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BOOK OF ABSTRACTS

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Towards More Sustainable District Heating Systems in Serbia - Options and Obstacles

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Abstract

The major share of energy consumed in the building environment is dedicated to meeting heating needs, which makes this sector one of the key players in the transformation of the whole energy system. The accurate approach to the transition process assumes acting on both the demand and supply sides. Lately, the supply side has received more attention, as its transformation is one of the key steps of the energy transition process. District heating systems are recognized as substantial contributors to decarbonization. Some locally available renewables, such as municipal solid waste, waste heat from sewage systems, or industrial waste heat, can be utilized for heat generation only through centralized systems or otherwise will be wasted. Currently, heat production in district heating systems in Serbia is based exclusively on combustion processes, with a dominant share of imported natural gas. Although technologies for the utilization of renewable and alternative energy sources are well known and mature, their utilization in district heating systems in Serbia is still negligible (approximately 2% of wooden biomass). To identify and facilitate the transition process, a survey among representatives of Serbian district heating companies was conducted. It was aimed to map and gain insight, from the point of producers, on the perception of obstacles for each renewable energy source that could be introduced into the energy mix. Results indicate that the perception of obstacles for RES introduction is influenced by the size of the company, i.e. the type of the settlement, and that different obstacles have an impact on the application of different RES. Larger district heating companies pointed out the need for additional space as a primary obstacle, which cannot be easily provided in densely populated areas, whereas smaller to medium-sized companies prioritize the lack of knowledge and information. These results are useful for the development of effective policy instruments in close collaboration with stakeholders considering the specificities of utilization of each renewable energy source as well specifics of district heating systems. Special attention was devoted to distinguishing obstacles among the different available renewable energy sources. The survey results reveal that all identified obstacles significantly affect the decision-making and adoption of renewable energy sources, highlighting their collective importance.

Towards more sustainable district heating systems in Serbia - Options and obstacles

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Introduction

Heating sector-key contributor in achieving decarbonisation goals.

District heating systems have an important role in transition of national energy systems.

Heat can be produced by utilizing any Renewable Energy Source.

Some of localy available energy sources can be utilized only through district heating systems.

Contribution to reduction of local air pollution.

Introduction

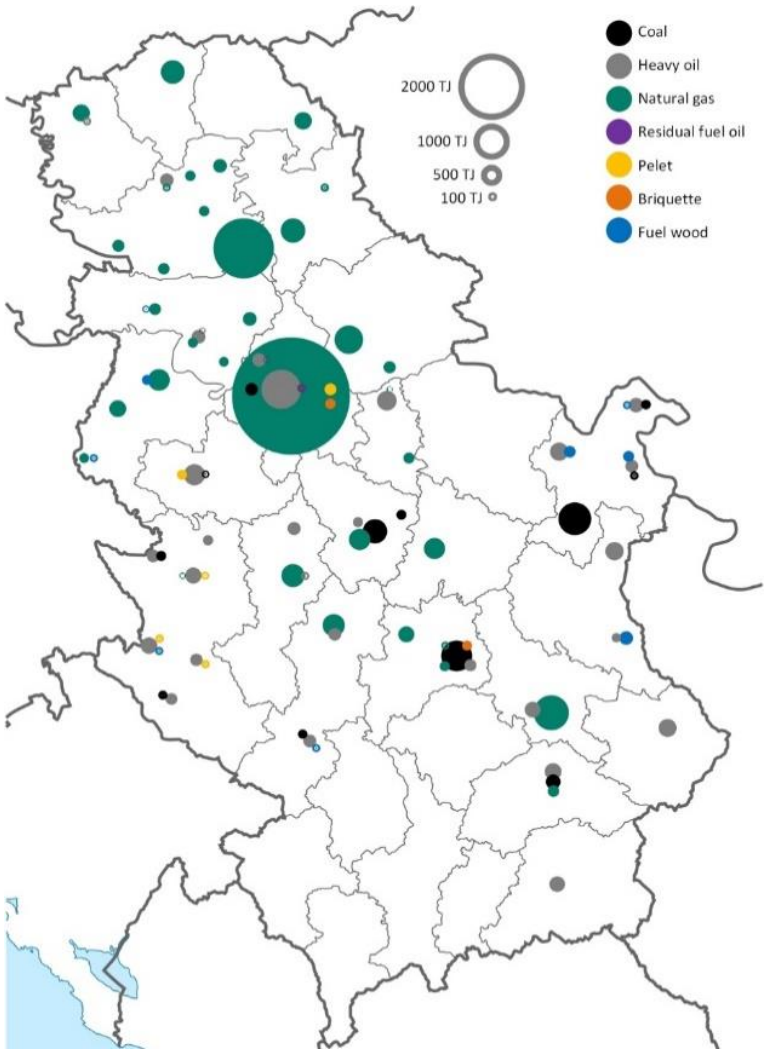
Current practice shows that heat in DHS is produced mainly from fossil fuels

