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Research on solar energy systems in buildings

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The modern comfort living conditions are achieved at the cost of vast energy resources. Global warming and ozone depletion and the escalating costs of fossil fuels over the last few years, have forced governments and engineers to re-examine the whole approach to the design and control of building energy system. Consequently, it is of great importance in the building field to reconsider the building structure and exploit renewable energy systems, which can minimize the energy expenditure and improve thermal comfort.

Solar energy is abundant and clean; it is meaningful to substitute solar energy for conventional energy. Solar energy therefore has an important role to play in the building energy system. Recently, solar water collectors have undergone a rapid development; they are installed with the main purpose of preheating domestic hot water and / or to cover a fraction of the space heating demand. However, this application mainly for obtaining hot water through solar energy is not very consistent with the order of nature. In winter, it is convenient to combine hot water system with space heating system just through increasing the collector area. Whereas, for summer with high solar radiant intensity and high ambient air temperature, the demand for air-conditioning and refrigeration is in preference to hot water. Based on this background, the research on solar thermal technologies, especially solar cooling technology will be introduced.[1] The main contents include 1) design of solar thermal systems, 2) performance of solar thermal systems based upon experimental investigation, 3) cases of solar thermal systems in buildings.[2,3] Finally, some conclusions will be given, which is helpful for the design and application of solar systems in buildings. Besides, some research topics which are relevant to solar thermal systems will be put forward.[4,5,6]

Reference

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