

**MEASURES TO ACHIEVE THE ENERGY EFFICIENCY  
IMPROVEMENT TARGETS IN THE MULTI-APARTMENT  
RESIDENTIAL SECTOR, THROUGH CO-FINANCING BY  
THE EUROPEAN UNION**

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In Latvia, the main volume of multi-apartment buildings up to 75 % is made up of standard residential houses built in the period from 1946 to 1993.

- The average standardized heat consumption for heating of these apartment buildings is 166 KWh/m<sup>2</sup> per year.
- The results of multi-apartment building renovation projects implemented in European countries and Latvia demonstrate that by performing complex insulation it is possible to reduce heat energy consumption for heating by 40–60 % of the initial consumption

# The topicality of the research is determined by several aspects:

- 1) It is important for the owners of multi-apartment residential buildings to reduce the costs of heat energy. There is a human natural tendency to live rationally and save heat energy and other resources, if one has to pay for them; thus, it leads to economical use of energy.
- 2) In the period from 1955 to 1992, reinforced concrete structures were widely used in construction. The construction of buildings of this period is characterised by high specific energy consumption and low heat resistance of building envelopes.
- 3) Multi-apartment residential buildings constructed in the 50s and 60s are approaching the end of the normative service life; depreciation of engineering services of buildings is 70–100 %.
- 4) During the European Union funds planning period, apartment owners in multi-apartment buildings have the opportunity to receive co-financing for the implementation of energy efficiency improvement measures.

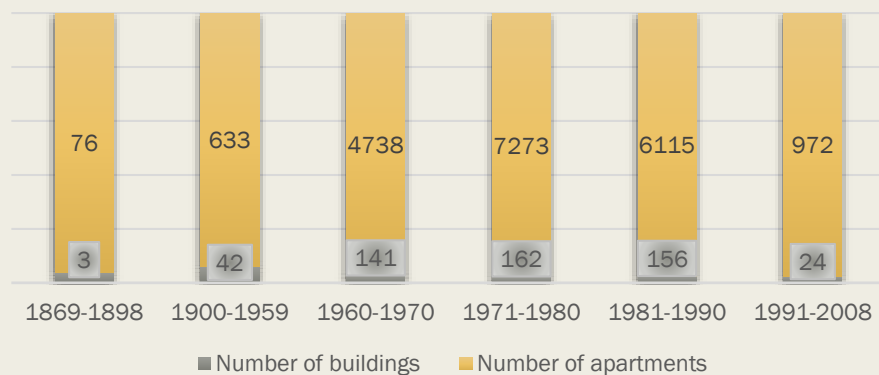
- The goal of the research is to study the implementation of energy efficiency measures in multi-apartment residential buildings and the achieved indicators using the co-financing of the European Union Structural Funds.
- To achieve the goal, the following objectives are set: 1) to study scientific articles on the chosen topic; 2) to find out the main achievable indicators in the implementation of the programme; 3) to find out the tools to make sure of the quality of construction work.
- The subject of the research is energy efficiency measures for multi-apartment residential buildings, and the object of the research – multi-apartment residential buildings.

The average heat consumption for heating of multi-apartment residential buildings submitted to the DME programme is 155 kWh/m<sup>2</sup>

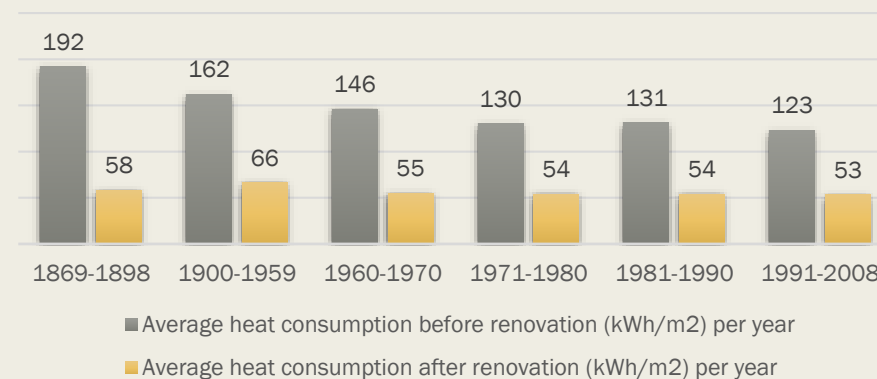
The number of multi-apartment residential buildings and households (apartments) in the DME programme until 12 July 2020 (created by the authors using ALTUM information).

