

REAL ESTATE DEVELOPMENT LEED CERTIFICATE SYSTEM AND EVALUATION OF APPLICATION SAMPLES IN THE SECTOR

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Abstract: Global warming, thirst, environmental pollution and the rapid consumption of natural resources have brought the construction of environmentally friendly, ecological buildings to the agenda in the construction sector. When it comes to sustainable, ecological and environmentally friendly buildings, we come across green buildings. Green buildings are considered as sustainable structures that start with the selection of the land, evaluated within the framework of the life cycle, designed with a holistic understanding, social and environmental responsibility awareness, suitable for climate characteristics and land conditions, consuming as much as needed, oriented towards renewable energy sources, using natural materials, and sensitive to ecosystems. is defined. With the increasing number of green buildings, standardization and certification studies have started. Certification systems aim to define green building by establishing general and valid measurement standards, to increase consumer awareness about the benefits of green building and to transform buildings. In this study, the concept of green building is discussed in terms of real estate development. In this context; The Hilton Garden Inn hotel project was examined and evaluated according to the Leed certification system and evaluated according to the real estate valuation and real estate valuation criteria.

Keywords: Real estate valuation, green buildings, certification systems, zoning law, land ownership, sustainability.

1. GREEN BUILDING CERTIFICATION SYSTEMS

Green Building is today sustainable, ecological, green, eco-friendly etc. Structures in harmony with nature, which we come across under many names, are evaluated within the framework of the life cycle starting from the selection of the land, designed with a holistic understanding and with an understanding of social & environmental responsibility, suitable for climate data and the conditions specific to that place, consuming as much as needed, oriented towards renewable energy sources, natural and environmentally friendly. are structures sensitive to ecosystems that encourage participation using non-waste materials (Appraisal Institute, 2004).

In order to ensure and encourage the implementation of green buildings; Green building evaluation systems, namely certification systems, have been developed by green building councils around the world, which confirm the sustainability of buildings within the framework of a number of standards. The main green building certification systems developed by different countries are;

BREEAM, which emerged in England in 1990,

LEED, which emerged in the United States in 1998,

SBTOOL, which emerged in Canada in 1996,

GREENSTAR, which was created in Australia by adapting from BREEAM in 2003,

CASBEE that emerged in Japan in 2004.

At its first meeting in California, USA, in 1999, four internationally accepted by the "World Green Building Council (WGBC)" was established with the participation of Australia, Canada, Japan, Spain, Russia, United Arab Emirates, United Kingdom and the United States. method exists. The first of these, BREEAM, which was introduced in the UK in 1990, is the most widely used international method today. LEED, which was introduced in the United States in 1998, ranks second in international use (Çelik, 2009).

Evaluation of buildings according to green building evaluation systems in Turkey is a topic that has come to the fore in recent years. Currently, Turkey does not have a local assessment system and interested building owners and investors prefer to certify their buildings using one of the LEED or BREEAM Green Building Assessment systems.

1.1. LEED Building Certification System

The LEED Certification System is a system developed by USGBC and implemented in 1998 for the sustainable building industry to identify and evaluate green buildings.

According to USGBC, the goals of LEED are stated as developing a holistic building design method by establishing generally accepted measurement standards to define Green Building, creating environmental leadership in the construction industry, promoting green competition, and increasing consumer awareness of the benefits of green building.

All individuals and organizations that have a share in the construction sector draw attention to the environmental effects they create during the life cycle of the buildings and develop their activities and products in order to reduce these effects. Today, USGBC has certified more than 14,000 projects in America and 30 countries around the world. A completely transparent technical evaluation and certification process is carried out in the LEED system. The entire certification and documentation system is based on certification. The work is open to the public and supported by more than 10,000 USGBC member institutions and organizations.

Within the scope of the LEED program, which was first developed for New Buildings, later versions were developed to respond to different building types. 6 different types of LEED developed for different building types: LEED-NC (New Buildings), LEED-EB (Operation and Maintenance of Existing Buildings), LEED-CI (Commercial Interior), LEED-CS (Building Core and Shell), LEED- H (Houses), LEED-ND (Settlements), LEED-HC (Healthcare Facilities) (Akça,2011). Projects in the relevant criteria, as a result of the scoring made according to the evaluation criteria; They qualify for Certified, Silver, Gold or Platinum certification. Thus, green buildings declare how green they are (Sirkinti, 2012).

LEED was developed by the American Green Building Council (USGBC), which was founded in 1993. It is a non-profit, national and international certification system created by more than 1800 members. The LEED certification system is regularly renewed and requirements are strengthened. The first version, LEED V.01, was released in 1998. After extensive changes, LEED V.02 was released in 2000. This was followed by LEED V2.1 in 2002 and LEED V2.2 in 2005. The LEED V3 version of the system was created in 2009 and the LEED V4 version in 2014 [22]. In 2016, the LEED V3 version will be retired. Until this date, the LEED V3 version continues to be used together with LEED V4.

