(MASTER THESIS)

COMPARISON OF SUSTAINABLE HOTEL DESIGN EXAMPLES USING PERFORMANCE INDICATORS

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This study titled "**Comparison of Sustainable Hotel Design Examples Using Performance Indicators**" and presented as Master Thesis by Duygu Kanbul Yüksel has been evaluated in compliance with the relevant provisions of Y.U. Graduate Education and Training Regulation and Y.U. Institute of Science Education and Training Direction and jury members written below have decided for the defense of this thesis and it has been declared by consensus / majority of votes that the candidate has succeeded in thesis defense examination dated 24.05.2013.

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TEXT OF OATH

I hereby certify with honor that this MSc/Ph.D. thesis titled "**COMPARISON of SUSTAINABLE HOTEL DESIGN EXAMPLES USING PERFORMANCE INDICATORS"** was written by me, without aid that would not comply with scientific ethics and academic traditions, that the bibliography I have used is that indicated in this thesis and that appropriate reference has been given whenever necessary.

24/05/2013

Duygu KANBUL YÜKSEL

ÖZET

SÜRDÜRÜLEBİLİR OTEL TASARIM ÖRNEKLERİNİN PERFORMANS KRİTERLERİ İLE KARŞILAŞTIRILMASI

KANBUL YÜKSEL, Duygu

Yüksek Lisans Tezi, İç Mimarlık Bölümü
Tez Danışmanı: Assist. Prof. Dr. Eray BOZKURT
Mayıs 2013, 124 sayfa

Binaların çevre üzerindeki negatif etkileri; sera gazı ve toksik gaz yayılımı günden güne artmaktadır. Sürdürülebilir tasarım prensipleri ile çevre üzerindeki negatif etkiyi azaltmak hedeflenmektedir. Günümüzde turizm sektörünün sürdürülebilir olması için çalışmalara başlanmıştır. Bununla ilgili yönetmelikler, tasarılar gözden geçirilmektedir. Bu konudaki bilinç ve duyarlılığı arttırmak için çeşitli çalışmalar yapılmaktadır. Sürdürülebilir turizm bağlamında, çevreye duyarlı yaklaşımlar ile binalar üretilerek, sürdürülebilirliğin sağlanması temel sorumluluklar içinde yerini almaktadır.

Bu çalışmada, öncelikle sürdürülebilir bir otel tasarımındaki problemler, literatür araştırması sayesinde, belirlenmiştir. Tez kapsamında, sürdürülebilir otel yapımına yönelik olarak kriterler belirlenerek, yaklaşımlar geliştirerek dünya ülkeleri üzerinde çevre koruma bilincine duyarlı tasarlanmış otel örnekleri incelenmiş ve elde edilen bulgular derlenmiştir.

Çalışmanın amacı, otel yapılarında, malzeme seçimi, verimli enerji tasarımı, su tüketimi, etkili iç mekân hava kalitesi sağlanması, verimli gün ışığı kullanımı, yapısal form ve atık yönetimi gibi yedi tasarım başlığı adı altında toplanan sürdürülebilir tasarım kriterlerinin örnekler üzerinden incelenmesi, akış şemalarının hazırlanması ve aralarında karşılaştırma yapılmasıdır. Bu tez, otel yapılarının tasarımına katkı sağlayabilecek kaynak niteliğinde bir çalışmadır.

Anahtar Kelimeler: Sürdürülebilirlik, tasarım kriterleri, Turizm, Otel, İç mimari.

ABSTRACT

COMPARISON of SUSTAINABLE HOTEL DESIGN EXAMPLES USING PERFORMANCE INDICATORS

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Negative effects of the buildings on the environment such as emission of the greenhouse gas and the toxic gas increases from day to day. It is aimed to reduce these kinds of negative effects on the environment with the aid of sustainable design criterions. In the present day, numerous studies related to the sustainability of tourism sector have been started. All the regulations and the legislations concerned with these issues are reviewed. In the meanwhile, in order to raise the consciousness and the mental capacity of the people about this issue, quite numbers of studies are carried out. In the context of sustainable tourism, maintaining the sustainability by constructing the buildings with the approaches that are sensitive to environment, take the place of basis responsibilities.

In this study, first of all, in order to obtain sustainable hotel design, literature reviews have been accomplished and using these data, designation problems related to hotel design have also been specified. In content of this thesis, criterions with respect to the sustainable hotel design have been determined and in the meantime concerned approaches have been developed. At the same time wide range of samples of the hotel designed with the intention of eco-friendly and also sensitive to consciousness of protection of the environment have been investigated and the findings have been compiled properly.

As part of the aim of this study, wide range of hotel samples have been examined and prepared the flow charts and also compared each other's in terms of the seven sustainable design criterions including choice of the suitable materials, productive energy design, water consumption, ensuring the effective air condition in the interior site of the hotels, use of day light effectively, structural form and the management of contaminants. However this study will contribute all the hotel structures and is the sample for design studies in Turkey and also considered as the source study in literature.

Key Words: Sustainability, Design Criteria, Tourism, Hotel, Interior Architecture.

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Kısaltmalar / Abbreviations

EIA	Environmental Impact Assessment
FSC	Forest Stewardship Council
GSTC	The Global Sustainable Tourism Council
GBC	Green Building Council
LEED	Leadership in Energy and Environmental Design
UNWTO	World Tourism Organization
USGBC	U.S. Green Building Council
SEG	Greenhouse Gas Emissions Indicator

1. CONCEPTUAL FRAMEWORK

This chapter tries to put the research topic in its setting of the way finding behavior and its relation with cognition. This preliminary chapter also introduces the basic research subject, goals and objectives of the study, as well as its research methods and its scope.

1.1 Introduction

Today global climate changes of the world's most important actors are construction, tourism and transportation sectors which threatens the future of world. When we look at the structures in the world, 17% of fresh water resources, 25% of forest products consumption and 40% of energy sources are the results for the structures consumption. And the interviews with the hotel owner show that tourism structures share the consumption of 20% in Turkey. In addition, the tourism sector in the world SEG (Greenhouse Gas Emissions Indicator) and CO2 emissions are estimated to be approximately 5% of the produce. In this context, these will contribute to sustainable hotel that will be designed from now on (Simpson, 2008).

Some studies have found that the tourism industry is only interested in environmental protection so long as it reduces operating and activity costs (Akis, 2001). It is normal to expect that enterprises in the tourism sector will adopt energy-saving methods and proper disposal of solid waste only if they minimize the related expenditures; competitive markets require cost minimization and profit maximization for an enterprise to survive. In this context, while designed places, hotels, it's possible by using today's design approaches to environmental-friendly and sustainable buildings with sustainable tourism.

The hotel industry, because of the nature of its functions, characteristics, and services, consumes substantial quantities of energy, water, and non-durable products. It has been estimated that most environmental impacts created by the hotel industry can be attributed to site planning and facility management; excessive consumption of local and imported non-durable goods, energy, and water; and emissions into the air, water, and soil (APAT, 2002; Mensah, 2004; Trung & Kumar, 2005).

The pressure for improved environmental performance of hotels can be seen, therefore, as driven by a need to preserve the local environment, perceived benefits such an opportunity to reduce operating costs and sustaining competitive advantage, enforcement of environmental regulations, institutional pressures, and a growing demand by customers for environmentally friendly programs. (Bohdanowicz, 2005a, b; Le et al., 2006; Rivera, 2004; Vazques, Santos, & Alvarez, 2001).

Sustainability is a complex word that is hard to define and even more challenging to quantify. It was first brought into popular use in 1987 in the United Nations documents the Common Future, a report by the World Commission on Environmental and Development, which defined sustainable development as meeting 'the need of the present without compromising the ability of future generations to meet their own'. Since then the term 'sustainability' and such expressions as 'green', 'eco' and 'environmentally friendly' have been used to describe a multitude of product and actions that show concern for the earth's resources. The overuse of these terms has threatened to reduce the potency of their meaning (Strongman, 2007)

There is no greater potential for personal expression than building one's own shelter. For this reason alone, every effort should be made to enable new building construction to be sustainable for generations to come. Today, we realize that to be truly sustainable, it is not enough to imagine methods of minimizing damage to the environment: instead the result must have a net positive impact on it (Foster, 2007).

The aim of the study is to emphasize and application criteria's of hotels around the world including Turkey which claim to be sustainable and environmentally friendly. In this study sustainable design criteria are determined under the core indicators; material consumption, energy efficiency, water consumption, efficient indoor air quality, efficient daylight saving, structural form and waste management. Analysis of sustainable buildings, some criteria are preferred or not, by making survey to world example and Turkey examples. Consequently, in the light of information obtained, building design criteria considered in sustainable buildings are presented with a general outline.

An increasing population, rapid urbanization and natural resources being under threat have been the most important facts that created environmental problems today. When looking at the historical development process of hotel building designs built the aim to service to customer, it has been observed that they were designed within basic framework such as location, building with environmental design, furniture and interior space organization as a result of the inadequacy of laws and lack of standards. When one observes at the building environment around the world, 17% of fresh water resources, 25% of forest products consumption and 40% of energy sources are the results for the structures consumption (Esin and Yuksek, 2009). It is accepted that construction has also played an important role in the emergence of environmental problems. A growing population, rapid urbanization and natural resources being under threat have been the most important environmental problems today.

Designed appropriateness of the people who use spaces, holds an important place in the evaluation of space. There are some Architectural Design Assessment Criteria in Hotels;

1. Functional Eligibility conditions,
2. Positive Contact Terms of Conformity,
3. User Specified Eligibility,
4. Health and Comfort Conditions Eligibility,
5. Aesthetic Conditions Eligibility,
6. Revised Environmental Conditions Eligibility,
7. Economic Conditions Eligibility (Laçin, 2004).

These criteria affect the hotel design and stuck with always same materials, same structural form. For these reason, to change the design criteria of the hotel, we need new solutions to support these criteria and protect the environment. With the change of the logic, customer used to see functional and environmental friendly buildings.

In order to document the purpose of the study, written thesis, books, articles, web sites, magazines, photographs, technical drawings, some hotel data's as well as correspondence with owner of the hotels have been used. Collected documents were arranged according to the content of sub-titles and text integrity. All the data obtained were turned into a thesis study as a written text upon executing necessary editing.

In this thesis, sustainable tourism, classifications of hotel by type, environmental awareness and sustainable hotel that have been include these researches. Thirty thesis of Turkish Council of Higher Education which related these topics analyzed.

The summaries of the main sources that were used within the scope and aim of this study are as follows.

Bohdanowicz P. (2001) and Kallhauge A. 'Energy Efficiency and Conservation in Hotels- towards Sustainable Tourism' thesis explained the designed and operated hotel facilities offer convincing environmental and socio cultural advantages, as well as attractive opportunities for sustainable business. And paper explains sustainable tourism, including the sustainable use of energy and other resources in the hotel sector.

Akis S. (2001) 'Sustainable Tourism and Turkey': Result of a field Research' and Sweeting A. (2003) 'Initiative for Sustainable Tourism Development' Definition of sustainable tourism and world tourism organization explained in these theses. These researches show the tourism wrong applications. Development of the tourism explained with the causes.

Scott D. (2009) 'Weather and Climate Information for Tourism' article show the sustainable tourism effects and explain the logic them. Tourism developers, operators and destinations discuss with the climate changes. Application of weather and climate information in the sustainable tourism learned.

Gezici F. (2005) 'Components of Sustainability Two Cases from Turkey' thesis explained the development process and goals of sustainability in two internationally popular cultural destinations in Turkey. The study hypothesis was the rapid development and high concentration of tourism activities cause negative effects on the natural environment.

Romppanen J. (2010) 'Increasing Environmental Awareness of Hotel Customers, Case: A Turkish Eco Hotel' thesis give information about sustainable tourism, environmental impacts of tourism and about environmentally friendly ways of travelling and doing business.

Also show the ecotourism is a growing industry also in Turkey with the negative impacts, climate changes and pollution effects.

Bohdanowicz P. (2003) 'Environmental Awareness in the Hotel Industry- Questionnaire Analysis- Draft of Final Report' thesis explains the importance of the environmental awareness in the hotel. Questionnaire Analysis among the hotel customer in order to compare and verify opinion about some of the issues mentioned. And these changes will take positive direction, towards the sustainability explained.

Erdoğan N. (2009) 'Environmental Protection Programs and Conservation Practices of Hotel in Ankara, Turkey' researches explained the importance of hotel industry with the environmental protection programs. And waste management and energy conservation sustainable design indicators discussed.

Conbay N. (2008) 'Green Certification System Evaluation in World' researches explained the certification system importance and how many type certification systems used in the world and Turkey.

Yolcu E. (2006) 'Hotel Interior, Environment, Design Principles' thesis explained the definition of hotels with the type and stages that hotels have undergone until today, and to determine what kind of inputs a designer would need when he/she prepares the program of the needs of a hotel, and to apply the principles of architectural design planning of hotels.

Rutkin K. (2005) 'User Preference of Interior Design Elements in Hotel Spaces' thesis examines which variations of interior design elements are preferred by the hotel guests and which elements are most important to overall preference of the spaces. The scale, furniture type, material and access to day lighting elements explained.

Dilşad Ö. (2007) 'Analyzed the Interior Hotel Design Examples' thesis explained hotel definition, hotel types, design process and interior placements. This help to understand the hotel design principles and researches with the examples compared that design process learned.

Balikcioglu G. (2004) ‘Urban Convention Hotel Design Criteria and a Design Proposal for Ankara Case’ thesis explains the efficient, flexible and valid hotel design. Design need for the hotel and many examples were investigated.

Chan L. (2010) ‘Selection of Hotels: Is the sustainability of a building more important than its aesthetic appearance? ’ thesis show the sustainable hotel building rating system and sustainability performance indicators. This help to create the sustainable design performance indicators in this thesis.

Rafael J. (2011) ‘Cogeneration Supply By Bio-Energy for a Sustainable Hotel Building Management System’ article explained the development of an energy model based on a mixed system of renewable energy, with primary energy sources as solar and biomass. Environment friendly process aims the reduction of energy demand, costs and emissions. This energy model is a new sustainable standard about energy consumption efficiency such as electrical and thermal demands of a hotel building discussed.

Bohdanowicz P. (2005) ‘Sustainable Hotels Environmental Reporting According to Green Globe 21’ named thesis explained the developing and making available reliable tools for benchmarking environmental performance are important steps in the quest for sustainability in hotel facilities.

Şenel A. (2010) ‘The Examination of Sustainable Building Construction Principles And New Approaches’ purpose of this research is to explore the ideas and approaches developed towards sustainable building construction. Sustainable and Sustainable Development which are key concept that are derived to be a solution to environmental, economical and social issues described.

Priyadarsini R. (2009) ‘A study on Energy Performance of Hotel in Singapore’ article explained the energy performance of the hotel building. Building features and operational characteristics contributing to the variations in hotel energy performance were discussed. Energy consumption of hotels and proposal explained in the article.

Treberspurg M. (2010) ‘New Technical Solution for Energy Efficient Buildings’ article explained façade systems and types of the façade. Wood façade, solar active façade

systems, glass façade systems, energy façade systems, hybrid façade systems and green façade systems described with the examples.

Karagiorgas M. (2006) 'HOTRES: Renewable Energies in the Hotels. An extensive technical tool for the hotel industry' article explained the five renewable energy technologies. These renewable energies create the Sustainable hotel and affect the tourism industry. Beccali M. (2009) 'An Empirical Approach for Ranking Environmental and Energy Saving Measures in the Hotel Sector' article explained the energy saving and reduction of CO2 emissions.

Yıldız Y. (2008) 'Retrofitting Existing Mass Housing for Energy Efficiency: A Case Study in Gaziemir Emlak Bank Housing Area, Izmir, Turkey' thesis explain energy consumption and energy efficiency in Turkey.

Becker E. (2009) 'The Proximity Hotel: A Case Study on Guest Satisfaction of Sustainable Luxury Environments'' thesis explained the Sustainable Designs and guest satisfaction relation and help to development of the hotel.

The 2005 'World Sustainable Building Conference in Tokyo, Student Session Sustainable Building Design Book' is to present those Sustainable buildings such as zero-emission refined buildings, passively designed energy saving building and water consumptions explained with the examples.

Ozgur M. (2008) 'Review of Turkey's renewable energy potential' article describes the Global renewable energy status and Turkey renewable energy potential and its utilization explained. Climate change and C02 emission of Turkey detailed survey.

Zinzade D. (2010) 'An Investigation of the Sustainability Formulating the High Rise Buildings' article explain the sustainable buildings design and performance strategies and to state the sustainability strategies shaping the high rise buildings investigated throughout the study.

This study is to determine the sustainable design criteria for environmental friendly hotel design and to research the attained application results for the chosen locations. The design principles are identified and then evaluated. By analyzing various written sources, the

design difficulties of the research subject are revealed and evaluated. Information concerning environmental friendly sustainable hotels and certificates are conveyed in this study. In the light of this acquired information, sustainable principles have come up

In the first chapter, with the introduction; the aim, the method type to realize these objectives, scope of the study and limitations and the technique to be used during the data collection process are explained.

In the second chapter, 'sustainable tourism and environmental awareness' which forms the center of the study are discussed. Sustainable tourism was carried out with the global organizations, climates changes of tourism and the global sustainable tourism organization focused. 'Environmental awareness of sustainable hotel design' analyzed with the management and evaluation system of hotels. The evaluation system helps to create the 7 design criteria which will be explained in the next chapter.

In the third chapter, under the heading 'Sustainable Hotel Performance Indicator' concept of sustainability in hotel industry, global hotel industry and the environment and sustainable development of hotel explained. Under the heading 'Hotel Interior Design Criteria' and definition of hotel, types of hotel and the hotel design development in the world explained with the hotel picture. 'Sustainable Hotel Design Performance Indicators' were shown with the flow chart and compose the basis of this study. Limited with 7 sustainable design criteria of hotels which includes material consumption, energy efficiency, water consumption, efficient indoor air quality, efficient daylight saving, structural form and waste management.

In the fourth chapter, sustainable hotel examples designed in countries across the world were collected upon personal interviews with the hotel owner and managers were examined in the context of design criteria. These selected hotel examples analyzed with the seven design criteria; material consumption, energy efficiency, water consumption, efficient indoor air quality, efficient daylight saving, structural form and waste management.

In the fifth chapters, the examples which are explained in the chapter five are being compared with each other and with the use of point system, evaluation shows with tables. Analyzed hotel examples with the 7 sustainable hotel design criteria and named with poor,

weak, below average, average, above average, good and best. The comparison of the hotels explained with the table and evaluation described with the help of Pareto Principle. The Pareto principle (also known as the 80–20 rule, the law of the vital few, and the principle of factor sparsely) states that, for many events, roughly 80% of the effects come from 20% of the causes (http://en.wikipedia.org/wiki/Pareto_principle).

In the conclusion, the findings of the study carried out in accordance with the objectives and purposes are explained and recommendations are made for the future.

Sustainable hotel designs will gain importance when the significance of sustainable tourism is realized all over the world. Therefore, customers recognizing their environmental responsibility will give importance to sustainable hotels to conserve the nature and protect the environment. In the light of these, the construction sector will develop in a sustainable manner, and the sustainable hotel design will become essential for more comfortable and healthy lives.

The scope of the study is collected under headings; Sustainable Tourism and environmental awareness and sustainable hotel design criteria, sustainable hotel buildings and comparison of hotels. The significance of 'sustainable tourism' chapter help to understood, why we need sustainable hotel design.

Importance of project to environment and construction details of sustainable hotels are described under the heading of 'sustainable hotel design criteria'. And sustainable hotel design criteria' chapter explained and discussed with the help of 14 Sustainable hotel Design examples which were claim to be a sustainable hotel. And the comparison of the hotels with the sustainable design criteria were explained.

This study is limited with 7 sustainable design criteria of hotels which includes material consumption, energy efficiency, water consumption, efficient indoor air quality, efficient daylight saving, structural form and waste management. The finding were organized, analyzed, and presented according to the categories. And the hotels which are selected for evaluation are claiming to be sustainable hotels.

2. SUSTAINABLE TOURISM AND ENVIRONMENTAL AWARENESS

In the second chapter the sustainable tourism and the relation with the environmental awareness were described under main and sub-headings. And today's evaluation systems in Turkey and western civilization were described.

2.1. Definition of Sustainable Tourism

Tourism in the Green Economy refers to tourism activities that can be maintained, or sustained, indefinitely in their social, economic, socioeconomic, cultural, and environmental contexts: "sustainable tourism." This term describes policies, practices and programs that take into account not only the expectations of tourists about responsible natural resource management (demand), but also the needs and quality of life of the environment and communities that support tourist projects (supply) (Romppanen, 2010).

The principles of sustainable tourism are based on the following factors:

(a) Changing patterns of resource consumption;
(b) Efficient use of the Earth's natural resources through conservation and management of water and energy;
(c) Protection of our global commons through efficient energy use, environmentally Friendly transportation, efficient land use and resource development, and protection and management of the air, land, and oceans;
(d) Management of chemicals and wastes by prevention, reduction, and management of hazardous waste, reduction of solid wastes, reuse and recycling, and waste water Management; (e) site planning, use and management;
(f) Inclusion of staff, clients, and society in environmental issues;
(g) Development of partnerships to promote sustainable development; and
(h) Sustainable planning (Mengi & Algan, 2003).

Turkey is not exempt from this discussion. Hence, it is necessary to assess the nature of Turkish policy and business practices in the tourism and travel industry to provide valuable information that can support policy development, the application of policy, and control of environmental impacts.

The European Union began to develop environmental policy and action plans in 1972. Since then, minimum standards and legal infrastructures have been established for waste recycling and water and air pollution. Environmental issues are included in the Union's programs related to the Amsterdam Protocol because the existing legal provisions were found to be insufficient for the prevention of environmental pollution.

The Fifth Environmental Action Program was established for the 1993–2000 period. The inclusion of an environmental dimension in all work and every program carried out in the European Union became mandatory since the Fifth Environmental Action Program covered the industrial, energy, tourism, transportation, and agricultural sectors (Mengi & Algan, 2003). This suggests a need to discover whether Turkey's hotel industry meets the internationally and nationally prescribed and expected standards.

There have been numerous studies of the environmental protection practices of hotels, but the majority has focused on large hotels catering to the demands of mass tourism on seashores and in popular resort areas (Romppanen, 2010). Inner-city hotels, and especially hotels in large cities, have generally been ignored. Contrary to the prevailing notion that only coastal hotels create environmental problems and take measures to solve or prevent them, inner-city hotels also create and solve environmental problems. Thus, it is necessary to determine the nature of the environmental policies and practices of city hotels in order to improve the knowledge of their status and their impacts and to develop and apply environmentally sound solutions (Romppanen, 2010).

Tourism can be regarded as one of the largest industries in the world as it offers employment for nearly 200 million people. Yearly there are approximately 800 million travelers and the number is expected to be doubled by the year 2020. (WWF, Finland). A huge number of visitors also put enormous stress on the environment. However, with responsible actions negative impacts on the environment can be minimized. Responsible actions apply to the whole sustainable Tourism industry (Romppanen, 2010).

Sustainable Tourism organization support by the World Tourism Organization (UNWTO), climate change and The Global Sustainable Tourism Council (GSTC). These are help to optimal use of environmental resources and support the Sustainable tourism.

2.1.1 World Tourism Organization (UNWTO)

UNWTO support the establishment of observatories of the Sustainable Tourism for Tourism destinations, through the use of systematic application of monitoring, evaluation and information techniques as key tools for the development of Sustainable policies (Romppanen, 2010).

UNWTO, Supporting Sustainable Tourism policies and practices which make optimal use of environmental resources, respect the socio-cultural authenticity of host communities and provide socio-economic benefits for all.

The World Tourism Organization is the United Nations agency responsible for the promotion of responsible, sustainable and universally accessible tourism.

As the leading international organization in the field of tourism, UNWTO promotes tourism as a driver of economic growth, inclusive development and environmental sustainability and offers leadership and support to the sector in advancing knowledge and tourism policies worldwide.

2.1.2 Tourism and the Climate Change

Climate change is one of the most serious threats to the economy and the environment. As climate defines the length and quality of tourism seasons, affects tourism operations and influences environmental conditions that both attract and deter visitors, the tourism and travel sector is highly-climate sensitive. Recognizing the high dependency of Tourism activities on climate conditions, and the high vulnerability of many destinations to climate change impacts, UNWTO launched the “Davos Process on climate change and tourism” named after an international conference held in 2007 (Romppanen, 2010).

Against this background, UNWTO jointly with the Secretariat of Tourism of Mexico held a side event at the Sixteen Conference of the Parties of the United Nations Framework Convention on Climate Change, in Cancun, Mexico, from 29 November to 10 December 2010. The side event presented the work undertaken so far by the tourism public and private sectors to mitigate greenhouse gas emissions, promote adaptation in Tourism businesses and destinations, invest in new technologies and support developing countries through financing. Participants also underlined the vulnerability of certain tourism destinations in developing countries to the devastating impacts of coral reefs, to the loss of basic tourism services such as water supply and food security. UNWTO presented as well its Hotel Energy Solutions project aimed at increasing energy efficiency and the use of renewable Energy technologies by SME hotels in the European Union (SDT E-Bulten, 2011).

2.1.3 Global Sustainable Tourism Criteria and Council

The Global Sustainable Tourism Council (GSTC) was established in August of 2010, as a body aiming at the dissemination and application of the Global Sustainable Tourism Criteria (GSTC) and its main goals for 2011 include the launch of an accreditation process, for existing Tourism certification programmers and of a market access strategy. (SDT E-Bulten, 2011)

2.2 Environmental Awareness of Sustainable Hotel Design

One of the leading obstacles to transforming environmental awareness into industrial practice is the assumed cost of environmental protection. Some studies have found that the tourism industry is only interested in environmental protection so long as it reduces operating and activity costs (Akis, 2001).

It is normal to expect that enterprises in the tourism sector will adopt energy-saving methods and proper disposal of solid waste only if they minimize the related expenditures; competitive markets require cost minimization and profit maximization for an enterprise to survive.

Studies in the US and Europe have mostly stated similar reasons on how to draw the attention of hotel industry to environmental protection. In Turkey, there is a lack of information about the level of environmental knowledge and interest of hotel managers and about the daily hotel practices related to environmental outcomes and protection (Akis, S. (2001).

2.2.1 Hotel Design of Environmental Awareness

The hotel designed to investigate the general nature of environmental awareness with the sustainable design criteria; material, energy and water use, indoor air quality, efficient daylight saving, structural form and waste management.

The objectives of the research were (Bohdanowicz, 2003):

- By determining and discussing the environmental practices of hotels, to attract the attention of the hotel industry and other interested parties, including academics and researchers, to environmental issues and the world examples with parallel business cultures and practices.
- To provide new information on the issue for a different location and distinctive business culture, thereby expanding the existing body of knowledge beyond previous localities and countries.
- To contribute to the development of better environmental awareness and practices in Turkey and around the world, not only on the part of hotel industry but also on the part of every interested party, including policymakers, academics, researchers, the media, and related industries.

With these criteria's in mind, hotels should be designed with the environmental awareness and environmental management will be supported and we will have sustainable livable world.

2.2.2 Hotel Management of Environmental Awareness

Hotel managements should plan to keep the energy and water consumption, and the usage of waste at minimum levels to raise environmental awareness.

There is no recent detailed data on the size of the hotel sector but it can be reasonably estimated at the level of over 360 000 facilities and 30 million beds worldwide (IH&RA 2000; JLLSH 2001).

Among commercial buildings, lodging facilities are unique with regard to operational schemes, the type of services offered, as well as the resulting patterns of the natural resource consumption. Hotel constitutes ‘a refuge far removed from the caves of everyday life’ (Bohdanowicz, 2003). They are designed to provide multi-facetted comfort and services to guests frequently accustomed to, and willing to pay for exclusive amenities, treatment and entertainment (Bohdanowicz, 2003).

