



CONFERENCE  
Strategies to Overcome Poverty & Inequality  
"Towards Carnegie III"  
University of Cape Town, 3 - 7 September 2012



This paper was presented at "Towards Carnegie III", a conference held at the University of Cape Town from 3 to 7 September 2012.

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## THE CHALLENGE OF ADDRESSING HOUSEHOLD ENERGY POVERTY

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### Introduction

The absence of an integrated, household energy strategy and policy in South Africa is a major concern. Having primarily worked within low-income areas over the last few years, the Paraffin Safety Association of Southern Africa (PASASA) has investigated energy usage patterns among households and reflected upon the challenges of “energy poverty” experienced by those living in informal settlements and in rural areas. PASASA’s injury surveillance project has also revealed increasing pressures experienced by the health system as many energy-related injuries (predominantly burns and ingestions) are unnecessarily presenting themselves at health care institutions. The lack of a comprehensive, integrated household energy strategy and policy, which encompasses associated programmes and projects, may represent a key contributor to some of the major indirect factors inhibiting development and perpetuating poverty in this country.

The country’s residential energy mix includes electricity, liquid petroleum gas, coal, paraffin, biomass and solar energy. However, policy and programmes to date have largely focused on electricity. This means that many households are still exposed to countless energy safety risks that are not being addressed. This fact has necessitated PASASA’s current transformation from a singular focus on the safety concerns of paraffin, to addressing the safety concerns related to the use of all energy carriers used in South African homes.

Both PASASA and the South African National Energy Development Institute (SANEDI) have consulted broadly regarding the issues of household energy and have agreed on the need to focus upon challenges relating to the supply, availability, access, affordability and safety of household energy. This partnership has three overarching goals:

- 1) to bring household energy use into the forefront of the policy agenda;
- 2) to identify the gaps in current policy and the challenges regarding the impact of urbanization on development (with regards to energy access for rural and/or informal communities, energy supply, efficiency and safety) and;
- 3) to suggest best practices and recommendations for a national household energy strategy and policy.

## Household Energy Usage in Low-Income Communities

Within the context of the household or residential demand subsector, electricity, liquid petroleum gas, coal, paraffin and solar energy encompass the energy supply bundle in South Africa. Despite the successes of South Africa's electrification programme since the early 1990s, the South African Department of Energy has indicated that 3.4 million households currently do not have access to electricity across South Africa [1]. This translates to about 25% of households of which 1/3 are informal households and 2/3 formal households (see Figure 1 below). It is unlikely that these households would have access to electricity in the foreseeable future. This raises pertinent questions such as what energy carriers can these households rely upon and what provision has the State made for their energy needs?



Figure 1 An excerpt from proceedings at the 2012 conference for domestic use of energy [1].

PASASA household surveillance data, collected from over 12,000 South African households in low-income areas since 2007, indicate that a range of energy carriers are used in these communities. Figure 2 indicates that 57% of households surveyed used paraffin for cooking and 23% used electricity for cooking. When observing energy-use for heating, 46% of households surveyed used paraffin and 18% used electricity (with a similar percentage using wood) [2]. Candles remain a common source of lighting in resource poor communities. This demonstrates that low-income households practice multiple fuel use for various reasons, particularly affordability and cultural or behavioural preferences.

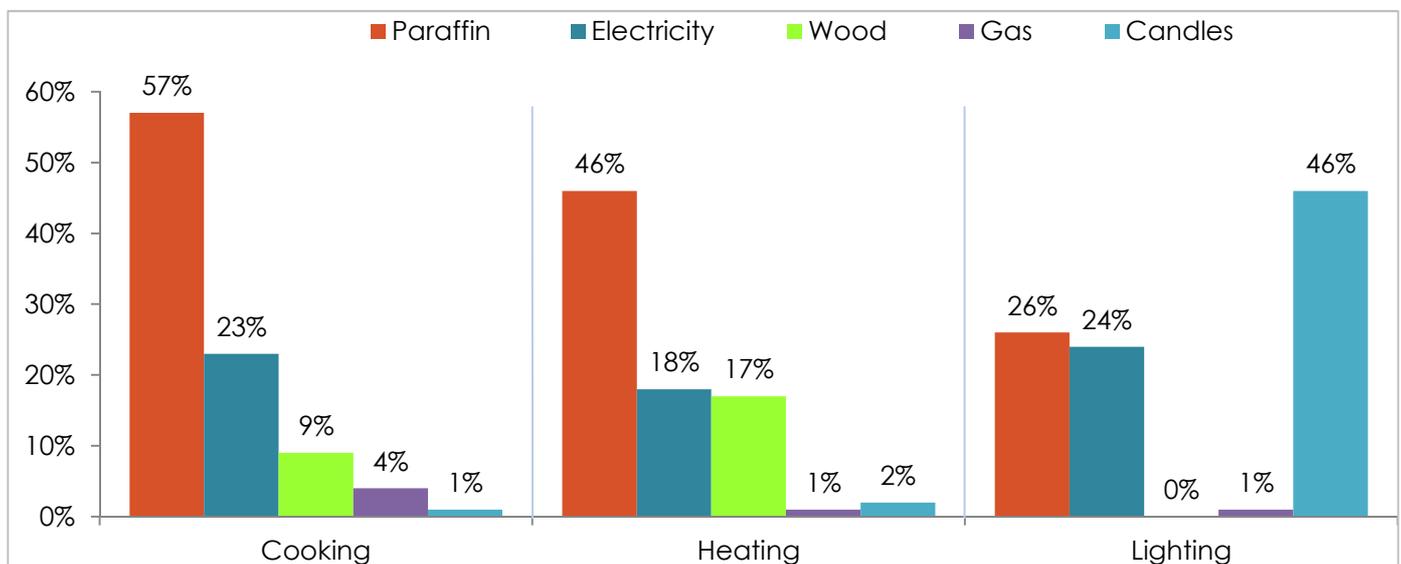


Figure 2 Types of Energy Sources used in Low-income Communities [2]

## The Cost of Household Energy

PASASA studies conducted within informal settings (n=12159 households) have illustrated that 2/3 of low-income households surveyed earn less than R1000/month (refer to Figure 3)[2]. This has contributed to a highly regressive and inequitable energy financing environment within South Africa whereby lower income households are seen to spend more on their household energy needs (up to 26% of their monthly incomes), when compared to their better off counterparts (refer to Figure 4) [3]. The majority of those who use paraffin as their household fuel for cooking, heating and lighting do so primarily as a result of affordability factors however; portability, availability, lack of access to alternatives such as electricity, low set-up costs and cultural/behavioural factors also play important roles in determining household energy choices.

