Sustainability is a major concern for everyone. Diminishing resources and increasing pollution raise questions about sustainability. This creates a pressure in the world to become more environmentally friendly. A green hospital is an organization that improves people's health and meets its share of the burden of disease by continuously reducing environmental impacts on sustainability. This sector is expected to grow several times over the next decade. Energy savings and water savings are tangible benefits of green hospitals. Increased daylight, faster patient recovery, natural connections, improved hygiene and health are just a few intangible benefits of green hospitals. Criteria have been set worldwide with certificates to qualify hospitals as green. In this context, in Turkey, the Ministry of Environment, Urbanization and Climate Change started the YeS-TR: In this study, a comparison of green certification standards in the world and YeS-TR: Green Certificate application was compared with the green certification standards in the World.

Keywords: Green building, Green hospital, Leadership Energy Environmental Design, Green certificate Turkey, Energy.

1 INTRODUCTION

Hospitals operate continuously throughout the year, utilizing advanced and modern medical technologies and performing complex medical procedures that require adequate lighting and temperature. Although there is no global definition of a green hospital, it can be defined as a building that is planned and designed to be efficient and environmentally sensitive, using natural resources to the maximum (Garg and Dewan 2022). The healthcare sector is a major consumer of energy and other natural resources. Continuous electricity is required for uninterrupted operations 24 hours a day. Hospitals produce 2.5 times more carbon emissions than commercial buildings. Healthcare is growing at a very fast pace and contributes to improving the quality of services. Therefore, there is a constant need to implement the "Green building concept" in the healthcare sector to minimize the use of natural resources and energy. Reductions in water use in green hospitals can range from 20 to 30 % and approx. Energy consumption is reduced by 30-40% in green hospitals. A hospital that receives a green hospital certificate can increase patient satisfaction and inpatient revenue, contribute positively to patient health and living environment, dispose of nearly 100% hazardous waste, and transform into a more efficient, high quality and low cost, high performance structure (Cilhoroz and Isik 2018).
2 MATERIALS AND METHODS

Within the scope of the study, first, the healthcare buildings in Turkey that have “Leadership in Energy and Environmental Design” (LEED) certification were examined. As a result of the examination, 8 healthcare buildings with LEED For Healthcare were identified in our country. These healthcare buildings are Memorial Bahcelievler Hospital, Adana City Hospital, Basaksehir Ikitelli City Hospital, Bursa City Hospital, Acibadem Altunzade Hospital, Yozgat City Hospital, APY Atasehir Hospital, Erol Olcok Egitim ve Araştirma Hospital. In the research, firstly, the scores of these healthcare buildings in the main categories within the scope of LEED certification were analyzed, and with this data, the success percentages of healthcare buildings with LEED For Healthcare certification in Turkey were determined. Then YeS-TR: Green Certificate and LEED For Healthcare certificate were compared and the main differences and similarities between the two certificates were revealed. As a result of the study, recommendations are made for the future versions of both types of certificates.

3 YeS-TR: GREEN CERTIFICATION AND LEED CERTIFICATION

The Green Certificate (YeS-TR) is issued by the Ministry of Environment, Urbanization and Climate Change of the Republic of Turkey. It aims to establish a green building organization for buildings and settlements and to use energy and natural resources efficiently. In addition to these, there are many international certificates. This type of national certificate is the equivalent of these on the basis of the Republic of Turkey. It is functionally similar to certificates such as Leadership in Energy and Environmental Design (LEED), The Building Research Establishment's Environmental Assessment Method (BREEAM), which are widely known in the world. These certificate types have been serving internationally since the 1990s with various examples and functions.

3.1 YeS-TR Green Certificate Building

On June 12, 2022, the Regulation on Green Certificate for Buildings and Settlements was published in Turkey and guidelines were published on behalf of buildings and settlements for YeS-Tr certification. Thus, the "Green Certificate" system, which was prepared as a domestic and national application for the first time in order to certify sustainable Green Buildings in our country, started to serve (Republic of Turkey Ministry of Environment, Urbanization and Climate Change 2022). Purpose of the regulation: To establish an evaluation and certification system that will reduce the negative impacts of buildings and settlements on the environment by using natural resources and energy efficiently; To determine the procedures and principles regarding the qualifications of green certified individuals, the way of evaluation and the criteria to be used in the evaluation of green buildings and green settlements (Republic of Turkey Ministry of Environment, Urbanization and Climate Change 2022). The Regulation covers the assessment and certification of the environmental, social and economic sustainability of existing and new buildings and communities (Republic of Turkey Ministry of Environment, Urbanization and Climate Change 2022). YeS-TR: Green Certificate a total of 110 points can be obtained within the scope of the building certificate. YeS-TR A total of 110 points can be obtained within the scope of the Green Certificate Building certificate. The main categories are as follows: integrated building design, construction, and management 14 points; building material and life cycle assessment 16 points; indoor environmental quality 20 points; energy efficiency and utilization 30 points; water and waste management 20 points; innovation building 10 points.
3.2 LEED Building Design + Construction (BD+C) Healthcare

