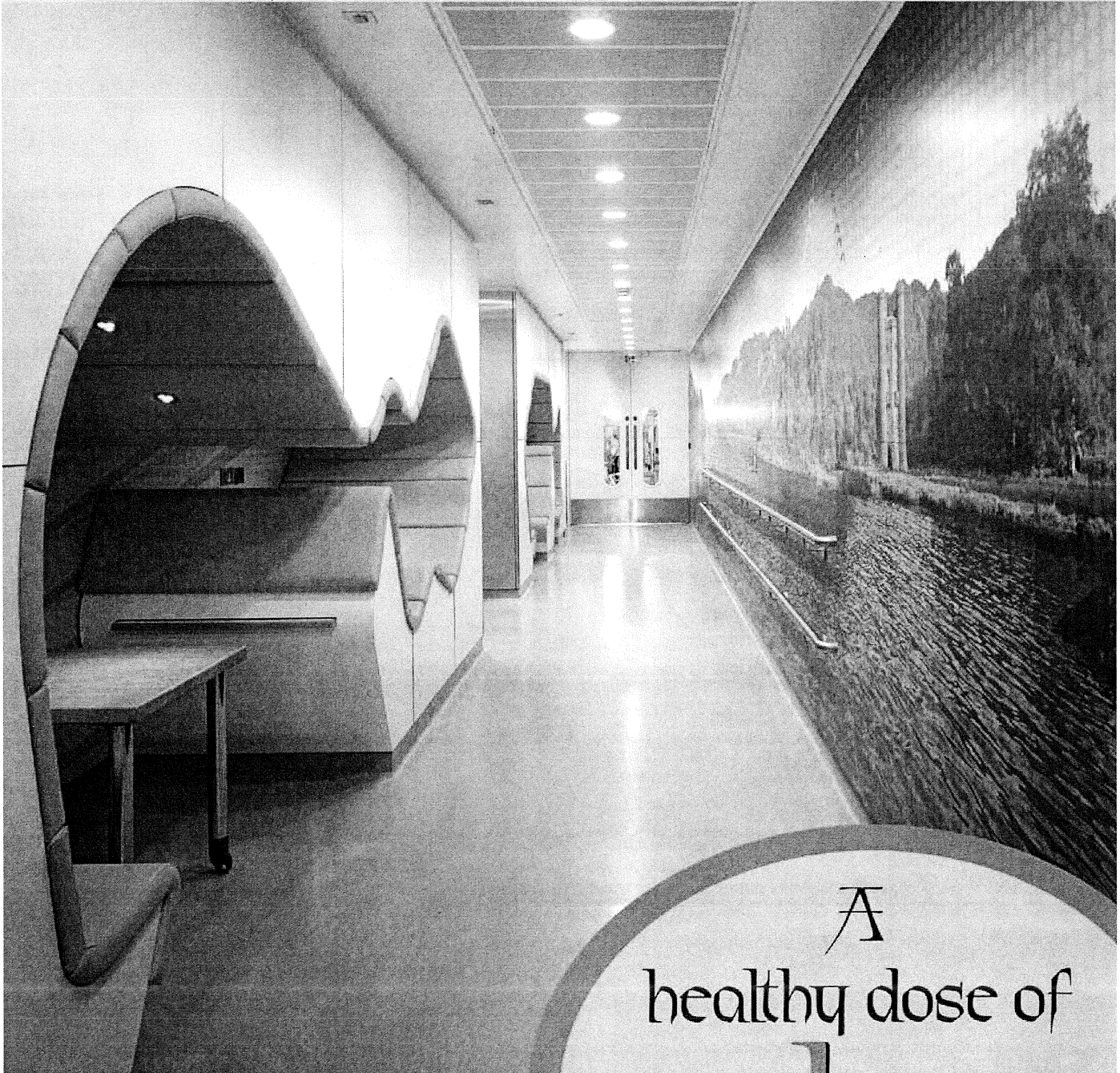


Architecture

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Teenage Cancer Trust Ward,
Birmingham Children's Hospital, UK

A
healthy dose of
colour

GRIHA and Green Healthcare

Apoorv Vij, Programme Officer, ADaRSH, TERI

Environmentally conscious practices in hospitals would ensure that not only is the health of building occupants a priority but by reducing the pollution from the building, the hospital also contributes towards improving the environmental conditions of people in its vicinity. A green hospital provides good care for both people living within it as well as outside it.

