PROJECT REPORT

Green BMCHRC
Making Sustainable Development a Reality

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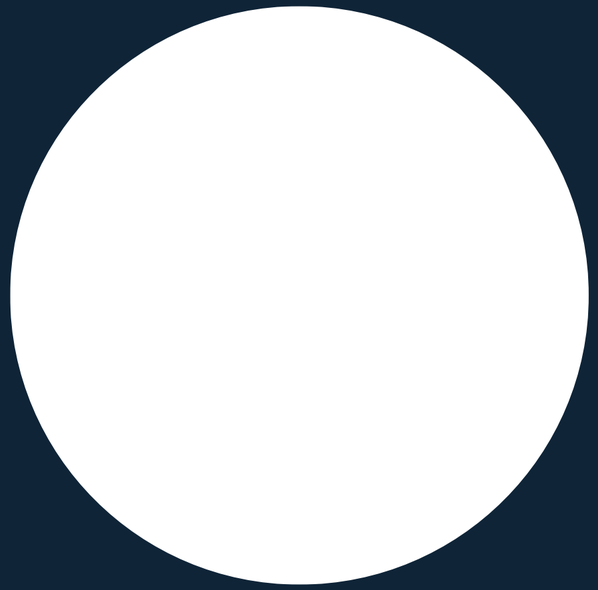
What do you think is THE COLOUR of a hospital?



Purity & Cleanliness

- However, recent research has suggested that hospitals that are painted green heal their patients quicker and have a lower mortality rate.

- The green color relaxes patients and makes them feel more at ease.

- Green was a popular choice. Surgeons first added “spinach-leaf green” to their clothing in 1914 to reduce glare from traditional hospital whites.

- In the 1930s, hospital decorators used green to influence patient moods. It carried associations with nature, growth and recovery.

- Tiled surgical suites, patient rooms, clothing and instruments all went green in the post World War Two era.

So, why can't a BUILDING be GREEN?

Evaluation Report on the Green Building Hospital Planning of BMCHRC.

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INTRODUCTION

- Healthcare sector, by consuming resources, constructing, and operating large or small, complex, or not establishments, including technologies that are some of the most energy-intensive and producing various types of waste—including medical waste—has itself become a public health concern.

- According to Indian Green Building Council, a green hospital building can be defined as one which enhances patient well-being, aids the curative process, while utilizing natural resources in an efficient, environment-friendly manner .

- The primary goal of designing a green building is to reduce the use of resources such as land, water, energy, and supplies so that the people who live, work, learn and heal in green buildings are healthier, happier and more productive.

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CERTIFICATIONS

- The Confederation of Indian Industry (CII) established The Climate Neutral and Sustainable Buildings Council in 2001 to promote the development of climate neutral and sustainable buildings throughout India, so that by 2025 it will be a global leader in this effort. The council is licensed by the US Green Building Council to award LEED certificates for projects investing within India.

- Green Rating for Integrated Habitat Assessment (GRIHA) is the national rating system of India for any completed construction, endorsed by the Ministry of New & Renewable Energy (MNRE), Government of India and TERI. It is an assessment tool to measure and rate a building's environmental performance.

- Against this background, the Indian Green Building Council (IGBC) has launched 'IGBC Green Healthcare rating system® to address National priorities. This rating program is a tool which enables the designer to apply green concepts and reduce environmental impacts that are measurable.

BENEFITS OF HAVING A GREEN BUILDING HOSPITAL

- The energy savings could range from 30 - 40 %
- Water savings around 20 - 30%
- Improved health and hygiene
- Enhanced daylight
- Connectivity with nature
- Improved health & hygiene for better infection control
- Faster recovery of patients by 15%
- Reduction in patient stay by 41%

OBJECTIVES

· A primary goal of designing sustainable hospital's building is to limit the environmental impact of the hospital structure, while improving the economic and social consequences of the people occupying the building.

· To utilize key resources like energy, water, materials, and land much more efficiently than traditional structures.

