The economics of energy for the poor: fuel and appliance purchase in low-income urban households

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1. Introduction

Consumers' perspectives on energy efficiency can be gleaned by investigating their patterns of appliance acquisition and use. This report argues that building a holistic understanding of appliance use dynamics is a prerequisite of addressing consumers' energy efficiency issues.

The main objective of this report is to provide an analysis of households' perspectives of energy efficiency. This analysis is based on qualitative research and builds on the current knowledge provided by quantitative household energy research database (cf. National Domestic Energy Use Database). As there is a dearth of qualitative analysis in South Africa on appliances use by the urban poor, this report draws heavily on the recently completed Social Determinants of Energy Use (SDEU) project; this DME-funded project analyses the energy use patterns of the urban poor over a three-year period in Cape Town, East London, Durban and Johannesburg. The specific aim of the analysis is to demonstrate that we need to contextualise appliance acquisition by probing the interlocking determinants that govern people's choice of appliances, and implications for consumer economics. We should acknowledge that no single determinant sufficiently explains use of household appliances. In analysing appliance-use patterns, this report examines economic and social determinants that influence consumers' decisions as to the best appliance to buy and use, especially for cooking and space-heating. Case studies of appliance acquisition and use are used throughout to address the following key issues:

- the social and economic determinants of appliance purchase and use;
- the symbolic meanings of appliances acquisition and use (i.e. different meanings associated with appliances);
- the acquisition, maintenance and discarding of appliances;
- the use of fuel/appliance combinations in the households (including multiple appliance use and users' notions of energy efficiency).

2. Current assumptions about the low-income households' use of appliances

As the first step, it is important to address assumptions of what influences consumers' appliance purchase and, by extension, the efficient use of energy.

- A first assumption is that appliance ownership is proportionate to, or determined by, the household income. Recent studies have demonstrate that, while income continues to play a pivotal role in the purchase and use of appliances, other important determinants should also be considered (Mehlwana & Qase 1996, 1999; White et al 1998; Jones et al 1998; Bank 1998). More often than not, the interplay of multiple (social and economic) factors determines appliance acquisition and use.
- A second assumption is that appliance ownership equates to appliance use. Recent studies on appliance ownership mention this important distinction (such as Simmonds & Mammon 1996: 59). Appliances mean more to the consumers than their end-uses – for instance, electrical appliances are important for their decorative splendour. Some households are cluttered with unusable appliances, such as electric stoves, kettles, heaters, etc, because these appliances serve another purpose, such as concealing poverty and portraying images of a better lifestyle. Thus, it is important to determine the meanings associated with various appliances, and the symbols associated with their ownership.
- A third assumption is that appliance purchase is largely determined by the gender of the purchaser. Women are said to prioritise cooking appliances while men are likely to prioritise

entertainment appliances. Although this may appear to be case, it is important to note that appliance acquisition is determined more by who holds (economic) power in households – the breadwinner – than by the gender of the purchaser. Many women have decision-making powers in the allocation of household resources (including the purchase of appliances) because they contribute financially more or less the same as their partners.

- A fourth assumption is that the inefficient use of energy is caused or determined by consumers' lack of knowledge about the appliances they use. In order to improve efficiency, the assumption implies, there is a need for a concerted awareness programmes (such as pamphlets, media, etc) directed at consumers to 'educate' them about the importance of energy efficiency. However, some households have sophisticated understanding of energy efficiency notions, but continue to use energy inefficiently. The question, therefore, is to probe why they indulge in energy-inefficient practices while they are aware of their wastefulness.

While the above assumptions cannot be dismissed as wholly irrelevant (as they hold true in some contexts), to understand the nuances of appliance acquisition and use we need a critical analysis which goes deeper. Unfortunately, there is a dearth of literature in South Africa which questions the assumptions and gives a qualitative dimension to understanding appliance use by the urban poor. It is an important point of departure that, for energy efficiency strategies to be successfully implemented, they should be grounded in in-depth consumer research. This research should build on, and raise, the level of knowledge gleaned from a plethora of quantitative studies which have been carried out.

3. The socio-economic determinants of appliance ownership and use

Appliance ownership and use patterns by geographical areas are fairly well documented in energy research (see EDRC Energy Database). In the western regions of South Africa, for example, many low-income households own gas appliances, while in the interior and eastern parts of the country coal stoves are widely used. These fuel use patterns are more a result of the availability and costs of fuels in specific regions than a result of users' preferences – coal is more readily available and cheaper in Gauteng than in other regions; in the Western Cape and coastal seaboard, gas and paraffin are cheaper than in the interior (see Williams 1994; Simmonds & Mammon 1996).

There are also close parallels between appliance ownership and use patterns and the type of settlements. Low-income households are spread over, roughly, five distinct settlement types: formal houses, formal planned shacks (most of which are provided with electricity), backyard shacks, informal unplanned (sometimes referred to as 'squatter communities') and hostels. For the latter type there is little data, and it is therefore excluded from this analysis.

The National Domestic Energy Use Database shows that formal settlements have more appliances than other types of settlements (see also Figure 3-1). This is because they are likely to have access to more fuels. The Social Determinants project confirms that there is a close parallel between appliance ownership and the place of residence and, as will be shown below, these different patterns go beyond issues of cost and affordability.

In the many formal settlements, for instance, appliance acquisition is generally prioritised over other household needs. More households own various and elaborate appliances. Since almost every formal house is electrified (some having been electrified decades ago), there is also a tendency to replace simple electrical appliances (such as two-plate stoves or tabletop stoves) with elaborate four-plate stoves with big ovens. More than 60% of the Johannesburg sample owned four-plate stoves (White et al 1998: 60).

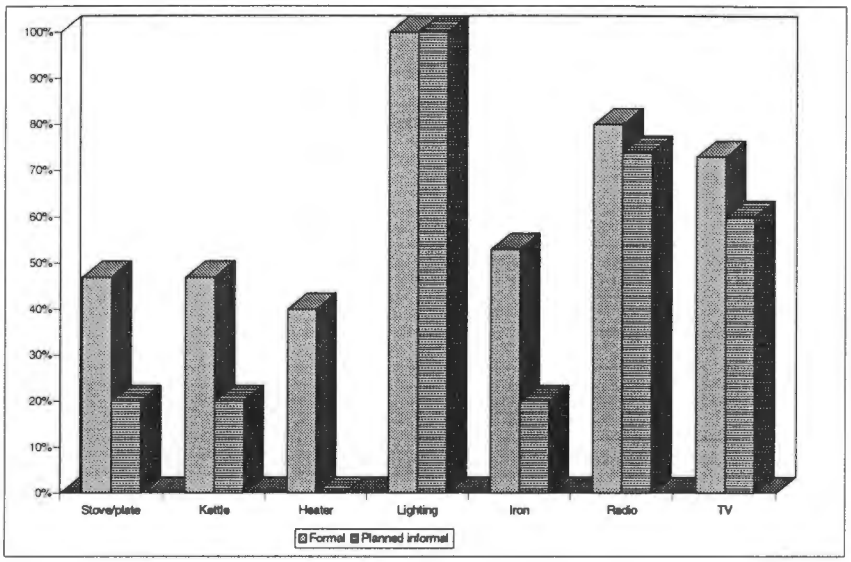


Figure 3-1: Penetration of electrical appliances in low-income informal and formal electrified households in Cape Town
Source: Simmonds & Mammon (1996); Mehlwana & Qase (1996)

However, ownership of these elaborate stoves does not necessarily translate into their use (see also Simmonds & Mammon 1996). The reason for this is discussed later in the report; here it suffices to argue that one is more likely to find various 'modern' (read electrical) appliances in formal areas than in other types of settlements.