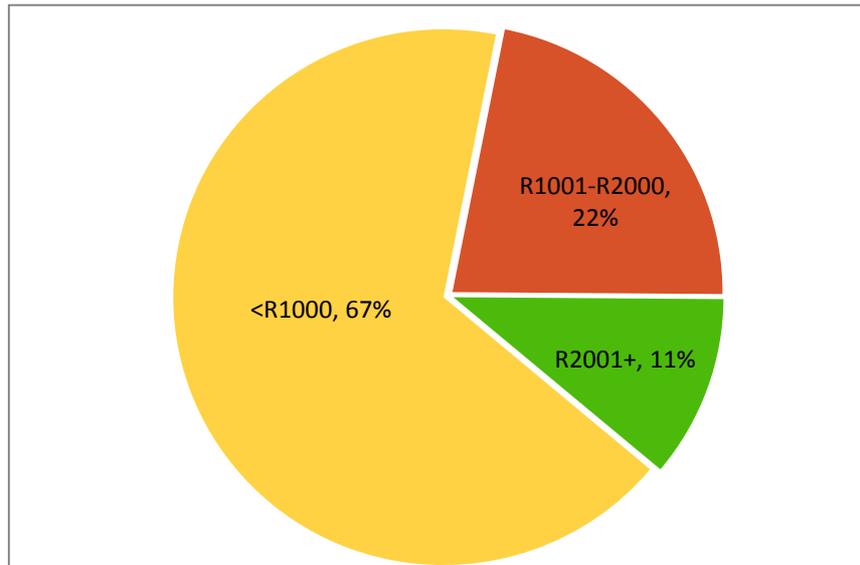


Figure 3 Average Monthly Household Income [2]

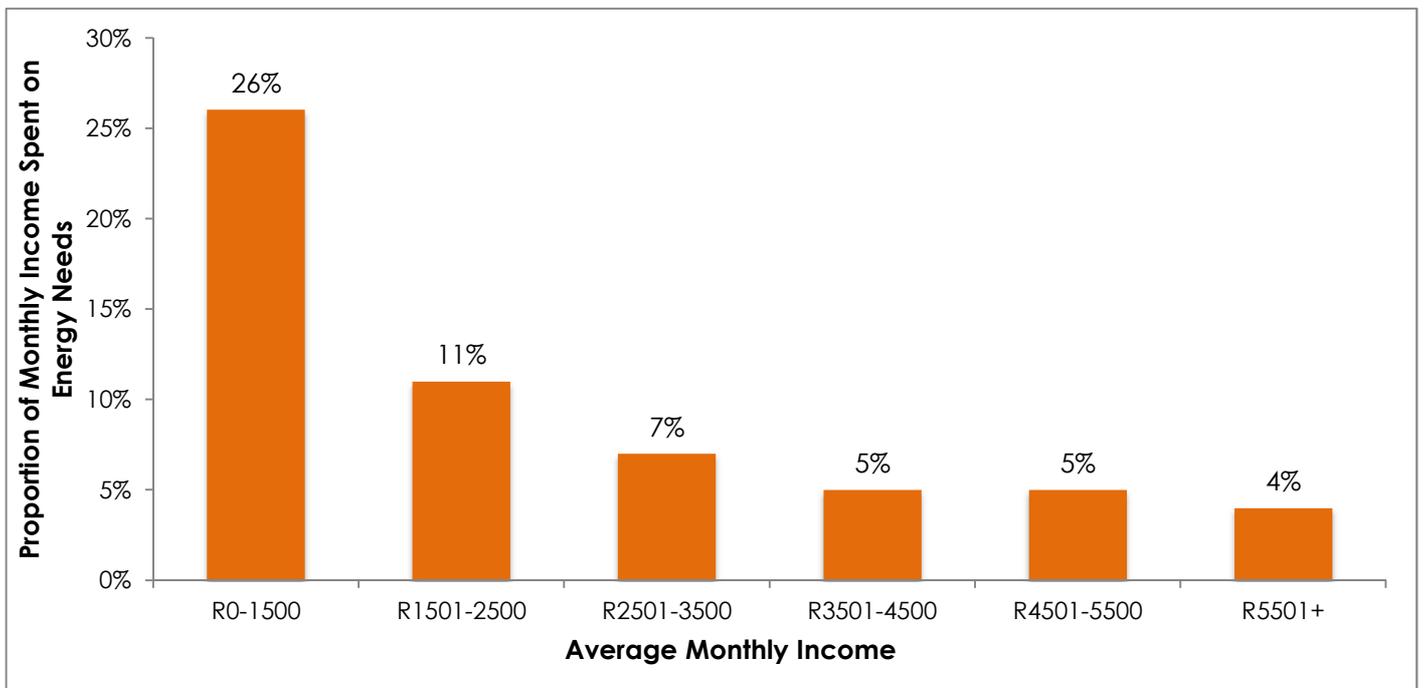
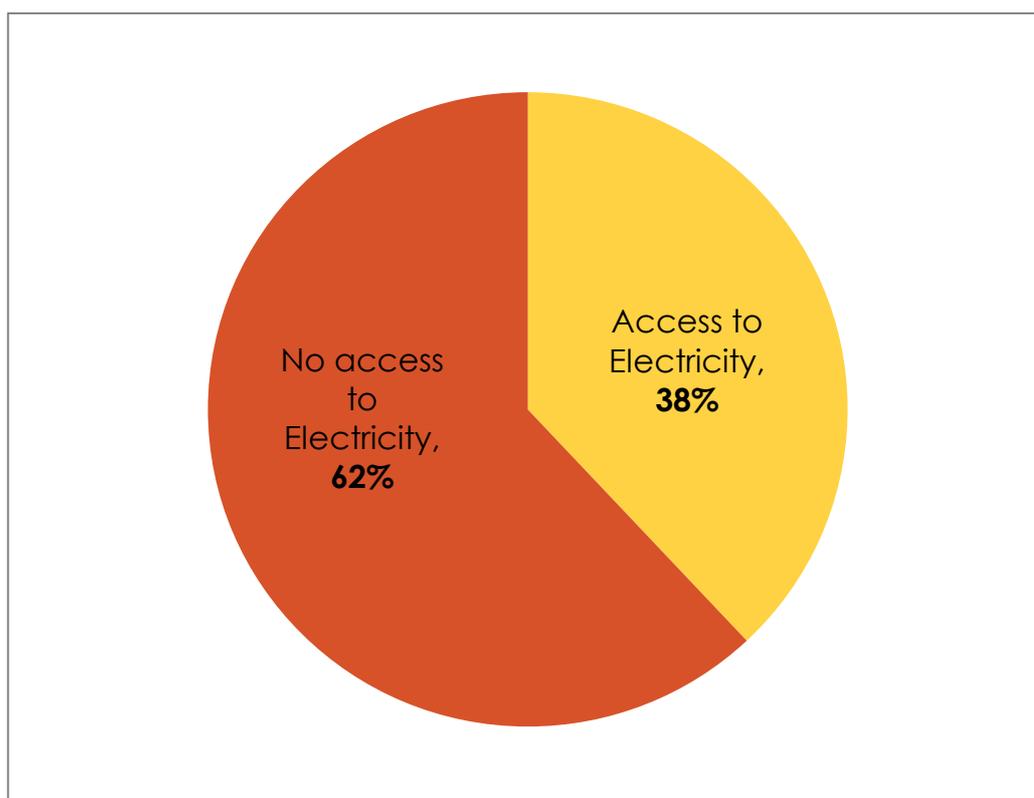


