

**DIRECTIONS OF THE INNOVATIVE DEVELOPMENT OF THE LATVIAN HOUSING****Vitālijs Zubkovs<sup>1</sup>, Ineta Geipele<sup>2</sup>***Riga Technical University, 1/7 Meza St., Office 213, Riga, LV-1048, Latvia.**E-mails: <sup>1</sup>vitalijzubkov@gmail.com; <sup>2</sup>ineta.geipele@gmail.com*

**Abstract.** Availability of high-quality housing has always been one of the criteria of the prosperity, stability and progress of the citizens of any nationality. The issue raised in this study is to find out possibilities and options for the stabilization and renewal of the quality of physically and mentally outdated parts of the housing fund of Latvia, for dwelling. Today, the maintenance of technical condition of the housing fund of Latvia is a huge problem. Building of new houses constitutes insignificant part of the housing fund, so a special attention should be paid to houses built in 60s-70s of the previous century. A large proportion of residential buildings are both morally and physically outworn. The situation, which is characterized by completely missing restoration and replacement program of the housing fund to the suitable accommodation fund that is more energy-efficient and meets modern requirements for housing. Development of such programme shall be considered to be one of the main tasks of the improvement of the situation in the housing of Latvia. The change of the existing housing fund is unavoidable. Postponing consideration of this issue during the economic crisis is both lowering welfare level of the population as well as the living conditions of the inhabitants of Latvia. The authors researched and compiled possible options for the reduction of physically and mentally outdated parts of the housing fund of Latvia at the same time offering new construction capabilities as the alternative solutions for refurbishment and suggesting potential model for project financing. Values of economic indicators of different options concerning restoration and replacement of the existing housing fund with the constructions that are more energy-efficient and correspond to the requirements and needs of our modern society.

**Keywords:** energy resources, efficient use of resources, economic modelling, housing fund.

**1. Introduction**

Availability of high-quality housing has always been one of the criteria of the prosperity, stability and progress of the citizens of any nationality. For the residents of Latvia, an accessible and high-quality housing issue has become a project that strategically may affect solution of problems referring to demographic, economic and political issues. Sustainable and well-balanced development of the territories is inextricably associated with the improvement initiatives and activities carried out by inhabitants. For the previously mentioned reason, development of the requirements for high-quality housing is one of the objectives of national socio-economic policy priorities.

Improving the standard of living of the inhabitants of Latvia is of great importance for the development of the Republic of Latvia and its further integration in the European Union. Availability of high-quality accommodation is one of the indicators of the standard of living of the inhabitants. At the moment, providing population with appropriate accommodation is not satisfactory because of its absence and low quality of the housing that is very behind the EU standards. The necessity for the solution of the particular issue is also determined by the increase of the negative processes in the market of residen-

tial houses. The situation with the existing housing fund indicators of the energy consumption and high operating expenses is unacceptable.

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During the increase construction market, the business environment of Latvia had a possibility to use all the resources in the country. From that time, in relation to the total amount of the housing fund only a few high-quality

constructions and buildings are set up, but the remaining living fund continues to age. Aging volumes and the rate of acceleration are such that, if not correcting the situation immediately, then by 2030 the overlapping of multiple depreciation “waves” will take place: the remaining five-storey houses will become outdated and could not be used for living, at the same time the similar problems will rise regarding nine –storey buildings - they will get to the condition which the houses built in the 20s-30s of the previous century has. No construction industry will reimburse the losses of the housing fund of this volume. If not initiate any activity regarding the above mentioned, we will leave huge problems to our children and grandchildren.

The increase in construction industry showed capabilities of different housing projects that are associated both with the different construction expenses and operating expenditures.

The change of the existing housing fund is unavoidable. Postponing consideration of this issue during the economic crisis is both lowering welfare level of the population as well as the living conditions of the inhabitants of Latvia.

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## 2. Housing fund as the Basis of Economic Development

Sustainable and balanced territory development is inextricably related to the improvement of living conditions of population; therefore, the implementation of high-quality housing facilities is a priority for socio-economic policy of the country. Moreover, the United Nations Organization has recognized the housing problem as one of the main, and put forward the right to housing as an essential constituent of the problem.

Housing has a high social value. If it suddenly turns out that even a small percentage of the population does not have housing or cannot afford to pay for the expenses related to the provision of basic services, the question immediately becomes a problem for the entire community. (LV Central statistical management, 2010.)

