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IGBC

Impact of Green Buildings on Occupants Wellbeing



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The report titled- 'Impact of green buildings on occupant's wellbeing' is part of WorldGBC's initiative on Better Places for People. This report aims to highlight the positive impact of green buildings on the health and wellbeing of the occupants.

The data and information mentioned in the report is based on the survey conducted by IGBC in selected IGBC rated green building projects, across the Country.

While every care has been taken in compiling this report, neither IGBC nor the participating projects accept any claim for compensation.

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Message from the Chairman

The Indian Green Building Movement in India stands tall today with more than 4,000 building projects, equivalent to 4.50 billion sq ft of green space being developed, as per various IGBC Ratings. It is time to understand the experience of occupants in green buildings through a detailed study. The World Green Building Council's (WGBC) global campaign, 'Better Places for People', has come as an excellent opportunity to assess the experience of people in green buildings. We are grateful to WGBC for having allocated this prestigious assignment to IGBC, for buildings in India.

The questionnaire survey and video shoot in various IGBC-certified buildings, as part of this WGBC project, reaffirm the fact that the Wellbeing of its occupants is in all green buildings. The results of the survey make it abundantly clear that access to clean, healthy, day-lit and comfortable spaces have positive psychological and physiological impact.

We shall continue working with WGBC in taking forward this initiative, thereby leading to the creation of better places for our people.

Dr Prem C Jain
Chairman
Indian Green Building Council (IGBC)



Foreword

Winston Churchill said, "We shape our buildings; thereafter they shape us". It is so apt, since 90% of our lives is spent indoors, within Buildings. Buildings can assist us in improving our Cognitive Ability, Productivity and Wellness, while keeping us safe, to achieve our full potential. We have a Program to build Smart Cities. We are in need of Smart buildings with Smart People.

People are the most valuable resource in organizations. The salary and wage bill of people working in buildings is one of the major costs of any organization. We focus on rental of buildings only! We need to map out the Productivity increase benefits of occupying a building and also take it into account, in our calculations.

Wellness results in fewer sick days and results in a motivated work force. This is besides the energy efficiency of the building, resulting in lower OPEX for the owner/ operator. It is the duty of an employer to care for the wellbeing of their employees and provide a healthy and comfortable workplace. Occupant satisfaction should be measured. A small increase in individual productivity lead to significant gains for an organization.

With this background, this study by IGBC has come at the right time. We are currently deliberating on the wellness standards in India, suited to our lifestyles and the National context. The findings of this survey will go a long way in creating people-centric spaces in the country. We thank all the building owners, expert consultants and occupants who have participated in this study. We look forward to their continued support in building a healthy, greener, smarter, safe, happy and a productive India.

Mr Kamal Meattle
Chairman
IGBC Wellbeing Rating

Impact of Green Buildings on Occupants Wellbeing

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Better Places for People aims to accelerate the demand and the supply of buildings that support people in living healthier, happier lives by raising awareness of how buildings impact people, and by presenting the business case for action.

WorldGBC and its partner organisations will engage and collaborate with building occupants, developers and landlords, investors, and real estate agents and advisors through a wide range of activities to help drive action on the ground.

Key activities include:

- Providing further evidence on the link between good design and positive outcomes.
- Creating tools and guidance on how to collect health and wellbeing data for building types beyond offices.
- Establishing a network for organisations to exchange lessons learned and share best practice.
- Supporting Green Building Councils in the collection of consistent data at national levels.

The Green Building movement in India triggered when CII-Sohrabji Godrej Green Business Centre (IGBC Head Quarters) building in Hyderabad was awarded with the first Platinum rated green building rating in India. Since then, Green Building movement in India has gained tremendous impetus over the years. Today, more than 4000 green building projects are implementing various green strategies. As a next chapter of the green building movement in India, it is vital to understand the occupant experience on living in green buildings.

The study aims to highlight the positive impacts of green building on health & wellbeing of the occupants. This report is part of WGBC's initiative on '*Better Places for People*' that aims to create a world in which buildings support healthier and happier lives for those who occupy them. WGBC has entrusted IGBC to conduct a study on the wellbeing aspect in IGBC rated green buildings. 25 buildings have been selected from 7 major cities of India. The questionnaire was designed to capture user's perception and experience on the built environment they occupy.

The study indicates that green buildings have supported healthier and happier living in several ways. Various attributes such as thermally comfortable environment, optimum illumination & noise levels, greenery within the built environment, ergonomically designed spaces, have significantly contributed in providing a comfortable working environment to the users occupying them. Based on the study, the report further attempts to provide ideas for improvement in the built environment. Following are few highlights of the report:

- 80% occupants are thermally comfortable throughout the year on account of the good design and proper operation of the facilities
- People in green buildings accord tremendous importance to fitness activities. 84% occupants actively utilise sports and meditation facilities provided by their facility
- Due to good façade design, 89% occupants are happy with the visual environment and do not have problem of glare.
- 78% occupants are satisfied with the acoustical design of their facility.
- Educating the occupants of green buildings is extremely important. 93% occupants were found to be well educated on the various benefits of eco-friendly practices.

The objective of the study was to understand measures that would enhance health & wellbeing in buildings. Following are the key measures identified which people have expressed are important to them:

- Conduct periodic user satisfaction survey to analyse thermal, visual and acoustic comfort of the occupants
- Provide sports and meditation facilities which would enhance the fitness of occupants
- Provide more green spaces within the built environment
- Encourage eco-friendly and healthy modes of transport
- Maintain hygienic conditions in buildings

Green Buildings increasingly have been important part of India's growth. More and more stakeholders are realising the importance of green buildings. The study would further strengthen the area of wellbeing and would guide upcoming facilities to be healthy and add to the wellbeing of people.



Thermal Comfort : The occupants' perception of the thermal environment and their preference facilitates the building managers to provide a widely acceptable thermal environment. A better control over thermal environment reduces stress and help in focusing on activities at work.



Visual Comfort : Lighting is one of the component of comfort and plays major role in the wellbeing of the occupant. Optimum lux levels reduce strain in eyes and improve concentration of occupant. Daylight also contributes significantly to the health and wellbeing. Poor visibility, glare, flicker and lack of control of the visual environment can affect task performance.



Acoustic Comfort : Noise distractions affect concentration and surrounding environment. The workplace layout is key in maintaining the acoustical comfort, while allowing the occupants to work and communicate efficiently and remain stress free.



Ergonomics : Ergonomically designed furniture and office layout reduces the impact that office work has on the body, promotes healthy & correct body posture.



