Market power of green buildings in sustainable development goals

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Abstract. This article is dedicated to the development of the green building sector falling under the Sustainable Development Goals (SDGs). The paper illustrates major trends of green economy development and provides indicators for projects assessment in terms of green building. As the international practice shows, the implementation of modern environmental and energy projects and the introduction of special property of material are now becoming a strategic task in the construction sector. International companies are actively introducing technologies and new materials to reduce energy consumption in industrial buildings and offices. This study contains the analysis of green projects implemented in practice nowadays.

Introduction
Current trends in the development of the global economy to ensure economic growth and sustainable development have led to the increase in the need for green building in both developing and developed countries. Meeting demand for a safe, environmentally friendly and energy-efficient infrastructure is key to achieving global initiatives for sustainable development and the green economy.

Today, governments and the private sector are focusing on environmental issues in the framework of achieving the SDGs in all sectors of the economy. The relevance of this study results from the fact that currently the problem of transition to a safe and environmentally friendly city remains one of the most important for any country.

The construction sector is the world’s largest sector consuming raw materials, in which energy-intensive and carbon-intensive resources are often used for the production of building materials. Thus, green building is the key part of the modern economy to achieve global goals for reducing emissions and improving the environmental situation in the world. To achieve the green principles, there are various measures, such as energy-efficient design and modernization of existing facilities. International companies seek to invest in green projects to improve environmental performance and, consequently, increase branding and higher asset values in the sector.

Sustainable development and green economy
The priority tasks for achieving sustainable development in the framework of Agenda 21 adopted in 1992 at the UN Conference on Environment and Development in Rio de Janeiro are designed to prepare the world community for solving the global problems that civilization faced in the 21st century.
Sustainable development is understood as such development that can satisfy current needs, but not at the expense of the capabilities of future generations [2].

17 SDGs developed and adopted by the UN in 2015 are aimed at promising and inclusive development of the future of our planet, in which there is no place for poverty and hunger, injustice and discrimination, international conflicts and wars, natural and environmental disasters. Recognizing the relevance and interconnectedness in jointly addressing global challenges, many countries are taking bold actions to achieve the SDGs.

Strengthening globalization processes contributes to the development of the green economy, which aims to improve the well-being of the population, taking into account the reduction of environmental risks and the reduction of the deficit of natural resources. The priority tasks are as follows: inclusive economic growth with the efficient use of natural resources with minimal impact on the ecosystem, increasing employment, attracting investment in green industries, reducing CO₂ emissions at all stages of the production of goods or services, preserving biodiversity, etc.

The green economy is an attractive investment destination. Every year, the share of the green economy in the global market is growing, while the fossil fuel sector is reducing (Figure 1). According to FTSE Russell, by 2030, the green economy could have reached 7% of the world market capitalization, with the current growth path. “If green investments accelerate to the level of 90 tn dollars, the green economy will reach 10%, which corresponds to a similar amount of global health” [5].

![Figure 1. Trends of the green economy and the fossil fuel sector development, % of market capitalization [5]](image)

In accordance with the Industry Classification Benchmark (ICB) controlled by FTSE Russell, Figure 2 shows the main sectors of the green economy. Today, many industries are already implementing green principles in the public and private sectors.
In modern conditions, the private sector, especially business, is one of the most crucial players in achieving sustainable development, because it can stimulate the implementation of the Sustainable Development Agenda by 2030, as well as create additional opportunities for the introduction of green technologies.

**Green building certification and Indexes**

In order to implement projects in green building, “green” tools are being introduced to measure and confirm the commitment of companies to sustainable development. The systems of the certificates and indexes offer a variety of criteria for evaluating new and existing infrastructure facilities of the company. This section of the study will examine the main “green” indices and certificates widely used in international practice.

1. LEED (Leadership in Energy and Environmental Design) is one of the most popular certification system worldwide. The LEED system is developed by the used green building Council (USGBC) [6].

   LEED certification confirms the company’s commitment to sustainable development. The projects pursuing LEED certification earn points across several categories: Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation and more. Based on the number of points achieved, a project then earns one of four LEED rating levels: Certified, Silver, Gold or Platinum.

   Implicitly, evidence from a series of academic studies suggests that green building certification is taken into account by investors: buildings certified by Energy Star and/or LEED have been shown to transact for about 10.1% more [6]. There are also statistics on the rental of such structures, its percentage is also higher than the percentage of rent of non-certified buildings. The benefits of this certification also extend to internal financial performance. The introduction of green technologies as solar panels helps to reduce the costs of the enterprise in the long term.

2. The FTSE EPRA Nareit Green Indexes provide investors with a useful tool for integrating climate risk into their listed real estate portfolio. These indexes provide a sustainability-focused extension to the FTSE EPRA Nareit Global Real Estate Index Series, the world’s leading series of listed real estate benchmarks. The FTSE EPRA Nareit Green indexes weight constituents based on two sustainable investment measures; green building certification and energy usage, and follows the FTSE Global Factor Index Series methodology to address concerns about liquidity, capacity, diversification and turnover [7].
FTSE EPRA Nareit Green Indices produce screening candidates in three stages. Immediately after the selection of applicants by any company’s capitalization index (e.g. FTSE EPRA Nareit Developed Index), FTSE EPRA Nareit Green Indices "weighs" the shares of the company's certified buildings and the energy use of these buildings. In the second stage, specialists narrow the index and limit the final criteria that do not contribute to the overall goal of the factor, while ensuring that the restrictions on diversification will not be violated. The third stage provides an overview of the rating and its publication. The index is revised annually in September to update new compliant companies, changes in energy use and green building certification. [7]

3. BREEAM (BRE Environmental Assessment Method) is an international green standard for assessing the effectiveness of buildings, developed by the British company BRE Global. The English version of the green standards BREEAM, is a widely used method of environmental assessment of real estate, including in the Russian Federation. The object of certification can be designed, reconstructed and existing building for any purpose, as well as part of the building.