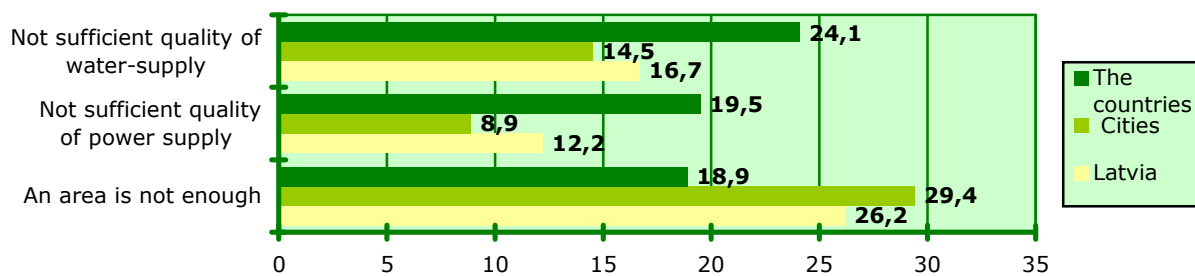


Fig 1. Owners of houses which are dissatisfied by an area by communications of houses 2007 year (percents) (Source – statistics of Latvia, 2010)

The process of modernization and refurbishment of the housing fund plays a major role in improving the quality of housing and satisfying the population’s housing needs.

All the processes influencing the housing conditions can be divided into controlled and uncontrolled ones.

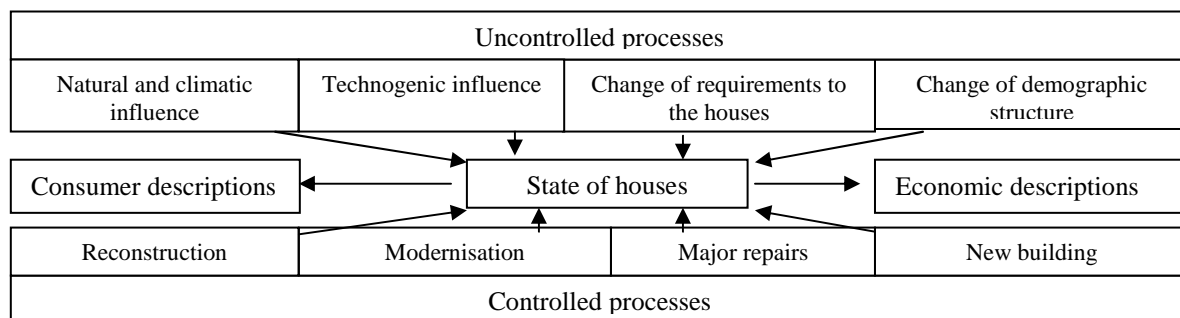


Fig 2. Processes, having influence on the state of houses (Source – Riga management of energy, 2010)

The latter include unpredictable situations of technological, ecological and social nature that affect the condition of the housing fund, its physical and functional depreciation. (Joseph Murphy, 2000.)

The controlled processes include the processes of improving the current condition of the housing fund or a complete renovation in the form of new construction.

The quantitative level of the existing housing fund in the given period is maintained by means of *simple reproduction* divided into two main types – partial and full reproduction. *The partial reproduction* includes the costs of major repairs within the normative period of building service life; *the full reproduction*, on the contrary, includes the costs of constructing new buildings instead of the ones having reached the limit of physical depreciation. *Innovative reproduction* is defined as the construction of new housing in addition to the existing one with minimal energy consumption. (Joseph Murphy, 2000.) Full or partial impact on the housing fund is a **necessary condition for the reproduction of the housing fund**.

Thus, according to these definitions, the process of reproduction of the housing fund is mainly evaluated from the perspective of recovery of technical housing characteristics. By means of partial reproduction it is possible to restore or improve the condition of some (not all) elements and building structures. However, the full reproduction is refurbishment of the whole residential building. **Innovative reproduction**, to a great extent, will make it possible not only to refurbish the housing fund quantitatively, but to approach the most advanced standards and requirements imposed on the housing around the world. (Hastings. 2006)

### The Assessment of the Housing fund Condition and Its Dynamics in Latvia

The housing fund in Latvia in 2009. According to the data of the Central Statistical Bureau of Latvia, at the end of 2009 the total area of housing fund in Latvia was 61.0 million square meters. The dynamics of the number of flats built from 2005 to 2009, in Latvia.

