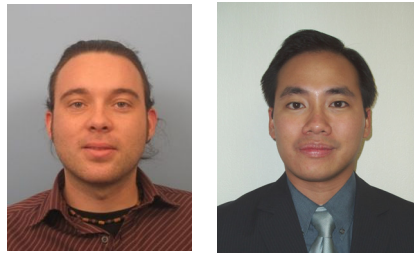


# DEVELOPMENT OF A LOCAL HOUSING POLICY TO FACILITATE THE SUSTAINABLE REFURBISHMENT OF HIGH RISE RESIDENTIAL BUILDINGS

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## Abstract

European countries are currently facing serious problems with the quality of their high rise housing stock. The majority of the high-rise housing stock was built in the first decades after World War II, and cannot meet the current standard in terms of technical and social quality. The need for refurbishment of these buildings and their environment is an urgent problem, but has not been adequately solved by the local government. There is still a need for a well-organised governance system at city, district and neighbourhood level that is able to initiate and facilitate the refurbishment programme.

An MSc graduation research project at the Eindhoven University of Technology on a pilot project in the Slovak Republic has shown that the effective implementation of new technical solutions for refurbishment is failed due to financial and organisational barriers. On the one hand, as home-owners or inhabitants are facing increasing costs for services (heat, gas and electricity) and maintenance, many of them are not able to take part in financial investments for major refurbishment. On the other hand, the intention of the European Union and different national governments to address the issue of sustainable regeneration often fails to reach the individual home-owners or inhabitants.

After describing the current situation and problems, this paper moves on to propose a new systematic approach for policy development. Based on an ongoing research project at TNO (Netherlands Organisation for Applied Scientific Research), conceptual process models are presented.

## 1. Introduction

European countries are facing serious problems with the quality of their aging high-rise housing stock, of which the most dwellings are dated from the first decade after the Second World War. These dwellings cannot meet the current standard of technical and social quality. Technical and social deterioration of the high-rise residential buildings have led to other problems of the living environment in many cities across Europe. In EU member states in Central and Eastern Europe alone, approximately 34 million people live in such dwellings (Turkington, 2004).

Refurbishment of high-rise residential buildings and their surrounding environment has received much attention at EU and national governance level (PRC, 2005). However, the development and implementation of sustainable housing policy at the local level is still lacking. Various initiatives to set-up pilot refurbishment projects and funds have not delivered sufficient impact to the local housing associations and home owners. There are many obstacles which hinder the attempts to apply innovations in technology and construction process, as demonstrated in the pilot projects, more broadly.

The hypothesis to be investigated in this paper through case studies is: A conducive political and financial environment is required for a successful development and implementation of the local housing policy for sustainable refurbishment of high-rise residential buildings. As it is often said, 'It takes a fertile soil to grow a tree from a seed', in the process of housing policy development, complex political, regulatory and financial constraints have to be resolved. In terms of politics, the investigation will focus on identifying the structure and objectives of the local government, and the solution to the fragmented communication processes between the local communities and the government. In terms of finance, the investigation will focus on the

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framework to enable self-financing capacity based on the cooperation between home owners, housing associations, and local businesses.

In the following sections, this paper will discuss a literature review on systems approach for policy-making and the state-of-the-art research on sustainable refurbishment of high-rise residential buildings in Europe. Subsequently, the hypothesis will be tested in case studies of local housing projects in the Netherlands and Slovak Republic. Next to the conclusions, several recommendations will be given to local governments and to the academic community how ideas and knowledge can be translated into practice.

## **2. Literature review**

### **2.1. Theoretical reference of systems approach for policy development**

A system is an assemblage of interrelated parts that work together by way of some driving process. Systems are often visualized or modelled as component blocks that have connections drawn between them (Pidwirny, 2006). As a policy can be seen as a system, the systems approach can be used in the policy development process. The systems approach integrates the analytic and the synthetic method, encompassing both holism and reductionism (Heylighen, 1998). This approach employs the systems thinking introduced by Simon (1960). When solving a complex problem following the systems thinking, one is to take out the parts which can be well defined and solve them separately.

