ENERGY EFFICIENCY IN URBAN RESTRUCTURING PROJECTS - GUIDELINES AND PRACTICAL LESSONS FROM 6 EUROPEAN CITIES

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Summary

Within the European project ENPIRE practical lessons were derived from urban restructuring projects in 6 European cities. Based on these experiences a set of guidelines was developed that can help to organize the decision making process. In this paper we will discuss both general approach for energy planning in urban restructuring areas and the practical implications on the basis of the Czech case study for the town of Havirov.

Keywords: Energy efficiency, urban planning, restructuring projects, renovation.

1 Introduction

All over Europe local governments are involved in projects to improve the quality of houses in the urban environment. This involves not only the development of new urban areas but increasingly also the restructuring of *existing* urban areas. Such restructuring projects offer very good opportunities for improving the energy efficiency of the dwellings. The potential for energy savings in such project is enormous, not only in Central Europe but also in the West. However, it is very important that the issue of energy efficiency is already considered at the most early stages of the urban planning processes

Within the European project ENPIRE practical lessons were derived from urban restructuring projects in 6 European cities (in Czech Republic, Denmark, Netherlands, Italy, Spain and Ireland). In this paper we will discuss both general approach for energy planning in urban restructuring areas and the practical implications on the basis of the Czech case study.

2 Energy and urban planning

The preparation of an energy plan as part of an urban planning programme involves a complex process with input from many different stakeholders and many issues to take into account. In many cases the local authorities (e.g. municipality) will be the party that is in

the best position to take the initiative for the energy planning process. The figure below shows a flow scheme that can be used to plan such a process.

