

# SAIP2014



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## **Geyser heating cycle of 2kW tank domestic solar water heater under varying loads**

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### **Abstract :**

Electric geysers are very important for providing a constant supply of hot water in the household. Water in a tank is kept at the thermostat set point temperature by the element which results in continuous heating throughout the day. In South Africa, over 50% of total household electricity use in the home is attributed to water heating. Solar water heaters provide a sustainable and environmentally friendly way to heat water, while reducing consumers' overall electricity consumption. By using the geyser element only as a backup, peak demand can be significantly reduced, relieving pressure on the national utility. Integrating a geyser timer into the system allows occupants to control element heating to suit household hot water use pattern. This study presents the results of a series of experiments carried out to compare the electrical energy consumption of a 2kW element installed as a backup for a domestic solar water heater (DSWH), under different loads. For comparison, a morning peak load was used. High, medium and low water loads were drawn, for 6 different days on a domestic solar water heater with a tank capacity of 200litres. The geyser heating cycle was investigated in order to determine the instantaneous electrical energy demand. Comparisons were made with the heating cycle when the geyser is controlled using a geyser timer. Results show that over a period of 24hours 3.54 kWh of energy were used when a low morning peak load was used. Activating a timer reduced total daily energy to 2.33kWh. Incorporating a timer into the system prevents heating when solar radiation is available thereby reducing electrical energy consumption. The solar contribution to the total heating load is also increased. Complete results will be presented in the final presentation.

### **Award :**

Yes

### **Level :**

Msc

### **Supervisor :**

Doctor Michael Simon FHIT

### **Paper :**

No

**Primary authors :** Ms. NDLOVU, Nothando (University of Fort Hare)

**Co-authors :** Dr. SIMON, Michael (FHIT) ; Prof. MEYER, Edson (University of Fort Hare)

**Presenter :** Ms. NDLOVU, Nothando (University of Fort Hare)

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