· To create healthier, more comfortable, and productive indoor environments.

· To make BMCHRC a sustainable building seeking to reduce the environmental footprint and enhance its economic and social value for its owners, occupants, and the surrounding community.

· To try reducing the cost of implementing energy-efficient devices

GREEN Initiatives by BMCHRC

Fig 1: Bio Methanation Plant at BMCHRC

Fig 2: Pantry near the wards at BMCHRC

BIO-METHANATION PLANT

Bio-methanation is the process of combining organic waste materials into biogas and in generating manure that is used as fertilizer for plants at the hospital's garden.

1) Total Food Waste generated in the hospital in the month of May: 353 kgs
Total Compost received after getting processed in the month of May: 253 kgs.

2) Total Food Waste generated in the hospital in the month of June: 425 kgs
Total Compost received after getting processed in the month of June: 345kgs

Fig 3: Sewage Treatment Plant at BMCHRC

Fig 4: Water being used for gardening purposes.

SEWAGE TREATMENT PLANT

To maintain cleanliness and sanitation of the hospital, wastewater from different departments such as operation theatre, emergency ward, laundry, etc. is treated.

The treated water from this plant can be used for gardening purposes only since bacteria are still present in the treated water and organisms such as algae, fungi, flourish on it.

Fig 5: Patient Parking Space – 120kw

Fig 6: Terrace- 50kw

SOLAR PANELS

BMCHRC has two Solar Panels- One is on the IPD Terrace (50KW) and the other one is in the Patient Parking Lot (120KW).

Total Power Generated by Solar Panels in the Parking Lot-
May: On an average 616.45 KWH (Out of which, solar was off for three days)
June: On an average 612.37 KWH

Total Power Generated by Solar Panels on the IPD terrace-
May: On an average 197.59 KWH.
June: On an average 262.7 KWH

According to The Energy Sage Solar Marketplace in 2020, solar shoppers can achieve payback on their solar investment in about 8 years.

Total Electricity Consumption (kWh):
May : on an average 366520 (814.04 from the solar panels)
June : on an average 395920 (875.07 from the solar panels)

Fig 7: Chiller Plant at BMCHRC

CHILLER PLANT

A chiller plant acts as the central cooling system for the building.

Chiller Plant uses the water coming from the 3 Borewells. The average consumption in-

MAY:

Borewell 1- 54,000 L

Borewell 2- 30,000 L

Borewell 3- 37,000 L

JUNE:

Borewell 1- 45,000 L

Borewell 2- 80,000 L

Borewell 3- 36,000 L

Out of this 35,000 L of water is used by the chiller tank in the centralized cooling system present in the corridors and rooms. Hospital is still left with 3.5 to 4.5 lakhs liter as reserve.

Fig 8: Inside Nuclear Medicine Department at BMCHRC

Fig 9: Children Activity Area at BMCHRC

BIOPHILLIA

Biophilic design is a concept used within the building industry to increase occupant connectivity to the natural environment through the use of direct nature, indirect nature, and space and place conditions.

The hospital knows that redesigning the hospital experience from a biophilic point of view can benefit patients. Exposure to natural elements; whether directly from nature or interpretations of it, can help to reduce stress and anxiety for both the patient and for his/her loved ones. It also reduces the carbon print.

Fig 10: Main Entrance

Fig 11: Surgical Ward at BMCHRC

Fig 12: Near the OPD Billing at BMCHRC

NATURAL LIGHT

Light is a healing force that regulates the body's circadian rhythm, controls sleep-wake cycles, and plays a role in emotional health, heart function, body temperature, and other functions necessary for healing.

