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MULTI-CRITERIA CERTIFICATION OF BUILDINGS IN POLAND

CERTYFIKACJA WIELOKRYTERIALNA OBIEKTÓW BUDOWLANYCH W POLSCE

Abstract

The certification of green buildings has become more and more popular as a tool used for comparison and evaluation of newly built structures. The authors of this article analyse various certification systems of green buildings in Poland with particular interest paid to newly built multi- and one-family residential buildings. The reason there is such little interest in green building certification processes is also considered. Additionally, the major constraints behind introducing green building certificates for newly built structures is also presented. The Article also presents an analysis of benefits resulting from green building certification for investors, contractors and final users of a particular building.

Keywords: Green buildings, green building certification, LEED, BREEAM, DGNB

Streszczenie

Certyfikacja budynków ekologicznych staje się coraz popularniejszym narzędziem dla porównania i oceny nowo powstających obiektów. W artykule dokonuje się analizy dostępnych w Polsce systemów certyfikacji ekologicznej budynków ze zwróceniem uwagi na powstające obiekty mieszkalne zarówno wielorodzinne, jak i jednorodzinne. Rozważa się przyczyny małego zainteresowania procesem certyfikowania oraz prezentuje największe przeszkody w wprowadzaniu ekologicznych certyfikatów dla nowo budowanych obiektów. W artykule przeprowadzono także analizę korzyści wynikających z certyfikacji obiektu dla inwestora, wykonawcy i użytkownika końcowego obiektu.

Słowa kluczowe: Zielone budynki, certyfikacja ekologiczna, LEED, BREEAM, DGNB

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1. Introduction

Nowadays, in the era of the development of building construction, the main field of interest in the context of both old and newly built structures is ecology, economy and societal needs. New solutions, which allow one to live in a healthy, convenient and low-cost building, are being pursued. Taking sustainable development into consideration, appropriate certificates have been created allowing for the evaluation and comparison of buildings in this respect. The umbrella term of green building certification, which encompasses such certification systems associated with energy sustainability as LEED, BREEAM and DGNB, is commonly used in Poland. It should be remembered that these terms and systems are actually multi-criteria evaluation methods for structures which provide a broader perspective on a particular building.

The history of certification begins at the end of the 20th century. A report by the World Commission on Environment and Development entitled “Our Common Future” defines the term “sustainable development”. Sustainable development „fulfills the needs of the present without compromising the ability of future generations to meet their own needs. In the broadest possible meaning, the strategy of sustainable development is aimed towards nurturing harmony between humanity and environment” [1]. While analysing the need for sustainable building construction, the main focus being on the following:

- limiting climate changes,
- environmental protection,
- better natural resource management,
- health protection,
- high quality of life,
- social integration,
- limiting costs of building exploitation.

The points listed above have led to the creation of a multi-criteria certification that has been developing for the past decade and which has resulted in systems for evaluating the quality of a particular building depending on the criterion applied.

2. The most popular certification systems used in Poland.

Green building certification has been quite recently introduced in Poland, however, it becomes more and more popular when it comes to newly built structures. The most popular certificate is the so-called LEED. The Leadership in Energy and Environmental Design, which was developed in the United States of America in 1998 by an American organization – the U.S Green Building Council that deals with green building standards. LEED is one of the most popular certificates in the world. It is mainly issued in the United States of America (one-third of all LEED-certified structures in the world).

Structures, which meet the criteria for certification, may also be encountered in other highly developed countries.

Depending on the structure type, the following LEED certificate types may be distinguished:

- LEED for New Construction,
- LEED for Homes,

- LEED for School,
- LEED for Core& Shell,
- LEED for Retail,
- LEED for Commercial Interiors,
- LEED for Existing Buildings,
- LEED for Neighborhood Development.

Certification consists of seven criterion groups regardless of the type chosen [2]. Altogether there are 110 points to earn from all categories. However, the most important part is an obligatory fulfillment of prerequisites. Should any of the prerequisites not be fulfilled, a certificate will not be granted. Certification consists of the following categories: sustainable sites (max. 26 points), water efficiency (max. 10 points), energy and atmosphere (max. 35 points), materials and resources (max. 14 points), indoor environmental quality (max. 15 points), innovation in design (max. 6 points, including 1 point for the presence of a LEED consultant), regional priority (max. 4 points). The first five groups consist of these prerequisites. If the total score is between 26 and 32 points, it allows for basic certification. The number of points a particular project earns determines its level of LEED certification:

- Certified – 40–49 points,
- Silver – 50–59 points,
- Gold – 60–79 points,
- Platinum – 80 points and more.