In the latest development, systems approach has moved on to embrace the concept of autopoiesis and a variety of soft systems methodologies. Collectively, these theories offer a way of analysing policy quite distinct from the institutionalist approaches which tend to dominate the theory and practice of policy-making. Rather than selecting instruments to a particular kind of policy problem (the conventional approach to policy design) systems analysis suggests that the nature of the problem cannot be understood separately from its solution. For policy problems characterized by complexity (such as those concerned with environmental management and regulation, and urban re-development) using systems concepts offers a way of rationalising aspects of existing practice and of suggesting directions for improvement (Stewart et.al., 2001).

De Greene (1993) introduced a new paradigm which both presented and advanced the new way of thinking about the systems of science, technology, society, economics, politics, and the environment. It called for the replacement of the old cognitive paradigm. While systems theories and models can certainly be improved, De Greene placed great emphasis on the deficiencies in the structure of the policy situation and in policymakers. He provided the results of many years of working with complex systems in the contexts of systems analysis, systems design, and policy-making and decision-making.

While aiming at the application in the housing sector, in this paper we learn from Burian (1989) who discussed a framework for understanding policy analysis and development. The framework presented can be used in the policy development process or post facto in policy analysis. The usefulness of the framework is that it provides a means to think about a policy and its development. It is not prescriptive, nor is it predictive about any particular policy. Policy analysis has tended to rely too heavily on technical analysis, with insufficient attention to other dimensions. This framework offers a basis for people to talk across organisations and cultures.

According to the systems approach as understood from the literature, 6 steps of policy development process are defined in this paper, namely:

1. Preparation and informal consultations
2. Establishment of political agenda
3. Creation of social commitment and public opinion
4. Decision making
5. Evaluation
6. Implementation and policy management

### **2.2. Recent studies and research projects on housing refurbishment**

The literature review as presented in this section covers European research projects SUREURO and RESTATE on housing refurbishment, a study conducted for the European Housing Ministries' Conference, and a recent study by International Energy Agency.

SUREURO (Bueren et.al., 2002) was a large European research project, conducted between March 2000 and June 2004. The research focused on sustainable refurbishment of existing housing areas. Its goal was to stimulate and support sustainable and consumer oriented transformation of big housing areas (SUREURO, 2004). The main results of this project are management tools designed for housing companies and decision makers (government) in order to integrate sustainability and tenant participation in refurbishment management processes.

RESTATE (Kempen et.al., 2005) was a European research project carried out from 2002 until 2005. It studied the current situation and future prospects of large housing estates in European Cities. In seven of the first group EU member states and three of the new member states, large housing estates were examined to define which strategies and practices could contribute to the improvement of these housing estates. In

compliance with this research project, numerous reports have been published on individual cities and cases to illustrate the complexity of the singular projects. It was concluded that an integrated approach for policy making based on a strategic plan could contribute to better outcomes.

For the European Housing Ministers' conference held in Prague (CZ) in 2005, a report on sustainable refurbishment of high rise residential buildings and restructuring of surrounding areas in Europe was prepared (PRC, 2005). Based upon questionnaires sent to the 25 EU member states, and three accession states at that moment, a comprehensive analysis of national data was compiled. The main objective was to identify the problems of sustainable refurbishment and restructuring of high-rise residential buildings and surrounding areas. Not only were problems from a technical perspective discussed, but also social and economic indicators were taken into account.

A recent study by the International Energy Agency raises the issue of the extreme cost needed for effective energy saving solutions in the high-rise housing sector (IEA, 2006). The report identifies various barriers which prevent the occupants from maintaining and refurbishing the high-rise housing stock to the level of comfort and energy performance that meets the long-term expectations. Based on a number of case studies and pilot projects, the benefits of incorporating energy saving measures as part of the widely needed overall refurbishment are evident.

