Қазақстан Республикасы Тәуелсіздігінің 30 жылдығына арналған «Сейфуллин оқулары – 17: «Қазіргі аграрлық ғылым: цифрлық трансформация» атты халықаралық ғылыми – тәжірибелік конференцияға материалдар = Материалы международной научно – теоретической конференции «Сейфуллинские чтения – 17: «Современная аграрная наука: цифровая трансформация», посвященной 30 – летию Независимости Республики Казахстан.- 2021.- Т.2, Ч.1 - С. 215-217

GREEN ARCHITECTURE

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With the increase in the number of people on Earth, the destructive impact of human activity on the environment also increases. In this regard, there is a need to apply a number of measures to preserve what we have through the development of alternative sources of energy, heat, water and air purification. Therefore, the idea of "green" architecture is more relevant in our time than ever.

"Green" buildings are designed, constructed, and maintained to make them as viable as possible with minimal environmental impact. The main focus is on the efficient use of natural resources, reducing the impact of waste and pollution on the environment, providing all the materials necessary for construction, without affecting the natural world.

The beginning of the formation of "green" architecture is considered to be the 70-80’s of the 20th century. After the next energy crisis, the Western world seriously thought about the problems of the environment and the conservation of natural resources and began to actively work on the idea of "green" construction.

At first sight, it may seem that "Green" architecture is just an architecture with an integrated natural component, but if we consider this concept more thoroughly, we can come to the conclusion that it is an energy-efficient, economical and ecological architecture that is created through the interaction of both engineering and architectural and landscape solutions.

Green architecture, philosophy of architecture that advocates sustainable energy sources, the conservation of energy, the reuse and safety of building materials, and the siting of a building with consideration of its impact on the environment.

In the early 21st century the building of shelter (in all its forms) consumed more than half of the world’s resources—translating into 16 percent of the Earth’s freshwater resources, 30–40 percent of all energy supplies, and 50 percent by weight of all the raw materials withdrawn from Earth’s surface. Architecture was also responsible for 40–50 percent of waste deposits in landfills and 20–30 percent of greenhouse gas emissions. [1]

Principles Of Building Green

The advances in research and in building techniques achieved by the above-mentioned green design luminaries have been compiled into a reliable database of environmental construction methods and sustainable materials—some of which

have been in use for thousands of years yet remain the basis for contemporary advances in environmental technology. For private residences of the 21st century, the essential green design principles are as follows:

-*Alternative energy sources.* Whenever feasible, build homes and communities that supply their own power; such buildings may operate entirely off the regional power grid, or they may be able to feed excess energy back onto the grid. Wind and solar power are the usual alternatives. The quality of solar collectors and photovoltaic panels continues to improve with the advance of technology; practical considerations for choosing one supplier over another include price, durability, availability, delivery method, technology, and warranty support.

-*Energy conservation.* Weatherize buildings for maximum protection against the loss of warm or cool air. Major chemical companies have developed responsibly manufactured, dependable, moisture-resistant insulating materials that do not cause indoor humidity problems. Laminated glass was also radically improved at the end of the 20th century; some windows provide the same insulation value as traditional stone, masonry, and wood construction. In regions that experience extreme heat, straw-bale or mud-brick construction—used since ancient times—is a good way to save money and energy.

-*Reuse of materials*. Use recycled building materials. Although such products were scarce in the early 1990s, since the early 21st century they have been readily available from a burgeoning number of companies that specialize in salvaging materials from demolition sites.

-*Careful siting.* Consider using underground or earth-sheltered architecture, which can be ideal for domestic living. Starting at a depth of about 1.5 metres (5 feet) below the surface, the temperature is a constant 52 °F (11 °C)—which makes the earth itself a dependable source of climate control.[2]

Challenges To Architecture

If architecture is to become truly green, then a revolution of form and content—including radical changes in the entire look of architecture—is essential. This can only happen if those involved in the building arts create a fundamentally new language that is more contextually integrative, socially responsive, functionally ethical, and visually germane.

Likewise, green architecture in the 21st century has similar obligations to the psychological and physical needs of its inhabitants. Buildings are most successful when they respond to multiple senses—meaning that truly green design engages touch, smell, and hearing as well as sight in the design of buildings and public spaces.

Continuing advances in environmental technology have significantly strengthened the goals of sustainable architecture and city planning over the last decade. Yet many people consider the environmental crisis beyond their comprehension and control. Though technological solutions are necessary, they represent only one facet of the whole. Indeed, the transfer of responsibility to engineers and scientists threatens the social and psychological commitment needed for philosophical unity [3].