Many of the services provided to hotel guests are highly resource intensive, whether it concerns energy, water or raw materials. As a consequence, hotels have been found to have the highest negative impact on the environment of all commercial buildings, with the expectation of hospitals (Rada, 1996). The environmental awareness among the hotel representatives in world, as well as to gather to information about the environmental indicatives already takes places within the industry.

As regards the incentives that would encourage hotel manager to undertake environmentally-oriented initiatives in their hotels, the possibility of reducing the operational costs is the one by far the most commonly pointed out (Bohdanowicz, 2003). Furthermore to decrease the negative environmental impacts has been underlined, together with the requirements of customers.

Renewable forms of energy are used, waste is sorted and purchasing is done in a responsible way. Hotels, or more broadly accommodation sector represents one of the most important subsectors of the travel and tourism industry.

2.2.3 General Guidelines to Environmental Management at Hotels

Environmental management at hotels is a planned and organized operation that minimizes the use of energy, water, waste and chemicals. Instead, renewable forms of energy are used, waste is sorted and purchasing is done in a responsible way. The use of the above-mentioned issues is regularly monitored with regards to amount and cost. In addition, staff members are regularly educated to work according to the company's environmental values.

Environmental conservation is essential and the maintenance of the surroundings is done according to the principles of sustainability, for instance by planting local plants, collecting rainwater for watering the garden and using as little asphalt as possible. Further on, cooperation with environmentally responsible organizations is important (Diamantis, 2001).

This part takes a closer look at hotels, their sustainability and environmental management as a part of the larger tourism industry. Sustainability at Hotels today is starting to be a requirement in order for a hotel to keep up with the growing competition. There will be a growing demand for sustainable hotels in the future, not only because of customer demand but also because of the increased awareness of the state of the environment.

When a hotel commits to environmental protection, it not only brings environmental benefits but also cost savings and increased profitability for the hotel, preserves the hotel's natural assets and surroundings and enhances its image and reputation as an environmentally responsible hotel, which especially today is becoming a factor of choice for the customers (Han, Hsu & Sheu 2010).

2.2.4 Evaluation system in western civilization

In this part the concept of evaluation system in western civilization was defined and described under sub-headings. Evaluation Systems in western Civilization are Green Globe, BREAM and LEED choose and described with the certificate examples.

2.2.4.1 Green globe

Green Globe is the global travel and tourism industries' certification program for sustainable tourism. Green Globe Members save energy and water resources, reduce operational costs, positively contribute to local communities and their environment and meet the high expectations of green leisure and business travelers.

Green Globe certification can be performed in English, Spanish, French, German, Chinese and Portuguese. The Green Globe Solution Center is the online community for sustainability knowledge and advice.

Global marketing via Green Globe Public Relations reaches over 450,000 travel professionals worldwide. Green Globe Members attract green leisure and business travelers via the Green Globe App. Green Globe Preferred Partners operate in 83 countries, providing Members local access to professional sustainable tourism consultants and Green Globe Accredited Auditors. Sustainability training for Members and other professionals is offered via the (Green Building Initiative, 2013)

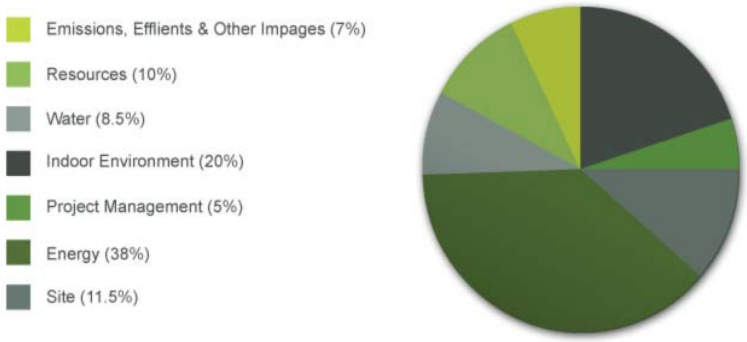

Figure 2.1 Green Globe Point Allocation (Green Building Initiative, 2013)

2.2.4.2 BREAM

BREAM is the world's foremost environmental assessment method and rating system for buildings, with 250,000 buildings with certified BREAM assessment ratings and over a million registered for assessment since it was first launched in 1990.

BREAM sets the standard for best practice in sustainable building design, construction and operation and has become one of the most comprehensive and widely recognized measures of a building's environmental performance. It encourages designers, clients and others to think about low carbon and low impact design, minimizing the energy demands created by a building before considering energy efficiency and low carbon technologies.

A BREAM assessment uses recognized measures of performance, which are set against established benchmarks, to evaluate a building's specification, design, construction and use. The measures used represent a broad range of categories and criteria from energy to ecology. They include aspects related to energy and water use, the internal environment health and well-being, pollution, transport, materials, waste, ecology and management processes.

Clients, planner's development agencies, funders and developers use BREAM to specify the sustainability performance of their buildings in a way that is quick, comprehensive, and highly visible in the marketplace and provides a level playing field. Property agents use it to promote the environmental credentials and benefits of a building to potential purchasers and tenants.

Design teams use it as a method to improve the performance of their buildings and their own experience and knowledge of environmental aspects of sustainability. Managers use it to reduce running costs, measure and improve the performance of buildings, empower staff, develop action plans and monitor and report performance at both the single building and portfolio level (http://www.breeam.org/about.jsp?id=66: UPDATE 10.04.2013).

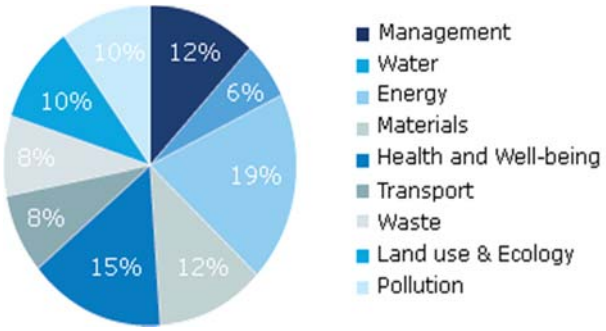

Figure 2.2 BREAM Point Allocation (http://www.breeam.org/about.jsp?id=66)

2.2.4.3 LEED

Leadership in Energy and Environmental Design (LEED) consists of a suite of rating systems for the design, construction and operation of high performance green buildings, homes and neighborhoods.

Developed by the U.S. Green Building Council (USGBC), LEED is intended to provide building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions.

Since its inception in 1993, the U.S. Green Building Council has grown to encompass more than 7,000 projects in the United States and 30 countries, covering over 1.501 billion square feet (140 km²) of development area .

Today, LEED consists of a suite of nine rating systems for the design, construction and operation of buildings, homes and neighborhoods. Five overarching categories correspond to the specialties available under the LEED Accredited Professional program. That suite currently consists of:

Green Building Design & Construction

- LEED for New Construction
- LEED for Core & Shell
- LEED for Schools
- LEED for Retail: New Construction and Major Renovations
- LEED for Healthcare

Green Interior Design & Construction

- LEED for Commercial Interiors
- LEED for Retail: Commercial Interiors

Green Building Operations & Maintenance

- LEED for Existing Buildings: Operations & Maintenance

Green Neighborhood Development

- LEED for Neighborhood Development

Green Home Design and Construction

- LEED for Homes

LEED certified buildings are intended to use resources more efficiently when compared to conventional buildings simply built to code. LEED certified buildings often provide healthier work and living environments, which contributes to higher productivity and improved employee health and comfort (http://en.wikipedia.org/wiki/Leadership_in_Energy_and_Environmental_Design, UPDATE 10.04.2013)

The LEED Green Building Rating System for Commercial Interiors is a set of performance standards for certifying the design and construction of tenant spaces for office, restaurant, healthcare, hotel/resort and education buildings of all sizes, both public and private.

The intent is to promote healthful, durable, affordable, and environmentally sound practices in tenant space design and construction (Appendix 1-2). Prerequisites and credits in the LEED for Commercial Interiors Rating System address 7 topics:

- Sustainable Sites (SS)
- Water Efficiency (WE)
- Energy and Atmosphere (EA)
- Materials and Resources (MR)
- Indoor Environmental Quality (IEQ)
- Innovation in Design (ID)

- Regional Priority (RP)

LEED for Commercial Interiors certifications are awarded according to the following scale:

- Certified 40 – 49 points
- Silver 50 – 59 points
- Gold 60 – 79 points
- Platinum 80 points and above

In the thesis from Leed Evaluation system; Green Interior Design & Construction categories of Commercial Interiors rating systems 7 point choose as a hotel design criteria's.

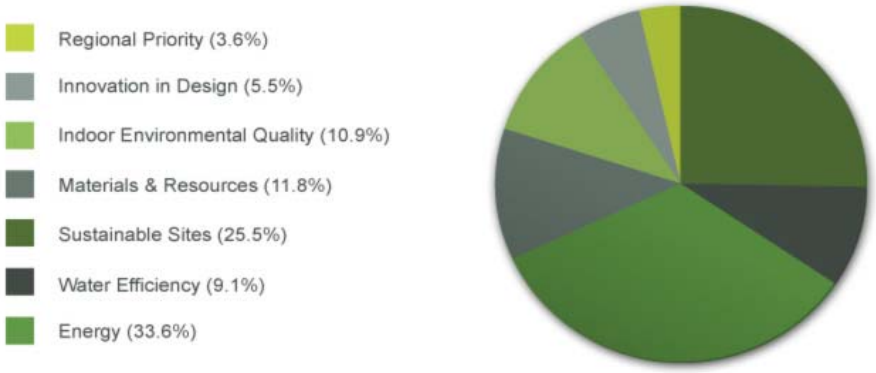

Figure 2.2 LEED Point Allocation (http://www.leed.org/about.jsp?id=66)

2.2.5. Evaluation system in Turkey

In this part the concept of evaluation system in Turkey was defined and described under sub-headings. Evaluation Systems in Turkey are Environment protection programs, Bep-TR, Green Starts choose and described with the certificate examples.

2.2.5.1 Environmental protection programs

In the protection of environment program in Turkey, Environmental Impact Assessment and The Turkish Ministry of Culture and Tourism, Bep-TR and Green Star support to create sustainable hotel design.

According to Turkey's Environmental Impact Assessment (EIA) regulation, hotels with 50 or more guest rooms must prepare an environmental impact assessment report (ÇED, 2003), but only 20% of the sampled hotels had produced an EIA report. Only 1 four-star and 1 three-star hotel had a written environmental policy, program, and EIA report, whereas 3 of 7 five-star (42.9%), 11 of 17 four-star (64.7%), and 11 of 16 three-star hotels (68.8%) had no environmental policy, program, or EIA report (Erdoğan, Baris, 2006).

The Turkish Ministry of Culture and Tourism started an environmental sensitivity campaign in 1992 to encourage the tourism industry to contribute to environmental protection and conservation in their daily practices. At the request of a hotel, the Ministry would visit the hotel and award a ‘‘friend of the environment’’ certificate called the Pine Award if the hotel met the standards of the award program.

These standards include harmony of the facility with nature, the choice of materials used in construction, the selection and use of landscape elements, isolation measures taken against noise, the quality and quantity of materials used for decoration of the facility, the measures and arrangements taken for energy and water conservation, the measures taken for fire prevention, the arrangements for waste management, wastewater treatment and reuse, kitchen and service materials used, the quality and quantity of consumables (e.g., detergents, disinfectants, and shampoos), environmental education materials (e.g., brochures and posters) for visitors, and environmental training of the staff (Erdoğan and Baris, 2006).

2.2.5.2 Bep-TR

Bep-TR is the method for calculating the energy performance of buildings in Turkey. The method of calculation, residential, office, education, health care buildings, hotels, shopping and commercial centers, such as the building typologies can be used to assess the energy performance of existing and new buildings.

All the parameters that affect the energy consumption of buildings assess the impact of energy efficiency and developed to determine energy performance (Sev, 2008).

Specifically, the method which shows the calculation of energy can be obtained of the net output energy and as a result of step; the need for heating and cooling of the building of the annual net energy (Appendix 3).

Evaluation of the method of calculation the buildings performance (Sev, 2008);

- Calculation the amount of energy needed for heating and cooling of the building.
- Determination of the total heating and cooling energy consumption of the building.
- Determination of the Ventilation of energy Consumption
- The effects of the sunlight to building and the period which is untapped of daylight and sunlight areas calculation done for the energy demand and consumption.
- Calculation of the sanitary hot water which is needed for the of energy consumption.

2.2.5.3 Green Stars

Green Star applications; aim is to environmental protection, environmental awareness, development of environmentally friendly constructions and tourist accommodation establishments promoting entrepreneurship characteristics.

Within the scope of the General Directorate of the Ministry of Culture and Tourism Investment Businesses, environmental policy, energy consumption, periodic maintenance and

repair of installations and a personnel providing environmental education ‘Green Star’ is one of the criteria. Plants 'Green Star' and contribute to the protection of the environment without compromising on quality makes (Sev, 2008).

In addition, water conservation, increase energy efficiency, environmental consumption, reducing the amount of hazardous substances and waste, to promote the use of renewable energy resources from the stage of investment to planning, accommodation establishments must be environmentally sensitive, touristy plant of adaptation to the environment, beautification the regulatory environment, awareness of the environmental sensitivity, collaboration with the relevant institutions are try to secure with Culture and Ministry of Tourism until 1993 Sev, 2008) (Appendix 4).

These evaluation systems in Western Civilization and Turkey help to understand the sustainable building design criteria.

3. SUSTAINABLE HOTEL DESIGN PERFORMANCE INDICATORS

In this chapter, under the heading of Sustainable Hotel Design performance indicators, sustainable hotel industry, global hotel industries were explained. Sustainable hotel design performance indicators were described with the flow chart.

3.1 The Concept of Sustainability in the Hotel Industry

In light of the growing environmental degradation, society is becoming increasingly aware of the need of adopting and enforcing more effective measures of environmental protection. Sustainable development, including the development of a more sustainable built environment, has thus become a vital priority and a veritable challenge of the time. The issue of sustainability should be addressed at all levels, in cooperation with policy makers, academia, industry, the general public and many other stakeholders. A number of factors indicate that the hotel industry has an important responsibility in this process (Bohdanowicz, 2005).

3.1.1 Global hotel industry and the environment

Although hotels typically represent less than 5% of a nation's building stock (Bohdanowicz, 2004), the global hotel industry, comprising over 300 000 facilities, constitutes one of the most important sectors of the tourism industry (Olsen, 2000). Hotels provide accommodation to half of all national and international visitors (EC, 1998), which, in Europe alone, account for 160-200 million international visitors per year (WTO, 2004).

Due to the high level of resource utilization (energy, water, consumables) in hotel facilities, the environmental footprint of hotels is typically larger than those of other types of buildings of similar size (Rada, 1996). According to Perrera (2003), the entire American lodging industry (including hotels, dormitories and other accommodation facilities) was estimated to consume 55.6 twh of energy/year in 2000, while the corresponding figure for European facilities was 39 twh (Choose, 2001).

The prevalence of fossil-fuel generated power translates into commensurate emissions of carbon dioxide, particulates, nitrogen and sulphur oxides, and other air pollutants, both locally and globally. It is estimated that a typical hotel releases between 160 and 200 kg of carbon dioxide per m2 of room floor area annually, depending on the fuel used to generate electricity, heating, or cooling (Chan and Lam, 2002).

Bohdanowicz (2005) estimates that European hotels emit more than 10 mega tones of CO2. There is no collective data for hotel water consumption on a global, or a European scale, but according to Davies and Cahill (2000) tourists in the American lodging industry consume approximately 174.88 million m3 of water annually.

Most of the water consumed is released in the form of sewage, requiring adequate treatment. Since hotels are large users of consumer goods, waste generation is one of the more visible impacts the hotel industry has on the environment. According to and HER (2004) estimate, a typical hotel produces in excess of 1 kg of waste per guest-day, which, for a typical facility, results in many tons of waste each month. These figures illustrate the urgent need for more environmentally sound practices and products in the hotel industry.

3.1.2 Sustainable development of the hotel industry

Until quite recently, the hotel industry has been rather oblivious of the extent of environmental damage caused by its services and operations. The last two decades, however, have brought about an increased environmental awareness among the general public, the emergence of social environmental movements, and the development of the concept of "green consumerism".

This has eventually spurred growing criticism of existing tourism/hotel practices. In the recent past, environmental responsibility has been receiving more attention in the hotel industry and is now increasingly becoming a corporate issue. However, in order to achieve greater environmental responsibility, proper implementation tools and strategies are necessary. The primary instruments of action include the enforcement of relevant laws and regulations (health and safety requirements, planning and building regulations, laws relevant to water utilization, waste generation and the release of emissions), the levying of environmental taxes (e.g. based on the amount of water and energy used), as well as voluntary standards.

The latter are generally less binding, and provide guidelines indicating specific levels of environment-related performance that ought to be achieved. Certification and labeling schemes offered internationally, nationally or locally by industrial organizations, governmental and nongovernmental institutions are increasingly growing in popularity. In order to assist hoteliers in running more environmentally responsible businesses, branch associations, academic communities and hotel companies themselves continue to develop guidelines, manuals and training modules (Bohdanowicz, 2004). Hoteliers are increasingly aware that the environment and its protection are crucial to hotel industry development and performance.

3.2. Hotel Interior Design Criteria

3.2.1 Definition of Hotel

A hotel is an establishment that provides lodging paid on a short-term basis. The provision of basic accommodation, in times past, consisting only of a room with a bed, a cupboard, a small table and a washstand has largely been replaced by rooms with modern facilities, including en-suite bathrooms and air conditioning or climate control. Additional common features found in hotel rooms are a telephone, an alarm clock, a television, a safe, a mini-bar with snack foods and drinks, and facilities for making tea and coffee (http://en.wikipedia.org/wiki/Hotel).

Luxury features include bathrobes and slippers, a pillow menu, twin-sink vanities, and jacuzzi bathtubs. Larger hotels may provide additional guest facilities such as a swimming pool, fitness center, business center, childcare, conference facilities and social function services (http://en.wikipedia.org/wiki/Hotel).

Hotel rooms are usually numbered to allow guests to identify their room. Some hotels offer meals as part of a room and board arrangement. In the United Kingdom, a hotel is required by law to serve food and drinks to all guests within certain stated hours. In Japan, capsule hotels provide a minimized amount of room space and shared facilities. In Turkey, hotels are different services depends on the type; holiday hotel or business hotel (http://en.wikipedia.org/wiki/Hotel).

3.2.2 Types of hotel

From 19. Century, hotel's types divided 2; type of service and according to the accommodations (Önder, 1995). Hotels are classified according to the hotel size, location, target markets, levels of service, facilities, number of rooms, ownership and affiliation etc.

Size - or number of rooms

Under 150 rooms
150 to 299 rooms
300 to 600 rooms
More than 600 rooms

These categories enable hotels of similar sizes to compare operating procedures and statistical results.

Target markets

Hotels target many markets and can be classified according to the markets they attempt to attract their guests. Common types of markets include business, airport, suites, residential, resort, timeshare, casino, convention and conference hotels.

- Business Hotels: These hotels are the largest group of hotel types and cater primarily to business travelers and usually located in downtown or business districts. Although business hotels primarily serve business travelers, many tour groups, individual tourists and small conference groups find these hotels attractive.

- Airport Hotels: These type of hotels typically target business clientele, airline passengers with overnight travel layovers or cancelled flights and airline personnel.

- Suite Hotels: These kinds of hotels are the latest trend and the fastest growing segments in the hotel industry. Main attraction of these hotels is guestrooms with a living room and a separate bedroom. In exchange for more complete living room suite hotels generally have fewer and more limited public areas and guest services than other hotels.

- Extended Stay Hotels: Extended stay hotels is somewhat similar to the suite hotels, but usually offers kitchen amenities in the room. These kind of hotels are for travelers who want to stay more than a week and does not want to depend on the service of the hotel.

- Apartment Hotels: Apartment / Residential hotels provide long-term or permanent accommodation for guests. Usually guests make a lease agreement with the hotel for minimum of one month up to a year. These lease agreements are renewed on a yearly basis. Guest rooms generally include living room, bedroom, kitchen, private balcony, washing machines, kitchen utensils etc.

- Resort Hotels: Resort hotels are usually located in the mountains, on an island, or in some other exotic locations away from cities. These hotels have recreational facilities, scenery, golf, tennis, sailing, skiing and swimming. Resort hotels provide enjoyable and memorable guest experiences that encourage guest to repeat to the resort.

- Bed and Breakfast Hotels: These are houses with rooms converted into overnight facilities; this can size up to 20 to 30 guest rooms. They are also known as 'Home Stay's'. Due to the limited services offered at these hotels the price for room is very less than any full service hotel.

- Timeshare and condominium Hotels: Another new type or segment of the hospitality industry is the timeshare hotels. These are sometimes referred to as “Vacation-interval" hotels. Timeshare hotels are where the guests who purchase the ownership of accommodations for a specific period. These owners may also have the unit rented out by the management company that operates the hotel.

  Condominiums are similar to timeshare but the difference between the two lies in the type of ownership. Units in condominium hotels only have one owner instead of multiple owners, each for a limited amount of time each year. In a condominium hotel, an owner informs the management company if when he/ she want to occupy the unit.

- Casino Hotels: Hotels with gambling facilities may be categorized as a distinct group called Casino Hotels. Although the food and beverage operations in casino is luxurious their functions is secondary to and supportive of casino operations. Casino hotels attract guest by promoting the gambling and other entertainments.

- Conference Centers: This type of hotels focus on meeting and conferences and overnight accommodation for meeting attendees. They also provide high quality audiovisual equipments, business services, flexible seating arrangements, flipchart etc.

- Convention Centers: Convention hotels are larger in size compared to conference centers and likely to have more than 1500 rooms. These hotels are huge and have sufficient number of guest rooms to house all the attendees of most conventions, even the size of the meeting rooms, ball rooms, exhibit rooms are quite huge. They usually cater to convention market for state, regional, national, and international associations.

Levels of service

- World class service: These are also called luxury hotels; they target top business executives, entertainment celebrities, high- ranking political figures, and wealthy clientele as their primary markets. They provide upscale restaurants and lounges, concierge services and also private dining facilities.

- Mid-Range Service: Hotels offering mid-range service appeal the largest segment of the travelling public. This kind of hotels does not provide elaborate service and have a adequate staffing.

- Economy / Limited Service: These hotels provide clean, comfortable, safe, inexpensive rooms and meet the basic need of guests. Economy hotels appeal primarily to budget minded travelers who wants a room with minimum services and amenities required for comfortable stay, without unnecessary paying additional cost for costly services.

Ownership and affiliations

Ownership and affiliation provide another means by which to classify hotel property. There are two types: one is individual and another is chain hotel.

- Independent Hotels: They do not have identifiable ownership or management affiliation with other properties. That means these properties don't have any relationship to another

hotel regarding policies, procedures, marketing or financial obligations. Example for the same would be family owned and operated hotel that is not following any corporate policies or procedures.

- Chain hotels: This kind of ownership usually imposes certain minimum standards, rules, policies and procedures to restrict affiliate activities. In general the more centralized the organization the stronger the control over the individual property. Some chain has strong control over the architecture, management and standards of affiliate properties. Others concentrate only on marketing, advertising and central purchasing. (http://www.setupmyhotel.com/about-hotel-industry/classification-of-hotels-by-there-type.html)

3.2.3 Hotel design development

Taking a look at the history of the design hotel trend, one might say that Las Vegas, The Walt Disney Company and the theme parks in the United States, like Universal Studios, were the first to introduce the hotel as an experience in itself and, basically, as an entertainment experience. Various hotels in Las Vegas base their design philosophy on 'replicators', i.e. the idea of replicating places and cities (e.g. The Venetian Hotel and Casino, The Paris Hotel and Casino). Loews hotels (Figure 3.1), a company with 55 years of history, are a paradigmatic example of a company integrating lodging into theme parks and the entertainment sector (Freund, 2005).

Figure 3.1 Loews Hotel Exterior View (http://www.loewshotels.com)

After having started in the late 70s Studio 54, the New York disco club that set the standard for hedonistic excess, Ian Schrager burst on to the hotel scene in 1984 when he opened hotel Morgans in New York.

Morgans brought with him an unconventional approach and outsider mentality that was deeply rooted in the spirit and ethos of the entertainment industry. The design element, with the hotel experience as theatre, has always been part of Ian Schrager's philosophy.

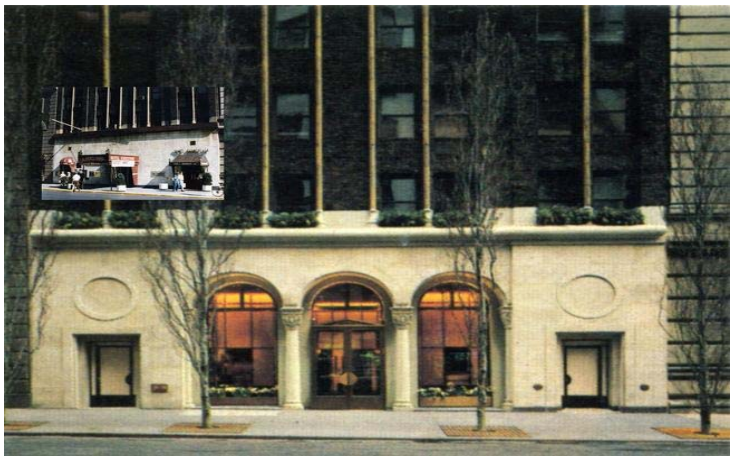

Figure 3.2 Morgans Hotel Exterior before and after Views

(http://www.morganshotelgroup.com/en-us/)

Morgans Hotel was the first property to emphasize the experience of hotel design from the inside, giving rise to the term design or designer hotel (Figure 3.2). It was the Royalton the next hotel opened and the first full collaboration with Philippe Starck, a renowned French designer that would provide the blueprint for his empire of hotels. His success lies on his being among the first to tap into a vein of consumer consciousness and in making it a priority to create hotels that appeal to the local community (Freund, 2005).

Perhaps the most important and subtle turning point in the development of interior design trends for the contemporary hotel was the introduction of the narrative into design brought by Ian Schrager and followed by Jean Nouvel (e.g. The Hotel, Luzern) (Figure 3.3), requiring that the designer view the project more as a film director, theatre set director or author of fiction (e.g. The Park, Chennai, India).

Figure 3.3 Hotel Luzern Exterior Views and Hotel Luzern Interior View (http://www.designhotels.com/hotels/)

It is the experience of this overall theme or concept, expressed through the interiors, which the guest will identify and will carry away as his memory of the hotel (Curtis, 2003).

Around the same period, more and more hotel operators would embrace a contemporary approach in styling and equipping their hotels, extending the use of the term design hotel, trademarked by Lebensart Global Networks, the holding company of Design Hotel Inc. Suscribing to the view of design as a measure of living, not as a temporary trend, the company began to cooperate with forward looking hoteliers and designers who shared a similar vision, like Matheo Thun from The Side Hotel, Hamburg. For Europe, it is interesting to mention the evolution of the Sorat Group of Hotels (Figure 3.4), the Berlin group that started with a spectacular design hotel in 1990 (Curtis, 2003).

Figure 3.4 Sorat Hotel Exterior Views (http://www.hotel.info/Hotel/)

This medium-sized company now has 24 town hotels all around Germany, becoming the European leader in terms of size in 2003 (Freund, 2005).

Design has become one of the key elements in the evolution of the hotel product and not only for unique entrepreneurs opening unique hotels. Starwood launching in 1998 its hotel concept W (Figure 3.5) is the first example of a traditional box hotel company turning into the lifestyle hotel sector (Curtis, 2003). W tries to combine what is popular in contemporary home furnishings and in latest technology.

Lifestyle guests are often early adopters in technology because products such as the laptop and the mobile phone allow merging working time and leisure time in the form of teleconferencing (Curtis, 2003).