Despite much effort in investigating the comprehensive situation and understanding the complex problems of refurbishment as well as in raising the awareness of the local stakeholders and showing best practices using several pilot projects, little success has been achieved in solving these problems on the local level. The real challenge is to go beyond these pilot projects towards a wider implementation of sustainable refurbishment based on new local housing policies.

### **3. Case studies**

#### **3.1. Case description**

During this European Housing Ministers' conference held in Prague in 2005, the problems of high-rise residential buildings and the surrounding areas in the cities received main attention in the agenda. For a further action on this point, the Ministry of Construction and Regional Development of the Slovak Republic pointed out to the urgent need of refurbishment in their country. Almost 97% of the dwellings in Slovakia are privately owned, of which 50% are high-rise residential buildings. At present, it is estimated that nearly 70% of the national housing stock needs immediate refurbishment (PRC, 2005). Therefore, a pilot study on sustainable housing refurbishment in the Slovak Republic is very relevant. The problems in the Slovak Republic also reflect common problems in many Central and Eastern European countries. Considering this as well as based on the MSc research project by one of the authors of this paper, Brouwer (2007), the case of sustainable refurbishment of panel flats in the Slovak Republic is selected.

Several cities in different regions of the country were assessed for the eligibility for the pilot project. Among the most potential cities were Trnava, Martin, Presov and Liptovský Mikuláš. Preliminary plans for the pilot project were drawn and evaluated by an expert team. A medium-sized city was preferred for the pilot project in order to be able to monitor the objectives, processes and preliminary results. The city of Martin, which is located in the northern part of Slovakia, is a known example of a post industrialised city, in which many inhabitants live in high-rise residential buildings built soon after the World War II. Martin represents the housing situation in many other cities in the Central and Eastern Europe.

Martin is characterised by a relative monotonous large housing estate with high-rise residential buildings, which are locally known as panel flats or 'panelaky'. The housing refurbishment pilot project focused on a complex of 5 panel flats varying between 3 and 9 storeys which are situated at the periphery of the city. The complex consists of more than 300 apartments in total, of which 70 apartments are privately owned (the home-owners are members of a condominium) and 230 apartments are owned by a housing corporation or a non-profit organisation. In the further past, the ownership was much more divided between the owner-inhabitants and the housing companies which rented out the dwellings to the tenants. Since 2001, there was an intention to transfer the rental apartments to a non-profit organisation or a housing corporation that was responsible for maintenance in cooperation with the municipality. However, the lack of professional organised condominiums (associations of home-owners and tenants) and the limited financial resources of the municipalities caused the lack of actions taken. In the pilot project, next to the attempt to find sustainable technical solutions for refurbishment, much attention was given to enable the organisations (housing corporations, condominiums and municipality departments) to work effectively together in policy development and implementation for the refurbishment of high-rise panel flats. Among the most important steps taken during the pilot project are: setting-up the organisation for refurbishment project, the establishment of a housing corporation (non-profit organisation), and the development and execution of the project plan including the financing plan.



Figure 1: An image of high-rise residential buildings 'panel flats' in Martin (Habitat Platform, 2006)

### 3.2. Case study findings

One of the most important goals of the pilot was to present a best-practice example of the systematic approach to refurbish high-rise residential buildings. This goal was successfully achieved. Another goal was to effectively organize the collaborative effort for refurbishment. During the pilot project, the home-owners, tenants and municipal authority learned to acknowledge their position as problem owners. This was an important achievement and considered as the one and only way to establish a realistic improvement process based on a commitment from both public and private stakeholders.

During the pilot project, a new non-profit housing corporation was established. The organisation owned about 80 apartments. One of the most significant roles of this organisation was to coordinate the collaboration between the local authority on the one side, and home-owners and tenants on the other. The housing corporation contributed to the development of a well-organized rental housing sector which was much needed in Martin. In the housing market in the city, the demand for dwellings exceeded the supply by far. This resulted in high rents and low housing conditions. The enlargement of the rental housing sector organized by non-profit housing corporations was expected to provide a better opportunity to get affordable housing in a sustainable living environment. In turn, this would prevent the creation of social ghettos

Another important finding was the new role proposed to the municipality, namely to carry out an indirect control through a supervisory board, instead of exercising a direct control by rising rental price or forcing the home-owners and inhabitants to self-conduct the refurbishment.

