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Energy consumption in buildings after decentralization of district heating

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Introduction

- *rationalization of energy consumption in residential sector*
 - heat source,
 - heating system,
 - regulation of heating and hot water preparation system.

but ...

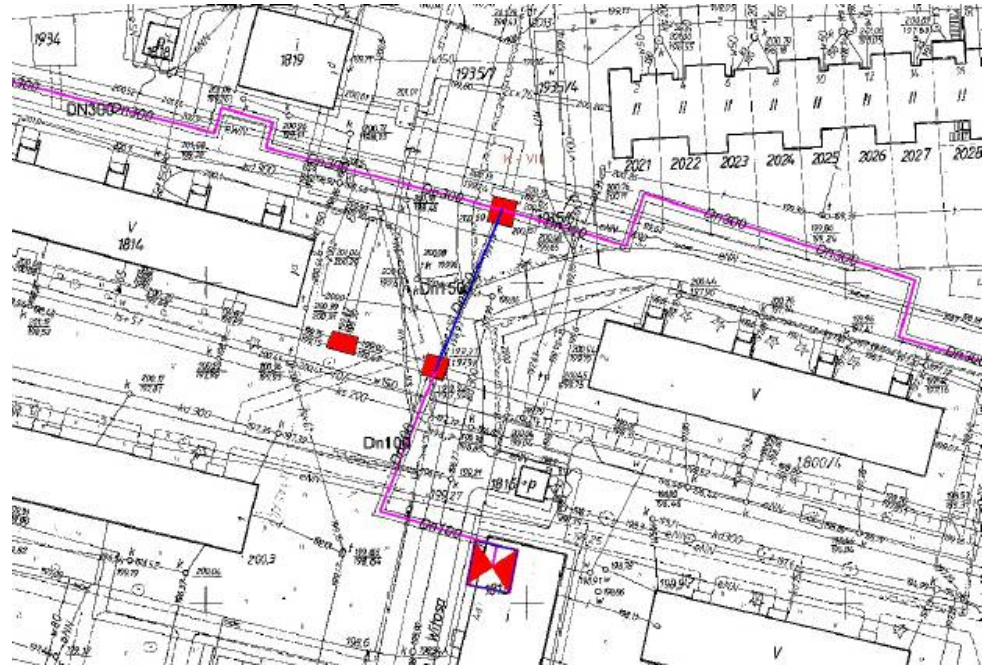


Fig. 1. Scheme of district heating system



