

Role of Industries in India towards Sustainable Growth

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Abstract:-- India is amongst the few countries which stepped towards greener environment. India has 2380 registered green buildings and have more than 60 LEED platinum rated building and SUZLON ONE EARTH is one amongst them. The company is one of the world's leading in the sector of wind energy. As we say a "problem well defined is half solved", we are facing the problem of depletion of our conventional resources and need to have a control over it. Suzlon believes in the policy of "powering a greener tomorrow" and aims for responsible growth.

The paper presents the solutions that has been adopted by the company for sustainability such as recycled materials used in construction, reduction in consumption of water and energy, and use of renewable energy. Thus, they provide a role model for the corporates and industries for working towards development of greener environment by promoting and maximize energy saving for the future generation without compromising their comfort level.

Keywords: sustainability, renewable energy, architecture, rating

I. INTRODUCTION

Sustainable growth means growth of the company or industries without causing harm to the environment and also not to their economy or economic growth. Sustainability is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Environmental sustainability is the need of the hour as we are witnessing extreme changes in the weather change, global warming and environment degradation. As the population increased it increased the number of industries which did not consider the environment degradation. But now the case is different the resources are depleting very fast and even there is lot of environment issues there is very necessary for the industries to take a step towards sustainability for future generation needs.

Suzlon is the leading multinational company providing end to end solutions in wind energy sector. Suzlon is world's biggest producers of "clean" wind energy.. It is situated in Hadspar, Pune, Maharashtra. It has been ranked 5th largest wind turbine supplier in the world today by installed capacity. They wanted to build a headquarter building that reflected their global and "sustainable" status. Its architecture involves use of non-toxic and recyclable materials. They have taken care of all the principles of sustainability from very initial stage such as site selection. Other factors are design engineering,

construction material and operation. In keeping with the theme, the corporate buildings at One Earth have been named after the key elements of nature as Aqua, Tree, Sky and Sun. Their motive is to provide healthy and productive environment to the workers, employees in terms of good indoor quality and daylight usage.

II. SUSTAINABLE ARCHITECTURE OF SUZLON

Architecture has played very important role for making of sustainable building Suzlon. Architecture of this building is designed by Prof. Christopher Benninger, I.M. Peis's bank of China in Hong Kong, Norman Foster's design. They have looked over the need of the hour to design buildings which reflect their values, concerns for environment and the comfort of new age. They had to design building taking into consideration climate and energy efficiency. The main aim of Suzlon was to develop a place which was matter of civic responsibilities, the objective was to develop a good indoor and outdoor place for the work. They accepted the idea of land scraper instead of sky scraper means all the building in Suzlon are only G+ 2 structures and only one is G+3. The inspiration of Suzlon's architect is Indian historical structures, ex-fatehpursikri and the Meenakshi temple in Madurai. They identified the need of the hour of architecture that it should borrow elements of critical rationalism, with hangs, louvers, pergolas, courtyards, water and natural light permeation and constructed their building using these elements. The design process was started with the construction of central gathering space known as

brahmasthan, taking theme of sky as the ceiling. This gave unique feeling to the campus and thus was named as 'secret internal garden'. This garden could be seen from anywhere. There is a large water body lake in the central court which helps in purifying air and air quality and for evaporative cooling. There is a wind lounge having a look of very traditional Indian chowk, with the traditional 'kund' like steps leading into the water pool shaded by photovoltaic panels allowing filtered light in.

The architecture is such that the inhabitants enjoys daylight and external views so that they can take enjoyment of the seasons going, weather conditions and can connect to the time of the day. All the external landscape having various species has been bought indoors along the perimeter of the building to have fresh air, nature's look, and natural light. The buildings are lower thinner and long in shapes which increases the ratio of fenestration to volume, enhancing natural light and ventilation in hot and dry climatic conditions. 65% of energy is saved due proper planning and use of LED outdoor light systems in comparison to conventional scheme.

III. MANAGEMENT TECHNIQUES

Suzlon have used some techniques for reduction in use of water, recycling water, waste management, and energy saving. All these management practices have been described in detail.

3.1 Water Management

In Suzlon 100% water is recycled by sewage treatment plant. This recycled water is used for landscaping, air conditioning and flushing. They have a very good landscaping which has naturalized and adapted plant species. They have innovative type of rain water harvesting system which has pebbles to drain the excess water. Use of flow faucets, touchless urinals with sensors and dual flush and water pressure compensated pipelines have been made which saves more than 40% of potable water. These are known as low flow fixtures. According to actual data survey for the year 2010-11 it says that 0% of water is disposed and 56% is recycled. Overall the company has '60% water saving'.

3.2 Waste Management

Suzlon adopted implementation of zero waste practices. Zero waste means designing and managing process in such a way that minimum toxic waste is produced which has to be buried or burn but instead of that

using sustainable materials and conserve resources. The biodegradable waste is processed in organic waste converter which is installed on the site. The non-degradable is processed through approved and certified recycling vendors. The organic waste which is produced is used as manure for the landscaping. The amount of organic waste produced in the campus is nearly about 19000kg. They have greenhouse keeping practices with appropriate system and certified products. Green housekeeping program is a green cleaning service designed for safety and health of their customers, their family and pets their staff and for protection of environment. They recycle about 85% of waste which is generated.