Usually, the LEED system is handled by trained consultants. In order to become a consultant, one must have professional experience within the green building industry, participate in a course and pass two exams. The first exam is a basic LEED GA (Green Associate) exam followed by LEED AP exam, however, the latter one may only be taken if one has documented their engagement in projects connected with LEED certification.

In order to acquire a certificate, one must hire a consultant that will help an investment and obtain and realize the highest possible score. A decision to acquire a certificate should be gained as early as possible, preferably at the design stage, as one's late decision may impede the fulfillment of the prerequisites for certificate acquisition.

Yet another certificate issued in Poland is the so-called BREEAM certificate [3]. The Building Research Establishment Environmental Assessment Methodology, which was developed by a British organization – BRE (Building Research Establishment) in 1990. [4] All newly built and restored buildings in the United Kingdom will be required to have BREEAM certificate from 2019.

Depending on the building type, the following BREEAM certificate types may be distinguished:

- BREEAM Domestic,
- BREEAM EcoHomes,
- BREEAM EcoHomes XB,
- BREEAM Multi-Residential.

Additionally, depending on the building functions, the following BREEAM certificate types may be distinguished:

- BREEAM Offices,
- BREEAM Education,
- BREEAM Courts,
- BREEAM Prisons,

- BREEAM Retail,
- BREEAM Healthcare,
- BREEAM Industrial.

A BREEAM certificate is based on eight criterion groups: Management (12% of the total score), Health and Wellbeing (15%), Energy (19%), Transport (8%), Water (6%), Materials (12,5%), Waste (7,5%), Pollution (10%) and Innovation (10%)

The percentage of points a particular project earns determines its level of certification [5]:

PASS – 30–44%, GOOD – 45–54%, VERY GOOD – 55–74%, EXCELLENT – 75–84%, OUTSTANDING – 85% and more.

Similarly to the LEED certification process, in order to acquire BREEAM certificate, one must hire specialists called “assessors”. An assessor is a mediator between an investor and certification body. In order to become an assessor, one must only participate in a three-day course and pass an exam. At the next step, a candidate is required to deliver a case study that will be evaluated within three months from the date the candidate passed their exam. Candidates are not required to have professional experience within the green building industry. An application for BREEAM certificate must be filed within 12 months from the commencement of building occupancy.

The last certificate being analysed in this paper is the so-called DGBN certificate. Deutsche Gesellschaft für Nachhaltiges Bauen certificate, which was developed by the German Society for Sustainable Building. It is the most exacting and, at the same, the most transparent multi-criteria system used for building evaluation. It consists of only two prerequisites which are quite difficult to fulfill. The first prerequisite concerns the total amount indoor VOCs (Volatile organic compounds) in chosen rooms. The total VOCs concentration must not exceed 3000 $\mu\text{g}/\text{m}^3$ while the amount of formaldehyde must not exceed 120 $\mu\text{g}/\text{m}^3$. Additionally, buildings must be adapted for the disabled in all public areas.

DGNB Certification is comprised of the following aspects: [6]: ecological, economic, socio-cultural, technological, process quality and location. Owing to universal criteria, the certificate may be issued for all types of structures. The following certificates can be acquired [7]: Bronze (>50%), Silver(>65%) and Gold (>80%).

There are two advisers for the purpose of certification process: a Consultant and an Auditor. In order to become an advisor, one must pass a series of tests and prove to have a year-long professional experience and education within the building construction industry.

3. The use of certificates in Poland

Polish Investors more frequently apply for green building certificates to enhance the prestige of a particular structure and highlight its uniqueness. The most popular certificate is the aforementioned LEED certificate. So far, the certificate has been granted to the total of 19 buildings, including 5 at the highest Platinum level. The second most popular certificate is BREEAM certificate. It is easier to obtain, hence it may be issued more frequently in the coming years. It is said that DGNB certificate, in turn, is the most difficult one to be obtained. However, any building that has achieved DGNB certificate is deemed to fulfill the strictest requirements. The DGNB certificate is the only certificate that encompasses facilities for the disabled and this, undoubtedly, increases its value.