Materials and Methods

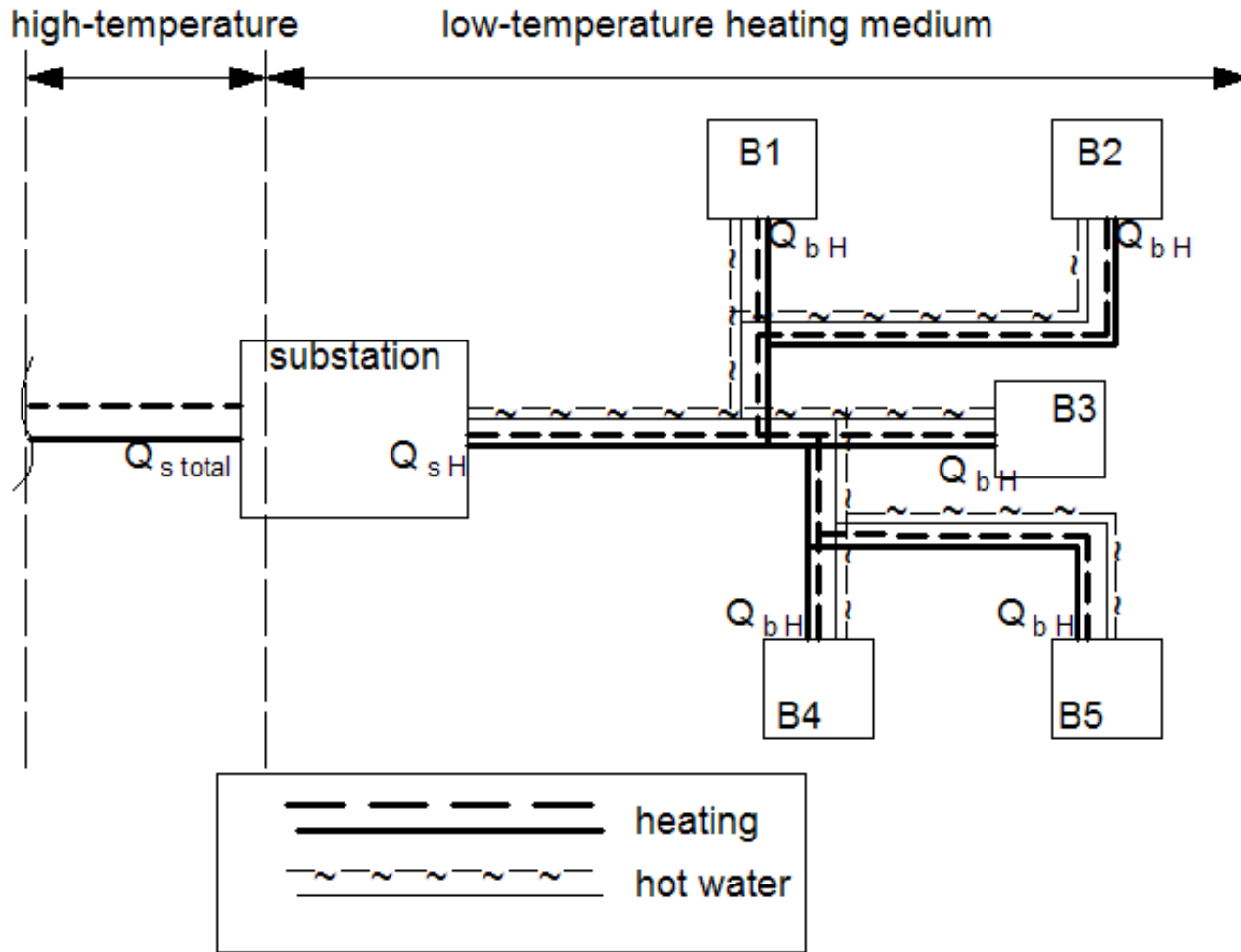


Fig. 2. Block schema of analyzed system before modernization



Materials and Methods

Heat required for hot water preparation in the substation

$$Q_{s W} = Q_{s total} - Q_{s H} \quad [GJ]$$

where:

$Q_{s total}$ - total amount of heat delivered to the substation, [GJ],

$Q_{s H}$ - amount of heat for heating purposes measured in the substation, [GJ].



