

Theme

Household energy poverty and paraffin consumption in South Africa

Using paraffin (kerosene) for cooking, heating or lighting is strongly associated with poverty in South Africa. In addition, many regard it to be the most dangerous form of household energy because of the high profile given to the unacceptably high number of harmful paraffin-related domestic incidents that have taken place.

Research in recent years, however, has revealed that the danger is not so much paraffin per se but rather the unsafe system of paraffin use. If the systemic problems are addressed, paraffin can be used very safely. Furthermore, hospital surveillance is indicating that burn injuries involving electricity are equal in magnitude to those related to paraffin. This suggests a common problem of poor household energy safety practise that must be addressed.

Inspired by the Freedom Charter's vision and the desire, as a developmental state, to provide electricity to all citizens, the South African government has diverted its attention away from ensuring that the paraffin consumption system is as failsafe as other energy systems – with dire consequences. Paraffin is a very important domestic thermal energy carrier and will be so for some time as there is a lack of alternative, available, viable energy options.

This article argues that it is more prudent to address the systemic problems associated with paraffin than to try and convert consumers to an alternative energy carrier. It also presents a view on the issues and briefly explains how the Paraffin Safety Association has set about addressing the problems at hand.

Let them eat cake

The French Revolution phrase “Let them eat cake” is a fitting allegory to contextualise a discussion about paraffin as a household energy carrier at this time of global crisis. It has uncanny parallels. Some say this phrase was wrongly attributed to Marie-Antoinette (1755-93), the Queen consort of Louis XVI, when she was informed that the French people had no bread to eat. Life is messy and proffering cake did not address the needs or the sentiment of the masses - she lost her head at the guillotine for her troubles.

Here the parallels begin. The world as we know it is in crisis. There is an insatiable appetite for consumption of everything money can buy, especially energy. The gap between rich and poor is vast. There are

energy shortages and blackouts. Fear and greed is in evidence; financial institutions are imploding, shortages have given rise to unimaginable food and energy costs as evidenced by the recent oil price hikes, local currencies' values have plummeted, and there is a global recession looming. As was the case with Louis XVI and his advisers, it can be argued that today's governments are failing almost entirely to deal effectively with any of these woes. In South Africa, our national president has recently been “beheaded” before term, recalled by his own revolutionary party which is divided and splitting. It was on his watch that our current electricity crisis unfolded as a result of declining supply and growing demand. Poor decisions and miscalculations were among the most important causes of the crisis according to an official investigation (Wannenber, 2008).

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Glenn has written this article in his personal capacity and the views he has expressed are not necessarily those of the Paraffin Safety Association.

“Everyone has the right to an environment that is not harmful to their health and well-being...”

Ch.2 Sec.24
South African Bill of Rights

It is in this context, at recent Energy Bill hearings in the South African Parliament, that the Paraffin Safety Association of Southern Africa presented to the Energy Portfolio committee members, a “Paraffin User's Declaration” calling for a household energy safety policy and its urgent implementation. The declaration recognised that the poor had limited energy options and called on government to ensure that all household energy is safer, more affordable and sustainable, especially paraffin (Final Declaration, 2007). In the midst of this crisis, the initial response from a number of parliamentarians was, “We are not going to make paraffin safe. We are going to provide electricity for all. We thought you were here to tell us how to phase out this dangerous paraffin and candles”. Notwithstanding the noble goals of the past or the Freedom Charter (1955),

