

Abstract

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The Impact of Digital Simulations on Planning Energy Efficient and Solar Friendly Urban Communities

Since 2014, the Egyptian state has taken major steps towards developing housing schemes and reducing subsidies on electricity. As further housing developments are expected to be held on the short-term, planning new communities to be energy efficient becomes crucial to meet the state's goals, and reduce economic stress on citizens. In the context of upper Egypt's hot weather and solar potential, urban form has a significant influence on energy consumption and harvesting solar energy. This paper casts the light on the literature related to energy efficient and solar friendly urban forms especially the methods that incorporated software simulations. The goal is to theoretically compare the different approaches while simultaneously surveying the variables proved to be most correlated to energy consumption solar power generation in each study. Eventually, a holistic methodology is introduced and theoretically discussed. Rather than providing accurate estimates of electricity consumption, the method will aim to provide an understanding of the inherent relationships between the different variables that formulate an urban form and resulting net watts per meter. The method will also explore the means of achieving a balanced compromise between a minimized consumption of fossil energy and a maximized production of solar energy within urban boundaries.