Figure 4 Average Monthly Expenditure on Energy needs as a percentage of Average Monthly Household Income [3]

One common myth is that, when there is access to electricity, people will use it. This is not necessarily the case; 38% of households surveyed that had access to electricity continued to use paraffin (refer to Figure 5 below) [2].



**Figure 5** Proportion of Paraffin-using Households With & Without Electricity Access [2]

A clearer understanding of this energy usage pattern is needed. A narrow focus on the provision of electricity might be short-sighted as these findings clearly show that households will continue to use other fuels and appliances. In addition, existing electrification policies do not target all households. Backyard dwellers and informal settlements on unproclaimed land, for example, are not eligible for these services and will therefore never benefit from these policies. Therefore, adequate programmes and policies which ensure the safe usage of **all** energy carriers are necessary. Needless to say, there is added risk in low-income communities as 1/3 of households surveyed obtain their electricity through illegal connections.

Increases in the cost of electricity over the past few years therefore imply that the costs for household energy among these groups, as well as the inequity in the financing and distribution of fuels, are likely to grow. In electrified areas, these increasing prices coupled with interruptions in electricity supply has had implications on illegal electricity connections as well as a propensity for households to revert to, or rely more heavily on paraffin fuel.

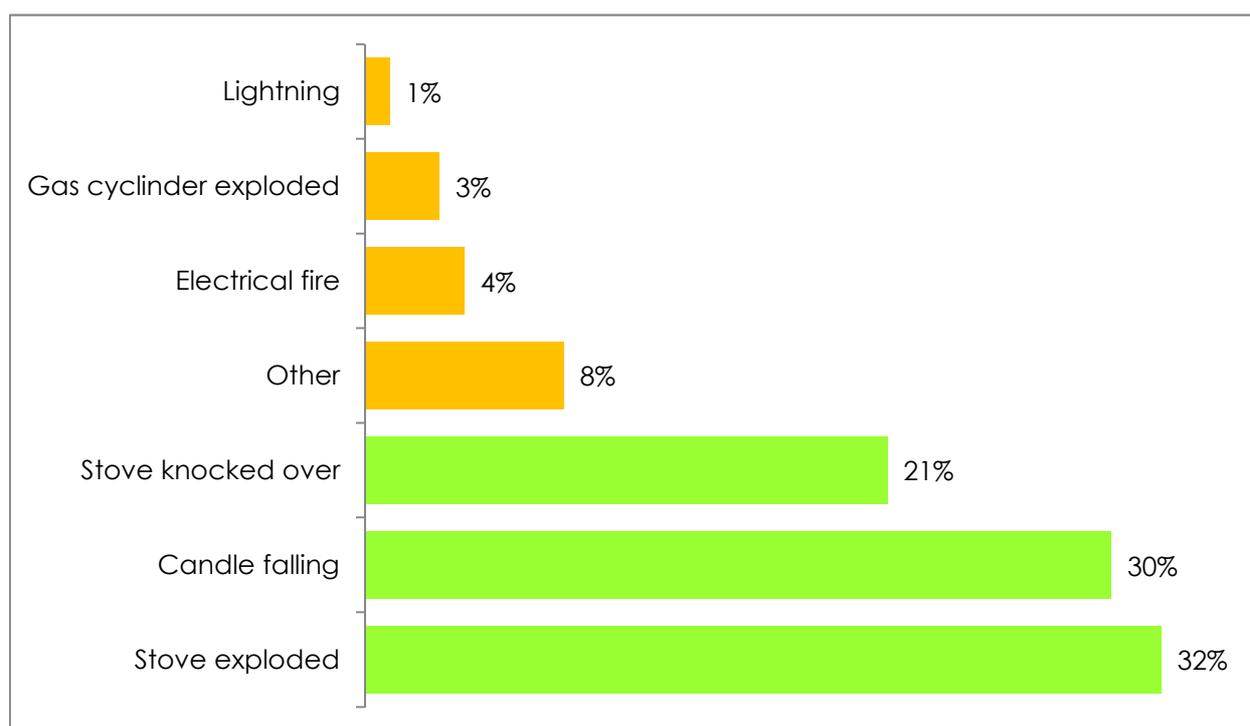
The systemic challenges around paraffin usage also contribute to a cost. Injuries due to a lack of access to safe, affordable paraffin, that is correctly packaged and clearly labeled, are common and often serious, even fatal. To use paraffin within the household requires either a wick-based, non-pressurized appliance or a pressurized appliance. Non-pressurized stoves account for 90% of the market and pressurized stoves account for 10% of the market [3]. Within South Africa, appliances as well as the liquid paraffin fuel, reach households informally through micro-enterprises, or *spaza* shops.

