

ENHR PRAG W09 – Housing Regeneration and Maintenance: Towards Sustainable Regeneration of the Housing Stock

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Stimulating integral refurbishment principles in social housing as a challenge for sustainable development

Case Study: Energy saving strategies of the Municipality of Maribor, Slovenia

Abstract

Circumstances of climate changes have raised the awareness of the role housing construction activity plays in being one of the major stimuli of socio-economic processes in Slovenia. Further encouragement came through corresponding EU-strategies focusing not only on new housing constructions but also on refurbishment and renewal of the existing stock, which has been rather neglected. Firstly, information on the Slovenian housing system along with institutional and governance changes - having taken place since 1991 - will be presented, particularly in terms of tenure and housing ownership. In the middle of the 1990s, fragmented ownership was regulated by the formation of condominiums as the basis of housing management and maintenance. Further on, special attention will be paid to newly introduced policies concerning energy efficiency of building constructions at the national level. In addition, the paper will concentrate on endeavours to refurbish the existing multi-family housing stock which represents the most problematic financial issue in terms of a long term investment perspective. Slovenia has in fact not developed any special policies regarding refurbishment of the existing housing stock, either at the national, or at the local level. The housing development sector of the Municipality of Maribor is one of the most significant cases in Slovenia, as far as transition consequences to be effected in the social housing sector are concerned. However, the transformation from an old industrial town into a sustainable community was characterized by extreme complexity. Relying upon its own development strategies the local building construction sector succeeded in remaining one of the most dynamic economic activities of the town and the region. As a recommendation, ideas of energy renewal strategies and measures, based on the local energy concept and supported by financial mechanisms of public private partnership, will be discussed.

Keywords:

Slovenia, Maribor, Housing, Refurbishment, Energy Efficiency, Local Energy Concept, Public Intermunicipal Housing Fund.

Introduction

Circumstances of climate changes have raised the awareness of the sustainability issue which is the main strategic target Slovenia has declared for in its strategic, programme and legislation documents on economic, spatial, social and environmental development.

Burdening of the environment and its impact on climate changes have launched new document preparation, in compliance with The European Union (EU) guidelines whose implementation is nevertheless becoming ever more dispersed among different sectors. Such specific situation, typical of the housing stock construction, historically depends on social circumstances from different points of view – those of organization, ownership and housing stock management. The latter is particularly true of the existing housing stock - built in the period of the former political system (before 1991) - to which Slovenia did not pay particular attention after the process of privatization of the public stock.

The paper discusses various approaches to problems of refurbishment within a sustainable development scheme which Slovenia strongly supports through energy sector strategies and programmes, realizable primarily at the local level where a broader scope of mutual connection with different stakeholders ensures definition of priorities for their implementation. Recommendations addressed to local authorities with a purpose of helping the latter establish environmentally-linked activities were already exposed in the Integrated Environmental Management Programme (2002), which opens room for sustainable action. However, refurbishment processes are highly complex and overlapping, and as such, they demand integration of all stakeholders as driving forces for local governance. With respect to refurbishment projects, in terms of technology, reconstruction, retrofitting of buildings, and in reference to regeneration of the neighbourhoods, there is a list of more or less successful best practice models from abroad that seem to be applicable in Slovenia. In fact, some ideas and examples drawn from cases of similar background (economic and political circumstances) could be applied in Slovenia; nevertheless it seems crucial to examine the very particular historical and cultural reasons behind the housing development in the country, with a special focus on public rental housing.

Characteristics of the existing housing stock in Slovenia

Housing development in Slovenia is illustrated by specific indicators defining the current state, the needs and possibilities of complex sustainable refurbishment. According to statistical data on construction of buildings (SORS; Census 2002), residential housing construction outnumbers that of non-housing buildings by 100 per cent (Figure 1).

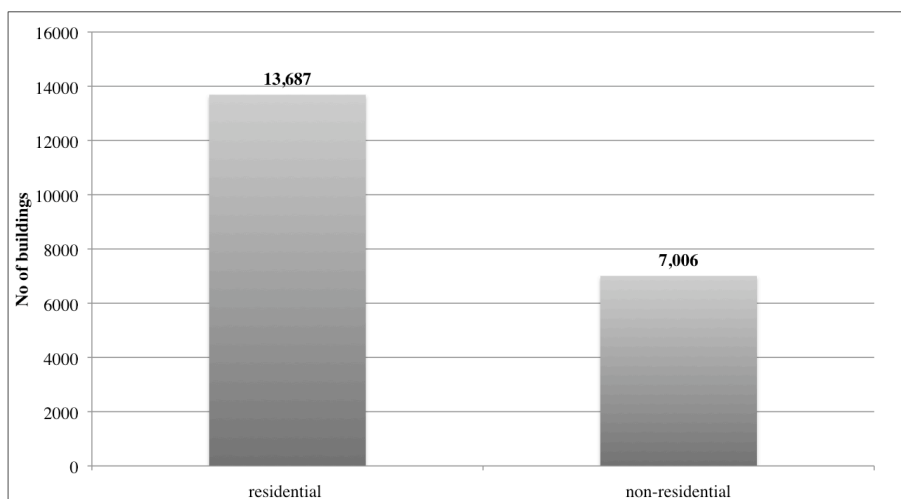


Figure 1: Number of buildings in construction 2002

Source: Statistical Office of the Republic of Slovenia, Census 2002

Evaluation of the existing housing stock from the viewpoint of the need of refurbishment shows a 70 per cent share of all buildings which are more than 30 years old (Figure 2). Unfortunately there is neither any purpose-gathered data on the state of buildings or previous renovation works nor are there any measurable indicators for quality assessment. We can, upon empirical estimation, additionally classify as energy inefficient also buildings under 30 years of age which fall into the category of energy inefficiency, predominantly because of poor technical and technological construction and lower energy standards set at the time of their construction. Another proof of the above findings lies in the statistical profile of construction activities showing a three-quarter share of new constructions and a mere 10 per cent cut of refurbishment, reconstruction and maintenance (Sitar et al., 2005).

