Philosophy of unity with nature as basis of energy-efficient house architecture

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Abstract. In the present age of deterioration of the ecological situation and an active search for the methods for improving energy efficiency in architecture, it is important to take into account the natural factor as a fundamental element in green design. The detachment from nature, the lack of a careful attitude toward it and the loss of the significance of the natural aspect affect the environmental sustainability of the environment. It seems necessary to justify the connection between architecture and nature at the philosophical level, to determine the patterns in the formation of green architecture. The article reveals the peculiarities of the mutual influence of the architecture of the dwelling and the natural environment and suggests the idea of creating a favorable environment in harmony with nature.

1. Introduction
Time of unlimited consumption of resources, contamination of environment resulted in worsening of ecological situation and excessive expense of world supplies of natural raw material. Such position compels world community of scientists to develop measures on renewal of natural environment, and methods of economy of resources. The man, surrounded frequently by of the same type architecture, forming an oppressive visual environment, all anymore aspires to nature. The task of creation of the ecological dwelling became extraordinarily actual, and all more architects work in the direction of planning ecologically of clean habitat, connecting functionality, aesthetically beautifulness and favorable conditions for a man.

2. Relevance and significance, literature review
The theme of forming of the ecological dwelling is widely overcame by many modern directions in architecture (figure 1). The actual need for an ecologically clean dwelling is confirmed not only by the projects of modern energy-efficient houses, but also by entire eco-cities and towns, in which ecology and wasteless technologies are connected [1-7]. It is worked out and the large variety of alternative energy sources is effectively used: energy of a sun, wind, energy of waves of the rivers, seas and oceans, energy of waves, geothermal energy, thermal energy of earth and air, biomass, which is a specially grown plant to produce energy. Different technologies are used planting of greenery of surfaces of building, allowing to reduce the level of consumption of energy in countries with a hot climate, due to the increase of heat-insulation and providing of additional sun protection, and to improve ecology of environment (figure 2) [14-17]. The modern systems of certification of
energy effective building operate and created, in the number of that recently worked out in Russia of Green Zoom [5].

![Figure 1. Spain. In harmony with nature.](image1)

![Figure 2. Vertical greenery of the eco-house.](image2)

### 3. Tasks

However, it is impossible fully to decide the problem of ecology of dwelling exceptionally technical means, modern receptions and innovative technologies. Seems very important to trace from what emerged the conditions that violated the ecological aspect. A philosophical approach is needed to study the relationship of man to natural environment, forming ecofriendly space. It is important to focus attention on the mutual influence of ecology and man, and what should be the foundation, basing innovative directions of "green" architecture. The philosophical understanding the problem of ecology of the dwelling gives the key to determination of basic receptions of creation of favourable environment.

### 4. Theoretical part

A man during many centuries lived in unity with nature. Nature gave to him all required for vital functions, surrounded him a cleanness from the point of view of ecology, strengthened his heartfelt forces, formed a world view. And only when we deleted from itself a natural factor, substituting a natural environment by domination of synthetic materials, there were terms for violation of ecosystem of architectural environment [8-13]. For example, physically excluding natural materials and energy-saving technologies from architecture, we are worsening an ecological situation. Spiritual disconnection with nature, absence of careful relation and caring about her, puts under a threat existence of resources and even influences on a climate. Thus, we can set forth the idea of importance of maximal integration of architecture in nature, meaning a synergetics effect in the process of forming of ecological habitat[18-20].

Among many directions in architecture, examining nature as inalienable part of project, it is possible to distinguish organic architecture that despite the birth in the 90's of the 20th century, constantly improves and finds more modern lines, at the same time consolidating an ecological aspect.

A "House at the rock" of the Norwegian architects of Lund Hagem is actually built-in in nature, a rock replaced one of walls in a project, and a thick vegetation protects in natural way a place from a sun and wind (figure 3).
Figure 3. "House at the Rock" by Norwegian architects Lund Hagem.

Another interesting house in organic style - "The paradise - like house" in China (figure 4). In this project the special attention it is desirable to turn on the abundance of sunlight and natural materials. For creation of effect of security and confluence with nature, to the windows of bedroom are added enormous boulders. Paterfamilias, getting tired from a city, aimed to surround nature dwelling, that it was effectively succeeded to incarnate in a project, both in an interior and in an exterior. The Fully glazed residence of "Hidden Pavilion" in Spain opens a kind on the picturesque forest of all corners of building, creating harmony of space in that dwellings apartments as though are located in the middle of natural landscape. The Large value in modern organic architecture is spared to planting of greenery of space. It is as an example possible to look at the project of dwelling-house of studio Penda in Indium every apartment of that supposes the own green garden. It is needed to mark that a building facade, due to placing of gardens on every tier of house, must decorate and plant trees and shrubs character of all adherent municipal environment (figure 5).

Figure 4. "The paradise - like house" in China.

Figure 5. Project of a residential house in Penda.
Eco-friendly architecture besides energy-saving technologies constantly cares of the use all new natural materials, using modern technologies for innovative developments. Thus, exactly nature becomes basis of ecofriendly choice of materials. Presently most demanded are the panels applied for warming from flax, wool, cotton, cork, algae material, actively used wood chipboard, that is easily processed and does not have in the composition of glue connections. New heavy-duty wooden structures that will compete with a brick and other materials are developed. Besides energy efficiency, timber-works have a row of advantages among that stability to seismic activity. The so-called wooden brick is most widespread in application.

Efficiency of ecofriendly decisions is complemented by application of the modern newest technologies. All of them are aimed at conserving natural resources and work-hardening of eco-stability of environment. It is possible to cite as an example Green BIM technologies taking into account the ecological aspect of model, the plugin BIM IQ from Oldcastle Building, visualizing a model in real time, in addition creating the thermal maps of facades, service of VIMtrek, that allows to translate BIM model in the virtual 3D environment of high quality. VR in planning ecologically of clean space allows to imitate different environmental conditions.

5. Conclusions and practical significance
Considering the methods of forming of ecofriendly architecture, including by volume of-spatial decisions, choice of materials and application of technologies, we see the dominant role of nature and her ecological aspect. "The most praiseworthy is the architect who is able to combine beauty in construction with convenience for life" - quotation of the prominent Italian architect and sculptor Lorenzo Bernini. Integrating architecture in nature, we get both a comfort and clean natural beauty. Investigating the problem of ecology of dwelling not only from the point of view of energy efficiency, but first of all from the point of view of maintenance and defence of nature, we simultaneously decide the tasks of eco-stability in architecture of dwelling. The scheme developed by us visually demonstrates the interconnection of nature and the ecological aspect, uniting to itself energy saving, the formation of ecologically clean space and careful attitude to the natural environment (figure 6). Thus, the architect working in the direction of "green" architecture must take into account in the projects indissoluble connection of man with nature. In this case, a project and his realization will be in harmony with an environment, will create favourable terms for a man and will not prang natural balance of natural environment.

Figure 6. Scheme for the formation of a favorable architectural environment, based on nature.
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