

Gas geyser versus electric

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We at KVA Control are importers of Stiebel Eltron and AEG products. We do not sell gas or conventional electric geysers and are not biased towards one or the other.

Aim:

To compare the cost of running an electric geyser versus a gas geyser over a period of one month.

Introduction:

Our company has had many requests for a gas - electric comparison. Many people are under the impression that a gas geyser is far cheaper than an electric geyser that runs all day. The thinking behind this is that because a gas geyser only uses gas while heating water, the overall running costs to heat water will be lower than a conventional electric element geyser.

The test will resemble the exact living conditions of an average working person that either showers or baths in the morning before work (6:00 am) and then again in the evening after work (18:00). This is critical for the electric geyser that needs the time during the day to recover the heat. The gas geyser will only run when hot water is needed.

Every morning 100 Litres of cold water will be heated from 20 deg to 55 deg by the gas geyser. Another 100 litres will be heated by the electric geyser from the same 20 Deg to 55 deg. This process will be repeated in the evening. This test is focused on the average working man who has a family that needs to bath or shower in the morning, has to go to work or school and then in the evening needs to take another bath or shower. The electric geyser will remain on 24 hours a day. There will be no geyser timers, or energy saving devices connected to the geyser.

Test equipment:



Figure 1 Test equipment used

Test procedure:

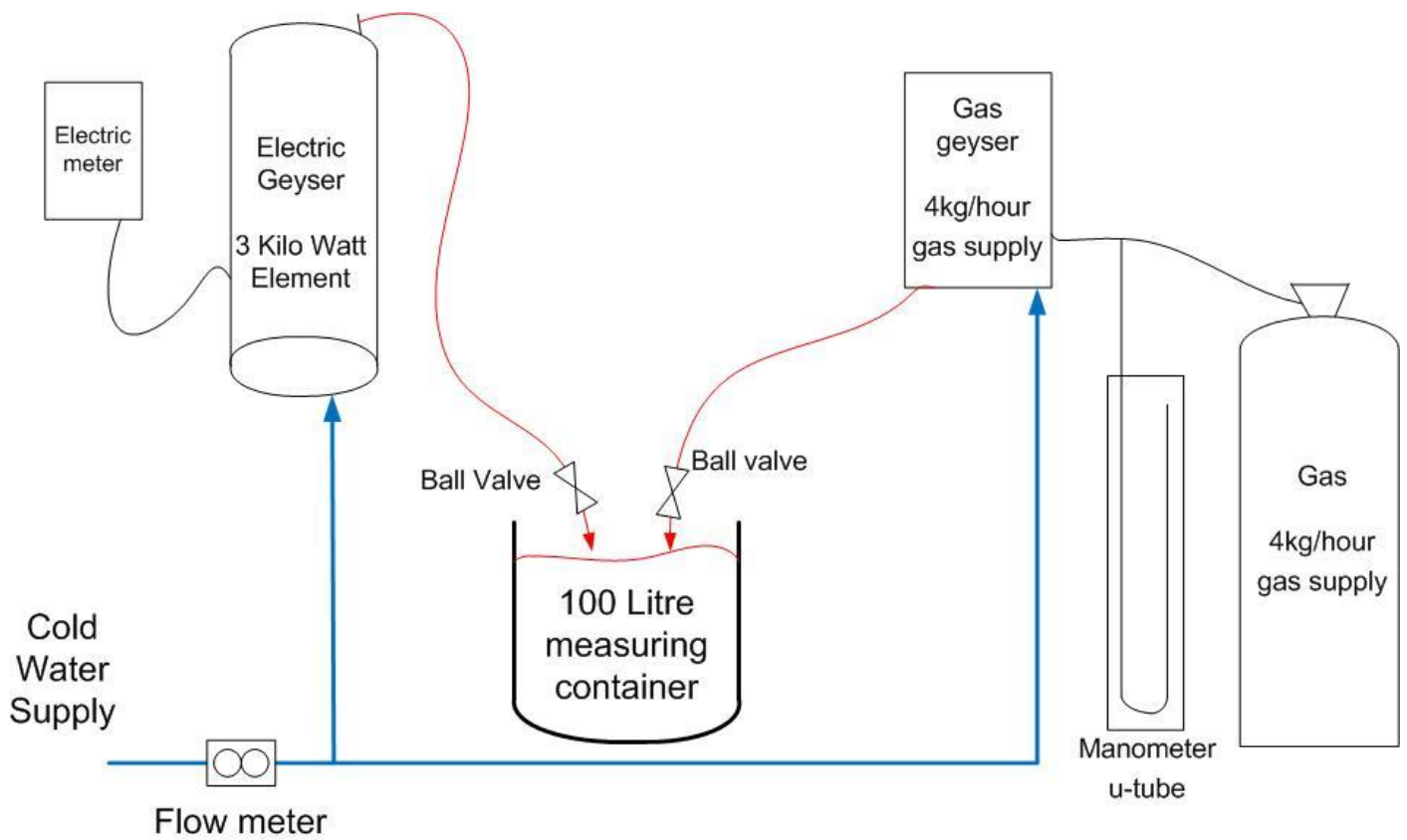


Figure 2 Pipe layout

Test procedure:

Testing procedure morning:

Before the test, on a weekly basis, measure the weight of the gas bottle and record three weight readings to calculate an average.

Record the electric kilo watt hour reading on the electric meter.

Gas test first

- 1) Record the water reading on the water flow meter
- 2) Open gas bottle
- 3) Open ball valve on gas geyser and allow 100 litres of hot water to fill up the 100litre measuring container
- 4) Continuously monitor the output temperature and ensure that 55 degree water is maintained.
- 5) Close the hot water tap.

Electric geyser test second

- 1) Record the reading on the water flow meter
- 2) Open ball valve on electric geyser and allow 100 litres of hot water to fill up the measuring container
- 3) Continuously monitor the output temperature and make sure that the 55 deg water is maintained.
- 4) Close the hot water tap

The same procedure is repeated in the evening.

Testing criteria and specifications:

The gas geyser: For obvious reasons, the make and model of the gas geyser may not be displayed. The gas geyser used is a very popular make and model. The main features of the unit are:

- 1.) Electric pilot flame start. The new gas geysers are connected to the Eskom mains or battery supply to cause an electric spark which will light the gas. This feature is to save the gas used on the pilot flame. This will not be used for the test. Before and after each test the gas bottle will be manually opened and closed.
- 2.) Variable flow control. Inside the gas geyser, automatic flow regulators ensure that more gas flames are added as the water flow increases.
- 3.) Variable electric fans to automatically change speed as the gas demand increases.

The electricity or battery used by the gas geyser to light the pilot flames, to regulate the air flow with electric fans and the internal electronics will be ignored and considered negligible.