Figure 3.5 W Hotel Exterior View (http://www.wistanbul.com.tr/)

With respect to the evolution of the lifestyle market segment, design and style have become a basic requirement to attract clients and are not longer enough in their own right. In the 90s, design has been an advantage, nowadays it's a minimum requirement (Curtis, 2003).

3.3 Sustainable Hotel Design Performance Indicators

Design sensitive to environmental issues which protect the ecological balance and ecosystem and which provide necessary comfort and health conditions in order to increase the life satisfaction and happiness of the customer are examples of sustainable design buildings.

This chapter, try to emphasize on seven sustainable principles that should be incorporated in the design for hotels that should dramatically produce more efficient and positive results for the resident as well as the environment.

Construction, tourism and transportation sectors are the most important actors of the threatening the future global climate changes today. Tourism produce 5% of the total carbon emission in the world that global warming decreasing availability of natural resources, such as oil, gas and fresh water that we need some sustainable principles to more livable world (Bohdanowicz, 2004).

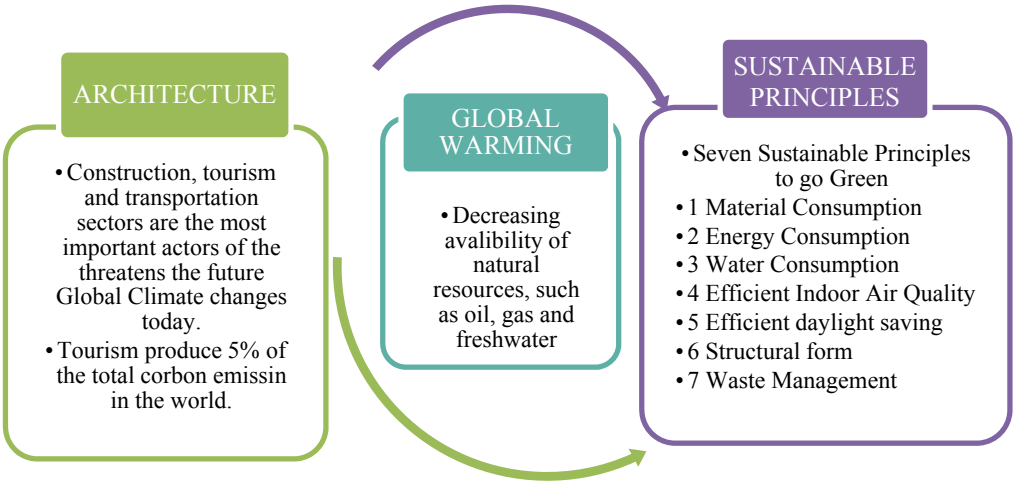

Figure 3.6. Basic relationship of architecture to global warming with tourism and the state Seven sustainable principles (http://www.wordpress.com/2011/11/08/sustainable/)

The diagram above shows the basic relationship of architecture to global warming with tourism and the state seven sustainable principles; material consumption, energy consumption, water consumption, efficient indoor air quality, efficient daylight saving,

structural form, waste management (Figure 3.6. For the purpose of this project I have researched the seven principles, stating possible solutions to bring about this change.

3.3.1 Material consumption

The characteristic of the sustainable building material is that it is produced and sold by companies that are socially and environmentally responsible. These are companies that treat their employees and customers well, exert a positive influence in the community, and engage in sustainable environmental practices in all aspect of the business; in offices, the factory and the field.

One of the principal goals in sustainable building is to use materials that promote both the health of the people who will stay in hotels and the health of the planet. To do so, we must select those materials, as well those techniques, technologies and designs that have the lowest life cycle cost.

In this part, we will specifically on sustainable building material used in hotels. Sustainable building material support the environmental goals of sustainable building outline with conservation, recycling, renewable resource use, and restoration and sustainable management of resources. And many of them also help promote healthier interiors.

The goal of Materials and Resources (MR) is to minimize a buildings reliance on virgin resources (LEED for New Construction and Major Renovations). This means that resources used on projects should include materials that originated from natural resources to a minimum as well as using recycled products. The prerequisite, Storage and Collection of Recyclables, helps to provide an easily accessible area that serves the entire building and is dedicated to the collection and storage of non-hazardous materials for recycling (LEED for New Construction and Major Renovations). Building Reuse, Construction Waste Management, Recycled Content, Regional Materials, Rapidly Renewable Materials, and Certified Wood can be achieved (LEED for New Construction and Major Renovations).

Ultimately materials and resources persuade builders to reuse, renew, and recycle materials that are used in construction. As the categories stated above, the selection of materials should also be local, energy efficient, non-toxic, and salvageable (Sands 2008). Finding ways to select sustainable materials that can be reused helps to extend the lifecycle of the building. Figure 3.7 show the sustainable material usage in hotel room.

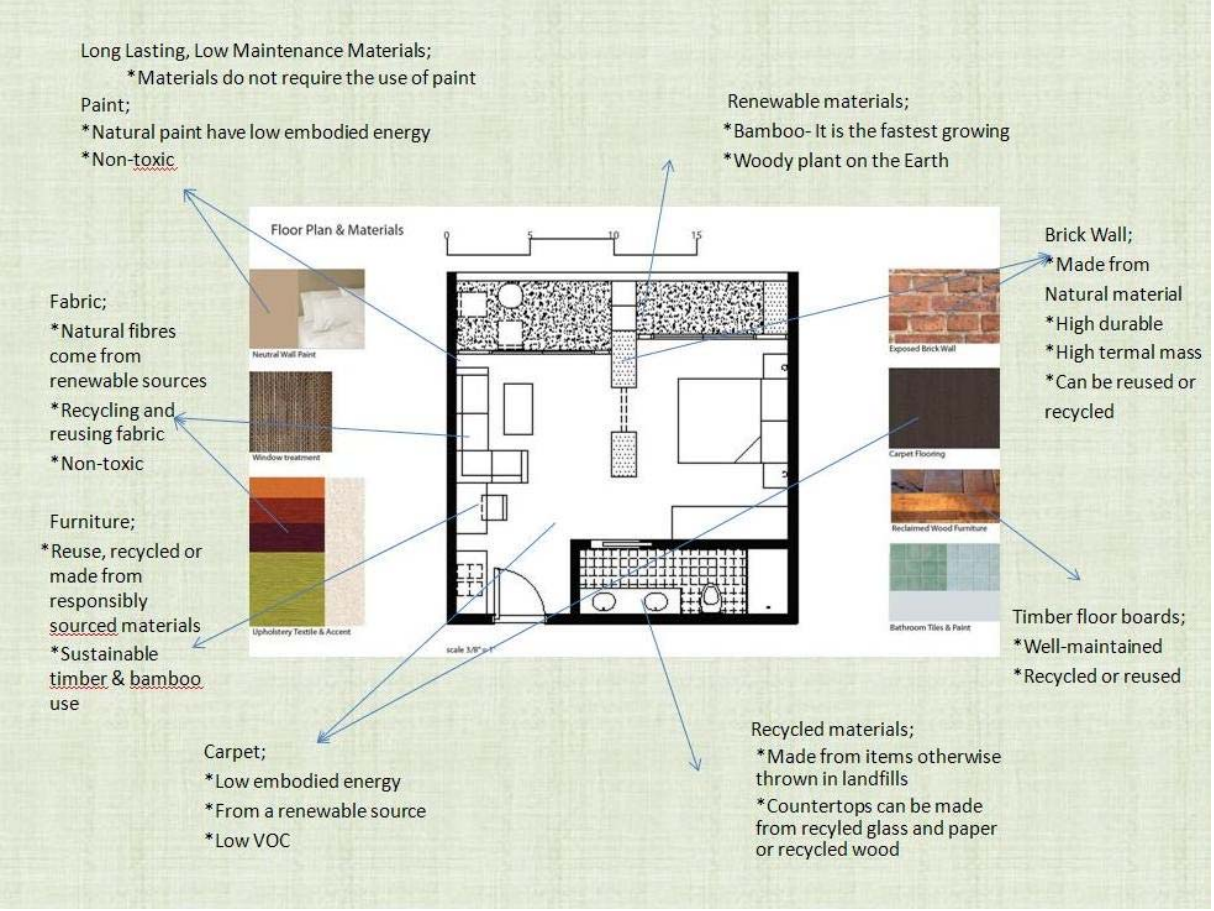

Figure 3.7 Example of sustainable material use in hotel room

The term sustainable building material refers to a growing list of products used to build and furnish hotels that are use for people and the planet. To make the list, these materials must meet at least one of the characteristics of sustainable materials described in the diagram (Figure 3.8).

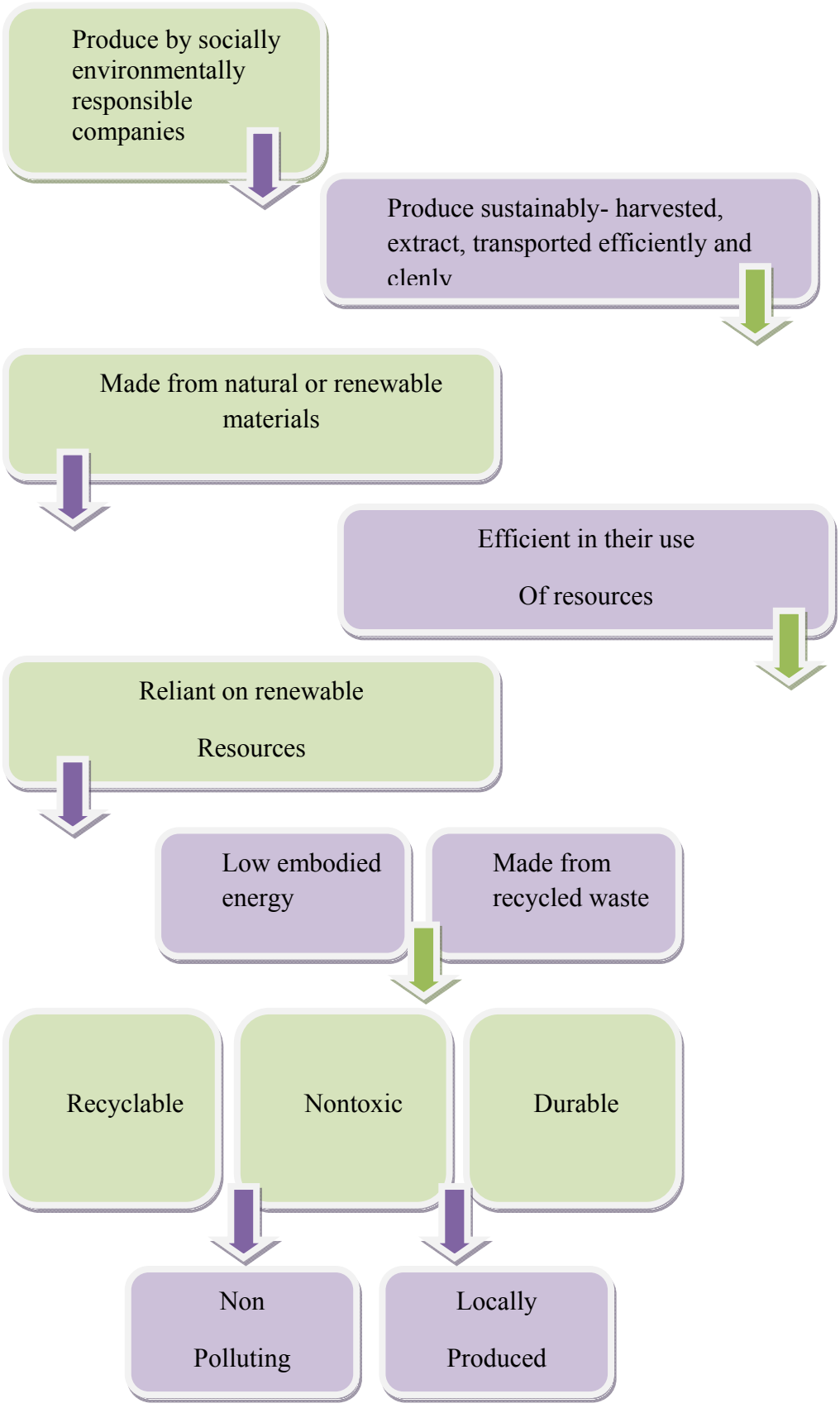

Figure 3.8 Characteristics of sustainable materials (http://www.wordpress.com/2011/11/08/sustainable/)

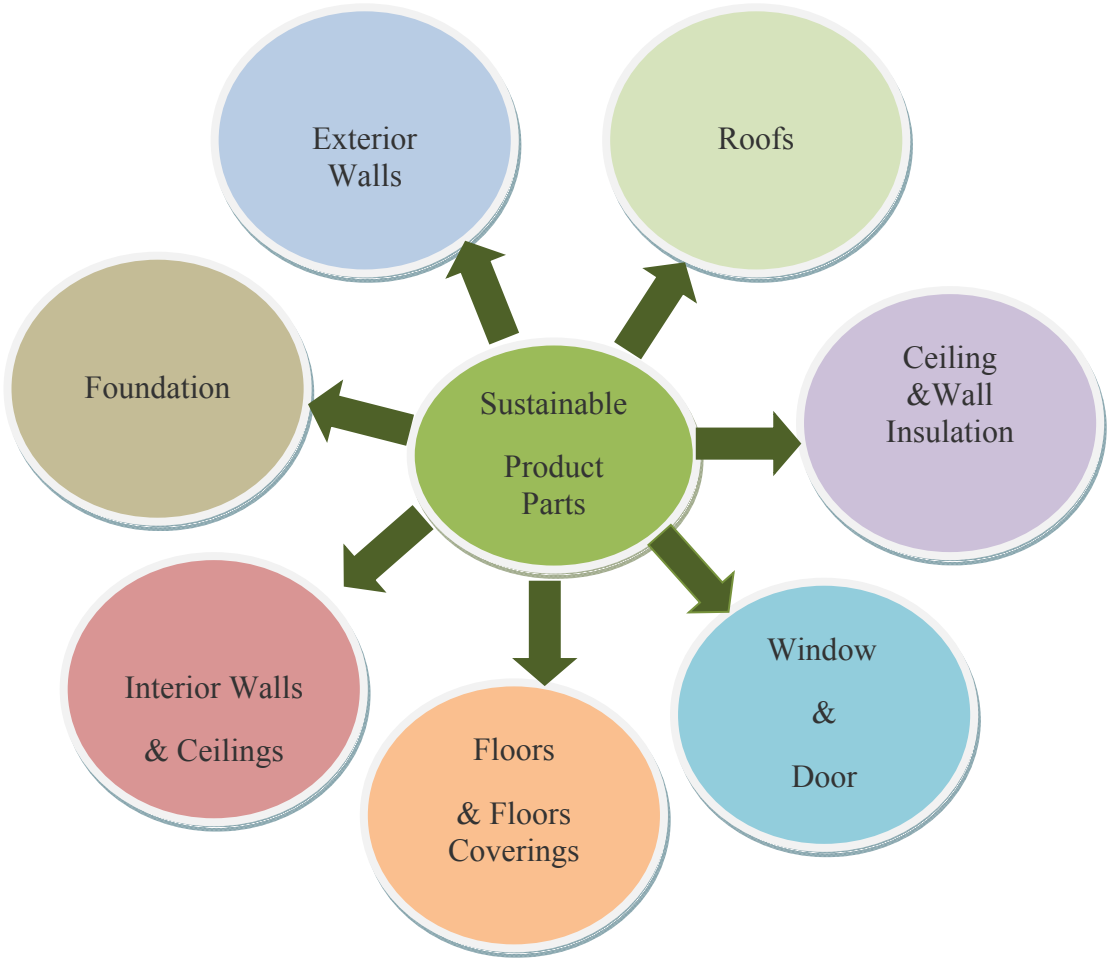

Figure 3.9. Sustainable product check list parts (http://www.wordpress.com/2011/11/08/sustainable/)

And then the sustainable product check list can be a good explanation to understand the sustainable building materials (Figure 3.9). With the above check list part, we can analyze the Sustainable Hotels Design criteria. This part can be analyzed separately.

3.3.2 Energy efficiency

Energy, its consumption and production are one the most important themes in today's world as future generations might not be able to use the current energy sources (Romppanen, 2010). At hotels an enormous amount of energy is used for daily operations and activities requiring energy are among the highest areas of costs at hotels. There is a high demand for energy as the hotels try to provide their customers with modern comforts and high-technology, such as air-conditioning. Most hotels get their energy from burning fossil fuels,

such as coal, oil and natural gas which further on causes local air pollution and global climate change in addition to other environmental problems (Sweeting, 2003).

There is a wide range of environmental damages that energy production causes, ranging from the supply of fossil fuels to the building of power plants. The use of non-renewable natural resources such as oil and coal should be decreased as these resources will not last forever.

In addition, power plants and other equipment needed for energy production require huge areas of land transform the landscape and destroy natural habitats. With wise and thoughtful energy use, natural resources can be saved also for the next generations. Moreover, the demand for energy will be minimized which further on eases the pressure for new power plants and energy supply. As a result, environmental impacts caused by energy production and transport will decrease (Romppanen, 2010).

A hotel can reduce its energy use and costs in various ways. These ways and their effect, however, depend on the type, size and location of the hotel facility. The correct use of electrical energy in the building, which is an indispensable energy source of today are also included among sustainable design criteria.

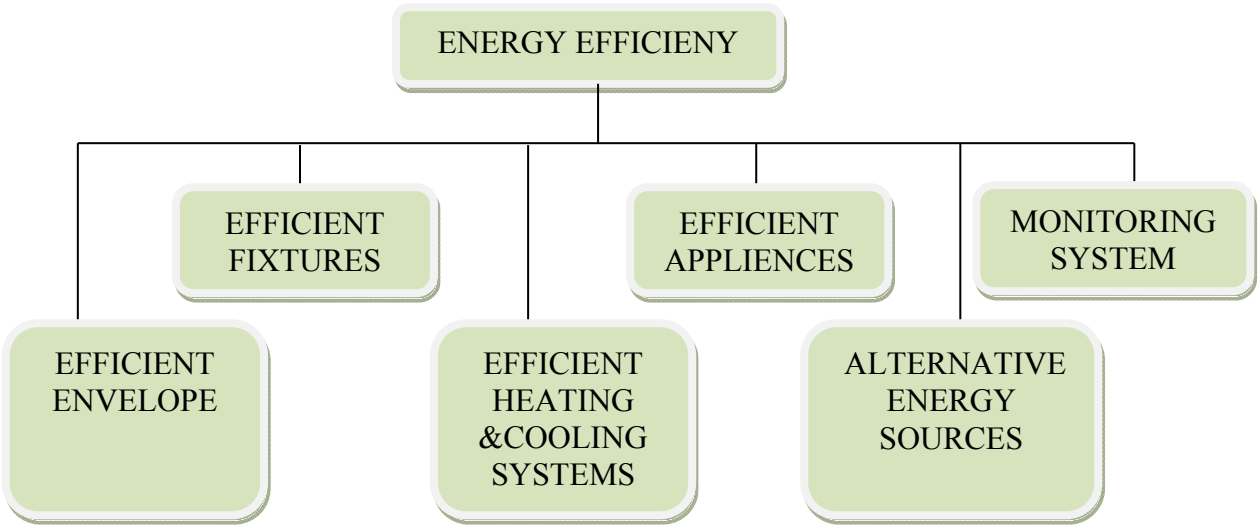

Figure 3.10 Energy efficient design chart (http://www.wordpress.com/2011/11/08/sustainable/)

The flow chart above (Figure 3.4) describes the components of energy efficient designs that are sustainable thus would be better for the environment and energy save of the hotels. The correct use of energy in building describes with the 6 energy efficient design chart.

3.3.3.1 Efficient envelope

Is the tight seal between foundation, roof, walls and doors and windows. Insulation and green roof designs are the efficient energy use alternatives that can use for the hotel design.

3.3.3.2 Efficient fixtures

Energy efficient bulbs last longer and consume less energy, saving money and reducing carbon emissions. LED light are good for focus lighting and 133 times longer than standard bulbs. Energy saver control system can be use in guest rooms. Using photocell lighting can be use in general restrooms (Figure 3.11).

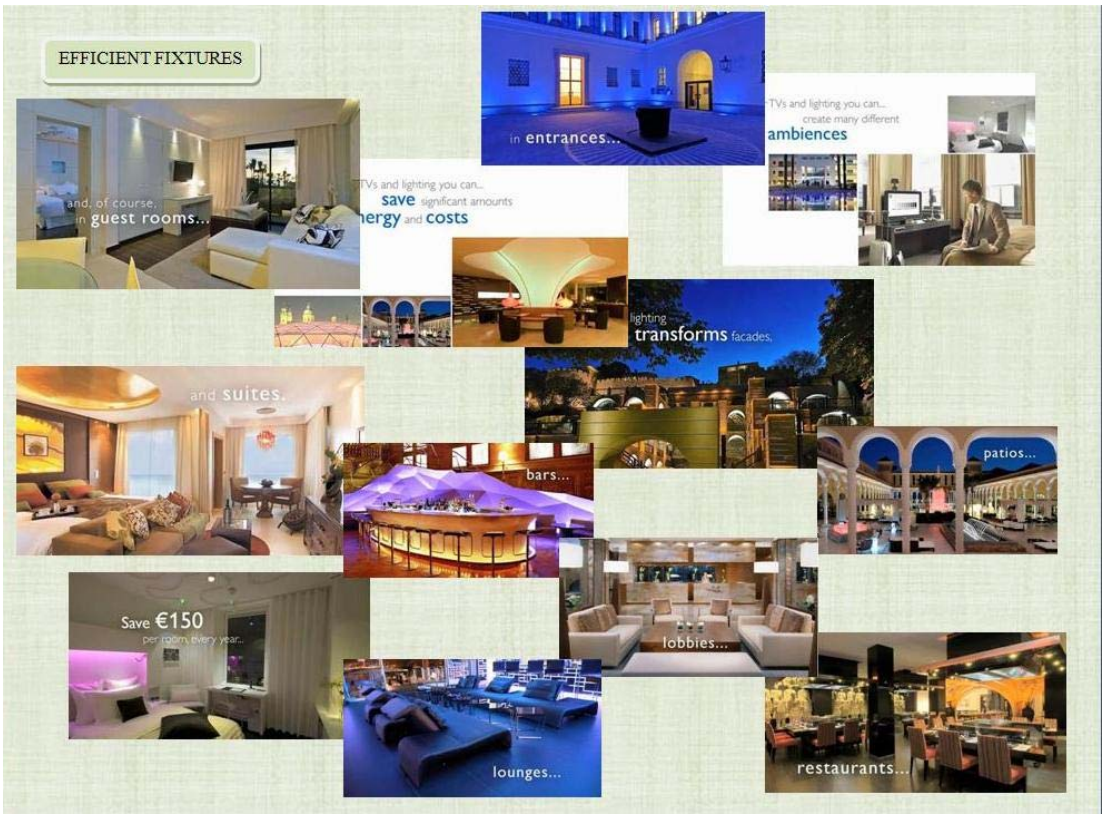

Figure 3.11 Efficient fixture usage in hotel part

3.3.3.3 Efficient heating & cooling systems

Landscaping also influences the heating and cooling requirement of a building. Carefully placed trees can make huge differences in heating and cooling costs, creating economy and comfort. Sun shading and cool roof like use the color of white re the system that can use in the building for efficient heating and cooling. A radiant heating system is the energy emitted from a warm floor and people rather than heating the air around them.

3.3.3.4 Efficient appliances

Use the energy star programs, which are energy efficient appliances that meet the energy efficiency.

3.3.3.5 Alternative energy sources

Use of renewable resources such as photovoltaic solar thermal, solar energy for low consumption cost, thermal water heater, sun energy and wind energy.

3.3.3.6 Monitoring systems

If you know the where energy goes in the hotel, investor can start to change from that point. If you know the consumption habit of the building and start to redesign the hotel.

3.3.3 Water consumption

'Of all the water used by the hospitality industry, only 5 per cent is used for eating and drinking; the vast majority of it is used either for cleaning or for the preparation of food' (Webster 2000, p. 90).

When it comes to water management at a hotel, the main task for an environmentally conscious hotel business is to monitor its water Consumption and bring it to a rational level by means that also save and protect the local resources (Romppanen, 2010). Water should be used only when needed. Especially in the Mediterranean countries water shortages are a problem and water usage is many times more than that of a local resident (Sweeting and Sweeting 2003).

A hotel establishment requires a vast amount of water resources for its daily operations, for instance for laundry and for the maintenance of swimming pools, lawns, garden and golf courses.

Water needed for all these operations is also costly; therefore, when operating in an environmentally friendly manner, a hotel will not only save in water costs but also help protect the local water resources, ensure availability of water also for the local residents as well as preserve the quality of the local water resources by eliminating the need for expensive drinking water treatment processes.

In order for a hotel to achieve better water management, it is first important to identify the main areas with largest water consumption at the hotel as these are the areas where the most significant water savings can be achieved. Secondly, water consumption of each department should be regularly monitored with water meters for indentifying leaks and quantifying water savings. With monitoring, monthly water consumption and its costs can be determined and the areas and activities of high water consumption identified.

For minimizing wastage of water, for instance water reducing Technologies should be used and water-saving devices (for example self-closing taps and low-flush toilets) installed where possible. It is also important to eliminate leaks with regular maintenance and repairing of water equipment. By setting the Water temperature of showers to the optimal temperature, also energy can be saved (Romppanen, 2010).

Water potential makes it necessary to immediately use water resources actively by new technologies. The aim to reduce Water Consumption also makes buildings more sustainable and environmental friendly world. The diagram shows the water consumption methods (Figure 3.12) and the methods help to use water more efficiently help buildings to use Water more effectively.