As the commitment from the home-owners and tenants were essential for the success of the sustainable refurbishment effort, an assessment procedure for selection of tenants was necessary. During the pilot project, special attention was given to certain tenant categories, i.e. the young families, tenants with lower incomes, tenants with moderate income, and tenants with special reasons to live in the location, i.e. those come to the region for labour opportunity.

The result of the SWOT analysis performed during the pilot project is documented by Cervenov (2005) can be found in Table 1. The SWOT analysis shows, that the establishment of a non-profit housing organisation would contribute to the development of the rental housing sector in the city. New dwellings would be developed and supported by the infrastructure for mobility of the inhabitants in relation to the growing labour opportunities in the nearby areas. Knowledge of the state-of-the-art of sustainable housing was an important input to develop refurbishment plans. However, as can be understood from the SWOT analysis, finance was a serious weakness in the attempt for sustainable housing refurbishment. Based on the estimation made during the pilot project, to cover the overall costs for the refurbishment, a substantial financial contribution from the inhabitants was required. The optimal operation of the housing corporation was also depending on the financial sufficiency. If this issue was not adequately addressed in the business plan, it could become a threat. As regulated in the national legislation, the municipality must at least invest 51% of the starting capital of a non-profit housing corporation. Therefore, a solid business plan was prerequisite before a decision on the founding of such organisation can be taken.

Table 1: Results of the SWOT analysis on the pilot project housing refurbishment in Martin, Slovak Republic

Strengths		Weaknesses	
- Existing rental housing sector	- Motivation to maintenance the housing stock and surrounding environment	- Financial constraints	- Legal and financial framework
- Transport and mobility infrastructure	- Social cohesiveness		
Opportunities		Threats	
- New housing development	- Demand for better quality dwellings due to the grow of the industrial sector	- Inadequate business plan of the newly established housing corporation	- Tenant with paying problems
- International knowledge of sustainable housing		- High operational costs	

## 4. Analysis of policy development for sustainable housing refurbishment

### 4.1. Lessons-learned from the practice

In the beginning of this paper, a hypothesis is stated that a conducive political and financial environment is required for a successful development and implementation of the local housing policy for sustainable refurbishment of high-rise residential buildings. Based on the empirical knowledge from the case study, the hypothesis is confirmed. A conducive environment of policies and regulations is needed to guide the sustainable approach for whole cycle of the project, from the initial design and planning stage until refurbishment and demolition or recycling. New political and financial instruments are needed to prevent the deteriorating process of the existing high-rise residential buildings. These instruments are also needed to gather the commitment from the inhabitants and local commercial parties to contribute improving their living environment. During the refurbishment process, a link between the micro level (the refurbishment project) and the macro level (housing market in the city) is crucial to create a synergy effect.

Different instruments can be used, both for stimulation as well as for enforcement. Stimulation is important for facilitating and motivating people and organisations to actively involve in real attempts to improve their living environments. Some examples of the instruments to stimulate the development of rental housing sector are: the inclusion of long term financing systems for the construction of municipal rental housing into rational housing policies; and the extension of the housing stock of the non-profit housing corporation through reverse privatisation. In order to stimulate a better social cohesion, an instrument to facilitate heterogeneous groups of people living in the same building or area can be used. A proper tax relief system can be used to stimulate the inhabitants to invest in energy reduction measures. Together with the use of policy instruments for stimulation, the instruments for enforcement can be applied in certain ways, e.g. through formal procedures for the approval of plans and inspections to assure the building and environmental quality, and the obligation for multi ownership in high-rise residential buildings and to establish home-owners associations.

In terms of financing, as the financial burden is high for many of the inhabitants of the panel flats, the direction for future solutions should consider the extent of financial support by authorities and commercial parties. There are some interesting European initiatives focussing upon the urban revitalisation in terms of the founding and use of the structural funds for the refurbishment of panel-flats dominated urban areas. Another option is an arrangement through which financial institutions pre-finance the refurbishment projects, and get paid back over a certain period of time partly by the savings from the energy efficiency measures.

