BIOCLIMATIC IMPROVEMENTS OF EXISTING HOUSING BLOCKS IN KOSOVA

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ABSTRACT

It was with the emergence of the first oil crisis in the early 1970's that we started questioning the environmental impact of a lifestyle based on ever growing exploitation of non-renewable energy resources.
At present, sustainable development represents one of the major political ideologies and concerns of quite many countries of the world, and sustainable architecture represents prevailing trend and theme. Housing is one of the essential conditions of our existence and as 80% of planning, designing and constructing activities involve dwelling typologies, housing construction stands for a sector of major importance and of social interest.
The housing problems of the ever growing urban population in current cities are not easily solved through developments of individual housing typologies. Although medium to high-density apartment blocks have the least of an appeal for both architects and dwellers, they represent an utmost sociological and economical necessity.
In many European countries, various studies show that the construction of new dwellings consist slightly more than 2% of the existing constructions stock. In the case of Kosova, following the postwar chaotic urban developments, especially with the emergence of numerous illegal housing buildings, the space for any new constructions, including the green buildings, often gets narrower. This study tends to show that generally, improvements in energy performance are better accomplished when refurbishing and renovating an existing dwelling structure than when constructing a new dwelling.
The study involves the analysis of several existing apartment blocks built in the last decades of the last century in Kosovar urban areas and suggests possibilities of applying green technology and interventions in interior spatial arrangements with the aim of achieving higher energy performance of these existing dwelling structures.

KEYWORDS

Housing Blocks, Energy Efficiency, Energy, Efficiency, Bioclimatic Improvments, Improvement Measures, Refurbishment

TYPOLOGY OF HOUSING BLOCKS IN KOSOVA

The construction of housing blocks in Kosovo started after the World War II.
The chronologically building of typology of housing blocks in Kosovo are basically divided in:

1. Buildings constructed in the '50 and '60 of the last century.
2. Buildings constructed in the '70, '80 and a small number in '90 of the last century.
3. Buildings constructed since 1999 onwards.

Buildings under 1. and 2. are designed by architects of ex-Yugoslavia (Department of Architecture in Prishtina was established in 1978) and were similar to housing blocks constructed in the area of ex-Yugoslavia, meeting the norms, standards and regulations of ex-Yugoslavia.
After 1999 (2) a sudden increase of population in larger cities of Kosova (Prishtina, Prizren, Peja, etc) become apparent. Hence, the necessity of new housing blocks increased as well as legislative vacuum for some years allowed burst in illegally and abusively ill-constructed housing blocks now dominating large portions of central parts of cities in Kosova.
According to data offered by Ministry of Environment and Spatial Planning, more than 10000 buildings are constructed in Kosovo since 1999, of which the greatest number are to be found in Prishtina. (Enis Veliu, gazeta Zeri, shtojca javore per Ekonomi, Biznes dhe Karriere, 06 prill 2011) and a large portion of this number comprises housing. Most of these housing buildings are designed by unauthorized architects, students, civil engineers, etc. without a least consideration of building regulations and norms. They are very often designed without taking sufficient account of the climate. Factors such as the urban surroundings or site characteristics, orientation and architectural design of the building, choice of building materials, etc. are often not given enough importance, consequently, buildings often have a poor indoor climate, which affects comfort, health and efficiency.

BIOCLIMATIC IMPROVEMENT MEASURES FOR HOUSING BLOCKS IN PRISHTINA

"The most urgently needed refurbishment of all isn't of our homes, but our behavior inside them. The best efficient light on the market isn't really so clever if it's left blazing in an empty room"

As stated above, urban housing blocks in Kosova face problems because:
- Buildings are designed without taking into consideration the importance of energy consumption. - Heating systems are worn-out and of low quality, and low capacity. - Thermal performance of walls is critically low due to old and inadequate materials and poor detail design.
And, since Kosova faces major energy problems, bioclimatic improvement measures are an urgent matter to be considered.

