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IMPACT OF TECHNICAL AND BEHAVIORAL MEASURES ON ENERGY SAVINGS IN SCHOOL BUILDINGS

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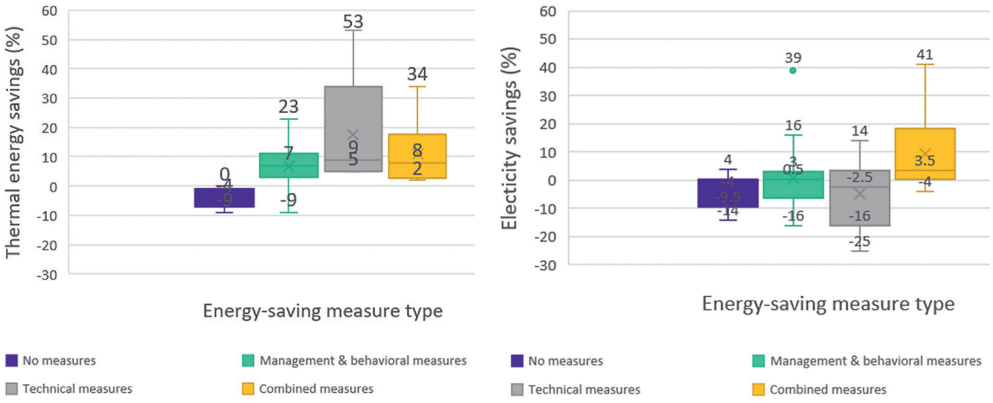
Abstract – Improving energy efficiency is a strategic priority within the framework of the European Green Deal and the Energy Efficiency Directive. In the public building stock, educational institutions account for a significant share of energy consumption. Improving the energy efficiency of school buildings simultaneously contributes to achieving climate goals, reduces operating costs for municipalities, and promotes the development of sustainable thinking in society by involving students as future decision-makers. Therefore, assessing the actual impact of different energy saving approaches is essential for evidence-based investment planning and effective implementation of climate policy. The study analyzed the energy savings of school buildings in three Latvian municipalities using a structured dataset on building characteristics, energy consumption and implemented energy saving measures during renovation, construction, and operation. The analysis revealed significant differences in the energy efficiency of buildings – the specific heat energy consumption of schools ranged from 42 to 181 kWh/m^2, indicating a significant untapped energy saving potential. The results show that thermal energy savings are mainly provided by capital-intensive technical measures, but management and user behavior measures can also have a significant effect, reaching savings of up to 23 %. The most stable results in terms of electricity consumption were achieved in buildings where technical solutions were combined with behavioral change and energy management approaches, with combined strategies providing the most balanced performance. The study highlights that targeted data analysis allows municipalities to identify priority buildings, select the most cost-effective measures, and accelerate emission reductions in the public sector. For municipalities with limited budgets, low-cost management and action measures can serve as an immediate first step, while preparing the ground for long-term renovation investments and facilitating the move towards climate neutrality.

Keywords – Educational buildings; energy efficiency; energy consumption; energy management



Methodological framework for biosurfactant sustainability evaluation