

# HEAT INSULATION OF DWELLING HOUSES

Anita SIDELSKA, Latvia

**Key words:** Dwelling house, quality of the housing, state-supported housing improvement measures

## SUMMARY

Assessing the Latvian housing found it seems that the biggest problem of it is the physical and moral depreciation, as well as the low quality ratio. The quality of housing is indissolubly tied to the state economic development indicators, political stability in the long-term period, opportunities to attract investment and the overall economic situation in the world. The aim of the study was to evaluate the quality of the state-supported housing improvement measures. The object of the study was dwelling houses. In order to appraise the situation of the quality of housing in Latvia, data from The Central Statistical Bureau were analyzed, policy development documents of state institutions, as well as opinions of officials on the theme issue were used for this study. Descriptive method were used to describe the quality of housing. In its turn, to evaluate policy development documents and expert opinions a monographic description, as well as the method of analysis and synthesis was used. The investigation concluded that public support measures are available mainly for apartment owners in large urban dwelling houses, as well as for the private house owners, which are capable to provide co-financing housing quality improvement activities. As a significant problem was determined the disorder in laws and regulations, but as disturbing factors were observed the economic precariousness and financial prudence of the people and the banks. In order to improve the existing quality of Latvian housing and to provide for building of new, to energy efficiency requirements appropriate and sustainable housing, it is required to develop new residential building standards, an advanced concept of housing development and set people-friendly support programs for building new housings and assuring the quality of existing housings.

## SUMMARY

Vērtējot Latvijas dzīvojamo fondu, tā lielākā problēma ir fiziskais un morālais nolietojums, kā arī zemie kvalitātes rādītāji. Mājokļu kvalitāte ir nesaraujami saistīta ar valsts ekonomiskās attīstības rādītājiem, politisko stabilitāti ilgtermiņā, iespējām piesaistīt investīcijas un arī vispārējo ekonomisko situāciju pasaulē. Pētījuma mērķis bija izvērtēt valsts atbalstītos mājokļu kvalitātes uzlabošanas pasākumus. Pētījuma priekšmets bija daudzdzīvokļu mājas, kas uzceltas līdz 1993.gadam. Lai novērtētu situāciju Latvijā mājokļu kvalitātes jomā, pētījumā tika izmantoti Centrālās statistikas pārvaldes dati, valsts institūciju izstrādātie politikas plānošanas dokumenti, kā arī atbildīgo amatpersonu viedokļi par pētāmo jautājumu. Mājokļu kvalitātes aprakstam izmantota aprakstošās statistikas metode un dinamikas rindu analīze. Politikas plānošanas dokumentu un ekspertu viedokļu izvērtēšanai tika izmantota

monogrāfiski aprakstot, kā arī analīzes un sintēzes metodes. Pētījumā secināts, ka valsts atbalsta pasākumi ir pieejami galvenokārt lielo pilsētu daudzdzīvokļu dzīvojamo māju dzīvokļu īpašniekiem, kā arī to privātmāju īpašnieku daļai, kas spēj nodrošināt līdzfinansējumu dzīvojamo māju kvalitātes uzlabošanas pasākumu veikšanai. Kā traucējošie faktori tika novēroti valsts ekonomiskā nestabilitāte un finansiālā piesardzība gan no iedzīvotāju, gan arī banku puses. Nespējot realizēt savas vēlmes Latvijā, daļa iedzīvotāju izvēlas pārcelties uz citām valstīm ar augstāku dzīves līmeni un kvalitatīvākiem sadzīves apstākļiem. Lai uzlabotu esošā Latvijas dzīvojamā fonda kvalitāti un nodrošinātu jaunu, energoefektivitātes prasībām atbilstošu un ilgtspējīgu mājokļu celtniecību, nepieciešams izstrādāt jaunus dzīvojamo māju būvniecības standartus, mūsdienīgu prasībām atbilstošu mājokļu attīstības koncepciju, kā arī izveidot iedzīvotājiem draudzīgas atbalsta programmas jaunu mājokļu celtniecībai un esošo kvalitātes nodrošināšanai.

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## 1. INTRODUCTION

Describing the Latvian housing fund, in the Latvian Strategy for Sustainable Development the biggest problem mentioned was its considerable wear and poor quality. About 1/3 of the dwelling houses were built before World War II. The capacity of thermal isolation of dissociated constructions in apartment houses built industrially after the war is low, the heat consumption - excessive and therefore the operation of the housing is both uneconomical and environmentally unfriendly. In order to improve and put in order the situation of the housing fund in Latvia, several policy objectives of the housing have been raised. For example, to approximate the quality of life conditions to the average level in the European Union member states, as well as to save and use efficiently energy in the households, focusing on renewable energy sources. (Ministru kabinets, 2010).