LEED aims to maximize the use of natural resources, to support regenerative and restorative strategies, to minimize the harmful effects on the environment and living health, and to increase the indoor quality for building users. At the same time, the goal of the LEED program is to draw attention to the environmental effects created by all individuals and organizations that have a share in the construction sector, and to develop their products in line with reducing these effects. In the LEED system, the entire certification and documentation system is based on certification and a completely transparent technical evaluation process is carried out. The work is open to the public and supported by more than 10,000 USGBC member institutions and organizations. The data collection process can easily be divided into the construction phase and the design phase.

The LEED V4 system has 4 different types of LEED certification.

These;

- LEED system for building design and construction (LEED BD&C)
- LEED system for Operation and Maintenance (LEED EB O+M)

- LEED system (LEED ID+C) for interior design and construction
- LEED certification systems for the development of the neighborhood (LEED ND)

In the LEED V4 BD&C rating system, the sustainability of buildings is evaluated in nine categories. These categories are; integrated process management, location and transportation, sustainable areas, water efficiency, materials and resources, energy and atmosphere, indoor environmental quality, innovation in design and regional priority (Saka, 2011).

When LEED applications in Turkey are examined, it has been determined that there are 357 projects in total demanding LEED certification and only 90 of them have received LEED certification. 71 of the certified projects received certificates in the building design and construction category. For LEED V4, there are 10 projects in total at this stage, but the certification processes are still in progress.

Green Building Certification Systems are tools for measuring the environmental impact of buildings. The systems we have mentioned above have been created to ensure that the projects comply with similar criteria, and although there are differences in procedure, their objectives are the same. No matter which certification system is used in a project, the main goal is to design and construct the building as a sustainable structure and to measure the sustainability of the final product. In order for these systems to develop and achieve their real goals, they must first be adapted to local conditions (Peiser, Frej, 2007).

2. EVALUATION OF LEED APPLICATION EXAMPLES IN THE SECTOR

2.1. Hilton Garden Inn Hotel Project

Hilton Garden Inn Project is located in Sutluce, Istanbul. The project, which has a construction area of 20,000 m², was designed in 2009 and 2010 and was built in 2011. Hilton Garden Inn Golden Horn Project received LEED NC 2009(V3) GOLD certificate in May 2012.

2.1.1. Projenin sürdürülebilirlik yaklaşımları ve LEED puan tablosu

The project land has a very sloping topography. By creating terraces facing the direction of the Golden Horn and sitting at different levels, a mass design that adapts to the silhouette of the Golden Horn was made. The restaurant and meeting rooms are located on the ground and mezzanine floors, and the rooms are positioned to open up to the Golden Horn view as much as possible.

The studies carried out to produce energy efficient green buildings in the project are given below;

- It is designed to make maximum use of the landscape and daylight (the rate of living spaces with daylight is 80%, the rate of living space with a view is 90%),
- All of the car parks are designed in the basement, and materials with low heat reflectivity are used in the roof areas. In this way, the heat island effect is minimized.
- Local plants that consume less water were preferred in the landscape areas, and an efficient irrigation system was implemented, resulting in 67% water savings in irrigation.
- In the building, low flow toilet bowls, waterless urinals and high efficiency sensor batteries were used in wet areas, thus saving 40% of the mains water.
- Local materials were preferred in the project and 46% of the project consists of recycled materials.
- Automation system and heat recovery systems are used for heating, cooling and ventilation.
- Losses in heating and cooling are prevented by using high-performance exterior insulation and high-performance glasses.
- Carbon dioxide sensors are used in areas with high usage density. According to ASHREA standards, 46% more fresh air is provided. In this way, a healthy environment is created indoors.
- Lighting systems with adjustable light levels are used and unnecessary lighting is prevented with motion sensors.
- Energy savings are achieved with high efficiency pumps and fans.

- Solar panels were used to meet the hot water needs of the building.



Figure 1: Hilton Garden Inn Golden Horn Project Figure 2: Hilton Garden Inn Golden Horn Project in the Golden Horn Silhouette

The Hilton Garden Inn Haliç Project received a total of 65 points according to the LEED score table and was awarded the LEED BD&C V3 GOLD certificate in the new buildings category. Table 1 shows the distribution and weights of the scores obtained in the Hilton Garden Inn Project according to LEED categories (Environmentally Friendly Green Buildings Association, 2013).