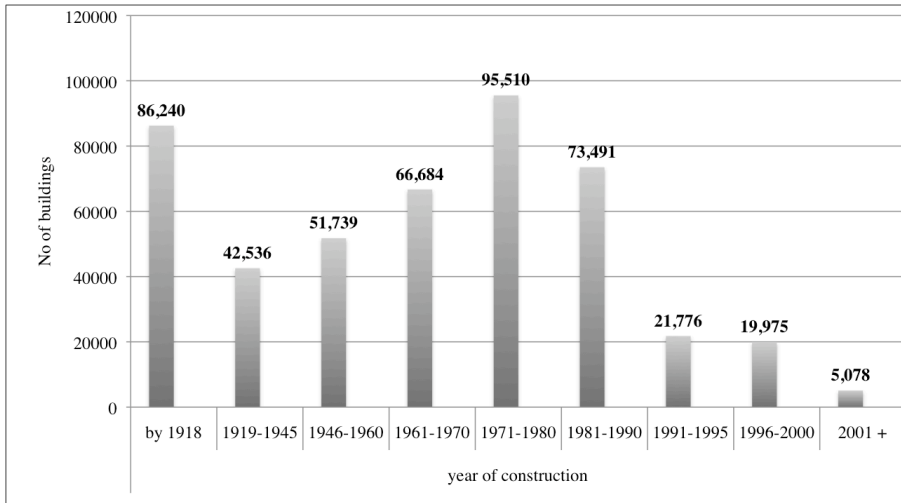


Figure 2: Number of multi-family buildings by the year of construction, Slovenia
 Source: Statistical Office of the Republic of Slovenia, Census 2002

According to statistics, there were 652,422 dwellings in Slovenia in 1991. The ratio of private stock to public stock had been 67 per cent to 33 per cent. During the two-year-privatisation-period from 1991 to 1993, a drastic shift in tenure structure occurred, since more than 20 per cent of the total housing stock changed from the public rental to the owner-occupied private sector. In 2002 (Figure 3), there were 777,772 dwellings of which 92 per cent were private, 6 per cent public, and 2 per cent remained the property of other institutions, with half of them being situated in urban areas.

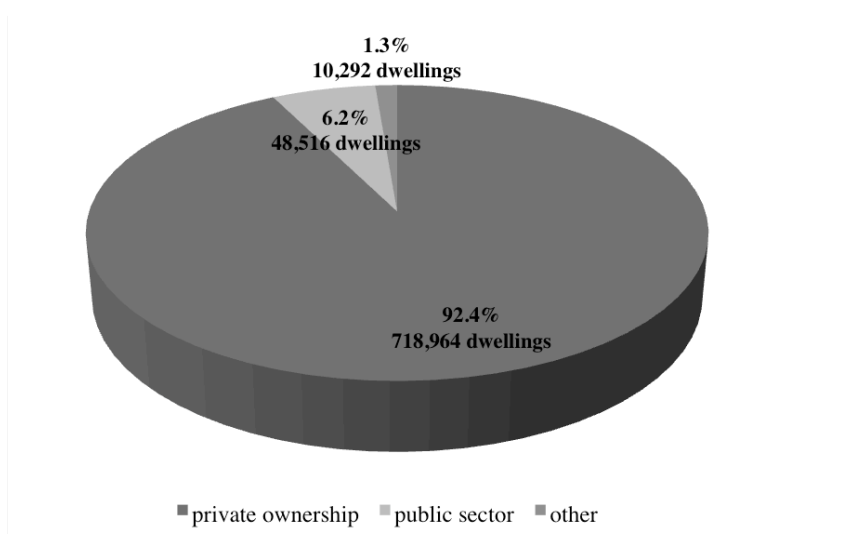


Figure 3: Ownership structure by the number of dwellings in Slovenia, 2002
 Source: Statistical Office of the Republic of Slovenia, Census 2002

Our estimation shows that in spite of having institutional framework, complex refurbishment of public rental housing faces difficulties in its realization due to several objective and subjective reasons. First obstacles are encountered as early as in gathering data on individual dwellings, multi-family housing or neighbourhoods/estates, since socially handicapped tenants refuse any kind of cooperation. Further hindrance observed in refurbishment procedure setting is problems arising from mixed ownership scheme, insufficient informing, inadequate awareness and limited financial capacity of individual

owners or tenants, which can already be seen in maintenance cost coverage. In addition, there are housing management problems in organization and implementation of complex refurbishment, where housing managers play an important part. The formation of condominiums, according to van Kempen et al., needs involvement of a range of stakeholders who have adequate resources at their disposal, as well as engagement of different actors with different skills. Problems caused by different interests on the one hand and different financial situation of the parties on the other, would thus be avoided (2006). Consequently, refurbishment of public rental residential buildings owned by national or local Housing funds is supposed to grow into a best practice model on the basis of the already approved methodologies.

Aspects of energy refurbishment

Sustainable complex refurbishment of the existing housing stock, from the viewpoint of reducing environment burdening on the basis of energy efficient construction, represents one of the key goals of European sustainable development vision. Slovenian legislation also defines the relevant framework, which is proven by the following documents: Resolution on the National Energy Programme and the National Programme for Encouraging Efficient Use and Renewable Energy Sources.

