

Improved automated solar water heating system with a control unit

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Abstract

In Sri Lanka, about 150 solar companies are in operation and about 50 of them are producing solar water heaters. According to a research survey done, solar water heater systems can be optimized to improve efficiency using smart features. The purpose of a domestic solar water heater is to provide hot water for domestic purposes such as drinking, bathing and space heating. Locally available water heaters provide specific applications and in these products, output cannot be controlled as per the user requirements. Considering such drawbacks, an automatic solar water heating system with a dedicated control unit was developed. The system was designed with standard pipe connections and has two main systems such as Heat absorption unit and Hot water storage unit. Heater absorption unit consists of inclined copper tubes (19 degree) with twisted copper wires inside it. Hot water storage unit consists of two well insulated tanks operating at two temperatures (50°C and 70°C). Hot water from the two-storage tank can be used for multiple purposes by mixing due to its varying degree of temperatures. The developed system needs to be designed according to daily hot water requirements of household. Proposed hot water system was designed and tested for performance. Results (3 outputs gives as 50°C, 60°C and 70°C) indicate that the system can be used get hot water for a wide range of applications (drinking and bathing) and the developed system is portable and affordable.

Keywords: *Solar Water Heaters, Renewable Energy, Control Unit, Automated system*