RATIONAL USE OF RESOURCES IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

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Abstract: *First strategy of sustainable development has been adopted at the European Council meeting in Goteborg (2001). This strategy was supplemented by an external size in the year 2002 by the European Council that take place in Barcelona. The Treaty of Lisbon (2007) has the table of contents and additional protocols on climate change and fight against global warming. In this respect, EU officials highlight alternative the need for thorough the connections between social systems, economic and environmental that contributes to the prevention and limit the risks, to support projects intended for public and private users. One of solutions is the ecological constructions, with various destinations, which are buildings and objectives assigned principles of sustainable development. They directly concerns ensure energetically efficiently, promoting a clean develop for savings and environmental protection. Ecological habitat is a modern and economical solution in which human-factor they can develop their activity and daily existence in an optimum way. This habitat can be achieved physically using recyclable materials, biodegradable and with systems and new technologies that lower costs of heating, air-conditioning and lighting.*
Keywords*: sustainable developing, ecological habitat, recycling materials, economy of energy.*

1. INTRODUCTION

A general objective of the European Union stipulated in the Treaty, that governs all policies and activities of union is to create the conditions for sustainable development of societies. Sustainable development means the meeting of actually generation's needs, without compromising the ability of the future generation to meet their own necessities

Sustainable development is a general objective of the European Union which governs all policies and activities of union and member states, as stipulated in the Treaty and took over in the documents and strategies, basic element of corporate orientation [3].

A few provisions of the Treaty refer to solidarity in matters related to the provision of energy and the changes in the policy European energy.

The Council, Lisbon Agenda 2020, the new draft of the Europe's economic strategy [5] aimed to promoting the economic growth based on the knowledge" and the creation of employment in long term by subsidy from the state, of "green technologies".

1.1 General objectives of the strategy for sustainable development of the European Union

The main objectives of the European Union's strategy of sustainable development are:

- limiting climate change, the costs and its effects negative for society and the environment;
- promoting models of sustainable production and consumption;
- improvement the management and to avoid over exploiting of natural resources;
- recognizing the value of the ecosystems services;
- promote the good public health fair and improve the protection against threats to health;
- create a society of social inclusion by taking into account the solidarity among and within the framework of future generations;
- ensure the safety and the increase of the quality of life of the citizen as a precondition for maintaining individual welfare;
- promote activate on the sustainable development on a large scale in conditions under which foreign and domestic policies of the EU are in participants with sustainable development [4].

In table 1 shall be presented by way of comparison, the share energy obtaining through renewable sources, from final energy consumption to the year 2005 and the estimate for the year 2020. It should be noted that the share energy from renewable sources in raw final consumption of energy in 2020, and in Romania will be approximately 22 %.

Table 1

Country	share energy obtaining through renewable sources, from final energy consumption in the year 2005	share energy obtaining through renewable sources, from final energy consumption to the year 2020
Belgium	2,2 %	13 %
Bulgaria	9,4 %	16 %
Czech Republic	6,1 %	13 %
Denmark	17,0 %	30 %
Germany	5,8 %	18 %
Estonia	18,0 %	25 %
Ireland	3,1 %	16 %
Greece	6,9 %	18 %
Spain	8,7 %	20 %
France	10,3 %	23 %
Italy	5,2 %	17 %
Cyprus	2,9 %	13 %
Leetonia	32,6 %	40 %
Lithuania	15,0 %	23 %
Luxemburg	0,9 %	11 %
Hungary	4,3 %	13 %
Romania	3,4%	22%
Austria	23,3 %	34 %
Poland	7,2 %	15 %
Portugal	20,5 %	31 %

Source:[3]

1.2 Research about ecological habitat

In our research on the construction of an ecological habitat [1], for the first we discussed about the house project. Then we must to find and choice the construction materials. These will be eco-friendly materials and must to use technologies which will be able to handle most economical energy resources necessary officials in optimum conditions.

An ecological habitat is a building green (a concept already well defined) with specified requirements relating to the site for the construction, use of sustainable materials. The water management, autonomy of consumption energy (by using a diversity of energetically systems), life-cycle analysis of construction, etc., is therefore a more permissive standard and for the built the house can use traditional technologies for the construction.