Next to the political and financial environment, organisation is an important factor to increase the level of support by project stakeholders, and is required for good decision making. The local government cannot act alone. It needs to empower the non-profit housing corporations to improve the social housing sector. A non-profit housing corporation needs a sustainable business plan. This contains the elaboration of sustainability in the mission, aim, strategy, and structure of the organisation. When developing the business plan, a market research is needed to determine the level of demand for social housing and the potential to economically sustain the business of the organisation. An adequate business plan is the first step to the establishment of a successful collaboration with the municipality, inhabitants and business partners.

All of these are the essential elements of the policy for sustainable housing refurbishment. In the following section the process of policy development will be analysed.

### 4.2. Proposed models for policy development process

A systems approach for policy development can be used to integrate different views and to structure the process involving many stakeholders. The implementation of this approach is not simple since it will take much effort to break down closed thinking patterns and working cultures as well as to introduce new roles in the collaboration. In order to do so, we firstly need to understand the real context of the policy for sustainable housing refurbishment. The model as shown in Figure 2 can be used to define the scope of the policy

development. The vertical axis indicates the targeted decision level. At the local level, policy development is aimed at elaborating strategies which reflect the policy for sustainable housing defined at European and national level. The first horizontal axis indicates the environmental scale, from micro to macro. Policy development for refurbishment of buildings and neighbourhoods is in direct relation with policies for product development, for instance sustainable façade, and urban area development, for instance mixed-use in the urban area. The other horizontal axis clarifies that refurbishment is a phase within the whole building life-cycle. In setting-up strategies for refurbishment, one should take into account the current state of the building, such as the quality of design and engineering which were decided in the previous phases, as well as the consequences of the applied techniques and materials for refurbishment for the future recycle of the building.

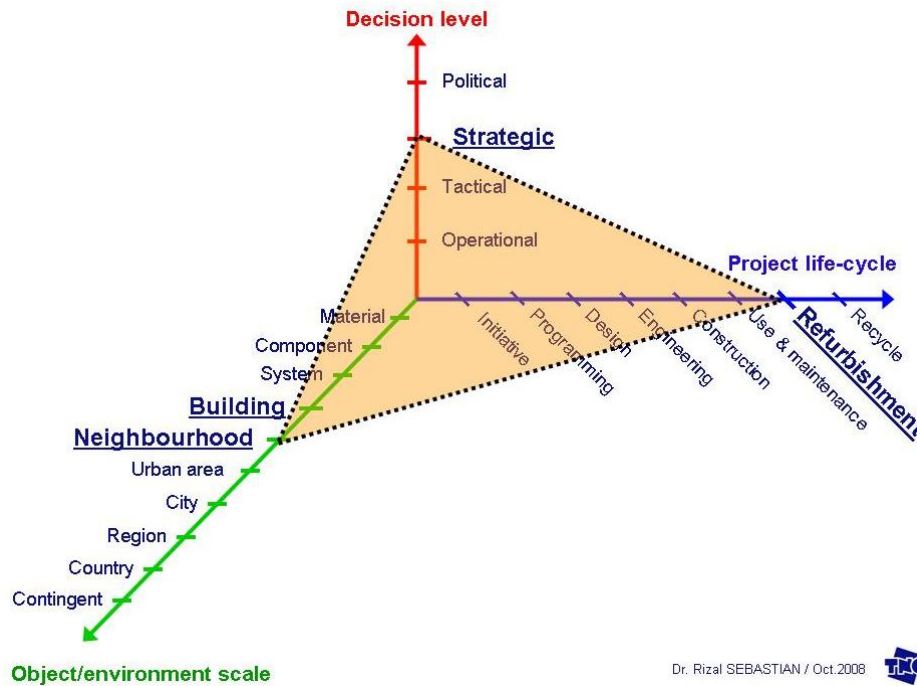


Figure 2: A model for defining the scope of policy development

After defining the scope, an analysis of the objectives and roles of the stakeholders in realizing a sustainable business case of housing refurbishment is required. This is to address the steps 1 until 3 of the policy development process as stated earlier in this paper (sub-section 2.1). For this purpose, a model shown in Figure 3 is developed. This model refers to the main factors of sustainable development, namely: people, planet and profit (Poll, 1999).

