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Sustainable Urban Housing

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Abstract: Housing is a basic need for every person. The concept of sustainability is widely known as it focused on three pillars which are social, economic and environment. To accomplish the goal, housing sector could play an important role as it has significant impact to all those three dimensions. Housing represents one of the main areas of expenditure in Indian society. Affordable and decent housing continues to constitute an essential part of the quality of life.

Many aspects of housing and urban issues are related to the broad concept of sustainability, which can be addressed from various angles. Sustainable urban communities are based on an approach that links economic, social and environmental issues and solutions. They are designed to be socially and economically viable, environmentally sustainable and equitable places. This challenging framework requires taking into consideration not only the needs of people facing difficulties to find decent and affordable residences on the general housing market, but also to meet the environmental requirements.

The present thesis focuses on the approach and experience in supporting sustainable housing and urban development. It also offers a brief overview of future trends and needs, widely examined in the study, affecting housing markets and shaping demand for housing and urban infrastructure. Finally, the case study provides some reflections on housing activities in the coming years, with particular attention being paid to the residential sector as a potential vector of environmental sustainability through improvements in energy efficiency. This whole society is ultimately created on the basis of three important techniques i.e. 3R Reduce, Reuse, and Recycle and so is this study.

I. INTRODUCTION

Housing is one of those basic social conditions that determine the quality of life and welfare of people and places. Where homes are located, how well designed and built, and how well they are weaved into the environmental, social, cultural, and economic fabric of communities are factors that, in a very real way, influence the daily lives of people, their health, security and well-being, and which, given the long life of buildings, affect both the present and future generations. Housing is therefore central to sustainable development.

In a rapidly changing and urbanizing world, the provision of adequate and affordable housing remains a key priority for all governments. However, the concept of housing requires a new understanding to effectively and synergistically address the pressing issues of slums prevention, the urban divide, economic and human development, and climate change. No longer regarded as simply a roof over one's head, housing today plays a crucial role in achieving sustainable development – as envisaged by the idea of sustainable housing.

It is rare that the social, cultural, environmental and economic facets of housing are addressed there in an integrated policy. In many developing contexts, the so-called pro-poor housing programs often provide accommodation of poor standards, in remote locations, with little consideration to the residents' lifestyle and livelihood strategies. In others, rapid housing developments create amplified carbon footprint and further negative impacts on the environment. Yet in most developing cities, decent and safe housing remains a dream for the majority of the population, while government considers affordable housing as merely a social burden.

II. OBJECTIVES

Sustainable Urban Housing outlines key concepts and considerations underpinning the idea of sustainable housing and provides a comprehensive framework for designing sustainable housing policies and practical actions. Although sustainable housing is often considered from a predominantly "green" perspective (resource saving, greenhouse gas reduction), this report advocates a more holistic approach, which recognizes the multiple functions of housing – as both a physical and social system – and which seeks to enhance and harmonize the environmental, social, cultural, and economic dimensions of housing sustainability. Thus, along with the solutions for the built environment (resource and energy efficiency, environmental, ecological and health safety, resilience to natural disasters), sustainable housing policies should deal with the affordability, social justice, cultural and economic impacts of housing, and contribute to making healthy residential neighborhoods and sustainable cities.

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It is only through sustainable solutions that the tensions between urban growth, climate change, poverty alleviation, affordable housing provision, and access to quality residential services, clean energy and environmental conditions can be mitigated, while the potential of housing for improved economic prosperity and social development can be further unlocked. Well-designed, inclusive and participatory housing policies and programs have much to offer to this end.

Although sustainable housing is often associated with wealth and affluence, it does not need to be so – genuinely sustainable houses are those that are inclusive and affordable for all. Addressing the issue of affordability is, therefore, a necessary condition for transformation towards sustainable housing. And yet affordability is not enough, because the so-called affordable homes cannot be considered sustainable if they create negative impacts on the environment or social life. The marriage of affordability with other sustainability conditions is a must. In this project, the link between sustainability and affordability is discussed in the unified notion of sustainable housing.

Furthermore, while sustainable housing is often considered from a resource-saving (green) perspective, this project advocates a more comprehensive approach – viewing sustainable housing not simply as units or clusters of self-sufficient "green buildings", but as socially-enhancing and environmentally friendly residential practices integrated into the wider urban/settlement systems. This approach is necessitated by the holistic perspective of sustainable development and by the very multi-faceted nature of housing.

A. A Sustainable Building Is A Building That Can Maintain Or Improve

- The quality of life and harmonize within the local climate, tradition, culture.
- The environment in the region.
- Conserve energy, resources and recycling materials.
- Reduce the amount hazardous substances to which human and other organisms are (or may be) exposed and
- The local and global ecosystem throughout the entire building life-cycle.

B. Sustainable Houses Are Those That Are Designed, Built And Managed As

- Healthy, durable, safe and secure,
- Affordable for the whole spectrum of incomes, • Using ecological low-energy and affordable building materials and technology,
- Resilient to sustain potential natural disasters and climatic impacts,
- Connected to decent, safe and affordable energy, water, sanitation and recycling facilities, • Using energy and water most efficiently and equipped with certain on-site renewable energy generation and water recycling capabilities,
- Not polluting the environment and protected from external pollutions,
- Well-connected to jobs, shops, health and child-care, education and other services,
- Properly integrated into, and enhancing, the social, cultural and economic fabric of the local neighborhood and the wider urban areas,
- Properly run and maintained, timely renovated and retrofitted.