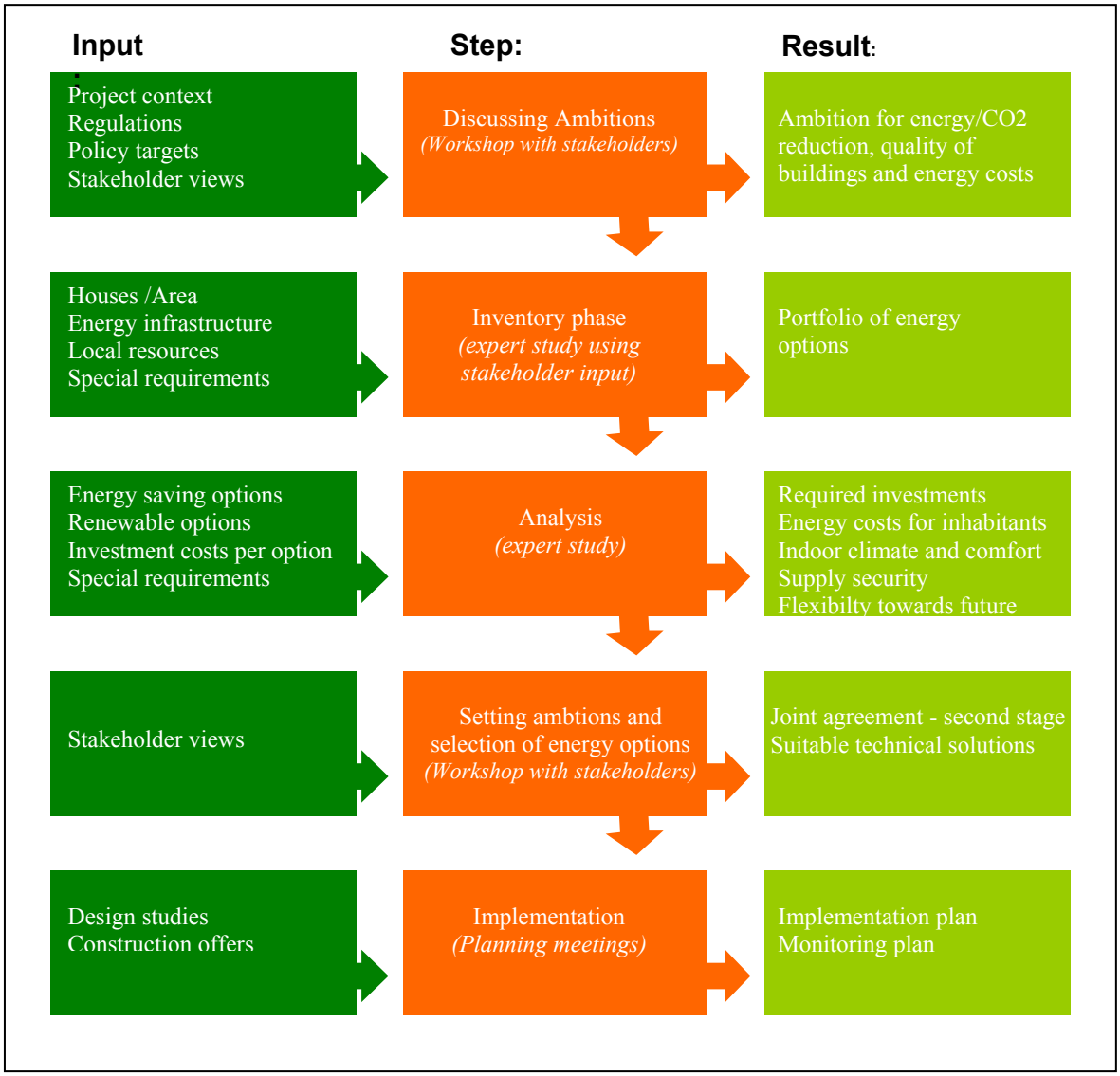

Fig. 1 Flow scheme for the process of energy planning

In this scheme we have discerned the following steps:

Discussing Ambitions: In this first step the ambition level of the project will be discussed between stakeholders. Themes in this discussion can extend to more than just the reduction of energy consumption and/or CO2 emissions. The technical quality of the buildings, the indoor climate, comfort levels and energy costs for inhabitants can all also be relevant subjects. CO2/energy ambitions will be set in relation to national and local regulations, climate policy targets and the overall project context (type of buildings, area, prospective users). A first agreement on the overall ambitions may be set out in a joint agreement document between local authorities, investors and prospective users. In later stages of the decision making process, after the analysis of reduction potentials and required investments, a recalibration or reconfirmation of the ambitions may be necessary.

Inventory phase: In this step all information is collected to characterise the project area, local resources of renewable energy, the present and future energy demand of buildings and building users, existing energy infrastructure, technical characteristics of the buildings, comfort levels, indoor climate requirements, and various social aspects. Also planned developments in adjacent areas may be considered as they may affect the possibilities for new energy infrastructures and certain collective solutions (e.g. activities generating waste heat or expected increases in heating/cooling demand). A good input from the stakeholders will be necessary to obtain all relevant information. Based on the inventory a portfolio of potential energy options can be prepared.

Analysis: The Analysis step builds further on the inventory phase by analysing the most promising energy options in terms of expected energy/CO2–reductions, required investments and energy costs for inhabitants. Also the analysis study will look at issues like security of energy supply and the flexibility of each concept with regard to future changes in the energy context.

Setting ambitions and selection of energy options: Depending on the detailed analysis results the original ambitions may need to be revisited, leading to either a reconfirmation of the ambition level or a downwards- or upwards modification of the original ambition. Broad support from all stakeholders for the decisions reached in this phase will be crucial for the further success of the project. Also at this stage, a decision may be made on the most suitable combination of energy measures which can achieve the agreed ambitions at acceptable costs and which also meet the additional requirements that were formulated in the first two steps. Potential bottlenecks in the following phase of implementation should be identified at this point and possible solutions for these bottlenecks should also be considered at this early stage.

Implementation: The implementation phase is of course the most important part of the process, and in many cases also one of the most challenging. This phase involves further participants with more interests than considered in previous steps and it has its own dynamics. Several measures can be taken to help in maintaining the ambition level intact and to monitor the (intermediate) achievements.

