

**„SMART BUILDINGS” HOUSING AND ECONOMY****Ljiljana Stosic Mihajlovic****Full professor, College of Applied Studies, Vranje, Serbia****Marija Mihajlović****University of Niš - Faculty of Architecture**

**Abstract:** *Expensive imported energy products (liquid fuels and gas) and the need for energy independence, direct us towards a strategy of increased use of renewable energy sources. Energy independence of one country can be read in the percentage of renewable energy sources (geothermal water, wind, water, hydropower, biomass, solar energy), compared to the amount of energy that is imported (liquid fuels and gas). In developed European countries, renewable energy sources make up 10 - 12% of the total energy balance, with us - just 1%. Environmental awareness obliges us to think about living in harmony with nature, using technologies that do not threaten the planet. If you would like to save a life on earth, must change the way of life and the way of construction. Inadequate access to jobs, is one of the most important contributions to global warming of the planet. Neanderthal Man is an intuitive built in harmony with nature. Technical and technological advances of civilization has brought the design and construction of the exhaust of fossil fuels, accumulate un-recyclable materials, improve emissions and alienate man from nature. For designers and investors is to develop, design and build „green”.*

**Keywords:** *smart bulidings, housing, economy, green ekonomy and green architekture.*

**1. Introduction**

The attribute „smart” office building gets its parameters by adjusting the external environment and the entire organization with employees and customers who spend time in it.

The need for automating business-residential facilities primarily resulting from efforts to save energy, given that about 45% of our world's energy is consumed by administration in commercial and residential buildings. The necessary investment is about 2% of the total investment, and the first results saving and cost reduction are visible after a few months.

Investors who first recognized the potential and possibilities, now very raspostranjenog required in a modern building, but reap the benefits of their investments. The system through savings pays for itself.

Some of the technologies applied in these algorithms are fuzzy logic, neural networks, genetic algorithms and the like. All of them are the result of many years of research and simulations conducted at the Department of Automatic Control and Systems, which produced a number of graduate and scientific works that are today successfully applied in practice. Some of the many examples of practical application of the algorithms, and the savings are as follows:

- Fuzzy logic control recuperative units Emergency Center Novi Sad has increased the efficiency of the recovery of more than 20%
- A combination of genetic algorithms and neural networks in the management of the chiller „Telenor Data Center” has reduced electricity consumption by 10%
- The optimization of air handling in buildings „Airport City” by controlling the concentration of CO<sub>2</sub> saved 10% of energy
- The combination of fuzzy logic and neural networks, and to manage the level of lighting in several buildings has led to energy savings of 15%.

Integrated BMS includes the following common sub-object:

Subsystem air conditioning, heating / cooling (air handling units, chiller, heat pump, heat substations, etc.). Brightness control outside the building and lighting in common areas (hallways, bathrooms, etc.); Control access to the common areas of the facility; Anti-theft system in the common areas of the facility; Measurement of electricity consumption, domestic hot water and the consumption subsystem responsible for heating / cooling the building; Fire protection system; Video surveillance; The unit system UPS.

In the event that the building has separate independent units such as offices, apartments or rooms-integrated BMS includes the following subsystems: Air conditioning, heating / cooling independently of each continent; The lighting control of each continent at the ON-OFF, with the possibility of defining the degree of brightness; Control of the curtain (curtains, blinds, etc.). Access control at the level of a whole; Anti-theft system at the level of a whole; Leak detection, etc.

## **2. Concept of „green architecture” and green economy**

„Green architecture” is the name for aritekturu generated and live in harmony with the natural environment. She respects the ecological principles, does not infringe them, draws renewable energy and fits into the natural streams as a living organism. This is the design and construction with

the full awareness of the nature and environment and use of natural ecosystems as a macro model of urban planning.

Green architecture is planned in line with a healthy way of housing (the correct orientation of buildings, abundant sunshine rooms in which to live and work, human population density in blocks and neighborhoods, plenty of greenery and recreational bodies of water ...)

It implies the maximum use of renewable and environmentally clean energy sources, conservation and recycling of water and energy, use of natural and recycled materials in the construction, use energy-saving materials (insulation, heating systems), use of sustainable technologies (economically and environmentally), design in harmony with nature and opening the interior to the surroundings, establishing a dialogue between objects and architectural environment with nature.

