

DEVELOPMENT OF "GREEN" CONSTRUCTION IN BELARUS AND CHINA

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A brief analysis of international green building standards is presented. The main approaches to the development of "green" construction in Belarus and China are presented. It is noted that in order to stimulate "green" construction, the issues of preferential tariffs for environmentally friendly materials and technological systems, tax incentives for organizations that build and own "green" buildings should be resolved, "green" standards have been developed.

Relevance of the topic. The guarantee of sustainable development is a significant aspect for the investment and construction complex. One of the main criteria for the activity of the investment and construction complex is the guarantee of the quality of construction products throughout the entire life cycle - from construction to demolition of a building. Requirements for modern buildings to ensure safety and create favorable conditions for human life, limit the negative impact of construction activities on the environment and ensure the protection and rational use of all types of natural resources make such quality indicators as energy efficiency, energy intensity and environmental friendliness of the building paramount. These parameters are the components of the concept of "green" construction.

Green building standardization. In world practice, there are a number of generally recognized "green" standards. The main ones are the English BREEAM standard, American LEED, German DGNB, French HQE. The fundamental concept of each is the goal of minimizing the negative impact on nature, which is caused by the construction and operation of the facility, and at the same time providing a comfortable atmosphere for subsequent operation.

The BREEAM (Environmental Assessment Method) standard was created in the UK in 1990. The essence of the BREEAM standard is to assign a building one of five levels of rating: satisfactory, good, very good, excellent, excellent. Assignment occurs through the integral assessment of such indicators as: water, materials, energy, land use, waste disposal.

The strength of the BREEAM in USE standard is that it is divided into three parts. The first part is the Part 1 Asset Performance. It is largely based on an assessment of the physical characteristics of the structure: the area of translucent structures (affects the availability of daylight and energy savings), the level of illumination, the ability to control temperature and air supply, the boilers used, ventilation machines and their efficiency, transport accessibility, water consumption, waste management infrastructure, land use, pollution, etc.

The second part - Building management (Part 2 Building management). To a greater extent, it concerns building management based on an assessment of the management company's approaches: to documenting procedures, training, forming and implementing policies, taking measurements, providing a comfortable environment for users (fresh air supply levels, monitoring CO₂, NO_x), controlling the content of volatile organic matter in the air, acoustic assessment, legionella control, energy efficiency and water management, as well as materials, landscape, pollution, etc.

The third part - Management of tenants (Part 3 Occupier Management). To a greater extent, it develops the issues of the second part, therefore, only joint certification of the third and second parts is possible (while the second part can be certified separately).

Advantages of the BREEAM assessment system - the assessment system is applicable to various types of buildings, the criteria are "tuned" to British law and, accordingly, British values, including high quality construction, and compliance with the declared project at the operational stage, an individual approach to one or another objects, the possibility of individual assessment programs, a clear scheme of adaptation to foreign norms. The disadvantages of the "BREEAM" assessment system are very strict requirements, high cost of obtaining approvals, the standard is tied to building and engineering norms and approaches of Great Britain [1,2].

The LEED standard (The Leadership in Energy & Environmental Design) was created in the USA in 1998 and is applicable for new construction projects, global renovation projects, interior renovation of buildings, projects for the creation of commercial interiors. The LEED grading system is based on the assignment of points to the object. Points are awarded based on the criteria of industrial development (26 possible points), water efficiency (10), energy and atmosphere (14), internal environmental quality (15), innovation and development process (5), availability of an accredited LEED professional (1) and availability regional advantage (4 possible points). In accordance with the points scored, there are 4 levels of compliance with standards assigned to objects by rating systems. LEED certification levels: 40–49 points mean Certified, 50–59 points Silver, 60–79 points Gold and 80 and above Platinum [1].

The German DGNB system, in turn, at the design stage, allows making decisions that will provide maximum savings in the operation of the facility. The mission of HQE is to create a high quality environment. In terms of the frequency of using standards for assessing "green" construction, BREEAM ranks first, LEED comes second, followed by the German DGNB standard, followed by France and its HQE standard [2].

Development of "green" construction in the Republic of Belarus. In the Republic of Belarus, one of the plans for the upcoming five-year period is the development and implementation of national standards for "green" construction and the development of voluntary certification of construction according to such standards. It is planned to approach the implementation of these directions in an integrated manner, already at the stage of developing urban planning documentation, the functions of the territory will be determined, parks, squares will be created, requirements for the norms of greening areas will be formed [3].