More information on the process of energy planning can be found in the ENPIRE Final Report and ENPIRE Guidelines which may be found on the ENPIRE web site (www.enpire.eu) in different language versions. Next we discuss the experiences in a specific case study for the Czech town of Havirov.

3 The case study of Havirov (CZ)

3.1 Local project area

The statutory city of Havířov is located in the region of northern Moravia at the edge of industrial area Ostrava-Karvina close to the polish border. Havířov has 89 000 inhabitants. Havířov is the youngest city in the Czech Republic. Officially founded in the year 1955 as a residential area for people working in the neighbouring coal mines and the heavy industry of Ostrava region. With few small exceptions the city was built on a greenfield land, 90,4% houses in Havířov area were built after the year 1945. The interior city urban

concept was very much influenced by russian stalinistic architectural styles and movements (so called SORELA).

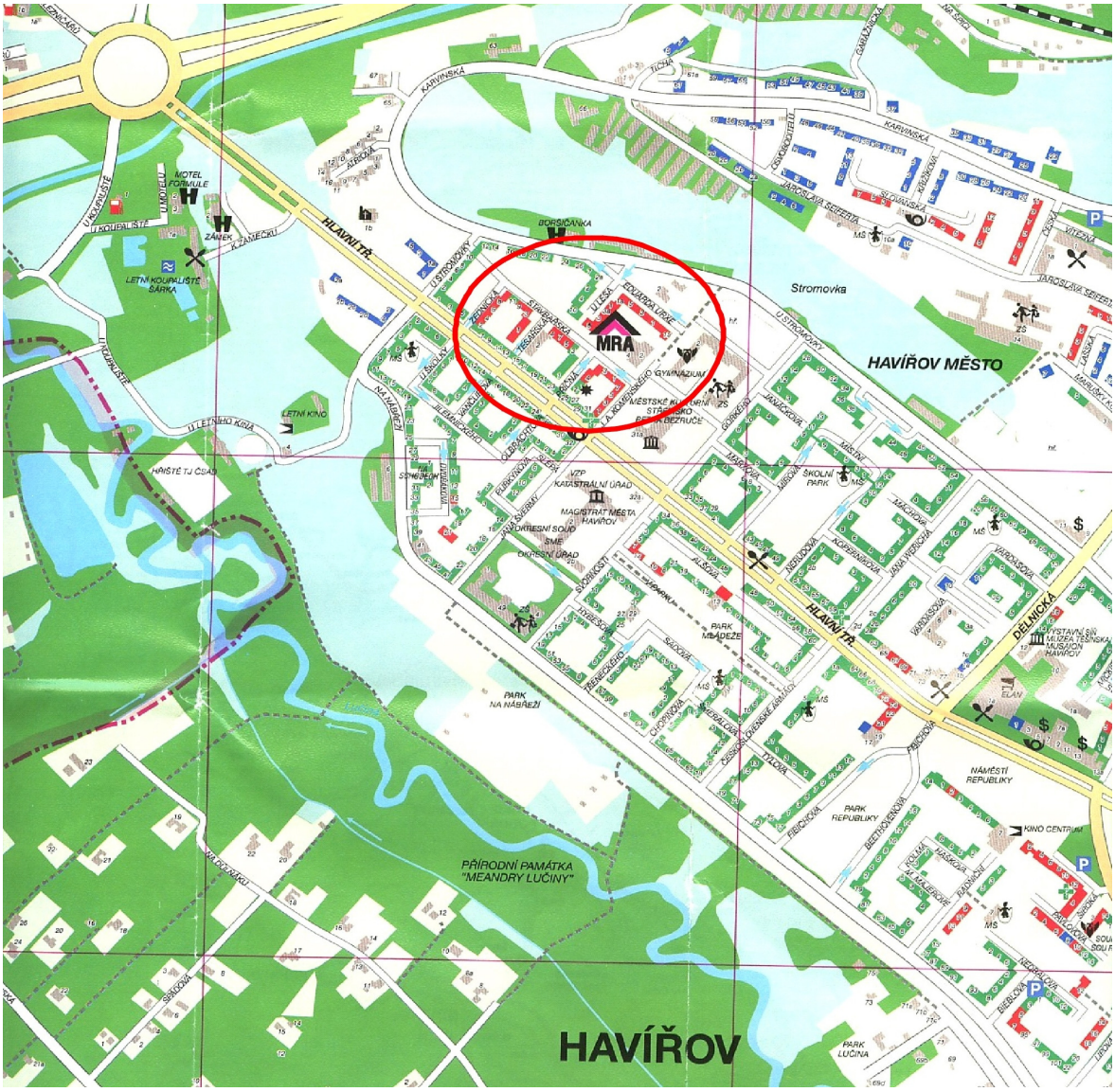

Fig. 2 Local project area map

The map shows the heart of the city of Havirov, that was built in the 1950´s. The buildings selected for ENPIRE local project are marked in red and depicted by a red circle. Most of the buildings are regulated rentals. The facility management of these buildings is provided by Municipal Real Estate Agency MRA who has been one of the partners in the project ENPIRE.

3.2 Energy strategic approach

During the past few years the MRA specialists have developed their own software tool supporting the energy strategic asset management. The tool shall give a possibility to the user to analyse the existing situation of his portfolio from different points of view and to set forward several scenarios to be evaluated and rated. During the local project execution

building data sheet will be processed for each building. The data sheet will be describing in sufficient detail the building situation from the technical, energy performance+CO_2 and social environment point of view. This data sheet will be linked with a list of possible strategic actions that can be customized according to the project needs, First results of energy vision study have shown that at least 20% energy saving ambition is realistic in case of buildings with partial restrictions on materials and technologies due to Monuments protection requirements. At least 30% energy saving can be achieved in case if additional thermal insulation can be applied to the exterior walls.

Fig. 3, 4 and 5 Details of SORELA facades