The Ministry of the Environment and Spatial Planning of the Republic of Slovenia encourages – directly or through the Eco Fund – certain activities, incentives for investments into efficient use of energy (households, public and service sector, industry) and investments into environment-friendly energy production (renewable energy sources, cogeneration systems). In principle, the Ministry also supports energy counselling and awareness raising, informing and energy user training or other target group training. In the last ten years we have witnessed promising endeavours made to harmonize legislation in the fields of environment protection, energetics and construction, with the urban planning field falling far behind. Transfer of energy directives to the fields of planning and construction is well defined by two up-to-date acts which set minimum standards as far energy efficient construction is concerned. Complex building refurbishment is defined as an opportunity for energy labelling of the buildings as well as for introducing energy labels, which is seen as a new instrument of stimulation towards energy efficiency.

Slovenia has only made its first few steps in the area of energy efficient refurbishment of the existing buildings, with the exception of some individual projects and partly carried out action plans in the framework of certain European environmental projects, run in different towns of Slovenia. Practice shows that there has been a non-systematic locally-based realization of complex refurbishment stimulated by national financial aid, while as a rule, refurbishment tends to be subject to individual action of buildings and investors. Major incentive for renovation is of a technological nature, focusing on improving thermal efficiency. It is unfortunately not being carried out on multi-family buildings which lack appropriate quality of bearing construction, of technologies and techniques and thus consume enormous amounts of energy for heating. According to statistics, the buildings are beside electricity generation and transport one of the the biggest consumers of primary energy (Novak, 2007). However, in the area of housing constructions there are major opportunities to reduce negative environmental impacts.

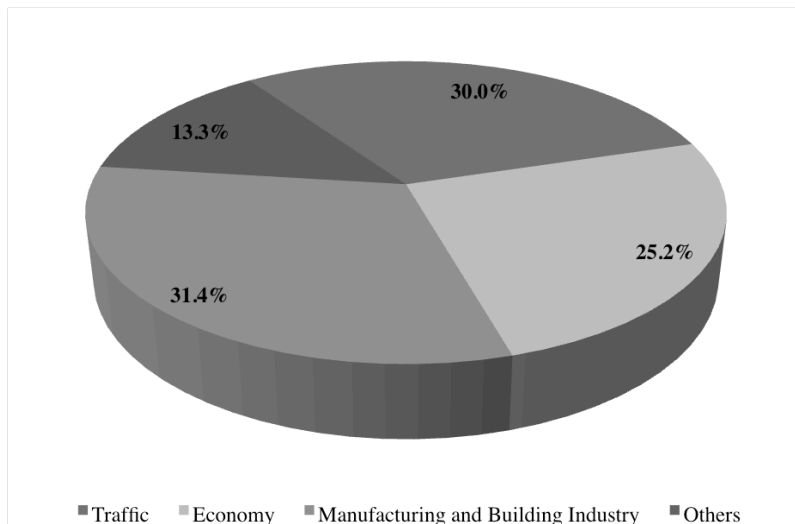


Figure 4: The structure of average energy use by sectors in the period of 2001–2005
 Source: National Action Plan for Energy Efficiency 2008–2016

In order to reach national target goals, i.e. annual energy savings of 1 per cent, we will undoubtedly have to remove a number of other obstacles, such as insufficient informing on the actual costs of refurbishment and the available technologies, insufficient qualifications of energy services providers etc. Consequently, the field of sustainable energy efficient refurbishment at the local level features overlapping of strategic guidelines due to different interests of individual sectors, all of which increases the need of an integral approach in local governance. The realization of energy efficient interventions performed on the existing buildings is being enabled through different strategic connections based on new mechanisms of public-private partnerships, which has currently been the case of the public housing segment in particular. Individual municipalities have thus been preparing certain programmes and projects related to the preparation of development documents with a view to successful applying for EU-financial grants which comprise also ‘non-spatial’ criteria that increase possibilities of acquiring financial resources for a specific purpose. Among other, these criteria are: a large enough critical mass and population structure, the existence of local partnership for better identification of appropriate strategies and priorities, the opportunity of including as many economy and social partners, non-government organizations, user groups etc, as possible. Requirements based on development and European standards application will probably become stricter and undergo transformations in the form of supplements. One can certainly witness a number of changes in Slovenia, from the viewpoint of suitable methodologies. National incentives to stimulate research and development in the field of energy efficiency and renewable sources are expected in the future.

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The following is a model of an integral approach to complex energy efficiency-based refurbishment of the existing housing stock in the case of the Municipality of Maribor.

Case Study: Energy saving strategies in the Municipality of Maribor

In addition to being the economic, administrative and cultural centre of the region of Podravje with 111,340 inhabitants and the area of 148 km² (Slovene Municipalities in Figures, 2009), the town of Maribor functions as a regional administration, education, health services, media, financial institutions centre, etc. Since 1991, the year of Slovenia's declaration of independence, the Municipality has considerably improved its urban, social and cultural images as well as its role of the most important regional centre of the north-east Slovenia (Sitar, after Drozg, 2006).

In the 1990s, the city and its urban region experienced one of the deepest economic recessions in their history, which was followed by decline in the population growth, in the number of work places, in new investments etc. By the middle of the 1990s the unemployment rate had grown to almost a quarter of the total active population, which was followed by periods of improvement in the unemployment scheme; e.g. its September 2008 rate was only 6.3 per cent. Recent statistic data of March 2009 show, however, a rise in numbers by 2.1 per cent.

