

# Roof Top Extension like a New Chance for Multifamily Buildings Refurbishment ?

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**Abstract** At present in Slovakia, and also other countries of Central and Eastern Europe, there is a vast housing area which was built after the World War II. This multifamily housing stock was during the 90's mainly privatized. Considering that the economy of Slovakia is not capable of replacing the existing housing fund which is located in the multifamily houses that were built after the World War II, it is necessary to dedicate an increased focus on renovation of this housing fund. The main problems of the current multifamily housing stock in Slovakia are: need for modernization, low level of energy efficiency and insufficient building maintenance level. One of the options how to create sufficient sources for renovation of apartment buildings is to utilize the roof of the apartment building as a construction area and build it up.

**Keywords** Roof top extension, multifamily houses refurbishment, sustainable development, housing stock

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## I. INTRODUCTION

Constant growth of human population lays increased demands on the development of urbanized area and on safeguarding sufficient number of housing units. The population is growing differently over the World. The amount of yearly growth in European union is approximately 0,4% in the last 5 years. This percentage is low compare with the population growth in some Asian countries like China and India. To the contrary the size of the area of European Union is relatively small compare with the population. It means relatively high population densities in EU and pressure to effective land use. Built up area covered by multifamily houses is one of the possible solutions how to save land. This style of development was preferred in CEE countries in the second half of last century.

In countries of European Union (EU 27 excluding Malta) were situated approximately 100,1 million multifamily dwelling units according to the Report for European Housing Ministers Conference held in Prague, 03. 03. 2005 [1]. These dwellings count for an average of 47.5% of the total housing stock in the European Union countries. Over one-third of the multifamily dwellings are situated in high-rise buildings with more than 4 floors.

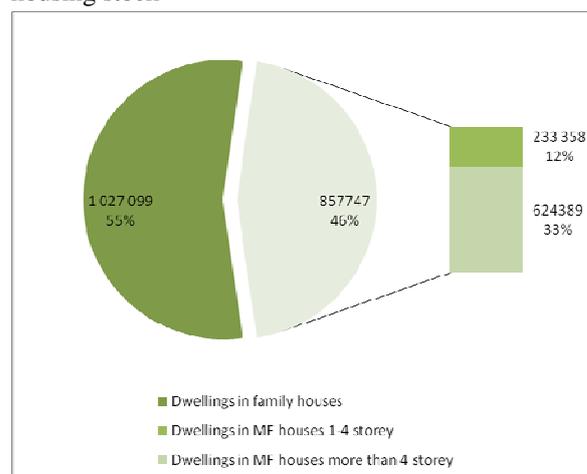
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Roughly calculated there are 36 million high-rise dwellings. Dwellings situated in high-rise buildings count for an average of 17% of the total housing stock in the EU countries. The percentage of high-rise dwellings in new members of EU (joined after 1.1. 2004) is higher (34.1%) compared to the old member countries (14,3%). The share of multifamily dwellings from the total housing stock is in the new member states in average 55,8% and in old member states in average 47,0% [1]. The difference between the share of multifamily dwellings from total housing stock in old and new EU member countries is not that high like the difference in case of high-rise dwellings. The number of storeys in multifamily houses has an influence on economy of roof top extension project. In generally there is a rule than fewer storey mean less additional costs (elevator, fire safety, additional foundation etc.) and bigger development potential.

## II. MULTIFAMILY HOUSING STOCK IN SLOVAKIA

At present in Slovakia, and also other countries of Central and Eastern Europe, there is a vast housing area which was built after the World War II. This is the matter of a complex of residential buildings that were built in the form of mass housing construction. Until the year 1990 the construction but also the renovation of residential buildings and housing developments was planned.

Figure 1 Share of multi-family residential dwellings in housing stock



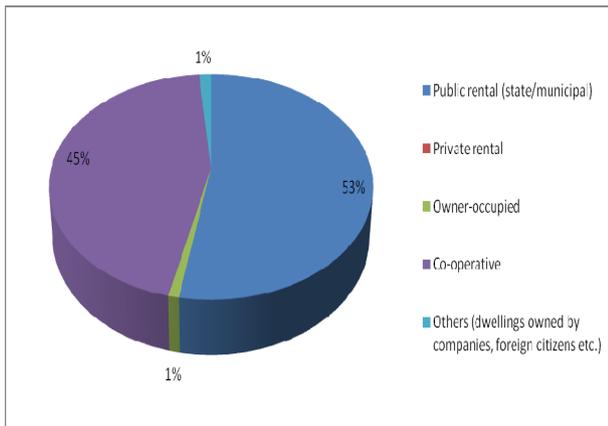
Source Statistical Office of the Slovak Republic Census 2001, Ministry of Construction and Regional Development of the Slovak Republic, [www.build.gov.sk](http://www.build.gov.sk)

There were many middle and big construction companies which were able to cover the demands for new construction

and renovation. After the year 1990 there was a change of socio-economical model of functioning of states of Middle and Eastern Europe.