Greenery : Greenery and natural habitat has positive impacts on people. The growing scientific understanding of biophilic design and its impact on mental health motivates designers to design and construct spaces having ample greenery.



Fitness : Fitness is an essential component of the wellbeing. Fitness fosters healthy living and contributes significantly to emotional and intellectual health. Accessibility to basic fitness amenities in buildings encourage occupants to actively participate in fitness related activities.



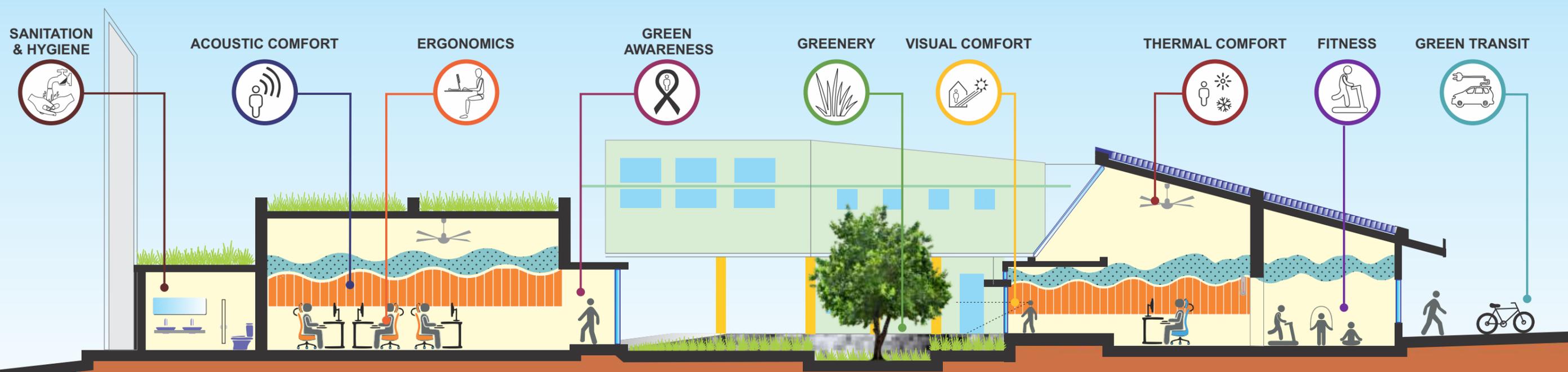
Green Transit : Green transit encourages occupants to adopt practices such as walking, cycling, using public transport, carpooling and using electric vehicles. This not only helps to combat environmental concerns but also enabling them to be fit which stimulates creativity and improves productivity.



Sanitation and Hygiene : Hygiene and cleanliness is essential in day to day aspects of life. Olfactory satisfaction and maintenance of a clean workplace promotes healthy living. A workplace with unpleasant smell and bad hygienic conditions can effect peoples mood, work performance and behavior.



Green Awareness : Green Buildings help to create an environment which is healthy and promote overall wellbeing of users. Spreading awareness regarding benefits of various ecofriendly practices benefits society at a larger scale.



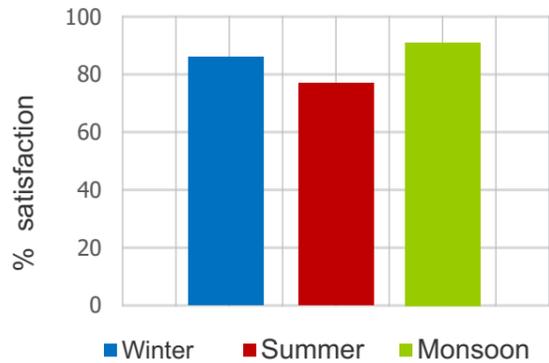


Introduction

Thermal comfort is defined by ASHRAE as ‘a condition of mind in which satisfaction is expressed with the thermal environment’¹. Thermal comfort depends on parameters such as air temperature, air velocity, relative humidity, mean radiant temperature, metabolic rate and clothing insulation.

Thermal comfort has been an important element of green buildings and is well addressed in terms of design, construction and operation.

A good building design ensures a thermally comfortable environment. This helps to reduce occupants stress level and improves their productivity.



▲ Thermal perception of occupants during different seasons indicate that green buildings facilitate satisfactory thermal environment



▲ Individual controllability, when provided to users, enhances individual thermal comfort

- 80%** Occupants are thermally comfortable throughout the year on account of good design and proper operation of the facility
- 96%** Occupants are happy with the humidity in green buildings
- 90%** Occupants are satisfied with the air movement at their facility, owing to good design and operation of the building

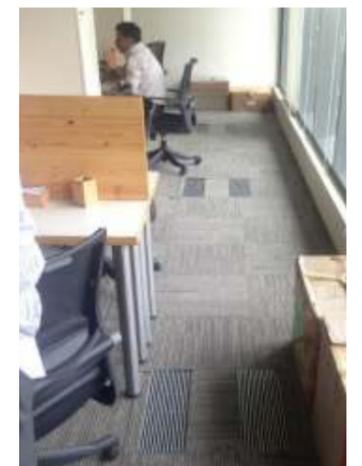
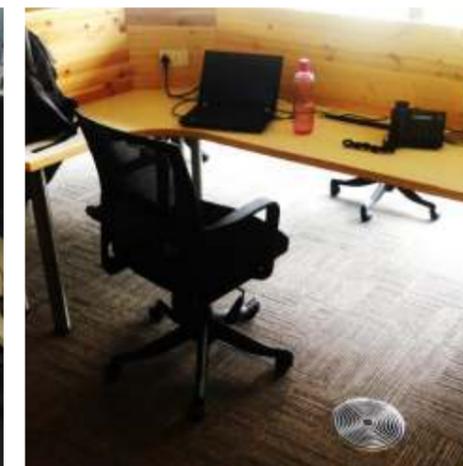
Measures for excellent thermal comfort

- ❖ Seek anonymous responses from occupants. This feedback would enable facility managers to identify the thermal comfort related problems and help in implementing corrective actions.
- ❖ Maintain temperatures between 20 to 23 °C during winter and 22 to 27 °C during summer.
- ❖ Monitor and maintain relative humidity between 30 to 70 %. Provide humidifiers and de-humidifiers to maintain acceptable humidity in the facility.
- ❖ Provide good air movement in the facility to enhance the thermal comfort of the occupants.
- ❖ Install individual thermal comfort controls for occupants, to adjust temperature and air movement based on need and preference.
- ❖ Encourage dressing culture leading to occupants thermal comfort.
- ❖ The problem of overcooling during summer should be addressed.