Each certificate focuses on different aspects, yet all of them encompass the same scope: cost-effectiveness and energy sustainability. Hence, the use of green building certificates will become yet another tool used to enhance convenience, elegance, energy sustainability, greenness and prestige of buildings surrounding us in the upcoming decades.

Table 1

The comparison between LEED, BREEAM and DGNB certificates

Comparison criterion	LEED	BREEAM	DGNB
Certification body	USGBC	BRE	DGBN
Number of certification levels	4	5	3
Number of prerequisites	8	11	2
Maximum score	110 points	100%	100%
Minimum score required for certification	40 points	30%	50%
Presence of specialists	Consultant (non-compulsory)	Assessor (compulsory)	DGNB Consultant DGNB Auditor
Number of certificates issued in Poland (until the end 2013)	19	6	No data is present

4. Benefits of green building certificate acquisition

Green building certification offers multiple benefits at particular stages of building functioning starting from its construction and through to its final use. The following participants of a construction process should be distinguished: a constructor, an investor and a final user, each of whom derives different benefits from building certification.

From the contractor's perspective, entirely new technologies of building connected with cost-effectiveness and sustainable construction seem most appealing [8]. Every constructor employed in the construction of buildings qualifying for certification derives such benefits as knowledge of the newest solutions within the field of technology, ecology and energy sustainability. This, in turn, enhances the prestige of a particular entrepreneur. Having a portfolio, which includes certified and modern buildings, one may easily compete to be contracted for realization of much bolder investments. Moreover, one's knowledge of sustainable construction may become crucial for potential investors when choosing a contractor. It is also highly probable that higher remuneration for realization of construction works will be offered to those constructors, who may guarantee that a particular construction element will be made in a proper way as well as in accordance with the best construction practices and manufacture's requirements. It is also worth mentioning

that one should not mistake a new building for a modern building complying with all requirements concerning energy sustainability. Modern and innovative solutions, which are indispensable while constructing buildings that qualify for an appropriately high level of certification, are considered to be a particular contractor's „know-how". Besides, such new solutions and ideas may be used by the contractor during realization of subsequent investments and for enhancing its competitiveness and reliability in the eyes of potential investors.

Any investor, who decides to invest in a building which complies with current requirements of certification programmes, also benefits. In the case of a commercial building, the number of potential clients increases significantly. Companies, in particular large international corporations relocating their offices to Eastern Europe, including Poland, tend to choose green, sustainable and original buildings such as the Green Towers building in Wrocław built by Skanska. It is the first structure in Poland that has been granted with the highest level of LEED certification, i.e. Platinum. The investor had no difficulties in finding lessees by offering commercial space in a modern building that complies with the world's highest green standards prevailing within the construction industry. Ernst & Young, Grupa Allegro, Dolby, Grupa Medicover, Becton Dickinson, Nokia Siemens Networks and Talex are, among others, the most recognizable lessees of the aforesaid building [9].

Finally, final users receive a modern and sustainable building of low exploitation costs such as heating costs, which comprise the greater part of all expenses for the building exploitation. Additionally, they acquire prestige, quality, and durability guaranteed by a particular certificate. Obviously, the costs of building maintenance depend on the way a particular building is being exploited. Some certification systems bind users of a particular building by separate agreements to use it in the most cost-effective and energy sustainable manner by using appropriate devices, which guarantee low energy consumption as well as by complying with all requirements imposed by a certification body that concern indoor area development. In return, the users are guaranteed that the building will comply with all relevant requirements and sustain high quality standards while being exploited. It should also be mentioned that from a lessee's perspective, where a lessee is usually a company that makes every effort to keep its profile high, the choice of a green building becomes a feature that distinguishes the said company from its competitors. Well-known brands and large corporations pay significant attention to PR activities, including the choice of a proper company's seat. A Green and Energy Sustainable image becomes an indisputable and desirable quality for an entrepreneur.

5. Issues and constraints on accessing green building certification and multi-criteria evaluation of buildings in Poland

Neither multi-criteria evaluations of buildings nor green building certifications are commonly used in Poland. There are several reasons for such low popularity of the aforesaid solutions. Fig. 1 shows the most important, according to the authors, reasons for such low interest in green building certification.