Figure 1 shows the temperature losses which occur to a classic construction, namely: 23% throw the roof, 14 % throw house basement, 19% throw windows, 14% throw venting system, 28 % throw the walls that are not thermal insulating.

Costs of heating and air conditioning are very low because materials used in construction of ecological habitat are very good thermal insulating. Costs for water heating are reduced by the use of an underground networks of pipes buried far below its frost quota (the system ensure a cold water at an average temperature both in winter and summer). These systems lead to the use of less than fuel; therefore the emissions of carbon dioxide will be low.

In the field of energy efficiency, environmental habitat is the nearest to traditional technologies, with the emphasis on thermal insulation windows, ventilation with heat recovery and using the heat pumps.

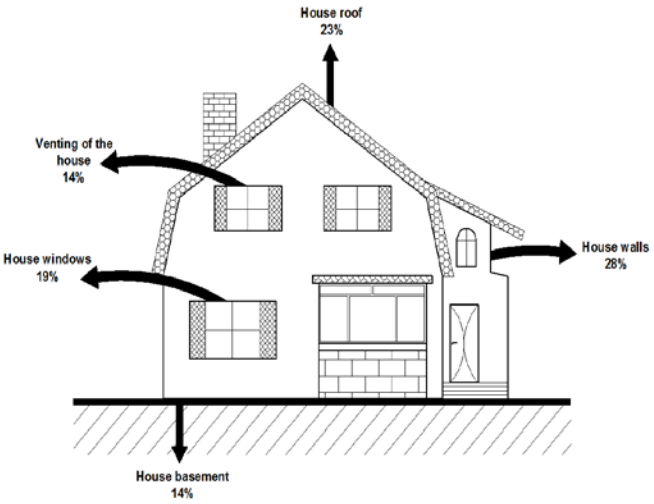

Fig. 1 The heat loose throw constructive elements of a classic type of house.

The concept that take in account the creation of construction that have smaller energy exchanges with the outside and the exposure of house to be on south.

There is an alternative concept, in which energy efficiency is obtained by restricting change of energy with the outside, but by controlling and directing the energy exchanges between inner and outer, of which the most promising concept (habitat shape) is that of bio-climatic design. Like building materials can be used wood, bamboo, clay mixed with straw (to increase the resistance) and other recyclable materials.

At this time, the European Union raised the standard with respect to energy efficiency of buildings. The new version on Energetically Efficiency of building (Strasbourg 2009) request that any building built in U.E. must to be „zero net energy building"[5].

Any new building should produce annually at least the quantity of energy they consume. Currently, in order to reduce the power consumption that was taken from national energy system, it is consider that ecological habitat can diminish with up to 10% the annual consumption using photovoltaic panels, wind systems, solar panels S.A.

May also be remembered and the lighting system Luxmate, which, by means of light sensors, determine the degree of lighting related to areas intended for offices. Depending on the level of sunshine sensors that are mounted in the building it is possible to reduce the power consumption by artificial light with 36%.

2. RESEARCH ON ENERGY EFFICIENCY OF ECOLOGICAL HABITAT

The construction materials used are natural raw materials (materials which are not processed in factories and refineries) or processed in simple workshops: wood, stone, clay, lime, sand, marble, terracotta and glass, combined in the most spectacular ways possible.

In the category of environmentally-friendly materials, successfully applied in residential constructions it can be talked about natural stones used on the floor house to obtain a thermal comfort.

Thus, we can use black basalt or stone of dark color that can be incorporated in the floor of a living room. These types of stone are loaded during the day with caloric energy and release heat at night.

The wallpaper on the basis of recyclable paper can be a way to ecological approach the house interior. We may be recommended permeable paints, which allow your house to breathe.

Wood can serve as functional application (structural) as well as material for finishes because of aesthetic appearance. From the wood processing it is uses very little power. For example, construction of timber offers a particularly architectural potential. Wooden floors are now recognized as being the future, because they look nice and reduce the dust accumulated and the germs.