Summary of current and **planned** average heat consumption per year of multi-apartment residential buildings before and after renovation of buildings (created by the authors using ALTUM information).

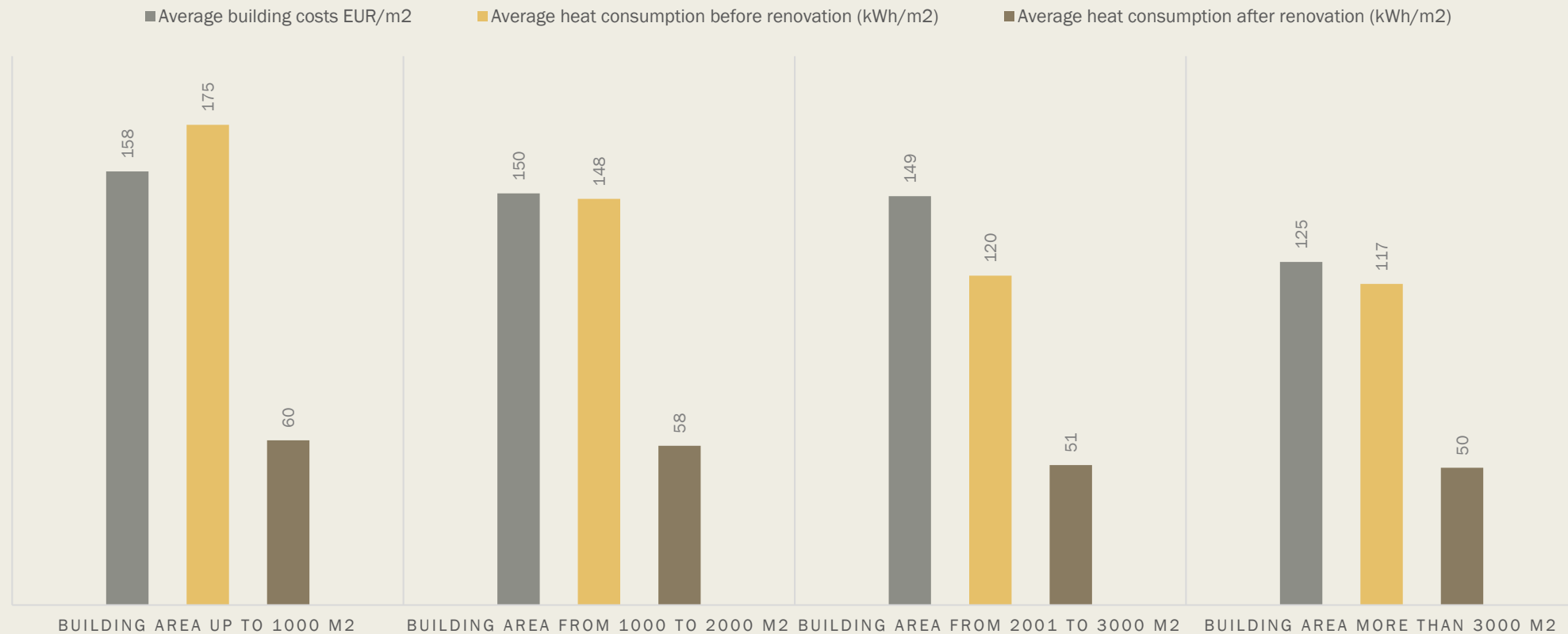
Overview of buildings submitted to the DME programme



