CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter gives a summary of the study and the main conclusions drawn from the results. The descriptive analysis and the socio-economic results reported in this study suggest that the observed patterns in the data are consistent with the ‘energy ladder’ theory. In other words, there is clear order in the distribution of energy shares by the primary fuels that depends on income in Zone Five. The results also show that poor households in Zone Two and Three rely on a range of energy sources to meet household needs. These energy sources are influenced by several socio-economic factors such as education profile, employment characteristics, housing structure and size, home ownership and cultural factors. Thus, the results corroborate that of the recent studies by Farsi et al., (2004) that fuel choice is not determined purely by economic factors and that a more general interpretation of the energy ladder theory is needed.

The results further show that people in Diepkloof have negative attitudes towards alternative energy sources. Alternative energy sources such as LPG is hard to get, costly, heavy to transport, while solar energy involved a considerable amount of time and effort transporting and charging the batteries. The arguments and observations developed around multiple fuel use in this research revealed that the energy policy makers still have a poor understanding of the complex and social urban fuel-use culture. It is clear that the needs of the poor households must be made a priority for the policy to be effective. In this regard, a number of considerations should be taken into account:

- the present socio-economic status of people living in Diepkloof
- the range of energy sources people use in Diepkloof
- different factors affecting fuel choices in Diepkloof
- attitude of people towards alternative energy sources
- the effectiveness of policy towards energy consumption patterns.
7.2 The present socio-economic status of people living in Diepkloof

By examining the socio-economic trends, it is evident that, as income rises, households move away from purchasing traditional energy sources towards more expensive fuels sources. This was evident in Zone Five where two thirds of this households use electricity only as their main fuel because it is a convenient and versatile fuel and they can afford appliances. Therefore, this finding confirms that households have a tendency to move towards a greater dependency on electricity as income increases. In contrast, low-income households in Zone Two and Three highly rely on multiple fuel use for thermal purposes, which use old traditional appliances. These households treat electricity as an additional fuel for lighting as well as entertainment purposes and it is an additional expense.

There are factors other than income that have heightened multiple fuel use in poor communities in Diepkloof. The research findings disprove the idea that fuel transitions can be affected by merely putting more money in people’s pockets. The results reveal that the persistence use of multiple fuel use in Zone Two and Three is much more strongly correlated to variables such as diet, cooking habit, ritual significance and renting shacks. It is highlighted from the research findings that, Zone Two and Three have three to four shanties for renting. This ‘culture of creating shacks’ has a significant impact on their energy consumption patterns. Thus, poor people find themselves paying more for electricity consumption in order to keep up with the demand for their tenants.

The survey results further show that household size is one of the significant factors, which affect fuel choice. On this issue, household size (i.e., number of people in the household) in Zone Two and Three is larger than household size in the high-income community in Zone Five. The study found that households in Zone Two and Three use a wider range of energy sources to meet the large household energy demand than households in Zone Five. The report from ESMAP (2003) concurs with the above findings that household size gives true consumption variation more than income variation does. In Zone Five, many households are small in size and use electricity as their main source of energy.
7.3 Range of energy sources in Diepkloof

The introduction of electricity has played a key role in spurring the shift in energy use patterns. However, the pattern of change is not a straight path as suggested by the energy ladder. In particular, the number and diversity of energies used by the urban households in Diepkloof particularly in Zone Two and Three have not declined following the introduction of electricity. It is evident that the changes are restricted to particular end uses, i.e. lighting, powering entertainment appliances and refrigeration. The transition does not gravitate towards end uses with high-energy demand such as cooking and heating. However, 85 percent of the households in Zone Five have completely substituted all other energy sources with electricity while 15 percent still rely on multiple fuel use. The high cost of electricity and the appliances that go with its use are the major constraints towards complete substitution of other fuels with electricity, especially since firewood and coal are adequate or can be purchased in small quantities at a lower price relative to electricity. According to the work done by Davis (1998) in South Africa, a large portion of electrified households used three or more fuels particularly in low-income urban households. The main reasons for using alternatives energy sources are the need for alternatives where the supply of a single fuel is restricted or where there is interruption in electricity supply, high electricity prices and fuel security.

7.4 Different factors affecting fuel choice

7.4.1 Multiple fuel use

The analysis of multiple fuel use patterns shows that high-income households in Zone Five are more likely to use one fuel only (e.g., electricity), whereas, low-income households in Zone Two and Three depend on two or more fuels for domestic use. The survey clearly demonstrates that there is an energy transition away from traditional fuels in high-income households while the reverse is true in lower income households. In other words, the process of energy transition is still at an early stage, given that coal, firewood and paraffin still account for about 50 percent of the total energy used in Diepkloof. Energy use varies tremendously across the entire surveyed households both in total and by fuel type, given the differences in available energy sources, prices and
income levels. The survey further show that traditional energy sources fall in absolute terms only at the highest levels of household income.