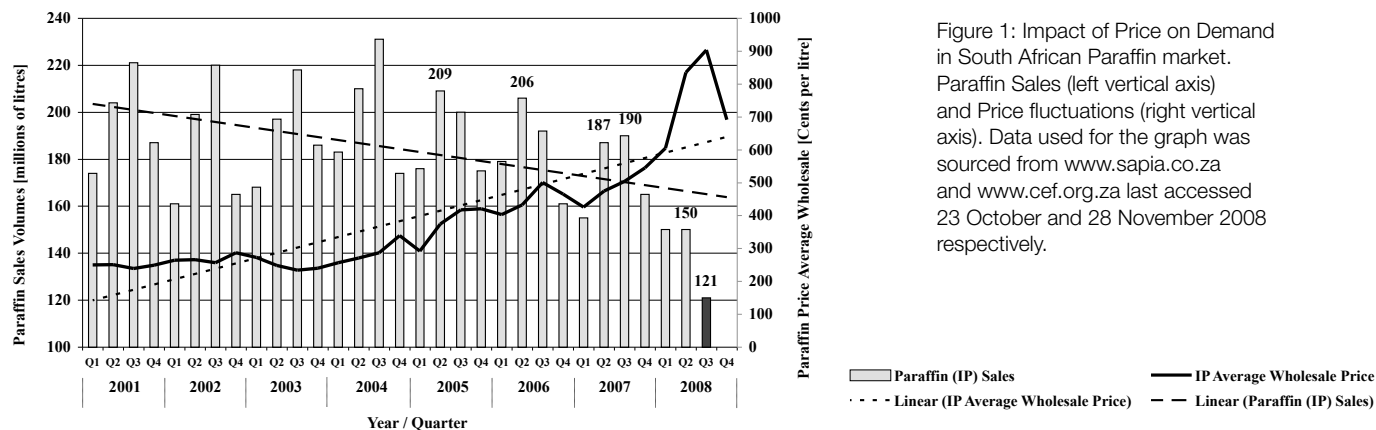


Figure 1: Impact of Price on Demand in South African Paraffin market. Paraffin Sales (left vertical axis) and Price fluctuations (right vertical axis). Data used for the graph was sourced from www.sapia.co.za and www.cef.org.za last accessed 23 October and 28 November 2008 respectively.

the present reality and recent experience shows that the country's capacity to supply electricity is compromised. As a result the government electrification programme is not progressing well and Eskom, the South African electricity public utility, is desperately looking for ways to reduce demand on the grid. A policy to focus primarily on supplying electricity to all citizens risks being judged harshly by history if the poor continue indefinitely with neither sufficient, affordable electricity nor acceptable levels of household energy safety. The prevailing reality dictates that current energy systems are improved and made safe, including the paraffin system.

This article argues that paraffin is safe and has a very definite role to play along with all other household energy carriers – provided the systems by which they are used are failsafe. Paraffin is excellent for meeting basic household thermal needs – hot water, warm space and bellies filled with cooked food. Unlike South Africa, the experience of countries like Japan and France prove that paraffin can be used safely, efficiently and cleanly. They do not experience paraffin ingestions, high indoor emissions, and uncontrolled fires relating to the use of paraffin for cooking and heating. The “hearth” of the home is where this energy revolution should be planned.

The Paraffin Safety Association

The Paraffin Safety Association of Southern Africa was established in 1996. The unacceptably high number of harmful, domestic, paraffin-related incidents could no longer be tolerated. A 2003 report to Treasury estimated the annual externality cost of paraffin related incidents to be 50 times higher than the annual fuel turnover value – approximately R 100 billion at the time (PDC, 2003). Paraffin incidents cost the economy R 7.90/litre (excluding deaths) and R 149/litre (including deaths). The mandate was simple – to promote safety in the domestic use of paraffin.

It has become clear to me that describing paraffin as dangerous and trying to eliminate

its use was counter productive because it will inevitably continue to be used. The association is at great pains to stipulate that it has no vested interest in the sale of paraffin or the promotion of paraffin over any other thermal domestic energy option. Its premise is to protect paraffin consumers. Because paraffin will continue to be used domestically, the association's mission, to ensure the safe use of paraffin as part of the energy mix for domestic users, remains. This is being achieved through strategic partnerships (especially with government), research and promotion of safe practices from manufacture through to the point of consumption.

Why people use paraffin and similar products.

While paraffin is considered to be a low income household fuel, evidence is emerging that a significant proportion of higher income homes also use paraffin as part of their energy mix. The difference is that the higher income households are less dependent on liquid fuels – it is not their primary source of energy.

The majority of people who use liquid fuels for cooking, heating and lighting do so simply because the liquid fuel option in question fills a specific niche in their household energy mix better than other options. Portability, affordability, availability, lack of access to alternatives such as electricity, and low set-up costs are some of the determining factors.

