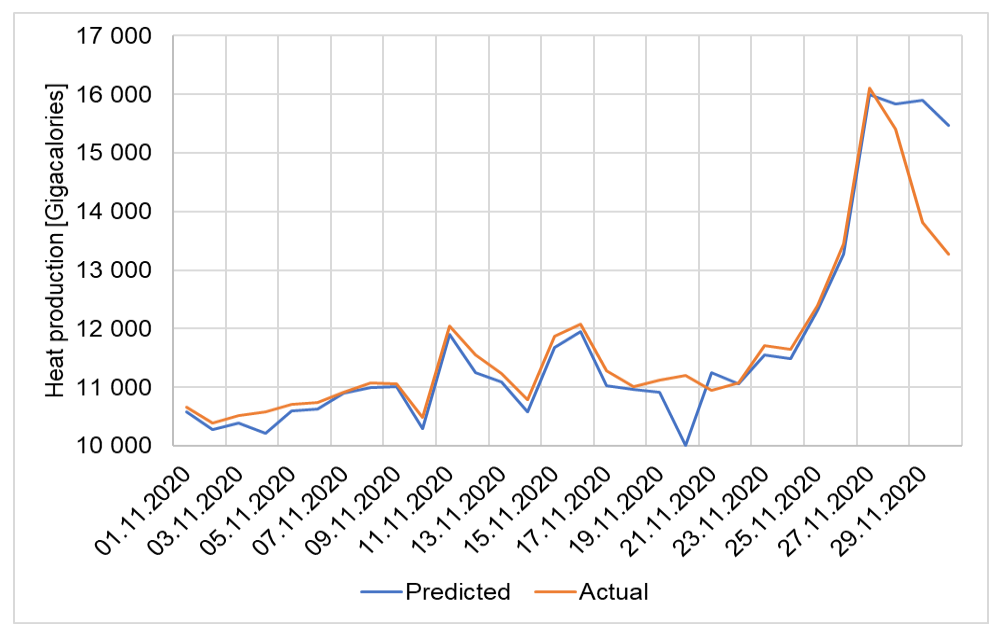
The research sets out to ensure a DH network durability, energy efficiency and reduction of fossil CO2 emissions by means of supply temperature decrease.

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Results



Heat production gathered by means of billing procedures and with a control box in area of equipped with such an installation buildings

Comparison of a quite noisy manually set temperature and a test one

In this paper we propose a new schedule for a so called ‘automated’ substation and first results of its introduction. Consumers are in favour of a pilot implementation as well due to performance enhancement of room heating system.

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Conclusions

From the research that has been undertaken, it is possible to conclude that the designed approach guarantees less complicated operation and maintenance. The study and understanding of weather-temperature profiles cannot be overestimated regardless of the study being complete due to large savings. The proposed method can be readily used in practice, albeit the complete analysis involves some labor, unless simplifying approximations can suffice. In our future research we intend to concentrate on higher resolution data, for instance hourly profiles of service water and radiators circuit temperatures.

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Thank you for your attention!

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