

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 5, May 2017

Importance of Applications of Energy Efficient Buildings in India

Kundan B.Patil, Prof. Dr.S.C.Potnis

Department Of Civil Engineering, Maharashtra Institute of Technology, Pune, India.

ABSTRACT: Climate change, caused by the release of greenhouse gases (mainly CO₂) into the atmosphere has been recognized as one of the greatest threats of the world. The earth's condition is deteriorating rapidly and it will turn sever unless people adopt eco-friendly policies. Eco-structure building has long been a concept and widely practiced for better living. India, having 159.1 million people due to sharp urbanization, population explosion facing severe problem. Up to 40% of the entire energy level is utilized by the buildings and constructions. It's possible to reduce the amount only by converting the buildings into eco-structure or greening concept. This can provide 50% saving opportunity to the nation. Importance of building structures in eco-friendly way is now becoming the major concern. Moreover, it has a lot of benefits for the society, economy and human being. Some specific pre-requirements are must be followed before construction. Developer, land owner, consumer as well as the society will be benefitted equally. Through the pace of the urbanization, it's not an easy deal to go through eco-structuring or green building construction. Obstacles regarding eco-structure building with heavy weight population are a constant. People are now concern about better living and healthy environment. This study shows the scenario of rapid population growth, urbanization, importance of green building by finding some obstacles. Recommendations have been suggested on this regard.

KEYWORDS: climate change, greenhouse, eco-structure, deteriorating

I.INTRODUCTION

Nowadays, we are facing many environmental crises like threat of climate change, the depletion of natural resources, increasing air and water pollution and growing levels of solid wastes. These issues are becoming the major concern in valuing real estate assets and a key driver in the decision making processes. The strategic sustainability process as called "the halo effect" was more worldwide which is affected by the popularity in environmental actions criteria (Mansfield, 2009). Green building has become major topic for the property industry (Robinson, 2007). There have been many terms used of real estate overview for called "sustainable development" such as "green building" (US term), "sustainable building" (UK and Australia term), "sustainable architecture" and "sustainable construction" (Mansfield, 2009; Sayce, 2010). Green building is the practice of constructing environmentally responsible, sustainable and resource-efficient structure for living or other purpose. This includes efficient use of energy, water and other natural resources, protecting health and life, improving employee productivity by reducing waste, pollution and environmental degradation (McManus, 2012 cited from Varma, et al., 2014). "Eco-structuring" enhances sustainability. It benefits humans, community, environment, and a builder's. It is about tailoring a building with the local climate, conditions, culture and community, in order to reduce resource consumption (Karolidis, 2002).

With 159.1 million people, India remarks as one of the densely populated country. In this country land prices are high; natural disasters are very frequent. Sturdy found that, permanent housing ratio is barely 3 percent in rural locations whereas 24.28 percent found in urban centers (World Bank, 2014). Estimates suggest a shortage of about 5 million houses in India, with as many as 500,000 houses added annually in urban areas and 3.5 million added in rural regions (World Bank, 2014). The need for housing upgrades is also high, given the temporary nature of most dwellings and the slum problem in Dhaka City. Housing supply is not forthcoming, however, except for the upper-income groups catered to by private developers. Some non-government organizations (NGOs) and microfinance institutions (MFIs) fund self-construction for lower-income groups—but on a far smaller scale, relative to the existing need. Government housing provision has not managed to address the issue adequately. Moreover, housing affordability is being eroded by poor land administration policies, which have resulted in very high land prices that make urban housing prohibitive for lower-income groups; and in infrastructure that is inadequate for expansion into per urban and rural areas. In our

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 5, May 2017

country public and private housing systems are now growing in a large scale but the most important fact is that, these are not environment friendly in nature as well as these are becoming life threatening to us. So, “look” for a green building that helps to better living is urgent. While natural and resource efficient features can be highlighted in a building construction, they can also be invisible within any architectural design. Living in a green environment that helps to build healthy environment should be the blessing for living. In this study we have discussed about the importance of eco-structure building for the over populated India.

II. OBJECTIVES

Broad objective: The objective of this study is to understand and analyze the growing of urban population and showing the importance of eco-structure building for living. The specific objectives of this study are:

Specific Objective:

1. Figuring the population size and housing size in India.
2. To show the importance of eco-structure building by analyzing the goals and benefits.
3. Find out the problems regarding eco-structuring and providing some recommendation regarding the issue.

III. METHODOLOGIES

This study is basically qualitative in nature based on secondary data. Different national and international published literatures, journals, brochures, articles, researches, case, World Bank report, annual reports, industry news and developments have studied carefully to collect data the list which has been cited in bibliography and reference section of this paper. For better understanding and application of the topic a critical assessment of the existing literatures on the issue is being provided.