There are few instances of the use of multiple use of fuels and appliances in informal unplanned settlements. An important reason for this is that energy service to these areas is minimal, owing largely to their haphazard and unplanned tenure. For instance, these settlements are not provided with electricity and have difficulty in accessing other fuels such as gas. They use cheap and readily available appliances such as paraffin stoves, coal and wood braziers or self-made stoves. It is important to note that households in formal areas are not necessarily better off than the inhabitants of 'squatter communities' in terms of income (Mehlwana & Qase 1999). That households in unplanned areas own few appliances may have little to do with the economics, but the type of settlement constrains them from using better appliances because they do not have access to appropriate fuels. The subsections below unpack the extent to which housing types, appliance costs and individual households' current priorities influence appliance purchases and uses. In Section 4, the values associated with some appliances will be examined in greater detail.

3.1 Housing types and appliances

The overview of appliances above partially explains why formal households own more appliances. An important reason which contributes to this is how different appliances are viewed in different settlement types. Electrical appliances are particularly seen as symbols of status and wealth in most formal households. Indeed, many formal households replace their non-electrical appliances with modern and sophisticated appliances immediately after electrification. Paraffin and coal stoves are replaced at first with two-plate electric stoves and later with more sophisticated four-plate stoves with ovens.

The coal stoves and paraffin heaters make way for electric stoves and heaters. There is a general perception that certain appliances, such as paraffin and coal stoves are not appropriate for formal households and, therefore do not make a house look 'nice'. White et al (1998: 71) observes that '(formal) houses are not only seen in terms of structures but also in terms of lifestyles they are imagined to embody'. Symbolic value is attached to certain electrical appliances such as bar heaters, four-plate stoves and large double-door refrigerators. Ownership of modern, spacious appliances has less to do with the household size than it has with the symbolic meaning that these appliances portray (cf. Bank et al 1996: 104; White et al

1998; Mehlwana & Qase 1999). For instance, a household with few members could purchase a big refrigerator or stove while smaller and cheaper ones would have sufficed.

This case below shows that in formal houses, utmost significance is attached to 'good' electrical appliances, which portray a middle-class lifestyle. More significantly, this case shows the implications that ownership and use of these appliances have for fuel efficiency and expenditure on fuels.

CASE STUDY: Electrified shack, Johannesburg[1]

Joseph Makeke is a sharp-minded entrepreneur. On retiring from the police force in 1993, he thought it necessary to set up an income source additional to his pension. At the time, there were already five spazas operating in his road, so he and his wife Elsie moved from their comfortable Pimville house to Motswaleti (a squatter settlement near Baragwanath) to set up a spaza enterprise there. Their adult daughters remained behind in the plush Pimville home. However Motswaleti was 'too rough. Every day there were killings', complained Joseph. When a friend notified him of open sites at Lusaka City in 1995, he and Elsie rushed there to secure a space. In May 1997, Joseph said they were about to return to their Pimville home. 'There it is a big house and it is furnished nicely. I can't leave it [any longer],' Joseph said, adding that of the five spazas in his street in 1993, only one remained. Now, they could set up a spaza from home without facing as much competition.

Furnishing (including appropriate appliances) is conceptualised in very different ways for the two Makeke homes – the Pimville house (originally a 'matchbox' structure, now extended into a double storey structure) and the Lusaka City shack. References to the comforts, size, modernity and luxury of his Pimville home litter Joseph's conversation. It is completely fitted out with electrical appliances including a fridge, a freezer (both kept solely for domestic use), a geyser (in a bathroom 'the size of a room!'), an air conditioner-cum-heater, a washing machine, a four-plate stove with oven, two asbestos heaters, a bar heater, a fan heater ('I've got a lot of heaters there!' he smiles, 'We must have a heater in each bedroom'), and a roof fan. They disposed of the coal stove when the house was extended. By way of explanation, Joseph said there wasn't space in the kitchen for two stoves – and when the house was redone, he invested in an electric one and built a fireplace instead. In contrast, in the Lusaka City shack, the Makekes owned and made use of a selection of both electrical and non-electrical appliances, including two paraffin stoves, a paraffin heater, a flat iron and a *mbawula*.

Joseph complains about the electricity accounts he receives in Pimville, yet he adamantly refuses to use any non-electric appliances to reduce them. 'I can't use paraffin heaters in that house!' he exclaimed, 'It will spoil it ... That house is too big, you must use electricity ... it won't look nice.'

This case shows that a coal stove does not fit the urban image and is replaced by five electric heaters, including the air conditioner-cum-heater. Using these many heaters has severe implications for this household's fuel expenditure and encourages inefficient practices. Though the respondent complains about the huge, unaffordable electricity bills, he cannot use other cheaper appliances such as paraffin heaters because that would be tantamount to compromising his middle-class lifestyle.

With respect to other types of settlements, the factors that determine appliance ownership are slightly different. Factors such as space and tenure problems constrain households from purchasing many appliances. In an informal electrified settlement and backyard shack of Lusaka, Johannesburg, White et al (1998: 71) observed that most dwellings owned two-plate electric stoves rather than stoves with ovens. The main reason for this, they argue, is that space limitations in these dwellings make it problematic for people to purchase bulky appliances. In Langa Township, Cape Town, backyard renting is a thriving business and many township

[1] Adapted from White et al (1998: 73-74).

house-owners' depend on it to supplement their household income (Mehlwana & Qase 1999). For the property owners to maximise their profit, they allow many shacks to be erected in their small backyards. Most of these shacks are too small for many appliances such as refrigerators and stoves.

The tenure problems in informal unplanned and backyards also play a direct role in the purchasing of electrical appliances. In the case of backyard dwellers, access to and use of electricity is entirely at their property owners' discretion (Mehlwana & Qase 1999; White et al 1998; Jones et al 1996). In many instances, relationships between tenants and landlords are highly unstable. Conflicts often arise about electricity use. There would be accusations of over-use of electricity (by the tenants) and extortionate bills (by the landlords). In order to avoid this conflict, many backyards would rather not access their landlords' electricity. The case below depicts a situation where a tenant backswitches to non-electrical appliances because of excessive electricity bills.

CASE STUDY: Non-electrified backyard shack, Cape Town[2]

Together with her late husband, Mavis moved from a crowded hostel room to rent a backyard site for R20 per month. Since, Mavis's husband and the owner of the site come from the same village in the Transkei they were given access to electricity. The hostel room that they lived in before their renting of the backyard shack had electricity. Mavis's husband had been in Cape Town for 'more than 15 years', and had bought a hotplate, iron and a kettle. It was fitting for them to use electricity, as they had used it before. The agreement was that Mavis would pay R50 per month for electricity.

In 1995, there were problems with this arrangement as the owner of the site had extended electricity use to the other two shacks on the site. Electricity consumption became higher, and so was the bill. It was during this time that many house-owners in Langa were converting from credit to prepayment meters because the majority had amassed huge bills dating back from the electricity boycotts. Mavis recalls that 'he [the landlord] called us one afternoon and showed us the bill. It was a lot of money.' The landlord apparently wanted all the electricity users to share the bill. According to Mavis, 'I have been paying for my use of electricity every month without failing ... I was even not using much electricity.' When she did not agree to share the bill, she was immediately disconnected. Since 1995 she has been using paraffin and gas for her households needs and 'I would never ask for electricity even if I can move from the present site. These people [landlords] are *skelms*. They are robbing us'. Since then, she has never used her electric appliances, though they are on display in her shack.