Its categories evaluate energy and water use, health and wellbeing, pollution, transport, materials, waste, ecology and management processes. Buildings are rated and certified on a scale of 'Pass', 'Good', 'Very Good', 'Excellent' and 'Outstanding'. It is carried out by independent, licensed assessors.

Work on creating BREEAM began at the Building Research Establishment (based in Watford, England, UK) in 1988. The first version for assessing new office buildings was launched in 1990. This was followed by versions for other buildings including superstores, industrial units and existing offices. Currently more than 250,000 buildings have been BREEAM-certified and over a million are registered for certification – in more than 50 countries worldwide. BREEAM also has a tool, which focuses on neighborhood development. [8]

4. DGNB (Deutsche Gesellschaft für Nachhaltiges Bauen) is a voluntary certification scheme designed to support green building and the assessment of green, cost-effective and energy-efficient buildings.

German Sustainable Building Council was founded in 2007 by 16 initiators from a variety of specialist backgrounds in the construction and property industry who wanted to do more to promote sustainable building in the future [9]. The DGNB system is based on the concept of holistic sustainable development, which to make sustainable building applicable on a practical level, measurable and thus comparable, the DGNB has developed its own certification system. This system offers a variety of options for buildings, indoor environments and districts – not only for new buildings but also for existing ones. The DGNB System works like a planning and optimisation tool, providing help with raising the tangible sustainability of building projects. It also fosters a shared understanding of the pertinent requirements of sustainable building methods, among all parties involved in development projects. Thus, the number of issued certificates increases every year (figure 3).

![Figure 3. The number of DGNB certificates issued from 2009 to 2017 [9]](image-url)
The DGNB assesses buildings with 6 criteria: environmental quality, economic quality, sociocultural and functional quality, technical quality, process quality, site quality. The DGNB Certificate is granted in Platinum, Gold or Silver, so it can also be used as a marketing instrument.

**Contemporary experience of green projects implementation**

Negative environmental situation in cities and a decrease in labor productivity resulted in incorporating sustainable methods into their development strategies by international companies to increase economic returns across the entire value chain. For example, some companies introduce high-performance technologies and innovations in the construction of infrastructure facilities.

The leader of the global market for perfumes and cosmetics, the French company L’Oréa l actively develops and implements green projects in the framework of the concept of sustainable development. A striking example is the first industrial facility in the world that received a LEED v4 Platinum Certificate – a plant located in the Kaluga region in the Russian Federation. During the construction of the plant, safe and new energy-efficient materials were used. To date, energy-saving equipment has been successfully used in the production cycle, for example, solar power plants. The implementation of the principles of green building allowed the company to reduce the building’s energy consumption by 46 %, and greenhouse gas emissions by more than two times, from 1300 to 600 tons per year [10].

A sustainable development policy is a key strategy for the largest technology companies. For example, the German company Siemens provides services in the field of building energy-efficient technologies to its clients and also introduces technologies into its own office buildings [11]. One of the first buildings in Russia to receive a LEED Certificate is the Siemens office, which introduced its own technologies.

As part of a program to combat climate change and protect the environment, the American company Apple is implementing projects for the construction of green buildings. A special example is the Apple Park building, a headquarters in Cupertino, California. This complex operates on 100% energy from renewable energy sources. The principles of green building (reduction of energy load and water consumption, installation of solar systems, etc.) are also implemented in many retail buildings [12].

To implement large-scale projects, certain costs are required to implement the principles of green building in the urban environment. Green projects have a huge advantage for the successful development of the city in terms of economic efficiency, improving the quality of life and environmental protection. In Russia, green projects are fully or partially represented in the following infrastructure facilities: business centers “Japan House”, “Hypercube” at the Skolkovo innovation center, the buildings of railway stations in Sochi, as well as various modern residential and sports complexes.

The transition to a safe and environmentally friendly city is manifested in the need to create a reliable infrastructure, including access to green and affordable energy, preserve the ecosystem, and create a sustainable consumption and production model.

**Summary**

Green building has the central role for meeting the SDGs since it overlaps main socio-economic and ecological goals. It is determined that in order to achieve maximum results it is necessary to implement and implement environmentally efficient projects using new materials in the construction of any infrastructure.

This study shows that it is necessary to further study the green building sector not only from an applied but also from a fundamental point of view. Systematization and generalization of the modern global trends, statistical data and practical experience will contribute to obtaining reliable basis for monitoring and implementation of programmes of sustainable development and principles of green economy. Thus, developing and implementing specialized assessment programs by means of international certificates and indices will ensure more effective contribution to sustainable infrastructure formation.
Green building as a market force is aimed at energy efficiency improvement at infrastructure facilities, conducting assessment and strategies related to renewable sources of energy, enhancing comfort and quality of service for clients and working conditions at companies. Today, the key task is a comprehensive study of foreign and domestic experience in green building, which should create all the necessary conditions to minimize the negative impact on the environment in the long term.

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