

# THE INSURANCE INDUSTRY AS A SOLAR WATER HEATER DRIVER IN THE COMMERCIAL AND DOMESTIC MARKETS IN SOUTH AFRICA

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## ABSTRACT

**South Africa faces severe electricity shortages. Most of the electricity generated is from coal, which contributes to climate change. Additionally a large amount of this power is lost through long distances of aging transmission lines.**

**Water heating is a major consumer of electricity. Solar Water Heaters (SWH) can alleviate these problems but has a low penetration in South Africa. Many water heaters installed annually in South Africa are replacements of failed water heaters and most of these are replaced via the insurance industry.**

**This paper makes an argument that the insurance industry can exploit this opportunity to introduce SWHs when a water heater must be replaced and help to jump start the SHW uptake.**

## 1. INTRODUCTION

The electricity supply in South Africa is under pressure and will remain tight until new capacity comes on line in 2013. Although the new Medupi coal fired power station with capacity of 4 800MW, which is being built by the state owned electricity supplier, Eskom, will take the pressure off after it comes on line in 2013, it is projected that even more capacity will be needed by 2018 to meet the fast-rising demand that has been projected [1]. Moreover commissioning of the new plant will not solve the environmental problems of coal burning or the losses currently incurred during power transmission.

Historically, the South African policy for electricity supply has been to increase the supply as demand arises. More recently, through Eskom's Demand Side Management (DSM) programme, efforts have been made to reduce the demand. One of these programmes is the subsidy scheme for Solar Water Heaters (SWH). Water heating imposes a heavy burden on the already stressed generation and transmission infrastructure of the country. Hot water is used in households as well as many commercial businesses, such as hotels, gyms, laundries, hospitals and restaurants. Most of this water is heated with standard water heaters (geysers) with electrical elements. Solar Water Heaters (SWH) can substantially reduce both generation and transmission of electricity. This great potential is under-utilised in South Africa.

SWH technology is the most potent and cost effective renewable energy solution available to us, which can also be rolled out in the shortest possible time. A SWH consist of a heat collector that uses solar radiation to heat

up the water and a storage unit for the hot water. The unit usually uses a back up electric element, but the electrical back up could also be done by a heat pump, which uses the ambient air temperature to heat up the water via a heat exchange. A heat pump is more energy efficient than an element for water heating but cost a lot more and many still use environmentally unacceptable refrigerants. SWH can be used in a wide variety of applications from small domestic units through medium sized units for the hotel and catering industry to large units, mostly for pre heating in any industry where heat is needed. Some buildings are not suitable for SWH. In this case, a water heater with an electric heat pump could be installed. A heat pump is more energy efficient than an element for water heating.

The South African government has set a target for renewable energy to contribute 10 000 gigawatt hours (GWh) of final energy consumption by 2013. Solar water heating could contribute to the reaching of this target. The South African government in addition has a target in place for the roll out of 1 000 000 SWH by 2014 but no clear strategy has been put in place to achieve this.

## 2. HOT WATER ENERGY NEEDS

Industry makes up 56% of electricity demand in South Africa and the commercial and public services sector 14% [2]. The residential sector makes up 20% of the electricity demand, but the demand from this sector rises to 37% at peak times [3].

Water heating makes up about 40% of a household's electricity needs [4] and about 30% of that of a small to medium sized hotel [5]. About 70% of this electricity can be saved by using a SWH [4]. The total electricity consumed by the domestic sector for 2007 was 41 213 GWh [2]. If a water heater uses 40% of the household electricity and 70% of this can be saved by installing a SWH [4], a saving of 11 540GWh can be attained if all households in South Africa switch to SWH. This could be translated to a 1 317MW Capacity reduction without taking transmission losses into account. This is a significant reduction and it does not include the hot water requirements of the commercial and industrial sectors. A water heater with an electric heat pump instead of an element will affect similar savings. If a heat pump is used instead of an element for back up energy in a SWH, the saving can be over 90% of electricity for water heating. As the water in a SWH is heated on site, the electricity saving at generation at the central plant is significantly more than the saving at the consumption side due to the avoidance of transmission losses.

The Eskom SWH subsidies have been doubled in January 2010 and now range from R2 100 to R12 500 per SWH unit installed [6]. About 700 Subsidies were paid out in 2008 and about 1 400 in 2009[7]. This is clearly a very small number.

There are currently an estimated 4.2 million water heaters installed in SA in the domestic sector alone, but only 77 000 SWH [8]. The SWH industry grew rapidly from 1979 to 1983 due to marketing efforts by the CSIR. The sales of SWH slowed down after that initial growth spurt, but have started to pick up again since 2005 when the South African government yet again started promoting SWH, mainly through the Central Energy Fund (CEF). The growth in sales was specifically significant in the first part of 2008 when SA experienced load shedding due to capacity constraints by Eskom. The doubling of the Eskom subsidy in January 2010 did not have as much effect on sales [9]. It is difficult to source reliable statistics on current SWH sales in South Africa, but the annual sales are estimated at between ten and twenty thousand SWH. This is very low as compared to standard water heaters which are more than 400 000 units per year [10]. Of these standard water heaters, about 200 000 are procured and installed via the insurance industry in the replacement of failed water heaters [11]. This figure clearly underscores the role of insurance.

