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ROLE OF ENERGY MANAGEMENT SYSTEM IN SCHOOLS AND PRIMARY SCHOOLS IN RIGA

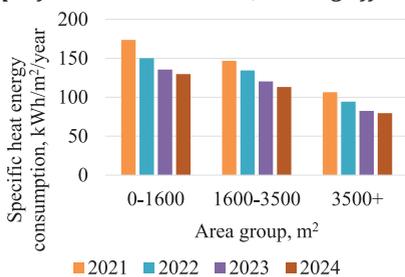
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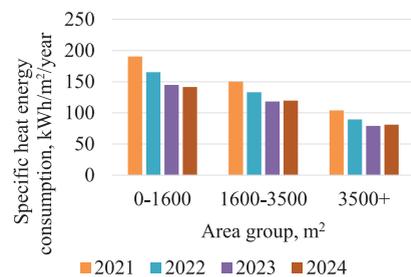
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Abstract – Educational buildings, such as schools and primary schools, are significant energy consumers, and improving their energy efficiency is crucial for reducing operational costs and negative impact on the environment. This study addresses the need to evaluate the effectiveness of Energy Management Systems (EMS) in optimizing heat energy consumption, focusing on the specific heat energy use (kWh/m^2) and the role of energy managers in sustaining long-term efficiency. The objective of this study is to assess how the implementation of an EMS impacts heating energy consumption and to identify additional measures needed to sustain improvements. The methodology is based on the analysis of actual heating energy consumption data obtained from utility bills collected from educational institutions. Key approaches include climate normalization of data, the process of normalizing energy consumption data to account for changes in weather conditions, allowing for accurate comparisons across time periods, metric estimation, and statistical analysis to assess trends in energy use. Interviews with employees responsible for building usage provide a better understanding of the actual operational activities that impact energy efficiency. Results show that EMS implementation significantly reduces specific heat energy consumption during the first two years, achieving savings of up to 13%. These reductions are attributed to the establishment of systematic monitoring, real-time energy tracking, and improved operational efficiency driven by energy managers. However, starting from the third year, the effectiveness of EMS alone begins to decline, indicating that monitoring and reporting efforts, while essential, are not sufficient to sustain energy efficiency improvements in the long term. The results highlight that the benefits of EMS decrease over time, showing the need for combined strategies to maintain energy efficiency in schools and primary schools. Future work should prioritize improving monitoring tools, education of responsible employees, and applying affordable upgrades to buildings.

Keywords – *Building energy optimization; educational buildings; energy monitoring; energy performance indicators; heating efficiency*



(a)



(b)

Specific heat energy consumption indicators in Riga schools and primary schools after the implementation of the EMS (a) Schools, (b) primary schools