As the above case shows, ownership of appliances is not necessary equivalent to its use. Mavis has electric appliances in her shack, which she does not intend using. Instead of disposing of them, they serve a 'secondary' purpose: display. This point is discussed further later in the report.

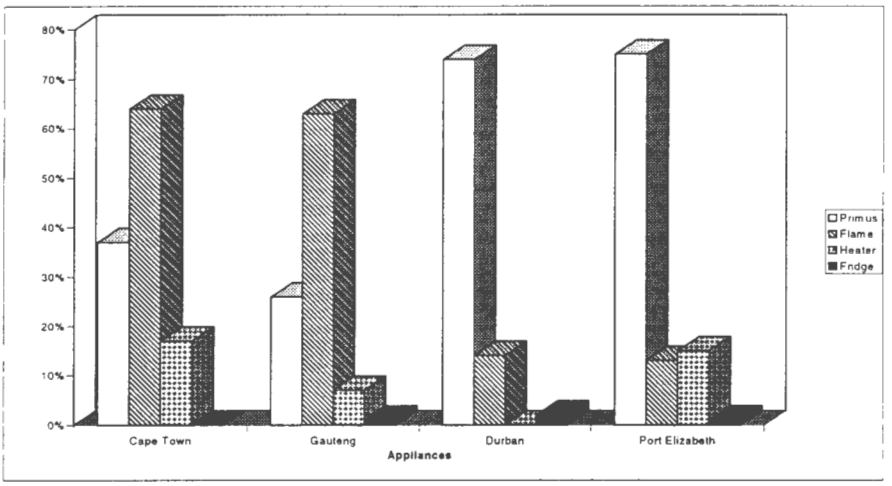
There are many instances in Cape Town, Durban and Johannesburg where a relationship between a tenant and landlord influences appliance use. A crucial issue is that households in formal and informal planned settlements have secure tenure. This also brings improved access to different fuels, since the distribution of energy services is facilitated by the planned nature of the settlements. Settlements that have limited access to fuels because of their geographic and spatial position face many constraints in appliance acquisition.

3.2 The cost and inaccessibility of appliances and fuels

[2] Adapted from Mehlwana and Qase (1999: 62).

For many low-income households, buying appliances competes with other priorities, such as food, accommodation and transport. As mentioned above, the inaccessibility of fuels in some settlements constrains them even further. While many people who have access to electricity prefer electrical appliances, their high cost is problematic – the National Electricity Regulator (1996) and Energy White Paper (1998) acknowledge that high costs of electrical appliances deter householders from using electricity for many end-uses. Little has been done so far to rectify this situation. Paraffin appliances, such as heaters and cooking stoves, are more affordable in the short term than gas and electrical ones. In addition, paraffin appliances are used for multiple uses such as cooking and space heating. In contrast, most electrical appliances are single-function, and householders have to buy a number of appliances to obtain the same benefits.

Figure 3-2: Cooking, heating and cooling (paraffin) appliances in informal dwellings



in Cape Town, Gauteng, Durban and Port Elizabeth
Source: Simmonds & Mammon (1996)

The use of paraffin and coal appliances has, however, both health and cost implications. While it is comparatively cheap to use them, there are problems associated with their use. Many low-income households, especially in Cape Town (see Figure 3-2) prefer to use wick stoves. Wick stoves are cheaper than other paraffin appliances (such as pump [primus] and *beatrice* stoves). In a popular supermarket in Langa, Cape Town, the prices as at January 21, 1997, were as follows: a wick stove cost R26.60, the *raaskop* (noise-head) pump stove was R66.99, the *silent* pump stove was R85.95, and the *beatrice* was R93.39. The primus and *beatrice* stoves are more efficient, safer and durable than wick stoves (White et al 1998: 58), but their cost is prohibitive.

Although the initial capital outlay is low, wick stoves are mostly substandard in terms of quality and have a short lifespan (Mehlwana 1998: 6). The poorest use wick stoves, yet these are often despised because of inferior quality and their propensity to cause fires (Mehlwana & Qase 1999: 87-99; Mehlwana 1998; Bank et al 1996: 41-69). In an informal shack settlement in Cape Town, most households were observed replacing their wick stoves in the space of two months; as one woman said:

> A wick stove does not last for a very long time at all. As you see it now, it is leaking fumes. My [two months old] child does not even sleep properly when the stove is in use because of the fumes. Do you believe that we bought this stove at Nabe just two months ago? This stove is new. The last one nearly caused fire and it was also brand new. In the same day that we bought it, its head *exploded* and nearly caused fire. We threw water over it. Next time I buy a stove, I am going to go for a primus stove.

In short, decisions to purchase and use the cheapest appliances are influenced by what consumers can afford at the time. Pressures on household incomes force them to make short-term decisions and therefore overlook the long-term factors such as the life cycle costs, efficiency and safety of an appliance.

The same logic of purchasing and using wick stoves applies to the continued use of home-made appliances such as coal/wood braziers and coal stoves. As White et al (1996) mention, an old coal stove is unlikely to be replaced by a new one. A new coal stove is prohibitively expensive, costing about R4 000 on hire purchase and over R2 000 if paid for with cash (White et al 1996). If a household can afford to buy a new stove, an electric stove is likely to be chosen, as the costs are about the same.

3.3 Urban/rural commitment and appliances

The legacy of the South Africa's infamous migrant labour system lives on. It is responsible for creating an underclass of migrants who oscillate between urban and rural areas. At present, there are two social groups: the urbanites and migrants. The former has limited or no ties with rural areas while the latter has functional ties with their rural households, with deep commitment to their rural households, and views life in urban townships as temporary (see also White et al 1998: 69). Generally, they tend to invest little in their urban households and either save or remit money for the maintenance of the rural households. Indeed, as Jones et al (1996) comment, the migrants tend to 'encapsulate' themselves and totally reject the urban lifestyle. What implication does this frugal existence have on fuel and appliance use?

CASE STUDY: Backyard shack, Johannesburg[3]

Metro Lekokotla arrived on the Reef for the first time aged 24. He has worked as a crane-driver ever since. His immediate family (a wife, Paulina, and two small children) live in GaMatlala, near Pietersburg in the Northern Province. There they run a spaza to augment the salary of Metro: both parents are determined to give their children the good education they never had themselves. Metro visits GaMatlala once a month if he can, taking with him provisions and money obtained in the city.

During the 16 years that have passed since he first arrived in Gauteng, Metro has always lived in cheap rented accommodation – in a selection of single men's hostels, and more recently in a backyard shack (so Paulina can stay with him when she visits). In all this time, Metro has accumulated nothing but the most basic appliances for use in his city accommodation: he cooks on an electric two-plate stove, has a small radio to enliven his solitude, and a two-bar heater for winter. Instead, he has directed all his spare cash into establishing a home in GaMatlala. At home, he says, they own a large colour TV, and a fridge which they use for their own food, and for spaza supplies.