Benefits of Natural Light in the Hospital :

1) Reduced Length of Hospital Stay
2) Faster Postoperative Recovery
3) Increased pain relief
4) Improved employee morale:

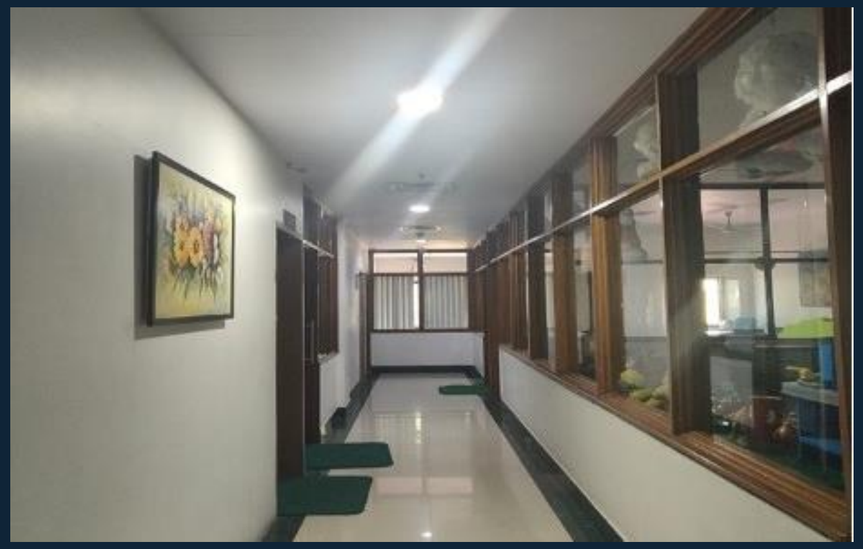


Fig 13: Outside Children Activity Area at BMCHRC

Fig 14: Surgical OPD at BMCHRC

LED LIGHTINGS

- With an estimated 80-90% energy efficiency compared to traditional lights, LEDs are a more efficient lighting option and significantly lower energy usage.

- All the lights were changed to LED last year. This was done to prevent short-circuiting, fires, and to eliminate the problem of burnt-out light bulbs. The hospital has 700 LED lightings which consume about 15KW of power.

Fig 15: Near Cancer Care (Arogya Dham)

Fig 16: MRD Department at BMCHRC

MATERIALS AND RESOURCES

Materials that are less energy-intensive, such as bamboo which grows very quickly, will make it possible to reduce the greenhouse gas emissions associated with traditional construction materials.

Paper products are made of organic materials that can be recycled. The Central Store at the hospital collects old paper products and then they donate them to be recycled. As a result of this recycling in total over 9600 kgs have been diverted from the landfill in just one year alone up to March 2021.

Fig 17: Biomedical Waste Room at BMCHRC

BIO-MEDICAL WASTE

Our hospital has 10 wards, 5 major and 1 minor operation theatres (OT), an outpatient department (OPD), and emergency services as well as a laboratory. We also have a waste treatment area that is approximately 500 meters away. In total (May and June), the hospital handled 8463.58 kilograms of BMW .

Waste generated during May and June 2021

- Yellow Biomedical Waste: 2300.98 kgs
- Red Biomedical Waste: 3771.39 kgs
- White Biomedical Waste: 127.01 kgs
- Blue Biomedical Waste: 2264.20 kg

Fig 18: Water Treatment Plant at BMCHRC

WATER TREATMENT PLANT

Chiller Plant uses the water coming from the 3 Borewells. The average consumption in-Out of this 25,000 L of water is used by the water treatment plant for filtering out water for drinking purposes and 70,000 L of water is used by the water treatment plant for gardening.

Fig 19: Way to Arogya Dham at BMCHRC

AROGYA DHAM

The way to Arogya Dham building was refurbished by the hospital itself using leftover resources, paint and other supplies which made it extremely cost-effective to maintain. The hospital already had the manpower on hand and this arrangement allowed for a great saving of both time and money. Like a pretty painting, nature is an image that elicits a sense of euphoria in people, which can improve general well-being as well as your mood on any given day.