Changes were manifested in every area of life and in the area of housing policy they led to massive privatization of the housing fund localized in residential buildings in Slovakia for the prices which mostly did not correspond with the market value of sale of real estate. Privatization of the housing fund negatively affected its technical condition. Regular renovations ceased or were performed in the non-systematic ways depending on the financial situation and on “the level of awareness” of the new owners.

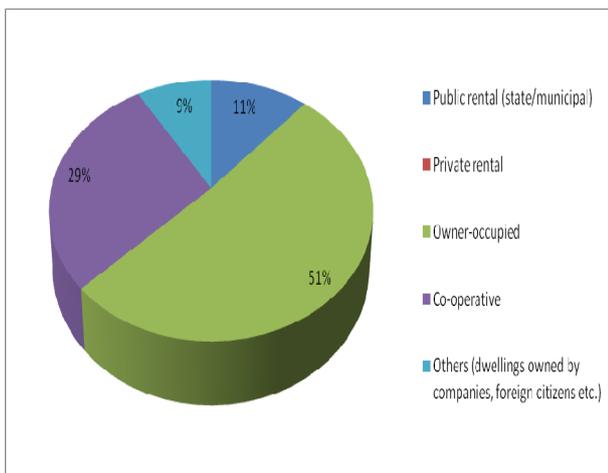
Figure 2 Tenure structure of multifamily dwellings in 1991



Source : CENSUS 1991

The law on condominiums in Slovakia is in place, which prescribe the establishment of a condominium in case of multi ownership. Issue of housing condominiums is governed by the Act No. 182/1993 Coll. on ownership of dwellings and non-occupational spaces as amended by subsequent regulations.

Figure 3 Tenure structure of multifamily dwellings in 2001



Source : CENSUS 2001

Owners can choose whether they establish a condominium in a multi-family residential building or close a management agreement with another natural person or legal person. Condominiums are until now important players in

management of multifamily housing stock despite than in last few years started to increase the number of professional facility management companies. In former Czechoslovakia played an important role in construction and management of multifamily houses cooperatives. Their share on market was decrease in second half of 90's. The market share of cooperative before 1991 was 45% and in 2001 was 28.5% (See figures number 2 and number 3).

### III. MULTIFAMILY DWELLINGS ON THE REAL ESTATE MARKET

State gradually accepted various measures to support the renovation of the housing fund which in regards of amount at disposal and necessary amount of finances could not resolve accumulating problems. Eighteen years passed from 1990 and during this time the real estate market in Slovakia was transitioning a fast development which represents itself by mostly a form of a fast development of the real estate prices in the attractive areas of Slovakia. It is a peculiarity of the situation on the real estate market in Slovakia, that the prices of old and new apartments are comparable in attractive regions. The increase of prices of the real estate characterizes the whole area of Slovakia in dependence of the demand level for real estate. In the future, in the opinions of real estate experts we can expect another increase of the prices of real estate. However, estimated increase will gradually lose its dynamics and gradually will lead to differentiation of increase (decrease) of prices of apartments in family houses and in apartment buildings and of prices of construction lands. In the future we expect that the increase of prices of apartments in apartment buildings will slow down or stagnate and the rich portion of population will find attractive living in family houses situated in suburban areas of central towns. This development will have an unfavorable effect on the environment which will be represented in the form of decrease of green scenery and agricultural soil, in the form of increase of volume of transportation, in the form of overpricing of functioning of cities – increase of energy consumption. In the inner cities a segregation of socially weaker classes have a negative influence on the redevelopment of apartment buildings in the less attractive areas of the city and with bad technical condition. Other states of Western Europe were confronted with similar development and problems. These states after acquiring negative experience are at the present trying to perform active policies focused on the decrease of social segregation. Part of this politics is also the support of refurbishment of decayed neighborhoods as well as the support of refurbishment of apartment buildings built in the form of mass construction.

Western European states compared to the countries of Middle and Eastern Europe have an advantage in the fact that the apartment houses mostly have one owner who rents out the apartments. One owner compared to several tens of owners (present state in Slovakia) can more easily prepare and realize complex refurbishment of the apartment house. Owners in Western Europe in most cases own apartment buildings long-term and for that reason they have a better understanding of construction modifications on objects built

in the past, of their technical condition and also have the accumulated means for a necessary renovation.

#### IV. POSSIBLE SOURCES OF FINANCE MF HOUSES REFURBISHMENT

Considering that the economy of Slovakia is not capable of replacing the existing housing fund which is located in the multifamily houses that were built after the World War II, it is necessary to dedicate an increased focus on renovation of this housing fund. To support renovation of apartment buildings various grant schemes can be created and financed by national and European sources (even though the question of utilization of European means is complicated in regards of the proprietary condition of real estate) and from the loan sources granted by financial institutions etc.. In 2003 the state expenditures on housing in Slovakia represented 2.8% of total annual budget [2]. The housing budget was divided into 5 main areas: subsidies for new construction, loans, interest subsidies, premiums building saving contracts.

State subsidies are oriented on the provision of funds in the following fields:

- provision of rental housing for socially underdeveloped population groups,
- preparation of land and development of technical infrastructure (public drinking water, savage and gas pipe network, electricity and public road) being a precondition of construction and utilization of new housing,
- removal of systems failures of residential buildings.