The above case attests to the observation that the migrants, unlike many people who live in formal houses, like to keep their expenses in urban areas to a minimum. They are more likely to live in backyard shacks or informal shacks (see the case study below) because it is cheap and allows for money to be spent elsewhere. Other than cheap accommodation, they choose backyards because they do not usually live with all their immediate families. Moreover, the backyards are safer than informal settlements and there is no pressure on the migrants to invest in a backyard shack because 'this place is not home' (Jones et al 1996: 42). Indeed, as Jones et al observe, backyard shacks 'fulfil the function that migrant hostels have done for decades: they provide [cheap] accommodation for workers whose singular intent is to support rural dependants and maintaining the rural home.'

It appears that access to electrification does not have dramatic impacts on changing the migrants' lifestyle. The case study below shows that electricity use (and appliance acquisition) is not an essential priority.

[3] Adapted from White et al (1998: 70).

CASE STUDY: Electrified shack, Cape Town[4]

Florence Twani lives with her partner, Phois Rawu in Site B, Khayelitsha. Each has two children. Florence is involved in the sewing business, and her partner owns two minibus taxis. Florence estimates that she gets about R300 per month from her business while her partner earns about R1 000 per month. (This is an extreme underestimation: the household's expenditure is more than R2 000 per month. It is our calculated guess that the household's income is some three times the stated R1 300.]

Most of Florence's monthly income goes on the payment of furniture she has bought on hire purchase from a shop in Cape Town. Over the years, Florence has made it a point to buy furniture and appliances in Cape Town and send them to her house in Transkei. At present she has just finished paying off her lounge suite, and is paying R167 per month for a kitchen unit. The latter is stored in the bedroom of their shack awaiting despatch to the Transkei.

The dwelling in which they live is, however, scantily furnished. All pieces of materials that make up the furniture have been bought second-hand. Although they have had access to electricity since 1994, they have been using it only for lighting and powering the music system that Florence bought in 1995. If it was not for the children, she says, she would not have bought it. For basic domestic tasks such as cooking and space heating, this household relies on paraffin stoves. Since they use electricity scantily, their electricity bills are between R10 and R20 per month. She would defend her investing in Transkei as 'I cannot buy new things for the shack because it can burn at any time'. All the shacks in Site B have electricity for lighting and cases of residential fires in this area are very rare.

This case shows that, irrespective of the type of settlement and access to different energy sources, investing in rural homes is the most important aspect for some households. Expenses on appliances are kept to a minimum. Although electricity would be available, paraffin appliances are likely to be used because they are perceived to be cheaper. It will be misleading to conclude that Florence's use of paraffin appliances is because she does not have capital to finance electrical appliances. Her expenditure on other household goods (which she sends 'home') makes it clear that she could afford to buy appliances if she wanted to.

Irrespective of type of settlement, people whose commitment is in urban areas invest their meagre resources on electrical appliances. The case below shows the different mentality of a woman who invests most of her income on buying appliances. For her, electrical appliances have a different meaning than in case studies cited previously.

CASE STUDY: Electrified backyard shack, Cape Town[5]

Rebecca came to stay in a backyard 'shack' in Langa from Upington, Northern Cape in 1987. She is a domestic worker in Sea Point and supplements her wages by buying and selling clothes. She says that her monthly income is R2 500 from formal employment and her informal business. Her face lights up when she speaks of her impressive collection of new electrical appliances, which cost more than R13 000 and were bought between 1993 and 1996. She claims that she hardly used paraffin appliances at her home in Upington. 'We use an electric stove for cooking, a bar heater for heating. We also have a *large* fridge, television and electric lights. That is why I am buying these many electric appliances because this is how I have been brought up.'

Her collection of appliances includes a large stove with oven, which she purchased in 1994 for R2 500. The stove, which occupies a corner of her unusually big backyard shack, has never been used. For daily use, she has a tabletop electric stove, which she bought second-hand for R159. She interchanges this with a 3kg-gas stove, which she bought in 1995 for R125. She has a music system that cost R2 500, a television she bought second-hand for R800 and a video machine that was R2 100. All these

4 Adapted from Mehlwana and Qase (1999: 47-48).

5 Adapted from Mehlwana and Qase (1999: 46).

appliances were bought in 1993 – interestingly, they were the first appliances she bought. In 1996 she purchased a fridge (R2 800), an electric kettle (R159), an electric fan (R1 500), a laundry dryer (R1 500), a chest freezer and microwave oven (both for R2 500). Most of these appliances are still new. 'I do not want my [new] house to look like a pauper's', she said. She is one of the people who are on waiting list for new (formal) houses in Langa.

The case of Rebecca is one of many instances where people put a high value on modern electric appliances. Although Rebecca lives in a backyard shack, she views this as a temporary. Her long-term goal is to own a formal house. In the meantime, she is collecting appliances that will make her future formal house look more middle-class. Noted in the above case is the size and sophistication of her appliances. She would not buy any stove, fridge or washing machine; she buys the 'beautiful and large ones' so as to impress her visitors. In the following section, the semiotics of appliance ownership are explored in detail to unravel symbols attached to various appliances.

4. Symbolical meanings of appliances

'It looks just like an electric two-plate!' commented two women, looking at a cream-enamelled stove with a single hot plate and with space alongside to which the pot could be removed while adjusting the flame (see White et al 1998: 78). Students at the Witwatersrand Technikon presented the models of improved paraffin stoves to stakeholders including women. Electric appliances are viewed differently to other non-electrical appliances. What caught the eye of these women was not the energy-saving features of the paraffin stoves, but how they look. In short, an appliance is looked at also in terms of visual appearance. Even if an appliance can be designed to be efficient, if it does not please the eye and mind, it stands little chance of being purchased and used. Many users of energy are caught in a modernity trap: an appliance is closely associated with lifestyle.

Most people seek to own one or more electric appliances because of the status associated with the ownership of these appliances. Having many electric appliances brings both respect and envy from the neighbourhood. They are symbols of modernity and comfortable existence, and many people will go to extremes in order to acquire these appliances. The case study below is one of many which shows the extent to which people go in order to get these appliances.

CASE STUDY: Electrified shack, Cape Town[6]

In 1995, the young and single Sizeka was not employed. She was living with her boyfriend who was the sole contributor to the household income. Sizeka had sent her two children to be raised by her parents in the rural village of Steynsburg in the Eastern Cape. During the first year (1995) of our research there, her shack was scantily furnished. Although she had access to electricity, she did not have electrical appliances other than three light bulbs and a portable black and white television. She had a battery-operated stereo radio, which she used to listen to the midday radio serial and music programmes 'to chase away the blues of not working'. She used two paraffin pump stoves for cooking, heating water and space heating. She would go to her neighbour's household – which always had a fire for brewing *umqombothi* (traditional beer) – to sit around the open fire. Although, she was doing this to save fuel, she also liked to go there for the sake of socialising.

In 1996 Sizeka was employed part-time at Shoprite, a grocery shop a few kilometres from her house, where she receives R300 per week (depending on whether she works the full week). As a 'young woman', she began to accumulate new furniture and appliances: 'I do not want my friends to think I am poor'.

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[6] Adapted from Mehlwana and Qase (1999: 44).

She has brought back one of her two children, but continues to send remittances to her parents in Steynsburg. She is now involved in rotating savings clubs. The money she receives is used to buy more appliances and groceries. At present, she has a colour television, a music centre and an electric kettle and iron on hire purchase. She bought also an old-fashioned electric stove for R250 from a second-hand shop. Her friends and neighbours also own stoves. Her stove only worked for few weeks and it packed up; firstly, the oven would not function and later the plates did not either. In the beginning of 1997, she bought an electric hot plate at Shoprite for R199.