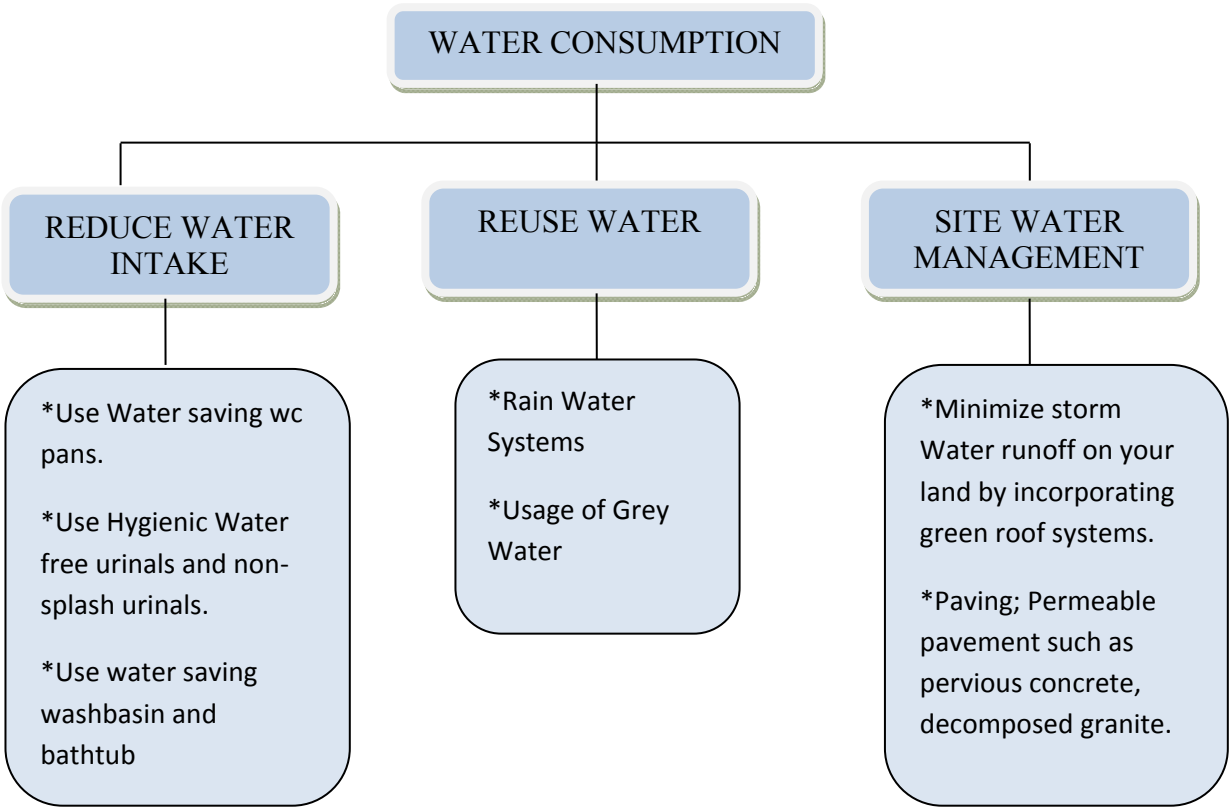

Figure 3.12 Water consumption chart (http://www.wordpress.com/2011/11/08/sustainable/)

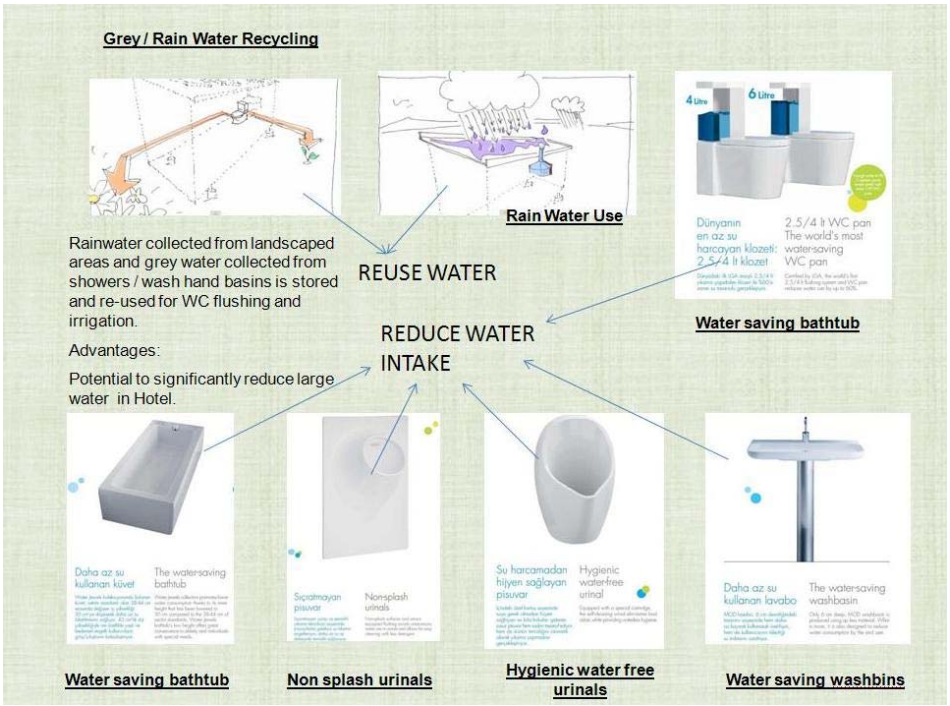

Figure 3.13 Water efficient equipment and systems

With the water consumption, 'Enough water to fill 3 Olympic pools saved yearly with every 250 wc pans.' (Blue Life, Vitra). Figure 3.13 show the equipment for water efficiency. This equipment for the hotel bathrooms help to decrease the cost and water save.

3.3.4 Efficient indoor air quality

The removal of discomfort cause by HVAC installations which established in buildings becomes important. Moreover, many researchers have been done to remove the effects to the construction (Figure 3.14).

There are two main approaches for improved indoor air in construction:

1. Choose construction materials that limit harmful off-gassing.
2. Provide fresh air introduction with mechanical ventilation (Figure 3.16).

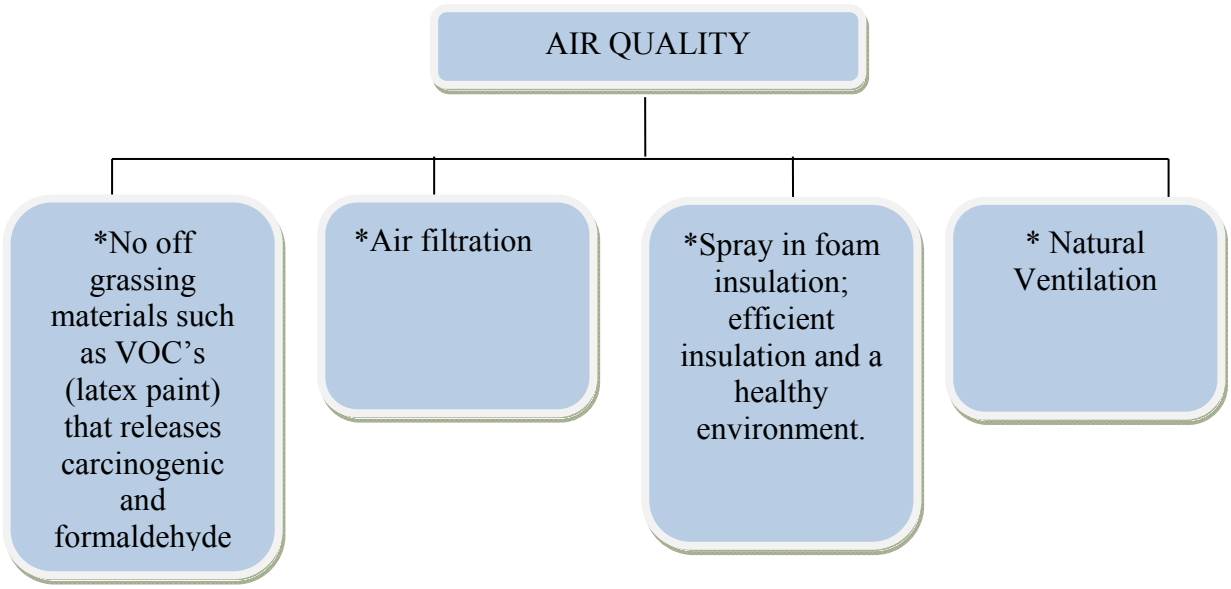

Figure 3.14 Air quality chart (http://www.wordpress.com/2011/11/08/sustainable/)

Better indoor air quality and energy efficient for HVAC system, check the figure 4.7. This figure shows the saving of the HVAC system with the indoor air quality (Figure 3.14). The strategy and technology shown in the table 3.15.

Strategy and Technology	Technology	Indoor Air Quality	Approximate Energy efficient of HVAC system
Air conditioner target number	Suitable	Good effect to Indoor Air Quality	%60 energy save related to climate
Clear HVACs' system of filtration	Suitable	Good effect to Indoor Air Quality	Heating system saver but electricity increase prices
Chemical Air filtration	Developing	Good effect to Indoor Air Quality	Heating system saver but electricity increase prices
Air amount equilibrium	Suitable	Good effect to Indoor Air Quality	Heating –Cooling system saver, %10 energy save
Good air condition	Suitable	Good effect to Indoor Air Quality	%50 energy save
Fresh breeze suction	Suitable	Good effect to Indoor Air Quality	No effect
Heat gain	Suitable	No effect	Heating %70 energy save
Natural ventilation	Suitable	Good effect to Indoor Air Quality	%60 saving
Maintenance	Suitable	Good effect to Indoor Air Quality	energy save

Figure 3.15 Better indoor air quality and energy efficient for HVAC (Cilingiroglu, 2010)

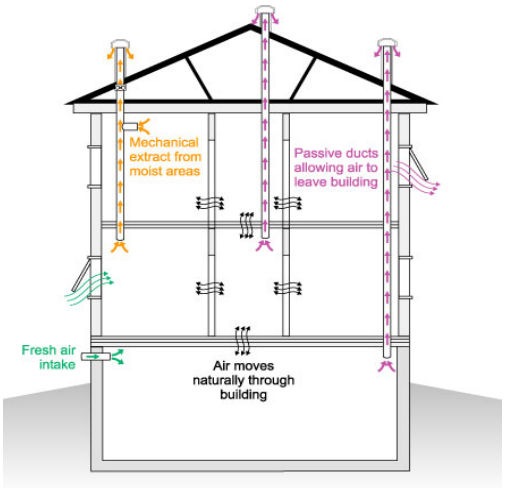

Figure 3.16 Natural ventilation

3.3.5 Efficient daylight saving

The use of daylight in buildings, with its variations, its spectral composition, and the provision for external views, is of great importance for the comfort and well-being of occupants. In a workplace, for example, daylight can positively influence the health of office personnel, improving efficiency, reducing unnecessary sick leave and resulting in greater benefits for enhanced productivity (Figure 3.17).

If carefully designed, a daylight strategy can also bring tangible energy savings, as long as it minimizes energy use for artificial lighting and prevents glare and other visual discomfort (such as contrast, adaptation problems and internal reflections). However, the overall energy efficiency of windows depends also on thermal effects (e.g. solar gains and heat losses through glass) and their balance against heat production of artificial lighting Systems (Altomonte, 2008). Figure 3.18 show the day to night artificial lighting diagram.

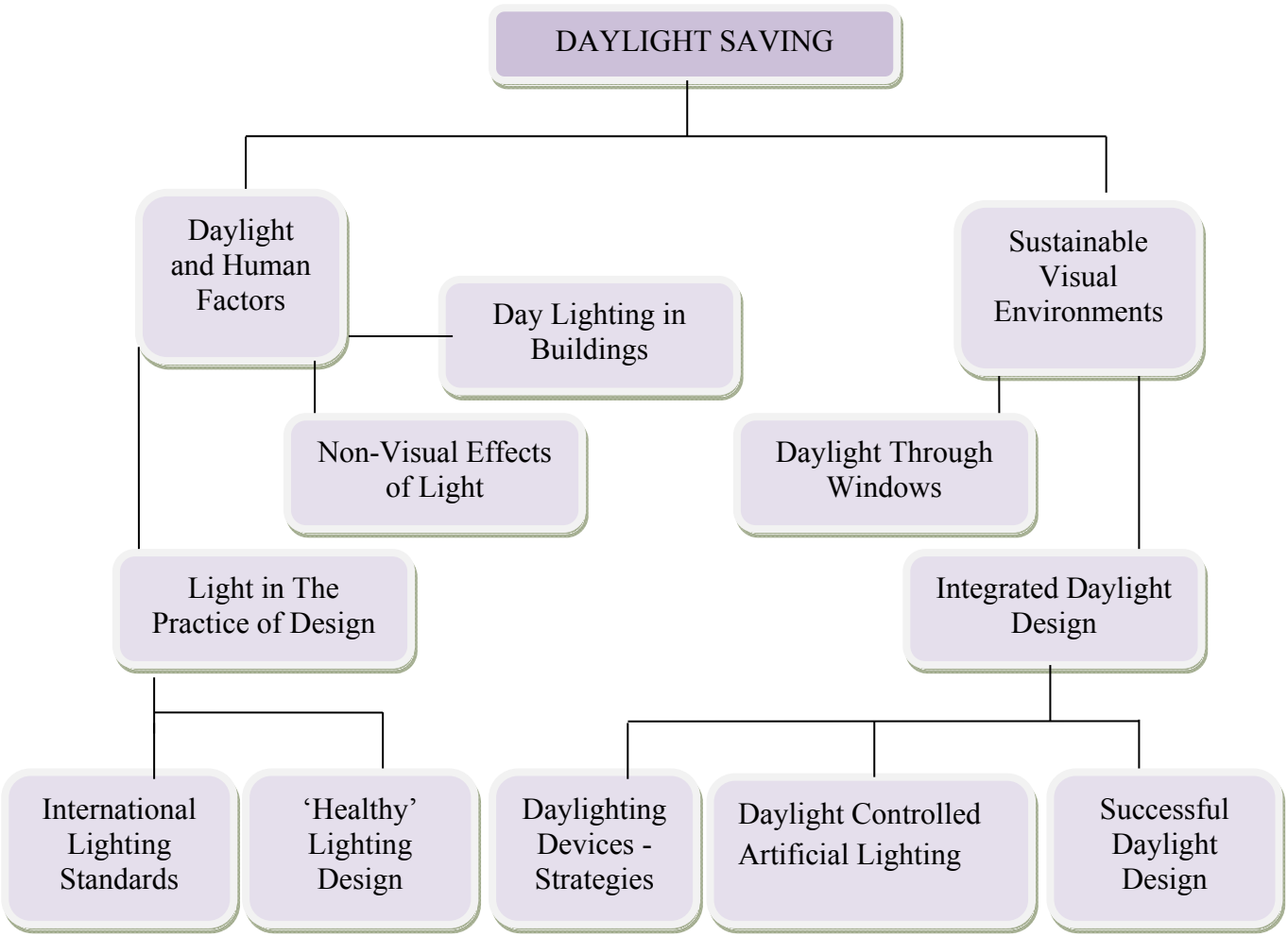

Figure 3.17 Efficient daylight saving (http://www.wordpress.com/2011/11/08/sustainable/)

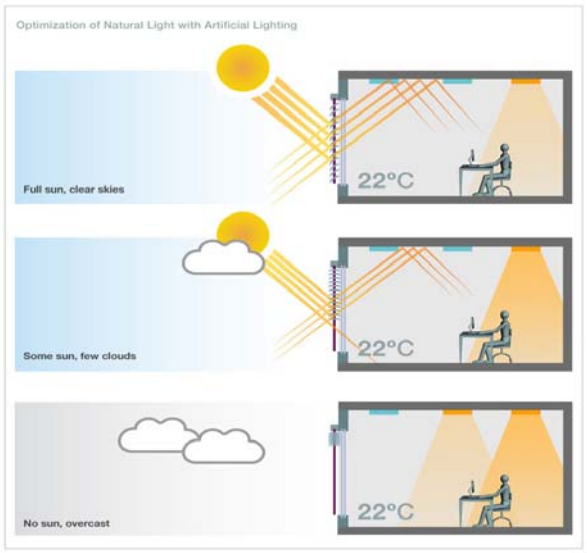

Figure 3.18 Optimization of Natural light with artificial lighting (http://www.wordpress.com/2011/11/08/sustainable/)

3.3.6 Structural form

To decrease of losses on building and increase in savings we have some variant structural form parts (Figure 3.19), these shapes and organization have a direct relation to affect the structural form. Variant such as shape, building height, roof type and structure shell are known as 'structural form'. These variants, depending on shape and organization have a direct relation related to decrease of losses on building and increase in saving.

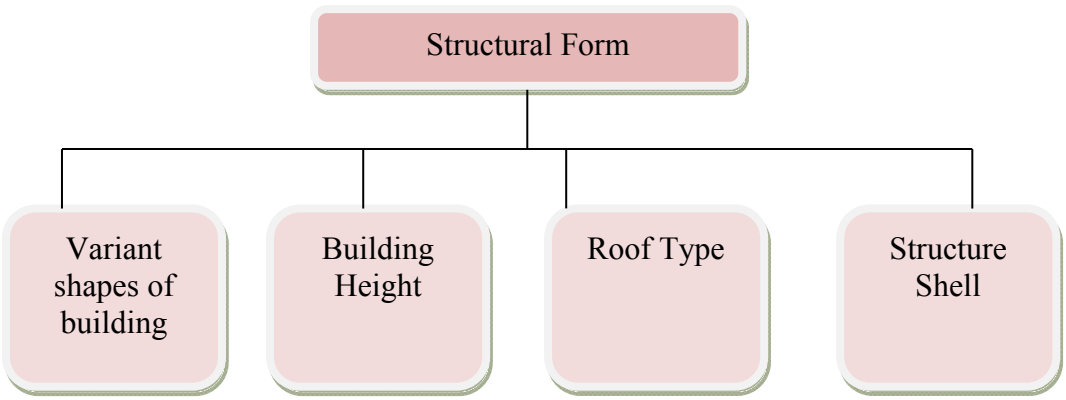

Figure 3.19 Structural form parts (http://www.wordpress.com/2011/11/08/sustainable/)

Places such as corridors, bathroom and which need less day lighting and places such as kitchen, spa where indoor heating gain is high should be directed to the North facade (Esin and Yüksek, 2009).

Building design which play an important role especially in terms of energy saving should be designed in a state for minimum heat gain in summer and maximum heat gain in winter. In this way, compact designed building forms are able to minimize heat transfer, to use actively natural lighting and natural ventilation and to keep heat gain at maximum level by virtue of the interaction with the shell of the building.

Wall, floor and door which separate inner and outer places from each other are defined as building shell. With the choice of material used in the shell of the buildings, efficient in increasing thermal comfort performance and energy saving to be provided.

Green roofs are membranes of soil and plants. To reduce the building temperature, to reduce the burden of waste water systems by holding rainwater, to reduce air pollution, to store carbon and to protect the material under the roof top cover against the harmful effects of the sun are among the most important objectives of green roof.

3.3.7 Waste management

Especially in the Mediterranean region the rapid development of the hotel and tourism industry has not only resulted in lack of water resources but also in overload of waste. This has further caused lack of waste disposal infrastructure and sanitation. Hotels produce large amounts of waste, solid and liquid, toxic and non-toxic, some of which end up in the surrounding environment because of inadequate handling and careless behavior. Many times waste has been dumped directly into seas and rivers which has caused not only visual pollution to the environment and harm to the hotel's image but also has lead to soil and water pollution (Sweeting and Sweeting 2003).

Over ninety percent of the natural resources used by humans transform into waste through the production of products and nutriment. The more a hotel aims to produce as little waste as possible, the fewer natural resources are used and environmental damages

minimized. Waste has direct impacts on the environment. It can pollute the soil, water and air and can cause harm to both humans and animals (Eronen 2008).

Environmentally friendly use of waste also decreases the need for landfill sites and waste treatment facilities. Landfill sites and other places of waste cause environmental damages by polluting the soil and water systems. Waste and especially biotic waste at the landfill site produces methane, which is a greenhouse gas that accelerates global warming. In addition, pollution and noise caused by waste transportation and treatment will decrease. By using environmentally friendly products, the harms caused by waste for humans and the environment will decrease as well (Romppanen, 2010).

The term “materials management” refers to the life cycle of materials as they trace their course through the economy, from raw material extraction to product manufacture, transport, use, source reduction, reuse, recycling, and disposal.

Waste management is important for each hotel and not only for the ones who contribute to environmental protection. A hotel needs to first identify the major sources of waste and consider ways to reduce the amount of waste. Waste should always be sorted. Sorting of waste is essential because sorted waste can be used as raw material for new products. It also reduces the need for new natural resources. However, precise sorting of waste in Turkey is quite difficult because of lack of proper waste disposal system. When there is no possibility to sort the waste, the most important issue is to at least reduce the amount of it (Romppanen, 2010).

There are multiple ways for a hotel to reduce the amount of waste. Most waste comes from different packaged goods and products; therefore a hotel should always try to aim to buy products with less packaging and use refillable products instead of disposable ones. Non-recyclable and hazardous Waste should always be handled with given instructions and special attention paid to it so that this sort of waste is not thrown in the environment. Waste should not be burned outside as it releases harmful gases and substances in the environment.

A hotel should always prefer to buy ‘green’ and environmentally labelled products that are sustainable, recyclable, non toxic, biodegradable, less processed and preferably made from

local materials. In addition, products and materials that are as long-lasting and non-polluting as possible should always be preferred (Hemmi 2005).

Effective and caring waste handling and management at hotels will not only save the environment but also cut down purchasing costs as well as waste disposal fees of the hotel. Proper waste disposal will also limit the risk of causing illnesses to hotel guests, and keeps the surrounding water suitable for recreational activities. All in all, a hotel business should always develop its waste management program around the three Rs: reduce, reuse, and recycle (Sweeting and Sweeting 2003).

Materials management often uses this life-cycle perspective since it helps uncover the less-visible resource and energy needs (Figure 3.20) that go into creating a final product (http://www.epa.gov/statelocalclimate/state/topics/waste-mgmt.html).

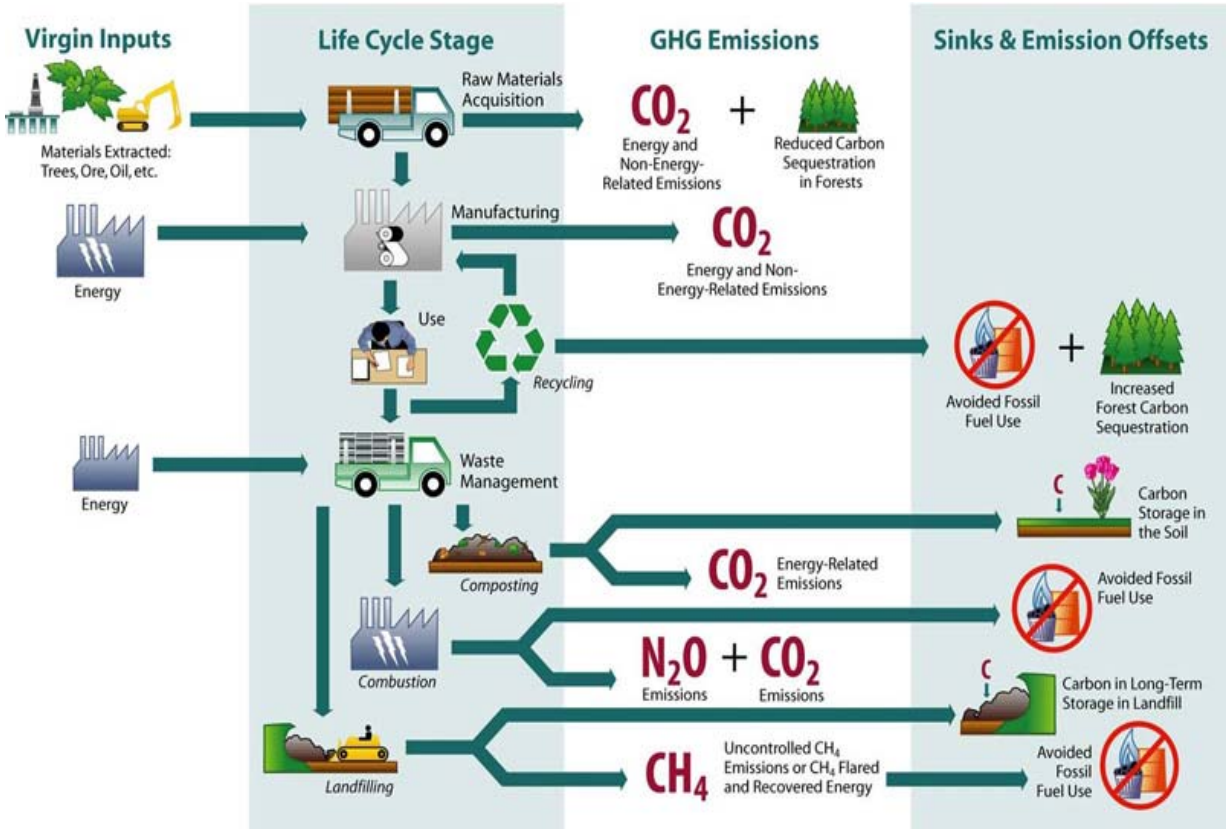

Figure 3.20 Waste material charts (http://www.epa.gov/statelocalclimate/state/topics/waste-mgmt.html)

Waste figures show that; Hotels can save on average 4.8 litres per guest per night, or 2,410 tonnes annually, equivalent to 401 less garbage trucks dumping to landfill, the total saving for two years, across the 30 hotels, has been 628 truckloads of waste (Figure 3.21).

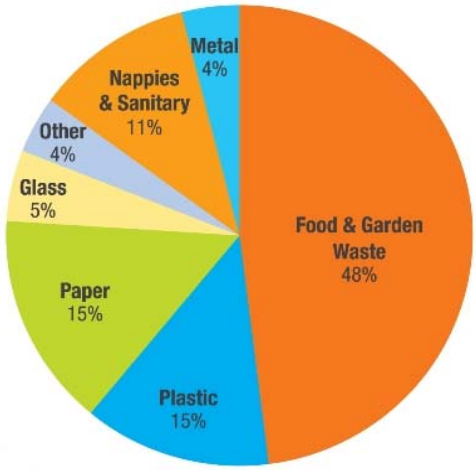

Figure 3.21 Waste percantage of charts (http://www.epa.gov/statelocalclimate/state/topics/waste-mgmt.html)

Figure 3.22 Waste percantage in hotel (http://www.epa.gov/statelocalclimate/state/topics/waste-mgmt.html)

Figure 3.23 Waste material solution way chart (http://www.epa.gov/statelocalclimate/state/topics/waste-mgmt.html)

Waste management principle show that; product manufacture, transport, use, source reduction, reuse, recycling, and disposal (Figure 3.23). This figure show the reduce the waste management and protect our environment.

4. CASE STUDY: EVALUATION of SELECTED HOTELS USING SUSTAINABLE CRITERIA INDICATORS

In the fifth chapter of the study, 14 hotel selected among sustainable hotel examples collected as a result of analysis of evaluation systems in Turkey & western civilization and interviews carried with hotel owner are discussed under main topics of material consumption, water efficiency, water consumption, efficient daylight saving, structural form, waste management. Some of the chosen hotel which claim to be a sustainable hotel and also final example is an model of sustainable hotel which is the first-ever Sustainable Suite Design Competition, a competition to showcase the best design strategies that boast environmental responsibility while enhancing the guest experience, selected Haptik as the winning suite as a model.

4.1 Sustainable Hotel Buildings

It is a known fact that the construction industry plays an important role in the emergence and growth of environmental issues. Especially the natural resource used during the protection and use process of the building and non-renewal of energy, production of harmful emissions and waste and leaving those to the environment, green space rapidly transformed into multistory reinforced concrete buildings clearly shows the damage to the environment by the construction sector.

In order to minimize this damage designers, under leadership of technological development and by taking advantage of motion in nature, have recorded new developments in the construction sector with the hope to reuse natural resources (Yuksel, 2012).

Designs according to; existing topography of the region, climate data, building physics, material selection, material production place and form, construction site organization of the building, production process of the building, indoor air quality, acoustic quality of the building, efficient landscape design, daylight saving and efficient energy, water use classified criteria minimize negative impacts that cause environmental issue and maximize the living comfort of users.

In chapter fourth, entitled ‘Sustainable Hotel Design Buildings Examples’, Sustainable hotel examples designed in Ukraine, Austria, Switzerland, Canada, England, Italy, China, Portugal, USA, France, Belgium and Istanbul are described with the written and visual expressions. The common feature of selected 14 sustainable hotel include most of the criteria determined in the 4 th chapter under the heading ‘Evaluation of Selected Hotels Using Sustainable Criteria Indicators’.

4.1.1 Example 1: Friend House Hotel

The Ryntovt Friend House Hotel is located on 3 hectares plot in forest resort zone aside of Orel River Bank. The Ryntovt Friend House Hotel constructed by the company Ryntovt Design in the southeast of Ukraine, famous with river, provides 1750 square meters since 2008. It is a single-floor group of buildings with open yards, parking, terraces, garden and park zones (Figure 4.1).

Figure 4.1 Friend House Hotel- General View

(http://www.archdaily.com/51767/friendhouse-hotel-ryntovt/)

Detail information about Friend House Hotel is given in the table 4.1.

Table 4.1 Information about Friend House Hotel

Architects:	Yuriy Ryntovt
Location:	Orel River Bank, Dnepropertrovsk, Ukraine

Project Team:	Yuriy Ryntovt /chief architect, Aleksey Bojko, Alan Kravchenko
Project Area:	1,750 sqm
Project Year:	2008
Photographs:	Andrey Avdeenko
Climate Zone:	Humid Continental

The shape of the building, design with using natural materials, harmonious shapes and customized furniture. The building of structural form design as a piece of environment. In addition that the structural form concept is try to organize with the landscape (Figure 4.2).