Main obstacles commonly identified in the transition of district heating systems are:

- Financial obstacles (investments, profitability, payback period)
- Administrative obstacles (difficulties in cooperation, contracting, permitting hurdles),
- Lack of knowledge and experience
- Supply-demand mismatch

Materials and Methods- District Heating Systems in Serbia

- 57 District heating systems
- 43,04% of households in the cities and 25,02% of the total number of households in the country are supplied from DHSs.
- The total nominal power of district heating plants is 6,673 MW. The largest DHS in the country with a nominal thermal power of 2,856 MW is located in Belgrade.



Materials and Methods- District Heating Systems in Serbia

- Heat production in district heating systems in Serbia is completely based on combustion processes.

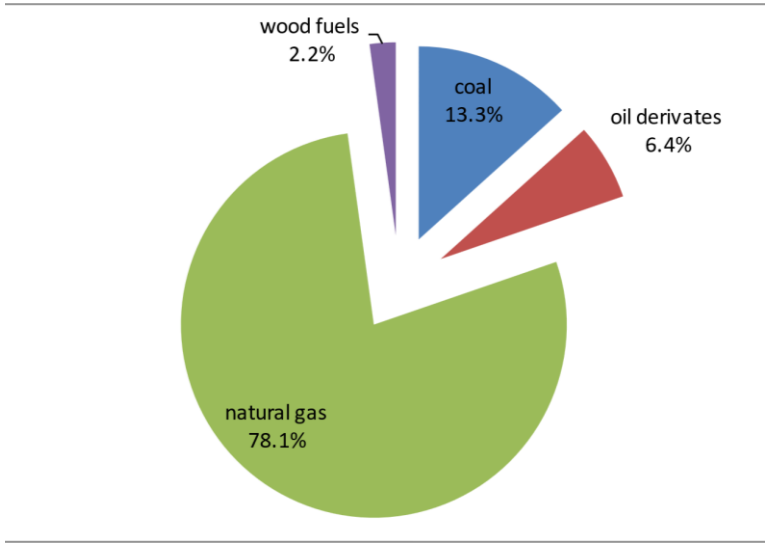


Figure: Energy mix of DHSs in Serbia

Materials and Methods- Survey

- The survey questionnaire was developed following a comprehensive review of international practices.
- The target population of the survey consists of representatives from district heating companies.
- The questionnaire covers various aspects, including:

1. Heating production capacity, average consumption (kWh/m^2/annum).
2. Opinion on the potential for integrating RES into existing heating systems.
3. Identification of main obstacles hindering the adoption of RES.
4. Assessment of different RES technologies on a scale of 1-5, indicating their perceived effectiveness and feasibility regarding the recognized obstacles.

Materials and Methods-Survey

Obstacles
Poor isolation/high consumption - O_1
Lack of hot water supply infrastructure - O_2
Inadequate operational regime - O_3
Lack of experience for RES utilisation - O_4
Inertia in DHS - O_5
Resistance to changes - O_6
Lack of professionals - O_7
Financial viability - O_8
Legal framework - O_9
Price of heat energy - O_{10}
Emissions of pollutants - O_{11}
Energy planning at local level - O_{12}
Energy planning at state level - O_{13}