At the moment in the Republic of Belarus "green building" is developing with the support of the state and international organizations. Within the framework of the international technical assistance project GEF-UNDP-Ministry of Natural Resources "Belarus: support for" green "urban development in small and medium-sized cities of Belarus" for 2016-2021. the principles of strategic territorial planning have been tested and successfully implemented, combining socio-economic directions of development and the vision of spatial development of the territory; methods for a comprehensive technical and economic assessment of the effectiveness of various measures were worked out, the possibilities of attracting "green" instruments for financing infrastructure projects and the implementation of sustainable procurement were considered, and pilot initiatives were implemented in the field of energy efficiency (Novogrudok) and sustainable urban mobility (Novopolotsk and St. Polotsk), focused on achieving a comprehensive energy, economic, environmental and social effect. During the implementation of the project, a direct reduction in greenhouse gas emissions during the life cycle of pilot initiatives in the amount of 77.8 thousand tons of CO₂ equivalent is expected by increasing the efficiency of urban transport in Polotsk and Novopolotsk, as well as 13.3 thousand tons CO₂ equivalent from energy efficiency improvements in Novogrudok. The indirect reduction of emissions cumulatively over a 10-year period after the completion of the project will be from 25.2 thousand tons to 231 thousand tons of CO₂ equivalent [4].

In order to develop "green" construction, the Decree of the President of the Republic of Belarus of September 4, 2019 No. 327 "On improving the energy efficiency of multi-apartment residential buildings" was adopted, which is one of the first regulatory legal acts that provide citizens with support in their desire to reduce heat consumption, increase energy efficiency residential building, thereby increasing the comfort of living. An example of a "green" building in Belarus is the Omega Tower business center at 57 Dzerzhinsky Street in Minsk, which became the first certified "green" building in Belarus according to the international BREEAM standard.

As the main ideological line of the Concept of the National Strategy for Sustainable Development of the Republic of Belarus for the period up to 2035, the strategy of inclusive sustainable "green" growth in all spheres of society is defined. The main vector for the implementation of this strategy is defined as the "green" economy, which ensures economic growth in conditions of preservation of natural capital, which allows to identify new potential sources of economic growth, without creating an "unstable" load on the quantity and quality of natural resources. To achieve this goal, priority directions and tasks have been identified in the field of ensuring an environmentally safe living environment, preserving and rational use of natural potential, biological and landscape diversity, effective use of waste and their environmentally friendly disposal, greening of industrial production.

Development of "green" construction in China. In China, the development of green buildings is also following in the footsteps of the world. In 1986, China issued the industry standard JGJ26-86 "Civil building energy-saving design standards (heating residential building part)", set a target of 30% energy conservation, which is Also China's First Building Energy-Saving Standards. In the 1990s, China issued the Notice of the State Council on The Approval of the State Building Materials Bureau and other departments on speeding up the innovation of wall materials and the promotion of energy-saving building opinions, the People's Republic of China Energy Conservation Law and other energy-saving-related policies and regulations.

In the 21st century, China began to promote green buildings throughout its life cycle. In 2001, China's first scientific research project on green buildings was completed. In 2004, China held the first China International Symposium on Intelligent and Green Building Technology, expressing the Chinese government's determination and ability to act on green buildings. In 2006, China's Ministry of Housing and Construction issued GB/T50378 Green Building Evaluation Standards. Green buildings at this stage are defined as buildings that maximize resource conservation (energy saving, land saving, water saving, material saving), protecting the environment, reducing pollution, providing people with healthy, suitable and efficient use of space, and living in harmony with nature over a lifetime.

The second generation of green buildings in the 11th and 12th Five-Year Plan period has been rapid development, from scratch, from less to more, from some cities to the overall development of the whole country. Some cities or regions have been led by the government to enforce green building standards, or in the construction

drawing audit to include green buildings in the special audit requirements. According to the requirements of the 13th Five-Year Plan for Building Energy Conservation and Green Building Development issued by the Ministry of Housing and Construction in 2017, the development of green buildings in China has entered the accelerator of "incremental quality" between 2016 and 2020. Planning requirements by 2020, the proportion of urban green buildings in China accounted for more than 50% of new buildings, new green construction area of more than 2 billion square meters. It is required that the proportion of green buildings with two-star logo above the project exceeds 80%, and the proportion of green building projects that obtain the running logo exceeds 30%.

In recent years, many parts of China frequent haze, secondary water supply caused by the drinking water quality of households is not up to standard, complex decoration caused by indoor formaldehyde and TVOC exceeding the standard, as well as the aging of residents, have put forward new requirements for the development of a new generation of green buildings.

In the industry, from the point of view of building users, the new people-oriented model has gradually become a new consensus for the development of green buildings. In 2019, China conducted its third iteration of green building standards, releasing the 2019 edition of gb-50378 Green Building Evaluation Standards. The new version of the green building standards and the new era of people's needs for a better life, reflecting the "people-centered" basic concept, in the original focus on building and environmental relations, "four sections and one environmental protection" on the basis of the dimension of expansion, the addition of safety and durability, energy conservation, healthy livability, full-age friendly and other aspects of technical content, reconstructed "safe and durable, healthy and comfortable, convenient life, resource conservation, environmental livability" five indicators system, defined China's third generation of green buildings.

It can be found that a new generation of green buildings has gradually incorporated the content of sponge cities and healthy buildings, healthy building concepts and green ecology, designed to enhance the experience and sense of access of building users to green buildings, the real combination of people-oriented and sustainable building development [5].