A manometer or u-tube

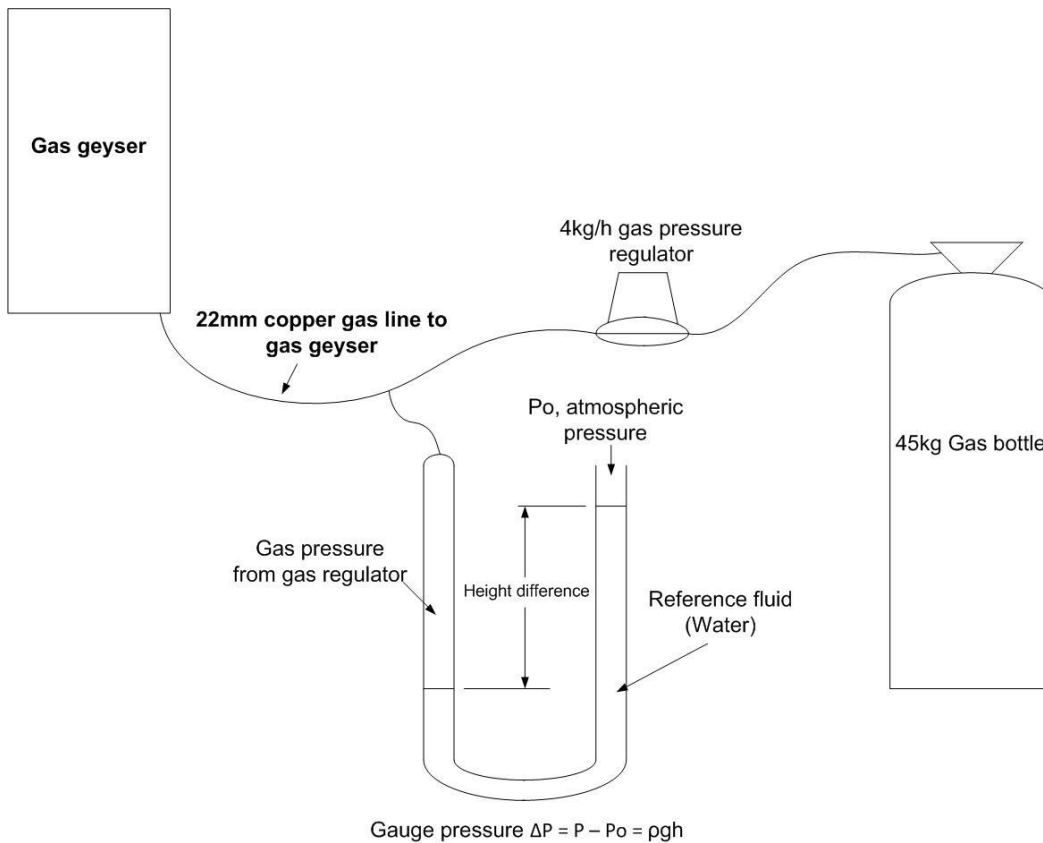


Figure 3 Gas manometer diagram

The manometer or u-tube is important as it will ensure that the gas geysers receives exactly the right amount of gas. The gas will exert pressure on the left column forcing the right column to rise and cause a pressure difference that is read in height. The gas geysers (**while in operation**) requires the column to show a height difference of 280 mm (11 inches). This will ensure that the gas geysers receives exactly the right amount of gas as set out by the manufacturer. The manometer will be isolated from the gas line after the reading has been taken to ensure no gas is lost to the u-tube.

Electric geysers

The electric geysers used is a 150 Liter geysers manufactured locally. It consists of a 3 kilo Watt electric element and standard thermostat which comes supplied standard with the unit. The electric geysers will have no timers, geysers controllers or electric blankets to assist the geysers. It will be connected to the mains supply 24 hours a day, 7 days a week to simulate an average household's hot water geysers.

The Kilo Watt Hour meter connected to the geysers:



This meter is situated in the water proof box next to the electric geysers and is used to accurately measure the energy of the electric geysers. This is the same electric meter that the municipality uses to measure the electricity in your house.

Results

George, Western Cape, South Africa

Propane Special Afrox

(Test was conducted with propane) R 845.86 This is a temporary special price to supplement the LPG shortage.

The purchase price for **propane**: R 964.28 incl Vat per 45 kg cylinder , Afrox George

Electric unit price: R 1.22 for George, Western Cape

Energy cost to heat 200 litre of hot water per day for one month	
Electric geyser running 24 hours a day. (No timer!)	Gas geyser with electric pilot flame starter
R 410.28	R 426.53

LPG normal price George

The purchase price for LPG: R 1028.56 incl Vat per **48** kg cylinder, Afrox George

Electric unit price: R 1.22 for George, Western Cape

Energy cost to heat 200 litre of hot water per day for one month	
Electric geyser running 24 hours a day. (No timer!)	Gas geyser with electric pilot flame starter
R 410.28	R 426.53

(NOTE: LPG and Propane are presently the same price. Propane is sold at the same price to supplement LPG shortage)

Sedgefield, Western Cape, South Africa

The purchase price for propane: R 1047 incl Vat per **48** kg cylinder , Total Sedgefield