Figure 4.2 Friend House Hotel- General View (http://www.archdaily.com/51767/friendhouse-hotel-ryntovt/)

Figure 4.3 and 4.4 shows the hotel room and the common use areas are located in South east direction this axis. The foyer formed by being raised from northern direction makes up the main axis of the building.

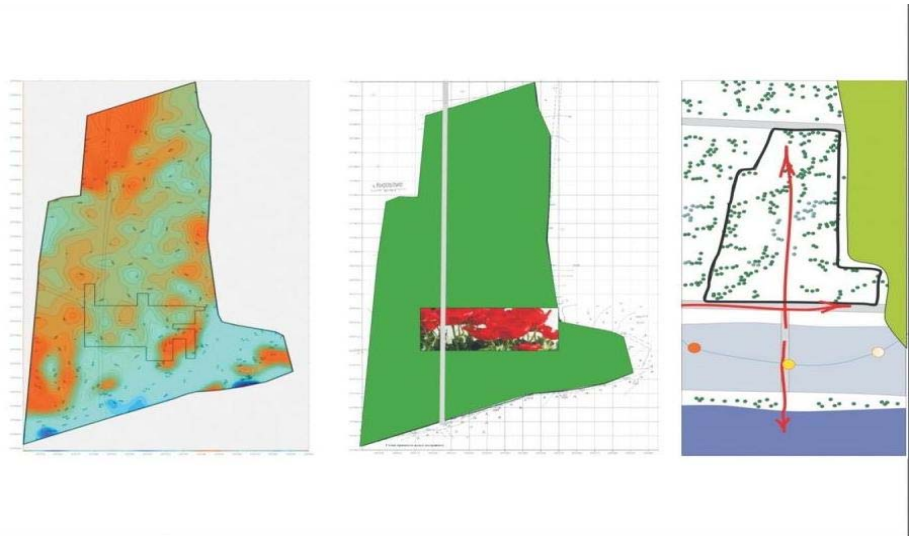

Figure 4.3 Friend House Hotel- Park Zones Landscape Plan (http://www.archdaily.com/51767/friendhouse)

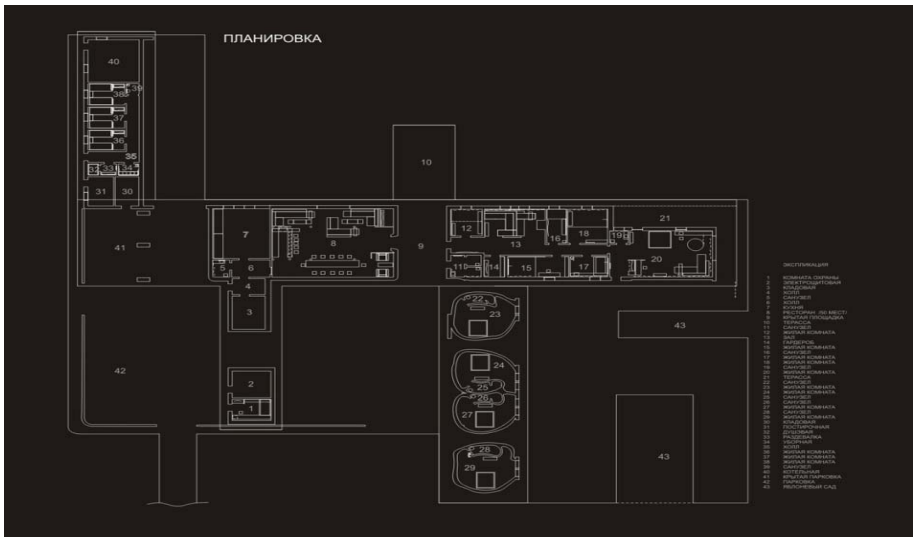

Figure 4.4 Friend House Hotel- Plan (http://www.archdaily.com/51767/friendhouse)

The structural plan being designed in the light of natural clay of circular shape in the interactive between building main lobby, restaurant with the natural wood usage (Figure4.5). In this way the building placement fit with the environment and use the natural ventilation in common areas, spreads the collected energy in equal distributions.

Figure 4.5 Friend House Hotel- Structural Form View (http://www.archdaily.com/51767/friendhouse)

The natural clay of circular shape is used for rooms and the other connection with the hotel room building material is wood as seen in Figure 4.5 and 4.6. Windows located at the top of the building shell components played an important role. The separation walls with the circular openings seen at figure 4.6 use sunlight efficiently.

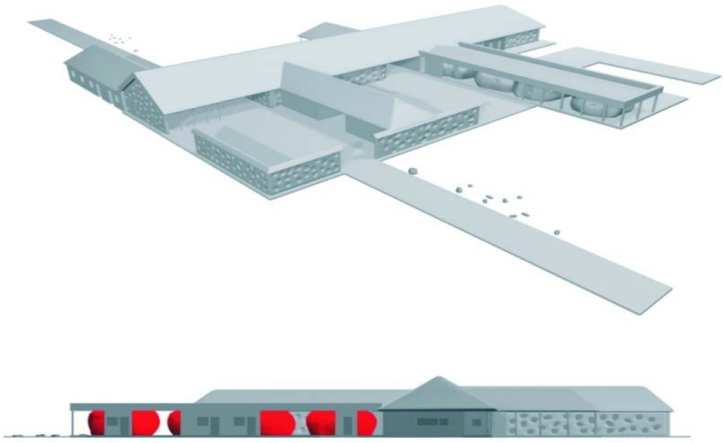

Figure 4.6 Friend House Hotel- General Layout of 3D (http://www.archdaily.com/51767/friendhouse)

Figure 4.7 shows the building natural ventilation in common areas, spreads the collected energy in equal distributions. Building constructed with ‘natural’ material such as clay, reed and wood in a cocoon style technique to become the various living areas united under the one roof. Figure 4.7 show the building material and interior material usage. The roof made by the wood and the walls are made from clay.

Figure 4.7 Friend House Hotel- Interior (http://www.archdaily.com/51767/friendhouse)

The interior furniture design creates such harmonious with the natural material usage. Rooms’ designs are so simple and the material is made of wood (Figure 4.8). The small window in every wall is used for the lighting and reduce the use of lighting.

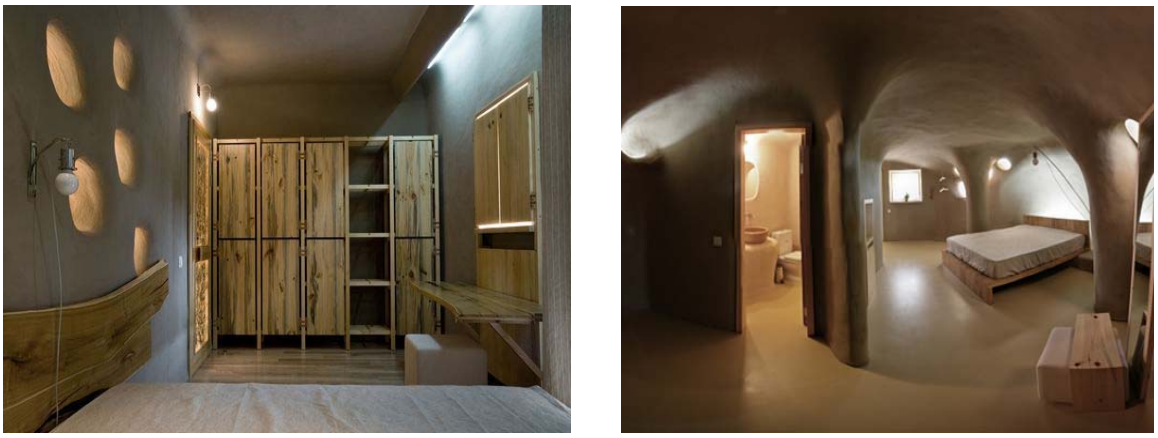

Figure 4.8 Friend House Hotel- Interior (http://www.archdaily.com/51767/friendhouse)

The bathroom design can see as below Figure 4.10, all materials are natural. The wall and the sink bench material are same done with clay. The sink and the shower made of wood. The shower material is made of reeds which are all natural material.

Figure 4.9 Friend House Hotel- Interior (http://www.archdaily.com/51767/friendhouse)

The hotel design building and interior design blending are completely with nature. The wooden floors, the most environmentally friendly options are reclaimed floorboards or sustainably certificated wood or bamboo, which is technically a grass but has a similar appearance to timber. A sustainable piece of furniture can it be reused, recycled or made from responsibly sourced material used in the hotel interior.

Finally the Friend House Hotel designed with these performance indicators; material consumption, indoor air quality and structural form shown as below Table 4.2. The seven hotel design performance indicators of 3 were used in this hotel.

Table 4.2 Friend House Environmental Awareness

1. Material Consumption	Natural materials, harmonious shapes and customized furniture. Clay, reed and wood in a cocoon style technique.
2. Energy Efficiency	There is no enough information about the energy efficiency that, accede as a negative design performance indicators.
3. Water Consumption	There is no enough information about the water consumption that, accede as a negative design performance indicators.
4. Efficient Indoor Air Quality	Natural Ventilation, no off grassing material such as VOC's.
5. Efficient Daylight Saving	There is no enough information about the efficient daylight saving that, accede as a negative design performance indicators.
6. Structural Form	Structural Shell Variant Shape of building; Circular shape in the interactive between building main lobby, restaurant with the natural wood usage.
7. Waste Management	There is no enough information about the waste management that, accede as a negative design performance indicators.

4.1.2 Example 2: Stadthalle Hotel

The Stadthall 3 star Hotel is located in a quiet neighborhood in Vienna city center. Stadthall Hotel constructed by the company DI Heinrich Trimmel in the quiet street close to Vienna and Vienna's city centre its many museums and sights around the city with 80 individually designed and furnished rooms since 2006.

Figure 4.10 Stadthalle Hotel - General View (http://www.hotelstadthalle.at/en)

Detail information about Stadthalle Hotel is given in the table 4.3.

Table 4.3 Information of Stadthalle Hotel

Architects:	DI Heinrich Trimmel
Location:	Hackengasse 20, 1150 Wien , Austria
Project Team:	Trimmen Partner
Project Area:	1100 sqm
Project Year:	2006
Photographs:	Copyright "Boutiquehotel Stadthalle"
Climate Zone:	Dry -Arid

It is a building with 3 floors which is ‘U’ shape with inner garden, after touring the city, surrounded by the scent of the lavender growing on the roof. Hotel Stadthalle was the first eco-friendly hotel in Vienna and was awarded with the European eco-label. The Stadthall is the first hotel with a zero energy balance. The building constructed according to passive home standards, with a green inner courtyard and a roof planted with lavender (Figure 4.11).

Figure 4.11 Stadthalle Hotel - General View (http://www.hotelstadthalle.at/en)

At Hotel Stadthalle Vienna, not only use renewable energy sources. All the energy the hotel complex requires is generated from renewable energy sources: a geothermal pump, a photovoltaic installation, solar panels and “active thermal slabs”: thermal activation of concrete and, in the near future, wind power (Figure 4.11). The façade covered with natural ivy leaves that help to natural insulation (Figure 4.11). The Stadthalle Hotel has a green roof up the building plan. This green roof covered with soil, grass and lavender reduce the building temperature in summer and increase the cooling effect (Figure 4.12). With the green roof it contributes both to natural lighting and catches architectural aesthetic by providing harmony with the environment. Water heat pump, for energy extraction and use well for water to toilets flushing. Large cisterns collect rain water from the roof, which use to tend the unique hotel garden and lavender roof. Surrounded by the scent of the lavender growing on the roof can be seen from Figure 4.12. Hotel garden is beautiful and flush bathrooms exclusively with rain water.

Figure 4.12 Stadthalle Hotel - Inner Garden (http://www.hotelstadthalle.at/en)

Other measures decrease the consumption of the hotel which is divided into two volumes: a renovated existing building and a new expansion built according to the dictates of passive construction with cement cladding. 130 m² of solar panels heat up enough hot water to supply the entire hotel with renewable energy (Figure 4.13). The hotel produces electricity with 94m2 photovoltaic system. Hotel sign generates its own electricity free.

Figure 4.13 Stadthalle Hotel –Exterior Necessary- Solar Panel (http://www.hotelstadthalle.at/en)

The foundation for the zero energy-balance hotels is a sophisticated concrete structure where integrated water pipes facilitate water circulation to cool and heat the whole building. Rain water use for everyday needs like tending the hotel garden or the flushing the toilets in bathrooms, toilets and to water the garden.

The hotel interior the sustainable fabric used, natural fibers often come from renewable sources and consume little energy in their production. The recycling and reusing fabric saves not only on landfill, but also on the energy and resources that would have been used to create new products. Natural fiber carpet used as a floor surface and rich texture with natural earthy tones used. Wood material used as a concrete wall that, this reduces the material consumption of construction material (Figure 4.14)

Figure 4.14 Stadthalle Hotel - Interior View (http://www.hotelstadthalle.at/en)

The waste management of the hotel improved those different rubbish bins: paper, organic, plastics, metal and non-recyclable waste. All of these bins are getting collected once a week, non-recyclable waste twice a week.

Finally the Stadthalle Hotel designed with these performance indicators; material consumption, energy efficiency, water consumption, structural form and waste management shown as below Table 4.4. The seven hotel design performance indicators of 5 were used in this hotel.

Table 4.4 Stadthalle Hotel Environmental Awareness

1. Material Consumption	Use baskets from recycled newspapers and recycled toilet paper. Use recycled fabrics for curtains.
2. Energy Efficiency	The water heat pump with well water generates the majority, about 75 percent, of necessary energy for the temperature control of our rooms. Lavender roof insulate the garden building so that in summer and winter heat can be absorbed. photovoltaic system Water heat pump for energy extraction The exhausted warm indoor air supports heat recovery. Use refrigerators with energy efficiency AAA.
3. Water Consumption	Rain water use In the passive house and in the garden building use the cold well water after it has been used in the heat pump as well as rain water for toilet flushing. In summer use the ice cold water for the cooling of the indoor air. Reduce water waste through restrictors and

	bubble filters in taps and toilet flushes.
4. Efficient Indoor Air Quality	There is no enough information about the Efficient Indoor Air Quality that, accede as a negative design performance indicators.
5. Efficient Dayligt Saving	There is no enough information about the Efficient Dayligt Saving that, accede as a negative design performance indicators.
6. Structural Form	Structural Shell Covered with the ivy for natural insulation
7. Waste Management	Different rubbish bins: paper, organic, plastics, metal and non-recyclable waste. All of these bins are getting collected once a week, non-recyclable waste twice a week. Furthermore bottles are collected separately and disposed in a public waste container. For cleaning use eco-friendly products, which arrive as concentrates in buckets. All suppliers are requested to take package material with them and dispose it correctly.

4.1.3 Example 3: Whitepod Eco Hotel

Whitepod Eco Hotel constructed in the Switzerland, set high in the breathtaking Swiss Alps famous with lake, provides 1400 square meters since 2004. White Eco located at 1400, in a private ski area in Switzerland, views of Lake Geneva. Whitepod was awarded with the World Prize for Sustainable Tourism in 2005. This unique ecological concept designed to be in total harmony with the surrounding environment.

Figure 4.15 General View of White Eco Hotel (http://www.fubiz.net/en/2013/01/30/whitepod/)

Detailed information about White Eco Hotel is given in the table 4.5.

Table 4.5 Properties of White Eco Hotel

Architects:	Sofia de Maer
Location:	1871 Les Giettes, Switzerland
Project Team:	Sofia de Maer Architecture Team
Project Area:	1400 sqm
Project Year:	2004
Photographs:	Whitepod
Climate Zone	Moderate-Marine West Coast

15 spacious pods dome shaped tents which are pitched on wooden platforms, isolated from all urban pollution; the mountain region lends itself beautifully to such a sustainable tourism development. 15 geodesic dome pods surround a central chalet and are designed to be in harmony with the surrounding environment while resembling boutique hotel rooms inside. Designed to blend with nature, the pods are green colored in the summer and covered with white canvas in the winter for maximum energy efficiency. Additionally, they are built on platforms that won't leave a trace on the land (Figure 4.16).

Figure 4.16 View of Dome in winter (http://www.fubiz.net/en/2013/01/30/whitepod/)

Each pod is equipped with a terrace to soak in the view, a wood burning stove, and solar and rechargeable energy that heat and powers them. Pod frames can with stand snowfall of 45-lbs/sq ft or winds of up to 130 mph, while the luminescent wall allows for passive solar heating (Figure 4.16 and Figure 4.17).

Figure 4.17 View of Dome in Winter (http://www.fubiz.net/en/2013/01/30/whitepod/)

Whitepod aims to be a model for sustainable tourism by using a number of measures to limit its impact on nature, for example:

- Minimize daily water and electricity consumption
- Reduce waste production
- Favor the use of renewable resources
- Increase the clients awareness of environment protection

Figure 4.18 Detail View of Dome (http://www.fubiz.net/en/2013/01/30/whitepod/)

Window located hall facade of the pods and some at the tops played an important role in the design of the hotel. Figure 4.18 show the use the sunlight efficiently in the south facade as best possible way.

Figure 4.19 Interior View of Dome (http://www.fubiz.net/en/2013/01/30/whitepod/)

The interior furniture chosen for the pods is made from recycled materials. All the waste generated by the camp is recycled in accordance with locally produced. The materials are nontoxic and durable that efficient in their use. As seen from Figure 4.19 the pods are heated by wood stoves and lit by petrol lamps.

Finally the Eco Hotel designed with these performance indicators; material consumption, energy efficiency, water consumption, structural form and waste management shown as below Table 4.6. The seven hotel design performance indicators of 5 were used in this hotel.

Table 4.6 White pod Environmental Awareness

1. Material Consumption	The furniture chosen for the pods is made from recycled materials. All the waste generated by the camp is recycled in accordance with local authority guidelines.
2. Energy Efficiency	Electricity is limited. The pods are heated by wood stoves and lit by petrol lamps.
3. Water Consumption	The consumption of water is limited by having two shared bathrooms rather than en-suite facilities. During individual stays, sheets and towels are changed on request only.
4. Efficient Indoor Air Quality	There is no enough information about the Efficient Indoor Air Quality that, accede as a negative design performance indicators.
5. Efficient Daylight Saving	There is no enough information about the Efficient Dayligt Saving that, accede as a negative design performance indicators.
6. Structural Form	Raising awareness of the local environment knowledge and understanding of the local environment is shared with guests
7. Waste Management	Reduce, reuse and recycle

Meanwhile, information's of the Ecological Policy of White Pod are given in below figure.

whitepod

Charte Ecologique
Ecological Policy

Consommation d'énergie et d'eau
Water & energy consumption

Utilisation d'ampoules LED.
Use of LED lampbulbs.

Utilisation de cheminées à foyer fermé afin de ralentir la consumation du bois.
Use of fireplaces with home closed to slow down the consumption of wood.

Favorisation d'appareils électriques de classe A.
Promote the use of Class A (low consumption) electrical devices.

Installation de minuteur sur les chauffes eau.
Installation of timers on water boilers.

Installation d'économiseur d'eau sur les pommeaux de douche et les robinets.
Installation of water-saving devices on water tabs and shower heads.

Utilisation d'eau de source.
Use of local spring water.

Utilisation d'un volume mort dans le réservoir d'eau des toilettes.
Toilet-dams are placed in the reservoirs.

Sensibilisation de la clientèle sur la préservation de l'environnement.
Raise clients awareness on environmental protection.

Déchets
Waste

Favorisation de l'achat en vrack afin de réduire les quantiés d'emballages.
Opt for the purchase of goods in bulk as to reduce the amount of packaging.

Mise en place d'une politique stricte de tri des déchets organiques et non organiques
Sorting of organic and non organic waste.

Chauffage & ressources renouvelables
Heating & Renewable resources

Chauffage des pods au bois issus de nos forêts.
Pods are heated using a woodstove and use local from the surrounding forests.

Chauffage au pellets dans le Pod-house.
The Pod-house uses a wood pellet heating system.

Participation au programme de replantation des arbres des Nations Unies.
Taking part in the United Nations reforestation program.
(http://www.unep.org)

Biodiversité
Biodiversity

Sensibilisation de la clientèle à la protection de la faune et de la flore locale
Raising guests' awareness to the surrounding fauna and flora

Limitation des éclairages nocturnes
Limit night lighting.

Pas de dépôts sauvages de déchets organiques mais utilisation d'un conteneur à compost.
Use of compost containers.

Se fondre dans le paysage
Merge in the landscape

La couleur des Pods est adaptée selon la saison: blanc en hiver, vert en été.
The color of the Pods are adapted accoding to the season : white in winter, green in summer.

Restauration
Food & beverage

Utilisation de fournisseurs locaux pour les vins et la viande.
Use of local wine and meat suppliers.

Favoriser l'utilisation de fournisseurs locaux, puis européens pour les autres ingrédients.
Aim to use local suppliers first, then use of European suppliers for all other ingredients.

Utilisation uniquement de mets de saison.
Only use seasonal products.

Utilisation de poissons labellisés pêche durable « MSC ».
Use of certified « MSC » sustainable fish.
www.msc.org

Consommables
Consumables

Produits de nettoyage 100% biodégradables.
100% biodegradeable cleaning products.

Utilisation de papiers certifiés « FSC » :
-papiers pour impressions, blocs notes, brochures, emballages mouchoires, papiers toilettes
Use of « FSC » certified paper :
-printing paper, note pads, brochures, tissue packaging, toilet paper

Produits de douche certifié « EU Ecolabel ».
Shower products certified « EU Ecolabel ».
www.ecolabel.eu

Figure 4.20. The Ecological Policy of White Pod (http://www.fubiz.net/en/2013/01/30/whitepod/)

4.1.4 Example 4: ALT Hotels

ALT Hotels constructed in Canada with the company Le Germain Group since 2004. ALT is the first Canadian hotel chain designed to follow the principles of ecological architecture.

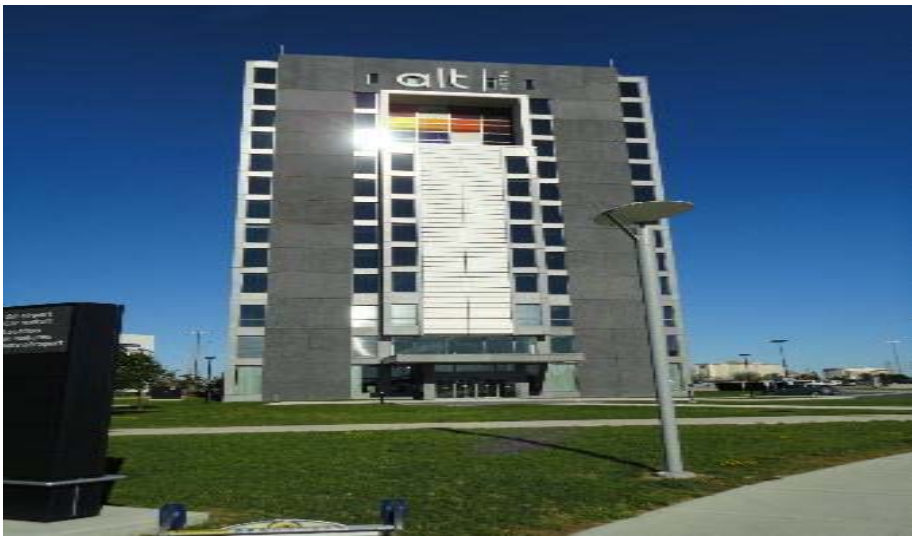

Figure 4.21 General View of ALT Hotel (http://www.althotels.ca/)

Detail information about ALT Hotel is given in the table 4.7.

Table 4.7 Properties of ALT Hotel

Architects:	Le Germain Group Architect
Location:	Brossard (QC) J5Y 0B6 Canada
Project Team:	Le Germain Group
Project Area:	1100 sqm
Project Year:	2004
Photographs:	ALT Hotels
Climate Zone:	Continental- Subarctic

In the lobby which also includes radiant floor heating, the element that most proud of is their use of geothermal heating and cooling. The hotel's green heating system will reduce CO2 emissions by approximately 430 tons/year, which is an average of 2.7 tons/day or 7 kg/day for each room (www.althotels.ca). Digital controls of ventilation, cooling and heating systems were used in the hotel (Figure 4.22).

The interior of ALT hotel is so bright and clear because of huge thermal window, and this helps to maximize the natural light (Figure 4.22). On exterior surface windows extending from ground to ceiling has been used. The reason for this is to provide maximum benefit from daylight even at the shortest angel of daylight. The windows are double glassed and solar filtered in order to prevent heat loss. In this way, interior heat loss is minimized and contribution is provided to efficient energy saving.

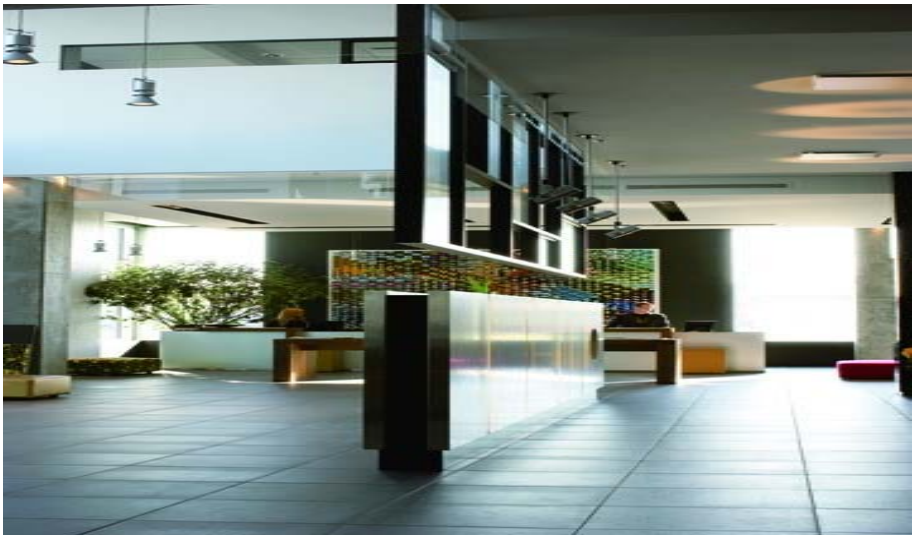

Figure 4.22 Interior View of ALT Hotel (http://www.althotels.ca/)

Finally the ALT Hotel designed with these performance indicators; energy efficiency and efficient daylight saving shown as below Table 4.8. The seven hotel design performance indicators of 2 were used in this hotel (Table 4.8).

Table 4.8 ALT Hotel Environmental Awareness

1. Material Consumption	There is no enough information about the Material Consumption that, accede as a negative design performance indicators.
2. Energy Efficiency	Geothermal heating and cooling Energy efficient lighting Central switch in the rooms to allow li lights be turned off remotely Sensors in the stairwell to limit the use of lighting Domestic water heating by geothermal Energy Heat recovery from ventilation exhaust to preheat cold air coming in from the exterior Heat recovery from water used in commercial washers Automatic regulation system for ventilation, air conditioning and heating
3. Water Consumption	There is no enough information about the Water Consumption that, accede as a negative design performance indicators.
4. Efficient Indoor Air Quality	There is no enough information about the Efficient Indoor Air Quality that, accede as a negative design performance indicators.
5. Efficient Daylight Saving	Huge thermal windows with low emission rates that maximize natural light
6. Structural Form	There is no enough information about the Structural Form that, accede as a negative design performance indicators.
7. Waste Management	There is no enough information about the Waste Management that, accede as a negative design performance indicators.

4.1.5 Example 5: The Scarlet Hotel

The Scarlet Hotel constructed in England with the company of Harrison Sutton Partnership. Developed from an ambitious brief, challenging convention, The Scarlet is a 37 bedroom luxury hotel perched overlooking the Atlantic since 2009.

Figure 4.23 General View of the Scarlet Hotel (http://www.scarlethotel.co.uk/)

Detail information about The Scarlet Hotel is given in the table 4.7.