Currently, only one locally manufactured, non-pressurized, licensed, legal stove exists which is sold under the brand name *Panda*. Although this product is reported to be used by 80% of households in South Africa, most often, households are in possession of an unlicensed, unsafe version of the *Panda* which is being manufactured by an unknown source and dominating the market due to its

low-cost and wide distribution network. This unlicensed *Panda* has not met South African standards and regulations as outlined by the South African Bureau of Standards (SABS) and the National Regulator for Compulsory Specifications (NRCS). Efforts to trace and prosecute these manufacturers have, as yet, been unsuccessful. The structure of micro-enterprises and the distribution of fuel and appliances have created a situation in which compliance with national standards and regulations is difficult to assess and enforce.

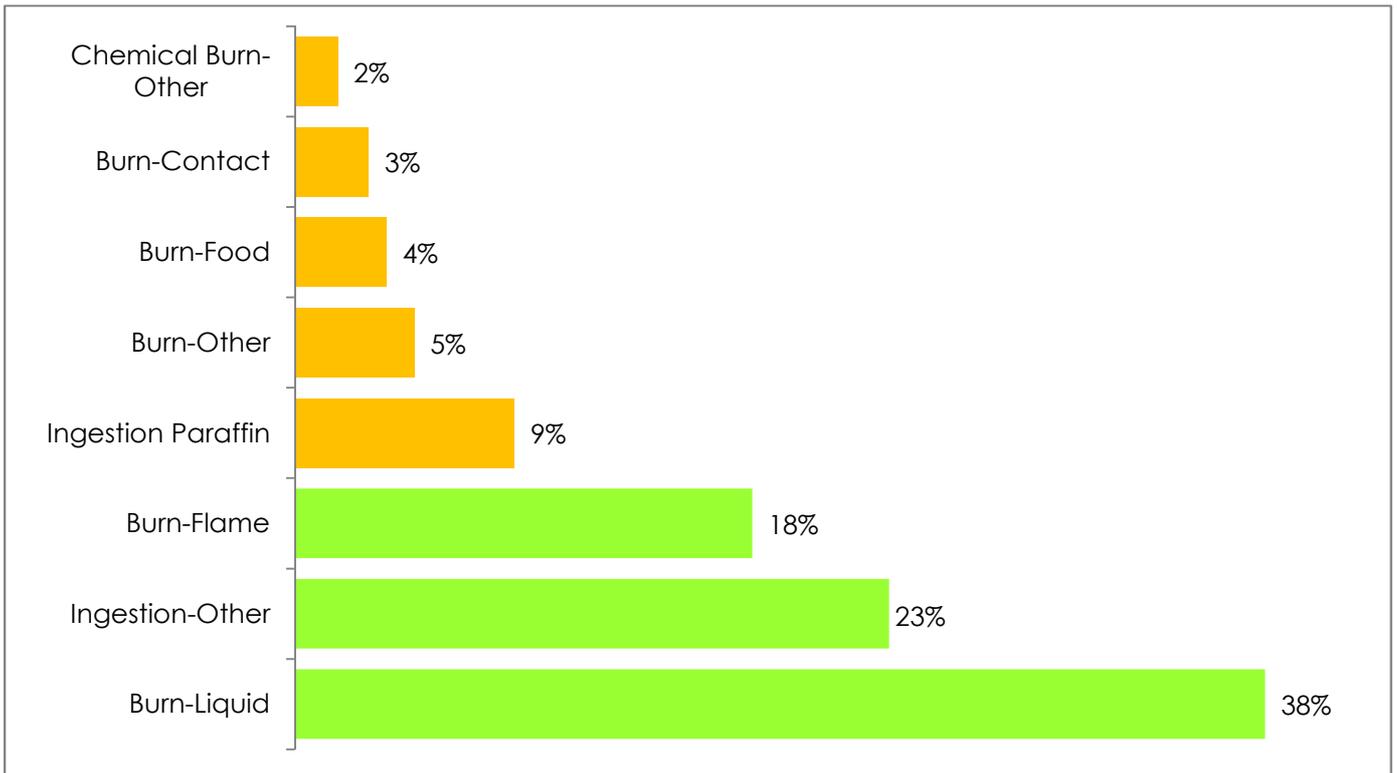
## Household energy-related injuries

Household energy-related injuries, such as burns and paraffin ingestions, are a serious problem in South Africa and cause devastating emotional, financial and physical damage to many communities, particularly in low-income areas. The Association has established a GIS-based (Geographical Information System – based) Injury Surveillance System (called the South African National Household Energy Surveillance System). This is where household energy-related injuries (burns and ingestions) are recorded (<http://www.gis.paraffinsafety.org>). Other community-based research conducted by the Association indicate systemic challenges in the supply and usage of paraffin (refer to Figure 6) whereby 53% of energy-related fires recorded were caused by unsafe stoves and; 30% of fires were caused by candles falling over [2]. This reveals the need for a more comprehensive approach to address household energy safety. Access to safe, efficient appliances (such as paraffin stoves) is a priority and the provision of a basic necessity such as safe lighting is needed.