**Table 1.** An amount of the built apartments in Latvia (Source – statistics of Latvia and worked out by authors)

Data	2005	2006	2007	2008	2009
Amount of apartments (thousand m <sup>2</sup> )	552.2	812.6	1188.4	1153.2	669.3
Rate of height %	-	47	46	-3	-42

As can be seen from the table, there is a downward trend in new housing fund and construction volume. The trend shows the decrease in housing construction volume over the past few years. Quantitative dynamics of the buildings renovated in Latvia from 2005 to 2009.

**Table 2.** Repair of houses in Latvia (Source – statistics of Latvia and worked out by authors)

Data	Major repairs (thousand m <sup>2</sup> )				
	2005	2006	2007	2008	2009
Apartments	21831	26627	34817	44392	34881
Rate of height %	-	22	31	27	-21

There is insufficient volume of renovation, including heat insulation, expressed as the number of renovated buildings to the total number of buildings in need of renovation. Now there is a major problem in Latvia – energy efficiency works of the housing fund and the maintenance of its technical condition. The analysis shows that 70% domestic premises of the total housing fund require major repairs and the works of improvement of energy efficiency. (Ham Maarten, 2009)

At present, the most severe problem is the maintenance of technical condition of the housing fund in Latvia. The analysis shows that domestic premises, 11% of the total housing fund, require major repairs.

At the same time, the relative volume of the renovation of the housing fund is very low. In 2008, construction of new housing comprised 1.4% of the total area of the housing fund, but major repairs – only 0.16%. A significant portion of the housing fund still does not satisfy the needs of the population, both due to its size and the qualitative characteristics.

For example, the service life of residential buildings of the housing development in 1960s – 1970s, the so-called “khrushchevki”, has almost expired. In several years of operating, these buildings, constituting a significant part of urban housing, will begin to fail massively. (Hastings. 2006)

Thus, by means of the analysis of the condition of the housing fund in Riga it was possible to identify the following problems:

1. Qualitative shortcomings – nonconformity of technical and consumer characteristics of the housing with the objective and subjective requirements imposed on the housing. The most severe problem is substantial energy loss (in the form of heat) in the process of using housing, heating.

2. Quantitative deficiencies – lack of housing, i.e. lack of number and total area of single-family houses, apartments, rooms. Also it is nonconformity of already existing apartments with the required areas. Besides, the existing volume of new construction and major repairs is not a solution to shortening the housing queues, reducing the number of old and dilapidated housing, which increases every year. Thus, the most important socio-economic objective is to increase the volume of renovations, new construction, and major repairs of the housing fund in Latvia.

#### 4. Technical Condition of Panel Buildings and Their Potential

Service life of buildings depends both on the durability of the material of structural elements and on the coupling of individual elements that form a stable spatial structure. If the load-bearing panels of buildings, obviously, under normal use, can be operated 100 and even 150 years, the corrodible mounting elements, made of metal welded assemblies, are their “weak” links. (Latvia republic economy ministry, 2010)

The main problem that may be faced by the households over a certain period of time is corrosion of embedded elements of exterior walls. Experts forecast that the critical level of corrosion will be reached already in fifteen years, taking into account a 40-year period of operation and the progressive corrosion of these elements. First of all, that kind of danger threatens the buildings of panel series.

It should be noted that the large-panel buildings of the initial period of industrialization in construction (five-storey buildings of 1960s), despite rather high structural reliability, have low reconstructive ability. This applies primarily to residential houses that have internal load-bearing walls arranged in a narrow pitch.

Moral and aesthetic inferiority of five-storey building development is enhanced by the fact that the only type of slab block of flats has been proposed and implemented, without taking into account the demographic, historical and architectural traditions of the districts, their climatic characteristics. (Hastings. 2006)

Construction of such buildings was carried out without taking into consideration the natural landscape and architectural features of surrounding buildings.

The performance characteristics of such buildings are low. They have low heat protective and soundproof qualities. Thus, in summer there is overheating of rooms, especially the upper floors, due to the combined roof, and in winter – freezing of joints, corner panels and walls. In adverse conditions there are the domestic premises of the first floors, where the microclimate is strongly influenced by the presence of poorly insulated basement, unequipped vestibules and doors.

Virtually, in all types of five-story buildings the soundproofing of interior walls, floors, and walls does not meet standards.