III. METHODOLOGY

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IV. RESULTS

A. Study Area

- Telangana state, Rangareddy district located at latitude 17° 23' 26.3544" N and longitude 77° 50'4.8984''E.
- Total area is 7,493 km²
- 6,458.73 km² rural area
- 1,034.27 km² urban area.
- 29.78% population in rural.

B. Climatic Condition

- Normal rainfall of 781.5 mm.
- Winds are generally light to moderate with some increase in force during May and South-West monsoon season.
- Forest area 7.63percent of the total geographical area.
- Low rainfall and inhospitable soil conditions.
- Eastern portion restricted to isolated hills.
- Western portion are slopes of the hillocks and plateau.

Sl. No	Equipment	Power (P) (Watt)	Number (n)	Approximate working hours per day (t) (hr.)	Total energy consumption per day (P*n*t/1000) (KWh)
1.	CFL	20	14	2	0.8
2.	TUBE	40	7	3	0.840
3.	CEILING FAN	75	5	7	2.625
4.	TELEVISION	100	1	5	0.5
5.	LAPTOP	65	1	2	0.130
6.	SCANNER	70	1	0.167	0.012
7.	MOTOR	370	1	0.25	0.0925
8.	IRON BOX	750	1	0.25	0.1875
9.	CELL PHONE CHARGER	2	3	1.5	0.009
10.	SETTOP BOX	8	1	5	0.04
11.	MIXER	750	1	0.167	0.125
	TOTAL				5.361

Table 1: ENERGY CONSUMPTION

1) Rainwater Harvesting

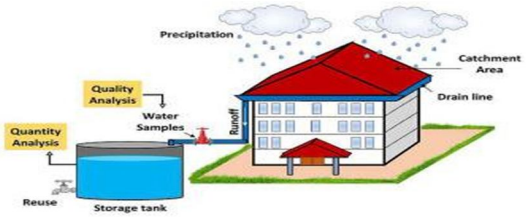


Figure 3: Rain Water Harvesting

2) Stages in Rain Water Harvesting

- Collection stage
- Distribution stage
- Storage stage

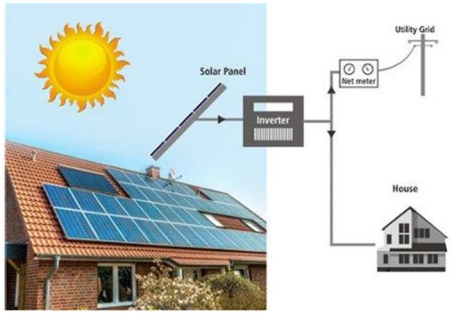


Figure 4: Solar Panel System

C. Calculations

- Power consumed monthly = 5.36 x 30 = 160 kW/h
- Power consumed annually = 160 * 12 = 1920 kW/h
- Specifications of system:
- Solar system size = 5 Kw
- Approximate roof space = 50 sqm
- Typical cost = Rs.1,85,650 /-
- Typical annual output = 7.5 MW/h

1) Benefits of Net Metering

- Net metering can save house owners hundreds of rupees on their utility bills every year, so it's a good reason to make the money-saving choice and go solar sooner rather than later.
- There's another benefit from net metering. Since your solar system is generating electricity near the point where it will be used.
- This reduces strain on the grid's distribution and transmission infrastructure and minimizes energy loss from sending voltage many miles from the nearest power plant.
- While some claim that net metering represents an unfair burden on non-solar electricity customers, many net metering cost-benefit studies have found the opposite to be true.