1. Improvement of fabrics of buildings by adding insulation to external walls externally where missing or insufficiently sized (most of the housing blocks constructed after 1999) or substituting if depleted layers by new one.

2. If missing, in low pitched roofs (housing blocks constructed in 1950s and 1960's) insulation can be applied at the ceiling level, between and above joints, between and above rafter levels, or between and under rafter levels 2.

3. Addition of sloped roofs (of suitable geometry and structure) in housing blocks containing flat roofs (constructed in 1970's to mid 1980's). Insulating actions applied as in 2.
4. Taking measures in ensuring passive solar system in buildings:
4.1 Increasing the number south-facing windows;
4.2 Enclosing south-facing balconies to act as mini "winter gardens";
4.3 Applying to south-facing balconies adequate solar walls (Tromb-Michel System)
5. Taking measures in ensuring active solar systems: hot water boiler and apartment heating by solar panels installed in south-facing slopes on the roofs of Housing Blocks or (analogously to Augustenborg, Malmo) in a specifically assigned zone in the wider neighborhood.
6. Green improvements: covering south facing walls with green vegetation. Ensuring protection from sun (in the south) and from the wind (in the north) by green walls as well by planting trees at the vicinity of buildings.

7. Adding new external architectural elements (if missing) - glazed balconies and terraces (in buildings constructed after 1999.

8. Improvement of the internal functional organization of the apartments (adjoining, extension of south-facing rooms);
Also, energy consumption of an existing dwelling should easily be reduced by:
• Installing a more fuel-efficient boiler.4 • Maintaining and servicing heating appliances annually by a licensed technician. • Installing thermostats to control heating levels, such as thermostatic radiator valves and boiler timers thereby avoiding over-heating by using thermostats to control room temperature. • Insulating pipe work and hot-water cylinders, to increase the efficiency of the heating and hot water system. • Fitting photocells or timers to external lights to prevent electricity waste. • Changing incandescent lamps to energy-efficient versions.




INTRODUCTION

"The world will no longer be divided by ideologies of 'left' and 'right', but by those who accept ecological limits and those who don't" Wolfgang Sachs, Wuppertal Institute

Buildings represent a huge investment, not only of money and time, but also of the world's resources. In constructing and occupying buildings, we consume vast quantities of materials and generate a
major portion of the world's environmental pollution. According to the Worldwatch Institute, buildings consume more than 40 percent of the energy utilized in the world each year and, in so doing, release
into the atmosphere one-third of the carbon dioxide and two-fifths of the compounds that cause acid rain. We see in these statistics that buildings are responsible for many forms of environmental degradation. They place a heavy burden on the earth's resources, most of which are nonrenewable and finite, and they jeopardize the health and welfare of humanity. Thus it is increasingly urgent that we learn to build and operate buildings in a sustainable manner. (1)

However, as mentioned-above buildings in use or in the course of erection account for great amount of total greenhouse gas emissions, building sustainable architecture is about more than just concerns related to these emissions. We also need to make sure that these buildings are used in a way that minimizes their other environmental impacts, such as the water they use, the waste they generate, and the materials they are built from. The same considerations should apply to existing homes, which comprise the overwhelming majority of the housing stock. In Europe the housing industry has started promoting practical changes in response to the sustainability agenda, and it is about time Kosova start embracing a similar agenda for existing housing.

Cities in Kosova are burdened by chaotic and abusive developments of the first decades of 2000 and space for action by introducing newly constructed green buildings within existing fabrics is extremely limited. And as about 40 percent of our landfill material comes from construction (involving destruction of old structures) projects, decisive actions to mitigate climate change on the housing front notably include designing-in or retrofitting high standards of insulation, energy-saving and energy generating technologies (for example solar panels, ground source heat pumps) and maximising the potential for rainwater harvesting.
The challenges facing the housing industry should centre on adaptation to climate change as well as helping to mitigate its causes.