Recommendations and Suggestions

- Replace round tap with a sensor/Pressmatic tap, this will not only save the environment but will also prevent illnesses that one can get while sharing the same tap for hand-washing

- Move the Bio-Methanation plant near the canteen. Bio-manure and biogas generated here can be supplied to cater to the waste disposal needs of both the canteen and onsite gardens. The biogas generated can be used to cook food, whereas the bio-manure can be used in gardening. This will help reduce the wastage of resources in our internal ecosystem.

- The administration should take out the food waste generated per bed for better analysis.

- Green buildings are unique in that they focus on minimizing risks and staying away from error-prone situations at all cost. That being said, navigation can also be very risky and potentially dangerous, so for best results when it comes to signage or wayfinding inside of a Green Building, consider implementing and using a strategy that prominently incorporates color coordination schemes.

• Draft to plan and keep track of when instruments are available. One way is to divide and categorize the surgeries is according to urgency:

- Instruments must be available within 3 hours
- Instruments must be available within 5 hours
- Instruments must be available in the afternoon
-Instruments must be available the following day

This categorization and optimization help you to optimize your operation planning process and determine how to set-up and run your washer-disinfectors and sterilizers.

- A shift towards e-prescriptions could save thousands of tons of paper each year. In addition to reducing paper, the move may also improve the sustainability of pharmacy practice and may reduce prescription errors caused by illegible handwriting notes – leading to better health outcomes for patients.

- It's important to find a new place for your Palliative Care Unit where there aren't so many patients/attendants/employees in the vicinity because of the busy corridor (Canteen). In Palliative Care, noise can impact patients' ability to rest or work, take medicine, and develop skills required for recovery. It has also been linked with worsened appetite, anxiety, depression, fatigue, and physical exhaustion - all of which could lead to longer patient stays in the hospital.

Fig 20: Outside Palliative Department at BMCHRC

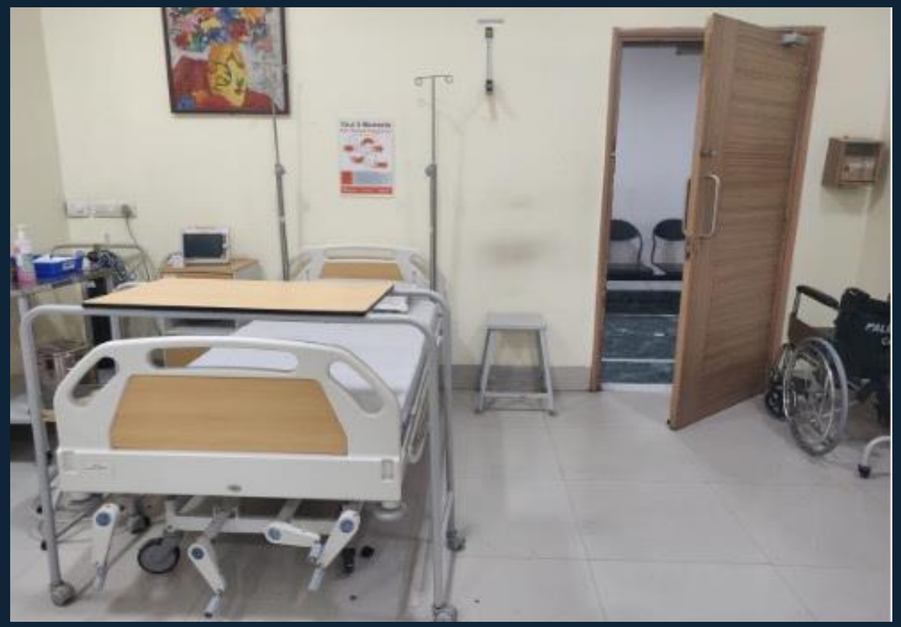


Fig 21: Inside the Palliative Department at BMCHRC

- Hospital should implement the principles of Japanese manufacturing industry, 5S which is a highly effective lean manufacturing methodology to ensure workplace cleanliness, efficiency, and safety. By taking care of environmental issues such as workplace cleanliness and safety, the 5S method facilitates risk management, waste reduction, cost savings and employee engagement.