The owners of apartment houses would be willing to engage in the processes of dwelling house renovation and carrying out measures of energy efficiency, too, if there were available co-financing from the state and local governments. Until 2008 energy audits in 200 apartment houses were carried out, despite the fact that the owners of apartments avoided to make a decision on dwelling house renovation and energy efficiency raising that could be explained by the increase in the construction prices after 2005, and precarious economic situation that had formed in the country and worldwide. Even though in such a situation support from the state to families with children and tenants of the denationalized houses was needed the most, due to the lack of funding the loan program for housing development was discontinued in 2009. (Cabinet of Ministers, 2006, 2008). The fact that Latvia joined the EU enabled it to raise the European Regional Development Fund (ERDF) and European Social Fund (ESF) for the development of certain areas. From 2009 the state continues to provide support to improve the heat insulation of apartment houses built in the pre-war period and during the Soviet times. Most of these houses are in poor technical condition and with a low heat resistance, which in turn contributes to an increase in the payments for heat.

## 2. RESULTS AND DISCUSSION

The formation of the Latvian housing fund could be divided into three stages: from the late 19th century, when the Latvian state started to develop until 1945, the second stage was the time, when Latvia was part of the Soviet Union (1945 and 1990), and the third stage from the renewal of the independence of Latvia in 1990 until nowadays.

Before the war, houses were built as one or two-storeyed wooden buildings, and only in urban centers there were three to six-storeyed brick buildings. The post-war period brought mostly stoned and prefab houses. Since 1958, 4-5 storeyed houses with a number of sessions (usually 2-4) began to be built in the cities, but in the end of the 60th 9 and 16-storeyed apartment houses were built. (Latvijas PSR Zinātņu..., 1968). Apartment houses were built using the assets of

the state and municipal authorities as well as the individual departments.

Large governmental companies and military units built apartment houses and dormitory type apartment houses, in which their employees were assigned. For example, Diesel Factory Riga, Rezekne Flax Mill, Cement and Slate Combine of Broceni, etc. built 2-3 storeyed stone building villages. As a result the housing areas developed nearby industrial enterprises or in some cases even within the closed area of the companies, for example, military parts, power company substations, etc. In Latvia 42 former military sites, which also include residential buildings, have been identified, in Estonia 23, while in Lithuania - 46 former military sites. Seventy percent of these sites are located in rural areas or near cities, mainly in local centers (Rumbēna, 2007).

Almost all EU member states suffered during World War II and in some cities the housing stock was completely destroyed therefore especially in the post-war period an active construction of housing stock took place. As it is shown in the study "Housing Statistics in the European Union 2010", compiled by the Ministry of the Interior and Kingdom Relations, within the period of time between 1946 and 1970 the greatest number of dwellings was built in Germany – 46.3% of the existing housing stock and in Romania – 37.3% of the existing housing stock. In other EU member states the proportion of houses built during this period of time varies from 15.9% in Ireland to 37% in Sweden. In Latvia during this period there have been built 22 % of the existing housing stock, while in Lithuania – 33 %, and in Estonia – 30.0%. This can be explained by the fact that in Latvia there was still a relatively high number (14%) of buildings older than one hundred years. In Lithuania had remained 6.2% and in Estonia – 9.4% of buildings older than one hundred years. The percentage of preserved buildings that were built a hundred or more years ago in some other countries is the following - Luxembourg (21.8%), Denmark (19.7%), France and the United Kingdom (17%). The lowest number of ancient buildings is in the Czech Republic (3.4%) and Romania (3.9%). (Ministry of the Interior ..., 2010).