In January 1997, she called us to look at her damaged stove. She said, 'I bought this stove and paid this man (street-electrician) to install it, since he also installed my friends' stoves. After he had installed the stove, I could not light the oven and after some time the stove became useless'. In addition to the age of the stove, it turned out that it was installed incorrectly.

Although Sizeka bought the stove to relieve her from the drudgery and inconvenience of using paraffin stoves, the big oven stove served a secondary purpose. Her friends own oven stoves too so she wanted to be like them and not appear to be poor. For a long time, she remained without an electric stove and other appliances because she did not have a reliable source of income. In few months after she obtained work, she was able to collect many electrical appliances. That her employment was not secure, and to save money (for the time she would be unemployed) was of little consequence to her. In addition, she did not consider the times when she would not be able to raise money to buy electricity coupons to power her appliances. She was only thinking of the present circumstances and how her friends and visitors would see her at that point in time.

This case is one of the many cases of homeowners' preference for electric appliances. Of significance, however, is that there is a further element of choice: the bigger the better. A bigger electric appliance is important more for its decorative than its use function. This explains a tendency of many homeowners to replace their portable black/white televisions with bigger colour televisions. The latter is not only bought for its picture quality but also because 'it looks nice in the cabinet'. The case below shows one such household where the ownership of appliances has little to do with the primary use but more to do with decoration and social status.

CASE STUDY: Electrified formal house, Johannesburg[7]

Winnie's kitchen is a sparkling advertisement for Handy Andy. Her coal stove glimmers shining white in the corner of the room, her three sets of cooking pots (set in ordered rows on shelves and cupboard tops) gleam from the scrubbings of pot scourers. It is a fairly functional space: any appliances that are not in regular use are packed away behind cupboard doors, keeping the surfaces clear and the space uncluttered. Striking then, are the two highly visible fridges. One is an aged giant, on which the seals are worn and leaking. The other is a new bar fridge, given to her as a retirement present by her employers. Both are kept running, though neither is anywhere near full. In one, half a pumpkin, a couple of tomatoes, and a tin bowl of leftovers dotted the shelves that day. The contents of the other were also scanty: a bowl of fresh beans, a bottle of water, a jar of atchar. The amount of cooling space is useful at month-end, Winnie says, when she and her daughter restock the household groceries. Besides, she adds: 'It's decoration! People will come and say 'Ooh, that Winnie, she's rich. She's got *two* fridges ... It is good to be on top sometimes. It's good not to look poor.'

This household has no practical use for two fridges; however, possessing them mean that friends and visitors would respect and speak highly of her household. That they remain empty for most of the time is not an issue to Winnie – besides, no one is going to see what is inside. Numerous cases of people displaying appliances that they hardly use are recorded. A woman in Khayelitsha took a neighbour's discarded fridge and put it in her kitchen. She did not intend to

[7] Adapted from White et al (1998: 76-77).

repair it. She said, 'I put it here for decoration; when I have enough money I will buy my own fridge' (Mehlwana & Qase 1999: 65). White et al (1998: 76) aptly comment that 'electric appliances are put on display as semiotic markers of fortune and comfortable living, outwardly denying the households' poor and struggling existence'. Most households do not want to be associated with poverty, and therefore will display as many appliances as possible even if they do not use them. Thozama's case below illustrates this well.

CASE STUDY: Electrified formal house, Cape Town[8]

The first impression one gets from Thozama's house in Khayelitsha is that of a household which lives comfortably. She shares the two-roomed house with her brother, sister and three school-going children. All the members of this household are not formally employed and have no regular, stable income, except for her sister who gets an insignificant maintenance grant for her child. At times, her brother would get 'piece jobs' to buy food and other household needs.

In 1995, Thozama's brother bought a big oven stove, a twin-tub washing machine, a big black and white television set and a refrigerator from an auction, for a total of R600 in cash. The washing machine, refrigerator and the television were not working at the time of purchase and they cannot afford to take them for repairs. The stove consumed too much electricity and they stopped using it. The presence of these appliances, however, serves another purpose; to make Thozama's household look presentable and conceal poverty.

Electrical appliances are deeply associated with modern values and anything less than that is not acceptable. This particular association of electrical appliances with modernity is common amongst the young generation of homeowners. As White et al (1998: 79) mention, the coal stoves, for instance, are 'frequent fatalities of images of modernity'. They are one of the first appliances to be replaced by electric stoves and heaters in Soweto. However, amongst the older generation and people with rural commitment, coal and paraffin stoves have a different symbolic attachment. They are revered and publicly accepted as cultural symbols (cf. Golding & Hoets 1992).

Case studies used in this section show, unequivocally, that appliance ownership does not necessarily mean appliance use. It is unfortunate that current studies do not make this important distinction.

5. Appliance acquisition and financing patterns

In their quest to own appliances, most households use many means of acquiring them. Figure 5-1 shows how appliances are acquired in a Cape Town sample (see Mehlwana & Qase (1999: 60-64) for a detailed discussion). The figures on the y-axis show the number of appliances acquired using different mechanisms. Although Figure 5-1 does not tabulate the appliances by fuel type, it shows a trend of buying new appliances on cash basis in Cape Town – but it would be misleading to conclude that this implies that the households have sufficient disposable income. Since most households in the Cape Town sample own paraffin appliances and basic electrical appliances (such as bar heaters, hotplate stoves and kettles), they buy these electric appliances on a cash basis, and these are relatively affordable vis-à-vis more elaborate appliances. Electric hotplates cost between R150 and R200 while irons and bar heaters cost about the same. For the more sophisticated appliances such as four-plate stoves and refrigerators, hire purchase (HP) and second-hand sales are utilised. Reasons for this peculiar trend are discussed in section 5.1 below.

[8] Adapted from Mehlwana & Qase (1996)

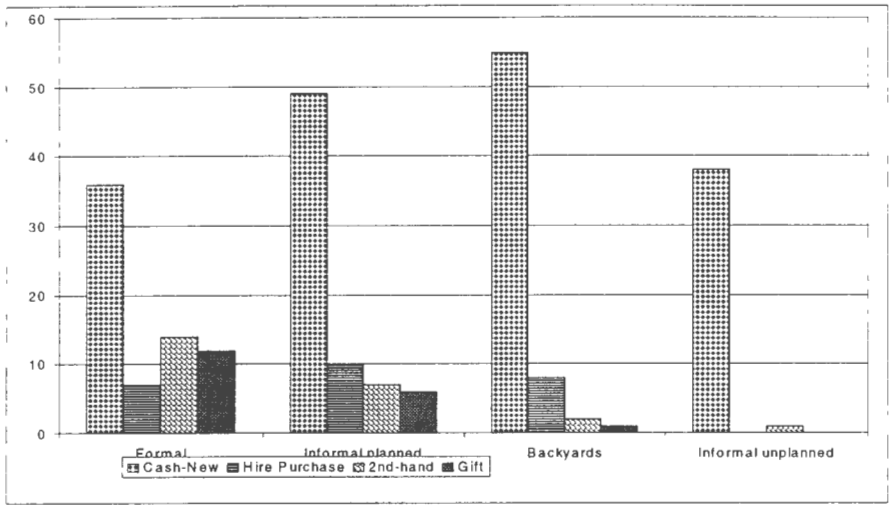

Figure 5-1: Buying patterns of low-income households in Cape Town
Source: Mehlwana & Qase (1999: 64)

5.1 Appliance financing mechanisms and schemes

5.1.1 Hire purchase

The trend especially in formal households is towards purchasing new appliances on HP. White et al (1998: 83) observe that households view 'new purchases as prudent purchases'. In general, householders view buying on HP as expensive, but are forced into it because they cannot raise sufficient cash for big electrical appliances. A woman interviewed in a Johannesburg formal house said, 'without HP, I wouldn't have been able make this house nice'; while another commented, 'I don't prefer [HP] because it is expensive, but I have no choice but to buy on instalment' (White et al 1998: 84). We have seen in Rebecca's case above how she accumulated all her appliances on HP. About 80% of her household income was spent on repaying her HP instalments. She knew that, although it was expensive, the appliances were an investment as they are new and therefore come with a guarantee.