Results and discussion

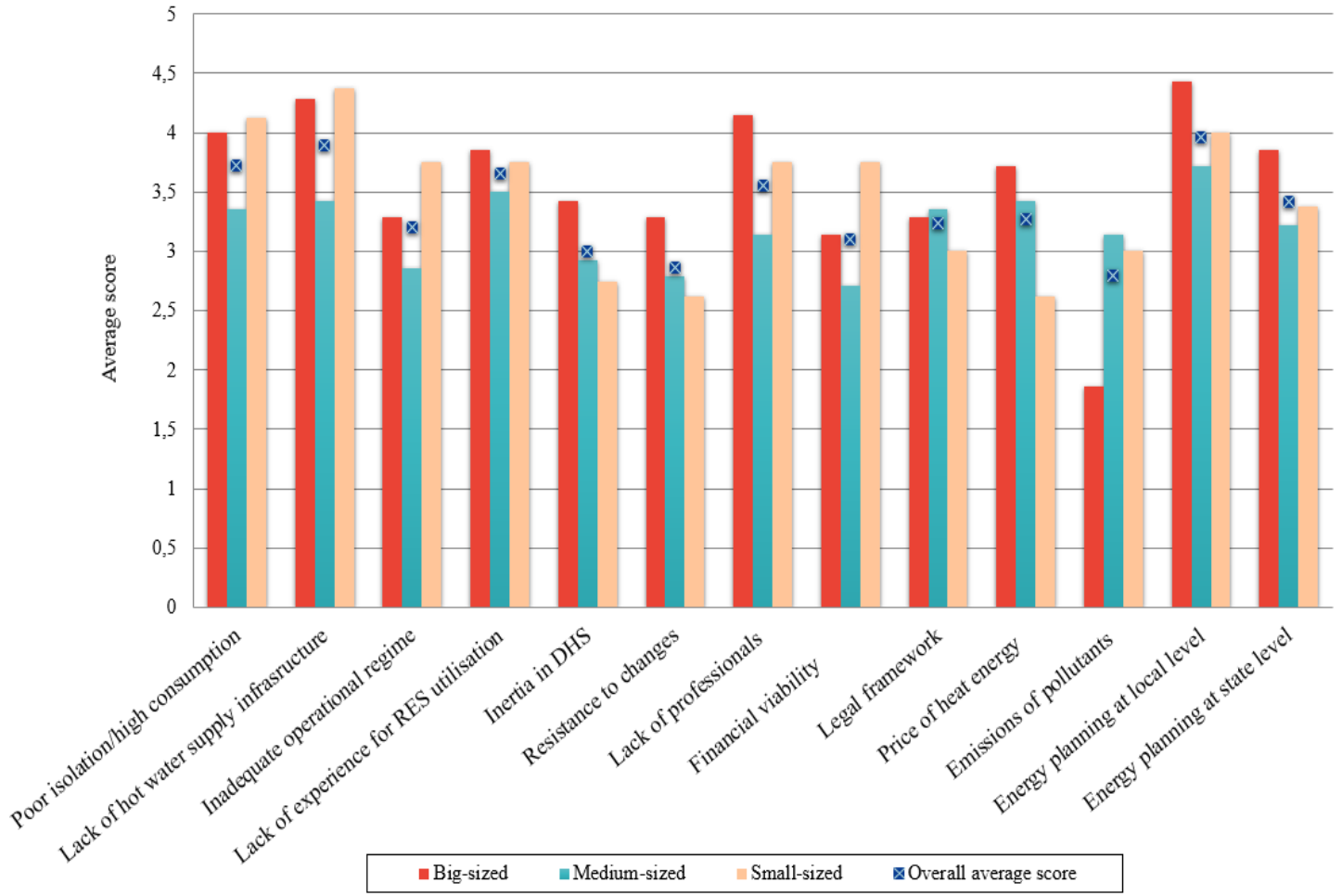


Figure: Evaluation of obstacles to the utilization of RES in the existing district heating systems in Serbia

