

Implementation of the First National Green Building Standard for Public Buildings in Ukraine

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ABSTRACT

The paper presents an analysis of the implementation of Ukraine's first green building standard for public buildings – CEM UA.10156.41.032:2025. The study examines the prerequisites for its development, structure, methodological approaches, and the expected impact on Ukraine's post-war reconstruction. The role of standardization in shaping a modern system of environmentally responsible construction aligned with international practices and the European Green Deal is analyzed. The advantages, challenges, and prospects for the development of the national sustainable building certification system are outlined

Keywords: green building, standard, public buildings, environmental certification, energy efficiency, sustainable development, post-war reconstruction.

1. INTRODUCTION

Following the large-scale invasion by the Russian Federation, Ukraine has faced the challenge not only of restoring its destroyed infrastructure but also of rethinking its construction approaches. A significant number of public buildings, including educational institutions, were damaged or destroyed. According to official data, approximately 4,000 such facilities have been affected, which requires a systematic and methodological approach to reconstruction [1].

In this context, the concept of sustainable (green) construction becomes essential. It combines energy efficiency, environmental safety, rational use of resources, and the creation of a comfortable environment for users. Ukraine's reconstruction must take into account future-oriented requirements; therefore, the introduction of the first national green building standard is an important, strategic, and at the same time innovative step.

2. INTERNATIONAL CONTEXT AND THE NEED FOR STANDARDIZATION

In the current context of global climate change, issues of energy efficiency and sustainable development have become defining factors in the evolution of the construction sector. Representatives of the European Union emphasize that the building sector generates up to 36% of CO₂ emissions and consumes more than 40% of energy, making it one of the key areas for decarbonization. Accordingly, the approach to building design must be based on comprehensive environmental criteria aimed at reducing environmental impact throughout the entire life cycle of a building – from material selection to operation and demolition [2].

For Ukraine, which is simultaneously undergoing large-scale reconstruction and integration into the European community, the harmonization of European-style standards is not only a technical necessity but also a demand of the time. The introduction of a green standard stimulates the emergence of new technologies, promotes responsible material production, and creates prerequisites for integrating the Ukrainian construction market into European financing mechanisms.

It is fundamentally important that the standard focuses not only on environmental aspects but also on improving the quality

of life for users. Comfort, safety, inclusiveness, accessibility, and a healthy indoor environment are all factors that directly influence the social resilience of communities. EU countries and many others are actively developing green building policies within the global movement toward climate neutrality. The European Green Deal identifies the energy efficiency of buildings as one of the key mechanisms for reducing CO₂ emissions and forming a circular economy.

Until recently, Ukraine did not have a unified national standard that comprehensively regulated the environmental assessment of public buildings. Existing procedures were fragmented, and the market was predominantly oriented toward individual international certification schemes (LEED, BREEAM, DGNB), which did not account for Ukrainian realities, including: climate conditions, the state of energy infrastructure, material availability, post-war risks, and the need for rapid reconstruction.

Therefore, a need emerged for a nationally adapted standard that provides flexibility and relevance in assessment.

In 2025, the standard CEM UA.10156.41.032:2025 "Public Buildings. Environmental Criteria and Life Cycle Assessment Methodology at the Design and Construction Stages" was introduced.

The new standard was developed with the participation of [1-3]:

- Technical Committee for Standardization TC 82 "Environmental Protection";
- Kyiv National University of Construction and Architecture;
- All-Ukrainian NGO "Living Planet."

The standard harmonizes Ukraine's environmental assessment system with ISO 21929-1:2011 "Sustainability in building construction – Indicators," ensuring alignment with international practices [4].

Taking into account national conditions, the standard includes requirements for shelter spaces under military and terrorist threats.

The standard also incorporates unique contributions from Ukrainian researchers in the field of green structures – the integration of building structures with living plants.

3. METHODOLOGY OF ASSESSMENT AND STRUCTURE OF THE STANDARD

The methodological framework of the standard covers the full life cycle of a building (Life Cycle Thinking), making it one

of the most advanced assessment tools in Europe. This approach allows for consideration of the environmental footprint of building materials, the energy efficiency of engineering systems, impacts on human health, operational conditions under various climate scenarios, and the cost-effectiveness of resource use.

The standard includes criteria adapted to Ukrainian conditions regarding shelters and safety solutions. This is a unique feature of modern Ukrainian standards, effectively forming a new international direction – resilient green construction, meaning sustainable building that remains resistant to external threats.

Particular attention is given to innovation. Buildings that incorporate modern energy monitoring technologies, heat recovery systems, low-carbon materials, or green façades and roofs receive higher rating scores. This stimulates engineering creativity and the implementation of advanced solutions in construction projects.

An important element is the requirement to use environmentally certified materials in accordance with ISO 14024 and ISO 14025. This supports the development of the eco-certification market in Ukraine and ensures transparency at all stages of construction.

The assessment is conducted across 10 key categories, including:

- energy efficiency,
- water-saving solutions,
- materials and waste,
- indoor air quality,
- acoustic and thermal comfort,
- safety and inclusiveness,
- engineering efficiency,
- construction process management,
- environmental impact throughout the building life cycle.

To calculate the integrated indicator, the Harrington desirability function is applied, which provides a comprehensive evaluation of the building's compliance with sustainability criteria.

The rating of a construction project – determining its ecological class and labeling from bronze to platinum – depends on the number of additional criteria met that improve energy efficiency, resource efficiency, indoor environmental quality, as well as on management systems, technologies, and innovations applied during construction. The level of the class also depends on the amount of environmentally certified products used for construction and interior finishing.

The certification system is carried out in two stages:

At the stage of project documentation (P, RP);

After the building is commissioned – with confirmation of actual compliance with environmental requirements.

This approach ensures quality control not only on paper but also under real operating conditions.

4. CHALLENGES AND PROSPECTS

The Ukrainian context requires the adaptation of international approaches to the conditions of wartime and post-war reconstruction. The standard takes into account the specific characteristics of the energy system, climate, and construction materials available on the domestic market. At the same time, it helps prevent greenwashing – the improper use of the term “environmentally friendly” without certified confirmation.

Further development of the system includes expanding the standard to residential and industrial buildings, establishing a

national network of independent auditors, and training specialists in the field of green construction.

The implementation of the standard will ensure:

- a 20–30% reduction in energy resource consumption;
- lower operational costs;
- improved indoor microclimate and user comfort;
- reduced carbon footprint of construction;
- increased durability and value of buildings.

The emergence of a standardized national certification system creates conditions for attracting investment from international financial institutions, enabling transparent control within the construction sector, and strengthening trust in Ukraine's reconstruction efforts.

This is particularly important for schools, kindergartens, hospitals, and administrative buildings – key elements of social infrastructure.

5. CONCLUSIONS

Thus, the implementation of the first national green building standard for public buildings in Ukraine is not only a regulatory decision but also a strategic step toward forming a new environmental culture within society. The standard ensures Ukraine's integration into modern global trends, enhances the quality of construction practices, and establishes the foundation for reconstruction focused on long-term sustainability and energy independence.

The document plays a key role in transforming the industry by embedding new values: transparency, responsibility, innovation, and prioritization of human health. In the long term, the standard will become part of a broader regulatory system that integrates environmental, social, and technological aspects of sustainable development.

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