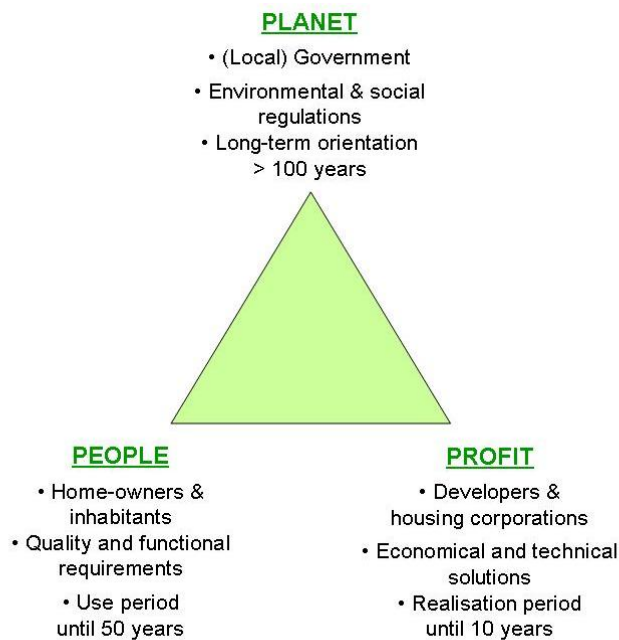
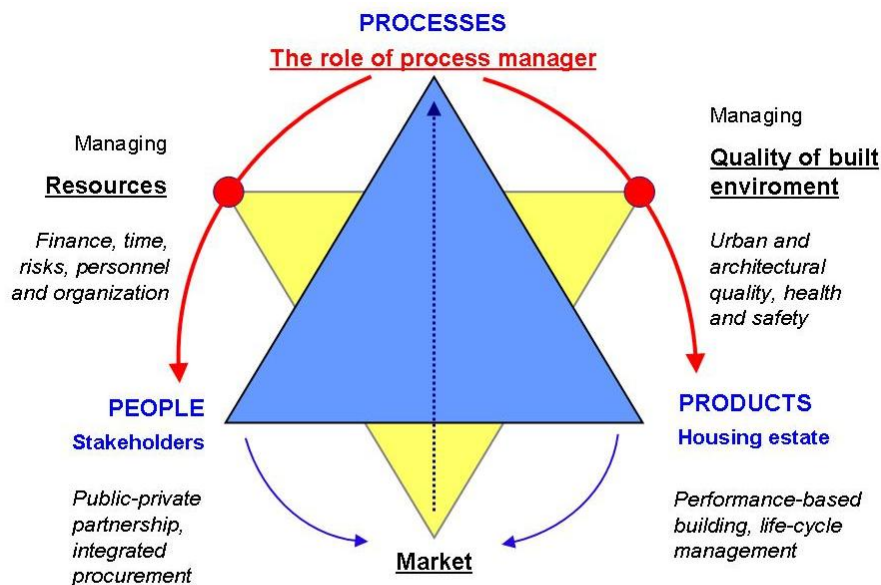


Figure 3: A model for analyzing the objectives and roles of the stakeholders in realizing a sustainable business case of housing refurbishment



In this model and within the context of housing refurbishment, 'people' means home-owners and inhabitants. Their focus is on quality and function of building and living environment, and within the use period, which in most cases does not exceed 50 years. 'Planet' reflects the role of local government and community at large. They are to assure long-term environmental and social sustainability, and therefore, set general rules and regulations. 'Profit' symbolises the importance of commercial clients in the housing sector, such as building developers and housing companies. They are mainly involved in the realisation period of dwellings in the neighbourhood, which generally extends up to 10 years. In the creation of a sustainable business case of housing refurbishment, these commercial parties are responsible for providing sustainable economical and technical solutions to the housing need.