Heat consumption of buildings submitted to the DME programme



Latvia has set high targets in the field of energy efficiency. In order to increase the energy efficiency of multi-apartment buildings, a complex approach is required, reaching the specific heat consumption for heating in the amount of 70–90 kWh/m<sup>2</sup>/year after the renovation of buildings (minimum requirements of the DME programme). To achieve such specific heat consumption, the project must achieve a total heat saving of 85 kWh/m<sup>2</sup> on average. In turn, in order to achieve such heat energy savings, the investment costs per m<sup>2</sup> of the total area of the building must be approximately 156 EUR

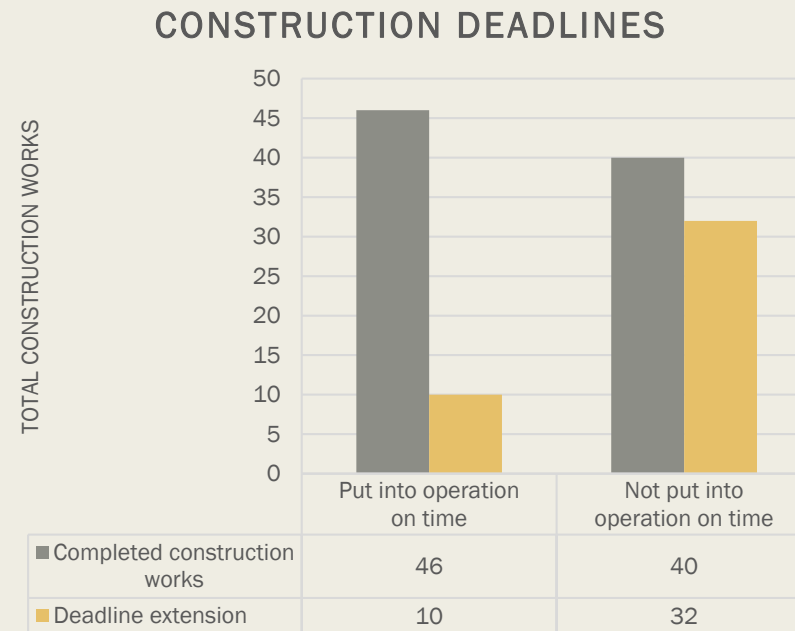


**Costs and heat consumption divided by the total m<sup>2</sup> of the building (distribution by m<sup>2</sup>, up to 1000, from 1000–2000, from 2001 3000, more than 3000)**

Evaluating the construction contracts submitted to the DME programme, it has been established that mostly project implementation is not carried out according to the planned plan – Project Time Schedule.

As soon as it is established that deviations are planned and the construction deadlines are not met, it is necessary to amend the contract, including an agreement on the extension of the term of work. Below statistics is provided (see Fig. 4) on how many of the completed projects were on time, how many were not, or whether there was an extension of deadlines.

- In order to extend the term of work, the builder needs to submit a substantiated application/letter to the customer and a new time schedule, while the customer draws up an affirmation act and an agreement within the contract.
- This information is then submitted to Altum, where the legal aspect and the requirements set out in the procurement regulations are assessed.



**Terms of the construction contract**

# *CONCLUSIONS*

1. To achieve the best possible result, it is necessary to develop the building renovation project in as much detail as possible, as well as to choose thermal insulation and finishing (plastered and ventilated facade) solutions, evaluating economic and technological aspects.
2. In the case of complex renovation of a building, the achieved energy savings, if both design and construction conditions are observed during the project implementation, shall be not less than **50 %** of the previous consumption.
3. The authors conclude that the current costs and the deadline for the preparation of technical documentation are not commensurate with the quality of the developed works. Most multi-apartment buildings are constructed according to standardised designs, so the design should be simpler, but with a comparatively finer approach to technical solutions, where attention should be paid to detail and the total investment costs should be calculated according to the energy saved.





THANKS FOR THE  
ATTENTION!

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