As a result of „green design”, there was a „smart house”. From the aspect of sustainable energy it uses most accessible and renewable energy. For us, it would be geothermal water, wind energy and solar energy, accumulates and conserves energy, integrates and combines energy systems, program control rationalize consumption, saves water, rainwater accumulates, recirculated water, control air quality in the home and the level of harmful emissions from home.

### **3. History of the development of eco-eco awareness in architecture**

When we talk about the concept of eco-consciousness eco then they mean that in the modern economy housing has to be a strong link between economic and ecological requirements on the one hand but also with architecture, and the need to live and work in a highly regulated and architecturally designed buildings.

From contemporary architects, the design principle „of dialogue with nature,” Steiner began, Wright, Alto, Le Corbusier. The awareness of stopping global warming damaging the planet building, was built in the second half of the twentieth century, which has issued several declarations (the conference of the United Nations World Commission on Environment and the 1986 Rio de Janeiro in 1992, the World Exhibition Expo92 in Seville). Today architects designed custom-made men, but with the awareness to protect the planet from further pollution. UNESCO, the world's various ecological movements and Architectural Association awarded the annual prize for the 'greenest' projects. The richest countries most economical grade buildings and settlements.

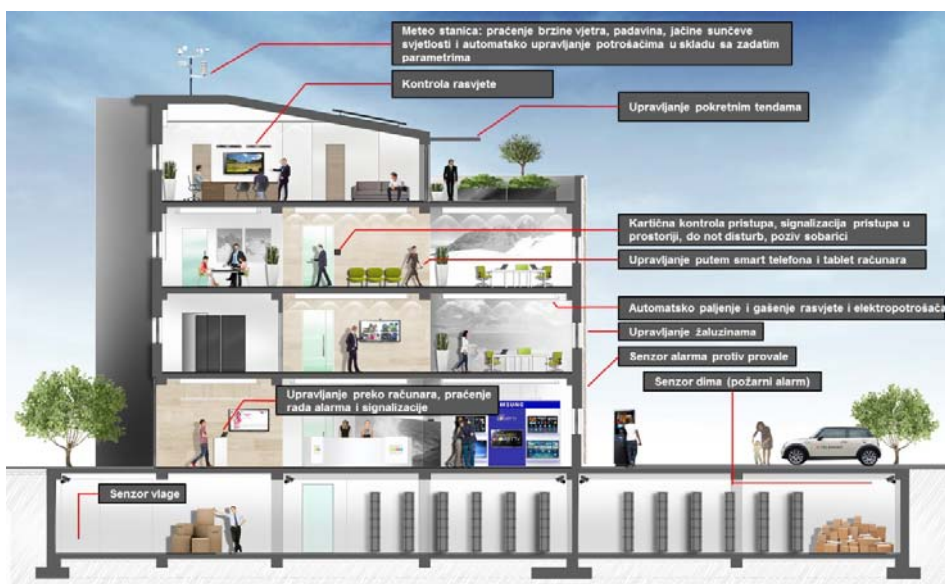
#### **4. Smart building or brutalism architectural and economy housing**

The emergence of Brutalist architecture in Serbia is mainly associated with the work of several authors, each of which is one of the most Branislav Jovin. Known by the project „Metro Beograd” and numerous embodiments, he stood out as a great creator of ground floor architecture. His projects Planning pedestrian zone Knez Mihailova Street and the Republic Square of work, largely determined the cosmopolitan character of Belgrade. When 1970. realized building Planning Institute of the City of Belgrade, implementing Natur- concrete as the primary means for achieving expressive term, Jovin has laid the foundation for research brutalist aesthetics in Serbia. The aim of this paper is to draw attention to the circumstances that led to the emergence of brutalističkih tendencies in Serbian architecture, and serve to further research the aesthetics of brutalism. In historiography is generally present opinion that Brutalist movement had significant influence on architecture in Serbia. First, be sure to note that the word „Brutalism” kind of instruction, because it means something that is raw, rough and coarse. However, it is more appropriate interpretation of the term when referring to the use of source material or when the building looks like it is still not dressed in anything subsequently applied. So it is the architecture that is consistent with the economic situation in the country. Asked whether such a position of significant influence on arhitekturu in Serbia, frankly, it should be noted that the architecture has been influenced by (press) the economic power of the investor. So today is not surprising that more and more often mentioned the term „investitorsa architecture”. This means that architects are increasingly subject to the influence of (economic power) the investors. For example, it was presumed that the house on the corner to be usually be accented dome, while the modern approach to the house should be like a tract, withdrawn in relation to regulation of streets, to form an antechamber in front of the object: to see when someone wears . When the object has no surplus, it is clear constructivism. So Brutalist movement had significant influence on architecture in Serbia.