OBJECTIVES

The objective of this study is to focus on measures to be taken for the bioclimatic improvement of existing housing blocks in urban areas of Kosova.

METHODS

This study is carried out as a desk study. The work is based on:
- compilation of authors experience in academia and in designing work
- literature survey of experiences in Europe
- synthesis of personal and collected information
- study of two case studies in Prishtina

GENERAL CONSIDERATIONS

Buildings are responsible for 40% to 50% of the national primary energy consumption. Half of which is used in domestic buildings to satisfy needs for lighting, heating and cooling. As architecture must also ensure thermal comfort and a healthy indoor environment throughout the year, while diminishing conventional fuels consumption on the basis of a bioclimatic, energy efficient approach, upgrading existing inefficient buildings to meet principles of bioclimatic design is an effective way to reduce energy use in countries. (4)

EXAMPLES OF BIOCLIMATIC IMPROVEMENTS OF HOUSING BLOCKS

The Case of Augstenborg in Malmö, Sweden

Ekostaden Augustenborg, is one of Sweden´s largest urban sustainability projects. It is a housing block neighborhood in Malmö built in 1950 that has suffered from interventions done in the facades in the 1970 which resulted in severely lowering the quality of interior comfort in the apartments manifested with damp, ventilation and temperature control. The outer covering of the walls on some of the buildings has been removed and a new insulation layer has been covered with a skimmed painted render. The energy efficiency has increased by about 10 percent compared with the 1998 status of the buildings or approximately 35 percent more efficient than the original status of the building. Actions taken for ensuring energy efficiency involve replacing thermal insulation, enclosing balconies, replacing plumbing, adding water meters, installing solar panels connected to neighborhood central heating system, green roofs and open storm water channels leading into ponds and wetlands, etc.





CONCLUSION

The housing problems of the ever growing urban population in current cities are not easily solved through developments of individual housing typologies. Although medium to high-density apartment blocks have the least of an appeal for both architects and dwellers, they represent an utmost sociological and economical necessity.
In many European countries, various studies show that the construction of new dwellings consist slightly more than 2% of the existing constructions stock. In the case of Kosova, following the postwar chaotic urban developments, especially with the emergence of numerous illegal housing buildings, the space for any new constructions, including the green buildings, often gets narrower. This study tends to show that generally, improvements in energy performance are better

REFERENCES

Bjedic Dz.,2005: Optimalizacija ekoloških limita pri definiranju i materijalizaciji arhitektonskog prostora, Doktorska disertacija, Arhitektonski fakultet, Univerzitet u Sarajevu
Cantal M.& Revedin J., 2009: Sustainable Design, Birkhauser, Basel, Boston, Berlin
Hadrovic A., 2008: Bioklimatska Arhitektura, trazenje puta u raj ,Arhitektonki fakultet u Sarajevu
Jodidio P. 2009: GREEN Architecture Now!, Taschen, Hong Kong, Koln, London, Los Angeles, Madrid, Paris, Tokyo
Rich S.,2008: Ecological Houses, teNeues, Italy
Rudlin D. & Falk N., 1999: Building the 21St Century Home, The Sustainable Urban Neighbourhood, Architectural Press, Great Britain
Rosenlund H., 2000: Climatic Design of Buildings Using Passive Techniques, Building Issues vol 10, Housing Development & Management, Lund University
Allen E., 2005: How Buildings Work - The Natural Order of Architecture, Oxford University, Press
Makrodimitri M., (?): Energy Efficient Refurbishmen of Old Listed Dwellings: The Case of Victorian Housing Stock, Dept. of Architecture, University of Cambridge, UK
Malmo Stad publication: EKOSTADEN AUGUSTENBORG - on the way towards a sustainable neighbourhood, http://www.malmo.se/English/Sustainable-City-Development/PDF-archive.html (10 03 2012, 15:30)

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