Materials and Methods

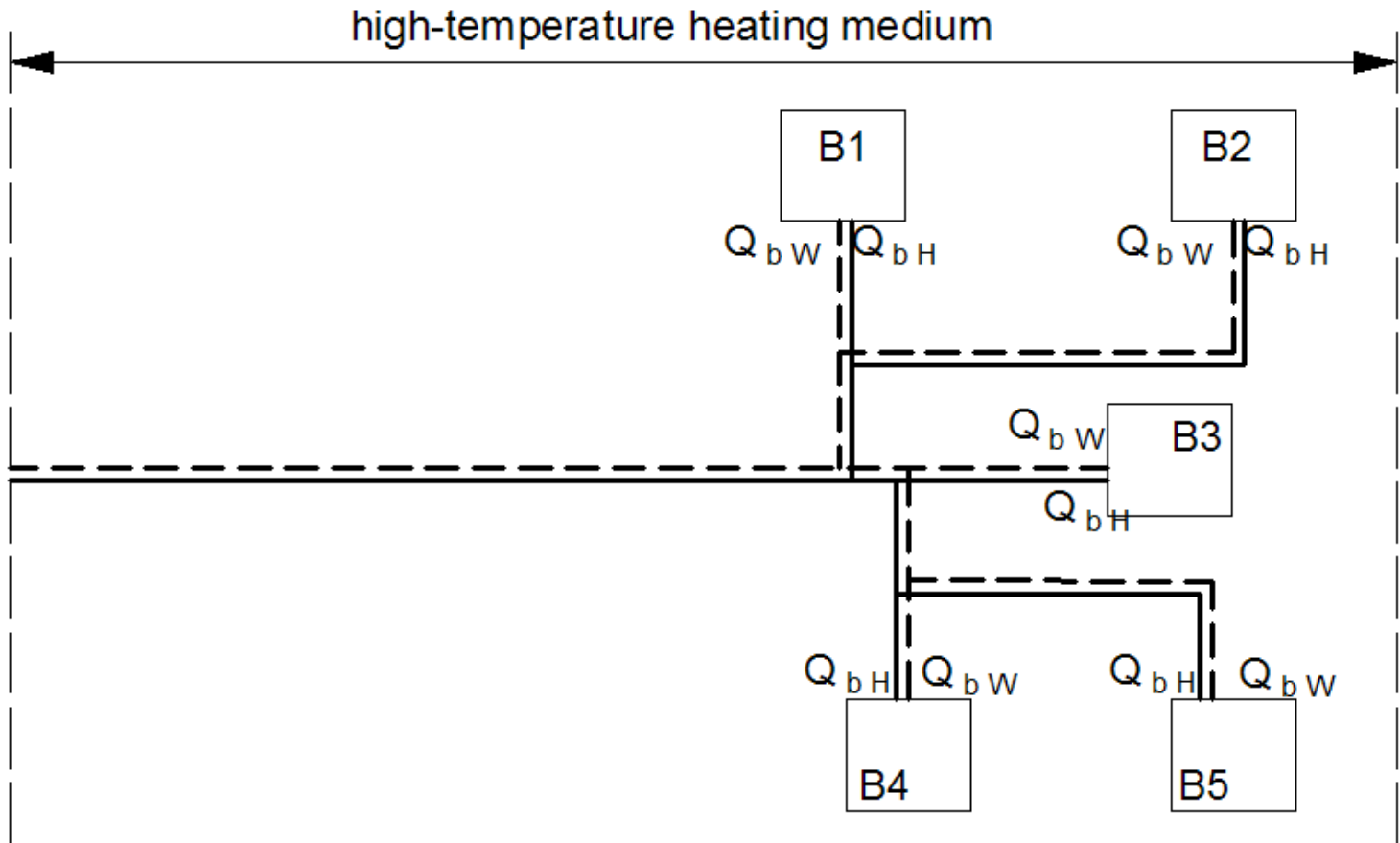


Fig. 3. Block schema of analyzed system after modernization



Results

Heat losses - 22% of Q_{sH}

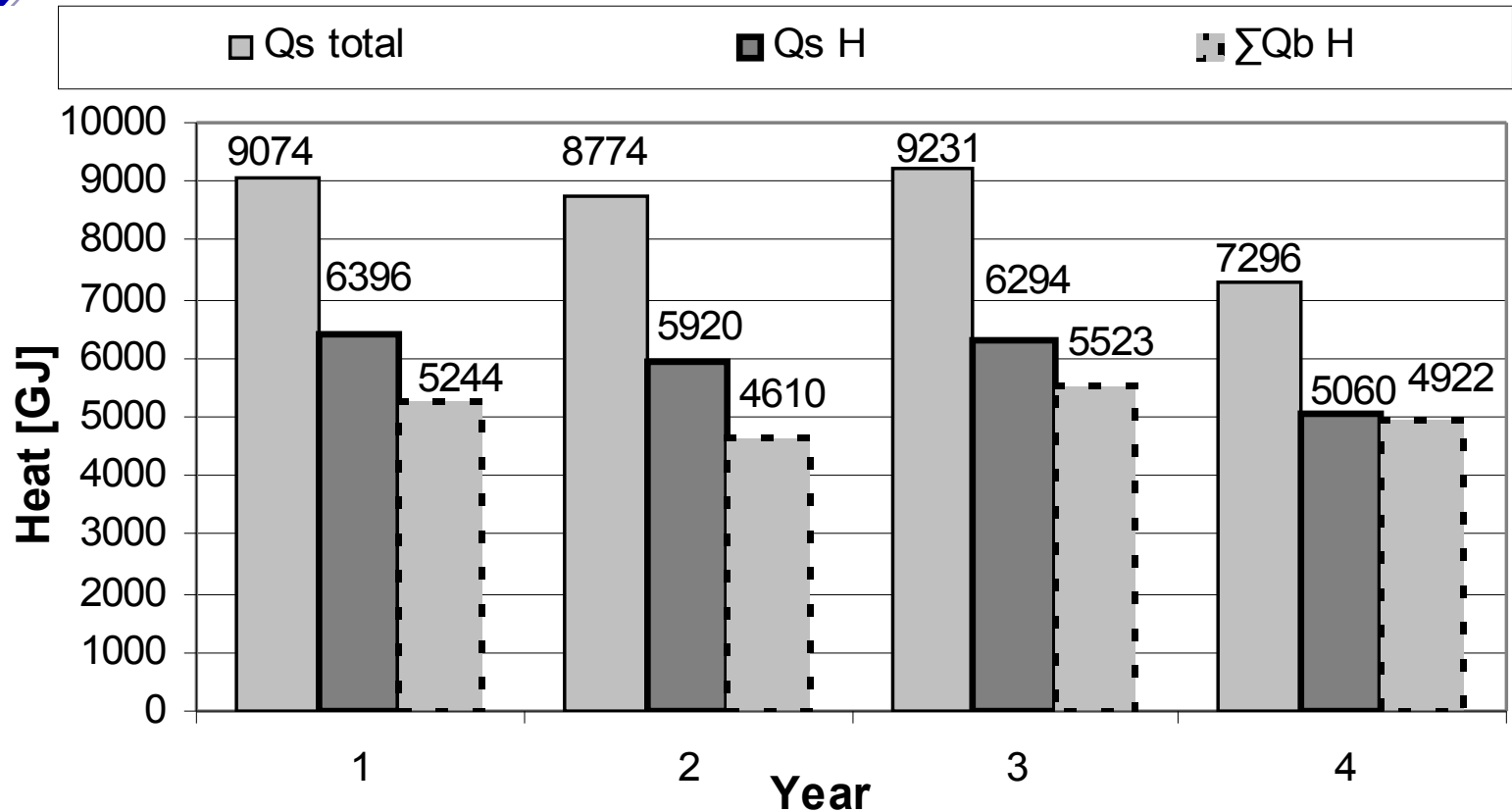


Fig. 4. The total heat consumption (Q_s total) and for heating ($Q_s H$) in the substation and the sum of the heat consumption delivered to individual buildings for heating ($\sum Q_b H$) within a period before the modernization