3.3 Energy Saving

Suzlon uses 100% renewable energy in its campus with both on- and off site renewable. They have installed on-site 18 hybrid types wind turbines and solar panels and photovoltaic cells which contribute to 7% of energy which is required. The remaining 93% is from offsite wind turbines. The building has incorporated 154.83KW renewable energy. Due to Suzlon's wind installations globally it has helped in reducing 20.50 million tons of CO₂ annually. They have wind installations in across 17 countries which generates 15,000 MW energy. They have installed heating system of capacity 10,000 litres per day which saves 1.4 LKWH electricity annually.

The communication server and the outdoor lightning run completely on renewable energy. They have taken adequate care of principals of planning by which they are able to achieve day light and glare control. The orientations of the blocks are such that the main part of the building faces North, South, North West and South east. Glazing on the first two floors has been shaded from direct solar radiation by means of louvers. They have installed high efficiency mechanical systems integrated with the efficient building envelope to ensure that the energy consumption is reduced significantly. They installed louvers in such a way that it does not become hindrance for view and provide efficient screening of light.

This building is "NET ZERO ENERGY FOR LIGHTNING" which means that all the energy which is required is met through on-site generation. The HVAC scheme is designed such that it combines various energy efficient components like pre cooling of fresh air, heat recovery mechanism which reduces overall energy consumption. As the Suzlon has innovative ways to reduce energy consumption they have managed to reduce consumption by 47.2% below the benchmarked energy by consumption by GRIHA.

3.4 Construction Materials

Suzlon have used 80% regional materials. Regional materials mean the materials which are available within 800 km radius of circle. So the cost of transportation is reduced. Materials with high recycle content have been used in construction, which measures to about 13.26% of the total value of materials in the project. Out of total material 10% of material is rapidly renewable material, ex-bamboo flooring and furniture used. The use of bamboo flooring also reduces energy consumption. They have reduced the quantity of concrete by using post tension slab. The reduction is about 37%. There is also reduction in structural steel due use of post tension slab which is nearly about 50%. This means post tension slab serves two purposes. For better insulation they have used Siporex fly ash blocks. They have 70% such type of material which reduces carbon foot print in their interior. They have used interlocking paver blocks which insures that the water percolation, control over storm water, runoff of water and also helps in maintaining ground water table.

IV. SUSTAINABILITY PRACTICES

Suzlon have installed CO₂ sensors in densely occupied places and parking lots. This sensors allow the flow fresh air as the CO₂ above the certified limit. HVAC System is developed in such a way that insures more 30% ventilation than mentioned in ASHARE standards. The whole campus is restricted for smoking for the health benefits of the habitants and environmental quality improvement. The products used such as composite wood products, sealants adhesives are low volatile emitting products. At Suzlon air conditioning and cooling system are free from Chloro Flouro carbons (CFCs), Hydro Chloro Flouro carbons and Halons. Halons are the compounds which causes depletion of ozone layer. Thus installation of such machines helps in zero carbon foot print and even Zero Ozone Depleting Potential. This air condition even reduce the overall power consumption. They have installed Jet fans installed at basements of inflow of fresh air by pushing out stale air and it also reduces energy consumption by 50%. There are day light sensors in work areas for minimum use of artificial lightning. This sensors lightning in unoccupied workstations which save about 20% of energy costs. During site construction dust screens were provided around the site to prevent air pollution. To avoid soil erosion proper care was taken. Utility corridors were designed along roads and pathways on site. For reduction of air pollution they have encouraged carpooling and for that they have reserved 20 % of total parking area for carpool users. They have also parking spaces for

electronic vehicles with charging point because they want to promote use of e – vehicle.

V. AWARDS WON BY SUZLON –ONE EARTH

5 star rating by GRIHA with 97 points. Platinum rated building by LEED with 57 points. AESA (architects, engineers, surveyors association) award. Best corporate building award. Best commercial project of the year 2010. Best interior awards to space matrix in association with Tao architecture. Environment friendly project of the year 2010 –commercial property award.

VI. CONCLUSION

The present paper signifies the effort made by Suzlon to create an environmentally responsible corporate home by managing the crucial issues of waste management and reduction of CO₂. They emphasized on health of the workers and providing productive environment thereby making it an inspiring place for work. In this paper, the techniques and methods utilized by Suzlon are described in detail. It is observed that Suzlon was successful to reduce energy consumption by 42.7%, water consumption by 60%, and waste is recycled by 85% and getting maximum use of non-conventional resources and sunlight available. In addition to this, the historical architectural approach was used for design and implemented it in their construction. They have identified the need of the hour and proved to be role model for other corporate offices. For the success of sustainability engineering all we need is to work together as it is said “Coming together is work, keeping together is progress, and working together is success”.

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