Conceptual Design of Low Energy Consumption House in Khartoum, Sudan

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Abstract : Approximately 50% of the energy used in buildings, including houses, provide environmental comfortable levels of thermal living. In Khartoum - the city under study- cooling uses the largest portion of energy and the basic idea of Low energy houses is to minimize energy consumption. Therefore, houses are designed to use natural climate strategies to provide thermal comfort. Strategies such as semi-open spaces, shading devices, small high windows and thick walls. The study aims to review these strategies and then, apply them. It aims to change house microclimate by using vegetation, green areas, and other components. A low energy house is being designed s. It will be the first low energy house in Khartoum designed to create a low-cost energy efficient building without any mechanical systems. Three different types of houses in Khartoum are examined and evaluated according to their energy loads which provides the basis for the designed house. The designed house uses passive design strategies to reduce the need for cooling. These results show that the house reduced energy cooling loads by more than 60% compared to the average of the three given types. The design house is economically viable when taking into consideration the energy prices in Sudan.

Keywords : building envelope, climate, energy loads, ventilation
Conference Title : ICEEPH 2018 : International Conference on Energy and Efficiency Plus Houses
Conference Location : Prague, Czechia
Conference Dates : July 09-10, 2018