In buildings where heat insulation and proper repair are not carried out, emergency condition is only a matter of time. The main problems of the current housing stock of Latvia are the following:

- the level of welfare;
- dissatisfaction with maintenance of residential buildings;
- lack of understanding/ knowledge of the common property maintenance in the future;
- fear of the additional expenses related to the improvement of common property maintenance;
- fear of the additional expenses related to the improvement of common property physical quality;

- reluctance on the part of co-owners to engage in the common property maintenance/ improvement;
- co-owners’ negligent/ destructive attitude towards reasonable requirements of common property, etc.

#### 5. Economic Situation of the Housing fund in Latvia

Latvian real estate market has experienced both the exaggerated rise in prices and the cascading fall in prices. Stable development of the market occurred during the period from 2000 to 2005, when real estate prices rose corresponding to salaries and the conditions for credit granting. However, already in 2005 the first signs of overheating started to appear. Increase in salary and prolonged period of credit no longer justified the exaggerated rise in prices.

During three years, the prices of standard-type apartments in micro-districts of Riga grew by about 71 percent. However, in 2007 a different trend was marked. This time, drastic changes occurred in the opposite direction. At first, property prices had reached their highest peak, but then the American crisis caused stress in the Latvian market, and the cascading fall in prices began. (LR Central statistical management, 2010.)

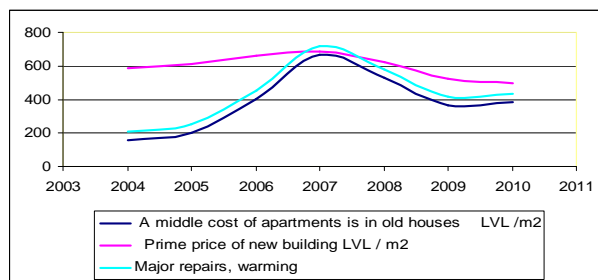


Fig 3. Sale of apartments price and cost of building production (Source – Latvia Statistics, 2010)

As seen in Figure 3, at present there is observed stable dynamics of the alignment of market prices for standard-type apartments and construction costs of new housing fund. In the situation, when the housing fund in Latvia almost is not refurbished, it is possible to use the potential of renewal of the existing housing fund that is often in bad condition or even, in some cases, the emergency condition.

According to the existing data of Ministry of Economics, the cost of renovation ranges from LVL 45 to 65 per square meter. Under existing comparative prices, the cost of renovation of the housing fund and the market value of the standard-type apartments, to a large extent, approach the cost of new construction. (Latvia republic economy ministry, 2010)

#### 6. Perspective of Innovative Development of the Housing

In recent years, there has been a growing interest in the buildings with low energy consumption, reflecting growing concerns about climate change and high energy prices. (Riga management of energy, 2010)

Today, all over the world the Passive House Standard Certificate has been awarded to more than 10,000 various buildings – starting from small private houses and finishing with office buildings, schools and shops. Most of them are located in Germany and Austria, where the concept of Passive House has been created, but also in other countries there is steadily growing interest in these buildings. (Fingleton, 2004)

Moreover, this approach is used for refurbishment of buildings constructed in the past. The implemented projects have confirmed that applying this method, energy efficiency has increased tenfold, thereby helping to reduce energy costs substantially in large buildings such as hospitals, schools, and apartment blocks.

Now the most severe problem in Latvia is quantitative deficiencies – lack of housing, i.e. lack of number and total area of single-family houses, apartments, rooms. This type of problem cannot be solved only through renovation of the existing housing fund. Also, there is virtually no refurbishment programme of the housing stock in Latvia, and there is no possibility for households of privatized apartments to improve their housing conditions within the framework of urban construction.

At present, the volume of renovation and major repairs of residential buildings in Latvia comprises approximately 1% of the total housing fund of the country. (Riga management of energy,2010) Sometimes upon existing difficulties or even impossibility to perform a major repair of the building, for various reasons, households do not have the opportunity to improve their living conditions. The main problem here is a significant difference between market value of the old housing and new construction. Sometimes, cyclical economic development almost creates the conditions under which the obtaining of credit is either impossible or cost of credit is unreasonably high. The possibility to create a model of development and refurbishment of the existing housing fund is an objective necessity. The possibility to use new construction as an alternative to renovation is of particular importance in the development of the housing fund. (Wells, 2007)

The proposed scheme of interaction between project participants is shown in Figure 4.