The Hilton Garden Inn Project is the first and only certified green building project designed by TeCe Architecture. During the certification process of the project, which received a Gold certificate, we worked with a LEED consultancy firm. The decision of the project to obtain LEED certificate was taken after the preliminary project and the LEED online registration of the project was made in December 2009 after the preliminary project. At the beginning of the project design process, natural and climatic analyzes of the Project area were partially made, certain criteria were accepted, but systematic studies were not carried out. During the project design process, LEED negotiations (charette) with the participation of the whole project team were not held, instead, separate meetings were held with the designers and contractors by the LEED consultant firm. According to the information obtained from the project designer, passive design approaches were taken into account in shaping the design.

To this end;

- With mock-ups and 3D digital models, it is possible to find out which points natural light can reach, its angle, etc. tested, building orientation, shape and façade occupancy vacancy rates were checked,
- Exterior joinery system is designed to ensure that the fresh air in the environment does not fall below a certain comfort level in case the mechanical systems fail in the common areas, Full natural ventilation is provided in the rooms,
- Natural light comfort of up to 80% has been achieved at the entire hotel scale, in living spaces (excluding technical spaces and parking lots, etc.).

The project design process took 8 months. In the opinion of the project designer, the LEED certification process extended the project design process by a certain amount. When asked whether the integrated design process was successful or not, the designer stated that the integrated design process had been successful, but that better results could have been achieved had this process started at the Avan project stage.

3. REAL ESTATE DEVELOPMENT

According to Article 704 of the Turkish Civil Code, the subject of immovable property consists of land, independent and permanent rights (construction, resource and other easement rights) recorded on a separate page in the Land Registry, and independent sections registered in the Condominium Ownership Register. Each of these is recorded on a single page in the Land Registry. In the legal literature, if something cannot be transported or moved without damaging its essence, it is called immovable property. Immovable properties are lands such as fields, vineyards, orchards that are sufficiently defined and closed within themselves. The property includes annexes both above and below the ground. According to Article 718 of the Turkish Civil Code, ownership on the land covers the air layers above and the ground layers below it, to the extent that it is beneficial to use it. This property includes structures, plants and resources without prejudice to legal restrictions (Emrealp, 2005).

If real estate development; It is a multifaceted business area that encompasses various actions from land development to building construction, marketing, operation and management, but it is also an evolutionary process that shapes the environment and also depends on the economic, social, legal and physical component (Keleş, 1998).

Real estate project development; immovable renewal is a concept that encompasses many works from re-leasing the vacant immovables to the sale of the raw lands after they are purchased by parcelling. Land development process; It consists of finding a land where the development will be done, feasibility studies, making connections with the necessary people or organizations, designing alternative projects, market research, financing the project, working with contractors, lands resulting from subdivision, real estate management and sales of products from the beginning to the completion stage. Depending on the creativity of real estate development companies, there are real estate development projects that can be produced for many projects. Within the scope of real estate development projects; It is possible to specialize in land, residence, office, shopping center, tourism and entertainment facilities, hotels, factories, industrial buildings and even just parking lot development projects. In particular, real estate development companies that not only meet the demand but also create new markets with mixed-use development projects by bringing together many functions, can achieve very successful results. In order to realize a real estate development project, real estate development companies need to bring together three important resources. These; land, project thinking and capital (Keleş, 1998).

Having three resources in the hands of a single developer is the easiest option for realizing the project. The person or company that has the space and capital must come up with a suitable project idea. The one who has land and project thinking has to solve the cost problem. He who has the idea of capital and project will search for ways to obtain the most suitable land for his idea and capital. For countries such as Turkey, where the production of land with infrastructure is low, it is seen as the best way to have the land first and to create a capital and project idea according to this situation. In real estate development and valuation work, first of all, the type of real estate should be determined. One of the controversial issues in determining the type of immovables is the process of determining which immovables are lands and which immovables are lands. According to the Turkish Language Institution, the area reserved for construction is considered as land. According to Article 5 of the Zoning Law No. 3194; "It is the form of the cadastral parcels within the zoning islands arranged in accordance with the Zoning Law, zoning plan and regulations." defined in the format. However, village settlements are not called land. The 12th article of the Real Estate Tax Law No. 1319, amended by the Law No. 1610, defined the lands that are in the nature of land and explained what would be considered as land.

What is important in unstructured immovables is to determine whether the immovables have the characteristics of land or land, or if they are in the process of transformation from land to land, at what stage of this process they are. There are many different types of built immovables created on land or plots according to their intended use (Sur, 2012).

Types of development can be broadly classified under five main headings, allowing land, residential, commercial, industrial and mixed use. Projects developed in central business areas, where the land market is more limited and the value increase is high, are generally mixed-use projects (Şenol, 2009).