Results and discussion

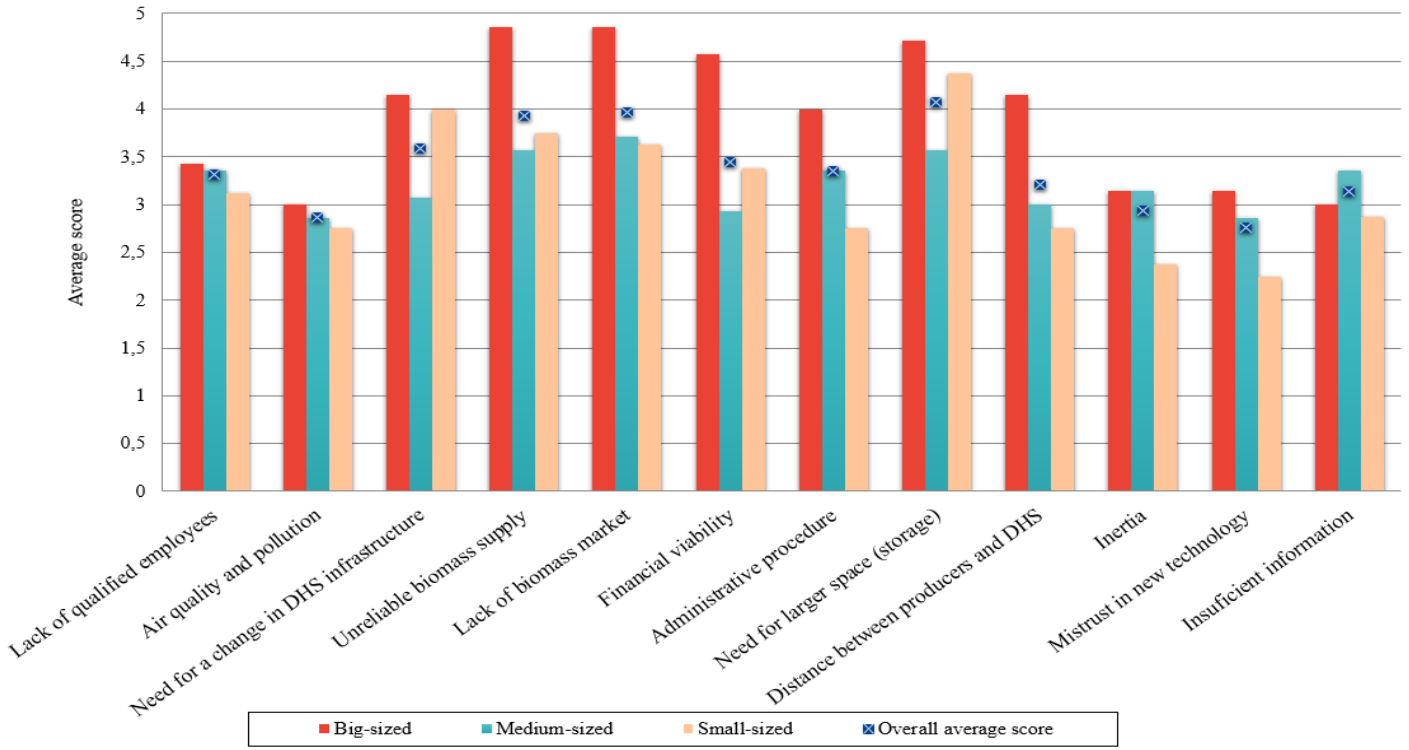


Figure: Evaluation of obstacles related to biomass utilisation in existing DHSs

