ENERGY EFFICIENT PASSIVE DESIGN STRATEGIES FOR BUILDINGS IN MADURAI.

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ABSTRACT

The rapid growth of energy use has raised concerns over problems in supply worldwide. This has caused the exhaustion of energy resources and severe environmental impacts such as depletion of ozone layer, global warming, and climate change. Efficient use of energy plays an essential role in minimizing energy usage and carbon dioxide emissions. This paper focuses on planning principles and number of parameters which affect the human thermal comfort in warm humid climate of Madurai. Climatic classification map of India has been included for identification of the climate of Madurai. Also Design recommendations on the building design provided by Mahoney tables are used to compare with the design techniques in a few case study buildings with vernacular architecture of this region. The main objective of this study is to explore the possible means and ways of improving and increasing the effectiveness of energy efficiency strategies of buildings in Madurai.

Key words: Thermal comfort, Energy efficiency, Passive design, Climate, Energy.

INTRODUCTION

The Ministry of Power estimate about 20 to 25 percent of the total electricity consumed in government buildings in India is wasted because of inefficient design parameters of buildings, which results in an annual energy related financial loss of about 1.5 billion Rupees. (US $33 million).Energy is the major factor required to achieve thermal comfort. India has different climatic conditions ranging from extremely hot conditions to severely cold conditions. Energy availability is scarce and people have to protect themselves from these extremities of the climate in a natural way. The energy consumption in buildings is quite high and is expected to further increase because of improving standards of life and increasing world population. Air conditioning use has increasingly penetrated the market during the last few years and greatly contributes to the increase in energy consumption. The largest growth in GHG emissions between 1970 and 2004 has come from energy supply, transport and industry, while residential and commercial buildings, forestry (including deforestation) and agriculture sectors have been growing at a lower rate (IPCC, 2007). Continued GHG emissions at or above current rates would

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Effects of Changing Urban Environment of Madurai-Challenges and Opportunities for Future Environmental Sustainability

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Abstract

Urban development is the major cause for changes in environment, as it leads to increase in population density which thereby increases the households, industries and transportation. Thus, urban centres are the major contributors of greenhouse gases and global warming. This paper collates the evidence of climate change effects on areas of urban growth pattern, temperature variations over the past decades and changes in the air quality of Madurai. It is evident from various studies that built up areas in urban centres exert a considerable influence on the local climate and urban heat island intensity. This main aim of this paper is to give information to urban planners, architects and engineers about the importance of climate studies and tools to promote strategies and measures of sustainable urban development.

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Keywords