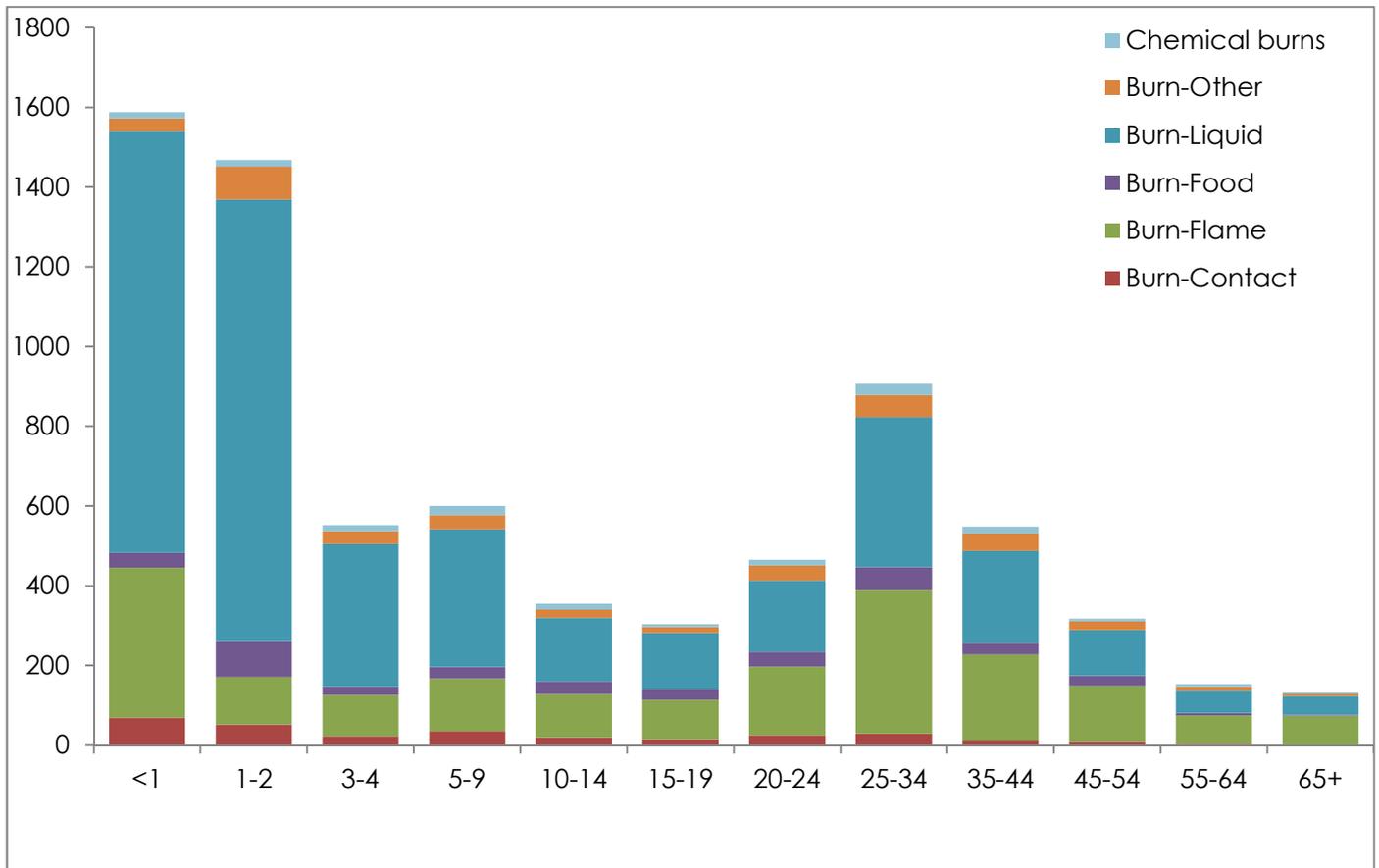


**Figure 6** Causes of Fires [2]

According to PASASA injury surveillance data, 24% of households surveyed had previously experienced energy-related harm, most often associated with fires, burns and ingestions [2]. Electricity and paraffin energy sources are responsible for approximately 73% of burn injuries; these largely are experienced through scalds or liquid burns, ingestions, and flame burns [2]. Figure 7 highlights hot water burns (scalds) as a major public health concern [2]. They contribute to 56% of all household energy-related burns [2]. Paraffin ingestions account for 25% of all ingestions recorded [2]. This points to the fact that paraffin is not packaged in safe, impervious containers with child resistant closures and the necessary health warnings. Interventions are urgently needed to prevent these unnecessary burn and ingestion injuries.