##### **4.1. Smart buildings**

Smart buildings are objects that are used in building materials and systems that will contribute to a lower consumption of energy and they simplify the operation of all facilities. Office buildings, hotels, hospitals, schools, or buildings for housing, all have the need for savings and greater comfort. Increasing energy prices justify the investment whose return is getting shorter, and to raise environmental awareness is best influenced

through reducing energy bills and other energy products. Also, an increasing number of installations and weak current complicated system management and maintenance, and automated and integrated solution easier to use, content is easier to access and more easily managed systems. In the construction of the special care of well designed and built materials, insulation against cold object that is the basis of rational use of heating and cooling systems. Glass surfaces on the building are made of materials that transmit light and retain heat. Solar panels are used to simply heat water used in the facility.



**Fig. 1.** „Smart buildings” or green economy housing.

Source: <http://www.telemont.me/wp-content/Pametne-Zgrade.jpg>

In addition to the passive elements in the building, saving a crucial impact on the integration of all the systems that achieved BMS (Building Management System). Such systems make it possible to integrate: The lighting; Thermal Engineering (heating and cooling); Access control and presence on the premises; The safety systems: video surveillance, fire alarm systems; Awnings, blinds, shutters ...

Electro consumers manual control, air conditioning, ventilation and lighting is enabled in several ways: The control buttons on the premises, where everything is simplified to the extent that all users can easily control the temperature, lighting, blinds, sound system; The computer over the Internet; With mobile-smartphone.

The system monitors the outer temperature, intensity of daylight and the presence of staff at the premises of these simple scenarios are created optimal and comfortable microclimate conditions, and avoids unnecessary wastage of electricity, while its total savings reach up to 60% compared to a classic built facilities.

That those systems are not a luxury and expensive investment is the fact that Telemont which is otherwise engaged in designing and installing systems for intelligent building management set aside 2% of the total investment in the new facility for that system.

## **5. Conclusion**

„Smart” buildings are called objects in whose construction the materials and systems that contribute to lower energy consumption and simplify the operation as all the amenities. Office buildings, hotels, hospitals, schools and housing facilities - they all have the need for savings and greater comfort. The brain and central nervous system, „smart” buildings make up the central computer servers and databases, which are pouring large amounts of information collected, that account is given and processed are sent to actuators carry out actions. Numerous and various sensors and cameras, are surrogates for the senses, which collect information and initiate action, where the blood circulation, neural networks or spinal cord may have imitated some of the protocols and buses for the transfer of data and control signals, while many zonal controllers represent a kind of peripheral the nervous system. Finally comes the internet and internet networks that connect individual organism with the entire community.

Such as, for example, a living organism regulates its internal temperature and reacts by sweating skin, adapting to external conditions, or current physical activity, as well as „smart” buildings and can automatically adjusts its internal temperature or the temperature of each specific spatial entities, or external conditions internal inactivity in certain geographical areas, automatic control of heating, cooling and ventilation. The same principles apply to other subsystems that integrated and centralized system management office building controls, such as lighting interior, exterior and facade lighting, access control, fire alarm system for air quality control, safety control system, control pumps, generators, elevators, fuse, windows and other equipment in the building.

Finally, its full meaning concept receives creating a safe, comfortable, economical and secure environment, while also saving energy, reducing maintenance costs, longer life cycle of the equipment and

significantly reduce pollution emitted in the building environment, thus obtained and the general concept of the general social value and importance.

#### **REFERENCE**

1. Stošić Mihajlović, Lj. Komponente upravljanja znanjem: konkurenstski menadžment i menadžment ljudskih resursa”, International Journal KNOWLEDGE, IKM, Scientific&Applicative Papers, Vol.10.1, str. 87
2. Стошић Михајловић, Љ: „Заштита природе у стратегији одрживог управљања просотором”, ECOLOGICA No 63, 2011. година XVIII, ISSN 0354-3285, COBISS.SR – ID 80263175, UDC:504.75.03:177 <http://www.telemont.me/wp-content/uploads/2013/02/Pametne-Zgrade.jpg>