

# Innovative Techniques and Methods used for an Improvement in Energy Saving in HM World City Bangalore

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**Abstract**— The design of buildings Using advanced designs and construction techniques that reduces heating, cooling, lighting, energy consumption with energy saving devices. The behavior adjustments that have the highest potential for utility energy savings. It can save carbon emission and changing climatic conditions.

**Day lighting** - Natural light is one of the factors within a building as much as possible. Introduction of skylight with passive solar design. Orientation of the building is to be designed to achieve impact from south side ultraviolet rays.

**Natural air flow**- Doors, windows, ventilators are the components of a building which reduces the air conditioning and heating equipments.

**Landscape** – Planting trees and vegetation or installing sun filters on the openings to reduce radiant heat. Vegetative roofing systems can keep water out of a building, reduce storm water run-off, reduce stress on urban sewer systems and decrease run-off related pollution in waterways

**Waste management, Energy management, Environmental Management, Water management** these systems are helps to enhance energy saving techniques.

**STP** - Sewage treatment plant to be provided to convert recycled water to soft landscaped area. Even this water can be converted after softening plant into use of flushing tanks in WC

Replacing florescent lamp to LED bulbs to produce same light and can have longer times and plentiful lighting.

Dry and wet waste is segregated at source. In dry waste recyclable and non recyclable are also separated at source.

Rain water harvest management is made compulsory by local and legal authorities.

The paper thus deals with the various energy saving concepts which can be incorporated at the time of planning, designing, landscaping. Construction and execution stage to have energy efficiency in buildings.

**Index Terms**— Construction technique, Landscape, Management, Orientation, Recycle

## I. INTRODUCTION

H M World city is a residential complex in JP Nagar 9th Phase Anjanapur, Off Kanakapura Road, Bangalore. The HM World city is spread over in 28 acres of land. The residential luxury residential segment. The project offers spacious Apartments with luxurious features. Beautiful landscapes all around HM Indigo make it more special & Elite. The builder is provided all possible amenities to bring a quality living experience to the community of JP Nagar, with brilliant architecture and equivalent lifestyle in HM World city. It's Location has excellent connectivity near existing and upcoming communities & facilities. This apartment include a fully equipped clubhouse, landscaped gardens, gymnasium, swimming pool, recreation rooms, outdoor sports courts, children's play area, party hall, and meticulously planned with utmost importance to state-of-the-art 24/7 securities.



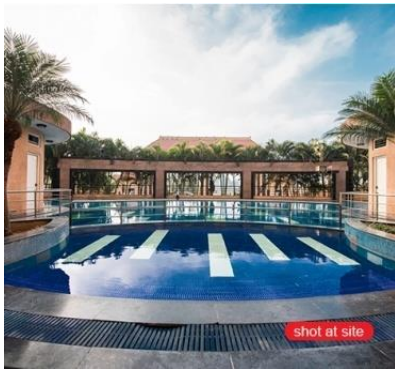
Fig. 1 Master Layout



**Fig. 2** Lay out of HM World city



**Fig. 3** 1 st Phase of HM World city



**Fig. 4** Swimming Pool



**Fig. 5** Swimming pool View from top floor



**Fig. 5b** Floor plan of Orchid Building



**Fig. 6** UPVC Window

The circulation and movement of the flats are well positioned according to the customer's feasibility. Each flat has all three sides open for cross ventilation. The position of a window is very important as an architectural element. The full size of glass openings are provided to get well natural lighting. Full glass doors are provided for all balconies. Material of all openings like sliding with three track windows, doors, Louvers, ventilators are provided with UPVC window. Sound insulated glass used for all openings.[1] The gaskets have provided for tracks to maintain thermal comfort. The position of window in a room is provided to get maximum day light. They have done planning in such a way that, longitudinal facade is facing towards external side. Reference for calculating day light factor is as follows.[2]

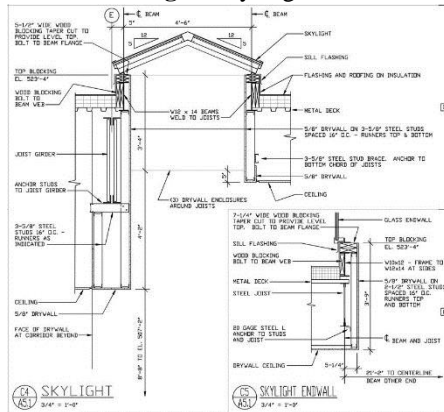
**Day lighting** - Natural light is one of the factor within a building as much as possible. Introduction of skylight with passive solar design. Orientation of the building is to be designed to achieve impact from south side ultraviolet rays.