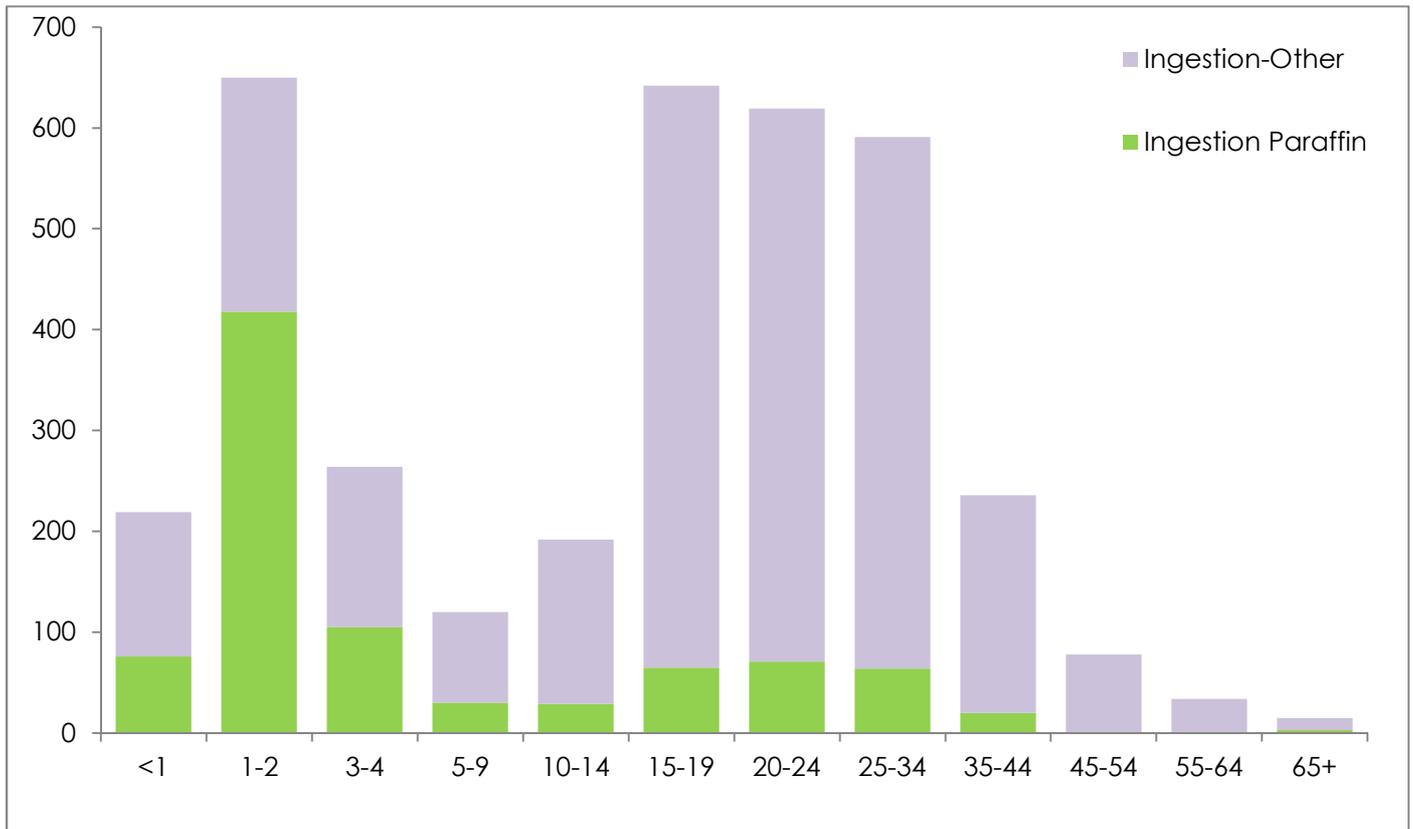


**Figure 7** Prevalence of Energy-Related Injury [2]



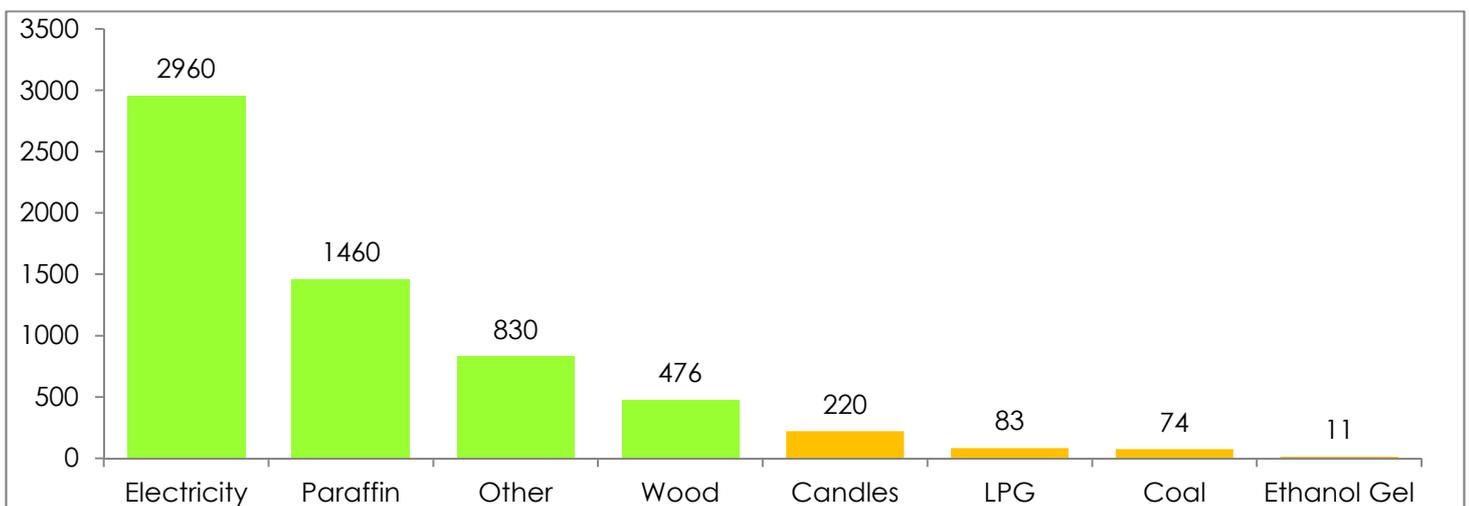
**Figure 8** Prevalence of Energy-related Burn Injuries by Age & Burn Type [2]  
 NB. The age categories differ due to the vast numbers of children that experience burns

Figure 8 (above) highlights paediatric burns as a major health challenge. Children, under the age of five, experience mainly hot water (liquid) burns followed by flame burns [2]. This pattern extends to adolescents under the age of twenty years. Children under five years are also most likely to swallow paraffin (refer to Figure 9 below) [2]. This is due to paraffin being bought mainly in milk/cooldrink bottles and stored within reach of children.



**Figure 9** Prevalence of Poison Ingestions by Age  
 NB. The age categories differ due to the vast numbers of children that experience ingestions

These household energy-related injuries adversely affect South Africa's overburdened healthcare system. A report commissioned by the National Treasury and the then Department of Minerals and Energy states that the cost of deaths and injuries due to paraffin use creates a burden fifty times higher than the annual turnover in paraffin sales [4]. This presents a significant challenge to the country, yet national energy policies and programmes do not significantly address the safety risks of South Africa's current energy mix.