¹ ASHRAE Standard 55 : Thermal Environmental Conditions for Human Occupancy



▲ In India, facilities have started providing ceiling fans in mechanically ventilated spaces to enhance the air movement. This contributes to better thermal sensation and improves performance of occupants



▲ Controllability is an important aspect of individual thermal comfort. Provide desk fans and under floor air distribution system to enable occupants in maintaining air movement based on their preference



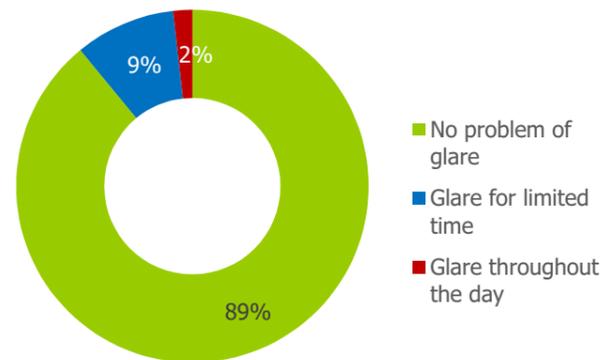
Providing thermostats in spaces such as meeting rooms and private cabins, allows the user to maintain temperatures as desired



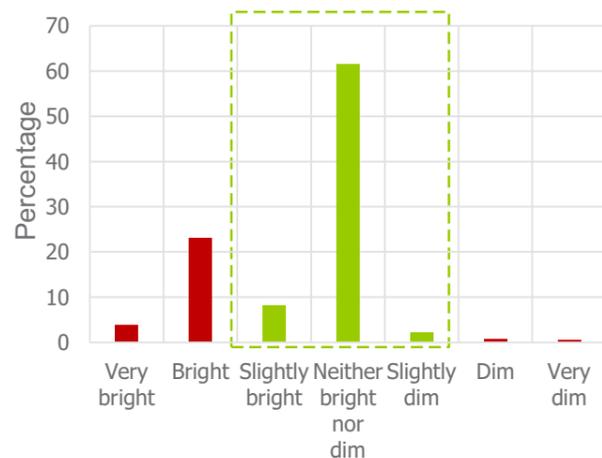
Introduction

Human comfort is affected by the light intensity (illuminance). The light should be of the right intensity so that eyes do not strain if it is too dark or bright. Thus maintaining optimum illuminance at the workplace with the use of artificial lighting or daylight is very essential.

Glare from sunlight can also cause strain in eyes. This can be avoided by providing controllability in the form of blinds, curtains or louvers.



▲ Green buildings allow facilitate both daylight and glare controllability. 89% of the occupants received ample daylight, without any glare



▲ The graph indicates lighting perception of occupants for artificial lighting. 72% of people are happy with the overall lighting levels. Dotted box indicates acceptable limits

- 88%** Occupants receive daylight through nearby window or skylight
- 89%** Occupants do not have problem of glare due to good façade design
- 82%** Occupants have controllability to control the glare using blinds, curtains and louvers

Measures for excellent visual comfort

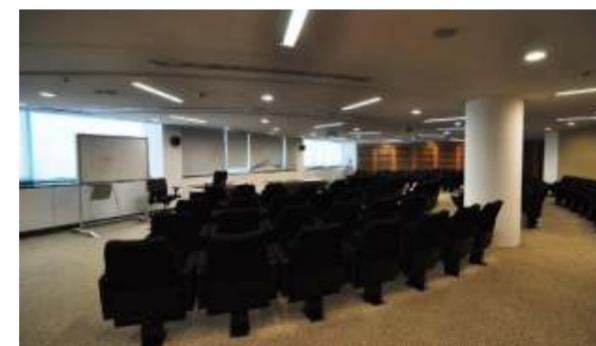
- ❖ Green buildings promote higher percentages of daylight into the office spaces. The building design should be such that it allows natural light to penetrate through windows and skylight.
- ❖ Design buildings with optimum window-to-wall ratio. This would ensure good amount of daylight within the spaces.
- ❖ Use double glazed glass and low-e glass to allow good daylight and less heat.
- ❖ Incorporate lighting elements such as light shelves, light pipes to allow deeper penetration of daylight into spaces.
- ❖ Use dimmer controls and daylight sensors to provide optimum lux levels to the occupants.
- ❖ Provide lighting controllability to individuals in the form of blinds, curtains and louvers to control glare and enhance their visual comfort.
- ❖ Provide individual task light, which enable occupants to maintain illumination levels based on their preference.



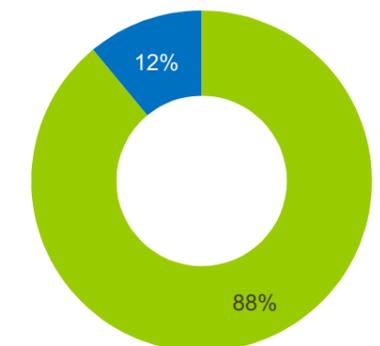
▲ Windows and skylights provided on the northern side allows maximum penetration of daylight. The north light allows maximum diffused light and minimum heat



▲ Design of façade in two levels – ‘top’ and ‘bottom’ window help in receiving optimum daylight. Top window acts as a light shelf and bottom window serves the purpose of visual connectivity



▲ Both artificial lighting and daylight can be used to provide optimum lux levels. Glare control should also be considered while designing the lighting for spaces



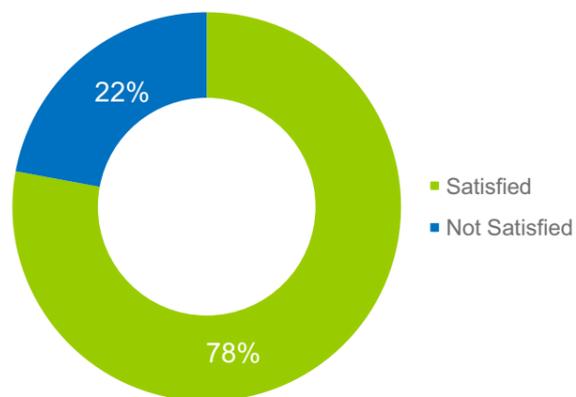
▲ Majority of the occupants feel comfortable with the ample daylight received at their workstations



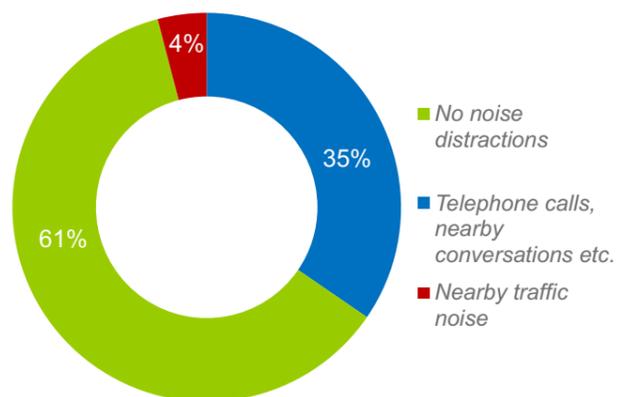
Introduction

Sound is the sensation perceived by the sense of hearing. Intensity of sound is measured in decibel. Sound beyond 65 decibel² (for commercial spaces) is considered as noise.