Results and discussion

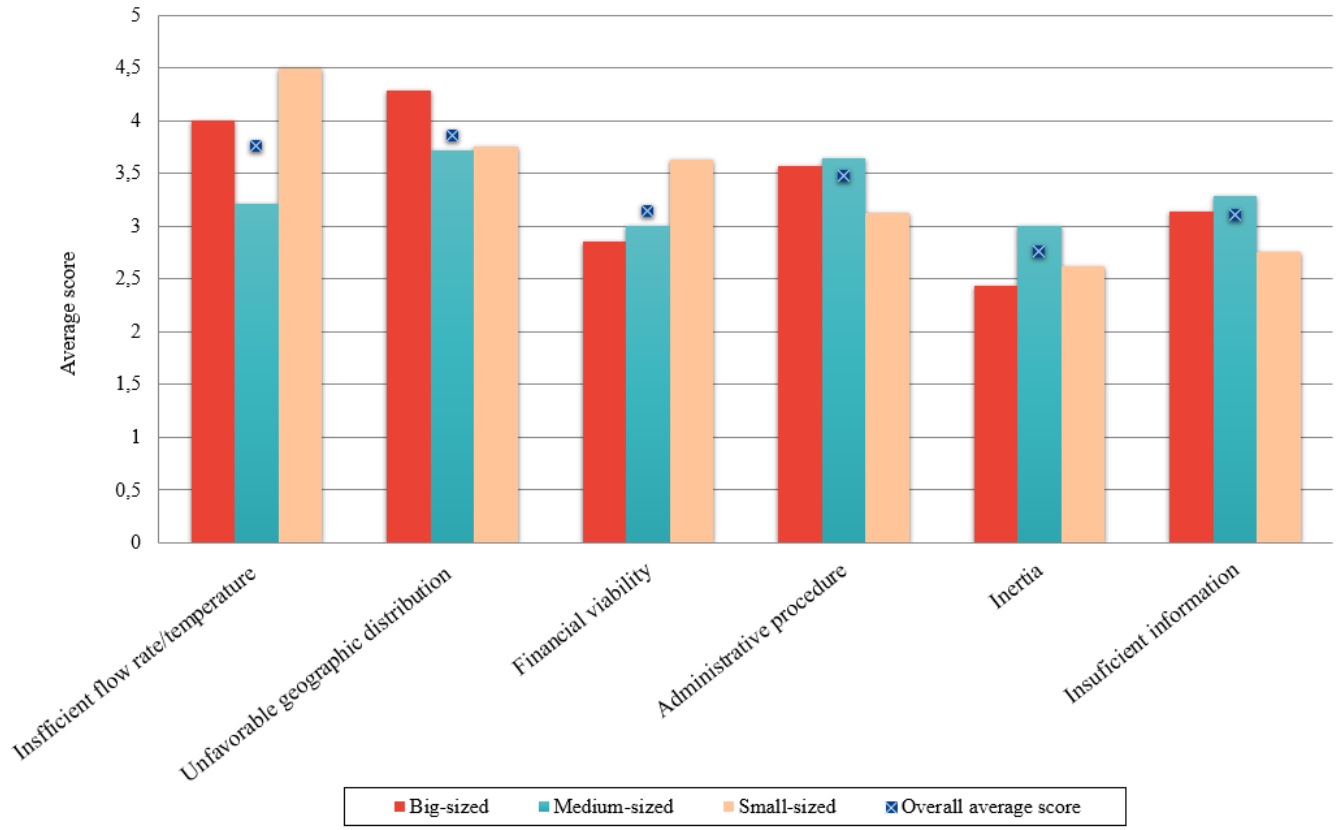


Figure. Evaluation of obstacles related to the utilisation of geothermal energy in existing DHSs