This certification system was established by the US Green Building Council (USGBC). LEED Health Certificates are created in conditions suitable for inpatient and outpatient access and consist of standards within the framework of sustainable green health. In addition to hospitals, it is also used in various medical units such as clinics and nursing homes. The overall goal is to create a healthy environment and benefit through proper waste management (Palteki 2013). The system, which issued certificates for green buildings in the first period of its establishment, issued a certificate for a health structure for the first time in 2003. The LEED health certification system includes methods such as avoiding harmful substances, accepting natural processing, and preferring renewable resources. The certification system was created as a result of adding medical standards to the existing rating system with the "Green Guide in Healthcare - GGHC" study. The US Green Building Council and GGHC collaborated for 7 years to develop a system to guide healthcare facilities (McCullough 2010). Founded in 2002, GGHC is known as the healthcare industry's first measurable system with integrated design principles. GGHC has pioneered the construction of nearly 40 million square meters of healthcare in the United States and surrounding regions. During the development of LEED certification for healthcare, GGHC was inspired by innovation and guidance (Čilhoroz ve İşık 2018, USGBC 2019). Within the scope of the study, the LEED Healthcare Certification certificate held by 8 healthcare buildings in Turkey is discussed. In this version, a total of 110 points can be obtained: Regional priority credits four points, innovation six points, indoor environmental quality 18 points, material, and resources 16 points, energy & atmosphere 39 points, water efficiency nine points, sustainable sites 18 points. LEED-certified healthcare spaces support health and wellness on two levels. Green buildings can improve health and wellness for both occupants and the community. Strategies such as good indoor air quality, non-toxic materials, and access to daylight can enhance the experience of people living or working in buildings. In the case of LEED-certified spaces, hospitals, clinics, and other healthcare facilities have positive impacts on human health. Their primary purpose is to improve and sustain health. LEED certifications aim to increase the efficiency of building spaces by making them healthier. Worldwide, the total of projects certified as healthcare facilities covers 237 million square meters, with a total of 1,668 projects. Also, LEED certified healthcare facilities worldwide:

- 1,376 projects are certified under LEED for Building Design and Construction (LEED BD+C),
- 259 projects certified under LEED for Interior Design and Construction (LEED ID+C),
- 36 projects certified under LEED for Operations and Maintenance (LEED O+M) (USGBC, 2023a).

Areas certified by country under LEED BD+C: The majority of healthcare certifications fall under LEED BD+C, where the US leads in terms of gross square meters with a share of almost 68%, followed by Canada with around 17%. The main reason why LEED is widespread in North American circles is that it is a certification type originating in the United States. The top five countries in the world that fall under LEED BD+C are as follows:

- United States of America: 1,088 projects; approximately 147 million square meters,
- Canada: 150 projects; over 36 million square meters,
- United Arab Emirates: 7 projects; over 5 million square meters,
- China: 11 projects; over 5 million square meters,
- Turkey: 13 projects; over 3 million square meters (URL-1)
Table 1. Healthcare buildings with LEED (BD+C) Healthcare Certification (USGBC 2023b, USGBC 2023c, USGBC 2023d, USGBC 2023e, USGBC 2023f, USGBC 2023g, USGBC 2023h, USGBC 2023i).

<table>
<thead>
<tr>
<th>Health Structure</th>
<th>Building Area (sq ft)</th>
<th>Certificate Degree</th>
<th>Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memorial Bahcelievler Hospital</td>
<td>602.828</td>
<td>Platinum</td>
<td>January, 2018</td>
</tr>
<tr>
<td>Adana City Hospital</td>
<td>278.458</td>
<td>Gold</td>
<td>August, 2018</td>
</tr>
<tr>
<td>Basaksehir Ikitelli City Hospital</td>
<td>572.568</td>
<td>Gold</td>
<td>October, 2020</td>
</tr>
<tr>
<td>Bursa City Hospital</td>
<td>273.798</td>
<td>Gold</td>
<td>January, 2020</td>
</tr>
<tr>
<td>Acibadem Altunizade Hospital</td>
<td>78.933</td>
<td>Gold</td>
<td>June, 2018</td>
</tr>
<tr>
<td>Yozgat Sehir Hospital</td>
<td>87.642</td>
<td>Gold</td>
<td>August, 2017</td>
</tr>
<tr>
<td>APY Atasehir Hospital</td>
<td>46.700</td>
<td>Gold</td>
<td>October, 2022</td>
</tr>
<tr>
<td>Erol Olcok Education and Research Hospital</td>
<td>1.413.152</td>
<td>Silver</td>
<td>January, 2018</td>
</tr>
</tbody>
</table>