Noise leads to disturbance and distress. This can be due to a neighbouring conversation, nearby traffic noise, poor ducting design or equipment noise. Acoustically designed buildings limit noise levels and help in maintaining a stress free working environment.



▲ Occupants of green buildings are happy with the acoustic design of the building



▲ The analysis above indicates that majorly people get distracted due to telephonic conversation and nearby conversation in a work environment. Acoustically designed space would ensure reduction in such disturbances

- 78%** Occupants are satisfied with the acoustical design of their facility
- 79%** Occupants agree that the workplace layout enables them to work without unwanted noise interruptions
- 86%** Occupants are satisfied with the L-shaped workplace layout, which enhance acoustic comfort

Measures for excellent acoustic comfort

- ❖ Design spaces based on the functional requirement of the building. Silent and non-silent zones should be segregated to enhance the acoustic comfort of the occupants.
- ❖ Design office layout which allows conversations but limits noise.
- ❖ Use sound absorbing materials on wall, carpet and ceiling to optimize sound levels. This also prevents reverberations within the spaces such as open office, meeting rooms conference rooms.
- ❖ Provide ducts designed to reduce noise due to air movement.
- ❖ Select systems and equipment such as fans, HVAC, duct & generators that leads to low noise criteria.
- ❖ Design landscape that reduces noise coming from external environment. Planting trees and thick vegetation acts as a buffer between traffic and buildings.

2 CPCB : Central Pollution Control board



▲ Application of sound absorbing material on walls, floors, ceilings, furniture etc. helps in enhancing the sound quality. Well designed spaces offer privacy required in meeting rooms and private cabins



◀ Carpets eliminate floor impact sounds such as noise produced by footfalls and chairs scraped across the floor



▲ Vegetation planted along the site boundary helps in reducing the traffic noise coming from the nearby roads



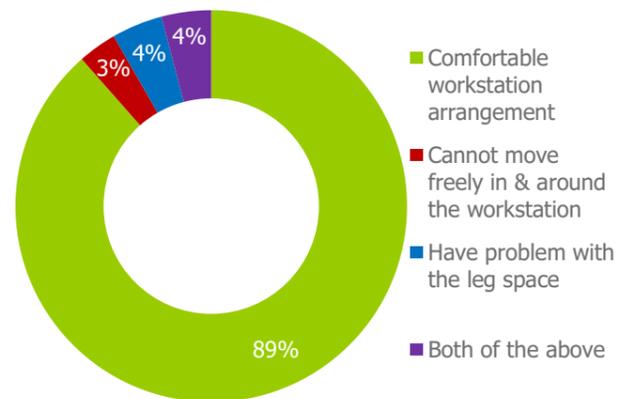
▲ Properly designed office layout enable occupants to work in an acoustically comfortable environment. The L-shaped workstation layout has significantly reduced disturbances from the surrounding that has enabled occupants to work in a stress free environment



Introduction

Ergonomics is a science that brings together human anatomy and engineering to ensure the workplace is designed to suit the people who use it³.

Ergonomically designed spaces provide better comfort and improved productivity. Office layout and mobility within workplace play a major role in providing ergonomically comfortable environment. The furniture should be designed to suit the people rather than people adapting to it.



▲ Percentage of employees comfortable in and around their workstation



▲ Spacious work arrangement is provided in most of the green buildings for better accessibility

89% Occupants are happy with the accessibility provided due to good workstation layout

95% Occupants working on L-shaped workstation feel more comfortable than conventional workstation

85% Occupants are able to adjust the chair based on their preference

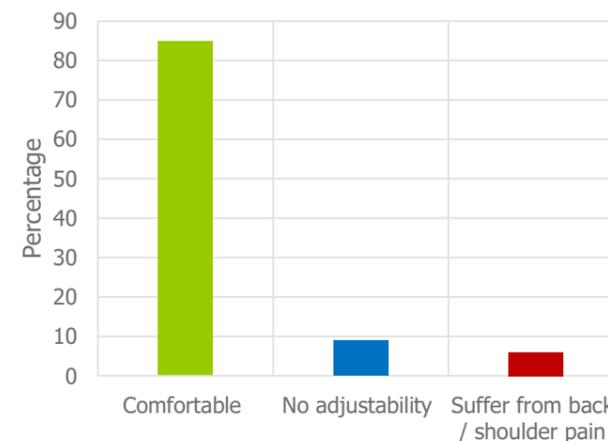
Measures to enhance workplace ergonomics

- ❖ Arrange the workstations to provide easy accessibility and enhanced mobility to the occupants.
- ❖ Provide optimum area per person while designing any space.
- ❖ Provide the type of workstation that suits occupants' nature of work. A workstation that can be adjusted by an user, offers flexibility and encourages collaborative and individual working style.
- ❖ Select a chair that provides an adjustable backrest and headrest. Ergonomically designed chair reduces neck, shoulder and other body aches while working for long hours.
- ❖ Provide desk with proper storage area. This would allow comfortable and safe working environment for the user.

3 Chartered Institute of Ergonomics & Human Factors



▲ Effective ergonomics and space planning has encouraged the users to work in a collaborative environment



▲ Ergonomically designed chairs enable correct posture which enhances productivity. Majority of the occupants in green buildings are comfortable and do not suffer from back/ shoulder pain



▲ Proper circulation within the workstation allows accessibility and mobility to the occupants



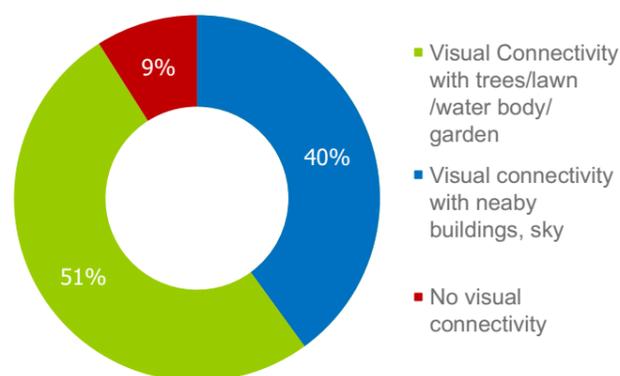
▶ Proper storage area enables occupants to work comfortably.