Table 4.9 Information about the Scarlet Hotel

Architects:	Jon Capel & Peter Harrison of the Harrison Sutton Partnership
Location:	Cornwall, England
Project Team:	Chartered architecture LLP
Project Area:	2000sqm
Project Year:	2009
Photographs:	The Scarlet
Climate Zone:	Moderate-Marine West Coast

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Figure 4.24 Interior View of the Scarlet Hotel (http://www.scarlethotel.co.uk/)

In hotel lighting is very important within a hotel and the energy used to maintain lighting is something that has been overlooked for a long time. The Scarlet has been designed to maximize the use of natural light as much as possible and this driven the development of the lighting systems itself. The huge windows extending from ground to ceiling have been used (Figure 4.23). Energy saving fluorescent and LED luminaries', along with multipurpose sensors, are integral elements of the lighting design (Figure4.24). From the building materials, to the interiors, to the high levels of insulation, air tightness, and the utilization of solar energy and natural cooling used. The aim is minimize the negative impact on the planet.

Grey water recycling system and rain water harvesting, laundry water footprint calculates and try to decrease the water consumption. The aim to reduce the water consumption also makes buildings more sustainable and environmental friendly world. The towels in the Spa are still 100% fairly traded organic cotton, however towels now a slightly lighter weight so more can go into one load of washing, and they take less time to dry.

Waste management tries to program around to reduce, reuse and recycle. In the Scarlet hotel food waste and beach rubbish reused and recycled.

Finally the Scarlett Hotel designed with these performance indicators; energy efficient, water consumption and waste management shown as below Table 4.10. The seven hotel design performance indicators of 3 were used in this hotel (Table 4.10).

Table 4.10 Scarlet Hotel Environmental Awareness

1. Material Consumption	There is no enough information about the Material Consumption that, accede as a negative design performance indicators
2. Energy Efficiency	Energy saving fluorescent and LED luminaries, along with multipurpose sensors, are integral elements of the lighting design.
3. Water Consumption	Grey water recycling system, Rain Water harvesting, Laundry Water footprint calculate and try to decrease the Consumption.
4. Efficient Indoor Air Quality	There is no enough information about the Efficient Indoor Air Quality that, accede as a negative design performance indicators
5. Efficient Daylight Saving	There is no enough information about the Efficient Daylight Saving that, accede as a negative design performance indicators
6. Structural Form	There is no enough information about the Structural Form that, accede as a negative design performance indicators
7. Waste Management	Food Waste and soup Waste Beach rubbish reused

4.1.6 Example 6: Vigilius Mountain Resort

Vigilius Mountain Resort constructed in Italy, South Tyrol, located on Vigiljoch Mountain since 2003. San Vigilius is the traditional recreation area for the district around the city of Merano located at 1500 m sea level. According to this, the design of the garden is kept very discrete for achieving a harmonic integration of the building into nature (Figure 4.25).

Figure 4.25 General View of Vigilius Mountain Resort (http://www.vigilius.it/de/resort/12-0.html)

Detail information about The Scarlet Hotel is given in the table 4.11.

Table 4.11 Properties of Vigilius Mountain Resort

Architects:	Matteo Thun
Location:	Italy, South Tyrol
Project Team:	Freilich landscape architecture
Project Area:	3000sqm
Project Year:	2003
Photographs:	Photo via Malediven.

Climate Zone:	Moderate-Mediterranean

The Vigilius mountain resort, as a “wooden house of modernity,” has been committed to its ecological approach from the very beginning. The building to resemble a fallen tree lying in the woods, the wooden lattice facade represents the bark of the fallen tree (Figure 4.26 and 4.27).

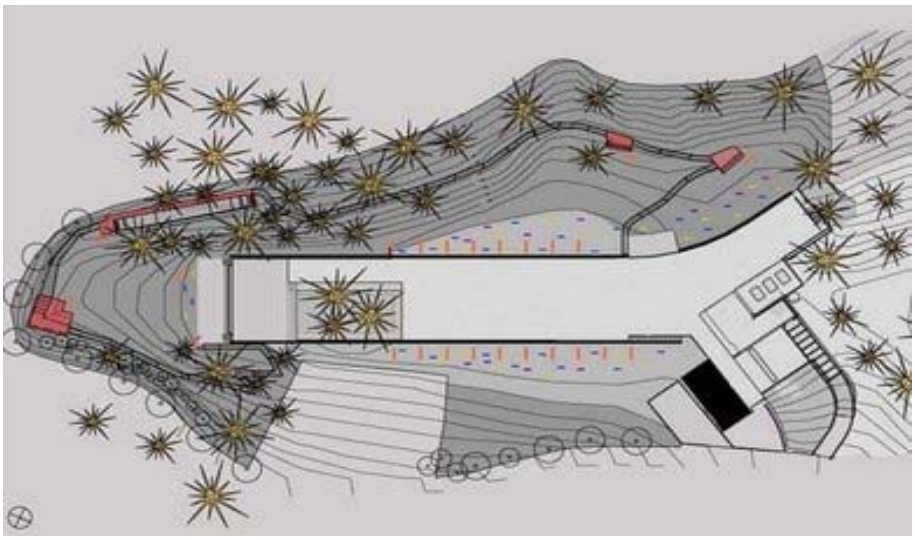


Figure 4.26 Plan of Vigilius Mountain Resort (http://www.vigilius.it/de/resort/12-0.html)

The panoramic windows bring the outdoors closer with dramatic views of the woods and mountains. There are no obstructions and with the scent of wood in each room, it almost feels like a tree house (Figure 4.27). These natural wood panels can transmit the feeling of comfort and quality that wood gives to a building. Façade is a cladding system with integrated building services for heating, cooling, ventilation and heat recovery as well as lighting and sound insulation within unitized cladding panels. The advantages of the wood panels on the façade are aesthetic accomplishment, good thermal and sound insulation, durability, water resistance and air tightness, hygienic integrity and multi functional use.

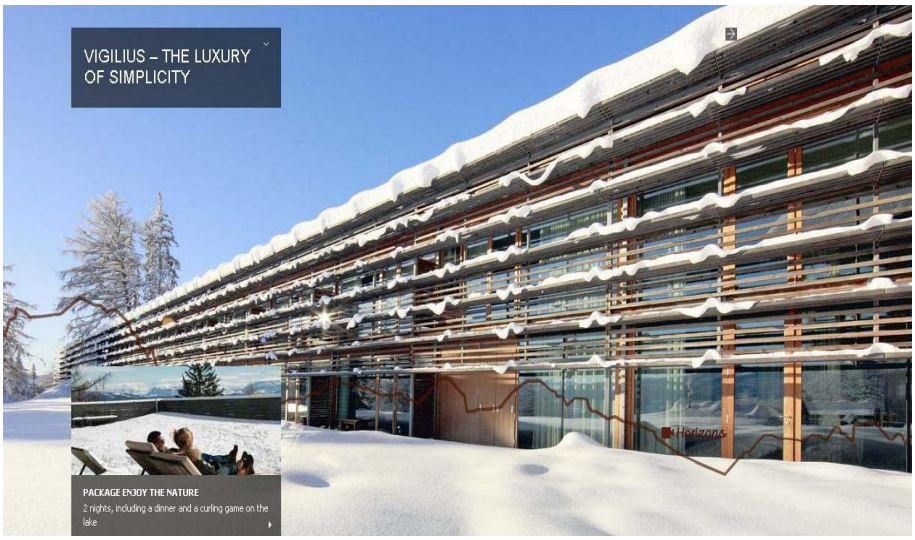


Figure 4.27 Facade of Vigilius Mountain Resort (http://www.vigilius.it/de/resort/12-0.html)

The interior of the Vigilius Mountain Resort used warm colors and materials such as clay, glass, stone, and linen. The furniture materials choose as a wood that reused recycled or made from responsibility sourced material used (Figure 4.28).

Figure 4.28 Interior view-plan of Vigilius Mountain Resort (http://www.vigilius.it/de/resort/12-0.html)

The interior view which show at the figure 4.29, natural brick wall used. The bricks made from a natural material; most clay pits are carefully managed and refilled and replanted after used. Bricks are high durable and low maintenance with high thermal mass.

Figure 4.29 Interior View-of Vigilius Mountain Resort (http://www.vigilius.it/de/resort/12-0.html)

The Vigilius mountain resort has been awarded several prizes for sustainable tourism with an ecological based concept. A particular milestone in the history of the hotel was the completion, in the summer of 2010, of the environmental certification according to ISO 14001, additional evidence of the environmental spirit that prevails at Vigilius mountain resort.

Finally the Vigiliuis Hotel designed with these performance indicators; material consumption and structural form shown as below Table 4.12. The seven hotel design performance indicators of 3 were used in this hotel (Table 4.12).

Table 4.12 Vigilius Hotel Environmental Awareness

1. Material Consumption	Wood flooring and natural furniture used Wooden façade used
2. Energy Efficiency	Wood façade panels, good insulation, efficient heating and cooling
3. Water Consumption	There is no enough information about the Water Consumption that, accede as a negative design performance indicators
4. Efficient Indoor Air Quality	There is no enough information about the Efficient Indoor Air Quality that, accede as a negative design performance indicators

5. Efficient Daylight Saving	There is no enough information about the Efficient Daylight Saving that, accede as a negative design performance indicators
6. Structural Form	The design of the garden is kept very discrete for achieving a harmonic integration of the building into nature
7. Waste Management	There is no enough information about the Waste Management that, accede as a negative design performance indicators

4.1.7 Example 7: Innhouse Eco Hotel

Innhouse Eco Hotel constructed in China, designed by Oval partnership and provides 2600 square meters since 2012. The architect's response to this site of natural beauty was to create an inspiring and exemplary model of responsible tourism and integrated with the environment to bring guests into closer contact with their natural surroundings.

Figure 4.30 General of Innhouse Hotel (http://www.archdaily.com/294610/innhouse-eco-hotel-oval-partnership/)

Detail information about Innhouse Eco Hotel is given in the table 4.13

Table 4.13 Properties of Innhouse Eco Hotel

Architects:	Oval Partnership
Location:	EXPO Eco Town, Kunming, China
Project Team:	Courtesy of Oval Partnership
Project Area:	2,600 sqm
Project Year:	2012
Photographs:	Courtesy of Oval Partnership
Climate Zone:	Dry-Semiarid

Based on a 'watershed' approach the hotel has maximum site coverage of 18%, creating a low density development with minimum impact on the environment (www.ınnhouse.com.uk). Other primary initiatives include site watershed conservation, solar thermal hot water, rainwater recycling and grey water reuse, a highly insulated envelope, reconstituted bamboo with low embodied energy, habitat preservation and also design as a sustainable building (Figure 4.31).

Figure 4.31 Facade of Innhouse Eco Hotel (http://www.archdaily.com/294610/innhouse-eco-hotel-oval-partnership/)

Each L-shaped block is formed of two wings with guest rooms over 3 to 4 storey's, connected by a central volume with vertical circulation and a link bridge. The L-shapes frame courtyards at first floor level, partly enclosed by the existing mature trees at the open sides, and encourage a greater integration of indoor and outdoor for guests.

Figure 4.32 View of Innhouse Eco Hotel (http://www.archdaily.com/294610/innhouse-eco-hotel-oval-partnership/)

The weather study and thermal simulation shaped the massing, orientation, cladding and glazing ratio of the guest blocks to optimize heating and cooling loads of the areas exposed to the east and west in summer and winter conditions. The generally cooler mountain conditions also required a well insulated envelope, with extensive use of locally sourced reconstituted bamboo and timber facade with cavity wall (Figure 4.32).

Figure 4.33 Elevation of Innhouse Eco Hotel (http://www.archdaily.com/294610/innhouse-eco-hotel-oval-partnership/)

The window to wall ratio is about 0.3, with the orientation of the blocks carefully considered to ensure window placement benefits the guests' views over the landscape whilst reducing solar gain or heat loss, with all windows using low emission double glazing (Figure 4.33).

Figure 4.34 Elevation of Innhouse Eco Hotel (http://www.archdaily.com/294610/innhouse-eco-hotel-oval-partnership/)

The simple arrangement of the blocks is largely devoid of decoration, focusing instead on the quality of the site, natural materials (Figure 4.35). The hotel incorporates active and passive environmental technologies to minimize energy consumption. With subtle lighting through a series of vertical windows, the more private areas are behind a feature partition wall and form a box within a box.

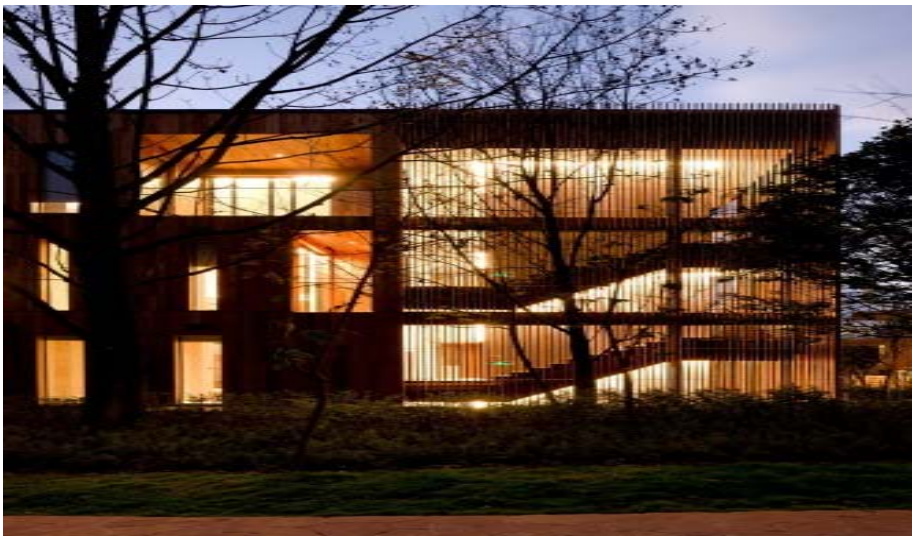


Figure 4.35 View of Innhouse Eco Hotel (http://www.archdaily.com/294610/innhouse-eco-hotel-oval-partnership/)

Crafted in response to local climatic conditions, this vernacular format has central courtyards providing daily communication between residents, as well as high levels of natural ventilation and lighting to the surrounding rooms (Figure 4.36).

Figure 4.36 Courtyards View of Innhouse Eco Hotel (http://www.archdaily.com/294610/innhouse-eco-hotel-oval-partnership/)

Finally the Innhouse Eco Hotel designed with these performance indicators; material consumption, energy efficiency, water consumption, efficient indoor air quality and structural

form shown as below Table 4.14. The seven hotel design performance indicators of 5 were used in this hotel (Table 4.14).

Table 4.14 Innhouse Eco Hotel Environmental Awareness

1. Material Consumption	natural materials, wooden use
2. Energy Efficiency	Highly insulated envelope, reconstituted bamboo with low embodied energy, natural ventilation and lighting to the surrounding rooms
3. Water Consumption	rainwater recycling grey water reuse
4. Efficient Indoor Air Quality	Natural ventilation
5. Efficient Daylight Saving	There is no enough information about the Efficient Daylight Saving that, accede as a negative design performance indicators
6. Structural Form	thermal simulation shaped Bamboo facade
7. Waste Management	There is no enough information about the Waste Management that, accede as a negative design performance indicators

4.1.8 Example 8: Pedras Salgadas Eco-Resort

Parque de Pedras Salgadas constructed in Portugal, designed by Luís Rebelo de Andrade & Diogo Aguiar and provides 687, 96 square meters since 2012. The new sustainable building of Parque de Pedras Salgadas, Portugal, consists of a set of seven small houses in perfect harmony with the surrounding outstanding nature (Figure 4.37).

Figure 4.37 General View of Parque de Pedras Salgadas (http://www.pedrassalgadaspark.com/pt/)

Detail information about Parque de Pedras Salgadas is given in the table 4.15

Table 4.15 Properties of Parque de Pedras Salgadas

Architects:	Luís Rebelo de Andrade & Diogo Aguiar
Location:	Pedras Salgadas, Portugal
Project Team:	Madalena Rebelo de Andrade, Raquel Jorge, João Jesus Constructor: Modular System
Project Area:	687,96 sqm
Project Year:	2012
Photographs:	FG + SG
Climate Zone	Moderate-Mediterranean

Designed in a modular prefabrication system but flexible to adapt to the specific places within the park, these houses result in several different combinations of the same three modules; entrance/bathing, living, sleeping, creating different morphologies and different dialogues with the surrounding nature, wisely occupying the empty spaces between the large trees (Figure 4.38)

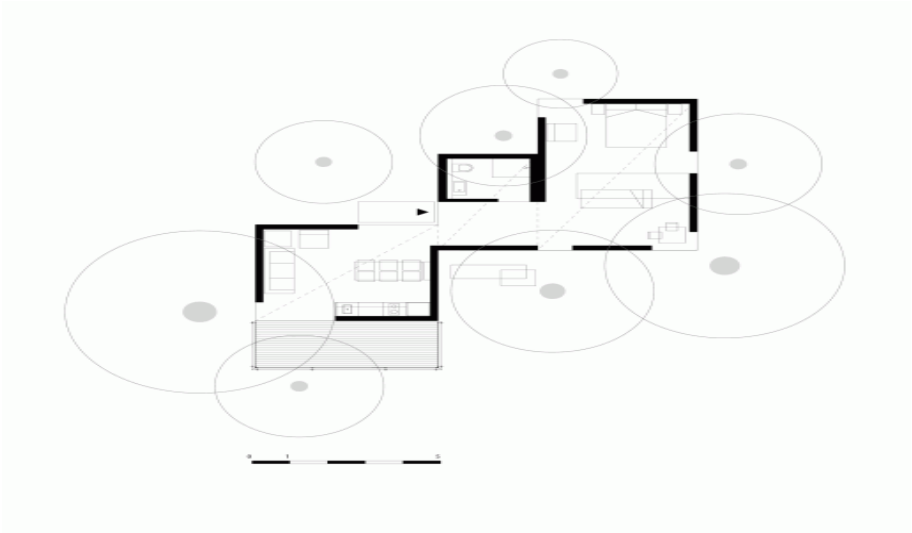


Figure 4.38 Plan of Parque de Pedras Salgadas (http://www.pedrassalgadaspark.com/pt/)

Figure 4.39 General view of Parque de Pedras Salgadas (http://www.pedrassalgadaspark.com/pt/)

The pitched roofs that characterize the intervention redefine the contours of the park boundary and result, within the houses in comfortable but dynamic spaces. The vain corner contradicts the structural logic of the house but creates the illusion that the park is inside the house framing living nature pictures (Figure 4.39). The forest in which green areas are intensively and actively used is designed as an emotional and social places fort e customer.

This forest which is used in natural form of the land provides the costumer the real natural environment and understands the sustainable tourism.

Figure 4.40 Interior view of Parque de Pedras Salgadas (http://www.pedrassalgadaspark.com/pt/)

One of the most important conditions to provide indoor air quality is the provision of adequate natural ventilation. Sunlight retrieved inside by huge windows has insured the use of natural lighting at maximum level and natural ventilation used in the hotel (Figure 4.40).

Figure 4.41 Interior view of Parque de Pedras Salgadas (http://www.pedrassalgadaspark.com/pt/)

The interior of the room as seen figure 4.41, furniture are choosing wood material. Floor surface is timber floorboards that well maintained floor that last for decades and can be recycled or reused. Timber from sustainably managed forest is one of the most ecological building materials. Carpet used in the room made from hessian, natural latex and low-VOC, water based and formaldehyde free glues are used. The outer coating in slate tile refers to the local contraction traditions and the slatted wood used when there is a balcony open to environment. The wall coverings natural paint that low embodied energy, micro porous, allowing water to pass through without causing flaking or peeling. The natural fibers used in the hotel room. Natural fibers often from renewable source and consume little energy. Recycling and reusing fabric saves not only landfill, but also on the energy and resource that would have been used to create new product.

Finally the Innhouse Eco Hotel designed with these performance indicators; material consumption, energy efficiency, efficient indoor air quality, efficient day light saving and structural form shown as below Table 4.16. The seven hotel design performance indicators of 5 were used in this hotel (Table 4.16).

Table 4.16 Parque de Pedras Salgadas Environmental Awareness

1. Material Consumption	natural materials, wooden use, natural fabric, renewable resource paint, carpet
2. Energy Efficiency	Windows and the placement of the building Efficient heating and cooling systems
3. Water Consumption	There is no enough information about the water sonsumption that, accede as a negative design performance indicators
4. Efficient Indoor Air Quality	Natural ventilation
5. Efficient Daylight Saving	Huge window –healthy lighting
6. Structural Form	Roof and the shape Design to use light well,

	design in forest with natural shape
7. Waste Management	There is no enough information about the Waste Management that, accede as a negative design performance indicators

4.1.9 Example 9: H2 Hotel

H2 Hotel constructed in California, USA designed by Jen Gadiel Design and Marie Fisher. The hotel located as an former petrol station that, first of all start to clean the contaminated soil.

Figure 4.42 General View of H2 Hotel (http://www.h2hotel.com/home/)

Detail information about H2 Hotel is given in the table 4.17

Table 4.17 Properties of H2 Hotel

Architects:	David Baker + Partners
Location:	219 Healdsburg Avenue, Healdsburg, California, USA
Project Team:	Jen Gadiel Design and Marie Fisher-Midstate Construction

Project Area:	1900 sqm
Project Year:	2004
Photographs:	Brian Rose
Climate Zone:	Moderate- Humid Continental

Registered for LEED certification, h2 Hotel infuses all aspects of its design, operations, and attitude with eco-consciousness, including such energy-saving measures as a green roof and solar panels. These roof systems help to collect the rain water (Figure 4.43).

Figure 4.43 Plan of H2 Hotel (http://www.h2hotel.com/home/)

The H2 Hotel has a green roof up o building plan. This green roof covered with soil and grass reduces the building temperature in summer and increase the cooling effect (Figure 4.44). The solar panel which is used at the roof used for the heating system of the pool and the need of hot water which is used in room is gain from these panels. Photovoltaic panels installed on the metal roof produce electricity by means of energy retrieved from sunlight and contributes to meet the electricity needs. H2 Hotel which provided re-gain to nature at least half of the area covered gives also support to environmental-friendly life with its green roof. In addition to the aesthetic appearance provided for the building, the heat and sound performance of the building is balanced with the green roof. In addition, this green roof

protects the material under the roof cover against the harmful influence of the sun (Figure 4.45).

Figure 4.44 Green Roof General View of H2 Hotel (http://www.h2hotel.com/home/)

Where environmental performance is concerned, green roof considerably outstrip any other roofing material. They replace vegetation covered or destroyed by buildings and encourage biodiversity, provide excellent sound and heat insulation and absorb water run-off, making them an effective tool against flash flooding.

Figure 4.45 Roof View of H2 Hotel (http://www.h2hotel.com/home/)

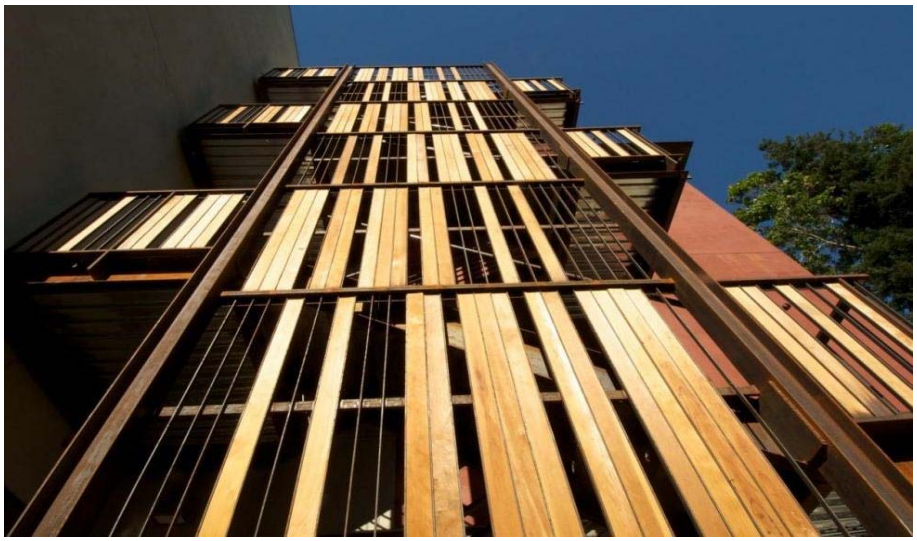


Figure 4.46 Façade view of H2 Hotel (http://www.h2hotel.com/home/)

The hotel H2 is the %27, 8 percentage energy consumption hotel in California. The facade wood panel helps to shade and insulation for the building. All the lighting fixtures of ventilator and HVAC system choose as a sensor to decrease the energy consumption All the windows which are used in common spaces choose cradle-to-cradle certificate and Low-e covered glass and shady spot used at the facade (Figure 4.46). Using of exterior shading to reduce glare by partially blocking occupants' view of the too-bright sky. Exterior surface also help smooth out interior daylight distribution (Figure 4.47).

Figure 4.47 Interior of H2 Hotel (http://www.h2hotel.com/home/)

Figure 4.48 Interior of H2 Hotel (http://www.h2hotel.com/home/)

The lift which is used in hotel interior is % 60 low energy consumption. The material which is used in interior and exterior choose as a wooden materials and recycled material and waste wood material. The wood area in the hotel lobby ceiling, doors, windows and furniture are FSC certificate (Figure 4.48). The waste construction materials are recycled.

Figure 4.49 Interior of H2 Hotel (http://www.h2hotel.com/home/)

The mechanical system and the clean air in structure is % 150 percentage clean than other Hotels. Used indoor air quality paints, coatings, composite wood products, adhesives, fillers low percentage of volatile organic compounds (VOC) were used. The art of tableau show the flow of rain water which is collected in the green roof (Figure 4.49). The customer see the re used water with the art on the wall (Figure 4.50).

Figure 4.50 The tableau in H2 Hotel (http://www.h2hotel.com/home/)

Finally the H2 Hotel designed with these performance indicators; material consumption, energy efficiency, water consumption and efficient indoor air quality shown as below Table 4.18. The seven hotel design performance indicators of 4 were used in this hotel (Table 4.18).

Table 4.18 H2 Hotel Environmental Awareness

1. Material Consumption	natural materials, wooden use, natural fabric, renewable resource paint, carpet
2. Energy Efficiency	Green roof Insulated window Efficient heating and cooling systems
3. Water Consumption	Rain Water usage

4. Efficient Indoor Air Quality	Natural ventilation Indoor air quality paints, coatings, composite wood products, adhesives, fillers low percentage of volatile organic compounds (VOC)
5. Efficient Daylight Saving	There is no enough information about the Efficient Daylight Saving that, accede as a negative design performance indicators
6. Structural Form	There is no enough information about the Structural form that, accede as a negative design performance indicators
7. Waste Management	There is no enough information about the waste management that, accede as a negative design performance indicators

4.1.10 Example 10: Ecotourism Center

Eco tourism Hotel constructed in France, designed by Inca Architects since 2011. The site of the "Gorges de Franchard" is the most popular in the forest area of France. The goal of the site, which is also the very first Eco tourism center within the France region, is the better management of the traffic flow in the area, as much as increasing the sustainable awareness.

Figure 4.51 Eco Tourism Center General View (http://www.archdaily.com/207883/ecoturism-center-in-france-inca-architectes/)

Detail information about Eco Tourism Hotel is given in the table 4.19

Table 4.19 Properties of Eco Tourism Center

Architects:	Inca Architects
Location:	Fontainebleau, France
Project Team:	Cap Paysage, Arpente, Alpes Structures et Rostain Coste, M. Forgue
Project Area:	5400 sqm converted; 250 sqm built
Project Year:	2011
Photographs:	Courtesy of Inca Architects
Climate Zone:	Moderate- Marine West Coast

Organized around a reception and exhibition area, the project includes a large hall designed for welcoming groups. The plan of the Eco tourism Hotel seen at below Figure 4.52 and place the environment shape of the land. The project has been developed based on the analyses the agency made on the building's atmosphere and its connection to the landscape.