Today, all walks of our lives are influenced by Climate Change. The primary reason for this is the excessive Green House Gas (GHG) emissions due to various anthropogenic activities. One of the biggest contributors to the global (GHG) emission scenario is the building and construction sector. Approximately 30-40 per cent of global green house gas emissions result from activities directly or indirectly related to buildings and construction. Energy is consumed during the construction of a building, during the operation of the building and for maintenance. There is also a lot of waste generated during each of these respective stages. Along with this, the current speed of urbanization makes the situation worrisome. There is a constant demand for new buildings in the residential and commercial sector. It is expected that by 2030, 47.1 per cent of Indian population would be living in urban centres. Buildings consume a lot of energy. Thus, if we can make buildings more energy efficient in terms of energy consumption and reduce the amount of waste generated by them, we in turn have a significant impact on the overall reduction of GHG emissions.

GREEN BUILDINGS

Buildings play an important role in our daily lives. All human activities are centered or revolve around



figure 1: AIIMS Bhubaneswar: 3D rendered view.

buildings. As the population shifts from rural to urban areas, the number of buildings required for various uses, like accommodation, offices, hospitals, schools increases. This, in-turn, leads to a drastic increase in the requirement of energy and resources. The result is that the occupants get desirable living conditions at a price that is fast becoming too steep to pay. This increasing consumption is now a problem that requires a solution in the very near future.

A green building is a building that offers all the comforts of, if not more than a conventional building while simultaneously minimizing its negative impacts on the surrounding environment. Efficient building & mechanical system design, renewable energy sources, water and waste management systems are some of the primary features of green buildings.

Adopting passive architectural design practices like proper north-south orientation, good daylighting and well-insulated building envelope can help reduce building energy consumption by up to 15 per cent. Optimized lighting in conjunction with efficient Heating, Ventilation & Air-Conditioning (HVAC) system can lead to about 20-25 per cent energy consumption reduction. Water can be conserved using low-flow fixtures, rain water harvesting and through the use of recycled water for various applications like landscape irrigation. Waste products can be recycled and reused. Using light-weight/non-fired/local building materials can help in reducing the embodied energy of the building. This, in financial terms, translates to a marginally higher capital investment, but also ensures that the costs involved in maintaining and operating the building drop by more than 50 per cent, if implemented correctly.

GREEN RATING FOR INTEGRATED HABITAT ASSESSMENT (GRIHA)

GRIHA is an indigenous green building rating system developed for the Indian construction scenario. It was developed by The Energy and Resources Institute (TERI) and has now been adopted by the Ministry of New and Renewable Energy (MNRE) as the National Green Building Rating System for India. GRIHA aligns itself with various national building codes and guidelines like the National Building Code, Energy Conservation Building Code, Ministry of Environment and Forests clearance, Central Pollution Control Board guidelines etc.

GRIHA is a rating system which assesses the environmental performance of buildings on a scale of 0-104 points with a

minimum of 50 points required for a building to be rated under GRIHA. On the basis of number of points scored, a building can be rated between 1 & 5 stars, 1 star being the lowest and 5 star being the highest level of environmental performance. GRIHA evaluates green building performance on the basis of various aspects like water and waste management, energy, site preservation, indoor comfort and air quality and innovation points.

GRIHA rating is administered by ADAARSH (Association for Development and Research of Sustainable Habitats), which is an independent registered society under the Government of India, jointly set up by the MNRE and TERI.

GRIHA as a rating tool emphasizes upon using traditional construction

techniques and knowledge in order to construct green buildings. GRIHA is a performance-oriented building rating system. Besides this, another unique feature of GRIHA is that it rates non air-conditioned, semi air-conditioned as well as fully air-conditioned buildings. This promotes the use of natural ventilation as a design strategy breaks the paradigm that green buildings are necessarily air-conditioned.

GREEN HOSPITALS

It has been observed in various studies that good indoor conditions help patients to recover faster. Certain key features of green buildings like better daylighting and access of views of good landscape, good indoor thermal comfort and indoor air quality help in faster recovery of patients. Therefore, it makes great

sense to incorporate these features in hospitals for ensuring faster recovery of patients. Additionally, environmentally conscious practices in hospitals would ensure that not only is the health of building occupants a priority but by reducing the pollution from the building, the hospital also contributes towards improving the environmental conditions of people in its vicinity. Therefore a green hospital provides good care for both people living within it as well as outside it.