Introduction

Greenery is an important element and has power to enhance the quality of life and wellbeing of people. People who stay in a greener environment are happier and tend to have better cognitive ability.

Greenery also plays a major role in enhancing indoor environment quality. It acts as a sink to human generated carbon emissions and absorbs pollutants to improve the overall quality of air.



▲ Green buildings facilitates visual connectivity to the outdoors. 91% occupants have accessibility to the external environment such as greenery, buildings and sky



▲ Roof garden acts as an design element for connecting occupants to the nature

88% Occupants have access to ample greenery at their facilities

75% Of the facilities have external greenery within their campus in form of trees, plants & lawns

Measures to enhance greenery

- ❖ Facilities should have minimum 20% of the area retained as natural topography. This promotes biodiversity within the campus. Green buildings have enabled built environment to have ample greenery in the premises.
- ❖ Incorporate green spaces that are accessible to the occupants. The spaces such as resting areas, pergola, gazebo, shaded pathways, breakout spaces, can be incorporated as design elements.
- ❖ Integrate interior spaces to the external environment. The occupants should have direct visual access to sky, flora and fauna. The connectivity can be through elements such as courtyards, gardens, green roofs, vertical greenery.
- ❖ Encourage planting of native vegetation that attracts habitat & promotes biodiversity.
- ❖ Plants such as *Dypsis lutescens* (areca palm), *Epipremnum aureum* (money plant), *Sansevieria trifasciata* (mother-in-law's tongue) can be integrated in the interior spaces to enhance the indoor air quality.



▲ Green buildings encourage design of spaces that have ample greenery and are accessible for users. These spaces also act as breakout spaces for relaxation and social interaction



◀ Facilities where the availability of open space is limited have considered green wall as a landscape element



▲ Integrating green spaces within the building interiors provide visual comfort & connectivity to the nature



▲ Incorporating indoor plants help in air purification. This improves indoor air quality and reduces pollutants & emissions



Introduction

Health is an aggregate of the body, senses, mind and soul⁴. World Health Organisation (WHO) defines Health as 'a state of complete physical, mental and social well-being and not merely the absence of disease⁵'.

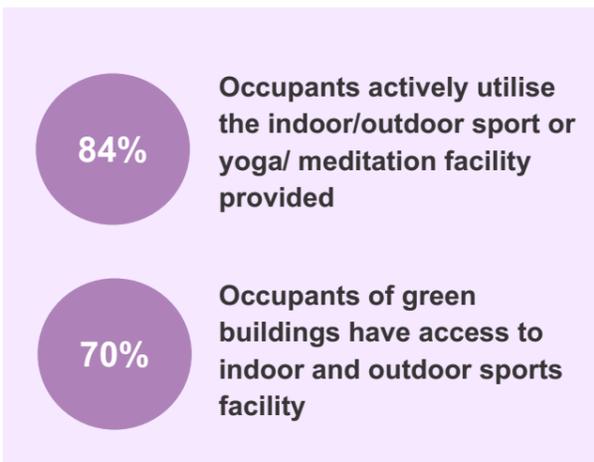
Aadequate exercise assists in being physically fit. Inclusion of sports and yoga in day-to-day routine helps in maintaining a healthy body and mind.



▲ Indoor sports facilities such as pool, foosball, carom and chess encourage social interactions and act as a stress busters

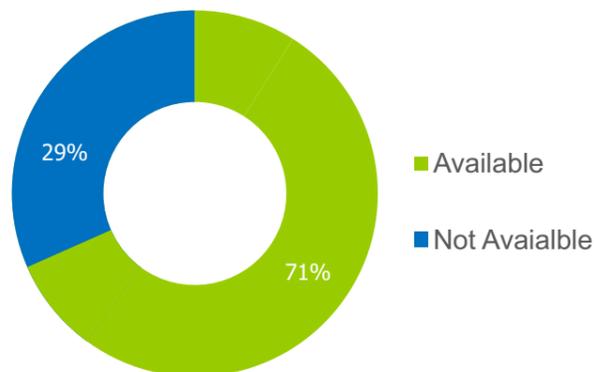


▲ Encouraging employees to participate in team building activities enhances their social wellbeing



Measures to improve fitness

- ❖ Provide indoor & outdoor fitness facilities such as table tennis, carom board, badminton court basketball.
- ❖ Provide yoga and meditation rooms for users to enhance their emotional & intellectual wellbeing
- ❖ Spread awareness to occupants on the importance of being fit & healthy by providing signage's in buildings on health & fitness.
- ❖ Design buildings that encourage occupants to use staircases instead of elevators
- ❖ Promote healthy diet by providing access to nutritious food. Provide signage indicating nutritional facts to spread awareness amongst the users



▲ Occupants of green buildings have access to yoga and meditation facilities which induces happiness among occupants

4 Wellness Sense by Om Swami
5 Constitution of the World Health Organization



▲ With rising awareness on fitness and its positive effects on occupants productivity, people have started to incorporate various physical activities in their busy schedule



◀ The culture of providing fitness facilities such as gymnasium, table tennis, swimming pool in offices and residential societies have increased significantly over the last decade with the focus on occupants health



◀ ▲ More and more buildings are including yoga and meditation facilities during the design of buildings. Thereby, providing basic amenity for mental and spiritual wellbeing of the occupants



Introduction

Sustainable mode of transportation is a key element while designing better places for people. It tremendously contributes to the environment and promotes sharing of transportation which in turn enhances the social fabric.

Mode of green transit such as walking and cycling enables an employee to be fit and also stimulates creativity. Additionally, it decreases the carbon footprint caused by fossil fuel emission from automobiles.