Each construction material that we use comes from natural sources, and natural resources will be end in few years. Of all these materials only wood is regenerated, it being the most effective and environmentally-friendly construction material that we have.

To the center for innovative construction materials we made research to obtain a new construction material by using the combination between hemp that are introduced in clay. This composite material is easy to obtain by mixing fibers plant with a special adhesive and then we introduce all mixture in clay with 33% humidity. After that, this composite material is casting in diverse shapes and burned in a furnace. It is a very resistant material. The hemp plant, stores the carbon dioxide during growth. While we produce this material are eliminate minimum quantities of carbon dioxide.

The clay used like construction material it is not very popular because the authority in construction do not recognize the specifically technique of construction. Another reason is because it is necessary a lot of work volume to built such of construction with burned clay bricks. The architect that must do the project of such ecological habitat developed an especially work in the same amount by comparing with the project of classic constructions.

Fig. 2 Ecological habitat inside and in harmony with the landscape [2]

The cost of such ecological habitat is about 330 euro on square meter.

Eco-house, which was carried out by a concept of sustainable architecture, implies the use of construction materials as well as more natural, efficient air conditioning systems, good thermal insulation, a good natural light and eliminate potential sources of pollution.

In side of eco-house the water can be heating using solar panels (from the spring till the autumn season). The water is heat from solar radiation and not from hot air that surround these panels. Internal Heating in winter and cool during the summer period may be done with 'heat pumps', which use the difference between ambient temperature and the subsoil dwelling in the vicinity, being a source of renewable energy and the infinite. Interesting is that in summer, this system cool home (no need to have air-conditioning) and in winter it will warm accommodation.

In figure 3 shall be submitted to environmental habitat composed of multiple habitats and a complex of relaxation constructed of eco-friendly materials and integrated perfectly in the natural environment.

The eco-tourist complex can create the electricity necessary for the functioning, using photovoltaic panels and thermal pump for heat. Therefore, it is energy independence and he manages his own power consumption. From an ecological point of view, the project avoid altering major natural frame, limiting exaggerated extension buildings. The project being embodied principles bio climatic areas of compliance and a wide range of eco-technologies

Among the eco-technologies used is include the central heating system based of heat pumps air-water. The heating system cost around 27,000 euros, and the price for heating hot water dwelling and the winter amount to approximately 360 euros per month, to a surface built of 1650 square meters.

If eco-house is positioned in a hill-top, electric current can be obtained using photovoltaic panels in combination with a wind power system.

Fig. 3 Multiple eco-house and a complex of relaxation [2]

A house correctly thermal insulated can do energies economy to 80% and investment is dumping in two or three years.Eco-houses are based on two constructively particularities namely:"green roof" system and "sandwich" walls. "Green roof" system use a vegetal roof composed by a lot of leyers like: a hydroizolated leyer taht is covered by a drainage leyer and at last a vegetal leyer.

The roof retained water and has a high capacity to the water outlet so the vertical as well as to the horizontal position.Another advantage of “green roof" system is the replacement of garden with flowers and vegetables. This types of house are completely integrate inside of land where there are built.

The heating system has integrated in the floor of a heating system, which ensures a high thermal comfort, even in areas where floor is covered with natural stones, material known like a cold floor.

House subpoenaed again is semi-buried and shall provide natural thermal insulation by the thermal mass, which leads to minimize the need for energy consumption in both cold weather and the warm season. The eco-complex has not air conditioner system.

This habitat has natural ventilation in summer, supplemented by a system of piping that was set on the ground, what is an inflow of cold air during the summer period and complement the solutions to air conditioning.

3. SYSTEMS USED TO CARRY OUT THE INVESTMENT AND COSTS OF ECO-FRIENDLY HOUSES

Initial investment in a project of sustainable architecture is higher than in the case of a project used to, but the costs of maintenance and energy economy in the long term may be that this initial investment will prove to be very profitable, in the case of the Brasov house (fig.4) energy costs is three times lower than,

The eco-habitat has photovoltaic panels mounted on the roof. The Foundation, resistance structure and the walls cost about 330 euros per square meter. There are other additional costs resulting from the bulk of diggings and from the necessity of achieving a complex system of drainage systems. House floor is made up of leaf structure of wood, the cost of the raw material amounting to about 21,000 euros. In addition, with a view to the solution of architecture which provides large terrace areas planted has been necessary to use a type of professional hydro isolation to carry out such works.