Results and discussion

"Green" architecture is very relevant to the modern architectural and construction trends, the relevance of which is due to the

increasingly increasing role of environmental construction.

American architect Louis Sullivan and sculptor Horatio Greenow, English architect Christopher Day are among the ideological leaders of "green" construction. K. Day drew attention in his books: "Places where the soul dwells. Architecture and environment as a medical treatment means" and "Build as your heart tells you" - not so much on the practical side of energy saving, but on the aesthetic, artistic correlation of nature and architecture. The father of "green" architecture is considered to be Frank Lloyd Wright, whose creative projects fully reflect the author's desire to create buildings that fit seamlessly into the landscape situation and are subordinate to nature. The greatest example of the coherence of the environment and architecture it became a country "House over the waterfall", designed for the Kaufman family, the quintessence of the concept of which is just in the property "to be in harmony with its surroundings, if nature manifests itself there" . The commonality of the landscape and the created projects of F. L. Wright is also based on the use of native materials, which causes the lack of clarity in the reading of the building that exists as part of the system, and the exterior, which is opposed to the functionalist actively developing architectural approach. Architectural organicity is not yet associated with "bionicity", but more with "naturalness", which is dominated by geometric forms, in contrast to the projects of the German architect Hugo Hering. This concept is becoming popular in the works of European architects, and depending on the region, it is local, with its own individual characteristics [2]. An example of the interaction of functionalism and organic architecture is the work of the Finnish architect Alvar Aalto: the order of the correct forms of early creativity is replaced by an eclectic combination Finnish original and international styles, "green" architecture, characterized by a polymorphic interesting compositional structure, consolidated with the environment [5].

The building of Villa Mairea, which creates a "forest" image both in the interior and in the exterior, makes it possible to trace the "nature" of Aalto projects. The projects of Reim Pietil are identical to the projects of Aalto, the natural contextuality of which is formed not only by the perception of" nature " in the internal and external architectural structure, but also in the form formation. The broken shapes of the ceilings, walls, and planning axes of the Student Club "Dipoli" are set by the brute stone rocks, and the plasticity of the forms of the Public Library "Metso" is seen by the architect as correlating with the image of a capercaillie or a clam shell. [2]

Source: Forbes magazine

It is evident from the recent statistics that fossil energy is becoming rarer by every passing day and soon it would become too expensive to afford. It is a global problem and no country is immune to it. We have to find a quick transition plan

and should find newer methods to harness energy from available resources. So energy conservation and use of alternate energy forms is a must if we have to postpone a global economic crisis. And Green architecture is one way of doing it [4].

Conclusion

We must not forget the main idea of "green" architecture – the creation of a comfortable life, health and aesthetic perception of the human environment. This is motivated by the special relevance of integrating architecture with nature, the introduction of natural elements in architecture.

Many nations, Like Dubai, for example are making it mandatory that all new buildings should be constructed using Green Architecture technologies (Source: Green Building specifications, Dubai Government). With so many environmental problems like pollution and global warming looming over our planet, every single solution to preserve our nature is precious and should be followed without excuses. Today 25% of the world's population lives without electricity.[5] But basic electricity requirement of these people, for their fundamental needs such as light at night and pumping water, would amount to just one percent of the entire energy demand that prevails today. As responsible citizens, it is our duty to ensure that we take all the necessary steps to provide our children a safe and pollution free planet which is devoid of any energy crisis. Green architecture, through its vast array of techniques, helps us to eliminate the adverse effects caused by buildings on the environment and thus helps us take a huge step towards living in harmony with the nature.

References

1. O. Attmann. Green Architecture: Advanced Technologies and Materials. DEFINITIONS AND OPERATIONALIZATIONS OF GREEN ARCHITECTURE. McGraw-Hill Professional: 2010. P 289.

2. C. Rice & B. Penner (2019) Introduction: the foundations of architectural research, The Journal of Architecture, 24:7, 887-897, DOI: 10.1080/13602365.2019.1695915

3. D. Hawkes. The Environmental Imagination: Technics and poetics of the architectural environment. Routledge, London & New Yor:2008.p375

4. Melissa Hincha-Ownby. Forbes. Retrieved from http://www.forbes.com/2010/08/12/lewis-center-oberlin-technology-green-buildings.html

5. Dubai Government. Green Building Regulations and Specifications. Retrieved from http://www.dewa.gov.ae/images/greenbuilding_eng.pdf (Accessed March 12, 2021)