▲ Solar based electric charging points provided to encourage the use of electric vehicles



▲ Availability of space for bicycle parking to promote cycling



▲ Design of walkways within the campus to promote the concept of walkability



Measures to enhance green transit

- ❖ Facilities should provide and encourage occupants to use eco-friendly practices such as carpooling, bus pooling and use of public transportation services
- ❖ Encourage occupants to walk or bicycle to work, specially when staying nearby
- ❖ Buildings should provide electric charging points to facilitate the use of electric vehicles. Spread the awareness to prefer electric or hybrid vehicles for commuting.
- ❖ Promote concept of walkability & cycling by providing pedestrian walkways and cycle tracks
- ❖ Make people aware about on the benefits of walking and cycling on the physical fitness



Introduction

Basic hygiene is a fundamental human requirement in a working environment. A hygienic place is one that prevents disease through cleanliness and proper sanitation. It allows people to perform their work optimally under comfortable conditions. Occupants claim to experience acute health problems when exposed to unhygienic work places.

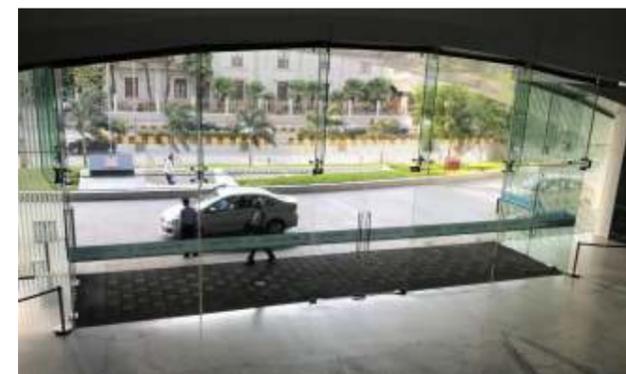
A workplace with unpleasant smell & bad hygiene condition can affect people's mood, work performance and behaviour.



▲ Waste segregation for different materials



▲ Drinking water treatment plant for provision of clean drinking water



◀ Entryways should be designed to prevent entry of micro-organisms and dust into the built environment. This enhances the indoor environment quality



Measures to improve hygiene and sanitation:

- ❖ Ensure appropriate housekeeping protocol which include periodic maintenance. Periodical cleaning and maintenance of ducts, filters and fresh air units should be part of O&M contract
- ❖ Adopt good waste management practices for segregating and managing the waste generated within the premises
- ❖ Ensure frequent cleaning of high touch surfaces such as handles, door knobs, staircase railing, table tops
- ❖ Design entryway systems to limit the outdoor pollutants entering the building
- ❖ Provision of treated clean drinking water should be made available to control water borne diseases
- ❖ Select low VOC and eco-friendly house-keeping materials for indoor application. This reduces occupants' exposure to harmful chemicals



Introduction

Green buildings have helped to create an environment which is healthy and promotes overall wellbeing of a person.

The benefits of green buildings are limitless and should be spread to a wider audience so that they can appreciate and adopt. Organisations and communities should spread awareness about various benefits of eco-friendly practices, to benefit the society at a larger scale.



▲ Certified green buildings are encouraged to conduct tours to educate people about the various benefits of green buildings



93% Occupants, residing in green buildings are educated on the various benefits of eco-friendly practices

75% Occupants take part in team building exercises conducted by their organisation, every quarter

Measures to spread green awareness

- ❖ Encourage celebration of world green week, earth day and water day to promote sustainability.
- ❖ Initiate plantation drives, clean up programs to promote sustainable and eco friendly practices among the occupants
- ❖ Provide signage in green buildings to educate people on the various benefits achieved by the facility
- ❖ Conduct regular tours and green building missions for students, facility managers, and occupants to spread awareness on importance of designing and constructing a green building
- ❖ No smoking signage should be installed to discourage public smoking.
- ❖ Conduct awareness programs to encourage eco friendly practices

◀ Various signage in green buildings provide visitors with an opportunity to learn through these visual elements of the buildings



▲ Organisations are voluntarily engaging in awareness sessions to promote green buildings and empowering people in adoption of eco-friendly practices



◀ Mega plantation drive organised on International Earth day, World Green Week allows the participants to add more greenery in the city



◀ ▲ Signage at work and residence educates occupants about the various elements of green building and encourages engagement in sustainable practices

This study has highlighted that besides looking at the resource efficiency, paramount importance has to be accorded for health & wellbeing of the people. In the survey conducted by IGBC, green buildings have addressed aspect of wellbeing to a large extent. There are many other areas where tremendous opportunities exist that would further enable projects to design and construct healthy buildings. Through the interaction with the users of green buildings, many such opportunities have been identified. All efforts towards implementing the wellbeing measures will go a long way in addressing people welfare & wellbeing in the built environment.

IGBC is deeply thankful to the organisations who have participated and have shared the results of the survey.

The participating projects are as follows

- ❖ Ascendas VIT Park, Hyderabad
- ❖ Bearys Global Research Triangle, Bengaluru
- ❖ Candor International School - Phase 1, Bengaluru
- ❖ CII - Sohrabji Godrej Green Business Centre, Hyderabad
- ❖ Cognizant KITS Campus - CKC, Chennai
- ❖ DMRC Metro Bhavan , New Delhi
- ❖ Godrej PL-13 Annex Building, Mumbai
- ❖ Grundfos Pumps Factory, Chennai
- ❖ ICICI Towers, Hyderabad
- ❖ Infosys Equinox (EC-47), Bengaluru
- ❖ Infinity IT Lagoon, Salt Lake, Kolkata
- ❖ Jakson Corporate Office, Noida
- ❖ KBL Corporate Office, Pune
- ❖ Mainetti (India) Pvt. Ltd, Chennai
- ❖ Olympia Technology Park, Chennai
- ❖ Paharpur Business Centre, New Delhi
- ❖ Ramanujan IT City, (TRIL Infopark), Chennai
- ❖ Reva Admin Block (Academic Wing), Bengaluru
- ❖ Shapath V, Ahmedabad
- ❖ Skeiron Office Interiors, Pune
- ❖ Tata Motors, Pimpri
- ❖ TCS Techno Park, Phase-1, Hyderabad
- ❖ TSI Waverock, Hyderabad
- ❖ The New Town School, Kolkata
- ❖ RP-SG Group's Quest Mall, Kolkata

ASCENDAS VIT PARK - Hyderabad IGBC - PLATINUM RATED



Building Use

- 12,000 employee
- 24hours



Water Management

- 100% of the treated waste water is recycled and reused



Energy Efficiency

- 38,500 MWH energy saved over three years
- Installed Motion sensors for all washrooms, VFD's and LED lights



Landscaping Strategies

- Drip irrigation for landscape watering



IEQ & Well being

- Facilities provided for differently abled employee
- Reactive silencers in STP to control noise level.

