

# Sustainability in Modern Corporate Offices Sustainable Of Future

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**Abstract:- Research also cater the various parameters on the basis sustainability in modern corporate offices defined to be more reliable in construction and a better option for overall building construction**

In this research paper, we are going to evaluate how to achieve sustainability in modern corporate offices and its need to be taken up. The whole study in this paper revolved around the sustainability techniques and its application in the field of architecture and construction.

We will study about its market approach and future scope not just in India but also in world.

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## I. INTRODUCTION

“Sustainable design is an intriguing field of architecture and construction that is becoming more popular.”

There's a reason that "green" or "sustainable" buildings are sometimes known as "high performance buildings": they not only save money on utilities, but there's also emerging evidence that they may boost tenant productivity and well-being by improving air quality and lighting.

## II. PEOPLE AND PLANET

Architecture is one of the intriguing field, visible and burgeoning areas for sustainable designing in architecture is achieved with rich array of technologies, materials, development technology in field of construction which readily in place that can be very useful in reducing the effect that building has over the environment and brings a step forward in achieving comfort and efficiency in terms of building which in results makes itself self-sufficient in terms of energy, ventilation and air circulation. Treating at least some of their own waste.

### A. AIMS

- Viability of sustainability in modern corporate office.

### B. OBJECTIVES

- Using or eliminating non-inhabitant spaces.
- To study effective water management system for the building.

- Carefully design to optimize the size and configuration of interior spaces.
- To understand the techniques of modern sustainable green building.

## III. SUSTAINABLE ARCHITECTURE

Sustainable architecture refers to the efficient and effective use of resources or materials in order to have a lower environmental impact.

Little has changed in forty years of building. Buildings today, whether offices or shopping malls, are designed and erected with little regard for the environmental impact of land use patterns, building materials, operation, and, most importantly, occupant comfort. They are substantially more expensive to heat and cool than they need to be, and they squander resources in their construction and operation. Furthermore, the people remain uncomfortable.

There is, however, a small but growing number of people who see the need to change 'business as usual' and are willing to embrace a conservative sector by becoming 'green and sustainable.'

## IV. WHAT IS ENVIRONMENTAL ARCHITECTURE

- **HEALTHFUL INTERIOR ENVIRONMENT:** To guarantee that the building materials and construction plan do not emit dangerous compounds into the interior atmosphere, every care should be taken. Filtration and planting will be used to further cleanse the interior air.
- **ENERGY EFFICIENCY:** Every reasonable precaution should be made to ensure that the building's energy consumption is kept to a minimum. Cooling, heating, and lighting systems that reduce or eliminate the usage of energy in the structure.

## V. ENVIRONMENTAL SUSTAINABILITY

Natural sustainability entails leaving the earth in a good or even better state for coming generations than we found it. Human activity, by definition, can only be done or protected in areas where natural resources are not wasted or the environment is not degraded.

- Utilization of resources can be minimal.
- Consumables should be 80% -85% from renewable resources
- Recycling of stream would be 100%.

Energy would be stored and electricity could be renewed and not polluted.

- Reduce the use of non-renewable resources
- Improving the environment
- Eliminating or minimizing the use of toxins

#### A. FIVE BASIC PRINCIPLE

- Ongoing building processes consider environmental, human health, and well-being issues. In addition to the standard working method. A builder should examine five "must do" concepts before beginning on a sustainable project, according to the Rocky Mountain Institute.
- Through planning.
- Continuous construction does not have to be expensive or difficult. The construction cost may be high as compare to usual building but it would be justify with all quick paybacks from reduced operating costs.
- An integrated approach is critical.
- The major purpose and organisational concept is to reduce energy usage.
- Green building is a mind-set, not a style.

### VI. ADVANCEMENT IN TECHNOLOGY

It doubt that technology that is more efficient will make an important contribution to the sustainable development, but this perspective has limitation.

It is through use of technology that we have seen drastic improvement in the quality of life of many people. Unfortunately, many of these temporary improvements in the quality of life quickly have also demanded significant lengths in the environment. In order to continue to thrive, we will have to act deliberately and think carefully about our technical employment. We need "sustainable technologies".

#### A. SUSTAINABLE TECHNOLOGIES

A sustainable technology is one that encourages a social shift toward sustainability, as well as one that is compatible with the objectives of sustainable development. They are realistic ideas for achieving human happiness and economic progress in a way that is environmentally friendly. These technologies contributed to, supported, or improved sustainable development by lowering risk, increasing cost effectiveness, improving process efficiency, and developing environmentally friendly processes, goods, or services that benefit humanity.

- In addition to addressing pre-existing criteria and limits, a sustainable technology solution must have the following features (example economic viability).
- Lessen use of non-renewable energy and natural resources.
- Satisfying human wants and aspirations while keeping cultural context in mind.