**Fig. 7** Sky Light



**Fig. 8 Sky Light**



**Fig. 9a Sky light for Basement**

Parking is provided in the Basement. Skylight is provided for natural lighting for easy movement of vehicles. This is one of the architectural elements to prove energy saving technique by HM World city developers [1].

**A. Orientation**

In master layout the buildings have organized in concentric semi circle.

First phase have three buildings in small semicircle facing to main entrance. each building has 96 flats with basement +14 floors. Each floor has 6 flats with combination of two different typologies. Lavish planning of internal areas with quite large corridor for connecting each flat. All flats are facing east west direction, every room has balcony projections to get warm weather, day light, comfortable luxurious feeling etc.

**Natural air flow** As the layout is oriented to get natural light and provided window position proves natural air flow in all flats in all buildings [2]

**B. Landscape**

Landscape is well designed with proper zoning, using all landscaping elements like in Hard cape Pavers with grey and terracotta combination used in all setback area, as it installed with color combination to show surface parking, vehicular movement area, jogging track, cycle path, etc. As this layout has different contours, well managed sloped tiling with low gradient walking paths with proper railing. Pavers is all in antiskid in nature. Landscape design creates a visual representation of a site using scaled dimensions [4].

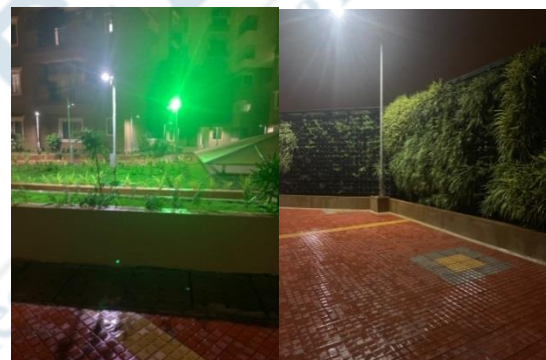
Soft cape elements are shrubbery, trees, and flowers, fountain, ground coverage. Moulds have created to break the

monotonous of grass as ground coverage. Combination of colors of crotons, flower plants, with proper curbs of 0.45 m in height with granite facial for sitting and mud should not fall on pavers. Landscape lighting done with proper layout with different lighting poles..In-between two concentric buildings beautiful pockets of shrubs, plants with different heights, colors are organized, serpentine path way created along with the pockets.

Children Park along with amphitheatre is provided in this layout. Proper sitting benches along with Senior Citizen Park.



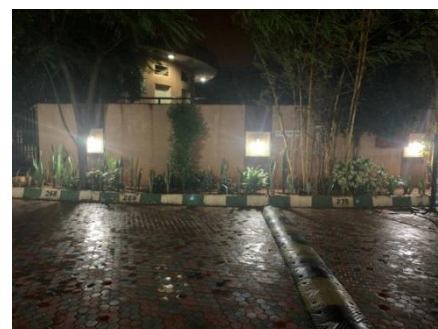
**Fig 9b soft cape pockets**



**Fig 10 pathway along skylight**

**C. Energy management**

In common areas well lighted with CFL bulbs changed from fluorescent lamps. Replacing all traditional bulbs into CFL as it give same illumination. These are all energy saving [3].



**Fig. 11 pavers**

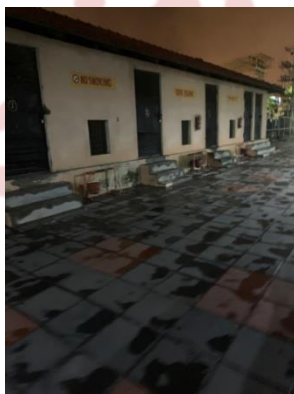


**Fig. 12** LED Bulbs

Opening a window, or building door is a simple energy saving technique that can help **reduce air conditioning and heating costs** by relying on natural ventilation for climate control [6]

**D. Waste Management**

In this apartment waste segregation is done since 4 years, wet waste and dry waste. From wet waste they will decompose and make manure for using this in landscape area. Space created for dumping dry waste. According to ward wise local government will organize to take dry waste. Sewage treatment plant have built in this layout. Recycled water will distribute to the landscape area. And after filtration the same water will be using for flushing in toilet area. Rain water harvesting is properly utilized from terrace and surface drains also provided to collect water. The same water can be treated and distribute into the flats.