BEARYS GLOBAL RESEARCH TRIANGLE - Bangalore IGBC - PLATINUM RATED



Building Use

- Around 7,000 employee
- 12 hours



Water Management

- Ultra low flow water fixtures and urinals to reduce water use
- Zero discharge building
- 100% of waste water is treated and reused
- Entire storm water is harvested
- 74% less water usage



Energy Efficiency

- Energy efficient lighting design
- High efficiency HVAC System of COP 6.416
- Free air cooling & night purging
- 54% energy saving



IEQ & Well being

- Expansive landscape, semi enclosed pergolas, obelisks, water cascades, water bodies and canopies to reduce heat island effect



Screening / Glazing Strategies

- 6-20-6 DGUs with high performance glass

"BGRT offers seamless connectivity, a creative & healthier work place and contemporary business life style."

CANDOR INTERNATIONAL SCHOOL - Bengaluru
IGBC - PLATINUM RATED



Building Use

- 600 occupants
- 12 hours



Water Management

- Ultra low flow water fixtures and urinals to reduce water use
- 100% of the treated waste water is recycled and reused
- 94% of rain water is harvested



Energy Efficiency

- Energy efficient lighting design



Resource management

- 94% of fans, computers and projectors are BEE 4 star rated



IEQ & Well being

- 98% of regularly occupied area is naturally ventilated and Day lighted



Eco Friendly Commuting

- 99 % employee use bus service

CII - SOHRABJI GODREJ GREEN BUSINESS CENTRE (IGBC Headquarters) Hyderabad
IGBC PLATINUM RATED



Building Use

- 100 employee
- 12 hours



Water Management

- Ultra low flow water fixtures and urinals which helps in 40% reduction of potable water consumption



Screening / Glazing Strategies

- Double glazed windows are provided

Energy Efficiency

- 100 tons / year reduction in CO2 emission (Since January 2004)



Resource Management

- Eco-friendly, reused & recycled materials used



IEQ & Well being

- Air Quality monitoring and a passive cooling system using wind towers.
- Awareness on eco-friendly practices imparted to employees, staffs and visitors



Landscaping Strategies

- The landscape is home to 600 varieties of trees, most of which are native species



Eco Friendly Commuting

- 30 % of employee commute by carpool, bicycles, and LPG cars

COGNIZANT TECHNOLOGY SOLUTION - Chennai
IGBC - GOLD RATED



Building Use

- 17,750 employee
- 24 hours



Water Management

- Ultra low flow water fixtures and sensor based urinals to reduce water use
- 100% of the treated waste water is recycled and reused



Resource Management

- Sludge developed in the STP is reused as manure



IEQ & Well being

- Demand control ventilation using CO2 sensors

DMRC METRO BHAWAN - New Delhi
IGBC - GOLD RATED



Water Management

- Ultra low flow water fixtures and sensor based urinals to reduce water use
- Sewage treatment plant of 25KLD capacity
- 100% of the treated waste water is recycled and reused



Energy Efficiency

- All appliances have BEE 3 star or above rating.
- Solar Photovoltaics and solar water heater installation
- VFDs (Variable Frequency Drives) in AHUs, and secondary pumps



Resource Management

- Waste recycling plant at ground floor area

GODREJ PL-13 ANNEX BUILDING - Mumbai
IGBC - PLATINUM RATED



Building Use

- 370 employee
- 10 hours



Water Management

- Ultra low flow water fixtures and urinals to reduce water use
- 100% of the treated waste water is recycled and reused



Energy Efficiency

- Energy efficient lighting fixtures.
- Solar Photovoltaic installation of 120KW



Eco Friendly Commuting

- 81 % employee use bus service



IEQ & Well being

- The building uses eco-friendly housekeeping chemicals

INFOSYS- EQUINOX (EC-47) - Bengaluru

IGBC - PLATINUM RATED



Building Use

- 2,380 employee
- 18 hours



Water Management

- Ultra low flow water fixtures and urinals to reduce water use
- 100% of the treated waste water is reused and recycled



Energy Efficiency

- Energy efficient lighting design.
- Solar Photovoltaics installation of 175 KW



IEQ & Well being

- 90 % of the regularly occupied spaces has an Outside view

GRUNDFOS PUMPS FACTORY - Chennai

IGBC - GOLD RATED



Building Use

- 90employee
- 24 hours



Water Management

- Ultra low flow water fixtures and sensor based urinals to reduce water use
- 98% of rainwater is harvested
- 100% of the treated waste water is reused and recycled



Resource Management

- 96% of waste diverted from landfill during construction



IEQ & Well being

- The project has various facilities to reduce workman fatigue like gaming zones , gyms , etc.



Screening / Glazing Strategies

- Energy efficient designs for roof and wall to reduce building heat load

INFINITY IT LAGOON, SALT LAKE - Kolkata

IGBC - PLATINUM RATED



Water Management

- Ultra low flow water fixtures and urinals to reduce water use
- 100% of the treated waste water is recycled and reused



Energy Efficiency

- Energy efficient lighting fixtures along with daylight sensor/ occupancy sensors .



Screening / Glazing Strategies

- Double glazing windows are provided



IEQ & Well being

- Ramps, toilets and elevators are designed to cater to differently abled and senior citizens

JAKSON CORPORATE OFFICE - Noida
IGBC - PLATINUM RATED



Building Use

- 400 employee
- 8 hours



Water Management

- Ultra low flow water fixtures and urinals to reduce water use
- 100% of the treated waste water is recycled and reused



Energy Efficiency

- 60 % savings due to efficient lighting, occupancy sensor, efficient fans & daylight sensor
- Solar Photovoltaics and solar water heater installation



IEQ & Well being

- Low VOC materials and Certified green housekeeping materials used for indoor application

MAINETTI (INDIA) PVT. LTD - Chennai
IGBC - PLATINUM RATED



Building Use

- 150 employee
- 24 hours



Water Management

- Ultra low flow water fixtures and urinals to reduce water use
- 100% of the treated waste water is recycled and reused



IEQ & Well being

- Outdoor break out spaces are provided to reduce workman fatigue
- Factory designed to optimise natural ventilation by orienting the building towards natural wind flow direction



Eco Friendly Commuting

- Company provides Bus & Van shuttle service
- 25% of total parking have electric charging facility

KBL CORPORATE OFFICE - Pune
IGBC - PLATINUM RATED



Building Use

- 600 employee
- 10 hours



Water Management

- Ultra low flow water fixtures and sensor based urinals to reduce water use
- 100% of the treated waste water is recycled and reused along with harvested rainwater



