



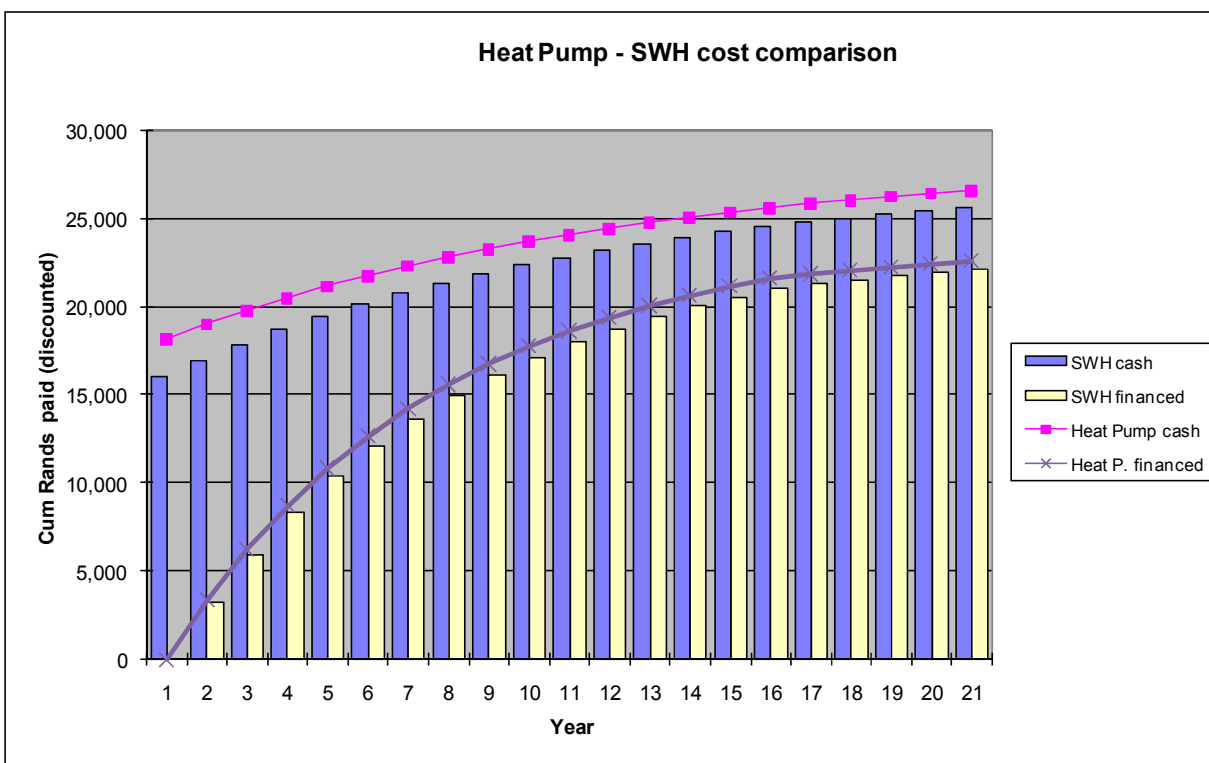
# Heat Pump / Solar Water Heater Comparison

## Overview

It has become apparent over the last few months that heat pumps are becoming an increasingly viable technology for domestic water heating purposes, and that there is a lack of information regarding their feasibility compared with solar water heating. This summary page reports on an initial comparative cost analysis of heat pumps against solar water heaters, and concludes that heat pumps are a more expensive option, albeit by a relatively small margin.

## Results

The discounted life-cycle costing results for both systems are illustrated in the graph below. The graph compares a 200l SWH system to a 200l heat pump system on both a cash payment and a financed basis.



## Notes –

- i. Maintenance costs were not available for this calculation. It is unlikely though that a SWH will require more maintenance than a heat pump system, which has a compressor and moving parts.
- ii. Eskom incentive not included in SWH calculation.
- iii. Input data and assumptions are given in the Appendix.