#### B. ENERGY FROM THE SUN

The sun may meet a building's heating and cooling demands in two ways: passive or active. To maintain temperature management, passive solar architecture relies on the creation of buildings using natural conduction of heat, transport, and radiation. Solar collectors, which require an external source of energy, are used in effective solar

construction.

#### C. PASSIVE SOLAR SYSTEM

##### ➤ Introduction

A passive heating or cooling system obtains and distributes heat or cold through a structure through natural sources, allowing the system to operate with little or no external electricity.

In the largest sense, a passive solar "system" is nothing more than the building itself, with many of its components serving a dual function providing, storing. Passive heating and cooling, therefore, is intrinsic to the building, affecting its site, landscaping, orientation, floor plan, circulation patterns, window placement, and building materials.

#### D. DESIGNING A SOLAR PASSIVE BUILDING

A typical solar system should have a method for collection of solar radiation, a way to distribute captured energy wherever it is required, and a way of energy storage that controls the energy flow when not required aid vice versa. Solar passive design concepts entail ways for collecting, storing, distributing, and managing thermal energy flow using natural heat transfer principles, allowing the system to operate with minimum external power.

#### E. PASSIVE COOLING

It is feasible to use natural cooling forces in the environment to lessen the high cooling requirements of most buildings if environmental circumstances are favourable. Passive cooling systems can be categorized as direct indirect and isolate. Direct cooling entails preventing heat gains as well as cooling a room by exposing it to an external heat sink (s).

Four commonly available heat sinks are:

- The sky, especially on clear nights
- The heat absorptance that occurs during evaporation.

##### ➤ DIRECT COOLING:-

- Heat retention, subsurface air conditioning, and evaporative cooling are the four fundamental components of direct cooling.
- Using indirect day lighting instead of artificial lighting.
- Shading roofs, wall and windows with overhands, wing-walls and vegetation.
- Changing the surface-to-volume ratios.

##### ➤ LANDSCAPING USING NATURE'S AIR CONDITIONERS

Landscaping which uses vegetation, water bodies, earth masses and the plantation of trees to act as wild breaks can help decrease the heat built up in the building through shading. As plants constantly rearrange and reposition their leaves for maximum solar exposure, they provide maximum shading, which is flexible while synthetic shading is inflexible.

##### ➤ PASSIVE ARCHITECTURE: A CHALLENGE FOR THE ARCHITECT

As it is essential to consider passive system concepts from the very beginning, the communication between a solar energy consultant and the project designer has to be very

close. South facing windows acting as solar apertures for collecting energy, skylights or clerestory windows providing a source of energy and lighting during the day, thermal storage mass walls serving a second function as load bearing structural elements of building, all these have to be carefully integrated into the building structure.

#### ➤ *ACTIVE SOLAR ARCHITECTURE*

The effectiveness of any solar system depends on good construction, proper balance between system components and the installation of quality construction. The solar architecture's active characteristics allow for more accurate management of the indoor climate and heat distribution. Solar panels for heat collection and electrically operated pumps, or Tran's heat/cold to the living space or storage, are active solar systems. Active and passive elements are combined in hybrid systems. The successful performance of any solar systems depends upon good design, the proper balance among the various components of the systems and quality construction and installations. The conversion of solar radiation to thermal energy and the use of this energy in meeting all heating/cooling needs including the of water is achieved through solar energy system component, normally solar collector.

#### F. *PHOTOVOLTAIC TECHNOLOGY*

When light reaches a photovoltaic/face cell, photons attack the atoms, causing them to release electrons. Light energises any electrical device by pumping electrons out one side of the cell, through the circuit, and back to the other side.

#### ➤ *DESIGN AND INSTALLATION OF PV SYSTEMS*

Proper selection and installation of items of the right size directly affects the reliability of the system, lifetime, and initial cost.

There are three sorts of systems, each with its own set of design and installation requirements. This article focuses on systems that exclusively employ solar technology and are not linked to the utility grid.

- Hybrid systems - those systems that use photovoltaic and other forms of energy, such as diesel or wind production.
- Grid-connected systems are those that are linked to a utility grid.

## VII. **BASIC ELEMENTS OF SUSTAINABLE ARCHITECTURE**

### A. *ENERGY LESSEN THE USE*

Approximately 90% of the carbon emissions produced by business buildings are due to energy usage during their operation. This is where they will save the most money in terms of lowering their total energy usage and emissions over their entire life cycle.

#### ➤ *Efficiency Method*

From lights to printers, we've got you covered. Ceiling or completely building fans, for example, can provide a temperature reduction of up to 9°F while using just 10% of the energy necessary for cooling.

#### ➤ *Equipment Saves Energy*

Individual controls, occupancy sensors that turn off lights in vacant rooms, and photo sensors that lower artificial lighting when not in use can all help to save energy. Furthermore, monitoring equipment for heating and cooling systems may significantly improve energy efficiency.