These results concur with the work done by Vermueler et al. (2000) in that changes in energy use patterns in urban areas cannot be generalised and are not a straight path as proposed by the energy ladder model. The high unemployment rate in Diepkloof means that cash income streams to households are low. This limits the uptake of electricity and LPG for thermal purposes. Therefore, fuel security for most households in Diepkloof is still necessary, the combination of a range of fuels that are accessed in spatially and temporary variable patterns as dictated by socio-economic circumstances, fuel security, and high electricity prices in the study area. One can conclude that given the countrywide electricity crisis, it is important to note that fuel switching and multiple fuel use are successful coping strategies being employed by the poor which is lacking in well off communities.

7.5 Attitude towards alternative energy sources
The results indicate that LPG gas can be considered as viable alternative to be included in the ‘multiple fuel use patterns’ of households in Diepkloof. People don’t have a problem with this energy sources as an alternative except for the fact that people experience poor access and perception that it is unsafe. In the case of solar systems, even if all the operation and financial problems are resolved, off-grid programmes based on solar PV home systems require an urgent review as they are focused on lighting, which is not the highest priority for the poor. Designing energy programmes for the poor must address household cooking and water-heating needs as a priority over lighting, which would, for example, reduce dependence of coal and firewood.

7.6 Policy reforms and service delivery
As part of cost recovery measures, there have been some major energy policy changes over the past few years and restructuring efforts for the electricity sector in South Africa. Both market driven (electricity pricing and restructuring) and poverty alleviation (grid and off-grid electrification, FBE) policies have been introduced (Basson, 2003). The
intention of restructuring the electricity industry in South Africa aims to ensure that the electricity service is equitable to all the customers. The results show that the policy has not addressed the problem of equitable access, as many poor in Zone Two and Three are still not enjoying electricity.

It is important to highlight that even though there are some areas that need improvements, access to electricity for domestic consumers has improved remarkably in numbers compared to the pre-democracy situation. The overall social and economic welfare situations of poor households need more attention, as there remain numerous problems relating to insufficient service delivery. On this issue, it can be argued that the extent to which policy debates about rights and access seems to take precedence over what works and does not at local level. What policy makers need to come to terms with is that there are complex and diverse cultures of domestic fuel use. These so called ‘cultures’ are actually shaped by the economic conditions under which people live, but they do not determine them. The policy makers need to learn better that the change in fuel use practices need more thinking between urban fuel-use practices, domestic practices and socio-cultural styles. The findings from this research lead to an understanding of the real reasons behind community protests in Diepkloof. Much of the non-payment is not a result of a ‘culture of non-payment’ but rather the consequence of a real economic inability to pay for basic electricity needs. In a way, the continuous protests against poor basic service delivery are a reminder to the service providers to increase efforts to address the needs of poor consumers.

7.7 Recommendations
A well-designed free basic electricity (FBE) policy management plan will contribute to curbing an adverse energy crisis related to affordability and indoor air pollution. The results of this study show that all relevant stakeholders (community leaders, SECC representatives, Eskom management and the community members) are positive about the outcome of the FBE intentions. It is, therefore, important also to revisit cultural norms and assess how a better common understanding can be developed in order to positively reduce the use of alternative energy sources. Furthermore, socio-economic factors should
also be addressed through pro-poor community programmes that boost efficient use of energy among poor households in Diepkloof. Several factors enhancing multiple fuel use or energy mix must be addressed through environmental education initiatives. In essence, government should take the initiative and undertake a leading role in implementing the basic energy needs in poor communities. It is crucial that policy makers properly engage the needs of the poor to allow a fair reflection of their objectives and values that have a potential of changing their lifestyles. Understanding the findings from this research report therefore, will enable the government to formulate energy policies that reflect current societal norms and aspirations. The status of the current energy consumption patterns in poor urban households demand a further energy policy reforms that will advocate for the affordable multiple sources.

The study shows that, whenever alternative energy sources (fuelwood, coal and paraffin) are available they continue to be the preferred fuels irrespective of household income and the availability of modern fuels (electricity). As alternative energy sources are available through various outlets to low income households in Diepkloof, government must put sufficient incentives in place to convince households to switch permanently to modern fuels. Increasing electrification, readjustment of electricity prices and appliances for low-income households could automatically motivate households to move up the ‘energy ladder’ towards modern efficient energy sources. This suggestion is consistent with a study of household energy use in Hyderabad (ESMAP, 1999) which showed that after adjusting the prices of modern energy sources, people began to use electricity and LPG for cooking, space heating and water heating because hydro-carbon fuel became more expensive.

Given the present dependency on alternatives in Diepkloof among low income households, cost-effective strategies for the near and long term could involve the use of better combustion techniques to minimise the indoor air pollution and hazards. In this context, it may be worth revamping the improved cook stoves program and subsidising poor people with free electricity across the country. Gender issues may also need special attention especially in the context of hydrocarbon and bio-fuel usage and the purchasing
of these fuels. The disease burden and gender discrimination could be alleviated mainly through intensive awareness campaigns.

Given the current economic stability in South Africa, and the consistent pressure exerted on institutions like Eskom and the government by social movements such as the SECC, there is need to invest in data gathering programmes in order to understand more about the current energy trend in Diepkloof and other townships. Moreover, the topic on energy crisis or electricity crisis is a very sensitive one at this time in South Africa’s development and community leaders, local government, Eskom officials and various organisations need to put their differences aside for the benefit of poor communities.