Abstract

Climate change is a hot and leading issue globally. Every kind has been affected by climate change since decades. There are a number of reasons, why everyone cares about climate change because a number of natural disasters like flooding, earthquakes and cyclones etc. are directly or indirectly related to climate change. Moreover, climate change has been proved as a commodity for different companies to sell their products. That's why we cannot hide its significance for our booming industries working day in and day out to manufacture heat and earthquake resilient buildings, windows, doors and other energy efficient accessories. The Impacts of Climate Change are endangering for every living being. Fossil fuels and human activities are playing a major role in raising global warming and greenhouse gas(GHG) effect which in return put a change in global climate. Pakistan is also facing extreme weather events such as; flooding, Glacial lake outburst floods (GLOF's), landslides, cyclones, storms, dust storms, heat waves and smog etc. All these events make an addition in global environment and affect human lives. Second most populated city of Pakistan, Lahore is facing multiple challenges, such as; extreme temperatures, increase in population and traffic congestions. Traffic overcrowdings is a leading platform for the emissions of Carbon di oxide (CO_2), Nitrous Oxide (N_2O), Sulphur di Oxide (SO_2) and Methane (CH_4), which are unhealthy for every living being.

The sole purpose of this work was to study the energy efficient window structures and analyze their impact on human being and environment. Furthermore, it is also concerned with how these energy efficient windows promise reduction in energy bills and GHG emissions.

For primary data collection two questionnaires were prepared; one was for focus group surveys to be conducted in the industries located in Lahore, other was prepared to take reviews of the users of energy efficient windows. Field data (point data, comprising latitudes and longitudes) was collected by Garmin etrex10 GPS. Secondary data was collected from Pakistan Meteorological Department (PMD) related to Mean Maximum and Mean Minimum Temperatures. Population Data was attained from Pakistan Bureau of Statistics and Images for Mapping were acquired from Google Earth.

Primary data was entered in SPSS software and presented in the form of pie-charts and bar graphs. Similarly, Secondary data related to temperature analysis was stored in Excel and interpreted in the form of line graphs showing 30 years' temperature trend. Maps were created in ArcGIS software using images acquired from Google Earth.

Energy Efficient Window Technologies are mostly used in lavish areas of Lahore such as D.H.A., Bahria Town, Model Town, Wapda Town and Johar Town by people whose salaries usually exceeds from 100,000 Rupees. UPVC is abbreviated as un-plasticized polyvinyl chloride, which is a good insulator, having less thermal conductivity and is manufactured from eco-friendly renewable material. Depending upon the type of technology, cost per foot of these windows range from 1500 PKR to 2000 PKR. UPVC windows; resist heat, sound, insects, Ultraviolet (UV) and Infrared (IR) rays, helps in keeping indoor air clean, ensures security breach and reduces GHG emissions.

The assessment was drawn between UPVC based, Aluminum based and metal based windows. Although energy efficient windows are 10% to 15% expensive than ordinary windows, still it saves roughly 30% to 50% of energy consumption. Monthly electricity bills of houses installed with UPVC windows were lesser than houses installed with aluminum and metal based windows.