However, HP is allowed only to consumers with a regular, stable and relatively high income, as well as a fixed home address. Many householders in informal unplanned areas are excluded from HP agreements, irrespective of their incomes, because the areas in which they live are not formally recognised. Other households whose income is very low are not 'creditworthy'.

White et al (1998) and Jones et al (1996) observe that many householders acquire appliances though informally organised associations. These associations, commonly known as *stokvels*, pool money from members, and redistribute it after a stipulated period. Such money is then used to buy appliances. Indeed, in East London, members of these associations are not allowed to use the money to finance other household needs (Bank et al 1996). There was little evidence of these associations in Cape Town, except for the case of Sizeka cited above. The main reason is that most households earn extremely low incomes. Like HP payments, a most important prerequisite for belonging to a *stokvel* or savings club is a stable and regular income. Therefore, many low-income households in the Cape Town depend on buying appliances through other means, either new on a cash basis, or second-hand. In terms of the former, it means that only cheap and basic appliances, such as hotplates and kettles, are purchased.

5.1.2 Second-hand appliances

Not many households prefer to buy their appliances second-hand, but are compelled to do so by the high cost of electrical appliances such as four-plate stoves and the fact that most households are not creditworthy to buy on HP. In one of the cases studies cited above, Sizeka bought a huge four-plate stove (not only because a smaller one would not have serve her household needs better, but because her friends own stoves as well). At the time of purchase, Sizeka's household consisted of only three members. She paid R250 cash for a second-hand

stove but it soon stopped working. She had to buy an electric hotplate which cost her a further R199 (Mehlwana & Qase 1999). Again, another case mentioned above is Thozama who bought many appliances in an auction; they were not working and would need a lot of capital (which she did not have) to repair.

What is also important is that paraffin, gas and coal appliances are also purchased by this method, and similar problems (although the financial implications are not the same) occur. A householder in an informal unplanned settlement in Cape Town bought a gas refrigerator for R800, to be used in her growing informal business. However, she found out later that it was not in good working order and would cost R700 to repair.

It must be underscored that people are well aware of dangers of buying second-hand electrical appliances, but various pressures, as discussed above, compel householders to acquire appliances by whatever means.

5.1.3 Gifts or 'hand-me-downs' and sharing

Lastly, the other option of appliances acquisition is through gift-giving or sharing of appliances. In the case of the former, many consumers obtain appliances from their employers. This is true of domestic workers who often get appliances that their employers no longer use. Although some of them would be in working order, most are faulty.

More importantly, there are movements of appliances between households. Using their networks (which are mostly kin- and friendship-based), people are able to share appliances with, and donate unused appliances to, relatives and friends. The case study below shows such movements.

CASE STUDY: Electrified formal house, Johannesburg[9]

Octavia and Lucky Kgaje seesaw in and out of electricity use. Their home is fitted with a credit-metered supply, but on their tiny and highly erratic income they struggle to maintain their payments. In the course of the last two years, they have twice been disconnected for not managing to do so. Echoing their electricity status, appliances move in and out of the household.

In September 1995, the house displayed an array of aged and semi-functional electric appliances (a two-plate stove, a fridge, a kettle, iron, two bar heaters, an electric frying pan, a small TV and hi-fi) as well as a paraffin wick stove and a giant coal stove inherited from Octavia's grandmother. Lucky's family gave several of these appliances to the Kgajes. 'They like their *makoti*!' Octavia jokes. Lucky's mother gave them both the heaters, and the electric two-plate. (Later they were observed to give them another two two-plates – on each of which only one plate was functional – and a tabletop oven). All of these appliances were cast-offs, no longer in use in the parents' home.

For the two months before our meeting, however, the electric appliances had stood unused. The household had been relying on the paraffin and coal stoves because their electricity was disconnected. Once reconnected in September 1995, Octavia gave the paraffin wick stove (and a set of car battery cables) to a needy friend living in an unelectrified informal settlement nearby.

In May 1996, not even a year later, the Kgajes were again disconnected from their electricity supply. The friend to whom they had given their paraffin stove was ill with TB in hospital, her shack locked and bolted, making it impossible for them to retrieve their back-up for these emergencies. Fortunately a friend of Lucky's, also living in Mzimhlope, gave them her spare paraffin stove.

This time they knew they were facing a long period of disconnection. Their arrears amounted to hundreds of rands and, since they were unemployed, the prospects for reconnection were bleak. For a full year they lived without electricity. During this time,

[9] Adapted from White et al (1998: 86-87).

they redistributed some of their own electrical appliances among family and friends. The tabletop oven was returned to Lucky's parents, the only properly functioning two-plate stove loaned to Octavia's mother, and the fridge plugged in at the home of a friend.

In June 1997, payments on the reconnection fee were finally completed, and the prospect of a brighter, easier winter was realised. The tabletop oven returned to its position on a rickety chair in the kitchen, the fridge moved back from the house along the road. And the paraffin stove exchanged places with one of the electric two-plates, hidden all this time under the kitchen table.

Paraffin appliances are easily exchanged: primus stoves and irons are moved from one household to another. In the case of electrical appliances, people in a kin- or friendship-based network allow use of each other's appliances. Indeed, a measure of people's relationships is the extent to which they share appliances. In some cases, people discard their unwanted appliances by giving them to relatives and friends (as the case above shows). These are usually paraffin, gas or coal appliances. White et al (1998: 87) aptly concludes that, '"borrowing" has become institutionalised into a mutually beneficial, permanent exchange of resources'.

5.2 Maintaining and discarding old appliances

Household appliances have varying life spans. Usually paraffin ones have a short lifespan and need to be replaced frequently. For instance, although wick stoves are the cheapest of paraffin appliances, they are mostly of substandard quality and soon need to be replaced – usually a few months after purchase (depending, of course on the frequency of use). When a wick stove is old, it is usually discarded because it is dangerous to use and can cause fires. Other paraffin appliances such as primus and *beatrice* stoves have a longer life span. It takes years for them to be replaced. A householder in Langa township purchased her *beatrice* stove in the early 1980s and claims that it never gave her major problems other than general maintenance. The only parts that are frequently replaced are the appliance heads (in the case of primus stoves) and wicks (in *beatrice* stoves and heaters).

For the primus stoves to last longer, paraffin is mixed with small doses of methylated spirits. Without this mixture, the stove emits smoke and the head is easily damaged. Some households were observed cleaning the tank of their primus and *beatrice* stoves for water residues that usually come from dirty paraffin bottles (Mehlwana 1998). Paraffin heaters are also maintained the same way as beatrice stoves and have a relatively longer life span. This is partly because paraffin heaters are not used as frequently as the paraffin stoves.