**Figure 10** Energy Source Being Used during Energy Related Incident [2]

A commonly held belief is that, when people are supplied with electricity, the number of energy-related injuries will decrease. Yet, this is not the case. Electricity was found to be the energy carrier most often being used when a burn injury occurred – more so than paraffin (refer to Figure 10, above) [2]. This again highlights the need to look at the systemic challenges that incorrectly results in paraffin being classified as a dangerous fuel. It is also a fallacy to believe that, when people are supplied with electricity, the number of energy-related injuries will decrease. All energy carriers used by people need to be focussed upon so that their supply and use can be made safe.

## Developing strategies to address household energy poverty & its related consequences

In its Chapter on economic infrastructure, the National Development Plan [5] focuses on electricity, however energy infrastructure should not be limited to electrification only. Universal access to modern energy services is key to many of the plan's objectives, including growing the economy, improving quality of life, reducing poverty, ensuring the health and safety of all citizens, and the provision of adequate services and infrastructure. As a development plan that seeks to identify the key challenges hampering development and the achievement of the vision for South Africa by 2030, access to modern energy services by poor households is a key issue that South Africa needs to address. Access to modern energy services by poor households underlies many of the objectives of the NDP including poverty reduction and improved quality of life, the health and safety of all citizens, the delivery of adequate services and infrastructure, as well as overall economic development for the country.

The National Energy Act (No. 34 of 2008) [6] states the following:

“To ensure that **diverse energy resources** are available, in **sustainable** quantities and at affordable prices, to the South African economy in support of **economic growth** and **poverty alleviation**, taking into account **environmental management** requirements and interactions amongst economic sectors; to provide for **energy planning**, increased generation and consumption of **renewable energies**, contingency energy supply, holding of strategic energy feed stocks and carriers, adequate **investment** in, appropriate upkeep and access to energy infrastructure; to provide measures for the furnishing of certain **data and information** regarding energy demand, supply and generation; to establish an institution to be responsible for promotion of **efficient generation and consumption** of energy and energy research; and to provide for all matters connected therewith.” [6]

The document refers to access to energy services and acknowledges that households employ a range of fuels and technologies to meet their needs. In energy policy and programmes to date however, there has been an almost singular focus on access to electricity only, and subsidies to address its affordability. Issues and challenges relating to the access of other fuels are almost completely absent in government documents. As a result many households are, for example, still exposed to the harmful effects of smoke from wood and coal fires and use unsafe appliances (e.g. paraffin stoves and candles) which pose significant safety risks.

Reference is made in Chapter 4 to the wider energy needs of poor households and the reference to integrated programmes to address energy poverty [5]. However, we note in the phrasing of activities that there is only mention made of developing a new electrification plan and not to plans to address access to other commonly used fuels and appliances and their distribution systems. Furthermore reference to energy access targets (95% of South Africans will have access to electricity by 2030) refer only to electrification. The definition of access to modern energy services in South Africa's policy environment needs to be revised in line with international trends and definitions. Access to modern energy services should include provision for access to all fuels and appliances, as espoused in the National Energy Act (No. 34 of 2008)[6].

In response to the National Development Plan's call to reduce inequality and eliminate poverty by 2030, PASASA and SANEDI have proposed an innovative integrated household energy strategy and policy that takes into account the diversity of the country's energy mix [7]. This can help reduce energy poverty, improve affordability, reduce the strain on the national electricity grid, address the impacts of climate change, improve safety and very importantly, create much-needed jobs in the South African economy.

Systemic issues in the distribution and use of energy in the household have exacerbated the problem. Lack of space in low-income housing and informal settlements means that toxic materials are not always safely stored, and it is difficult to ensure that heaters and stoves are kept a safe distance away from flammable materials and infants. In addition, paraffin appliances and fuel are generally sold informally through micro-enterprises and spaza shops where the paraffin is dangerously contained in beverage containers. There is a lack of options for affordable, legal appliances. Currently only two licensed, legal stoves exist in South Africa. This has resulted in a situation where the majority of households surveyed use cheap, illegal and unsafe stoves. Having national standards and regulations for paraffin-fuelled appliances has evidently not translated into increased safety within households.

A household energy safety policy must encourage competition and innovation in the local manufacturing of paraffin appliances, which will ultimately prevent the use of illegal and unsafe appliances. Government could stimulate and subsidise the development of relevant technology, which would also create jobs and make safer appliances more affordable to those that need them the most. These initiatives can be complemented by financing mechanisms which should be made available to assist poor households to buy safe, energy efficient and compliant appliances. It is crucial that unsafe products, especially appliances, no longer reach the South African market. To achieve this, the National Regulator for Compulsory Specifications needs sufficient funding to increase their capacity to enforce the existing regulations. Safer appliances will go further than ensuring a reduction in injuries; the consequences of these initiatives will undoubtedly have positive impacts for climate-change and energy demand, easing pressure on the national electricity grid.

Houses need to be constructed with energy efficiency and safety in mind. Addressing the right to shelter through the construction and planning of houses and communities has been done with little or no consideration for the requirement of households for safe, efficient and affordable energy consumption. Although solar energy initiatives are exciting, hot water is low on the list of household energy priorities of low income households. The housing plans for low income housing have poor thermal efficiency and no provision for energy consumption (ventilation, counters, space, light and insulation). As a requirement of the household energy safety strategy, the Department of Human Settlements and other relevant agencies must work together to develop low-cost homes that are safer and more energy efficient, particularly in informal settlements where there is exponential growth.