Towards the management of the policy development process regarding steps 4 until 6 as presented earlier in this paper (sub-section 2.1), the model in figure 4 describes the role of the process manager in multi-actor collaboration. Sebastian (2007) stated that process management deals with processes, people and products. During policy development process, the process manager acts as the catalyst and facilitator of multi-actor collaboration in defining the common objective and vision, and translating these into applicable strategies. The process manager holds no formal authority over the stakeholders. Therefore, he manages the process by managing the resources and the quality of the built environment.



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Figure 4: A model describing the role of the process manager in policy development process

Regarding the resources, since a refurbishment project at neighbourhood scale is often too large for one party, public-private partnership is desired. The process manager helps the stakeholders to agree on the division of roles, responsibilities, efforts and risks within the partnership and in choosing the most appropriate procurement strategy. Regarding the quality of the built environment, the process manager assists the creation of the urban and architectural vision and the basic criteria on building, neighbourhood and urban scale prior to the development of a project plan. At this stage he facilitates the sustainable integration of the user requirements, available resources and innovative technical solutions, for instance through concepts such as performance-based building and life-cycle management. Sustainable partnership and sustainable construction are essential elements of the housing policy. When the housing policy is implemented and a refurbishment project is set-up, the broader impact will stimulate new sustainable initiatives in the market. The knowledge of the current and future market situation is important for the process manager to determine an approach with most desirable practical impact.

## 5. Conclusions and recommendations

Although the case study discussed in this paper is on high-rise residential buildings, the knowledge gained can be applied more generally for sustainable housing refurbishment. The wider relevance of the knowledge gained from the case study in the Slovak Republic can also be acknowledged at the European level.

Based on literature and case studies, it can be concluded that there are several perspectives in developing the policy for sustainable housing refurbishment, namely: the construction perspective, the socio economic perspective, and the eco-efficiency perspective. What actually needed for a successful refurbishment is an integrated socio-technical perspective based on the systems approach. This brings the added value in terms of: the inclusion of multidisciplinary aspects of technology, social-economy, energy-efficiency, legal and organisational systems into the conceptualization of sustainable refurbishment policy; the coherent multi-

level, bottom-up and top-down actions; and the systematic thinking taking into account a broad historical and cultural review, which helps to understand the background of specific local problems.

Having analysed the empirical evidence, it can be concluded that many innovative technical and energy-efficiency solutions and strategic tools, such as those developed in European research projects, are available. However, the practical impacts are still very limited, for instance the application of the refurbishment concept based on energy-efficient roof extensions which have only been used in a small number of projects. Although such innovation is technically and economically feasible, the reason behind the lack of wider implementation is often found in the lack of supporting and coordinating organisations. To improve this situation, the local government can motivate the collaborative efforts by the local stakeholders using a housing policy that emphasises the added values of quality housing for the inhabitants as well as the financially sustainable business case for the commercial parties.

Focusing more on the aspects of organising inhabitants' and stakeholders' participation during the process of policy development is one of the most important recommendations to the local governments. The local government should enable the associations of home-owners and establish non-profit organisations to provide information and assistance to the inhabitants and other stakeholders. These non-profit organisations, i.e. in the form of housing corporations, should be the leading actor in the refurbishment programme and should bring the necessary expertise to the working field. A housing corporation can also be given the mandate and the responsibilities for maintaining the social housing stock. Within this participative plan, the local government is to take the role as the process manager that becomes the catalyst and facilitator of the collaboration between many stakeholders.

Having known that housing refurbishment is complex involving different development scales from buildings to urban areas and different decision-making levels, an integrated framework should be developed. The academic community should contribute to the development of such a framework by incorporating a more holistic view through which experts of building technology and urban planning work together with experts on environmental, political, social and economic sciences. In such research teams, the real problems will be better perceived and solutions which can resolve multidisciplinary barriers will be put forward.

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