In the PRC, the priority tasks of the Chinese leadership are the formation of innovative models and methods of economic growth, an increase in the standard of living of the population, a decrease in the anthropogenic load on the environment and respect for nature. The concept of China's ecological civilization began to form after the adoption of the "Program for Sustainable Development of China at the Beginning of the 21st Century" in 2003. It received the greatest theoretical and practical development since 2012, when it was formulated a complex task of building "ecological civilization" and "beautiful China" as an integral part of the further economic, cultural and social sustainable development of the Chinese nation [7].

Xie Zhenhua, Special Representative of China for Climate Change, Deputy Chairman of the Committee on Population, Resources and Environment of the CPPCC (People's Political Consultative Council of the People's Republic of China), writes: recycling and reuse, environmental protection, harmony between nature and humans, and the development of a unified regulatory environment in the relevant areas. In a narrow sense, "green development" is the protection and protection of the environment, in particular the elimination of the consequences of pollution, the restoration of the environment, and the increase in production capacity for the production of eco-products" [8].

Conclusion. Analyzing the prospects for the development of "green" construction, experts stress that the "greening" of the Belarusian construction industry will: improve the environment, increase energy security, increase the level of investment attractiveness of the country [9].

Studies in the field of green economy regulation in the context of sustainable development [2] have shown that in order to stimulate green construction it is necessary to increase the degree of economic and physical accessibility of environmental materials and technological systems. To achieve these goals, it is proposed to use the following tactics:

- set preferential tariffs for the import of materials and systems (especially in the absence of national production);
- at the stages of design and construction of buildings and structures for state needs, ensure compliance with "green" standards;
- to establish the possibility of subsidizing, at the expense of budgetary resources, part of the costs (including interest rates on bank loans: for construction - for enterprises, mortgage - for the population) investors of green buildings;
- to provide tax incentives for organizations that build and own "green" buildings.

It is noted [2, 9] that a significant resource of the state policy for the development of "green" construction and the economy in general is the assistance of scientific and educational programs in this area, including international ones. Universities and research centers are proposed to be involved in development by increasing public and private funding, which can provide a significant effect due to innovative thinking and the desire for "green" entrepreneurship among young people.

REFERENCES

1. Gelmanova, Z.S., Amirkhanova, M.A., Georgiadi, I.V. "Green" construction as an effective tool for ensuring sustainable development of territories [Electronic resource] / Z.S. Gelmanova, M.A. Amirkhanova, I.V. Georgiadi // Scientific Review. Economic sciences. - 2016. - No. 1. - S. 12-14. - Mode of access: <https://science-economy.ru/ru/article/view?id=764>. - Date of access: 10.02.2021.
2. Khalil Musab Rushadi Ahmad Scientific and methodological support of state policy for regulating the green economy in the context of sustainable development: dis ... cand. econom. Sciences: 08.00.05 / Khalil Musab Rushadi Ahmad. - Kursk, 2020.- 182 p. [Electronic resource]. - Mode of access: <https://www.dissercat.com/content/nauchno-metodicheskoe-obespechenie-gosudarstvennoi-politiki-regulirovaniya-zelenoi-ekonomiki>. - Date of access: 10.02.2021.
3. National standards for green building are planned to be developed and implemented in Belarus [Electronic resource] // Belarusian telephone agency BELTA: official site. - Mode of access: <https://www.belta.by/economics/view/natsionalnye-standarty-zelenogo-stroitelstva-planirujut-razrabotat-i-vnedrit-v-belarusi-426388-2021/>. - Date of access: 03/17/2021.
4. Plans for "green" urban development and streets with "smart" light - what has been done under the UNDP-GEF project [Electronic resource] // Belarus Today: official site. - Mode of access: <https://sb-by.turbopages.org/sb.by/s/articles/plany-zelenogo-gradostroitelstva-i-ulitsy-s-umnym-svetom-cto-sdelano-po-proektu-proongef.html>. - Date of access: 10.02.2021.
5. Li Guikun Path The development of green buildings in China [Electronic resource] / Li Guikun // Sinoceanland-Design. - 2021. - Mode of access: https://mp.weixin.qq.com/s/jsoO7dppkYFSVmiyd_tupQ. - Date of access: 04.19.2021.
6. Yingxin Zhua, Ling Song. Jerome Damiensa State of the art of green building standards and labelling system development in China / Yingxin Zhua, Ling Song. Jerome Damiensa [Electronic resource] // International Journal of Sustainable Building Technology and Urban Development. – 2013. - Vol. 4. - No. 3. – pp. 178–184. - Mode of access: <http://dx.doi.org/10.1080/2093761X.2013.837216/>. - Date of access: 04.19.2021.
7. Balchindorzhieva, O.B. The problem of building a green economy in China / O.B. Balchindorzhieva // Eurasianism and the World. - 2019. - No. 1. - P. 37–41.
8. Xie Zhenhua Path of "green development" / Xie Zhenhua // China. - 2018. - No. 10 (156). - S. 24-25.
9. Balamut, T.V. Green construction - investment in the future [Electronic resource] / T.V. Balamut // Ecology at the enterprise. - 2016. - No. 10 (64). - Mode of access: <https://ecologia.by/number/2016/10/>.