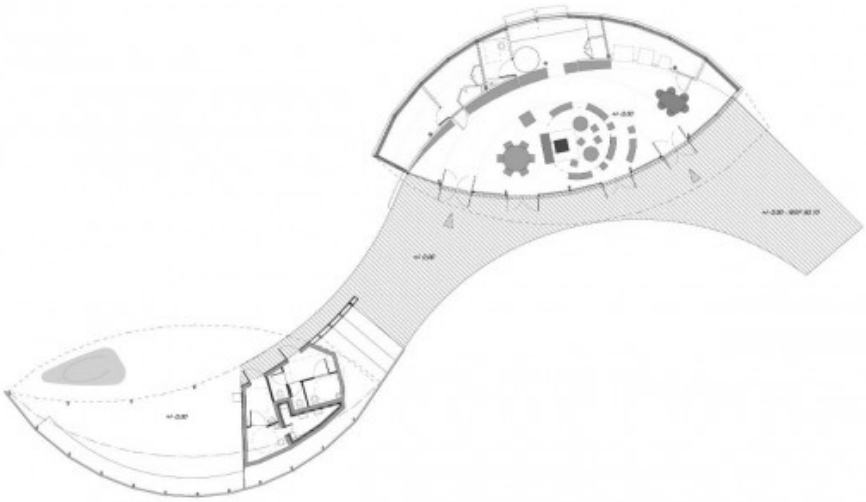


Figure 4.52 The plan of the Ecotourism Center (http://www.archdaily.com/207883/ecoturism-center-in-france-inca-architectes/)

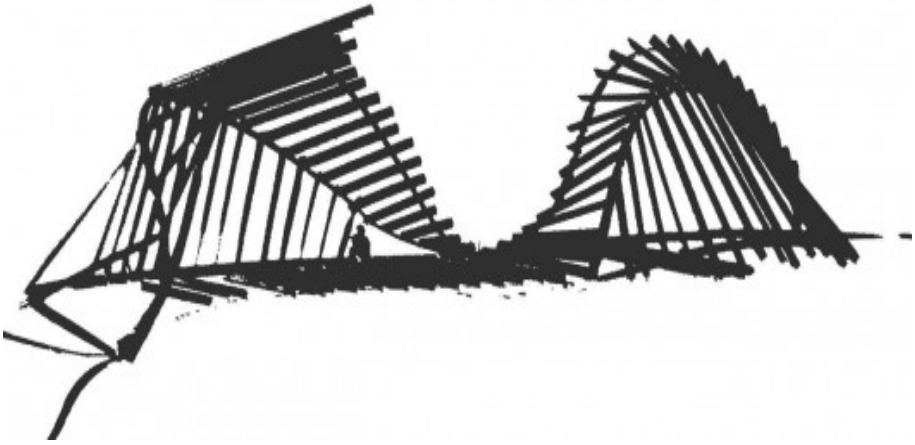


Figure 4.53 The sketch of the Ecotourism Center (http://www.archdaily.com/207883/ecoturism-center-in-france-inca-architectes/)

The building is thought of as a living room in the woods. Its wide and smooth shapes gently wandering along the preserved trees are inspired from the eroded stones seen on the site (Figure 4.53). The use of wood and its implementation gives us the opportunity for sustainable construction solutions (Figure 4.54).

Figure 4.54 Wood detail-facade of Ecotourism Center (http://www.archdaily.com/207883/ecoturism-center-in-france-inca-architectes/)

Finally the Eco Tourism Hotel designed with these performance indicators; material consumption and structural form shown as below Table 4.20. The seven hotel design performance indicators of 2 were used in this hotel (Table 4.20).

Table 4.20 EcoTourism Environmental Awareness

1. Material Consumption	Wooden use-Recycled material natural materials, wooden use, natural fabric, renewable resource paint, carpet
2. Energy Efficiency	There is no enough information about the Energy Efficiency that, accede as a negative design performance indicators
3. Water Consumption	There is no enough information about the Efficient Daylight Saving that, accede as a

	negative design performance indicators
4. Efficient Indoor Air Quality	There is no enough information about the Efficient indoor air quality that, accede as a negative design performance indicators
5. Efficient Daylight Saving	There is no enough information about the Efficient Daylight Saving that, accede as a negative design performance indicators
6. Structural Form	Variant Shape of building The protection from the main winds optimize the bioclimatic solutions Building Height
7. Waste Management	There is no enough information about the waste managemenent that, accede as a negative design performance indicators

4.1.11 Example 11: Crown Plaza Hotel Brussels

The Crown Plaza Hotel Brussels is situated at the Place Rogier in the heart of Brussels, in walking distance to the world-famous Grand Place and historical center. The location is convenient to business districts, NATO. The hotel took Aug 29, 2012, Los Angeles, CA Green Globe announces certification of the Crown Plaza Hotel.

Figure 4.55 General View of Crown Plaza Hotel (http://www.crowneplazabrussels.be/)

Detail information about Crown Plaza Hotel is given in the table 4.21

Table 4.21 Properties of Crown Plaza Hotel

Architects:	Paul Lukez
Location:	Rue Gineste 3 B-1210 Brussels Belgium
Project Team:	Paul Lukez Architecture
Project Year:	1990
Climate Zone:	Moderate- Marine West Coast

The Crown Plaza Brussels implemented a long term sustainability management system; greenhouse gas emissions from all sources controlled by the hotel are strictly measured. Guests are encouraged to support a carbon-neutral stay and to minimize their environmental footprint. In order to monitor and control the emissions of greenhouse gases, have introduced carbon footprint assessment fort o reduce the impact on the environment.

In the hotel, installed a combined heat and power system, which enables the hotel to generate its own electricity by collecting and releasing heat. With this system in place, energy consumption has been reduced by 46% for electricity, 15% for gas, and 17% for water (www.crownplaza.uk).

In order to improve control the energy consumption, company monitors the consumption of gas and electricity on a daily basis. Use low energy consumption light bulbs, motion sensors in several public and employee areas. In the hotel the technical facilities and equipment with “class A” devices used. Office equipment is energy efficient (Energy Star). Refrigerator and freezer temperatures are monitored on a constant basis. Guest room check-in protocol and policy has minimal use of lights and appliances, Automatic and efficient temperature settings for various areas of the hotel. Heating, air conditioning of ventilation are shut down or set back to low-energy pull temperatures in areas of the hotel that are not in used.

In order to control water savings, carry out daily monitoring of hotel consumption. Strive to adapt the equipment and technical facilities such as flow reducers in bedrooms and public facilities for showers, baths, toilets, taps use. Cleaning of room linen and bathrooms is provided on request, or every three days. Active system is in place to detect and repair leaking toilets, faucets and showerheads in guest rooms.

In order to control waste management, collect the following waste: cardboard, paper, glass, organic waste, batteries, ink cartridges, bulbs, cooking oil, aluminum, plastics and bulky materials. Partnerships have been formalized with approved organizations for the collection and recovery of this waste. Hotel tries to reducing the packaging of our fresh products by promoting reusable or returnable packaging. Single used plastic products have been eliminated as much as possible.

Figure 4.56 Interior view of Crown Plaza Hotel (http://www.crowneplazabrussels.be/)

Figure 4.56 shows the Efficient Indoor Air Quality: Reducing the release of chemicals through the use of: VOC and lead free paints are used in all areas of facility, Non-toxic or environmentally approved eco-labeled cleaning and dishwashing products, papers then final cleaning concentrates and dilution control systems to minimize chemical use.

Finally the Crown Plaza Hotel designed with these performance indicators; energy efficient, water consumption, efficient indoor air quality, and waste management shown as below Table 4.22. The seven hotel design performance indicators of 4 were used in this hotel (Table 4.22).

Table 4.22 Crown Plaza Hotel Environmental Awareness

1. Material Consumption	There is no enough information about the material consumptionthat, accede as a negative design performance indicators
2. Energy Efficiency	Light bulbs, Class A equipment Automatic Settings Low energy heating system
3. Water Consumption	Leaking toilets Flow reducers
4. Efficient Indoor Air Quality	VOC and lead free paints are used in all areas of facility Non toxic products Minimize the chemical use
5. Efficient Daylight Saving	There is no enough information about the Efficient Daylight Saving that, accede as a negative design performance indicators
6. Structural Form	There is no enough information about the structural form that, accede as a negative design performance indicators
7. Waste Management	Reduce packaging Collect the waste and recycled

4.1.12 Example 12: Hilton Garden Inn Hotel

Hilton Garden Inn Hotel constructed in Istanbul, designed by Tece Architect. The hotel has a special position with sloping topography which has a view of Haliç. Hilton Garden Inn Hotel has the first Leed Certificate in Turkey.

Figure 4.57 General view of Hilton Garden Inn (http://hiltongardeninn3.hilton.com/en/index.html?wt.srch=1)

Detail information about Garden Inn Hotel is given in the table 4.23

Table 4.23 Properties of Hilton Garden Inn

Architects:	Tece Architect
Location:	Sütlüce, Istanbul
Project Team:	Tece Architect Company- AHK Construction
Project Year:	2011
Climate Zone:	Moderate-Mediterranean

In the project, 23% of the energy, 40% of water consumption savings. To reduce water consumption, at the landscape areas, the less water-consuming local crops were preferred. In addition to these 67% efficiency savings with using the efficiency irrigation water system (http://www.hilton.com.tr/tr/Hilton-Garden-Inn-Istanbul-Golden-Horn/).

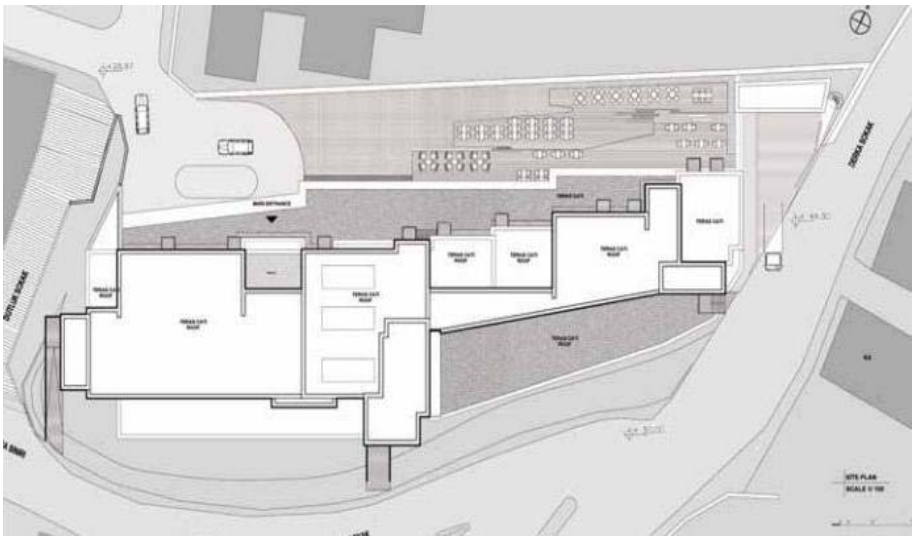


Figure 4.58 Plan of Hilton Garden Inn (http://hiltongardeninn3.hilton.com/en/index.html?wt.srch=1)

Figure 4.59 Facade of Hilton Garden Inn (http://hiltongardeninn3.hilton.com/en/index.html?wt.srch=1)

In the project, 80% of living spaces with natural light and landscape of living spaces 90% was achieved (Figure 4.59). The window played an important role in the design of Hilton Garden Inn Hotel. In order to use the sunlight effectively in the south facade as best as

possible, a large proportion of facade is covered with windows is reduced on east and west facades. Windows are applied on the structure surface in different dimensions in rectangular form (Figure 4.59). In this way, the direct incidence angle of sunlight is filtered and made to float the building as a silhouette.

Automation systems, heat recovery systems and four-pipe fan-coil heating and cooling systems were used for the building heating and cooling system. To stop the heating and cooling losses, high performance window and insulation panels used at the exterior facade. The heating and cooling system designed to be used with the least impact on global warming gases. In addition to these, the lighting system designed with the sensors and dimmer lighting. During the construction, the entire construction waste separated fort o recycled all them.

Solar Reflectivity rates which high-grade material is used to reduced heat island in the areas of the roof. The solar panels at the roof provide the hot water for o months (Figure 4.58). In the building wet areas, using the low-flow toilets, waterless urinals, and high efficiency sensor taps help to save 40 percentage of water consumption.

VOC and lead free paints are used in all areas of facility. In the building, to the ASHRAE standards, the fresh air gained % 30, the high density user areas control with the carbon dioxide sensors to give healthy working environment for employees and customers.

Finally the Hilton Garden Inn Hotel designed with these performance indicators; energy efficient, water consumption, efficient indoor air quality, efficient daylight saving and waste management shown as below Table 4.24. The seven hotel design performance indicators of 5 were used in this hotel (Table 4.24).

Table 4.24 Hilton Garden Inn Hotel Environmental Awareness

1. Material Consumption	There is no enough information about the material consumption that, accede as a negative design performance indicators
2. Energy Efficiency	Four-pipe fan-coil heating and cooling Systems, Solar panels
3. Water Consumption	Solar panels Low-flow toilets, waterless urinals, high efficiency sensor taps
4. Efficient Indoor Air Quality	Carbon dioxide sensors VOC and lead free paints are used in all areas of facility
5. Efficient Daylight Saving	80% of living spaces with natural light
6. Structural Form	There is no enough information about the structural form that, accede as a negative design performance indicators
7. Waste Management	Construction waste separated fort o recycled

4.1.13 Example 13: İber Hotel Sarigerme Park

İber Hotel Sarigerme Park constructed in Sarigerme in Mugla. The hotel has a special position with sloping topography which place in the forest. The hotel starts to application the 14000 Environmental Management System at 2000 of September. Also some more activities for Sustainable hotel design solar collectors and wind energy project workshops in 1992.

Figure 4.60 General view of İber Hotel Sarigerme Park (http://www.iberotel.de/en/hotels-resorts/turkey/the-turkish-aegean/iberotel-sarigerme-park/hotel.html)

Detail information about İber Sarigerme Hotel is given in the table 4.25

Table 4.25 Information of İber Hotel Sarigerme Park

Architects:	Erhan Boysanoğlu
Location:	Ortaca, Sarigerme in Mugla
Project Team:	MESA construction team
Project Area:	140.000sqm
Project Year:	1989
Climate Zone:	Moderate-Mediterranean

Hotel management works a lot about the waste management, especially medical, hazardous and contaminated waste management, waste water management, emission measurements, environmental education, carbon footprint calculations and performing similar work in the fields (Figure 4.61).

In Iber Hotel Sarigerme Park with the amount of waste created certain waste streams. These include: glass, metal, paper, plastic, hazardous waste, organic waste, oil waste and garbage. The basic priority of waste management is to stop the waste and then reduce the waste, finally recycled the waste. At the end of season oil wastes delivered the agreed company. Textile waste after waiting one year considered them all or the others which are used by charity area and some being woven as rugs.

In the hotel, to prevention of noise pollution, vehicle selected cordless and electric. The garden green waste such as dry twigs, grass, leaves become very small pieces with the garbage disposal and carry to treatment system to abolish them all. At the beach area lots of waste collected (Figure 4.61). There are separate waste bins for baby diapers. These wastes are evaluated separately in the hotel. And the cigarette butts are use for the waste management. In the Sarigerme Park Hotel all the waste management works very well with the good separation and informed managers, staff and customers.

Figure 4.61 Beach view of İber Hotel Sarigerme Park (http://www.iberotel.de/en/hotels-resorts/turkey/the-turkish-aegean/iberotel-sarigerme-park/hotel.html)

Finally the İber Sarigerme Hotel designed with these performance indicators; waste management shown as below Table 4.26. The seven hotel design performance indicators of 1 were used in this hotel (Table 4.26).

Table 4.26 Iber Sarigerme Hotel Environmental Awareness

1. Material Consumption	There is no enough information about the Material Consumption that, accede as a negative design performance indicators
2. Energy Efficiency	There is no enough information about the Energy Efficiency that, accede as a negative design performance indicators
3. Water Consumption	There is no enough information about the Water Consumption that, accede as a negative design performance indicators
4. Efficient Indoor Air Quality	There is no enough information about the Efficient Indoor Air Quality that, accede as a negative design performance indicators
5. Efficient Daylight Saving	There is no enough information about the Efficient Daylight Saving that, accede as a negative design performance indicators
6. Structural Form	There is no enough information about the Structural Form that, accede as a negative design performance indicators
7. Waste Management	Reduce, Reuse, Recycled Medical, hazardous and contaminated waste management, waste water management, emission measurements,

4.1.14 Conceptual Frame Work: Haptik Hotel

The first-ever Sustainable Suite Design Competition, a competition to showcase the best hospitality design strategies that boast environmental responsibility while enhancing the guest experience, selected Haptik as the winning suite.

Figure 4.62 Interior of Haptik Hotel (http://www.watg.com/?pageid=b6a0a1d9-1372-6883-1602fb1fdad5ecb5)

Detail information about Haptik Hotel is given in the table 4.27

Table 4.27 Properties of 67 Interior of Haptik Hotel

Architects:	IDEO Architecture
Location:	Las Vegas
Project Team:	WATG team
Project Year:	2010
Climate Zone:	No place only model

The suite is also perfectly sized and includes a good portion of deck relaxation space to enjoy the greenery and take in a little fresh air. Guests have the opportunity to customize lighting and temperature by phone prior to arrival. Upon arrival, the hotel provides Haptik guests with a smart room key that doubles as a bus and train pass, minimizing the need for rental transportation while away (http://www.watg.com/).

Figure 4.63 Plan of Haptik Hotel (http://www.watg.com/?pageid=b6a0a1d9-1372-6883-1602fb1fdad5ecb5)

Haptik features an all-off room switch, lighting that is keyed to passive infrared sensors, a wall in the shower that captures solar heat, a gray water irrigation system that channels water to outdoor gardens and landscaping, FSC certified wood products, zero-VOC paints, LED lighting, and massive wall (Figure 4.63). The room for energy efficiency; Energy-saving LEDs, color, tone and level, in terms of maximum adapting to space, reducing lighting power density. Smart, a programmable thermostat can control the temperature of the room. Solar energy use to reduce the energy. The PV panels at the roof met the electrical needs.

Haptik Hotel for material consumption; the furniture and materials from locally supplied. The furniture and wall paint does not contain chemically and natural (Figure 4.63). The room carpet made from recycled wool felt. The sink of bathroom made from recycled milk boxes (Figure 4.64). The wall covering of shower chooses from natural material. Bed made from recycled steel and foam. Bed linen, towels made of eucalyptus which is a sustainable resource.

Haptik Hotel for water consumption; Low flow shower use 6.6 liters of water use per minutes. Low flow faucet use 3.8 liters use per minutes (Figure 4.64). Faucet sensors are automatically charging. Low toilet with low pressure use 3.8 liter of water. Grey water use for the garden watering.

Figure 4.64 Bathroom of Haptik Hotel (http://www.watg.com/?pageid=b6a0a1d9-1372-6883-1602fb1fdad5ecb5)

5. RESULT: COMPARISON of PROPOSED SUSTAINABLE INDICATORS of SELECTED 13 HOTEL EXAMPLES

The construction sector contributing adversely to environmental issues has provided a new understanding in terms of finding methods to reduce this problem with a tendency to architectural designs in which architectural developments are expressed in sustainable terms. It is clearly observed that this new movement which has developed to reduce environmental issues and to enhance the life satisfaction and comfort of the users by means of healthy structures has also contributed in the improvement of environmental quality.

Planning these sustainable buildings, the basic aim of which is to provide the integration of the structure with nature while enhancing the life comfort of users at maximum

level, in the context of commercial building of hotel shows those to be a new trend in countries across the world within today's designs.

Especially re understanding of design parameters of hotel buildings, which form the foundation of sustainable tourism, by means of sustainable design criteria is clearly indicating this situation. While designed places, hotels, it's possible by using today's design approaches to environmental-friendly and sustainable buildings with sustainable tourism and live a life as a part of the natural environment and to carry these gains to their lives by means of behaviors.

The Pareto principle (also known as the 80–20 rule, the law of the vital few, and the principle of factor sparsely) states that, for many events, roughly 80% of the effects come from 20% of the causes (http://en.wikipedia.org/wiki/Pareto_principle).

Selected hotels in more than 80% compared to the level of awareness that other hotels have been selected as an example. It is observed that sustainable hotel examples designed in countries across the world are planned under these Sustainable Design criteria (table 5.1).

'Table 5.1 Comparison of Sustainable Hotel with Design Criteria' show the selected sustainable hotel examples of sustainable design criteria chart. The numbers show the sustainable design criteria;

1. Material Consumption
2. Energy Efficiency
3. Water Consumption
4. Efficient Indoor Air Quality
5. Efficient Daylight Saving
6. Structural Form
7. Waste Management

Table 5.1. Comparison of Sustainable Hotels with Design Criteria

	1. Material Consumption	2. Energy Efficiency	3 Water Consumption	4 Efficient Indoor Air Quality	5 Efficient Daylight Saving	6 Structural Form	7 Waste Management
Example1	●			●		●	
Example2	●	●	●			●	●
Example3	●	●	●			●	●
Example4		●			●		
Example5		●	●				●
Example6	●	●				●	
Example7	●	●	●	●		●	
Example8	●	●		●	●	●	
Example9	●	●	●	●			
Example10	●					●	
Example11		●	●	●			●
Example12		●	●	●	●		●
Example13							●

Table 5.1 ‘Comparison of Sustainable Hotel with Design Criteria’ shows that five main design criteria are more popular when designing sustainable hotels; material consumption, energy efficiency, water consumption, structural form and waste management. The seven design sustainable criteria of hotel’s number shown in table 5.1. are to explain the coupling of design criteria and selected 13 hotel. Material consumption and energy efficiency are most popular design criteria than continue with water consumption, structural form and waste management, the lowest design criteria is efficient indoor air quality and efficient daylight saving.

Table 5.2 The Numerical Value of Sustainable Design Criteria

1 Material Consumption	2 Energy Efficiency	3 Water Consumption	4 Efficient Indoor Air Quality	5 Efficient Daylight Saving	6 Structural Form	7 Waste Manag.
8 Hotel	10 Hotel	7 Hotel	6 Hotel	3 Hotel	7 Hotel	6 Hotel

‘Table 5.2 The Numerical Value of Sustainable Design Criteria’ shows how many design criteria applied and help to understand which design criteria applied in the selected hotel. Material consumption applied in 8 Hotel, energy efficiency applied in 10 hotels, water consumption applied in 7 hotels, efficient indoor air quality applied in 6 hotels, Efficient daylight saving applied in 3 hotels, structural form applied in 7 hotel and waste management applied in 6 hotels.

Sustainable design criteria of ‘material consumption’ used in 8 selected hotels examples. And considering of natural, renewable, made recycled waste, low embodied energy, non toxic, durable, non-polluting and locally produced qualities explained in the selected hotel examples.

Sustainable design criteria of ‘energy efficiency’ used in 10 selected hotels examples Energy Efficiency with good insulation, green roof, efficient fixtures, heating cooling system, appliances and alternative energy sources used in the selected sustainable hotel buildings.

Sustainable design criteria of ‘water consumption’ used in 7 selected hotels examples. Water consumption done with the saving fixtures; pans, urinals, faucets and rain water systems, gray water systems used in selected examples.

Sustainable design criteria of ‘efficient indoor air quality’ used in 6 selected hotels examples. In these examples natural ventilation used, No off grassing materials such as VOC’s (latex paint) that releases carcinogenic and formaldehyde choose and Carbon dioxide sensors used in the hotels.

Sustainable design criteria of ‘efficient daylight saving’ used in 3 selected hotels examples. Successful daylight design and huge thermal windows with low emission rates that maximize natural light used in the hotels.

Sustainable design criteria of ‘structural form’ used in 6 selected hotels examples. Simple plans consisting of square, rectangular or circular forms are another design criteria preferred in sustainable hotel buildings. It is frequently observed in sustainable hotel examples of countries across the world that basic plans are selected in order to ensure energy saving dependent on heat recovery and distribution, to shorten the production and to accelerate interaction between places.

Sustainable design criteria of ‘waste management used in 7 selected hotels examples. With the three way; reduce, reuse and recycle waste management can applied in the selected hotels.

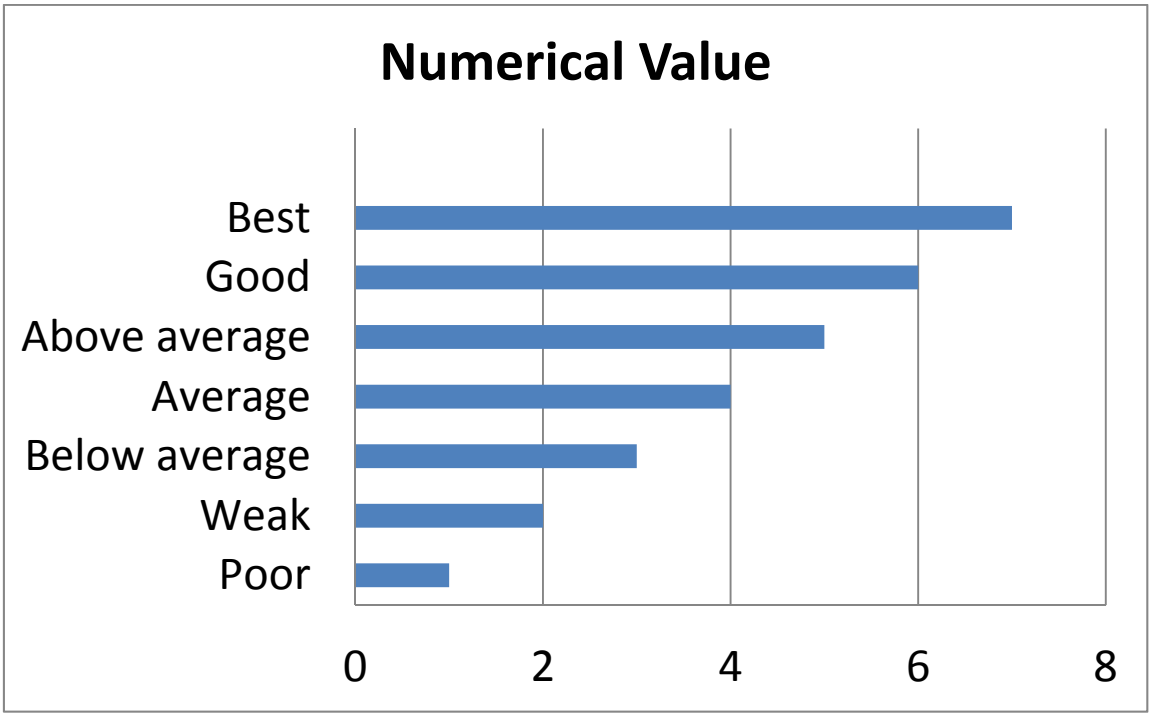
Analyzed the examples of selected hotel with the 7 design criteria of sustainable hotel then with the numerical value, named them; poor, weak, below average, average, above average, good and best (Table 5.3). The comparison of the hotels explained with the table and evaluation described with the help of Pareto Principle.

However, some hotels did give a high priority to the environment. 5 hotels (example 2, example 3, example 7, example 8 and example 12) had rules for minimizing material consumption, energy efficiency, water consumption, structural form and waste management.

And selected sustainable hotel examples 2, 3, 7, 8 and 12 are the most successful hotel building that seen in the Table 5.1. Example 2, 3, 7, 8 and 12 are named as above average (Figure 5.3). 7 sustainable design criteria of 5 applied in these 5 hotel examples that these are named as above average. Example 9 and 11 are named average in the numerical value system. 7 sustainable design criteria of 4 applied in these 2 hotel examples that these are named as an average. Example 1, 5 and 6 are below average in the point system and 7 sustainable design criteria of 3 applied in these 3 hotel examples that these are named as a below average. Example 4 and 10 are named weak in point system and 7 sustainable design criteria of 2 applied in these 2 hotel examples that these are named as a weak. Example 13 is a poor named in the point system because only one sustainable design criteria applied in hotel.