Electric unit price: R 1.00 for Sedgefield, Western Cape

Energy cost to heat 200 litre of hot water per day for one month	
Electric geyser running 24 hours a day. (No timer!)	Gas geyser with electric pilot flame starter
R 336.30	R 434.18

Knysna, Western Cape, South Africa

The purchase price for propane: R 960 incl Vat per 48 kg cylinder , Tuinroute Agri, knysna

Electric unit price: R 0.71 for Knysna, Western Cape

Energy cost to heat 200 litre of hot water per day for one month	
Electric geyser running 24 hours a day. (No timer!)	Gas geyser with electric pilot flame starter
R 238.77	R 398.1

If your unit price or gas price differs and you would like to know exactly what your consumption would be, then send the info to our company and we will convert it for you.

If your price for Gas or Electricity differs then you can use the following formulae to calculate your own price.

To heat 200 liters of hot water per day for one month, the gas used is 19.91kg

If you buy a LPG 45 kg bottle, then the formulae will look like this:

$$Price\ gas\ per\ month = \frac{19.91kg}{45\ kg\ propane\ gas} \times Gas\ price\ per\ 45kg\ bottle$$

To heat 200 liters of hot water per day for one month, the electric units used are 336.3 kWh:

$$Electric\ price = 336.3\ Electric\ units(kWh) \times Unit\ price$$

Conclusion

The fuel prices in this country vary from area to area. We can only work on average prices in each area. The heating cost of water in Sedgelyed and Knysna is $\pm 20 - 40\%$ higher with gas. We have found no areas where gas is cheaper than electric.

In conclusion: The capital cost of gas geysers is much higher than electric geysers.

Raw Data

		Electric reading (kWh)		Gas bottle (kg)	
		Morning	Evening	Weight	
23rd Arpil 2012	Monday	803		60.845	
24th Arpil 2012	Tuesday	810	816		
25th Arpil 2012	Wednesday	822	828		
26th Arpil 2012	Thursday	835	841		
27th Arpil 2012	Friday	847	853		
28th Arpil 2012	Saturday	859	865		
29th Arpil 2012	Sunday				
30th Arpil 2012	Monday	873	878		
1st May 2012	Tuesday	884	890		
2nd May 2012	Wednesday	896	902		
3rd May 2012	Thursday	908.1	913.2		
4th May 2012	Friday	920.2	925.1		
5th May 2012	Saturday	932.3	938.2		
6th May 2012	Sunday	944.2	951		
7th May 2012	Monday	957	962.1	52.39667	
8th May 2012	Tuesday	969.4	974.2		
9th May 2012	Wednesday	979	985.3		
10th May 2012	Thursday	991.3	992.3		
11th May 2012	Friday				
12th May 2012	Saturday	999	1006.2		
13th May 2012	Sunday	1012	1017		
14th May 2012	Monday	1024.3	1030.2	48.065	
15th May 2012	Tuesday	1037.2	1043.2		
16th May 2012	Wednesday	1049	1055		
17th May 2012	Thursday	1061.4	1067.3		
18th May 2012	Friday	1074.2			
19th May 2012	Saturday	1086.3	1093		
20th May 2012	Sunday	1099.2	1106.4		
21st May 2012	Monday	1113.1	1119.1	42.75	
22nd May 2012	Tuesday	1125.2	1131.3		
23rd May 2012	Wednesday	1138.4	1144.3	old gas	new gas
24th May 2012	Thursday	1151.4	1157.2	40.39	88.145
25th May 2012	Friday	1163.1	1169.2		
26th May 2012	Saturday	1176	1182		
27th May 2012	Sunday	1189.4	1194		
28th May 2012	Monday	1201.4	1207.4	85.635	
29th May 2012	Tuesday	1213.4	1219		
30th May 2012	Wednesday	1226.4	1232		
31st May 2012	Thursday		1239.3		
1st June 2012	Friday	1245.4	1251.4		
2nd June 2012	Saturday	Test finished		82.06	