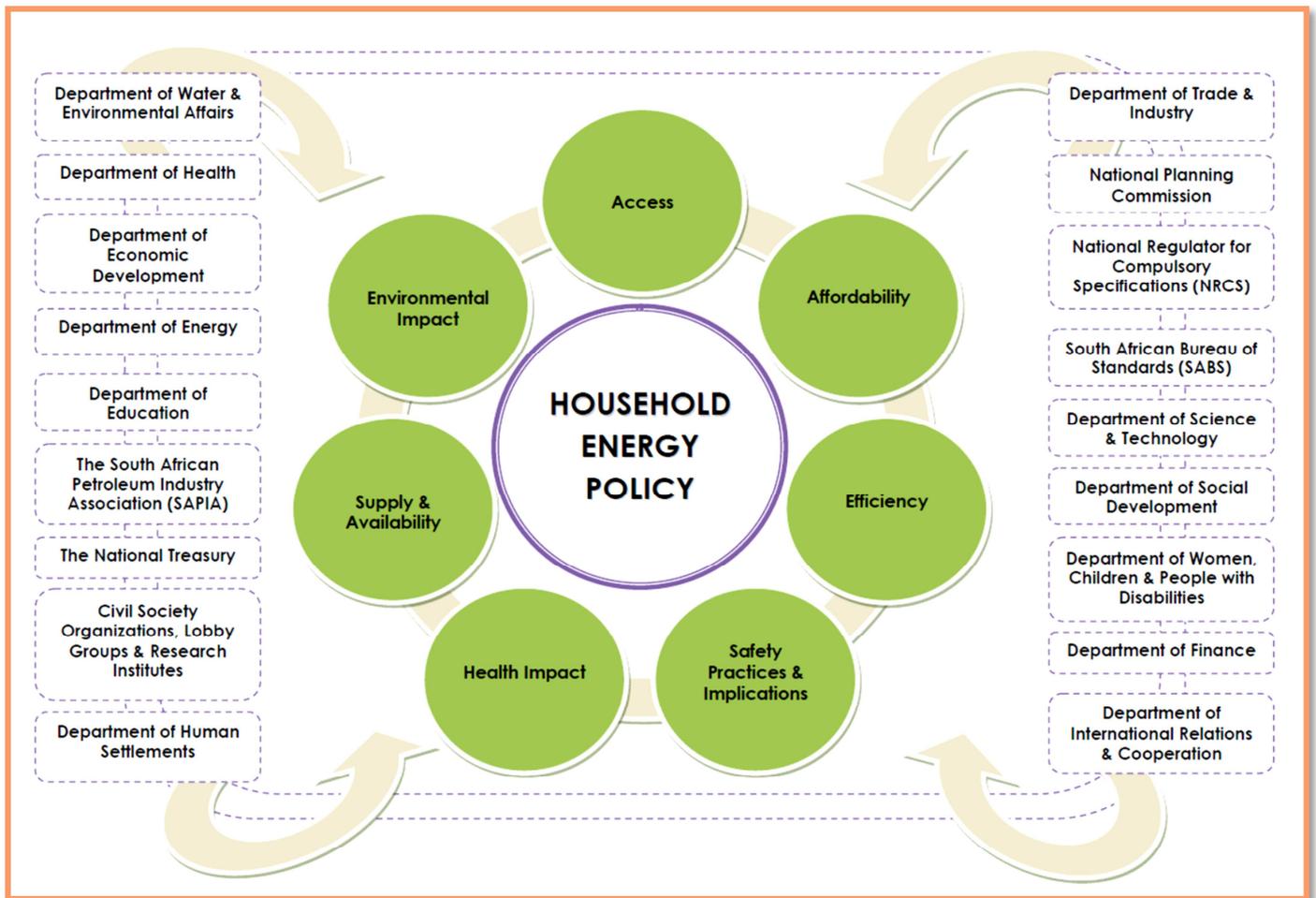
There is an urgent need to prioritise and adequately resource consumer protection efforts and public awareness programmes, similar in magnitude to the current Eskom-driven 49m Campaign to encourage consumers to use less electricity and educate consumers about their rights, energy risks and how to prevent injuries. Presently, consumers are either unaware or confused about their right to safety and good quality as enshrined by both the Consumer Protection Act and the right to a safe environment as expressed in the Constitution. Furthermore, the status quo makes it almost impossible to realise these rights. It is important to establish an easy identification guide for consumers to identify and report on unsafe stoves. The Consumer Protection Act holds the entire supply chain accountable for safe, quality goods. Special appliance labeling for both safety and efficiency should be considered.

## Conclusion

PASASA and SANEDI are committed to being evidence-based. It is necessary to use research, conducted particularly within low-income communities, in order to understand energy usage, systemic challenges and resultant injury patterns. This data and other relevant information should be used to inform health promotion and health education interventions as well as policy proposals to address these challenges.

This is a national emergency where people are dying or becoming significantly disabled or injured. Cost to the economy is debilitating and the hardship at a household level is devastating. Household energy safety and efficiency should be a national priority. Sadly, this is not the case. There is a need for a comprehensive framework (refer to Figure 11) [7] to support current energy policies, addressing the key issues of access, affordability, efficiency, safety, health, supply, availability and the environment [8]. The framework's success will require and depend on the cooperation and collaboration between various national departments, civil society organizations, research institutes and regulators [7]. It is necessary that work continues closely between government and various other organisations to address energy provision, security, safety and supply.

The demand for access to safe, affordable household energy has increasingly become part of service delivery protests. The focus needs to shift from electrification at all costs, to include all of South Africa's energy carriers. The current challenges faced in the context of household energy-



**Figure 11** Proposed Framework for a Household Energy Safety Policy

use in South Africa have to be addressed directly. The role of other energy carriers, particularly paraffin and biomass, is being neglected. The country's energy issues cannot properly be addressed until the diverse household energy mix is acknowledged. Only then can improvements in household energy safety and efficiency be made. This will prevent poverty proliferation and

contribute to true growth in South Africa. The development of an integrated household energy strategy and policy should be one of the major challenges facing the Department of Energy right now.

Even where households are able to access electricity, informal fuels play an important role in the majority of South African households. It is important to move away from the mindset that it is retrogressive to develop policy directed towards addressing the safety risks associated with current energy carriers and the need to improve on their distribution systems. This is critical for the protection of all South Africans.

## Author Information

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