For the majority of consumers of paraffin it is price that has qualified their choice. Slow cooking also plays a very important role when people choose a wick stove that can be turned down to a very low simmer – it matches household preferences for staples which need to be cooked slowly (samp, pap, tripe). Wick stoves (non-pressure) account for about 90% of the market.

Energy poverty and the demand for paraffin

Although paraffin demand has been gradually declining, the growing global energy crisis has precipitated a sudden shortage in supply with record prices,

triggering a local, sudden drop in demand. During 2008, the maximum allowed retail price skyrocketed by 63%, from 769 cents/litre to 1256 cents/litre over seven months before dropping back to 7% (823 cents/litre) above the price on 1 January 2008 (Central Energy Fund, 2008).

The gradual decline in Paraffin Sales in South Africa can be attributed primarily to two factors: 1) Growing prosperity in the lower middle-income groups; 2) Increasing electrification of households. It should be noted that it is impossible to isolate domestic consumption of paraffin from commercial consumption but most analysts would agree to attribute about 70% of the national sales to domestic consumption (PDC, 2003).

What can we observe from Figure 1?

1. From 2001 to 2007, there is no real correlation between the price of paraffin and sales volumes. The price goes up gradually and it appears that those who stick with paraffin continue to use it as they have always done.
2. There are seasonal fluctuations with increased consumption in the colder 2nd and 3rd quarters of each year. Space heating during milder and harsher winters (2004 Q3) may account for variances.
3. In 2008 the sudden and violent spike in oil prices appears to drive the price of paraffin so high that consumers do not have the disposable income to maintain the same level of consumption and are forced to cut back. Although the 2008 Q4 sales figures are not available, the 2008 Q3 figures (121 million litres) are desperately lower than anything experienced as far back as data is available (1994 Q1). For a time in 2008, electricity was more attractive on a cost basis than paraffin, before the latter receded in price and the electricity tariff increased dramatically.
4. The introduction of paraffin appliance standards and regulations in 2007, and the subsequent shortage of supply of appliances may also account for a slow-down in consumption. Although this is thought to be less of a factor than price.

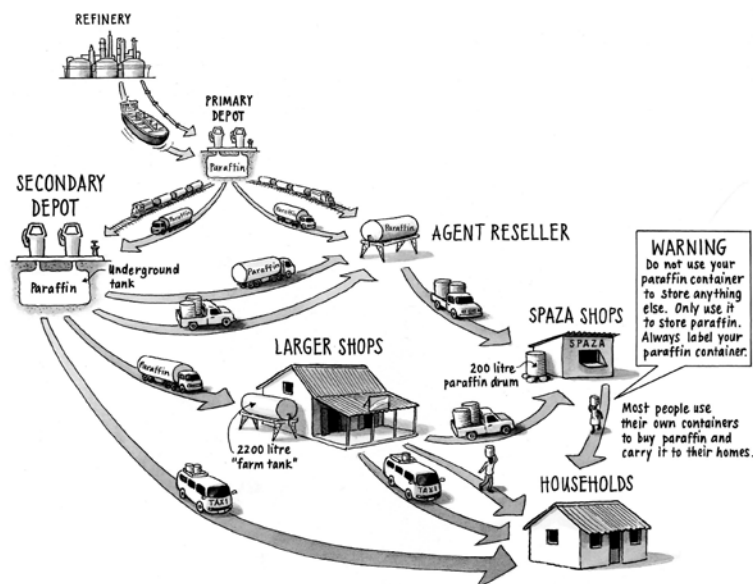


Figure 2: A model of the Paraffin supply chain. Adapted by the Paraffin Safety Association with permission from Sarah Ward, 2002. *The Energy Book*, p. 52.

Case study

It is time for me to introduce Grace. She is not a real person except that she represents many real people with whom we have interacted. Her story reflects the experiences of many young people.

Grace carries the scars of severe burns on her head, arms and abdomen. She wears a wig, high necklines and long sleeves to protect her skin from the sun as well as unwelcome stares. Grace was badly burnt when the new paraffin stove she had just bought and was lighting for the first time erupted into uncontrollable flames. She thought it was a result of her own carelessness - she had spilt some fuel and failed to clean it up. She was not used to using paraffin stoves and was not really sure what happened.