An additional factor worth mentioning is of a demographic nature. Maribor has been characterised by negative net migration since 1991, which is mainly due to decreased migration of workers from the former Yugoslav Republic. The stagnation of population is also reflected in the decreasing number of households, especially in the town centre. In addition, the ageing index outnumbers the Slovenian average by 50 per cent (Horvat, 2006).

Housing development

The transformation of an old industrial town to a modern sustainable community was characterized by extreme complexity. One of the most significant construction areas over the last few decades has been that of residential multi-family buildings, with the local building construction sector being one of the most dynamic economic actors of the town and the region. According to Figure 5, the housing production in the prosperous economic period of the 1960s and 1970s reached approximately 10,000 dwellings per year, with a considerable decrease taking place after 1991. Since then, the Municipality has been encouraging housing construction development in many aspects. In the past, the changes in the national system of housing provision caused an extreme shortage of rental non-profit housing in Maribor region. The waiting list of applicants, mostly young people and families who are not able to solve the housing problem in any other way, are still extremely long.

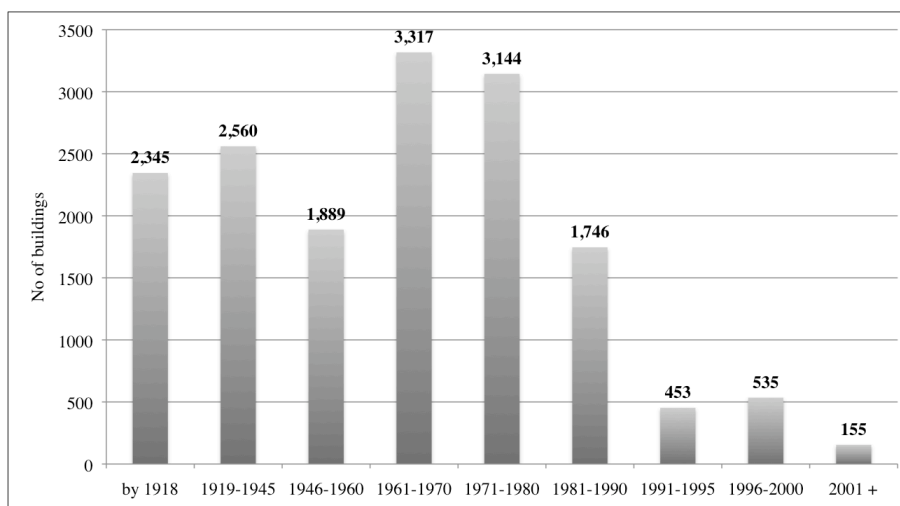


Figure 5: Number of multi-family buildings by the year of construction in Maribor
Source: Statistical Office of the Republic of Slovenia, Census 2002

Concerning the need for refurbishment, there are neither any systematic data on the technical state of the buildings nor on the energy performance of the existing housing stock. In order to highlight the current conditions we can only rely upon statistical data and some knowledge from experience. According to the year of construction, 11,857 buildings or 73 per cent of the total number of residential buildings are more than 30 years old which is estimated to be a time limit for refurbishment. An even more astonishing figure reveals an extremely high number of dwellings that have never been refurbished - 34,101 or 71 per cent (Sitar, Žegarac, 2009). Additional 3 per cent of the dwellings refurbished by 1980 (1,496 dwellings) belong to a critical group of dwellings which are almost 30 years old and therefore suitable for a second refurbishment (Figure 6).

	Total number of dwellings	Before 1970	1971-1975	1976-1980	1981-1985	1986-1990	1991-1995	1996-2000	2001+	Dwellings not yet refurbished
Slovenia	777,772	20,089	9,812	15,944	15,308	20,918	30,475	69,248	32,395	563,583
Maribor	48,038	575	360	561	697	1,119	2,124	5,652	2,849	34,101

Figure 6: Number of dwellings according to the year of the last refurbishment in Slovenia / Maribor
Source: Statistical Office of the Republic of Slovenia, Census 2002

Another fact that needs consideration is the ownership scheme; 88 per cent of dwellings in Maribor are privately-owned, which means that motivation for a more complex refurbishment as well as its feasibility depend largely on the financial capacity of individual owners or other users. The share of public dwellings is considerably larger than that of other types which can be estimated in light of social structure of the population. (Figure 7).

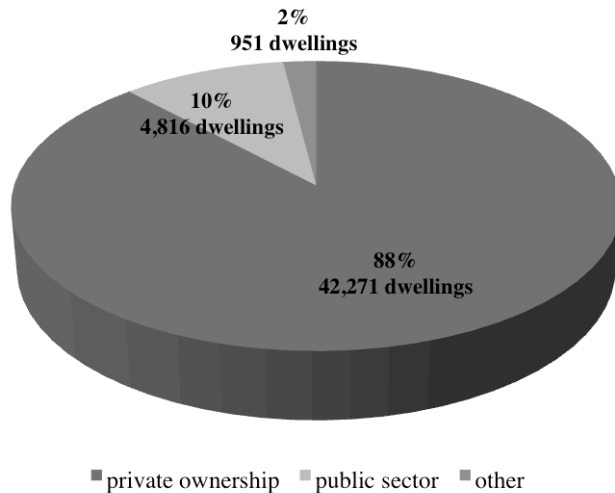


Figure 7: Ownership structure by the number of dwellings in Maribor, 2002
 Source: Statistical Office of the Republic of Slovenia, Census 2002

In the case of the Municipality of Maribor the housing development processes after 1991 led to the present share of households in non-profit dwellings which is considerably higher than the average of Slovenia (Figure 8a, 8b). However, our findings show that the public rental housing sector with almost 5,000 dwellings represents a realistic potential to develop a systematic approach to integral energy efficiency-based refurbishment.