IV. LITERATURE REVIEW

In the 21st century greenhouse gases discharge resulting in climate change (basically carbon dioxide) in the environment (CE Report & EB Report, 2015), is being marked as the biggest challenge (Perez-Lombard et.al. 2008). In the overall greenhouse gas emission the infrastructural sector has been recognized as the most outsized contributor (Per-Anders Enkvist, Thomas Naucner and Jerker Rosander, 2007, IPCC, 2007, Nicholas Stern, 2008). Statistics shows that global energy (UNEP/WHO, 2009) consumption in residences, commercial areas, and other buildings (Horvath, 1999) is above 40%. Electric equipment are being used for conditioning the buildings and so the energy consumption is acute (Harvey, 2009). The prediction projects that as India and neighbor countries are in the moderate level the figure will be double (UNEP Kyoto, 2008). It indicates that within 14 years major ecological threats will come for the over populated nations as well as imbalanced unstructured building. Living in a life hazardous place is not expected by all. Green building or eco-structure construction has become major topic (Olanrewaju, 2011) for the property industry (Robinson, 2007). Today; unlike traditional buildings “Green” building has gained popularity in environmental (Ziegenfuss, 2008 & Edwards, 2011) and health perspective which consumes major natural sources like energy, water, substances, and surface with more efficiency. Increase of the energy efficiency (EPBD, 2002), can have large effects on life-cycle of building. With the demand of developed countries (Matthew E. Kahn, 2009) and sophistication of developing economies (Edward L. Glaeser and Matthew E. Kahn, 2010, Siqi Zhenget al., 2009) the energy efficiency in building will significantly increase with time.

Green buildings or sustainable building (EPA, 2013) or ‘green potential’ (Ben Avraham & Capeluto, 2011) involves using sustainable methods (Berardi, 2013) and materials for planning and structuring properties (or in existing properties renovation) and operations, where the aim is to lower operations and maintenance costs including energy efficiency (EPBD, 2002) in lighting technologies and air quality, redeveloping brown field sites, or using green roofs that allow for runoff water to be recycled and also contribute to enriched workforce and student fitness, comfort, and

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 5, May 2017

productivity. The global environmental discourse and guiding ecosystem protection (Walsh, 2004; EPA, 2008), reduction or elimination of the negative impact of buildings (LEED, 2004) are being dominated by sustainable development. Though the average additional costs of green buildings require an amount, the advantages of those buildings are comparatively ten times higher. (Kats, 2003; Wiley, 2008; Wiley et. al, 2010). According to Karlenzig, 2005; the procedure of creating buildings and supporting infrastructure is referred to Green buildings that:

- 1) makes a decrease in resource usage,
- 2) decreases the negative effects on the environment, and
- 3) ensures well-conditioned environments for people

Cost savings, developed human performance (including productivity and health), and increased social value (Nalewaik and Venters, 2009) are connected with Green Buildings. Presently people are more concerned about climate change, cost and lack of resources, health issues so they are emphasizing in Eco-structure building (USGBC Report, 2008). According to Federal Environmental Executive of U.S. (2008), “Eco-structure building has developed as a holistic approach and practical answer to the environmental and health burdens of the conventional built environment”. Green buildings not only have some commercial benefits, but also have some social and environmental advantages (Yap, 2007). According to one federal report, eco-structure can also be defined as: “the practice of (1) maximizing the efficiency with which buildings and their sites use, generate and recycle energy, water, and materials, and (2) minimizing – and ultimately eliminating – buildings’ impacts on human health and the environment, through better siting, design, construction, operation, maintenance, and removal—the complete building life cycle”. Recycled, recyclable and non-toxic are used to build the Eco-structure buildings in order to lowering the effects on environment.

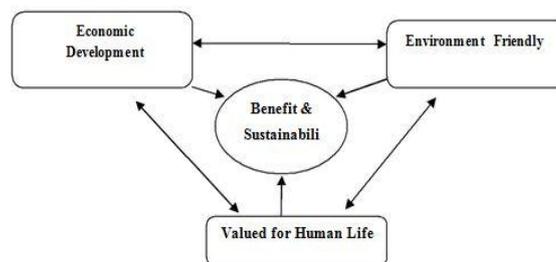


Fig No 01 Eco-structure Building or Green Building

A brief review of eco-structure building and green construction shows that for our country eco-structure is necessary in different circumstances, like- use resources –energy, water, and materials – while reducing building impacts on human health and the environment during the building’s lifecycle, through better siting, design, construction, operation, maintenance, and removal. Whereas the number of people are increasing rapidly, to accommodate this overloaded population we need to build eco-structure building on the same pace. The role of governments is highly appreciated in elevating by the experts (Atsusaka, 2003; Samari, 2012). New rules and regulations should be introduced to support green building and the enforcement should be ensured. For the betterment of the next generations Green building is under government’s consideration (Sood et al., 2011).

V. PRESENT STATUS OF POPULATION AND HOUSING

Since the independence from 1971 despite being a relatively low urbanized country, India has witnessed a significant rate of urban growth (Salma A. Shafi, 2010). India is making its way from ‘rural’ to ‘urban’ being an integral part of

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 5, May 2017

the urban transformation. Though the level of urbanization is only 28.4 percent, it already has managed a very large population of 42.7 million in 2011, living in the countries nearly 570 urban centers (Islam N., 2015).

