

HYBRID SOLAR WATER HEATER

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ABSTRACT

This report reveal on how create a solar water heater by reducing and manage the usage of electrical energy in a smart ways. This system is combination of solar energy mechanical concept and electrical water heater.

For the solar energy mechanical concept, a solar collector mounting system is use to heat up the water passing through. The inner part of the solar collector mounting system is made of mainly copper pipes. After the heated up water passed through the solar mounting system, the output of the water will flow to the storage tank. The output of the storage tank to connected to the backup water heater tank.

Inside of the backup water heater tank, heating elements are attached in the tank to heat up the water and solenoid valve is attached to cool down the water in case the water temperature is too high. A temperature sensor is use to sense the water temperature in the backup water heater tank. Users are allowed to set the temperature manually. The electrical heater will turn on if the water temperature is less than setting temperature. The solenoid valve will only turn on to allow cold water to enter when the temperature is higher than the setting temperature while electrical heater turns off.

The system is controlled using Arduino Duemilanove microcontroller board based on the ATmega328. It has 14 digital I/O pins of which 6 can be used as PWM outputs and 6 analog inputs which are suitable in this project. In the programming part, the system is programmed to measure the temperature and control the ULN2003A as known as the relay driver IC. The relay driver IC is use to power up the 12V relays for the heater and the solenoid valve.

Finally, the project design and objectives have been successfully realized.