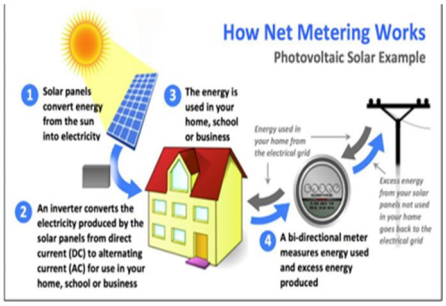


Figure 5: Working of Net Metering



Figure 6: Difference between clean, black and grey water

2) Grey Water Recycling and Reuse

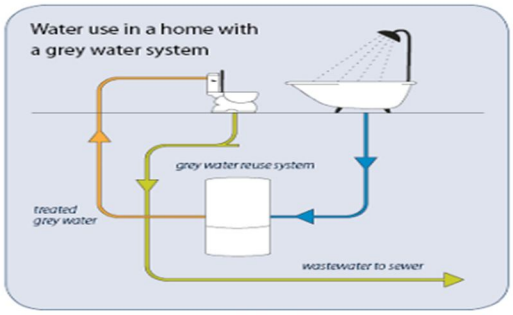


Figure 7: Grey Water System

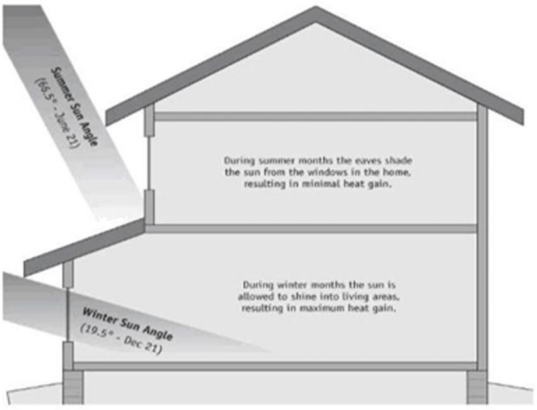


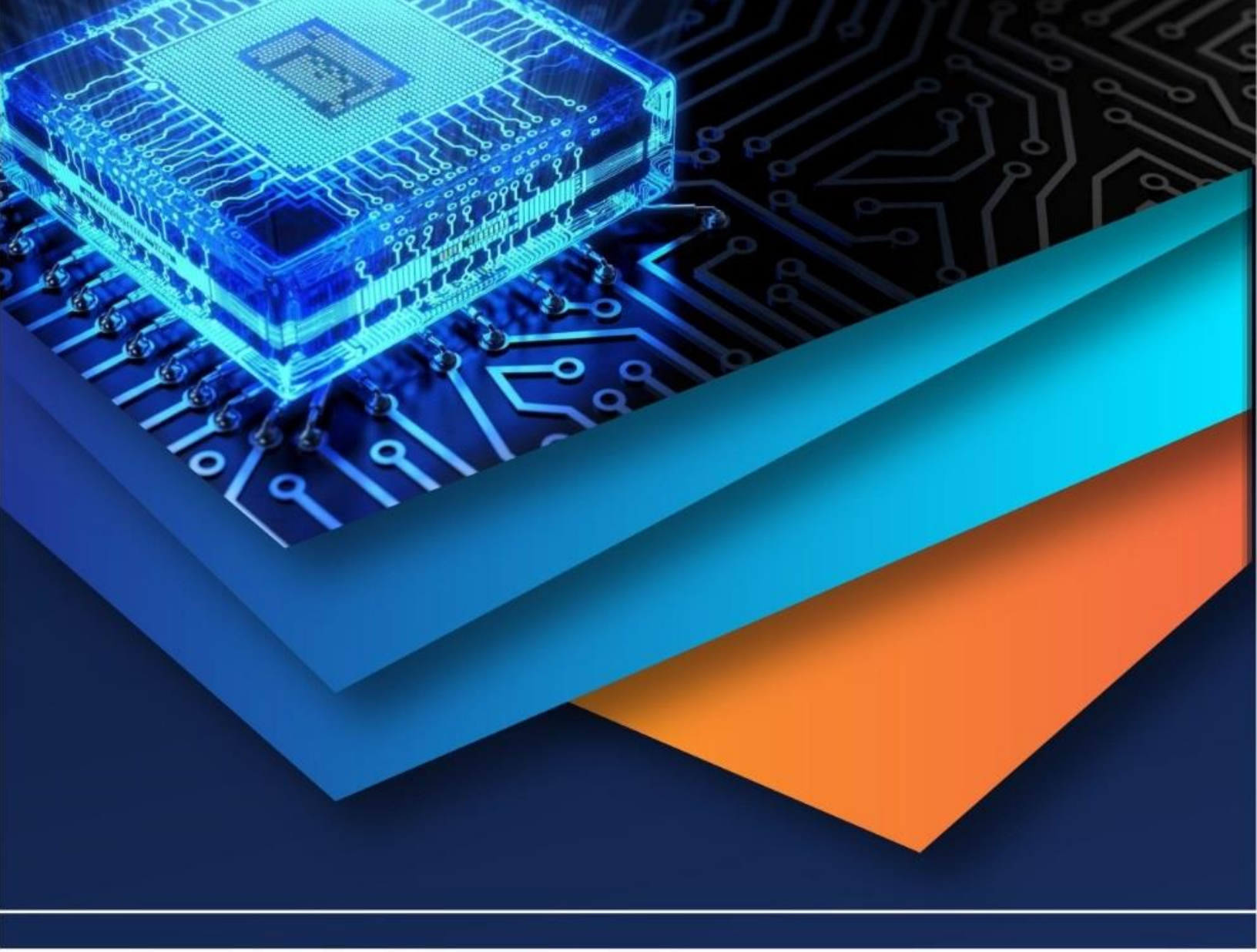
Figure 8: Orientation

V. CONCLUSION

1) Sustainable housing provides a healthy safe environment to occupants.
2) It conserves energy minimizes CO2 emission, also produces less waste.
3) We had tried to break the myth that sustainability always costs more. Effective treatment of grey water that can be used for gardening, flushing, etc.
4) Harvesting rainwater in order to reduce deal with water scarcity in dry period.
5) Effective cooling system that provides air conditioning similar to that provided by an electric air conditioner.
6) Passive design which increases internal air flow and provides sufficient ambient light.
7) Solar panels help to produce necessary amount of electricity for household purposes.

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