**Fig. 13** Gas block

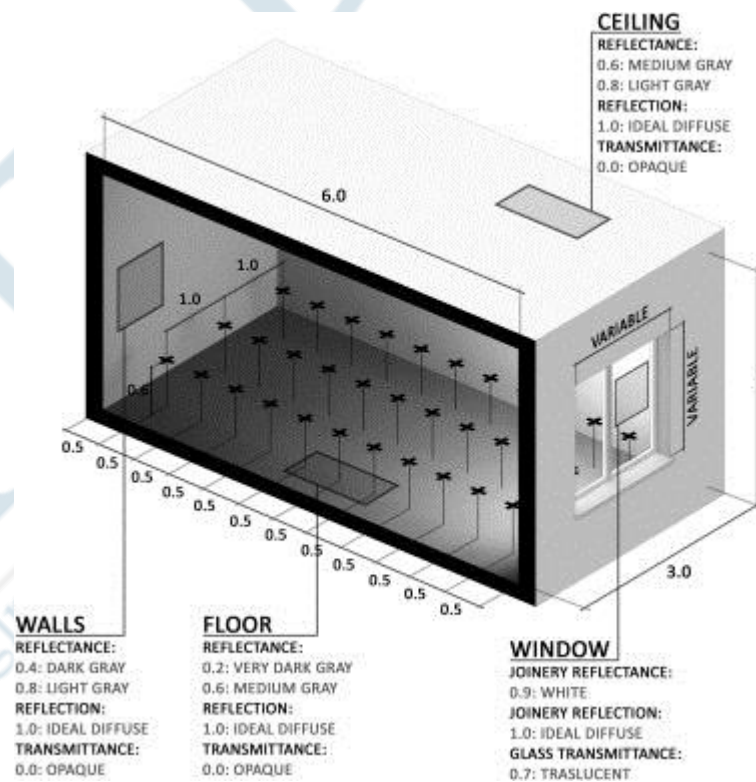
Main gas pipe connection to each individual flat is provided to reduce energy for geyser etc. Provided Amenities in HM World city proves that many energy saving techniques have used. Economics and environmental aspects of a building are merge to each other.

**II. LITERATURE STUDY**

**A. Choosing the calculation model**

The calculation model for the analysis of daylight factors is defined as a room 3.00 m wide by 6.00 m deep by 3.00 m

high. The ceiling, walls and floor of the room have a thickness of 0.25 m. A window of variable shape, size and position is located in the 3.00 m wide façade. The double-leaf window has 0.05 m thick joinery and double glazing which produces a solar factor of 0.7.[5] The reflectance of the inner surfaces of the calculation model is variable, accordingly two basic room models –with light or dark surfaces– are defined. The inner surfaces of the room are diffuse reflectors and the Lambertian reflection of daylight is therefore directly proportional to the cosine of the angle between the observer's line of sight and the surface normal. All variables of the calculation model are shown in Fig. 1:



**III. CONCLUSION**

By making small changes to your facility’s lighting, air conditioning usage and switching off equipment when not in use, you can make a big difference to your yearly energy consumption. Once you’ve mastered the basics, you may consider energy efficiency measures such as power factor correction, or energy monitoring to gain a better understanding of which systems consume the most energy.

**REFERENCES**

[1] AjitDanti,Suresha M and S.K Narasimhamurthy, “Invariant of Rotation and Scaling for Classification of Arecanut Based on Local Binary Patterns”, International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 10, October 2013.

- [2] HarishaNaik T and SureshaM, "Classification of Arecanut based on Color Features", International Journal of Circuit Theory and Application, 9(3), 2016, pp. 47-57.
- [3] Kuo-Yi Huang, "Detection and classification of areca nuts with machine vision", Elsevier, Computers and Mathematics with Applications 64 (2012) 739–746.
- [4] Siddesha S, S K Niranjana and V N Manjunath Aradya, "A Study of Different Color Segmentation Techniques for Crop Bunch in Arecanut", Copyright © 2020, IGI Global, Chapter 48.
- [5] Siddesha S, S K Niranjana, and V N Manjunath Aradhya, "Texture based classification of Arecanut", International Conference on Applied and Theoretical Computing and Communication Technology, 2015.
- [6] R Dinesh, N K Bharadwaj, "Possible Approaches to Arecanut Sorting/Grading using Computer Vision", International Conference on Computing, Communication and Automation, Greater Noida, India, 5-6 May 2017



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