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## The Extensive Analysis of Circumstances Between Heat Consumption of Multi-apartment Buildings and Information Campaigns

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### Abstract

The article presents the analysis of the heat energy consumption for the fifty multi-apartment buildings. The analysis of the heat energy consumption has been made based on the real measured data in the period from year 2011 till the year 2015. For the last five years, building energy efficient topic has become more and more actual. Various governmental institutions, private companies and NGO had realized massive information campaign since 2010. However, the number of fully renovated buildings is very low. For example, in Riga less than 1% of multi-apartment buildings have been renovated since 2010. In the most cases buildings' owners have replaced the old windows implemented local energy efficient measures such as hydraulic balance of heating and hot water systems, sealed entrance doors and windows in staircases etc. Moreover, the inhabitants have improved their habits and are able now to control their heat energy consumption. Information campaign have resulted in better understanding of the heat energy consumption, hot water consumption, ventilation principles etc.

This study shows the dynamics of heat energy consumption during the last five years and analyzes how the minor technical improvements and behavior change have effected buildings' heat energy consumption.

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**Keywords:** Heat consumption; apartment buildings; information campaigns; domestic hot water

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## 1. Introduction

Researches done in 2002 [1] had shown that building sector is about 40% of all the energy consumption in Europe. Renovation of existing building stock is an important issue in Europe since 1970ies. In Eastern European countries such as Latvia, Lithuania and Estonia problem of existing building energy efficiency has arisen since 2000ies. According to Latvia Central Statistical Bureau the average total energy consumption of residential sector in Latvia was 287 kWh/m<sup>2</sup> and for heating was 193 kWh/m<sup>2</sup> taking into account climatic correction. Latvian research done in 2004 [2] have shown that annual specific heat consumptions measured for 100 multi apartment building was 177,70 kWh/m<sup>2</sup> with climatic corrections. Such relatively low heat consumption can be explain than in major cases indoor air temperature is kept at 18°C and by efficient building compactness factor. In addition it should be mentioned that heating season usually starts in mid-October and lasts until mid-April. This causes extremely low thermal comfort and requires additional electrical heaters in September, April and May. Compactness factor for typical soviet building varies from 0.25 to 0.35. Existing studies [3, 4] also highline importance of promotion of energy efficiency measures for existing soviet multi apartment buildings. In order to reduce building energy consumption and to promote retrofitting of multi apartment buildings Latvian governmental organizations, NGO and other public organization have launched active information campaigns. Massive information campaign is a key measure to promote retrofitting of multi apartment buildings and to increase inhabitants' energy awareness. Study [2] have shown that through the active information campaign it is possible to achieve 5-10% reduction of buildings' heat consumption. In addition, also data [5] highline the importance of information campaigns and promotion of energy efficiency measures among end-users. One of the main campaign is "Let's live warmer" is implemented under ministry of economy since 2010. According to campaign data [6], total number of events from 2010 until 2014 was 198. More than 9130 participants participated in seminars, conferences and other events. The major role in information campaign plays such organization as Riga Municipal Agency "Riga Energy Agency", NGO Baltic Environmental Forum Latvia, Establishment of Society Zemgale Regional Energy Agency" and education/research institution. After short interview of involved organization, the following data was obtained. Riga Municipal Agency "Riga Energy Agency" and NGO Baltic Environmental Forum Latvia organize approximately 6 seminars on building energy efficiency per year. The approximate number of seminars on building energy efficiency can be estimated as min.350.

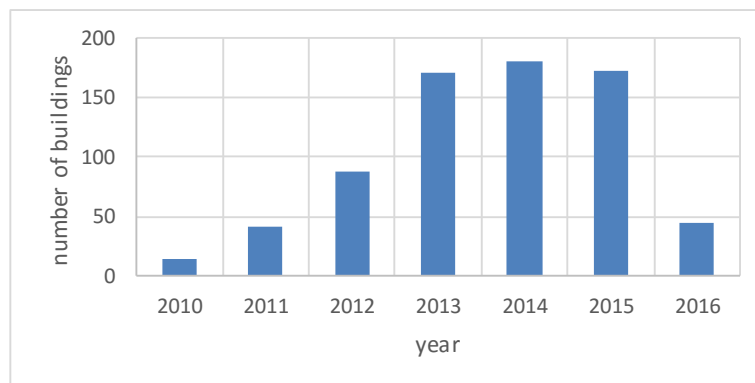


Fig.1 Number of renovated multi apartment buildings

As it can be seen, the major peak of renovated building was in years 2013 – 2015. The data for 2016 presents only projects started in 2015 and finished in 2016. The peak in 2013 – 2016 can be explained by availability of EU funds which ensures co-financing for renovation works.

In scope of this work, it is assumed that energy awareness campaign in Latvia should resulted not only in complex building renovation but also in wide implementation of individual measures such as window replacement, rational hot water usage and operation of ventilation systems.

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