UNIVERSITI TEKNOLOGI MARA

FREE COOLING BUILDING USING PHASE CHANGE MATERIAL

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ABSTRACT

Current trend in energy supply and use are economically, environmentally and socially unsustainable since it is free carbon dioxide emission thus reducing global warming effect. Globally, buildings are responsible for 40% of the total world annual energy consumption which is responsible for one-third of greenhouse gas emissions around the world. A significant portion of this energy is used for lighting, heating, cooling, and air conditioning purposes in buildings. Increasing awareness of the environmental impact of greenhouse effect prompt a renewed way in environmentally and friendly cooling technologies, making free cooling one of the alternative way to replace current air conditioning system used for the buildings.

To overcome this, latent heat storage of Phase-change material can be used as a free-cooling system. This material acts as a storage material, cool air during night time will solidify the PCM and the accumulated cold is extracted during hot day time. In other words, PCM will absorb heat during day time, making the building cool and will release the heat back into the environment when the temperature drops during night time.

In order to satisfy the demand towards saving energy, this project will focus on cooling the building without using electricity. The room temperature will be monitored by a monitoring system. This innovative technology can be place in hot area in which the buildings can save energy without using too much electricity on cooling system.

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INTRODUCTION

1.1 OVERVIEW OF STUDY

Universally, buildings are responsible for 40% of the total world annual energy consumption which is responsible for one-third of greenhouse gas releases around the world. In buildings, a major percentage of the energy is used by heating and cooling applications hence, leads to the energy demand increasing over the security of supplies throughout years. Therefore, it is vital for exploring deeper in finding material and system to overcome the future demand.

1.2 PROBLEM STATEMENT

Electricity generation is one of the main contributors of carbon dioxide emission in Malaysia. From the former study, the lifetime of carbon dioxide has been estimated around