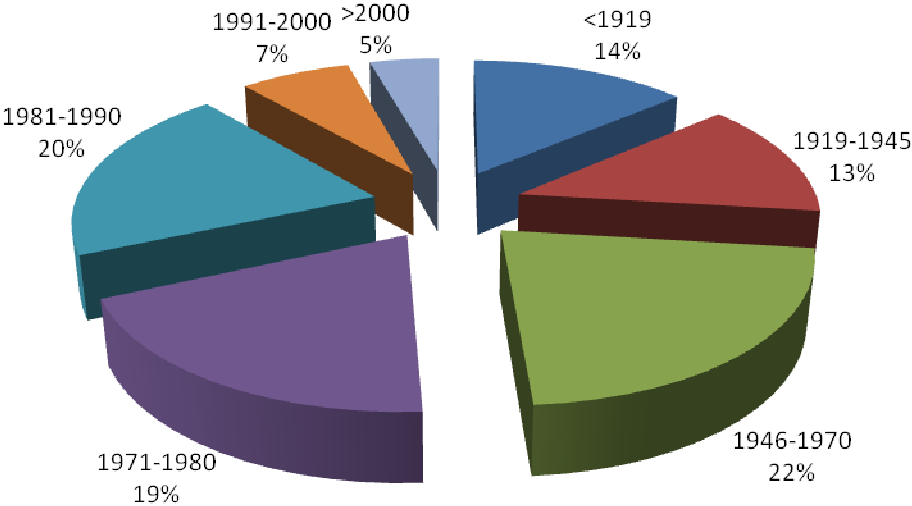


Fig.1. Latvian dwellings breakdown according to the construction year

Skribans and Pocs (Skribans un Počs, 2008), developing the model of the Latvian construction industry development forecasting, have assessed the population coverage with a living area and compared it to the rate in other European countries. They believe that, taking into account national peculiarities, Latvia can be compared to other European countries with similar traditions, like Denmark, Germany, Sweden and Finland, where in one family there are on average less than three people. In their study, they concluded that at this rate the number of dwellings in Latvia is sufficient because in each dwelling live 2.38 people. However, assessing other indicators adopted in Europe - the number of rooms per capita, Latvia lags far behind other European countries. Only in Latvia the figure is less than one (0.98). Comparing the residential area in square meters per capita in Latvia and other European countries, its amount should be increased by 40%, but taking into account the previously mentioned parameters (number of rooms in dwelling and number of rooms per capita), it can be assumed that increasing the housing quality is substantial, because people have no money to purchase new housings..

In Latvia a dwelling is a private single-family house or apartment in a residential or non-residential building (Figure 2).

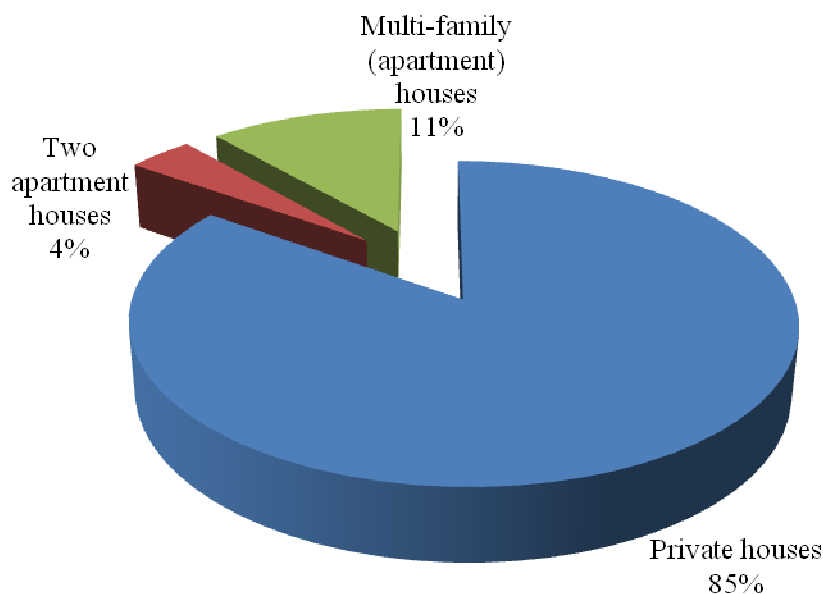


Fig.2 Housing fund breakdown by the number of apartments in the house  
 Source: Author's picture by the Latvian Central Statistical Bureau data

Hence, all the dwelling houses can be divided into two groups by the number of apartments – a single family (private) house and multi-family (apartment) house.

Comparing dwellings between the EU member states on this criterion, the largest proportion of private houses is in Denmark (65%) and the Netherlands (58%), but apartment houses are mostly inhabited in the Baltic States - Latvia (85%), Lithuania (68%) and Estonia (63% ) (Ministry of the Interior ..., 2010).

Dwelling houses are divided into apartment properties (Fig.3). An apartment property included a single property or a group of premises – an apartment, the undivided share of the

dwelling house and of the land parcel on which the dwelling house was located, if it was not some other person's property. The size of joint ownership undivided shares was determined as the proportion of the size of the individual ownership to the total sum of the separate properties in the whole dwelling house.

