

Green Energy 2021: Revealing the development and performance of an innovative, smart solar-enhanced air conditioning system for all climates

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Abstract

The need for moving away from traditional energy sources and to find alternate energy sources is undoubtedly one of the primary objectives for a sustainable progress to humankind. The design and construction of buildings consumes respectful amount of energy that in certain circumstances and regions impacts countries' peak demands. Worldwide, there is a rising concern on the current rate of energy consumption due to air conditioning especially in hot countries such as the Gulf States where the energy consumption due to air conditioning equates to about two thirds of the domestic electrical loads. Considering the wider impacts of carbon emissions on our climate, there is an urgent need to reduce these emissions therefore, effective energy efficiency solutions are crucial in order to achieve this vital goal. This paper presents the impact of climate change on human comfort, the challenges in air conditioning system design, the green features and the performance of a solar enhanced air conditioning system designed for all climates. The smart air conditioning system is fully integrated and can provide comfort for all climates including those with extreme weather conditions. The superefficient air conditioning system can provide can reduce the energy consumption between 30 to 80% of the energy consumption based on the design conditions and the application compared to conventional systems.