Fayoum University
Faculty of Engineering
Architecture Department

Methodology for selecting

Building materials and Design treatments

to optimize the energy efficiency of residential buildings in Egypt

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ABSTRACT

Energy is one of the basic necessities of life and an essential component in all aspects of life. Energy relies on renewable sources such as wind, sun, and water, as well as non−renewable sources such as oil, coal, and natural gas. Currently, 80% of global energy consumption is dependent on non−renewable sources, these sources are major contributors to carbon dioxide emissions which is directly linked to climate change, the most prominent issue facing humanity

One of the main reasons for this crisis is the massive consumption of energy for treatment design problems for buildings, such as ventilation, lighting, and others. Buildings consume more than 40% of the total energy consumption. So, countries need to invest in improving energy efficiency. The research problem is that residential buildings consume 38.4% of the total electrical energy in Egypt.

So, this research aims to extract a methodology for selecting Building materials and Design treatments to optimize the energy efficiency of residential buildings in different climatic regions in general, and Egypt (hot regions) in particular, in addition to contributing to achieving a building with zero energy, cost, and emissions, using energy simulation tools.

The results achieved the main research aim. This proposed methodology has applied on a residential tower model in the New Administrative Capital in Egypt, And Zero energy, cost and emissions were achieved.