Systems failures are defects grounded on the wrong design and technical solution of multifamily houses created according to the standardized project using prefabricated technology. The subsidy for removal of system failures is set by two parameters, by the proportion of procurement cost (up to 50%) and by cost per square meter of apartment floor area.

The expenditures on multifamily housing stock refurbishment subsidies are comparing with the demand on a very low level. The main problems of the current multifamily housing stock in Slovakia are: need for modernization, low level of energy efficiency and insufficient building maintenance level.

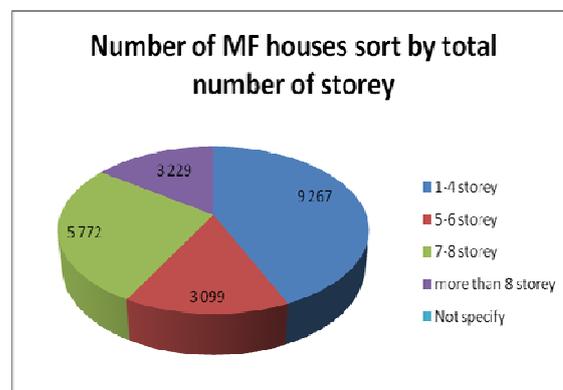
One of the options how to create sufficient sources for renovation of apartment buildings is to utilize the roof of the apartment building as a construction area and build it up. Means acquired from the sale of built-up after deducting the costs can be used for renovation. It is a matter of a one-time possibility which is limited by many factors that depend on localization and constructive technical solution of the apartment building. The aim of this thesis is to investigate these factors and suggest a model of financing and the process of realization of renovation of apartment building in the form of its built-up.

#### V. ESTIMATED ROOF TOP EXTENSION POTENTIAL IN SLOVAKIA

In Slovakia, in different parts of the country, there are around 4500-6500 multifamily houses which can be extended

by one or two floors. Of course this is only a rough estimation which is based on the number of houses which are lower than 8 floors. The estimation is grounded on statistical dates presented on Figure number 4.

Figure 4 Number of multifamily houses sort by total number of storey



Source : <http://www.rozvoivyvania.sk>, 09/2007

#### VI. ADVANTAGES OF ROOF EXTENSIONS

Advantages of roof extensions in Slovakia are mainly the same as in other countries. The main advantages are :

- Land saving especially in densely urbanized areas : for example Bratislava region,
- Creation of additional building sites in attractive areas of inner cities,
- Supporting the positive changes in tenure structure of high rise residential buildings by creating new high standard flats,
- Supporting the current housing stock replenishment by flats of bigger and smaller size than average,
- Improving the current appearance of building from architectural point of view and improving their technical condition
- Increasing the efficiency of use of current technical infrastructure, social infrastructure and public transport facilities
- Creation of additional sources to finance the refurbishment of multifamily houses.

#### VII. DISADVANTAGES OF ROOF EXTENSIONS

Disadvantages of roof extensions in Slovakia are mainly the same as in other countries. The main disadvantages are:

- The more efficient use of urban space, the more negative influence on its attractiveness,
- Design of individual roof extension projects without coordination may cause a degradation of the original architectural and urban concept of area. This is a serious problem in Slovakia today,
- With the construction of additional flats comes increased lack of parking facilities,
- Potential problems with bearing structure and foundation of objects after their roof extension,

- Problems occurring during the construction process. Damages caused by weather influences, for example leaking into the flats on the top floor.

## VIII. FACTORS WHICH HAVE INFLUENCE ON ROOF TOP EXTENSION PROJECT ECONOMY

In this chapter I will investigate what factors have influence on project economy. The most important factor is the price level at the real estate market in a specific region. This factor determine the level of expected incomes from the selling the additional created apartments.

Second important factor is the current physical condition of the multifamily building, on which can be created a new roof top extension. Important is the technical solution of the foundation and the type of soil under it. Important are the limitations joined with the number of storey of the multifamily house – for example regulation referred to the height determined by spatial plan of the area, regulations referred to the fire safety. There are some other regulations according to the law enacted by local municipality which are potential sources of additional expenditures for example the necessity to create new parking places.

There are some other costs which have smaller influence on project economy like: additional costs caused by necessity to rent public spaces to establish limited construction site and additional costs caused by carried out construction works in higher locations.

## IX. CONCLUSION

Multifamily houses are situated in every European country. In the western and eastern part of Europe are problems joined with multifamily houses different scope. There is one element which is similar in every country and that is the energy saving potential after the refurbishment. To create additional apartments in existing living areas is a good possibility to make correction in existing structure of size of apartments and in their tenure structure. In current multifamily housing stock in Slovakia is the share of the flats with size 100 or more square meters very low.

Roof extension for multifamily houses is a good possibility to create additional dwellings close to the central part of cities without build up existing green spaces. Profit from the selling of new dwelling units is an “extra source” to finance the reconstruction and modernization of multifamily houses.

Their current technical condition (especially in CEE countries) and moral appearance is on low level. This situation is partly the result of the low level of investments

to the maintenance in last decades. Roof top extension in existing residential areas is a very complex issue and has positive and negative influence to the living space and living standards.

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