### **Conclusions**

1. Based on information obtained, heat pumps are a more expensive option for heating water in households than solar water heaters. Even with a slightly better efficiency, the additional capital cost of a heat pump of around R2000 makes it overall a more expensive option. Current incentives for solar water heaters (R2000-R3600), which have not been included in this study, would further increase the comparative advantage of solar water heaters.
2. Even though the operating electricity costs of the heat pump are marginally more favourable than a SWH, the overall life cycle costs of both indicate that a SWH is a more feasible option, even over 20 years.
3. Heat pumps are a good energy efficiency solution for water heating in houses with poor or no access to sunlight.
4. Indicative comparative costs for solar water heaters and heat pumps are given below:

	Cash price (installed)	Life cycle cost PV (cash purchase)	Life cycle cost PV (financed)*
Solar water heater	R15,989	R25,639	R22,125
Heat pump	R 18,142	R26,585	R22,598

\* - financed life-cycle costs are less than cash purchase costs because future payments are discounted.

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## Appendix: Data and Assumptions

Calculations for heat pumps are based on figures received from Sirac - the heat pump supplier who has generated the renewed interest in the technology, and their installer. Solar water heater cost information is drawn from the Eskom approved SWH supplier list and is an average of all the 200l SWH systems available.

The efficiency figures of a heat pump when compared to a standard electric water heater increase with an increase in ambient temperature so will differ from installation to installation. The figure of 65% used in this study was based on a report from North-West University<sup>1</sup>. The Solar Water Heater figure of 60% was taken from the SESSA CEF study<sup>2</sup> and assumes a timer has been installed.

An important consideration when comparing the two technologies is that a new solar water heater geyser (2 inlets/2 outlets) will be required for both solar and heat pump installations.

Due to lack of data, maintenance and replacement costs have not been included for this study.

### Heat Pump Figures

#### Costs:

2.4KW Equivalent Heat Pump (Using 0.8KW)	R	R 9,120
Heat Pump Installation (Estimated)*		R 2,000
Solar Geyser 150 lit**		R 4,937
Solar Geyser 200 lit**		R 7,722
Total 150 lit		R 16,057
Total 200 lit		R 18,142

\* Telephonic discussion with RC Bosman Plumbing, official installer of Sirac Heat Pumps.

\*\* RC Bosman Plumbing suggested using solar water heater geyser for optimal efficiency, prices are cheapest geyser of said size from SolarDome

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<sup>1</sup> AN INVESTIGATION INTO THE ENERGY SAVINGS AND ECONOMIC VIABILITY OF HEAT PUMP WATER HEATERS APPLIED IN THE RESIDENTIAL AND COMMERCIAL SECTORS – A COMPARISON WITH SOLAR WATER HEATING SYSTEMS Dr. Riaan Rankin & Dr. Martin van EldikM-Tech Industrial (Pty) Ltd / North-West University February 2008

<sup>2</sup> Presentation by John Adams, SESSA project manager of CEF 50 project , 2007

## Solar Water Heater Figures

### Costs:

200l Solar Water Heater *	R 12,850
200l SWH Installation**	R 3,139
150l SWH*	R 11,841
150l SWH Installation**	R 2,860
Total 200l	R 15,989
Total 150l	R 14,701

\* Average 200l system as per Eskom accredited supplier list

\*\*Average installation costs as per Eskom accredited supplier list

CORE ASSUMPTIONS	
Heat pump cost (incl install)	R18,142
Heat pump elec cost/month	R71 (65% efficient)
SWH cost (incl install)	R15,989 (excl subsidy)
SWH elec cost/month	R81 (60% efficient)
Finance rate	11%
Financed over (years)	15
Discount rate	20%
Electricity Increase Rate	10%

Note: A discount rate of 20% was used for householders, higher than a typical business decision based discount rate (usually 10%). A personal discount rate may be as high as 30%, so 20% was considered reasonable.