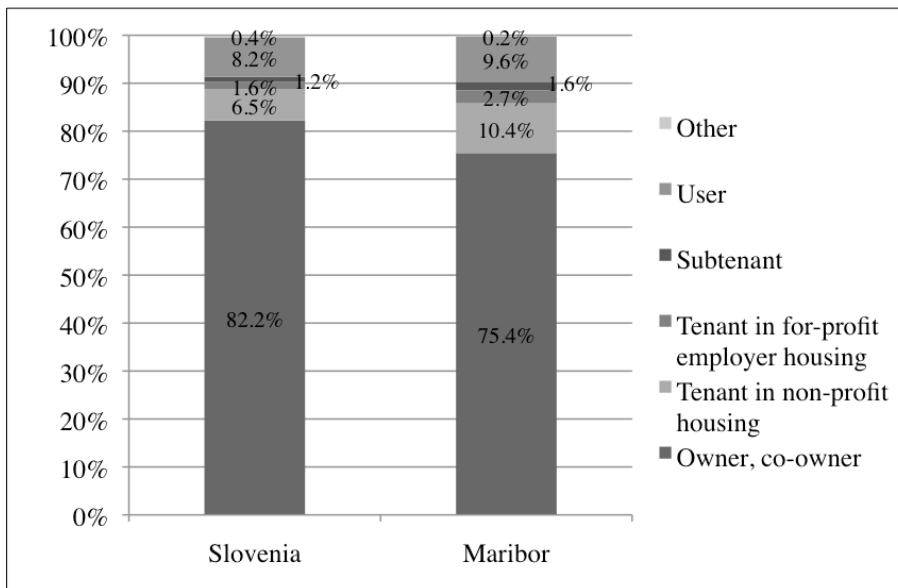


Figure 8a: Share of households by ownership and use of dwellings, Slovenia / Maribor
 Source: Statistical Office of the Republic of Slovenia, Census 2002

	Total	Owner, co-owner	Tenant in non-profit housing	Tenant in for-profit employer housing	Subtenant	User	Other
Slovenia	678,950	558,203	44,208	10,731	7,015	55,734	3,059
Maribor	43,702	32,973	4,525	1,196	704	4,197	107

Figure 8b: Number of households by ownership and use of dwellings, Slovenia / Maribor
Source: Statistical office of the Republic of Slovenia, Census 2002

Potential instruments of energy efficiency in the building sector

Slovenian current situation is a result of considerable changes that took place after 1991 and led to a shortage of system tools in the fields of political, economic and consequently, spatial development. The last few decades have therefore revealed necessity to put forth a lot of effort in assuring a broader frame of strategies which would offer the town of Maribor realistic opportunities for a complex sustainable development. Housing economy has thus gained legal basis in the fields of new constructions and building refurbishment. These had contributed to a revival of the construction activity – one of the traditionally most powerful economic branches of the town and its region after 2000. Economic circumstances along with a shortage of residential housing had in fact stimulated a preference for a new construction market whose recent operation has nearly come to a complete standstill due to the present global crisis. The need for complex refurbishment of the existing housing stock as a new tool to be developed by local policy represents a realistic opportunity for the launch of various economic activities integrating energy efficiency measures in all segments.

Urban Development Plan. Sustainable urban development has been a leading spatial and other documents' topic of the Municipality of Maribor since 1990s. After 1991, there was a growing need of a new legal framework to fit the changed economic and social circumstances that were significantly characterized by private real estate ownership in the independent state. The new urban development plan (1995-2001) was the very first product of the new generation of urban plans in Slovenian history. The plan is currently being revised; the group of experts is striving to highlight refurbishment and energy efficiency as major goals of long-term development.

Municipality Environmental Protection Programme. A shortage of system-based solutions in the field of spatial planning legislation made the Municipality of Maribor undertake the formulation of development concepts in the environmental protection sphere in the 1990s. The Municipality environmental protection programme adopted in 2007, upon the 1999 Local Agenda 21, linked the energy performance field of activity with that of construction and urban environment. Through refurbishment of the existing housing stock the programme primarily aims at reducing energy consumption, with priority being given to publicly-owned housing. It regulates compulsory data gathering and its monitoring along with the introduction of the energy label for publicly-owned buildings and those belonging to the Municipality. Moreover, it encourages framing of a spatially efficient energy concept, applicable locally and also to a broader region, and informs the interested parties. It raises their awareness, introduces financial stimulation in the form of loans for energy

efficient buildings, grants subsidies for energy efficient appliances etc. A long period of a rather inactive policy at the local level is now being followed by an era of certain changes leading to a more efficient usage of financial aid provided by different European funds.

Local Energy Concept. Local energy concept (LEC) adopted in 2009 served as a basis for an action plan to reach goals in the field of energy supply within the Municipality and a broader region. Energy audits applying a specialist methodology were therefore carried out; their results helped form a set of measures to be taken with a view to achieving greater energy efficiency in buildings with highest energy consumption. In order to introduce a system of energy management, data on energy consumption and the relevant costs had to be gathered and analysed. Data analysis serves as a basic tool to estimate energy costs of a single building and the entire set of buildings. Target-oriented energy consumption monitoring, using the method of regression, showed the possibilities of reducing energy consumption, which embraces lower costs and lower CO₂ emission.