A housing policy that is designed with these principles in mind; Financial Interventions to be carried out on housing investments, taxes, loans, housing purchase methods and similar areas, rent control and condominium applications, legal interventions to be carried out on various legal restrictions and incentives and housing standards, housing production types, construction methods and building materials technical interventions.

Housing development, which is one of the most important implementation tools of housing policy, is the ability of this fund to be transferred to the buyers who are in need of funds and who are willing to borrow in order to buy / make their own home from those with surplus funds. It is indispensable for those who need a successful housing finance to enable long-term borrowing. Because housing is an expensive commodity, which seriously pushes the budget of households. In the absence of long-term borrowing, the acquisition of housing in the short term is often impossible. There is a very clear link between the housing and housing development in the country. The typologies and quality of housing use in a country are the product of success or failure of housing financing in many places (Yigit, 2020).

4. CONCLUSION

The increase in applications related to green buildings has brought along standardization and certification studies. However, it is important to determine which valuation system to choose for a green building. An incorrectly chosen system can bring negative consequences in terms of applicability, cost and design. The application of the right system, on the other hand, increases the design quality, while minimizing the damage to the environment in the formation and life process of the

building. While certification systems provide documentation of the work done, they increase the prestige of the institution that receives the certificate and vary according to the regions. When applying international certification systems, local differences such as climatic conditions, changes in materials and techniques should be taken into account. The number of green buildings is increasing in Turkey, and since there is no existing local certification system, LEED and BREEAM are the most accepted certification systems in the world. However, since these systems are evaluated with the same criteria throughout the world, the desired level of success has not been achieved. As the needs of the countries change, the scores given to the criteria should be adjusted accordingly. For example, while energy conservation is important in some countries, ensuring the sustainability of water resources may come to the fore in others. Considering Turkey's position in the world, its climatic characteristics, and different types of regions, it is inevitable to develop a national certificate of social, economic, legal and ecological quality that can meet the needs.

The Leed Certificate system was used in the Hilton Garden Inn project. It is important to determine which valuation system will be chosen when valuing the property in the Hilton Garden Inn project. An incorrectly chosen system can bring negative consequences in terms of applicability, cost and design. The application of the right system, on the other hand, increases the design quality, while minimizing the damage to the environment in the formation and life process of the building. While green building certification systems increase the value of real estate, they also constitute an important element for sustainable design.

Green building projects are applications that gained importance by taking into account the damage caused by the buildings to the environment and nature, and then became widespread by introducing certain rules and standards. These standards determine the sustainability criteria of green buildings, how green buildings should be, and enable measurement and evaluation of the building. In Turkey, green building development projects have gained importance and started to be implemented in recent years. Some projects have started to be developed using international assessment and evaluation systems such as LEED and BREEAM. In our country, it may be beneficial to download green building certification systems on a regional basis. The prevalence and sustainability of green buildings in our country will only be possible with the creation of applicable certification systems.

REFERENCES

- [1] Appraisal Institute, 2004, Real Estate Appraisal, Istanbul University Printing and Publishing House, Istanbul.
- [2] Çelik, E., 2009, Examination of Green Building Certificate Systems and Evaluation of Their Applicability in Turkey, Master's Thesis, Istanbul Technical University, Istanbul.
- [3] Environmentally Friendly Green Buildings Association, 2013. ,Green Building Certificate Guide New Housing Version 1,
- [4] Emrealp, S., 2005, Facilitating Information Handbook for Local Agenda 21 Implementations, IULA-EMME Publication, February.
- [5] Keleş, R., 1998, Dictionary of Urban Science Terms, İmge Kitabevi Publications, Ankara.
- [6] Peiser, R.B., Frej, A.B., 2007, Professional Real Estate Development, The ULI Guide to the Business, Second Edition, ULI.
- [7] Saka, İ., 2011, Evaluation of an Office Building in Istanbul in Terms of Sustainability within the Scope of the LEED Certification System, Master's Thesis, Istanbul Technical University, Department of Architecture, January.
- [8] Sırkıntı, H., 2012, Green Construction Practices within the Scope of Sustainability and Suggestions for the LEED Certification System, Master's Thesis, Istanbul Technical University Institute of Science and Technology, Istanbul.
- [9] Sur, H., 2012, Environmentally Friendly Green Buildings, Green Buildings Reference Guide, Istanbul.
- [10] Şenol, S., 2009, Examination of Green Buildings in Terms of Sustainability Criteria in the Real Estate Development Process, Master's Thesis, Istanbul Technical University Institute of Science and Technology, Istanbul.
- [11] Yigit, P., (2020), İstanbul Housing and Land Appraisal System Reform Development Process and Property Values Analysis, Journal Life of Economics, Volume 7, Issue 1, pp.59-78. E-ISSN: 2148-4139, January, 2020.