Results and dicussion

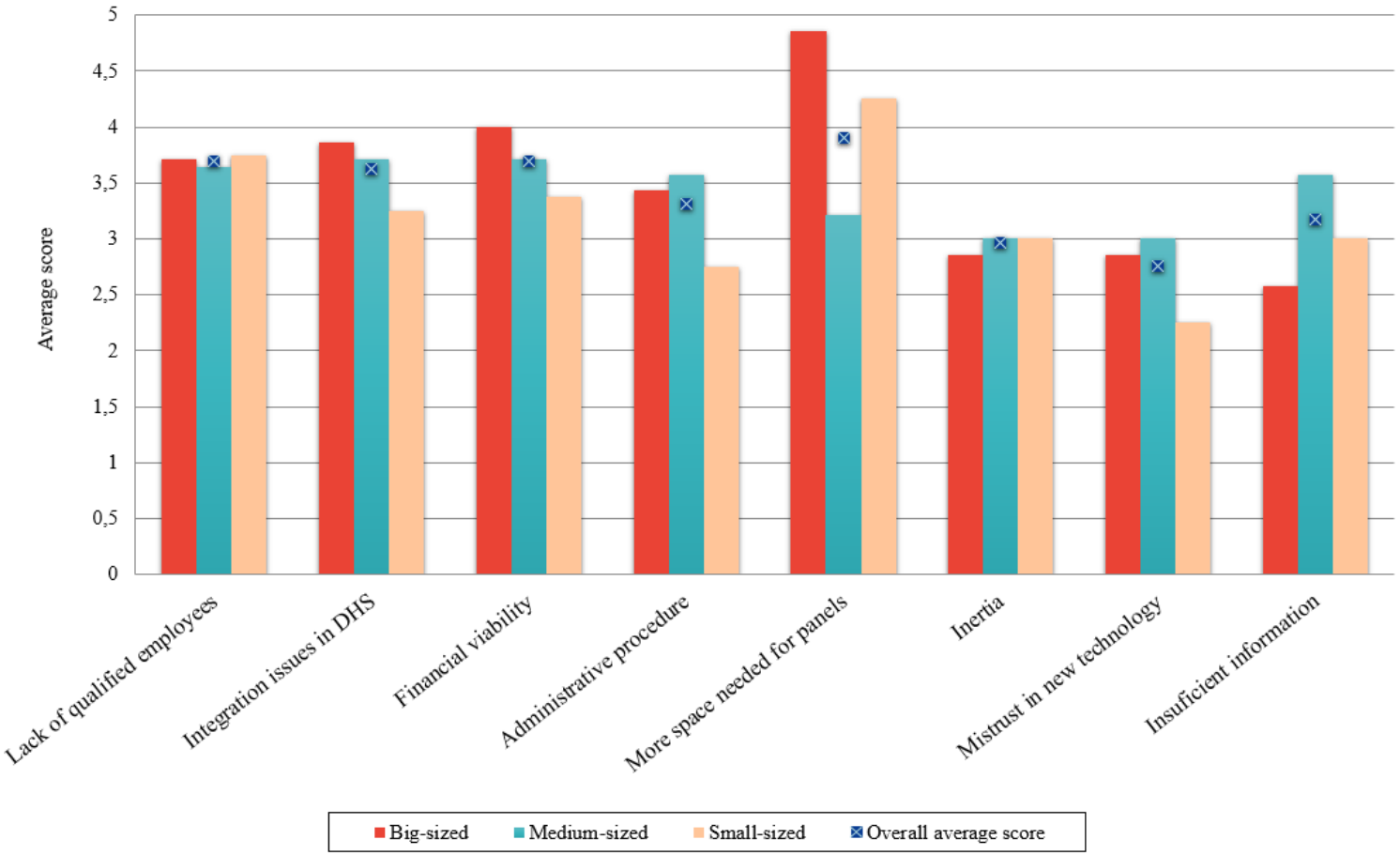


Figure: Evaluation of obstacles related to the utilisation of solar thermal energy in existing DHSs

Results and dicussion

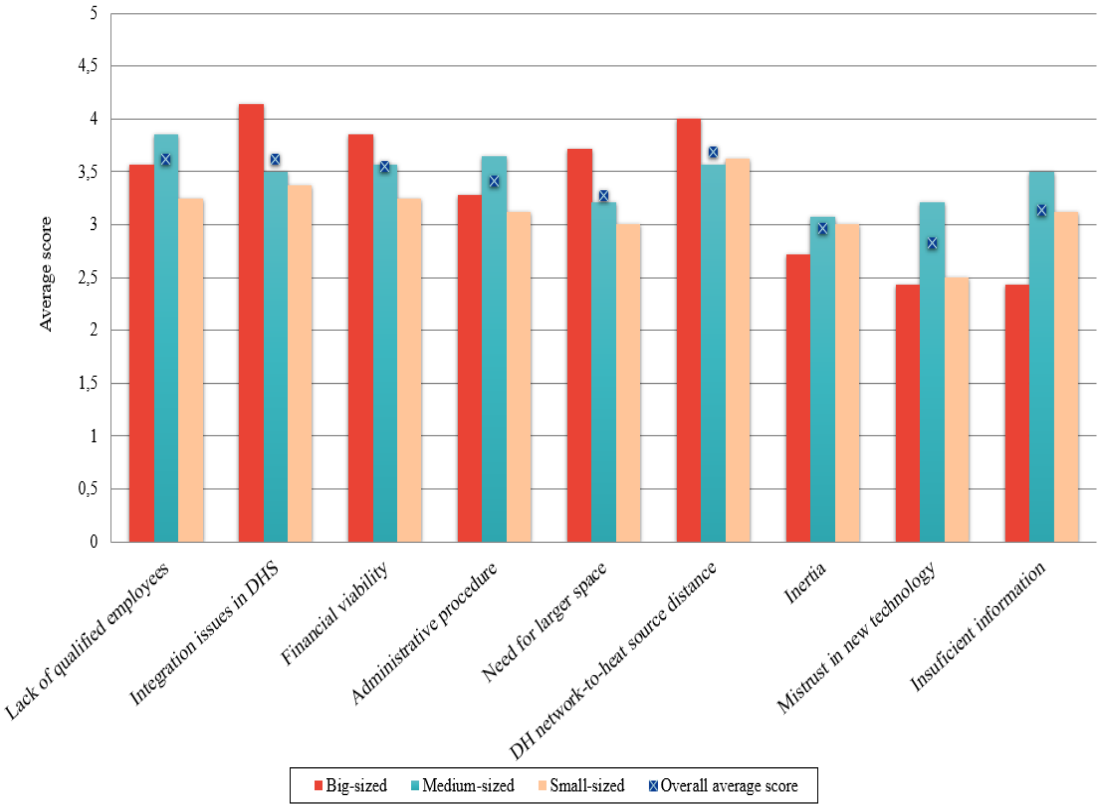


Figure:. Evaluation of obstacles related to the utilisation of waste heat in existing DHSs