The general tendency is that when people have access to gas or electricity, paraffin appliances are either stored away or given to friends and relatives. However, gas appliances are usually used in conjunction with paraffin ones. Gas would be used for specific tasks (such as cooking special quick-foods) and paraffin for foods that take a longer time to cook (see below). When non-electric appliances are not given or lent to other households, they are kept for emergency purposes, such as when there blackout or when households cannot afford electricity. However, as we have seen above, some formal households normally get rid of their non-electric appliances after getting electric ones. The former do not fit with their current (middle-class) lifestyle. Paraffin fridges and coal stoves make way for electric fridges and stoves.

Even when an electric appliance is not functioning, a household will keep it until such time as the appliance is replaced. Since repairs are expensive, this may take a long time. This is why ovens that never bake, and refrigerators that become storage places for dishes and pots are kept in many households.[10]

[10] White et al (1998) also mention that, other than throwing or storing unusable telephones away, some people keep them on display for decorative purposes, since ownership of a telephone is associated with a middle-class lifestyle.

6. The use of multiple appliances

6.1 Multiple fuel use, cost and energy efficiency

A common feature of fuel use patterns in low-income households is the multiple use of fuels. This phenomenon is widely documented although there is no consensus as to its real causes. Recent qualitative studies have unravelled that multiple fuel use is a permanent phenomenon and is determined by interlinking social and economic factors. The thinking behind the mass electrification programme of low-income households is to reduce or replace the dependence on 'transitional' fuels, such as paraffin, wood, coal and gas. Instead, electricity has extended, rather than replaced, the use of transitional fuels.

Energy expenditure in poor households competes with other household priorities. The primary priorities of households are food, furniture and appliance accumulation, accommodation, remitting money, and transport. In many cases, energy expenditure is down the priority list. Furthermore, the low and erratic income of many of these households does not allow long-term budgeting for fuel. The implication this has for appliance use is apparent. Electric and gas stoves will be used when income is available, usually at the end of the month, while other non-electric appliances are used where there is little disposable income. In one household in Khayelitsha, a homeowner would not spend more than R30 per month on electricity coupons (see Case Study below), because the availability of more electricity encourages wasteful practices.

What does multiple fuel use mean in terms of appliance purchase and use? To what extent does multiple use contribute to the energy efficiency by households? Does access to different fuels encourage energy efficiency?

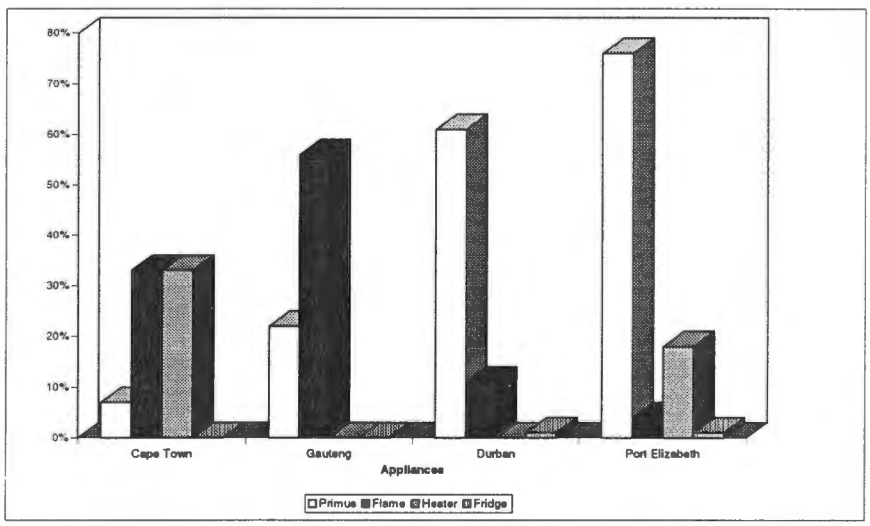

Figure 6-1: Paraffin appliances in formal households in Cape Town, Gauteng, Durban & Port Elizabeth
Source: Simmonds & Mammon (1996)

Multiple fuel use means that households have to use more than one fuel for the same purpose – using gas, paraffin, coal and/or electric stoves for cooking, for instance (see Figure 6-1). In some contexts, households use one appliance for more than one end-use – a paraffin or coal stove is used for cooking, while offering space-heating, for example. A noticeable trend is that the use of different appliances is congruent with households' incomes and budgets. It should be stressed however, that these are not the only reasons for the use of different fuels, as will be explored later.

However, it is important to note that in many instances multiple fuel use, as a means of regulating and control energy expenditure, becomes expensive (see Mehlwana 1997: 10). The

case study below is but one of such instances where the use of many appliances and fuels increases the energy burden on a household.

CASE STUDY: Electrified formal house, Cape Town[11]

Nomtshato's household has a range of appliances for different fuels, which are used at the same time. Electric lamps and bulbs are used to illuminate the whole dwelling. The television and refrigerator use electricity. They used their electric hot plate selectively since February 1995 when the breadwinner lost his job due to illness. The hotplate is used to cook 'quick' meals such as eggs, or to re-heat a previously cooked meal. Because of their selective use of electricity, the household's electricity bill is not very high. In the 1995 survey, the electricity bill was R10, and in 1996 it increased to R30 per month.

A two-plate gas stove is also used for cooking meals such as rice and meat, and boiling water (sometimes, though, they use the electric kettle to boil water). The 7-kg gas canister is refilled every month and in 1996 cost the household R17.26 for a refill.

Two pump stoves are used for cooking and ironing. A paraffin heater is used not only for space-heating but also for baking and cooking because 'the heater is very good for baking and it does not burn the bread ... and it also provides a welcome surface to finish cooking *umngqusho*'. It is cooked first on the paraffin stove and when it is nearly cooked, it is put on the heater. The household uses paraffin intensively. In 1996, they consumed 198 litres in one month, which cost R212.52.

Nomtshato's small transistor radio uses dry-cell batteries, which she buys every fourth week. The batteries cost the household R12.43 per month.

This household pays a huge energy bill because it uses many appliances. Although its electricity expenditure is low, the overall budget for energy is more than R220 per month. It would seem common sense for this household to use one or two fuels. Interestingly, this household is aware that, when calculated over a longer period (i.e. a month), their energy expenditure is quite high. However, the decision on appliance purchase has to take cognisance of the availability of money *at a particular point in time*. At the time, this household depended mostly on a pension of R860 per month for two persons. There was also an additional, albeit irregular and unstable, income from informal business which was used mainly for subsistence during the month when the pension money was spent. The same situation was observed in other poor households. When there is little money, paraffin and coal stoves are used because one can buy paraffin or coal in small units. Householders *know* that buying fuels this way is expensive, but have no choice because not enough money is available to buy in bulk.

Most low-income consumers do not think about the energy consumption or the fuel efficiency issues when they think of buying an appliance. Their decision is based on the look of an appliance. As discussed in this report, this is more applicable when it comes to electric appliances. The case study below shows a woman who filled her household with state-of-the-art appliances but found it difficult to use them in a sustainable way because they consume too much electricity.

CASE STUDY: Electrified formal house, East London[12]

In 1994, Nomsa's father died, leaving her as the only beneficiary of his insurance policies. At the time, Nomsa was unemployed and sold candles, matches and paraffin for a living. She also received R100 a month from her boyfriend for household expenses and R50 from rent-paying tenants on her backyard.