Energy Efficiency

- Energy efficient lighting design.
- 70KWp Solar Photovoltaics system is installed



Resource Management

- Laser Toner Cartridges are reused in Printers to reduce e-waste



IEQ & Well being

- A Recreational centre has been provided to refresh and rejuvenate the employees

OLYMPIA TECHNOLOGY PARK - Chennai
IGBC - GOLD RATED



Building Use

- 600 employee



Water Management

- Ultra low flow water fixtures and sensor based urinals to reduce water use
- 100% of the treated waste water is reused and recycled
- Reverse Osmosis Unit is used to provide clean drinking water



Energy Efficiency

- Energy efficient lighting designs along with daylight and occupancy sensors



IEQ & Well being

- Low VOC materials used to reduces exposure of harmful chemicals on the occupants

**PAHARPUR BUSINESS CENTRE -
New Delhi**
PLATINUM RATED



- Building Use**
- 600 employee
 - 10 hours



- Water Management**
- Ultra low flow water fixtures and urinals to reduce water use



- Screening / Glazing Strategies**
- Windows are airtight by installing rubber grips
 - Double layered reflective glass and UV banning films to reduce heat ingress



- Resource Management**
- Roof provided with High albedo material and SRI coating
 - Organic waste management is done through Vermi - culture to produce manure



- IEQ & Well being**
- Greenhouse on the top floor helps circulate fresh air
 - The project has facilities to reduce employee fatigue such as in-house restaurant , rooftop lounge, Electronic Massage chair

**REVA ADMINISTRATIVE BLOCK -
Bengaluru**
IGBC - PLATINUM RATED



- Building Use**
- 1,600 employee
 - 24 hours



- Water Management**
- Ultra low flow water fixtures and urinals to reduce water use
 - 100% of the treated waste water is recycled and reused



- Energy Efficiency**
- Energy efficient lighting design.
 - 33% energy saving due to Solar Photovoltaics installation



- IEQ & Well being**
- 90%of regularly occupied area is naturally ventilated and Day lit



- Eco Friendly Commuting**
- Bicycle racks and 12 buses for transportation

RP-SG Group's Quest Mall - Kolkata
IGBC - PLATINUM RATED



- Building Use**
- 1400 employee
 - 18 hours



- Water Management**
- Efficient water fixture reduce more than 50% potable water use over baseline
 - 100% waste water treatment and reuse



- Energy Efficiency**
- Efficient design by providing low e glass, roof insulation, heat resistant films, roof garden and heat reflective paints.



- Resource Management**
- All Appliances used are BEE 3 star rated or above



- Eco Friendly Commuting**
- 94% of employees use public transport



- Landscaping Strategies**
- Fertilisers used for landscaping purpose are organic fertilizers

SHAPATH V - Ahmedabad
IGBC - GOLD RATED



- Building Use**
- 5,645 employee



- Water Management**
- Ultra low flow water fixtures and sensor based urinals to reduce water use
 - 100% of the treated waste water is reused and recycled
 - Water efficient landscape helps in reducing water demand by 82%



- Energy Efficiency**
- Energy efficient lighting design.
 - 30% energy saving over baseline



- Resource Management**
- Use of rapidly renewable and recycled materials
 - 82% of waste diverted from landfill during construction

SKEIRON OFFICE INTERIORS - Pune
IGBC - PLATINUM RATED



Building Use

- 165 employee



Water Management

- Ultra low flow water fixtures and urinals to reduce water use



Energy Efficiency

- Energy efficient LED lighting fixtures.
- All Appliances used are BEE star rated



Resource Management

- Use of Eco-friendly and recycled materials



IEQ & Well being

- Designated spaces and time for break-out activities to relieve work related stress and ensure good health
- Awareness on eco-friendly practices imparted to employees, staffs and visitors

TSI BUSINESS PARKS - Hyderabad
IGBC - PLATINUM RATED



Building Use

- 14,000 employee



Water Management

- Ultra low flow water fixtures and urinals to reduce water use
- 100% of the treated waste water is recycled and reused
- Rainwater is harvested and reused



Energy Efficiency

- Energy efficient LED lighting fixtures.
- Thermography helps in energy savings



Eco Friendly Commuting

- 75% employees use bus and van pooling service



IEQ & Well being

- Facilities for occupant's well-being such as Yoga Room, Gymnasium Area and Indoor Game Room are provided
- Certified green housekeeping are used to reduce the exposure of harmful chemicals on the occupants.

THE NEW TOWN SCHOOL - Kolkata
IGBC - PLATINUM RATED



Building Use

- 3,600 employee
- 12 hours



Water Management

- Ultra low flow water fixtures and urinals to reduce water use
- 100% of the treated waste water is recycled and reused



Energy Efficiency

- Use of energy efficient LED lighting fixtures



Landscaping Strategies

- One third of the campus excluding the building footprint is covered with vegetation



IEQ & Well being

- Jalli acts as a double skin for entire facade and reduces direct solar radiation

About CII

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has over 8,300 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 200,000 enterprises from around 250 national and regional sectoral industry bodies.

CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few.

The CII theme for 2017-18, India Together: Inclusive. Ahead. Responsible emphasizes Industry's role in partnering Government to accelerate India's development. The focus will be on key enablers such as job creation; skill development and training; affirmative action; women parity; new models of development; sustainability; corporate social responsibility, governance and transparency.

With 66 offices, including 9 Centres of Excellence, in India, and 9 overseas offices in Australia, Bahrain, China, Egypt, France, Germany, Singapore, UK, and USA, as well as institutional partnerships with 344 counterpart organizations in 129 countries, CII serves as a reference point for Indian industry and the international business community.

About IGBC

The Indian Green Building Council (IGBC), part of the Confederation of Indian Industry (CII) was formed in the year 2001. The vision of the Council is - "to enable a sustainable built environment for all and facilitate India to be one of the global leaders in the sustainable built environment by 2025".

The Council offers a wide array of services which include developing new green building rating programmes, certification services and green building training programmes. The Council organises Green Building Congress, its annual flagship event on green buildings. The Council is committee-based, member-driven and consensus-focused. All the stakeholders of the construction industry comprising of architects, developers, product manufacturers, corporate, Government, academia and nodal agencies participate in the Council activities through local chapters. The Council also closely works with several State Governments, Central Government, World Green Building Council, bilateral & multi-lateral agencies in promoting green building concepts in the country.



Confederation of Indian Industry

CII - Indian Green Building Council

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