The water supply is to be ensured by capturing a source. For effectuate the disposal of waste water is installed a system of biological sewage treatment micro plants. The cost was estimated around of 2,500 -3,000 euros for a flat. The biggest costs were, those for finishes and equipment for luxury like: fireplaces, objects of luxury health, facilities control, security and video monitoring - which amounted to about 1,500 euros per square meter. In addition, they have been used for the house exterior plating with ornamental stone.

Fig. 4 Eco-house with solar panels on the roof [2]

A normal dwelling (of about 250 square meters) has on average an installed power of 60-65 kW and a necessary heat shield 70 kW.

The eco-friendly house has a necessary heat shield of about 45 kW and an input power installed 40 kW. The heating system is accomplished by means of a heat pump which works in tandem with solar panels system.

In this way has been obtained from a cost of 220 euros per month for electricity under the conditions to temperatures which have fallen at night below -20 degrees. Costs of heating and hot water with the system traditionally on gas would have been of about 650 euros per month. In the case of a houses bio climatic areas cannot be reached and a zero energy consumption through the use in extension solar panels for heating and hot water and photovoltaic panels for electric current.

In Romania, from an operational point of view, the system for the promotion of renewable shall consist of the allocation of compulsory rate of energy, and green certificates, referred to in this law.

Southern Moldova and Dobrogea, Romania ranks the second in the European classification of the best locations for the construction of wind farms.

As regards the capacity of production of the wind farms at the national level, a study of Romanian Institute of energy shows a level of 13 TW to the level of 2020.

In Romania can be mounted wind systems to electrical energy produce with a total capacity of 14,000 lb) hitch shown MW. This capacity is equivalent to a contribution of electricity of about 23,000 GWh/year. Romania has a surplus of 150 million green certificates, which represent the certificate for the emission of carbon dioxide CO2. Sales of these deposit certificates may bring to the state budget approximately two billion euros by the year 2015[3]. This amount can be used throw environment Fund for project that can reduce the noxes level. According to the same document, each signatory State shall be under an obligation, not to exceed a certain amount of CO^2 emissions in the period 2008-2012[3]. The difference than the target set, may be recovered by selling green certificates to other countries which fail to reach target.

4. CONCLUSIONS

The concept of sustainable architecture and the use of eco-friendly habitat is in an incipient phase on the local market, but with the increase of energy costs and the maintenance of a classic building, such of investment will be taken into account more often.Eco-Habitat, in temperate climate conditions, it does not require conventional heating systems. In the case of such a building, the power consumption is less than the 70-80% lower than in the case of a houses built of wood or brick of burned clay. In generally wood and his derivation is a material of construction which provides ideal conditions for a healthy climate and air humidity is balanced in side of construction.

Materials that are used in the eco-habitat do not allow uncontrollably losses of energy out of construction. These types of buildings facilitate installing ventilation and heating systems, in accordance with the standards. Use of the new construction materials, derived from wood, clay and other, allowed for the establishment of creative opportunities and open new roads to a modern architecture, in the future.

Amount of energy required eco-houses heating are about 15kWh/mp/year. As standard, the eco-house has passive ventilation by using heat exchangers, which allow the recovery of 70-80% of heat, lost through ventilation. The external isolation of eco-house must be about 15 cm-thick polystyrene and organic foams. The windows must have two or three layers of glass, by providing them with a tire of quality and correct ventilation.

Eco-friendly habitat windows, must be positioned at south direction in rate of 60 % and 15 % of the north direction. It is recomande to use tripling windows together with a heat exchanger and we obtained a recovered energy rate of approximately 90 %. Besides the advantage of leaving a natural environment, they have minimal energy loss, precisely because of the walls construction and default integrated perfectly in the soil. Reasons for "minergie concept" (energy consumption in buildings and the most widely applied building energy standard) are: high degree of comfort, minimum energy consumptions and compliance with ecological criteria.

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