The author of LEC preparation was the Energy Agency of Podravje EnergaP, a company founded in 2006, which has recently played an important part in public awareness activities, in informing and in carrying out of the activities focused on energy efficient refurbishment in Maribor.

Activities of the Energy Agency of Podravje EnergaP

The Energy Agency of Podravje (Agency) was founded by the Municipality of Maribor and co-financed by European Commission. Its establishment was part of the local community efforts to put forward sustainable energy supply. The Agency covers 15 neighbouring municipalities in the region, which means a critical mass of 180,000 inhabitants, and aims at offering specialist support on energy management, in all segments of the society and economy, to all interested stakeholders. Moreover, it coordinates and implements the goals set by LEC and provides annual reports, in the name of the Municipality, for the Ministry for Environment and Spatial Planning.

In order to eliminate all obstacles to energy efficient refurbishment the Agency organizes workshops on methodology used in energy performance audits of buildings, on minimum thermal performance requirements for new constructions and on those of a more comprehensive refurbishment of larger existing buildings. A considerable emphasis is also laid on heating systems, i.e. on regular inspection of boilers and other devices, on evaluation of heating systems whose boilers are more than 15 years old; on informing about new approaches to be taken and models to be used in achieving energy efficiency, such as energy bookkeeping which is planned to be introduced in all public buildings in the Municipality of Maribor. With energy audits of buildings, recommended measures for energy efficient refurbishment and the introduction of energy bookkeeping, an estimated 20 per cent decrease in energy consumption is seen as a realistic goal to be reached in the near future.

Another task the Agency carries out in order to enhance public awareness and inform energy users is a systematic set-up of a database on all energy sources, on their supply and consumption. Furthermore, it defines measures to be taken in achieving greater energy efficiency and applies new energy solutions. A central data gathering system has already been introduced in 63 buildings (schools and nurseries). The launch of an energy

management system makes room for taking energy efficiency measures with highest energy saving performance and designing an efficient building refurbishment plan.

Energy Efficiency Potentials and Measures

Individual projects of the existing public buildings are carried out within public-private partnerships which imply specific types of cooperation, e. g. Contract Energy Management (CEM). The CEM opened a possibility of running energy efficiency projects even in cases of insufficient financial means, since the financial impact in the form of energy savings affects all contracting parties - the owner, the contractor, and the tenant who might experience a slightly lower profit. Such contracting model makes room for investments into renewal of heating, ventilation, air-conditioning, cooling and other devices. In this way it makes use of available potentials for energy saving, which includes not only planning and new devices installation but also financing, operation management and inspection, servicing and maintenance, troubleshooting, as well as different kinds of motivation of energy users. CEM is a temporary agreement between the owner of a building and a private company providing energy performance services as the contractor. The owner refunds the contractor's investment through period-based instalments for energy delivery. Another way of refunding is to share energy savings. The presented way of service performance is of invaluable importance for energy users' motivation; moreover, it relieves the owner's financial situation and ensures positive environmental impacts-decreased use of energy sources and lower CO₂ emissions.

Inspection of energy consumption in public buildings represents an important tool that enables the users to measure proper variables in a span of time, to compare the figures, and to exercise surveillance of energy use. The system enables the interested parties to measure energy flows as well as energy efficiency. Besides, the Agency is studying new models appearing to support well-known methodologies tested in a certain number of European countries that make use of ICT methods and instruments. Since the EU adopted Communication on Mobilising Information and Communication Technologies (ICTs) to facilitate the transition to an energy-efficient low-carbon economy, new approaches to the cost savings focus on the behavioural change in the way to empower citizens and businesses to act by providing them with reliable data about their energy consumption. A new Central Communications body will be established to operate on all meter reading data. British government believes that they could save around 2 per cent in the energy use (<http://news.bbc.co.uk/1/hi/business/8042716.stm>, May 28, 2009).

Public Intermunicipal Housing Fund of Maribor

In the framework of energy management the Agency tends to extend its activities to several public institutions in the Municipality of Maribor. It has recently been focusing on refurbishment of social housing, in cooperation with *The Public Intermunicipal Housing Fund* (PIHF), an institution founded in 2002 by the Municipality of Maribor and 5 neighbouring municipalities. On the basis of its long term maintenance plan the PIHF defined its main task as continual provision of rental dwellings for all categories of

applicants along with the concern for the quality of housing. In addition to that, the PIHF manages its housing stock, consisting of non-profit and profit dwellings of different age and standards. It also acts as the main provider of public rental housing in Maribor and the surrounding municipalities.

According to the 2009 PIHF list, the non-profit rental housing stock comprises 2,865 dwellings with a net surface area of 155,974.92 m², including services. A certain number of dwellings are still being subject to denationalization procedures. It is therefore estimated, upon denationalization criteria, that the number of dwellings is going to fall down to 2,579 and their net surface area to 138,341.48 m².

Integral refurbishment of the housing stock managed by the PIHF certainly is one of the most complex and delicate projects in the Municipality, facing numerous obstacles described beforehand. The problems of the public rental housing stock are visible also in the diagram showing an extreme age diversity of the buildings (Figure 9) whose average age is 40 years. The buildings constructed by 1950 are energy efficient to a certain extent but inefficient in other ways. Those built after 1960 are in a bad technical state due to building regulations set at the time. Over the last few decades, there has been significant improvement in construction standards in Slovenia although some of them, e.g. thermal insulation and windows related standards saw their definition only by Regulations on efficient use of energy in buildings in 2008. One could infer from the facts listed above that buildings whose construction took place in the last 10 years boast of higher energy efficiency, which is unfortunately not the case owing to the insufficient quality of architectural design and realization. The consequence was extremely bad results of the energy use metering.