Grace may have been careless; she may have failed to take sufficient precautions. She was uncertain what she should be doing to protect herself and to prevent an accident. No one had told her what to do. She had seen many people use stoves and other paraffin appliances where the paraffin had spilt and nothing had happened.

What Grace did not know was that the paraffin she had purchased was contaminated with a minuscule amount of petrol. She had purchased the paraffin at her local "spaza" shop, an informal kiosk in a yard at the corner house in her street. She brought an empty cool drink bottle from home and they filled it - it is the way paraffin is sold in the townships and at taxi ranks. Grace's boyfriend, Siphso, had used the same cool drink bottle the day before to transport petrol he had bought on the way home from work. He was repairing his old car and needed to wash the grease off the parts he was working on. Grace did not know that there would be sufficient petrol residue in the bottle to contaminate the paraffin and so radically alter its chemical composition with dire consequences.

Paraffin is manufactured in South Africa for the South African market with a flashpoint always greater than 43°C. This means that paraffin in South Africa must be heated to at least 43°C before it will ignite. If paraffin is mixed with as little as approximately 1% by volume of petrol it will take on the properties of petrol. This means that paraffin contaminated with petrol will achieve a dramatically altered flashpoint as it is influenced by petrol's flashpoint which is -15°C or lower. The net result is a fuel that instantaneously ignites (as petrol does with a "whoosh" and an eruption of flames) at room temperature. If a consumer is unaware of this contamination when lighting (igniting) a paraffin appliance they will be taken by surprise and find themselves engulfed in flames. They will not know why it happened and may well blame themselves for the conflagration that follows.

Most contaminants like dirt and water, are not explosive like petrol, but will cause poor combustion and force the appliances to smoke unpleasantly, emitting partially burnt, potentially carcinogenic carbon based compounds. The system of selling paraffin in South Africa provides numerous opportunities for the risk of contamination. As can be seen from Figure 2, consumers buying from bulk stock are responsible for end-user packaging. There are many intermediaries in the paraffin supply chain, and each time the fuel is decanted is an additional opportunity for the risk of contamination and, incidentally, a mark-up on the price. This system also eliminates the opportunity to supply a chemical safety warning label (and child resistant closures), an international norm to protect consumers and the environment.

The story of Grace is important because it illustrates that it is necessary to improve the safety and quality of the entire system of domestic consumption of paraffin so that it is as safe as or even safer than other energy options such as liquefied petroleum gas or electricity. When fires start in poor,

urban communities, the high density of housing usually means that neighbours, often hundreds of them, suffer along with the household in which the uncontrolled fire began its destruction (Fig. 3).

The 'system of domestic consumption' is not only about the method of burning the fuel; it includes every step in the process from refining paraffin to its domestic consumption and management of its emissions. This includes bulk transporting, bulk and domestic storage, packaging, retailing, decanting, and maintenance and disposal of spent packaging and appliances. It is also about housing and household safety. It cannot and should not be left entirely to the consumer to ensure their safety. They must be able to use the energy in a domestic setting in a failsafe way.

Harmful household energy injuries

Very few resources are allocated to building household energy safety knowledge. As a result, there is an absence of clear, quality information essential for good decision making and evidence based household energy policy formulation and implementation.

The Paraffin Safety Association therefore initiated a National Household Energy Surveillance System using a geographical information system (GIS). The Surveillance system can hold and present any data and is particularly adept at reporting that data in spatial and time dimensions, facilitating the study of cause and effect. It is free to view on a dedicated website and persons contributing data are able to log on and capture data via the internet. Field research is facilitated by cell phone technology where questionnaires are completed using cell phones which transmit the data to the database. This saves time and minimises double entry errors. Nine medical facilities have signed up to contribute and fire data is loaded from the Cape Town and Buffalo



Figure 3: Aftermath of one of many devastating Joe Slovo informal settlement fires during a strong South-Easter – Cape Town, January 2005. Courtesy of the City Of Cape Town Disaster Management Unit.

City Municipalities. StatsSA census data is also recorded and mapped, including household energy use distribution maps for cooking, heating and lighting.