When Table 1 is analyzed, it is seen that hospital buildings in Turkey have not yet approached the total points from the LEED (BD+C) Healthcare certificate, where a total of 110 points can be obtained. Memorial Bahcelievler Hospital received the highest score with 83 points. Acibadem Altunizade Hospital with 72 points, Bursa City Hospital and APY Atasehir Hospital with 68 points respectively. Basaksehir Ikitelli City Hospital scored 63 points, Adana City Hospital 62 points, Yozgat Sehir Hospital 60 points and Erol Olcok Training and Research Hospital 55 points.

4 LEED (BD+C) HEALTHCARE AND YeS-TR: GREEN CERTIFICATION COMPARISON

Fig. 1, compares LEED (BD+C) Healthcare and YeS-TR: Green Certificate are compared. LEED certificate is colored in blue, and YeS-TR is colored in green. A total of 110 points can be obtained from both certificates. While there are 7 categories in LEED certificate, there are 6 categories in YeS-TR. The Regional priority credits category, which is included in the LEED certificate and can be obtained a total of 4 points, is not included in YeS-TR. However, the scoring and content of the other categories are close to each other despite some differences. In LEED certification, 6 points can be obtained from the Innovation in Design category. In YeS TR, this category is replaced by the Innovation and Building category and a total of 10 points can be obtained from this category. In LEED certification, there is a Water efficiency category, and a total of points can be obtained from this category. The equivalent of this category in YeS-TR is water and waste management and a total of 20 points can be obtained from this category. LEED certification has an Energy and Atmosphere category and a total of 39 points can be obtained from this category. The equivalent of this category in YeS-TR is energy use and efficiency. A total of 30 points can be obtained from this category. In LEED certification, there is a Materials and Resources category and a total of 16 points can be obtained from this category. Similarly, in YeS-TR, this category is called Building Materials and Life Cycle Assessment and the same total of 16 points can be obtained as LEED certificate. The Indoor Environmental Quality category, which is named the same in both certificates, can score a total of 18 points in both certificates. The LEED certificate has a sustainable lands category and a total of 18 points can be obtained from this category. This category corresponds to Integrated Building Design, Construction and Management in YeS-TR and a total of 13 points can be obtained from this category.
RESULTS AND CONCLUSIONS

With the rapid consumption of natural resources and increasing population, the trend towards green buildings is increasing. It is important that green building certification systems become widespread in order to reduce the damages of negative environmental impacts. This is especially critical in functional buildings such as hospitals and healthcare buildings, which are constantly active and where a large number of individuals constantly enter and exit. In this study, a comparison of green certification standards in the world and YeS-TR: Green Certificate application has been compared. Although the two certificates have similar features, the first striking difference between them is that there are 7 categories in LEED certificate while there are 6 categories in YeS-TR. The Regional Priority Credits category, which is included in the LEED certificate and for which a total of 4 points can be obtained, is not included in YeS-TR. However, the scoring and content of the other categories are close to each other despite some differences. A total of 110 points can be obtained from both certificates. In the LEED Healthcare certificate, the "energy and atmosphere" credit plays an active role in determining the type of certificate as it provides more points with 39 points. In the YeS-TR certificate, the category that earns the most points with 30 points is again the "energy and atmosphere" category. As seen in the comparison section, it is important to integrate energy systems such as energy use, renewable energy sources, trigeneration or cogeneration into buildings to gain higher points in LEED or YeS-TR certification types and to be a better green hospital structure. LEED certification has a more established practice and history. YeS-TR has been implemented since 2022. Comparisons of the two certification systems are based on current documents. Finally, within the scope of the study; the categories and scores of YeS-TR, a new certification system, are shown and the connection with LEED certified hospitals in Turkey is intended to be established. YeS-TR needs to be supported in order to create environmentally friendly themed hospitals in Turkey with a local certification system as in the LEED system. Therefore, as a recommendation, not only new hospital buildings but also existing health buildings in Turkey should contribute to the environment and create savings for future generations by taking into account the criteria in YeS-TR. In this context, incentives should be created in both public and private sectors in Turkey. It
is important that professional organizations increase their promotion and information in this field. With this study, it is aimed that the newly developing YeS-TR system will be the basis for academic studies to be prepared in the future.

References