The uptake of SWH in South Africa in general could be speeded up through legislation. It is most likely that a regulation to enforce the use of energy efficient water heating in new buildings and extensions to existing buildings will be in place by middle 2011. The National Regulator for Compulsory Specifications is busy drafting the new part of the National Building Regulation (NBR XA) to improve energy efficiency in buildings. This regulation will most probably enforce energy efficient hot water provision in all new buildings

Some municipalities are also looking at the possibility of efficient water heating bylaws. As the cost of a SWH is typically a small percentage of building cost, the additional cost of a SWH could be absorbed by the developer. However these are not likely to catch up soon with the already installed standard water heater population of 4.2 million units. Targeting to install SWH on these existing systems seems to be a much bigger prospect for SWH penetration and the alleviation of the power supply crisis at least in the short term.

There are however significant obstacles to the regulation of replacement of existing standard water heaters as there is no regular building inspection taking place as in the case of a new building. The cost of a SWH is also perceived as too high if it does not form part of a bigger project. There could be a possibility of a plumbing regulation to enforce energy efficient water heaters in all cases. The plumbing regulation enforcing drip trays under water heaters, which was put into effect in 1981 is an example of a very effective regulation which is strictly adhered to by the plumbing industry [10]. The extra

initial financial burden to the consumer has to be taken in consideration here.

### 3. REPLACEMENTS AND INSURERS

As the world's largest industry (if revenues were compared to GDP) [12], the insurance sector has immense leverage and also an immense responsibility. Insurers work with risk and it is in their own interest that as much as possible is done to avert climate change and its possible effect on their profitability and our livelihood.

The insurance industry is responsible for about 50% of the procurement and installation of standard water heaters in South Africa. Due to the many fraudulent claims by plumbers, the insurance industry has put sophisticated systems in place to reduce claims and to streamline the claims process. Most buildings (residential, commercial and industrial) in South Africa have short term insurance cover on them. As the water heater forms part of the building itself, it usually follows that the water heater is insured. The premiums for these policies are between 0.1 and 0.2% of the value of the building. Even though the amount and types of water heaters in the buildings are seldom discussed when a policy is taken out, about 70% of all claims on building insurance in the domestic sector are from failed water heaters [13]. These claims can range from very low, when only a small part of the water heater needs to be replaced to very high when the heater has burst and the resultant water damage to the property and possessions amounts to more than R100 000. The brake even point for short term insurance is at a 60% claims to premium ratio. As the premium for building insurance is very low, it is unlikely that the increased cost of a SWH can be carried by the insurers without an initial substantial increase in premiums or financial assistance form elsewhere.

If the SWH is installed on a rooftop, the future risk of peripheral damage is eliminated. This might be able to bring the premium down as the risk is lower. A SWH also has a much longer manufacturer's guarantee (a minimum of five years as opposed to two to three years on a standard water heater) so the insurer will not be liable for failures for a longer period. It is, however unlikely that the insurer will benefit from increased loyalty if a SWH is installed and the premium is increased as the policy holder might just change to another insurer on price difference after the installation of the SWH.

Most insurers in South Africa will allow the policy holder to change to a SWH at his or her own cost and own procurement and installation in the event of a water heater claim. For the policy holder who wants to change to SWH this would bring the cost of the SWH down by the replacement cost of the standard water heater.

As every SWH installed has a carbon emissions saving over its lifetime, it is possible to register a programmatic Clean Development Mechanism (CDM) programme for roll out of SWH.

#### 4. CASE STUDY

One of the big South African insurance companies, Santam, rolled out a SWH programme countrywide in February 2010. This programme was developed in partnership with Eskom, the Department of Public Enterprises (DPE) and Unlimited Energy. This programme is run from their claims division and makes it easier for the policy holder to switch to a SWH in event of a water heater claim. Apart from the replacement value of the water heater which is taken off the price of the SWH, there is also a cash flow and administrative benefit for the policy holder as the Eskom subsidy is administered by Santam. A discount is also given for Clean Development Mechanisms because of future carbon savings. With this programme, the policy holder claiming for a failed water heater could have a SWH installed for as little as R3 000 cost to himself.

For logistical reasons, this programme is only available from claims lodged at the central call centre at the moment. All operators at this call centre have been given extensive training to offer this option to every policy holder reporting water heater failure. Even though this programme seems attractive, the take up from policy holders has been disappointing. The anecdotal reason given for this low uptake is that the capital difference is still too high for the public's appetite. As this is the only SWH programme run by insurers in South Africa, it is recommended that more research be done as to the exact reasons why there is such a low uptake, as it is thought that the capital pay in alone cannot be the only barrier to the uptake.