Although the project is in its infancy it has already highlighted or verified some very important observations (See Figures 4 and 5);

1. With the exception of paraffin ingestions, household energy injuries are common to all significant energy carriers. Injuries involving electricity are as frequent as those involving paraffin.
2. The high incidence of liquid burns across all energy sources suggests that this problem requires urgent attention.
3. Across injury types and energy carriers, children, especially below the age of two years are the primary victims.
4. Because children under the age of two years are the most common victims, and because there are cool drinks of every imaginable colour, colouration of paraffin is unlikely to be an effective strategy to reduce paraffin ingestions. A strategy that eliminates access to paraffin by toddlers altogether should be favoured.
5. Paraffin ingestions, especially among children are unacceptably high and account for a vast proportion of paraffin related injuries. A strategy to address this gap is long overdue.

Communication of consumer safety awareness and education

Consumers are widespread and in constant transition, especially those living in informal settlements. This poses a serious challenge for communicating safety awareness education. A train-the-trainer approach has been adopted as the central pillar of the model. Materials have been developed in the 11 official languages and various other supporting resources are based on the core posters and their messages. The core messages focus on prevention, what to do in the case of an incident and what to do after the event to minimise impact. The Association also relies heavily on mass media communication linking it to specific interventions in specific communities.

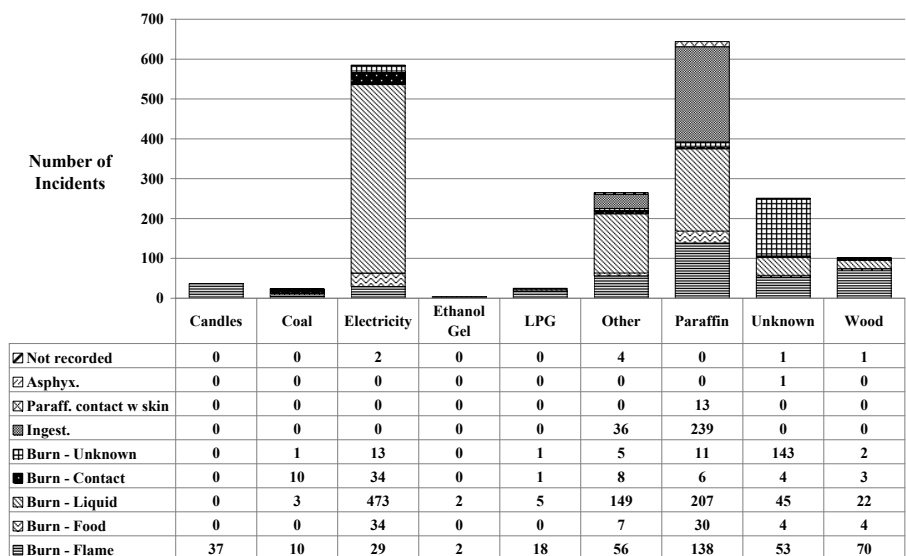


Figure 4: Analysis of injury cause by energy source, all participating institutions.

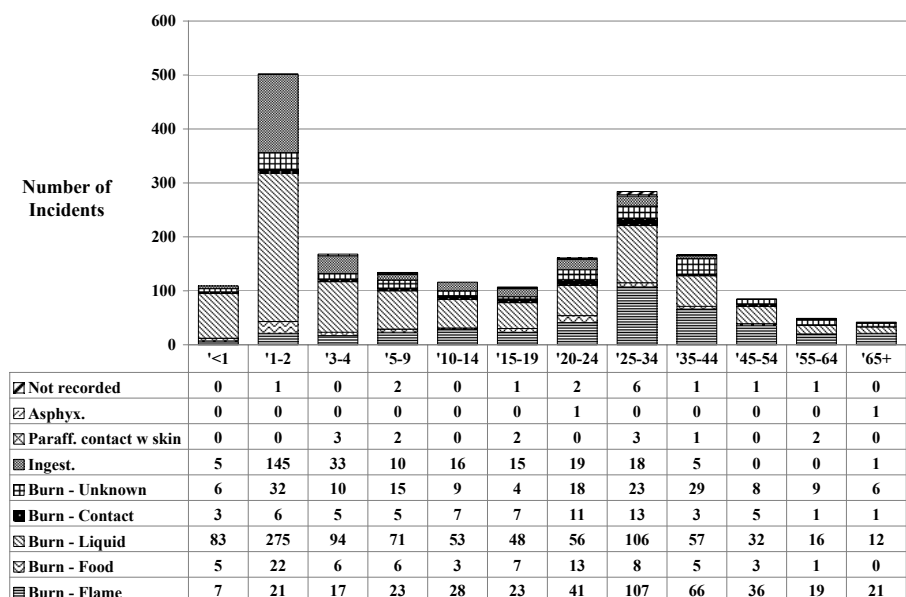


Figure 5: Analysis of injury cause by age group, all participating institutions.