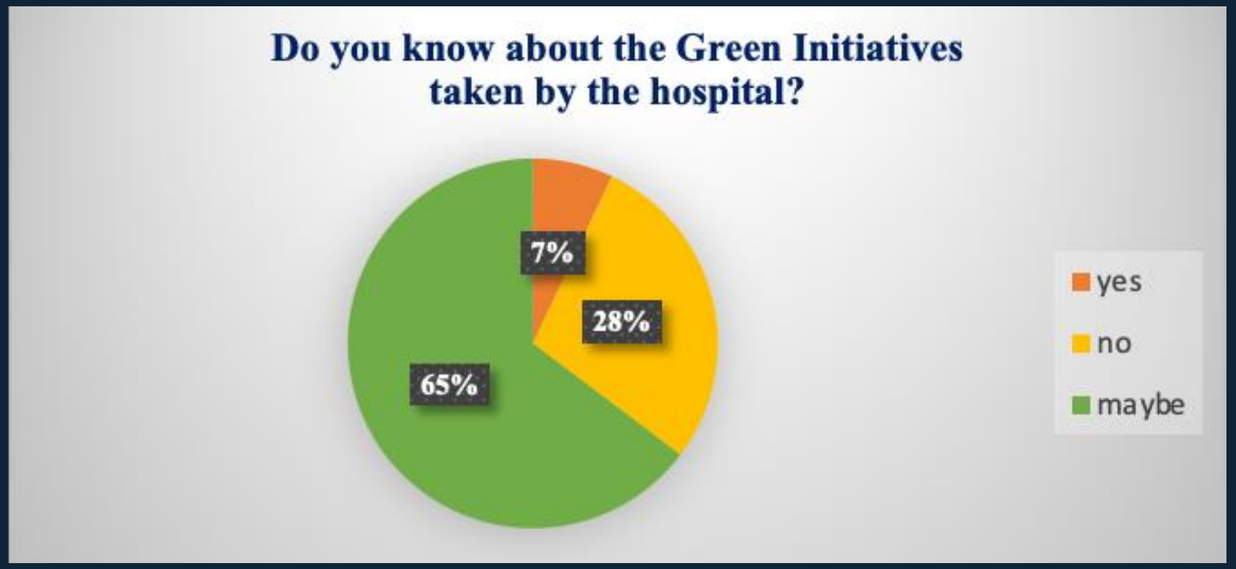
1. Sort - Remove unnecessary items from each area