The major constraint on building certification is additional construction costs [10]. These costs include not only certification costs but also, in the case of constructing a building that

is subject to multi-criteria evaluation, the cost of green materials and appropriate solutions. The following add to the construction costs of certified buildings: use of modern materials of sufficient quality in order to ensure minimum heat losses, use of modern technologies and solutions regarding ventilation and air-conditioning as well as other factors that influence the entirety of a building, convenience in using it as well as its operating environment. The aforementioned costs are directly proportional to the cubature and purpose of a building. This aspect is often emphasized by those who are interested in green building certification. Nevertheless, it should be highlighted that investments in modern technologies only bring profit during the exploitation of a building. As far as heat used to keep a particular building warm as well as the use of electricity and other utilities taken into consideration, higher initial costs bring real profits during exploitation. Despite that, the same higher initial costs may become a serious constraint for entities that have a fixed budget during the construction phase.



Fig. 1. The main reasons for low interest in Green building certification in Poland

Nowadays, social environmental awareness in Poland is much higher than it used to be. It can be observed that ecological aspects of all areas of life such as nutrition, leisure and professional activities, attract more and more attention. Despite the fact that people spend most of their life time indoors and should therefore care about buildings as well as their life environments, green building certificates issued as part of multi-criteria evaluation of buildings are not very popular. This situation is changing very slowly due to lack of both social campaigns and relevant advertising campaigns. It is anticipated that the demand for certified green buildings in Poland will rise, though. The higher social environmental awareness in Poland is, the faster the demand increases.

The lack of social and environmental awareness is also connected with the lack of generally available and accurate information about certification systems in Poland, as well as the certificates themselves. Many contractors and investors know that there are such certificates yet they do not have detailed information about them. This, in turn, constitutes a serious constraint on wide use of certification as potentially interested parties give up on it precisely due to lack of information. Additionally, final users, being unaware, very rarely require information from contractors that buildings comply with the newest green standards.

It can therefore be said that investors, contractors and final users are caught in a vicious circle that can only be broken by tapping sources of information about multi-criteria evaluation and green building certification.

Certification procedures take some of the time one needs to complete all necessary formalities and this constitutes yet another constraint on the general use of certificates. In order to obtain a certificate, one must undertake additional actions, i.e. apply for material checks as well as for particular stages of the construction process to be inspected. It happens quite often that Investors as well as Contractors do not approve of these additional duties and decide not to apply for a certificate despite all the benefits it carries.

In the case of LEED certificate, there is one additional constraint, i.e. periodical inspections of a building carried out to sustain the level guaranteed by the certificate. This duty belongs to final users of a building who should make every effort to ensure that a particular building is used accordingly to its purpose and does not lose its certification status. Such a duty should be imposed on users of all buildings regardless of their certification status or even a lack of it. Unfortunately, it can be observed that due to poor property management and improper exploitation, both technical and visual conditions of many buildings worsen. This, in turn, is reflected in higher exploitation costs and may cause additional restoration expenses.

5. Conclusions

The analysis of the most popular systems of multi-criteria evaluation of buildings in Poland shows that there are multiple systems and centers for building certification. Each of them evaluates different aspects of buildings yet all of them encompass the same scope: cost-effectiveness and energy sustainability. Some systems (e.g. LEED) encompass criteria that require an administrator as well as final users of a particular building to take care of the building during its lifetime, which, consequently, has a positive effect on the building's condition.

It can be said that major constraints on general and wide use of multi-criteria evaluation of buildings are both social awareness and ecological sensitivity that develop only through access to information and knowledge about modern technologies and solutions used within the construction industry. Certification costs should always be calculated keeping future savings in utilities costs in mind, which can be achieved through investments in modern technologies at both design and construction stages.

Multiple benefits of green building certification, which can be enjoyed by all individuals engaged in designing, constructing and exploiting a particular building, should not be omitted. It is certain that every certified building has been assiduously constructed and has a guaranteed level of energy efficiency, which, in turn, brings benefits not only to final users but also for constructors, who are proud to have knowledge about the newest technologies as well as the "know-how" on how to properly produce and provide ecological solutions within the construction industry.

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