Results

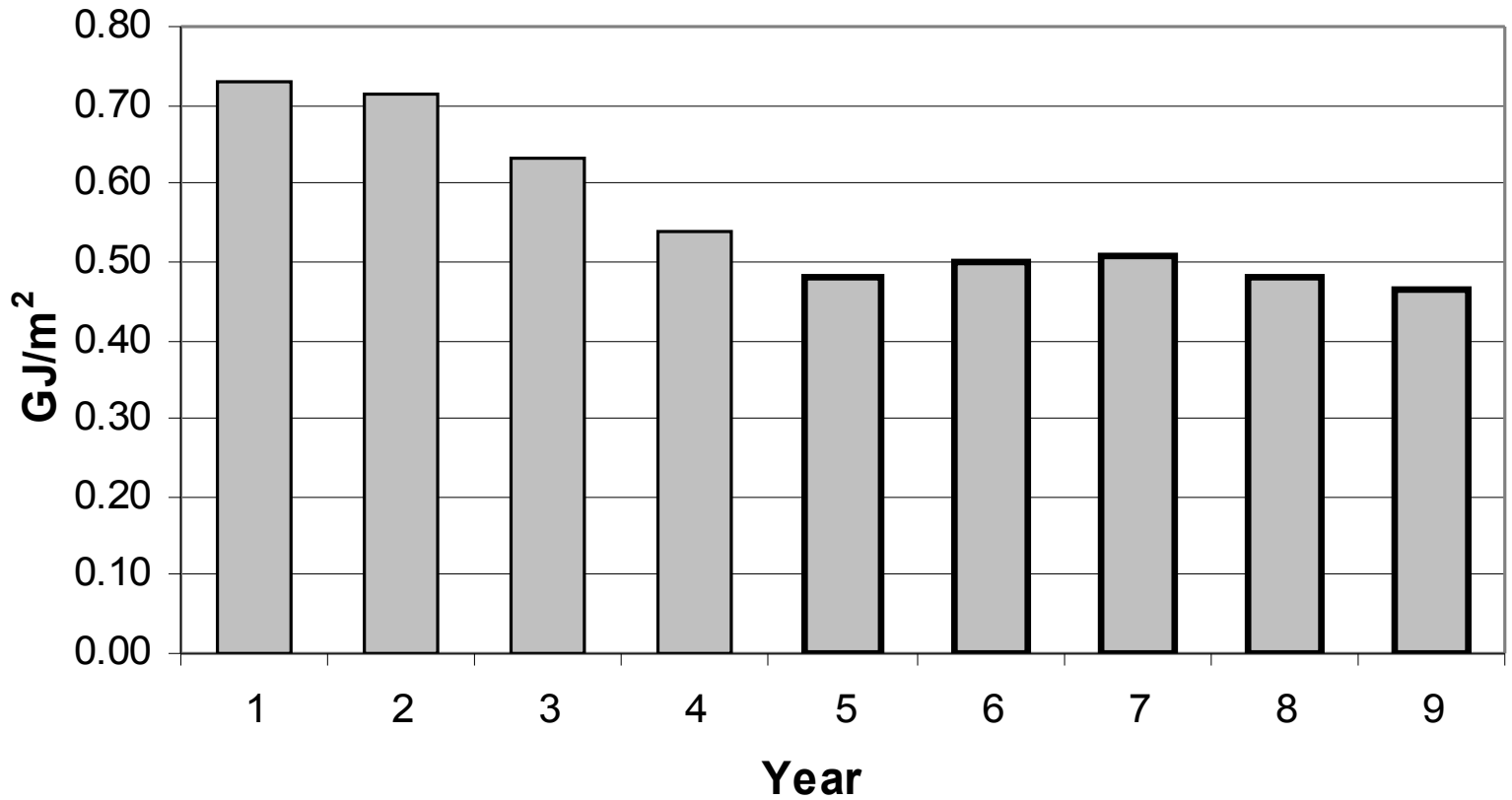


Fig. 5. The heat delivered to the substation (years 1-4) and to individual buildings (years 5-9) for heating purposes.