Results and discussion

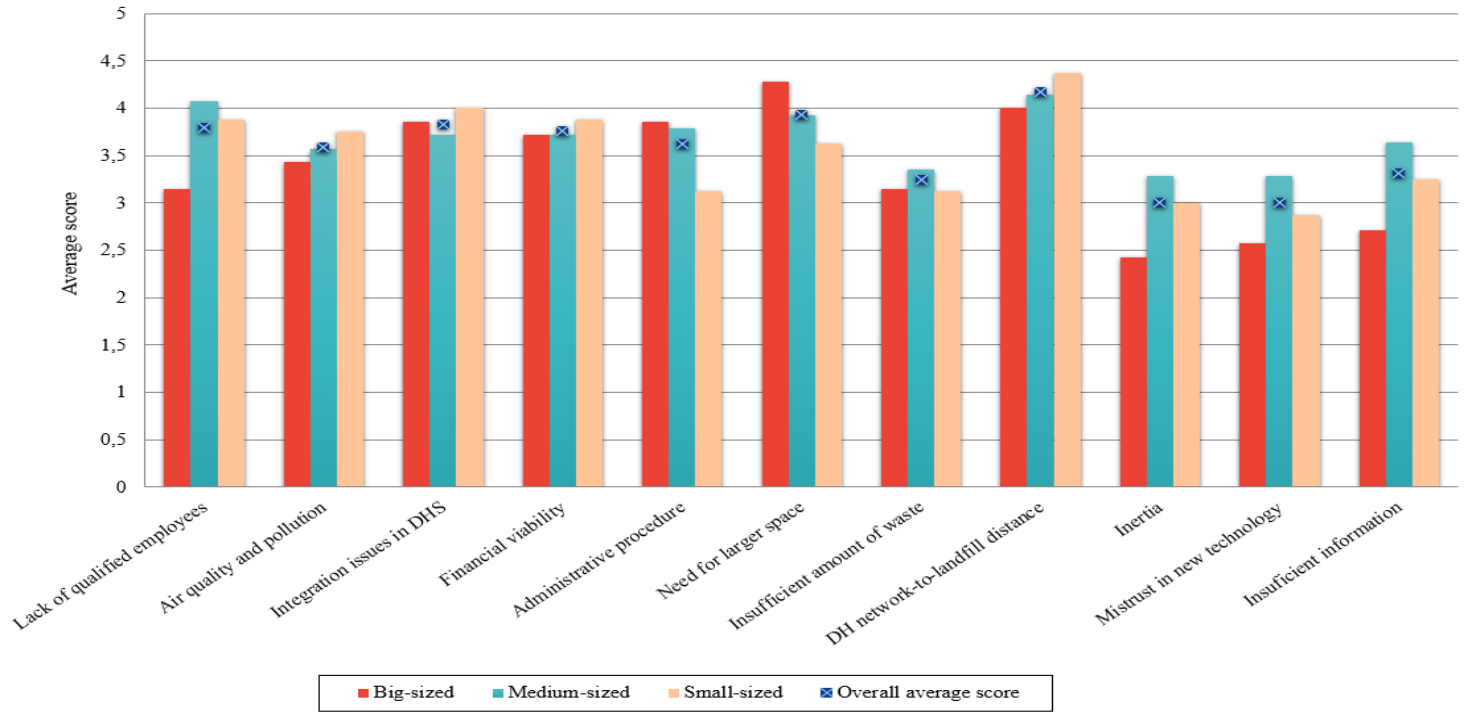


Figure: Assessment of obstacles related to the utilisation of municipal solid waste in existing DHSs

Conclusion

- Results of the survey indicate that all examined obstacles have an influence on the decision-making and implementation of RESs and that none of them can be neglected.
- different-sized heating systems (companies) have different attitudes about specified examined obstacles.
- Large-sized district heating companies identified as one of the main obstacles the need for extra space in high-density areas.
- Small and middle-sized companies identified a lack of knowledge and information.
- Different-sized companies are facing different effects of the same obstacles.
- Some of the identified obstacles cannot be diminished.
- Some obstacles can be removed in close collaboration with local self-governments in joint work on strategic and planning documents .

Thank you for your attention!

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