These table shows us the hotel evaluation named, if the sustainable hotel practice 7 of 1 applied, this will named as poor and then this will be goes until 7 of 7 practice called as a best solution (Table 5.3).

Table 5.3 Named of Numerical Value of Sustainable Design Criteria



The final evaluation show that 8 hotel examples are below average and 5 of them above average. The result of the Numerical Value show that below average hotel number is much more then above average. The hotel example effects the result that, we consider the 13 selected hotel which are claimed to be sustainable hotel.

The 3 hotel is from Turkey examples and 10 of the western civilization examples. In western civilization examples 2, 3, 7, 8 and 12 are above average and example 9 and 11 are average and example 1, 5 and 6 below average then example 4 and 10 are weak and that western civilization hotels result shows, expect 4 hotels, all of them are below the average.

In Turkey selected examples 12 is above average, example 11 is average and example 13 is poor. We understand that Turkey hotels are not stable. One of them is the best and the other one is the worst example. All of the selected examples are not applied the seven designed criteria and %80 hotels area unsuccessful to the Pareto Principle. These results show a lack of environmental awareness and concern.

6. CONCLUSION

It is evident from the literature reviewed that the hotel industry all over the world is becoming increasingly environmentally responsible. The main forces exerting pressure on the hotel industry throughout the world are said to be government regulations, changing consumer demands, shifting professional ethics, and initiatives by professional associations, international organizations, and nongovernmental organizations (Carmona-Moreno, Ce´spedes-Lorente, & De Burgos-Jimenez, 2004). The recommendations of this study, include almost all activities that have environmental consequences and ask managers to develop and apply a wide range of protection and conservation programs and practices, such as reducing waste production and resource and energy consumption by controlling and improving lighting, heating, ventilation, air conditioning, and water use, material use, and recycling materials.

Some studies indicate that industries are responsible for environmental problems and economical disparity within and among the countries (Duffy, 2002; Mbaiwa, 2003; Stone & Wall, 2004). Tosun (2001) found that the economic gain from tourism was low, and except a few market owners and restaurants, the community did not benefit significantly. The findings of the present study indicate that sustainable design criteria are needed in order to develop policies and practices that demonstrate the Sustainable Tourism industry is genuinely interested in the protection of natural and human ecology.

A huge number of visitors also put enormous stress on the environment. However, with responsible actions negative impacts on the environment can be minimized. Responsible actions apply to the whole sustainable Tourism industry. Thus, it is necessary to determine the nature of the environmental policies and practices of hotels in order to improve the knowledge of their status and their impacts and to develop and apply environmentally sound solutions.

Within the scope of the thesis, hotels constructed according to sustainable hotel design criteria were examined in terms of hotel buildings and were discussed in the light of examples designed in countries across the world. The hotels selected which claim to be a sustainable hotel.

Generally, the hotels are tending towards with their interior design, concept, well done service and development of the management. Some of them have an idea about sustainability, sustainable tourism and evaluation systems. Today, hotels try to learn and informed about the sustainable tourism and evaluation systems that will help to extend the life of hotel and try to save the money and to create sustainable livable environment.

It was observed that sustainable hotels try to minimize environmental issues caused generally by construction, in order to increase the life satisfaction and happiness of the customer / people. In order to realize this purpose, it was determined that material consumption, energy efficiency, water consumption, efficient indoor air quality, efficiency day light saving, structural form and waste management topics play an important role in the planning process of sustainable hotel buildings.

Considering of natural, renewable, made recycled waste, low embodied energy, non toxic, durable, non-polluting and locally produced qualities materials choose in sustainable hotels. Material consumption of these selections used in the selected hotel examples.

Sustainable building material selection factors as important as building operation. The businesses which protect the long-term use of the presence must use the all necessary resources with the future responsibility. When talk about resources, the first that comes to mind not only the energy and raw materials consumption also being able to financial sources and human. In this context, sustainable business growth, development and with the main foundations of classical general business objectives such as snow, economic, ecological and humanitarian social should be based on factors

It is learned that the most important criteria's are material consumption, energy efficiency, water consumption, structural form and waste management in hotel. The structural form created by the combination of variables such as form, structural height, roof type and slope, building shell. In order to provide energy saving and accelerate the interaction of the buildings, it was clearly observed in hotels samples designed globally that the applications of sustainable hotel building's structural shell an simple plan, in other words in the form of circular, a square or rectangular.

Energy efficiency with good insulation, green roof, efficient fixtures, heating cooling system, appliances and alternative energy sources used in the selected sustainable hotel buildings. By the virtue of green roofs, the ground lost from current ground is re-gained to reduce environmental loss, which at the same time provides a long life of the structure by protecting the materials over the roof cover.

It is determined in some sustainable hotel examples that natural resources reused. Particularly the electrical energy retrieved by means of photovoltaic panels meet the hot water, heating and cooling need of the building. With this system, the responsibility of the building towards the environment is enhanced as electricity costs are reduced.

Efficient use of day light within sustainable hotel structures has provided physiological and psychological comfort for customer and has reduced the consumption of electrical energy required for lighting. The wide- span windows and roof windows are preferred to provide an active use of daylight. In this way, desired daylight is easily carried into places as at the same visual communication is provided with external places for the users. In the sustainable hotel design examples do not consider these design criteria.

Collection and reuse of rain water, providing water saving in landscape watering, selecting facilities that use water more effectively show the importance given to water saving by buildings which provide them to be included among sustainable hotel examples.

The sustainable hotels in Turkey were examined with the sustainable hotels examples in countries across the world. Which are claimed to be sustainable 13 sustainable hotel examples are choosed, 3 of them from Turkey and the 10 of them from the world. In Turkey hotel examples, waste management is the most popular design criteria which are applied in 3 Turkey hotel examples. Then energy efficiency, water consumption and efficient indoor air quality follow as design criteria. Selected 10 world examples are %80 are below the average.

The final evaluation show that 13 hotels of 6 hotel examples are below average and 3 of them above average. The result of the Named of Numerical Value show that below average hotel number is much more then above average. These results show a lack of environmental awareness and concern.

There are some evaluation system for to evaluate the building like; Green Globe, BREAM, LEED, Bep-TR and Green Star certification systems. The most popular certification system is LEED in the world. Also the hotel can use these certification systems for commercial interiors.

The evaluation System like LEED; April 14, 2009 – The Orchard Hotel joins its sister property, the Orchard Garden Hotel in ‘green’ certification, earning LEED-EB certification for an existing building by the USGBC. The Orchard Hotel achieved LEED-EB certification for managing energy use, sustainable cleaning and maintenance practices, employee education, recycling policies, lighting, water and material use as well as incorporating a variety of other sustainable strategies (www.usgbc.org.). LEED-EB was established for market leaders to operate buildings that protect and save precious resources while also making good economic sense. The hotel’s green practices also include chemical-free cleaning products, a 100% tobacco-free environment, recycled paper and soy-based inks, low flow toilets and

showers, CFL, halogen or LED lighting throughout the hotel; low or no-VOC paints, adhesives and sealants; strict recycling and compost programs and more (www.usgbc.org.).

In the thesis there is no evaluation system like LEED certification system, no rating; the aim is only to analyze the seven sustainable design criteria which are suitable or not. In Turkey and world selected examples show that, design criteria of hotel building is not subject to specific standards, lack of laws and regulation on hotel building construction and operations, as well as lack of architects and interior architects specializing in professional hotel building design has led hotel building to appear in a uniform design. By being aware of this situation as soon as possible, it is necessary that the sustainable tourism condition, in which they will gain development of sustainable design hotel, match the design standards of the world. This report is just a preliminary evaluation of the results.

There are 3 different stages to be a sustainable hotel; design phase, construction phases, operational phases. If hotel try to be a sustainable hotel, these 3 stages are important for to be a sustainable hotel. These 7 design criteria must be check in these 3 stages of the buildings.

In the future and present, hotels with a green environmental sensitivity, to be preferred to both investors responsibility of environment will be very popular. Hotel investors and operators target is to reduce water consumption and energy cost that sustainable hotel will be expansion. In the future Turkey as a country which is party to the Kyoto Protocol must be reducing emissions of national CO2 and SEG. To design sustainable hotel, contribute this goal of Tourism industry. About this subject, government and Ministry of Tourism can work more effectively for investor’s conscious, development of the Turkey is tourism and this will help to minimum damage to the environments. Further, more detailed evaluations will be performed and published in the future.

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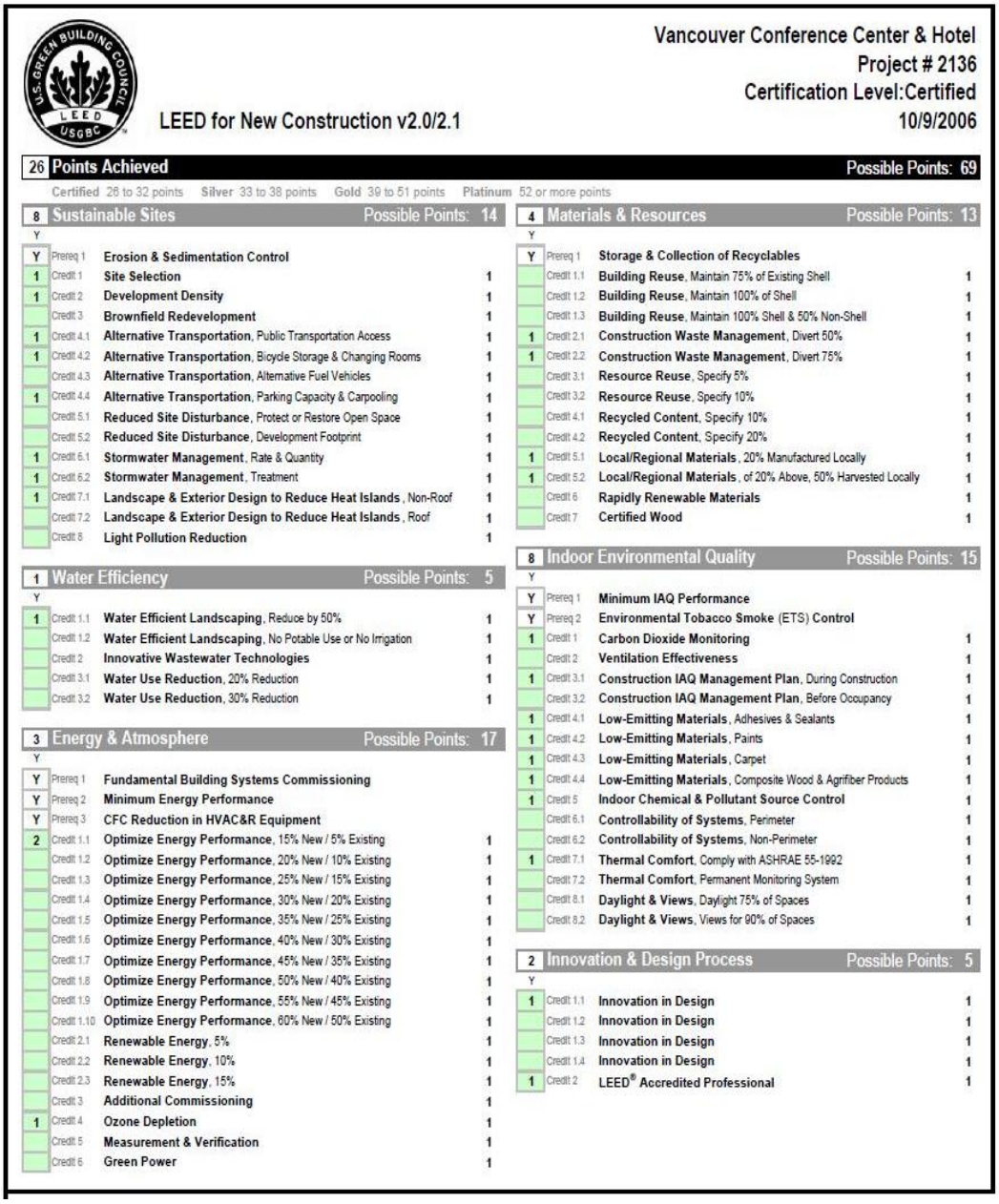
APPENDICES

Appendix 1 LEED for New Construction v2.0/2.1



Vancouver Conference Center & Hotel
Project # 2136
Certification Level:Certified
10/9/2006

LEED for New Construction v2.0/2.1

26 Points Achieved — Possible Points: 69

Certified 26 to 32 points Silver 33 to 38 points Gold 39 to 51 points Platinum 52 or more points

8 Sustainable Sites — Possible Points: 14

Y			
Y	Prereq 1	**Erosion & Sedimentation Control**	
1	Credit 1	**Site Selection**	1
1	Credit 2	**Development Density**	1
	Credit 3	**Brownfield Redevelopment**	1
1	Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
1	Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
	Credit 4.3	**Alternative Transportation**, Alternative Fuel Vehicles	1
1	Credit 4.4	**Alternative Transportation**, Parking Capacity & Carpooling	1
	Credit 5.1	**Reduced Site Disturbance**, Protect or Restore Open Space	1
	Credit 5.2	**Reduced Site Disturbance**, Development Footprint	1
1	Credit 6.1	**Stormwater Management**, Rate & Quantity	1
1	Credit 6.2	**Stormwater Management**, Treatment	1
1	Credit 7.1	**Landscape & Exterior Design to Reduce Heat Islands**, Non-Roof	1
	Credit 7.2	**Landscape & Exterior Design to Reduce Heat Islands**, Roof	1
	Credit 8	**Light Pollution Reduction**	1

1 Water Efficiency — Possible Points: 5

Y			
1	Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
	Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
	Credit 2	**Innovative Wastewater Technologies**	1
	Credit 3.1	**Water Use Reduction**, 20% Reduction	1
	Credit 3.2	**Water Use Reduction**, 30% Reduction	1

3 Energy & Atmosphere — Possible Points: 17

Y			
Y	Prereq 1	**Fundamental Building Systems Commissioning**	
Y	Prereq 2	**Minimum Energy Performance**	
Y	Prereq 3	**CFC Reduction in HVAC&R Equipment**	
2	Credit 1.1	**Optimize Energy Performance**, 15% New / 5% Existing	1
	Credit 1.2	**Optimize Energy Performance**, 20% New / 10% Existing	1
	Credit 1.3	**Optimize Energy Performance**, 25% New / 15% Existing	1
	Credit 1.4	**Optimize Energy Performance**, 30% New / 20% Existing	1
	Credit 1.5	**Optimize Energy Performance**, 35% New / 25% Existing	1
	Credit 1.6	**Optimize Energy Performance**, 40% New / 30% Existing	1
	Credit 1.7	**Optimize Energy Performance**, 45% New / 35% Existing	1
	Credit 1.8	**Optimize Energy Performance**, 50% New / 40% Existing	1
	Credit 1.9	**Optimize Energy Performance**, 55% New / 45% Existing	1
	Credit 1.10	**Optimize Energy Performance**, 60% New / 50% Existing	1
	Credit 2.1	**Renewable Energy**, 5%	1
	Credit 2.2	**Renewable Energy**, 10%	1
	Credit 2.3	**Renewable Energy**, 15%	1
	Credit 3	**Additional Commissioning**	1
1	Credit 4	**Ozone Depletion**	1
	Credit 5	**Measurement & Verification**	1
	Credit 6	**Green Power**	1

4 Materials & Resources — Possible Points: 13

Y			
Y	Prereq 1	**Storage & Collection of Recyclables**	
	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Shell	1
	Credit 1.2	**Building Reuse**, Maintain 100% of Shell	1
	Credit 1.3	**Building Reuse**, Maintain 100% Shell & 50% Non-Shell	1
1	Credit 2.1	**Construction Waste Management**, Divert 50%	1
1	Credit 2.2	**Construction Waste Management**, Divert 75%	1
	Credit 3.1	**Resource Reuse**, Specify 5%	1
	Credit 3.2	**Resource Reuse**, Specify 10%	1
	Credit 4.1	**Recycled Content**, Specify 10%	1
	Credit 4.2	**Recycled Content**, Specify 20%	1
1	Credit 5.1	**Local/Regional Materials**, 20% Manufactured Locally	1
1	Credit 5.2	**Local/Regional Materials**, of 20% Above, 50% Harvested Locally	1
	Credit 6	**Rapidly Renewable Materials**	1
	Credit 7	**Certified Wood**	1

8 Indoor Environmental Quality — Possible Points: 15

Y			
Y	Prereq 1	**Minimum IAQ Performance**	
Y	Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	
1	Credit 1	**Carbon Dioxide Monitoring**	1
	Credit 2	**Ventilation Effectiveness**	1
1	Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
	Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
1	Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
1	Credit 4.2	**Low-Emitting Materials**, Paints	1
1	Credit 4.3	**Low-Emitting Materials**, Carpet	1
1	Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
1	Credit 5	**Indoor Chemical & Pollutant Source Control**	1
	Credit 6.1	**Controllability of Systems**, Perimeter	1
	Credit 6.2	**Controllability of Systems**, Non-Perimeter	1
1	Credit 7.1	**Thermal Comfort**, Comply with ASHRAE 55-1992	1
	Credit 7.2	**Thermal Comfort**, Permanent Monitoring System	1
	Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
	Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

2 Innovation & Design Process — Possible Points: 5

Y			
1	Credit 1.1	**Innovation in Design**	1
	Credit 1.2	**Innovation in Design**	1
	Credit 1.3	**Innovation in Design**	1
	Credit 1.4	**Innovation in Design**	1
1	Credit 2	**LEED® Accredited Professional**	1

Appendix 2 LEED for new Construction

HOTEL: POSADA DE MIKE RAPU (10024791)

EASTER ISLAND, CL

Certification Level: Silver

Certification Date: 2009.02.10

LEED for New Construction

36	Points Achieved	Possible Points: 69

Certified 26 to 32 points Silver 33 to 36 points Gold 39 to 51 points Platinum 52 or more points

11	Sustainable Sites	Possible Points: 14	
Y	Prereq 1	Construction Activity Pollution Prevention	
1	Credit 1	Site Selection	1
	Credit 2	Development Density & Community Connectivity	1
	Credit 3	Brownfield Redevelopment	1
1	Credit 4.1	Alternative Transportation, Public Transportation Access	1
1	Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms	1
1	Credit 4.3	Alternative Transportation, Low-Emitting & Fuel-Efficient Vehicles	1
1	Credit 4.4	Alternative Transportation, Parking Capacity	1
1	Credit 5.1	Site Development, Protect or Restore Habitat	1
1	Credit 5.2	Site Development, Maximize Open Space	1
1	Credit 6.1	Stormwater Design, Quantity Control	1
1	Credit 6.2	Stormwater Design, Quality Control	1
1	Credit 7.1	Heat Island Effect, Non-Roof	1
	Credit 7.2	Heat Island Effect, Roof	1
1	Credit 8	Light Pollution Reduction	1

5	Water Efficiency	Possible Points: 5	
1	Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1
1	Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1
1	Credit 2	Innovative Wastewater Technologies	1
1	Credit 3.1	Water Use Reduction, 20% Reduction	1
1	Credit 3.2	Water Use Reduction, 30% Reduction	1

8	Energy & Atmosphere	Possible Points: 17	
Y	Prereq 1	Fundamental Commissioning of the Building Energy Systems	
Y	Prereq 2	Minimum Energy Performance	
Y	Prereq 3	Fundamental Refrigerant Management	1
1	Credit 1.1	Optimize Energy Performance, 10.5% New / 3.5% Existing	1
1	Credit 1.2	Optimize Energy Performance, 14% New / 7% Existing	1
1	Credit 1.3	Optimize Energy Performance, 17.5% New / 10.5% Existing	1
1	Credit 1.4	Optimize Energy Performance, 21% New / 14% Existing	1
	Credit 1.5	Optimize Energy Performance, 24.5% New / 17.5% Existing	1
	Credit 1.6	Optimize Energy Performance, 28% New / 21% Existing	1
	Credit 1.7	Optimize Energy Performance, 31.5% New / 24.5% Existing	1
	Credit 1.8	Optimize Energy Performance, 35% New / 28% Existing	1
	Credit 1.9	Optimize Energy Performance, 38.5% New / 31.5% Existing	1
	Credit 1.10	Optimize Energy Performance, 42% New / 35% Existing	1
1	Credit 2.1	Renewable Energy, 2.5%	1
1	Credit 2.2	Renewable Energy, 7.5%	1
	Credit 2.3	Renewable Energy, 12.5%	1
1	Credit 3	Enhanced Commissioning	1
1	Credit 4	Enhanced Refrigerant Management	1
	Credit 5	Measurement & Verification	1
	Credit 6	Green Power	1

1	Materials & Resources	Possible Points: 13	
Y	Prereq 1	Storage & Collection of Recyclables	
	Credit 1.1	Building Reuse, Maintain 75% of Existing Walls, Floors, & Roof	1
	Credit 1.2	Building Reuse, Maintain 95% of Existing Walls, Floors, & Roof	1
	Credit 1.3	Building Reuse, Maintain 50% of Interior Non-Structural Elements	1
	Credit 2.1	Construction Waste Management, Divert 50% from Disposal	1
	Credit 2.2	Construction Waste Management, Divert 75% from Disposal	1
	Credit 3.1	Materials Reuse, 5%	1
	Credit 3.2	Materials Reuse, 10%	1
	Credit 4.1a	Recycled Content, 10% (Post-consumer + 1/2 pre-consumer)	1
	Credit 4.1b	Recycled Content, 20% (Post-consumer + 1/2 pre-consumer)	1
1	Credit 5.1	Regional Materials, 10% Extracted, Processed, and Manufactured Regionally	1
	Credit 5.2	Regional Materials, 20% Extracted, Processed, and Manufactured Regionally	1
	Credit 6	Rapidly Renewable Materials	1
	Credit 7	Certified Wood	1

7	Indoor Environmental Quality	Possible Points: 15	
Y	Prereq 1	Minimum IAQ Performance	
Y	Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1	Credit 1	Outdoor Air Delivery Monitoring	1
	Credit 2	Increased Ventilation	1
	Credit 3.1	Construction IAQ Management Plan, During Construction	1
	Credit 3.2	Construction IAQ Management Plan, Before Occupancy	1
	Credit 4.1	Low-Emitting Materials, Adhesives & Sealants	1
	Credit 4.2	Low-Emitting Materials, Paints & Coatings	1
	Credit 4.3	Low-Emitting Materials, Carpet Systems	1
	Credit 4.4	Low-Emitting Materials, Composite Wood & Agrifiber Products	1
	Credit 5	Indoor Chemical & Pollutant Source Control	1
1	Credit 6.1	Controllability of Systems, Lighting	1
1	Credit 6.2	Controllability of Systems, Thermal Comfort	1
1	Credit 7.1	Thermal Comfort, Design	1
1	Credit 7.2	Thermal Comfort, Verification	1
1	Credit 8.1	Daylight & Views, Daylight 75% of Spaces	1
1	Credit 8.2	Daylight & Views, Views for 90% of Spaces	1

4	Innovation & Design Process	Possible Points: 5	
1	Credit 1.1	Innovation in Design	1
	Credit 1.2	Innovation in Design	1
1	Credit 1.3	Innovation in Design	1
1	Credit 1.4	Innovation in Design	1
1	Credit 2	LEED® Accredited Professional	1

Appendix 3 Bep-tr Enerji kimlik belgesi

ENERJİ KİMLİK BELGESİ

Binanın

Tipi	:	Ofis
İnşaat Yılı	:	
Kapalı Kullanma Alanı	:	635,45
Ada, Parseli	:	1823/20,M.II/1
Adresi	:	Vehbibey Mahallesi, Atatürk Cad., NO:112 Ayvalık, BALIKESİR Ayvalık/B/

Bina Sahibinin

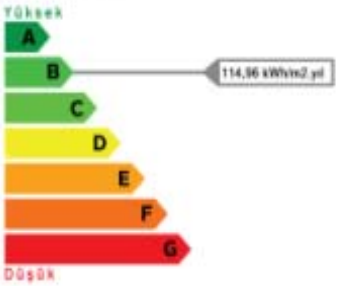
Adı Soyadı	:	Mustafa Köklen Sabuncugil, Bülent Cömert
Adresi	:	Vehbibey Mahallesi, Atatürk Cad., NO:112 Ayvalık, BALIKESİR

Müşterek Tesisatların Sahibi (gerekliyse)

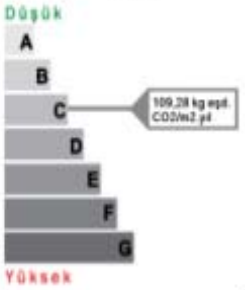
Adı Soyadı	:	Mustafa Köklen Sabuncugil, Bülent Cömert
Adresi	:	Vehbibey Mahallesi, Atatürk Cad., NO:112 Ayvalık, BALIKESİR

Binanın Resmi

Enerji Performansı



Sera Gazı Emisyonu



Yenilenebilir Enerji Kullanım Oranı

%0,00

Enerji Kullanım Alanı	Kullanılan Sistem	Yıllık Enerji Tüketimleri			Sınıfı
		Net (kWh/yıl)	Birincil (kWh/yıl)	Kullanım Alanı Başına (kWh/m2.yıl)	
TOPLAM		73.050,17	135.152,38	114,96	A B C D E F G
ISITMA	ıtma Sistemi, Isıtma Sistem	18.042,22	18.042,22	28,39	A B C D E F G
SIHHİ SICAK SU	Sıcak Su Sistemi	9.344,56	9.344,56	14,71	A B C D E F G
SOĞUTMA	ıtma Sistemi, Soğutma Sist	25.757,16	60.786,90	40,53	A B C D E F G
HAVALANDIRMA		0,00	0,00	0,00	
AYDINLATMA		19.906,23	46.978,70	31,33	A B C D E F G

Açıklamalar

Appendix 3 Enerji kimlik belge önerisi

ÖNERİLER SAYFASI

Bina Sahibinin

Adı Soyadı : Mustafa Köklen Sabuncugil, Bülent Cömert

Belgenin

Numarası : 5342C1C87784A

Açıklamalar

Aşağıda belirtilen verimlilik arttırıcı projelerin uygulanması durumunda binanın Enerji Performans sınıfı yükselecek ve Sera Gazı Emisyonu azalacaktır.

1. Yalıtım;
a. Bina duvarlarında yalıtım yapılması,
b. Mevcut mekanik sistemlerin, özellikle vana gövdelerinde yalıtım yapılması,
c. Pencerelerin yenilenerek, kontrolsüz hava sızdırmasının ve ısı iletiminin azaltılması,

2. Aydınlatma;
a. Manyetik balastların, Elektronik balastlarla değiştirilmesi,
b. Belli bölgelerde zamana, harekete ve gün ışığına bağlı kontrol yapılması,

3. Otomatik Kontrol;
a. Radyatörlerde termostatik vana uygulaması yapılması,
b. Mekanik sistemlerde Otomasyon ve genel hatlarda Enerji İzleme sisteminin kurulması,

4. Elektrik Motorları;
a. Verimsiz motorların sınıflarının yükseltilmesi,
b. Öngörülen motorlarda değişken hız sürücü uygulanması,

5. Yenilenebilir Enerji Sistemleri;
a. Sıcak su üretiminin güneşten desteklenmesi,

6. Isı geri kazanımı;
a. Atık ısıdan sıcak su üretiminin desteklenmesi,

7. Enerji Yönetimi;
a. Sürekli takip edilecek bir Enerji Yönetim Sisteminin tesisi,
b. Bir Enerji Yöneticisinin atanması,
c. Personelin enerji verimliliği ile ilgili konularda bilgilendirilmesi,
d. Teknik ve ilgili idari personelin mevzuat ve enerji verimliliği konularında eğitilmesi.

Ayrıntılar için Detaylı Etüt raporuna bakınız.