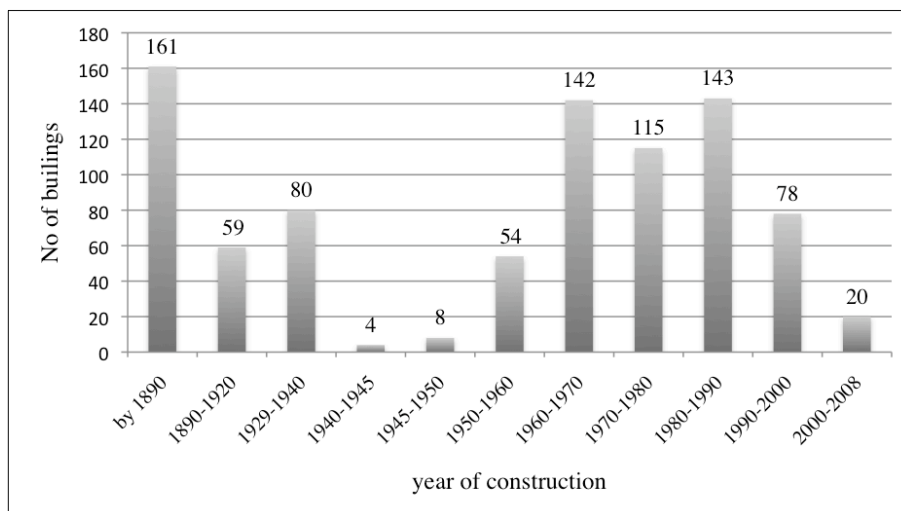


Figure 9: The age of residential buildings partly owned by the PIHF
Source: EnergaP, 2009

In accordance with the Housing act (2003) and the National Housing Programme 2000-2009 (2000), the PIHF prepares its own housing constructions programmes which are subsequently adopted by the Municipal Council. The realization of programmes is often hindered by difficulties in reaching a consensus for any kind of maintenance or refurbishment action, which is often the consequence of a mixed type ownership of dwellings in residential buildings. Furthermore, the current unfavourable financial situation of the PIHF resulting from the specific economic circumstances is rather inconvenient for

any reform regarding the complexity of refurbishment programmes. Consequently, the PIHF has even been considering the off-sale of the oldest share of its stock, with the purchase of new dwellings being limited to energy efficient buildings (the 2009 public call). The Fund's estimation goes in favour of refurbishment in cases of its predominant or exclusive ownership.

The project of integral energy efficient refurbishment of the public rental stock

Along with the Agency and with respect to LEC, the PIHF is planning to carry out a type of pilot project similar to that of energy efficient refurbishment of schools and nurseries whose first positive results are undoubtedly convincing. The already approved 2009 PIHF programme has not provided financial means for the housing stock refurbishment, which has not dissuaded the Agency from an energy efficient refurbishment-focused analysis of the residential buildings run by the PIHF. The first analysis has already been carried out and will serve as a basis for the pilot project action plan.

The PIHF decided to investigate 14 residential buildings out of its housing stock for the purpose of the project. Its selection criterion was the predominant ownership of the Fund which ensures the realization of a chosen refurbishment model on the basis of a single owner's decision and in cooperation with the interested stakeholders, i.e. following the model of public-private partnership. The buildings were constructed in the recent era and their average age is 12 years. However, they fail to meet the current requirements of energy efficient construction from two points of view, the technological and that of energy performance. The Fund has thus already made first steps by financing the study on technical defects of buildings situated in Veljka Vlahoviča Street. The study will be conducted by the Materials Research Laboratory of the Faculty of Civil Engineering at the University of Maribor.

Location/street	Year of construction	No of buildings	No of dwellings	Total surface area m ²
Engelsova ulica	1995	8	102	6155.12
Ul. V. Vlahoviča	1999	4	61	1465.3
Dominkova ulica	2000	2	24	2515.64
Total	/	14	187	10136.06

Figure 10: List of selected buildings JMSS Maribor
Source EnergaP, Maribor, internal materials, 2009

With its energy analysis of the selected buildings the Agency first examined electricity and heating energy consumption from 2006 to 2008. The results show an annual increase of 2.4 per cent in electricity consumption. The average annual electricity consumption per household in 2008 was 5,540 kWh. An average household has 3.5 people (according to the statistics), which is not a completely relevant number since some households fail to report the accurate number of people and consequently lower the costs charged. Since there are no experience-based standards in Slovenia, the Agency made a comparison with Austrian statistics, which revealed high energy consumption of Slovene households and subsequent heavy impact on family budgets. The average annual heating energy consumption per household from 2006 to 2008 was 100kWh/m², which classifies the selected buildings

among energy inefficient ones. Their situation however, is much better than that of public buildings whose average annual heating energy consumption was 150kWh/m² in schools and 220kWh/m² in nurseries.

The Agency foresees installation of electricity and heat meters to measure and regulate the use of energy. Such newly equipped buildings would then be incorporated into the central energy management system of the municipality running that particular system. The Agency can thus monitor and analyse data, which helps plan short and long term measures aiming at reducing energy consumption. Moreover, placing joint public orders of energy supply along with the previously described measures can sometimes mean lower costs for the tenants. The existing system of charging lump-sum costs per household does not make the tenants aware of their energy consumption responsibility. The latter will have to be taken by individual tenants since the installation of regulating and measuring devices enables the users to check their consumption on a daily basis, and invites them to act more rationally. Inspection systems can inform the users on their consumption compared to that of their neighbour or the entire street; unusual deviation from an average consumption level sets an alarm which simultaneously helps discover potential faulty energy system operation.