It has been noted internationally that the two biggest barriers to the large scale roll out of SWH are the initial high cost and public awareness [4]. Even though the SWH will save money over time due to electricity savings if the building owner is the occupant, the initial outlay is still a big obstacle. Standard water heaters typically cost between R4 500 and R6 500 installed. A comparable SWH typically costs between R15 000 R30 000.

The Eskom DSM subsidy scheme addresses this problem of high initial cost. The consumer however has to pay this subsidy upfront and then claim it back from Eskom. If a policy holder from Santam has a failed water heater and decides to switch to a SWH, the Eskom subsidy is administered via Santam and the policy holder gets that saving. In addition to this, the policy holder gets the saving of the price of the water heater that has been replaced. This means that the upfront cost to the policy holder is reduced to up to R10 000 with this programme. With this programme the SWH should start paying for itself after about two years, as opposed to the about three years at present for a consumer buying a SWH.

The subsidy scheme for SWH could be increased or new programmes for convincing consumers through financial incentives to buy a SWH (or even hand outs of SWH) could be looked into, but seeing as the saving of

electricity by itself should be a strong motivator for a SWH and it is still not being taken up by the South African population, different reasons from the purely financial should be looked into.

Some possible reasons that might be investigated apart from the high initial cost might be the inconvenience of waiting slightly longer for the installation of a SWH; the choices that have to be made between different systems; SWH technology might not be trusted yet; SWH might be considered ugly and there might be a perception that because SWH are eco friendly, that this technology is inferior. Some people are also still under the impression that a SWH will only work while the sun is shining and are unaware of the electric backup that SWH have. It is also possible that the option is not sold aggressively enough at point of claim.

All obstacles above could be taken away by aggressive marketing and awareness campaigns. Even the perception of high cost, could be eliminated as it is only a perception. The SWH pays for itself long before the guarantee is expired. The only real obstacle is the time frame to install a SWH. This will probably always be longer than that of a standard water heater. If, however the idea of a SWH as a desirable object and a "must have" is planted in the head of consumers, they might be willing to wait longer for the privilege of owning a SWH.

None of these obstacles mentioned (barred the time frame) is unique in the event of a failed water heater. The insurance industry has the duty to facilitate this shift and even have a duty to make it easy and convenient for the policy holder to change to a SWH. The insurance industry could also share the responsibility of promotion and marketing of energy efficient water heating options with the government.

#### 5. OPPORTUNITIES

As insurance companies deal with risk, climate change will impact on their profitability. Programmes for mitigation of climate change should therefore be at the top of their agenda. The insurance industry is used to making financial and business decisions on short term forecasts and historical data. The problems of the future will be different and different business models need to be found. A programme to mitigate climate change will reap much more benefits than planning for adaptation when it happens.

Between ten and twenty thousand people are installing SWH every year in South Africa. Most of them are doing it without their water heater having failed. Most of them are not receiving the Eskom subsidy. Most of them probably realised that a SWH will save them money, even though they need to pay upfront. We need to make this the norm. Everyone must want one on their roof.

The insurance companies are working out the cost to change its policy holders to SWH. What needs to be

looked at is the cost of not making the change. The cost to the country as a whole due to energy shortages and the cost to the world due to climate change. Insurance companies are risk managers and need to realise that the risk of not changing to a SWH at point of water heater failure is a lost opportunity, in which they are the facilitators.

If a SWH is installed on the roof of a building, the resultant damage when the water heater fails will be nonexistent. The SWH also typically has a minimum guarantee of five years as opposed to the two to three years for a standard water heater. The future risk is thus postponed for a longer period. In the case of a SWH failing, it is also unlikely that the panels and storage unit will all fail at the same time. The future claims from a SWH could possibly be similar or even lower to that of a standard water heater.

## 6. CONCLUSION

Not only is South Africa facing a power crisis, but the current way of generating electricity mostly by coal fired power stations is contributing to the emissions of greenhouse gases. In addition large amounts of power continue to get lost through long transmission lines.

Water heating is a major consumer of electricity in South Africa and offers a great opportunity for a reduction in the demand for power and subsequently defer the need for new power generation and transmission.

The capacity of Solar Water Heaters to alleviate all these problems is well proven worldwide. Despite this however the penetration of SWH in South Africa remains extremely low. In this paper a number of barriers to the penetration of SWH in the country have been cited.

Insurance companies are risk managers and their profitability will inevitably be affected by climate change. So there is reason why they should seize an opportunity to contribute to environmental sustainability.

A fair amount of water heaters installed in South Africa are failed water heaters that get replaced via the insurance industry. The insurance companies are thus in a unique position to have a great impact in this changing environment by making it mandatory to include a SWH in the replaced system. This point of intervention needs to be investigated further and a plan of action needs to be drawn up so that the chance for SWH uptake can occur en masse at this point.

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### Presenter:

The paper is presented by Karin Kritzinger.