### B. *AIR*

#### ➤ *AIR-CIRCULATION, MAINTAINED TEMPERATURE*

Sustain wind quality and thermal comfort can have a better effect on staff health, and productivity through:

- Maximizing self-control.
- Minimizing heat gain, by using light colour outer surfaces to reflect.

#### ➤ *SUNLIGHT*

- From the structure, shading devices, or expanded natural light.
- Buildings that inhale-utilizing normal ventilation as to conceivable.
- Low-energy furniture, materials, paints etc.
- Greenery, both outdoors and indoors for air salinization and shading.

#### ➤ *LOCATIONS OF OPENINGS*

The airflow pattern within a room is also affected by the placement of Inlet openings respect to wall areas.

When light reaches a photovoltaic/face cell, photons attack the atoms, causing them to release electrons. Light energises any electrical device by pumping electrons out one side of the cell, through the circuit, and back to the other side.

When the wind is blowing against the building the air tend to Carry it on the windward face, the inertia of the air will tend to carry it on through the opening the same direction as the outside airflow. The low Inlet opening is located next to a high-pressure area; therefore, the air should flow through this opening. Even without the benefit of the inertia consideration. Consequently, because of both Inertia and pressure differences, there will be a strong flow of air into the low Inlet opening, provided there is an effective outlet opening.

It can be seen that change in direction is slight; therefore, no difficulties should be encountered. It greater air changes are desired, both Inlet and outlet openings should be increased. It greater speeds are desired; the size of the outlet should be increased.

The most obvious way to get air to enter this room is to use an overcharge. The size and shapes of the overcharge will largely determine how much or will flow into the room. Although there is cross ventilation in the room, however, the strong air movement is not in the occupied zone near the floor.

#### ➤ *SOLAR THERMAL SYSTEMS*

Solar space heating and water heating application not employing mechanical devices are considered 'passive systems'. But when there is integration into the architecture the active passive difference is irrelevant. The concept is to entrap insulation and use the heat generators for useful end.

Main components of any or thermal devices are collector's circulation fluid and heat storage.

Collector: It gathers sun light and converts it into heat required for various purposes.

- Flat plate
- Evacuated tube and ,
- Concentrating collectors
- Flat plate- Most common for heating uses. Evacuated tube and concentrated systems are ideal for high temperature systems such as solar A.C. and industrial applications.
- Circulation fluid: Transfers heat from collectors to heat stone. It may be a liquid or air. Usually liquid is used in water heating and air in space heating care against freezing , leakage , corrosion,boiling etc. In case of liquid filled circulation. This system can be combined with conventional energy source if required.

### C. WATER: DECREASE THE USE

For the maintenance and reestablishment of sustainable water usage, there are certain basic guidelines to follow. This leads to the usage of greywater (water that may be used for reasons other than drinking, such as flushing or watering a nursery) and rainfall.

#### ➤ CONSERVATION

Protection can be immediate and backhanded. Indirectly, you can have your own brochures printed using a waterless process such as Preprint.

Alternatively, you can take a more direct conservative approach and install waterless urinals and less-water flush toilets.

- Dry urinals using a variety of sealants and water repellent coatings offer a waterless, likewise saving expenses in upkeep and establishment.

#### ➤ Recycling

Water may be reused in a variety of ways, such as using the black water left over from hand washing to water the nursery or flushing toilets. Rainwater may be collected using porous pavement or a sloping surface that allows run-off to be collected; the BP building in St James Square was redeveloped with a rainwater harvesting system. It may be used to irrigate gardens, flush toilets, and chill systems, among other things.

#### ➤ E rating system for LEED Home Construction is:

- Certified-the project scored 45 to 59 points of the core points.
- Silver rating - the project scored 60 to 74 points.
- Gold rating the project scored 90 to 136 points.
- Platinum rating - the project scored more than 136 points.

## VIII. CONCLUSION

- Based on the literature survey, a Sustainable place of business is one whose construction is planned, fabricated, a worked so that the adverse consequence to human wellbeing and the climate will be decreased. This incorporates assets utilized during development and activity of the structure whenever it is finished.

- ABST The GBC and LEED have fostered a rating framework that gives a structure a Number.
- The big number the more a structure meets the meaning of maintainable. To become ensured under either evaluating framework a structure should use material and building rehearses as characterized by these associations. The objective of either confirmation process is to decrease the effect on assets.
- Every day, rising energy expenses, harmful atmospheric aberrations, water shortages, limited assets, a growing population, and a plethora of other elements emphasize how people are living inefficiently. As is frequently stated. Home is where change begins. Our houses, workplaces, schools, community-gathering spaces, and all other structures have the potential to not only be sustainable, but also to supply free energy and water to satisfy other requirements (through solar or wind power) (such as transportation and farming). The Living Building Competition (a challenge to develop a fully sustainable building) is one example of research and interest, but it is up to designers, builders, architects, and planners to keep pushing the boundaries. Studying sustainable design and putting some of the concepts in this text into practise can help us get closer to a truly sustainable way of life.

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