Results

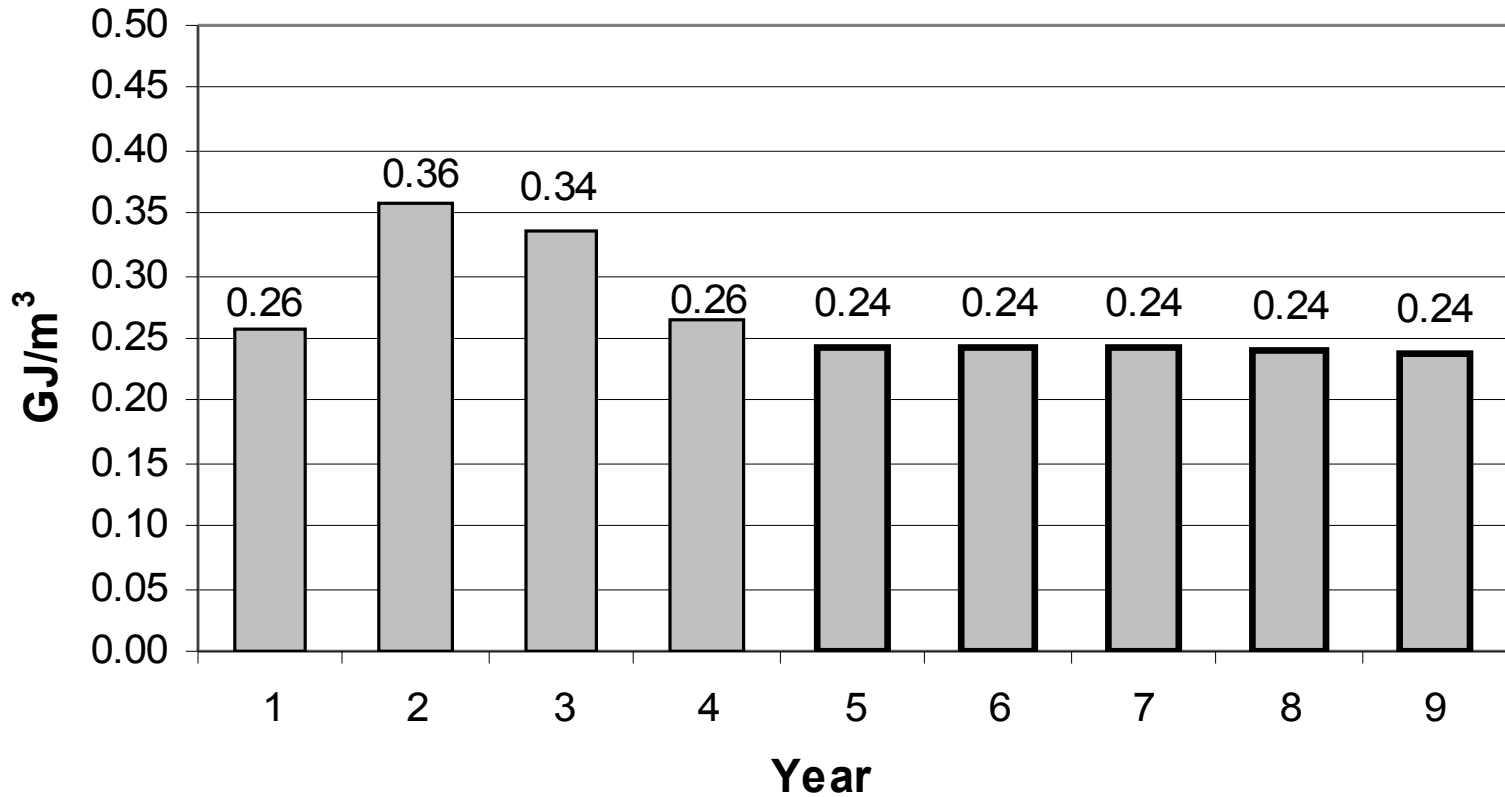


Fig. 6. Heat consumed for the preparation of a cubic meter of hot water for the system before (years 1-4) and after (years 5-9) the liquidation of the substation



