Leed green building rating system essay sample

ABSTRACT

This paper entitled Developing Resource-Efficient and Environment-Friendly Structures Through The LEED Green Building Rating System is an abridged study of the standards of the Green Building Rating System™ developed by the Leadership in Energy and Environmental Design (LEED), a third-party initiative program for " green building" certification recently granted to new construction projects adhering to its standards. This paper is not intended as a comprehensive technical resource on USGBC-LEED certification. Rather, this paper contains clear-cut discussions of USGBC-LEED's fundamental principles and its application, an introductory study which may be useful as a non-technical guide to students and researchers on the subject.

This paper is divided into two (2) main parts, namely: 1) Review of standards set by the LEED Rating Systems presented in layman's terms; and 2) Practical examples of the application of the said standards as employed on the certification of two (2) buildings located in the United States.

For a complete methodological study of the current USGBC-LEED standards, please refer to the official site of the LEED Rating Systems at http://www. usgbc. org.

INTRODUCTION

The issue of man's destructive effect to his environment has been addressed for so many times that the topic has become typical enough to be passed by with a cold shoulder. Despite of the global outrage brought about by the rapid devastation of man's natural environment the quality of the air we

breathe and the water we drink is continually degrading, the standard of urban living is not getting any better and future of human's survival is getting dimmer instead of greener. In any case, several government agencies around the world including non-government organizations have carried out their own initiatives to slow down, if not stop, this detrimental process of self destruction. Often, environmental issues are focused on pollutants caused by motorized transports and household by-products. Until recently, the construction industry gained enough attention to be considered as a major contributor to environmental abuse.

Roodman and Lenssen, on their paper A Building Revolution: How Ecology and Health Concerns Are Transforming Construction revealed how seriously construction business affects our ecosystem and its human inhabitants. The paper states that more than half of wood cut from the forest for non-fuel use goes to the construction industry. Almost half of the world's resources and power consumption is used for sustenance of the building's operation and one third all buildings in the world are considered unsafe for human habitation. Therefore, the need for sustainable development and maintenance of buildings that will ensure the safety of both the environment and human beings is of great necessity.

LEED Green Building Rating System addresses this problem by setting standards for design, construction and maintainance of " green buildings" which coverage of certification spans small houses, offices up to industrial plants and skyscrapers. Although totally voluntary, major businesses around the world have chosen to adhere to its standards in place of LEED certification of compliance.

The LEED Green Building Rating System

LEED stands for “ Leadership in Energy and Environmental Design”, the Green Building Rating System created by the U. S. Green Building Council (USGBC) in response to the need for environmentally sustainable building construction. Formed in 1998, it has issued individual certifications to some 14, 000 projects in 50 states in the U. S. and 30 countries around the world. LEED reviews and approves (or disapproves) applications of developers for a certain building project if it complies with the LEED standard as a “ green building”. To be a green building means that it must adhere with the common standards of measurements set by LEED in terms of design and construction, practice integrated and whole-building design, must recognize the qualities of being an environmental leader in building industry, inspire competition in being “ green” within the industry, promote understanding among its consumers on the benefit of the developing green buildings and contribute with these changes in the building industry.

Buildings are certified based on transparent and very simple criteria. Buildings are rated based on 69 possible points and are awarded with four (4) certification levels based on the total points it garnered: Certified (26-32 pts.), Silver (33-38 pts.), Gold (39-51 pts.) and Platinum (52-69 pts.)

Prominent Examples of LEED Certified Buildings

7 World Trade Center.

After its destruction in September 11, 2001, original building collapsed together with the World Trade Center (Twin Tower). After its reconstruction

in 2006 it obtained the Gold LEED Core and Shell category certification making it the very first green office building in New York. Located in World Trade Center site in lower Manhattan, 7 World Trade Center is a 741 feet-tall building with 52 storeys and a trapezoidal footprint in red exterior masonry. Silverstein Properties developed both the Twin Towers and the 7 world Trade Center which positions the building as one of the most well constructed edifices in the area. Collaboration with Chrisner Group, through Scott Chrisner, ensured that construction and design of the said building will ensure LEED Gold certification.

7 world Trade Center is being branded as “ The World’s Safest Skyscraper”. Elevators are designed to be fireproof with features that ensure fewer stops and less travel time for elevator passengers and access cards that identify the destination floor of tenants and employees, saving both waiting time for passengers and energy consumption for the building. The building was constructed with 2 feet thick reinforced-concrete making it fireproof and ensuring strength of the structure. Almost a third part of industrial steel used in constructing the building is made from recycled steel. First level of the tower which housed an electrical substation is enclosed in curtain wall with stainless steel louvers which provide outside air to ventilate the machinery in a natural way. Insulation materials used were derived from sunflower seeds husk and trees that are easily grown. Heavy equipments used in constructing the building were strictly required to use ultra-low-sulfur derivatives to reduce carbon monoxide emissions to the air. Low volatile paints with organic compounds to avoid toxic compounds to be released and mixed with air.

Cooling mechanism of the building’s interior as well as for plumbing rely on rainwater collected from the top of the building which then flows to the park to irrigate the grass and plants in the area. More open spaces mean increased visibility. In addition, recent glass technology provides more natural light to pass inside the building reducing the need to use electrically-powered lightning during the day.

Hearst Tower (New York City) .

At 300 West 57th Street, 959 8th Avenue stands Hearst Tower of New York City, the headquarters for the publication company, Hearst Corp. The building was completed after eighty years and was occupied in May of 2006. It stands 597 feet, a 46 stories tall skyscraper occupying 80, 000 sq. m of office space. It is the first green building ever completed in New York City.

Several environmental features of the Hearst Tower is similar with the 7 World Trade Center as they both hold a LEED Gold Certification from USGBC. The building uses Low-emittance (Low-E) glass coating reduces heat transfer maintaining constant room temperature inside the building and reducing U-factor by preventing heat flow. Hearst Tower also uses the same technology of accumulating rainwater from the tower’s roof for irrigating inside and outside the office’s plants. The water is also used to “ rehydrate” the building’s indoor air which water content is lost due to evaporation. This also helps AC units to consume less energy by making the air a lot cooler than usual because of the heat absorbed by the water in the air. Pressurized water is also driven from the top floor to the water sculpture on the main lobby below.

Unnecessary use of artificial lights is reduced by controlling its illumination depending on the available natural light in a room. Similar principle is used in turning lights or computers on or monitored by motion sensors thereby turning on lights and electronics only when somebody is present in a room or office. High-efficiency HVAC systems and Energy Star compliant appliances are used to further conserve energy. Inside ventilation is provided by pumping air accumulated from the outside instead of artificially cooling the air greatly reducing air conditioning cost almost three quarters of the year.

Another unique environmental feature of the building is its limestone faved atrium making the floor heat conductive. This helps equalize the temperature differences of the floor to the surrounding air which is especially useful during cold seasons. In addition, tube pipes made from Polyethylene are installed under the floor and is filled with cold water during the summer and warm water during the winter.

The Hearst Tower’s has so many environment-friendly and energy-efficient features that it even managed to surpass the industry standards by 25% thereby earning it the LEED Gold Core and Shell certification.

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