The Agency is aware of the necessity of continuous and intensive informing and simultaneous user training. Its expectations at the municipal level focus on a central system energy management control and monitoring applied to the entire public sector. The application of the system to the private sector is expected to take place in the future. Such central system allows average consumption and deviation to be defined through energy cost savings on a daily basis, which makes energy saving adaptable to individual groups of users or even to individual buildings. Constructional and technical parts of refurbishment will have to adapt to financial and other restrictions which dictate a time-based per-segment refurbishment; e.g. window replacement as the first in the line of steps to be made in the sector of schools, followed by building envelope refurbishment, roof and heating system refurbishment. Anticipated cost savings account allows an estimation of repayment periods of individual investments, which simplifies budget planning. Housing stock management and supervision of financial funds can thus be improved.

Another concern arising from legislation based requirements is the 25 per cent use of renewable energy sources. Their use in urban areas is rather limited, which calls for a special strategy and an action plan to meet the demands. Only after the data on energy use have been gathered will a complex solving of this problem become feasible - with common planning for several buildings or parts of town. The existing practice in Slovenia and even abroad shows a partial (individual building) problem solving method which leads to disadvantageous solutions on a long term basis.

The adopted methodology for energy cost saving

The first phase of refurbishment will comprise heating energy supply, i.e. cost saving following the heating system replacement, based on the Energy Supply Contracting model. Contract Energy Management, whose legal consent was given in 2008, represents a new model in Slovenia, based on the system of public-private ownership. The Agency is conducting a research on the possibility of introducing a purpose-shaped system that would allow a user to rent a certain energy supply infrastructure part, which distributes

responsibility between a private investor and a public institution. Given the experience and the present financial crisis, the model described is likely to be the only acceptable model for application. Owing to certain indistinctive factors, the model is being researched by groups of specialists in the sectors of public finances, legislation (public law) and energetics. A serious problem is currently seen in the lack of confidence of private investors who are reluctant to take a risk of inefficient energy management from the part of tenants. Inspection and monitoring of the users is difficult to conduct since it requires considerable financial means; a further problem lies in the lack of the relevant legislation frames for penalty in case of inappropriate or energy inefficient handling. In Maribor, the system is being tested on schools and will probably undergo adaptation to suit the needs of financing social housing (i.e. non-profit housing) refurbishment.

Example: due to its worn-out boiler-room a residential building faces high energy consumption costs in the amount of 100 units; a private investor provides a new boiler-room that a user rents for the entire period of investment repayment; although pure energy consumption costs are reduced to 60 units, the costs still remain at 100 units. The difference of 40 units would cover the boiler-room rental costs. Upon the expiry of the investment repayment period, the user is given the ownership of the boiler-room and the energy consumption costs are reduced to 60 units.

Conclusion

Our estimation referring to possible realization of approved strategies, concepts and action plans related to introducing efficient use of energy into all segments of economic, social and environmental fields of activity within public rental housing stock shows the existence of numerous impediments as well as opportunities. A serious approach ensures the transfer of all European documents requirements into Slovene legislation, which demands immediate action from all stakeholders. Energy sector was formally obliged to seek connection with the building and technology sector, which helped develop an integral strategic approach in case of new constructions and especially, in that of sustainable energy efficient refurbishment. In addition, a new national energy programme is undergoing the necessary procedures to gain approval. The programme sets harsher energy requirements and will undoubtedly call for supplements to the Construction Act. Even though several models are being tested via successful projects of good practice cases in different towns of Slovenia, there are still some open issues. One of them is integral energy efficient refurbishment whose problem lies in ensuring renewable sources since the state and its economy failed to develop appropriate programmes on renewable sources supply. Furthermore, it has been proved that building refurbishment calls for the need to focus on the non-profit housing sector where the problems of mixed ownership and related financial restrictions are non-existent. Based on integral approach to sustainable energy efficient refurbishment, the social housing sector in Slovenia means a great opportunity to revive building industry, at least as far as larger towns (e.g. Maribor) are concerned. Practice proves that different circumstances of activity organization – depending on the age of buildings, the quality of a project and its implementation and management - require the following: each building or set of buildings in the neighbourhood or a larger residential area needs an individual approach to refurbishment process with a prior identification of the most energy-efficient investments.

Given the state of insufficient own financial means, it is obviously only possible to address the problem of local level financing through inter-related system-based solutions foreseeing public-private partnership, which is the case of both, new building construction and the existing housing stock refurbishment. In the sphere of local politics and governance and with a view to realizing the adopted programmes, the Municipality of Maribor is looking for innovative solutions which are expected to set priorities for action programmes implementation, the process to be accompanied by most extensive cooperation with various stakeholders. The majority of incentives are assigned to buildings in the public sector. This assignment will set a good example of taking energy efficient measures in the public housing sector which shows significant lack of motivation due to its specific circumstances of ownership and unsolved management problems. Awareness raising, training and technical support for all active stakeholders are therefore of utmost importance.

The state of Slovenia fails to keep pace with European strategies in preparing legislation regulations and methodology for the field of energy efficiency and the use of renewable energy sources. Consequently, Slovenian municipalities undertake complex refurbishment each in its own way, with no common national strategy, since the Regulations on efficient use of energy in buildings are to take effect only on 1 July, 2009. Measures set in documents at the national level are rather of a theoretical nature, for the state lacks data on the existent state of buildings. Maribor is the first Slovenian municipality to have undertaken a systematic realization of the sustainable energy efficient refurbishment strategy and will probably serve as an example to be followed by the national level strategy.

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