2. Set-in Order - Organize and identify storage for efficient use

3. Shine - Clean and inspect each area regularly

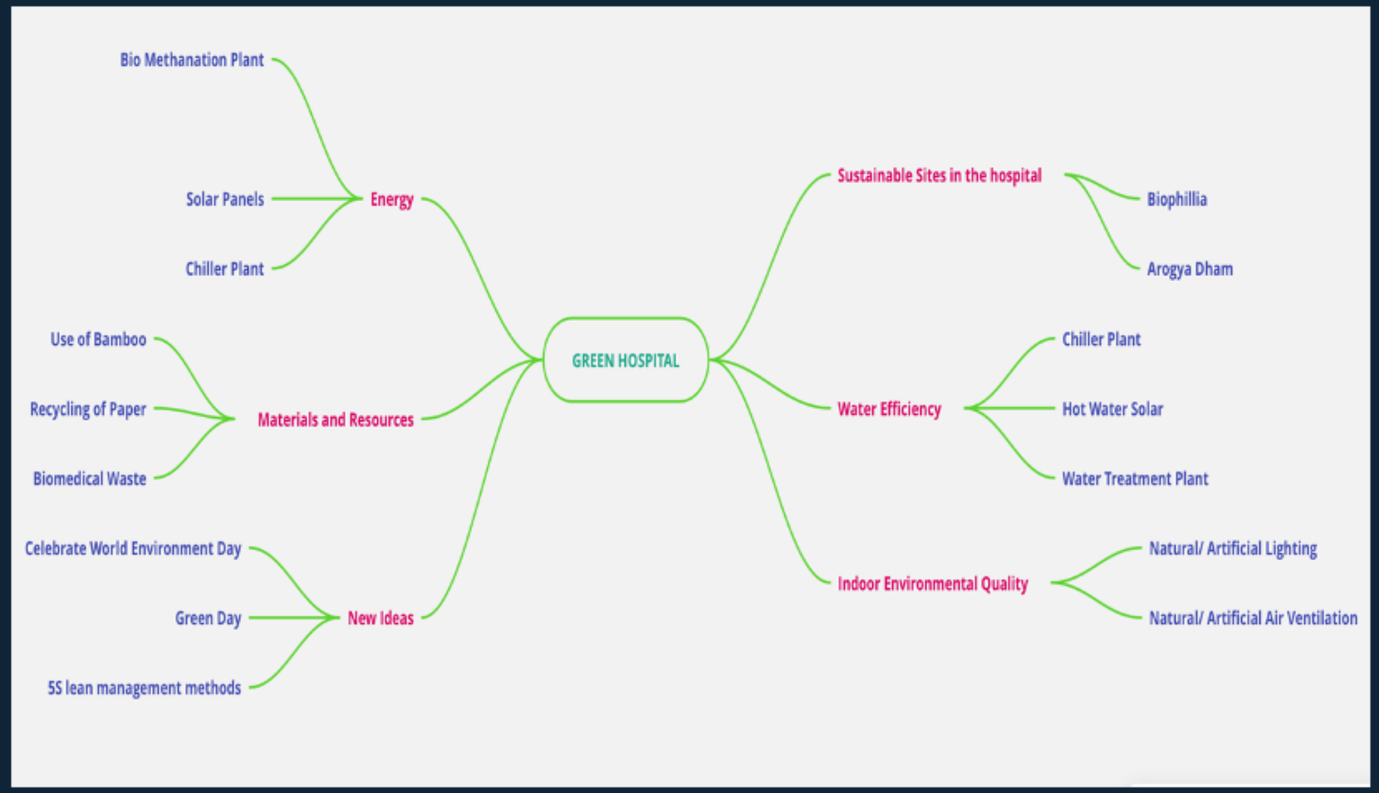
4. Standardize - Incorporate 5S into standard operating procedures

5. Sustain - Assign responsibility, track progress, and continue the cycle



The hospital should celebrate Green Day, World Health Day, and World Environment Day. They can do this by planting trees to establish a greener environment as well as to raise awareness about the eco-friendly initiatives that the hospital has taken up in previous years.

INTERPRETATION



IGBC Green Factory Buildings rating system addresses green features under the following categories

- Site Selection and Planning
- Water Conservation
- Energy Conservation
- Materials Conservation
- Indoor Environmental Quality
- Innovation and Design Process

VISION
MARCHING TO CERTIFICATION

Instead of 5, IGBC has given 12 new areas to encourage all key stakeholders including hospital owners, doctors, administrators and facility managers to incorporate and practice relevant measures to combat spread of COVID 19 in Healthcare facilities. The guidelines have been broadly developed addressing the following 12 areas of concern:

- Layout
- Site Selection for Greenfield Facility
- Modular Structures for Temporary Facilities
- Hygiene Practices
- Ventilation Parameters
- Energy Efficiency
- Water Conservation
- Waste Management
- Interior Furnishings
- Facilities for Health Workforces

BMCHRC should focus on new areas and should hire a green building consultant to evaluate the use of renewable energy sources. Moreover, it needs to start comparing itself with the other hospitals that have already moved forward with positive steps towards reducing their carbon footprint.

CONCLUSION

The hospital has initiated various steps towards becoming a greener, more environmentally conscious structure and eventually practice. They have carried out this mission while maintaining an increasing number of patients per year even though the energy consumption has remained steady over the past few years, showcasing their commitment to protecting the environment as well as their patients who come from it.


Thank
you