ALL INDIA INSTITUTE OF MEDICAL SCIENCES

The Ministry of Health and Family Welfare, Government of India, is constructing 6 new AIIMS across India along similar lines as the AIIMS at New Delhi. All 6 upcoming AIIMS across India (Bhopal, Bhubaneswar, Jodhpur,

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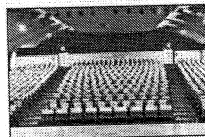
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URIA



Figure 2: FORTIS Shalimar Bagh, 3-star TERI-GRIHA rated (provisional rating).

Patna, Raipur and Rishikesh) are registered with GRIHA rating system and are being designed and constructed to achieve a minimum of 3-star GRIHA rating.

There are several features being incorporated in the AIIMS projects. Several steps are being taken in the AIIMS projects to make them as energy and water efficient as possible. In order to reduce energy consumption, all the AIIMS buildings have ECBC compliant building envelope, efficient artificial lighting system and HVAC systems. AIIMS Bhopal and Patna are also installing an Earth-Air tunnel system to further increase the energy efficiency of the buildings. With respect to water efficiency, all AIIMS are being fitted with low-flow fixtures to reduce water consumption, which reduce the water consumption. In addition to this, water recycling systems are being installed in order to recycle and reuse grey water, to further reduce the demand for fresh water.

Renewable energy systems are also being incorporated in the projects. All AIIMS are installing solar water heating systems as well as Solar PV (Photovoltaic)

panels with AIIMS Bhopal planning to install a 110 kWp solar PV system.

There are several other features which are being incorporated in the projects. AIIMS Rishikesh has been designed on an innovative structural grid system which reduces the overall concrete consumption as well as enables easy future expansion.

GREEN HOSPITALS AND GRIHA: CASE STUDY FORTIS HOSPITAL, SHALIMAR BAGH, DELHI

The FORTIS hospital, located in Shalimar Bagh, New Delhi is an excellent example of a green hospital. The project was awarded a 3-star provisional TERI-GRIHA rating in 2010. It goes to show the commitment by the management to ensure that the detrimental impacts on the environment due to the hospital processes are minimized.

From the initial design stages, the FORTIS team worked very closely with the energy consultants for the project. The consultants worked closely together in order to provide an integrated solution towards making the project green. Majority of the site has been

Conditioning systems. By adoption of highly efficient lamps, luminaires, chillers and controls the overall energy consumption was reduced by about 31 per cent over the GRIHA benchmarks and by about 48 per cent compared to a conventional hospital.

Note: EPI stands for Energy Performance Index. It is a measure of total energy consumed in a building for a unit built-up area for one year. In GRIHA, it is measured in kWh/sq.m./annum.

CONCLUSION

The green building movement in India is gaining impetus. All stakeholders, including the building occupants, have begun to realize the necessity and advantages of green buildings.

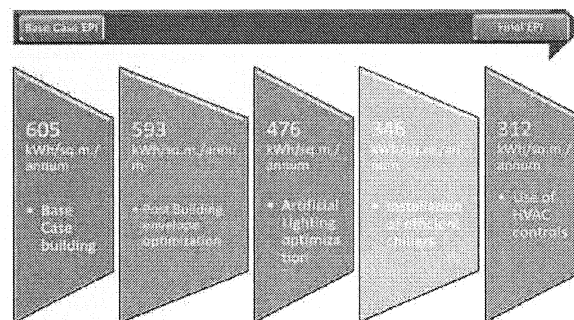


Figure 3: reduction in EPI in FORTIS Shalimar Bagh.

covered with grass pavers in order to reduce the Urban Heat Island Effect in the area. The building envelope has used Autoclaved Aerated concrete blocks instead of conventional bricks. The windows are double-glazed units with low thermal transmittance. The roof has been covered with vermiculite and highly reflective tiles. The net effect of the envelope measures was a significant reduction in the heat gain through the building envelope.

Once the building envelope was optimized, the next step was to optimize the mechanical systems like artificial lighting systems and Heating, Ventilation & Air

Efforts are required to ensure that the future hospitals are green and sensitive to the environment. ADARSH is engaging actively with various stakeholders as well as upcoming hospitals to ensure that all future hospitals are designed and constructed to be as environmentally friendly as possible. This helps in benefit to the hospital management, building occupants, patients as well as society as a whole. ▲

Note: For any information on GRIHA, SVAGRIHA, GRIHA for Large developments, training programs on green buildings, fast-track-EIA clearance, workshops etc. please visit the website: www.grihaIndia.org