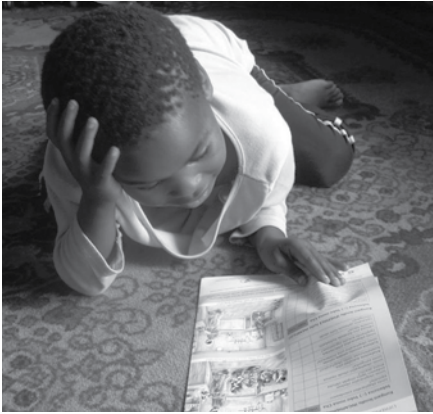


Figure 6: Child studying an 8 page flyer in his language of choice. (Photo: Nhlanhla Mdadane, Paraffin Safety Association)



Figure 7: Imported, unsafe, illegal paraffin stoves (Photo: Paraffin Safety Association)

Quality and safety standards, regulations and enforcement

Faulty and sub-standard paraffin appliances are widely believed to have been the main culprits in uncontrolled fires in low income households and informal settlements. They are possibly only rivalled by candles in their culpability. There are many, seriously unsafe, illegal paraffin appliances on the market (Fig. 7). Therefore, the development and enforcement of robust, compulsory safety and quality standards is crucial for ensuring that paraffin can be used as safely as any other household energy carrier.

The South African Bureau of Standards (SABS) is the statutory body responsible for the promotion and maintenance of standardization and quality in connection with commodities and the rendering of services. Safety and quality standards are drawn up for any product or service according to the Standards Act, 1993 (Act No. 29 of 1993) and are called South African National Standards (SANS). Standards are prepared through technical committees made up of a range of stakeholders and the standards are sent out for public comment before they become regulation. For example, the SANS1906:2006 is the standard for non pressure stoves and heaters. Compliance with this standard is voluntary for industry.

However, a standard becomes compulsory when any government minister, in terms of the standards act, proclaims a standard to be a compulsory specification or regulation by means of a government gazette, after a process of public consultation. The SANS1906:2007 was regulated on 1 January 2007 and hence became a compulsory specification – a standard which is compulsory for industry to comply with.

There are safety standards for paraffin – a fuel specification (SANS1913:2008) as well as standard governing its classification and labelling, packaging and transport (SANS10243:2008 being the most significant).

Although the enforcement of standards is a real challenge, the Paraffin Safety Association recommends that the

public and government should insist on appropriate SABS standards approval before purchasing paraffin appliances destined for domestic use regardless of whether the relevant applicable standard is voluntary or compulsory.

Conclusion

Paraffin has had a bad press yet it is not the fuel that is the problem, it is the system that must be made failsafe. The shortage of energy and energy systems, especially for the poor, make it essential to deliver paraffin safely for domestic thermal requirements.

There are human, causal factors for injuries which are common to all household energy carriers – these include alcoholism, violence, suicide, carelessness and ignorance. Surveillance data has a pivotal role to play in understanding the challenges and allocating scarce resources strategically.

The South African constitution enshrines the right of its citizens to a safe environment. There is a lot of work to be done before this will apply to household energy safety. Like bread, if the basic need is for safe, affordable, available, thermal household energy then a way must be found to ensure this need is met.

Profile of the author

Glenn Truran has a BA and two post graduate diplomas from the University of the Witwatersrand, the first being a higher diploma in education and the second a diploma in public policy and development administration. He also has an MBA from the University of Cape Town. He has worked for poverty alleviation non-profit organisations for most of his career. He is presently the general manager of the Paraffin Safety Association of Southern Africa based in Cape Town.

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- * News article: Report reveals 'real causes' of Eskom crisis

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