As already mentioned possible constraints are the conditions imposed by the Monuments protection office reflecting upon the fact that SORELA urban area has been declared a historical and architectural landmark. Restrictions on use of materials and products as well as technological processes leading to the improvement of thermal behaviour of the facade/building envelope (frescoes, mosaics) shall be anticipated.

4 Conclusions

Realisation of a high level of energy efficiency in building projects starts by giving this subject its own place within the overall urban planning process. In this document we have described a number of key steps in which the energy planning process may be broken down and discussed methods to manage the process. These recommendations are based on practical experiences in local projects in 6 European countries. Some key lessons that we have learned from these local projects were:

- Local authorities are in a good position to initiate the process of preparing an energy vision.

- Activation of stakeholders at the early stage and defining common targets can save a lot of time and energy;
- A wide scope of actors should be involved in initial discussions about ambitions. These discussions may cover more aspects than only energy or CO2 reduction but can also address energy costs and comfort levels for inhabitants, technical building improvement, etc. In this way a common set of interests can be identified with regard to improvement of existing buildings or the requirements for new buildings.
- A broad consensus among stakeholders on the desired ambition level is crucial for success in the implementation phase.
- Technical analyses should be used to support and guide this ambition setting process, but parties themselves will have to decide on the ambition they want to commit themselves to.
- A energy vision should consider also the options for the project area as a whole and not be restricted to measures on a building level.
- Technical solutions should preferably have a high degree of flexibility to accommodate future changes in energy infrastructure, energy demand and energy pricing.
- Modernization of district heating systems is needed at many places, low temperature district heating projects should be developed.
- Regulations that place an upper limit on the cold rent can be serious bottleneck for the economic feasibility of investments in energy saving measures. Consideration of total living costs (i.e. rent plus energy costs) and guarantees by property owners on the maximum level of these total living costs in the future will help to overcome this problem.

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References

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