1. Observation Table

Table No 01 Growth Rate of Population (in %).

| | 1974-1980 | 1981-1990 | 1991-2000 | 2001-2011 |
|-------|-----------|-----------|-----------|-----------|
| Urban | 6.66 | 19.99 | 5.06 | 1.05 |
| Rural | 2.83 | 1.90 | 0.68 | 1.24 |

From **SANEI** Report, 2013 it is estimated that , projections, keeping in mind the growth rates of population observed during 2001-2011 and based on the UN population projection model, indicate that India would achieve ‘the tipping point’ of 50 per cent urban by 2047. Population of India is increasing day after day. Thus, India is expected to be majority ‘urban’ within the next 35 years (**Islam N, 2015**).

2. Graphical View

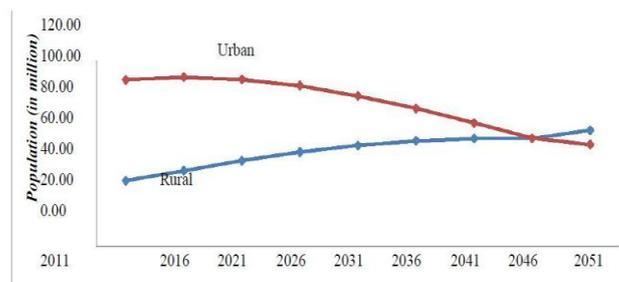
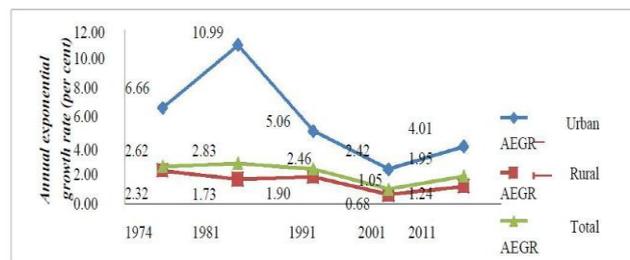


Figure 2. Annual growth rates of population (%): urban, rural and total: 1974-2011

India is still a predominantly rural nation, but urbanization has gathered pace, especially in the recent years. India has an urban population of 42.7 million in the year of 2011. As some changes were done in the Census definition of urban, the country experienced a remarkable change in the urban population in the year of 1981.

VI.CONCLUSION

While managing urban growth, urban expansion and urban development, India faces enormous challenge. To battle climate change, reduce energy bills, and diminish our reliance on fossil fuels it is mandatory to construct new eco-friendly projects, renovate existing construction in ecofriendly buildings which will also lower the cost. In an up growing trend of population, it is obvious to follow eco-structure for our well being. Goals of eco-structure construction can be attainable if there is cooperation between the public-private partnerships. By embracing the future and the change it will bring, we will achieve a balance between ourselves, our lifestyles, and our environment. Though India will be an urbanized country in demographic statistical term in less than four decades from now, but the nature of

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 5, May 2017

urbanism in the future remains rather indefinable. Political and cultural bindings, the threat of the climate change phenomenon and the crisis of governance at the national as well as urban local levels, all tend to make one feel uncomfortable, to state the least.

REFERENCES

- [1] KarstenVoss, EikeMusall , Markus Lichtme “From Low Energy To Net Zero Energy Buildings: Status and Perspectives” in Journal of Green Building, VOL. 6, NO. 1 2015.
- [2] Anderson, M.K., Bid good, J.K., & Heady, E.J. (2016). Hidden legal risks of green buildings. Florida bar Journal, 84(3), 35-41.
- [3] Atsusaka, N. (2015). Growing the Green Building Industry in Lane County - a report for the lane county sustainable business and job project, report prepared from the program for Watershed and Community Health, Institute for a Sustainable Environment, University of Oregon, USA.
- [4] Attmann, O. (2016). Green architecture-advanced materials and technologies. New York: McGraw-Hill.
- [5] BBS -India Bureau of Statistics. (2016). Population and Housing Census, Statistics and Informatics Division(SID), Ministry of Planning.
- [6] BCA-Building and Construction Authority. (2015). The Centre for Sustainable Buildings and Construction, Building and Construction Authority, ISBN 978-981-08-5313-6.
- [7] Ben Capeluto, I. G. (2016). A tool for determining the green potential of existing buildings. Paper presented at the PLEA 2011 - 27th Conference on Passive and Low Energy Architecture, Louvain-la-Neuve, Belgium.
- [8] Berardi, U. (2016). Clarifying the new interpretations of the concept of sustainable building. Sustainable Cities and Society, 8, 72-78. <http://dx.doi.org/10.1016/j.scs.2013.01.008>
- [9] L., Hughes, C., & Tight, M. (2017). Education, Work and adult life: how adults relate their learning to theirwork, family and social lives. In Sutherland, P. (Ed.), Adult Learning: A Reader (pp. 30-43). London, Kogan.