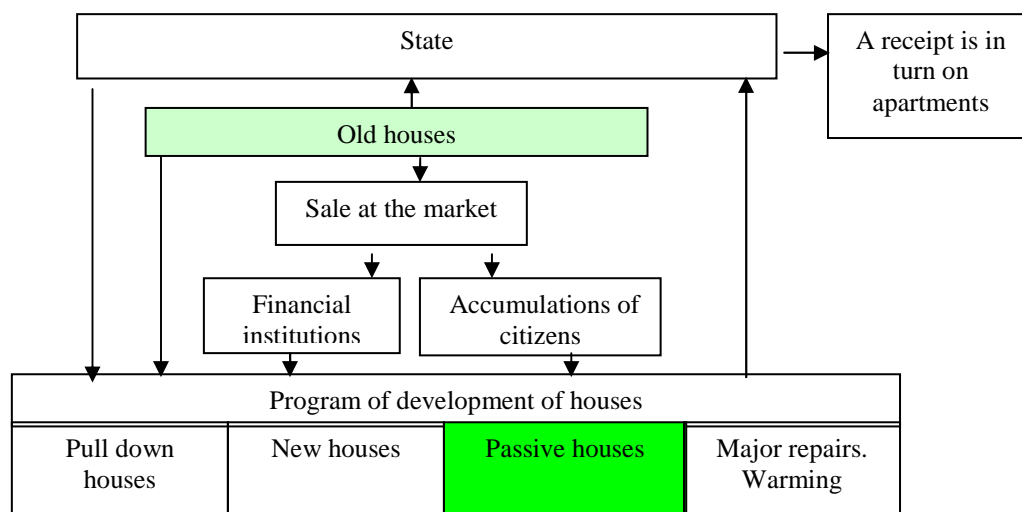


Fig 4. Scheme of updating of houses fund (Source – worked out by authors)

Refurbishment of the housing fund is a process that should take place constantly, as the basis for the development of economics and society. Improvement of housing conditions, decrease in maintenance costs form the basis of increasing the competitiveness of households in Latvia.

Residents of the old housing fund will have an opportunity to exchange their apartments for modern comfortable accommodation that meets all the social and sanitary standards. (Wells, 2007) The area of a new flat offered within the framework of this programme can be either smaller or larger the one which they occupy. It can be provided either without any additional payments or by means of obtaining credit in the framework of the given programme. It is an excellent opportunity provided to households in order to solve their housing problems. All those who at present do not have

the established social norm of housing will be provided with new apartments (with interior finish) at such a rate specified by regulations and modern requirements to the housing. The main advantages are the following:

- ✓ opportunity for sustainable refurbishment of the housing fund;
- ✓ improvement of living conditions;
- ✓ provision of housing for those who need it;
- ✓ lowering maintenance and repair costs of housing;
- ✓ improvement of ecological environment;
- ✓ increase in employment, etc.

## 6. Conclusions

The main goal of the priority national development is the elaboration and implementation of methods and mechanisms for enhancing accessibility and refurbishing

the existing housing for the various categories of population. Its achievement requires both creating the conditions for increasing purchasing power, refurbishment of housing through the development of state programmes, long-term mortgage housing credit and other forms of housing finance, and housing supply through the development of housing.

Unfortunately, the housing fund is being refurbished slowly, and the construction of residential buildings has been virtually halted in 2010. Every fifth house is in an emergency or a rundown condition, nearly half of all buildings are panel structures, which require heat insulation. Physical condition of housing and its heat provision influence costs for utility bill payments. Rising energy costs most of all affect least protected social groups, pensioners, low-income households and families with children. The state does not have enough new, modern areas of housing, especially housing at a cost, corresponding to income of the majority of population. The volume of renovation work is insignificant.

Through renovation it is not always possible to solve the issues of low energy efficiency of most of the constructions and equipment, their physical depreciation and obsolescence, as well as emergency position of buildings. The improved renovated condition of the housing fund does not always satisfy customers both with the existing area and inner layout. Ignoring the issue of housing stock refurbishment may threaten or hinder the long-term growth of state competitiveness. In this paper the authors have reviewed the current situation of the housing fund in Latvia. The analysis of the economic situation has shown that it is possible to refurbish the housing fund through new construction, as an alternative to renovation. Through new construction of the housing fund it is possible to solve important, social and economic tasks of the state.

Creating a programme that will combine all the functions for refurbishment of the housing fund is both a resource and determinant of the quality of life. This includes buildings, all communications, roads and other support of the housing fund. Refurbishment of the housing fund affects the development of economic activity of the national economy sectors and the increase in employment.

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