Results

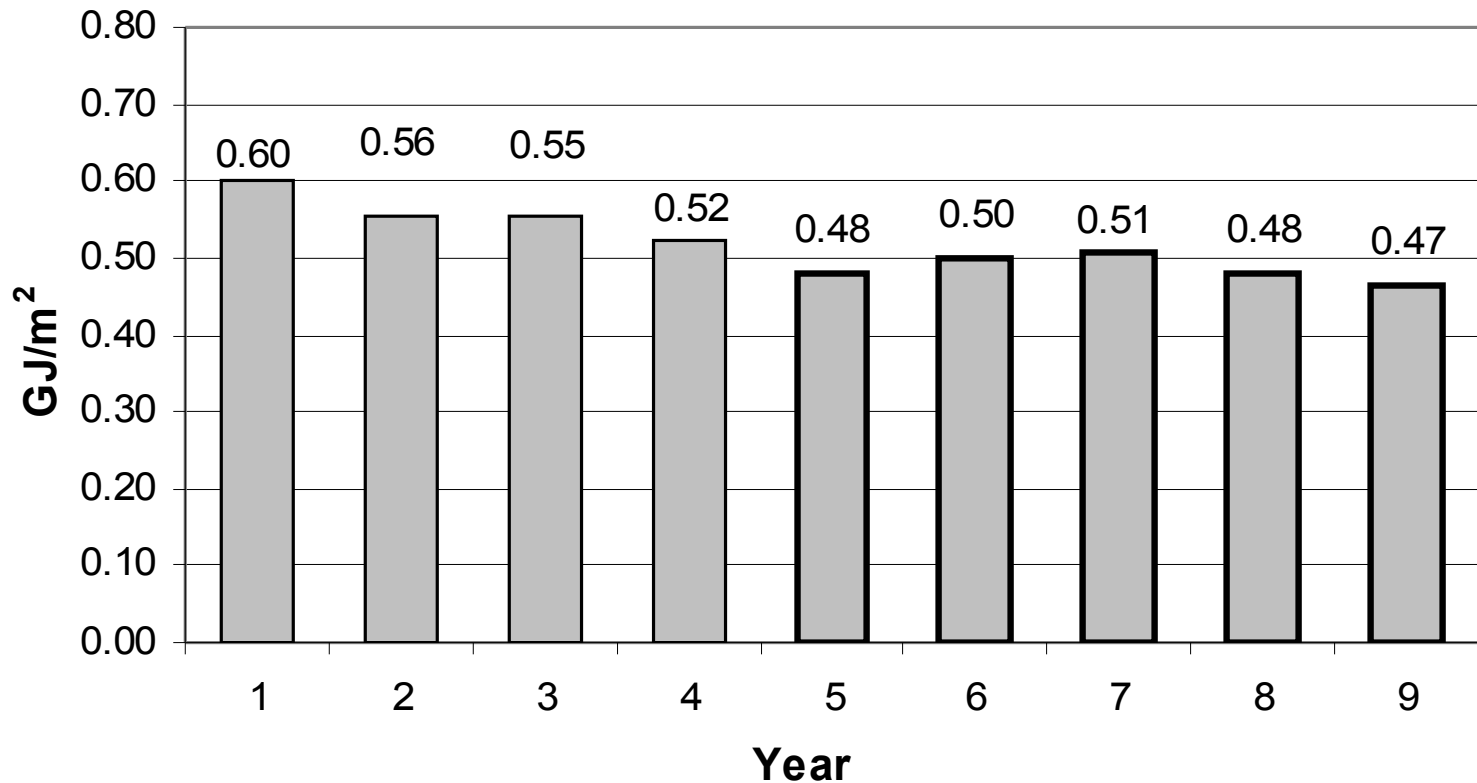


Fig. 7. The individual consumption of heat delivered to buildings for heating ($Q_{b,H}$) for the period before (years 1-4) and after (years 5-9) the liquidation of the substation.



Conclusions

- The manner of heat supplied to a building for heating and hot water preparation has got a significant impact on the energy efficiency of an energy system.
- The supply of the group of buildings from the district heating network by use of substation in which the parameters of heating medium for heating of buildings are lowered and central preparation of hot water is realized, is not economic.
- The decrease in the amount of heat required for heating of buildings after the modernization was noticed, what was connected with the use of the central weather regulation of the central heating installation for each building separately (not for the group of buildings).



Thank you for attention