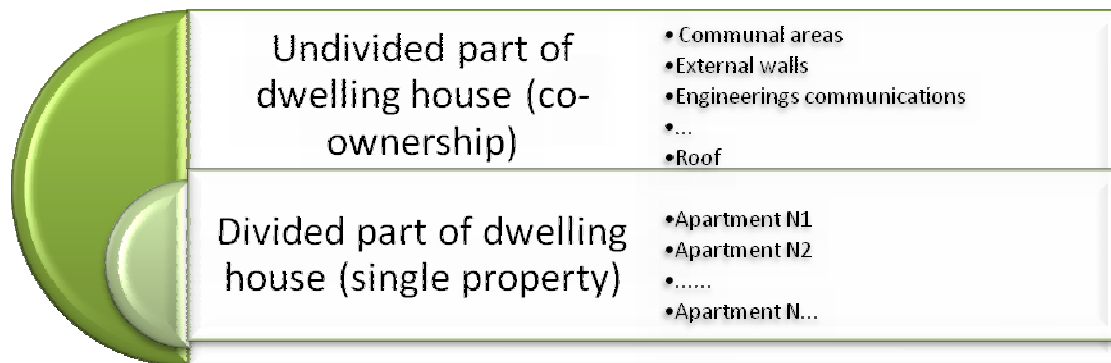


Fig.3 Parts of a dwelling house

Although the number of private houses in Latvia is the largest in the EU, most households live in apartment houses with 10 or more apartments - 63%, but in Riga even 85%. While in private houses live only 24% of Latvian households, but in Riga only 4.9% (Centrālā Statistikas Pārvalde, 2012). The decrease of the real estate market and slowdown of the construction industry development have activated old housing reconstruction process.

To ensure the sustainability of the housing fund and use of energy efficiency, on April 14, 2009 Latvia began to implement the Operational Programme "Infrastructure and Services" activity "Apartment Houses Improvement of Heat". Its aim was to improve energy efficiency in apartment houses, using the finances of the European Regional Development Fund. Construction operations of energy efficiency are carried out on the apartment owners joint property house parts (Fig.3) by restoring the structure of the building and improving its efficiency.

Renovation works are supported in dwelling houses, the construction of which was begun before 1993 and which have been put into operation until 2002, except for buildings included in the State protected cultural monuments. It is available for the houses with a small number of apartments, if the house is located in an area of a high development index. As a result of project implementation the consumption of the heating energy in the residential house should decrease by 40%. In three years since the activity began, 47 residential houses insulation projects have been implemented, 297 contracts concluded, and 67 new projects approved. The greatest activity was in 2011, when there were nearly 400 projects. (Ekonomikas ministrija, 2011). However, it is only 1% of the total number of apartment houses, and it does not include private houses (Fig.1).

The proposers of projects are from the largest cities in Latvia with a higher index of territorial development and opportunities to attract investments. It is possible to get an advance payment of 20% of the requested funding for project implementation. As it is stated in the report of the Ministry of Economics of the Republic of Latvia, as a result of the renovation the average thermal energy savings achieved are from 30 to 57%. (Ekonomikas ministrija, 2011).

Side by side with the energy efficiency the existing housing stock quality has improved, too,

which would have not been possible without these projects. In order to start renovation projects of dwelling houses it is necessary to tidy out the dwelling house management issues, which has been very difficult hitherto. There have developed associations of dwelling house management, which were formed by the apartment owners themselves who have an interest in long-term development of dwelling house using the least possible resources. At the time when the construction of new buildings has decreased dwelling houses renovation projects provide a large part of the construction industry revenue.

The above mentioned measures of energy efficiency improvement in apartment houses and the renovation of houses are related to the attraction of the ERDF funding. However, these funds are limited and can not be used for all dwellings. It is therefore necessary to develop a follow-up program for housing quality and minimum requirements of housing energy-efficiency. Being aware of economic opportunities, a permanent state support program for domestic heating would be required, and building of the houses with low energy usage needs to be promoted. It cannot be denied that the problem is not only in apartment houses, but also in the centralized heating network. Through reconstruction of the heat source and heating network it would be possible to reduce heat losses and identify energy-efficiency requirements for centralized heating supply systems.

#### 4.CONCLUSIONS

1. Renovation of dwelling houses results in a substantial heat savings and improved energy-efficiency in apartment house.
2. Renovation projects accelerate the development of the association of apartment owners, which ensure long-term management of dwelling houses.
3. Renovation of apartment house improves the quality and sustainability of the existing housing fund.
4. In the situation when the construction of new houses decreases, energy efficiency projects in dwelling houses provide the preservation of the construction industry.

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## BIOGRAPHICAL NOTES

For nine years (1999-2008) Anita Sidelska has worked in different structural units of the State Land Service, which is the relevant institution of land management in Latvia. She has been involved in the elaboration of legislative acts, has worked in many working groups and international projects. Anita Sidelska has a high competence in cadastre issues.

## CONTACTS

**Anita SIDELSKA.** *Mg.sc.ing* Doctors' programme student at the Department of Land Management and Geodesy Faculty of Rural Engineering of Latvia University of Agriculture.  
Address: Akademijas Street 19,  
Jelgava, LV-3001,  
Latvia



Tel: (+371) 63026152,  
e-mail: [anitasidelska@inbox.lv](mailto:anitasidelska@inbox.lv)