After her father's death, there was speculation in the neighbourhood that Nomsa would squander her inheritance on her boyfriend. Instead, she used the money to extend the house, to install electricity, and then to purchase a wide range of domestic appliances.

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11 Adapted from Mehlwana and Qase (1999: 74).

12 Adapted from Bank et al (1996: 104).

These investments cost her several thousand rands and greatly raised her status among the women of the neighbourhood. However, the main problem for Nomsa has been that she does not earn enough to make effective use of all appliances in her house.

Consequently, she has been forced to backswitch to paraffin for cooking and has even contemplated selling some of her appliances to raise money to run her household. Nomsa feels that she grossly under-estimated the cost of using electricity and regrets that she did not spend her inheritance money more prudently.

This case study confirms a trend in appliance purchase found in other recently electrified households, where the emphasis is placed on the look of an appliance rather than its thermal performance. As most newly electrified households are provided with prepayment meters, this makes them aware of which appliances consume too much electricity. People will discontinue using appliances such as electric stoves and bar heaters after realising the impact of their use on energy expenditure, as the case above shows. In view of this, what drives households to use their energy and appliances efficiently?

6.2 Efficient use of appliances: reducing costs of fuels?

It must be stated from the outset that what drives households to use their fuels and appliances efficiently is not the concerns with peak load demands (in case of electricity) or environmental issues in the case of other fuels. Rather, as has been elaborated in the above section, reducing costs of operation is the main driver. Multiple fuel use is one such strategy which consumers employ in their *attempts* to reduce fuel expenditure. There are attempts to use the fuel efficiently; however, (as the case studies above have shown), such strategies may become expensive in the end. The case study below shows how some households attempt to use energy efficiently.

CASE STUDY: Electrified shack, East London[13]

Thembisa has two adult daughters and a son. They are all unemployed. Thembisa spends most of her time away from her backyard shack as she works as a 'sleep-in' domestic servant in the white suburbs of East London. As a result, her daughters run and manage the household while she is away.

In 1990, electricity was installed in her household. In response, Thembisa immediately bought a kettle, a hob and an iron for the household. She also decided to invest R20 every month in her readyboard card to help her unemployed daughters with the management of the household. This was all she could afford from her wages.

Thembisa's daughters responded to this situation by using electricit selectively. They decided not to use the two-plate stove as they soon came to realise that it drew large amount of electricity. Instead, they retained the old paraffin flame stove for cooking. They also decided to run the radio off a PM 9 battery, which they felt was cheaper than using the card. They told us that they would buy one battery a month and when it was used up, they would not use the radio. They said this was the best way to control the amount of energy used for entertainment.

The only consistent use of Thembisa's daughters made of the new electricity supply was for lighting. They insisted that the electricity lights in the house drew a low current and were very economical to run. Through the process of careful assessment of their energy requirements of the different appliances at their disposal, Thembisa's daughters tried to use the limited amount of electricity at their disposal efficiently. They explained that if the economic circumstances of their household improved, they would expand their use of electricity to other areas such as cooking.

This household is well aware that it is cheap to use electricity for some purposes such as lighting, while it is expensive for others, such as cooking, ironing and space heating. This

[13] Adapted from Bank et al (1996: 102-3).

rationality is brought by experience of using and comparing all the energy sources at their disposal. Furthermore, this rationality is brought by the povert of these households: they are *forced* by it to change their appliance use practises.

Even with non-electric appliances, people make conscious choices about efficiency issues. For instance, different appliances cook different meals. Staple diets such as *umngqusho* (which takes several hours to cook) are prepared using paraffin stoves. Some householders make a further distinction. Wick stoves are said to be more efficient than primus stoves in terms of fuel consumption and are, therefore, preferred for cooking meals that take several hours. Primus stoves are said to be efficient when cooking quick meals or boiling water for beverages. Gas appliances are also used to prepare quick meals, such as eggs and meat.

All these efficiency measures are a response to the poverty conditions of households. Indeed, some of them carry additional external costs. For instance, the use of substandard wick stoves perpetuates the dangers of residential fires. Operating non-electric appliances is time-consuming. Because of their propensity for fires, paraffin appliances are closely monitored. Having to guard the appliance while it is still on does not free the users (especially women) for other productive activities.

7. Conclusions

This report has demonstrated that fuel- and appliance-use patterns in urban low-income households are complex, dynamic and fluid. There is therefore a critical need to question some of the assumptions currently holding sway in the domestic energy debates. These assumptions need to be revisited and revised as a prerequisite for the successful implementation of strategies to address energy poverty. For instance, unilinear explanations of energy and appliances use (that is, linear progression from one fuel to another) are not supported by empirical evidence (Bank 1998: 6). This report has argued that fuel and appliance use should be located within social and cultural landscapes of the poor communities. Rational economic decisions about energy use should be seen in, and as part of, the wider social contexts. More importantly, it should be recognised that specific social contexts play a major role in influencing decisions of domestic energy use.

What is, then, the single most important determinant of energy use patterns of the urban poor? This report has demonstrated that decisions around the use of fuels and appliances are made within the context of poverty. Indeed, poverty is the keyword in this report. We have seen the extent to which a wide range of necessities and contradictory priorities places tremendous pressure in the incomes of households. In terms of household priorities, energy tends to be at the bottom while appliances are amongst the top. This has important ramifications.

Firstly, fuels and appliances are treated in the same way as other household commodities and have different meanings. The semiotics of, or symbolisms attached to, appliances are not homogenous and mean different things to different people. These symbols and signs are a product of, and mediated by, specific social landscapes. In the formal households, as shown above, electric appliances have different meanings than in other settlements. However, this is not clear-cut, as there are other mediating factors such as the generation gap, with younger householders more likely to value electric appliances than their older counterparts.

Secondly, there is an assumption that urbanisation and access to electricity will create a situation where households will gradually acquire electric appliances. Africa et al (1997) even suggest that it takes a period of five years for the uptake of electricity to stabilise in low-income households. The report has questioned this assumption and showed that some other people's priorities do not lie with electricity. Cases cited above show that in other instances the period of urbanisation and exposure to electricity does not correlate with electricity use. A migrant cited in one of the case studies has been in urban areas for 16 years, yet his fuel use patterns has remained unchanged over that period.

Thirdly, in the case of households with prepayment meters, the presence of appliances does not necessarily mean that they are used. Cases above have shown that when people buy electrical appliances, they do not consider the operating costs and therefor backswitch to paraffin and other 'inferior' fuels once they realise that it is expensive to buy electricity. One advantage of prepayment meters is that households become aware of the costs of fuelling appliances. However, their awareness is mostly based on hindsight rather than foresight.

Fourthly, in the case of household with prepayment meters, awareness of appliance efficiency is lacking. Specifically, awareness about which electric appliances consume much electricity is lacking. In one of the cases cited above, we have seen how a homeowner complained about the electricity bills he received each month, but was reluctant to change his excessive household fuel-use practices.

Lastly, in the case of non-electric appliances, such as paraffin stoves, the pressures on household income force the households to purchase cheap, substandard and inefficient appliances. Paraffin appliances that are more durable, more efficient and safer are expensive. An important point to note is that consumers are aware of the fact that there are external costs (related to safety and health) associated with the use of cheap appliances. However, their income does not allow them to make long-term decisions about which appliance to use. Decisions to buy cheap appliances are based on what they can afford at a particular time.

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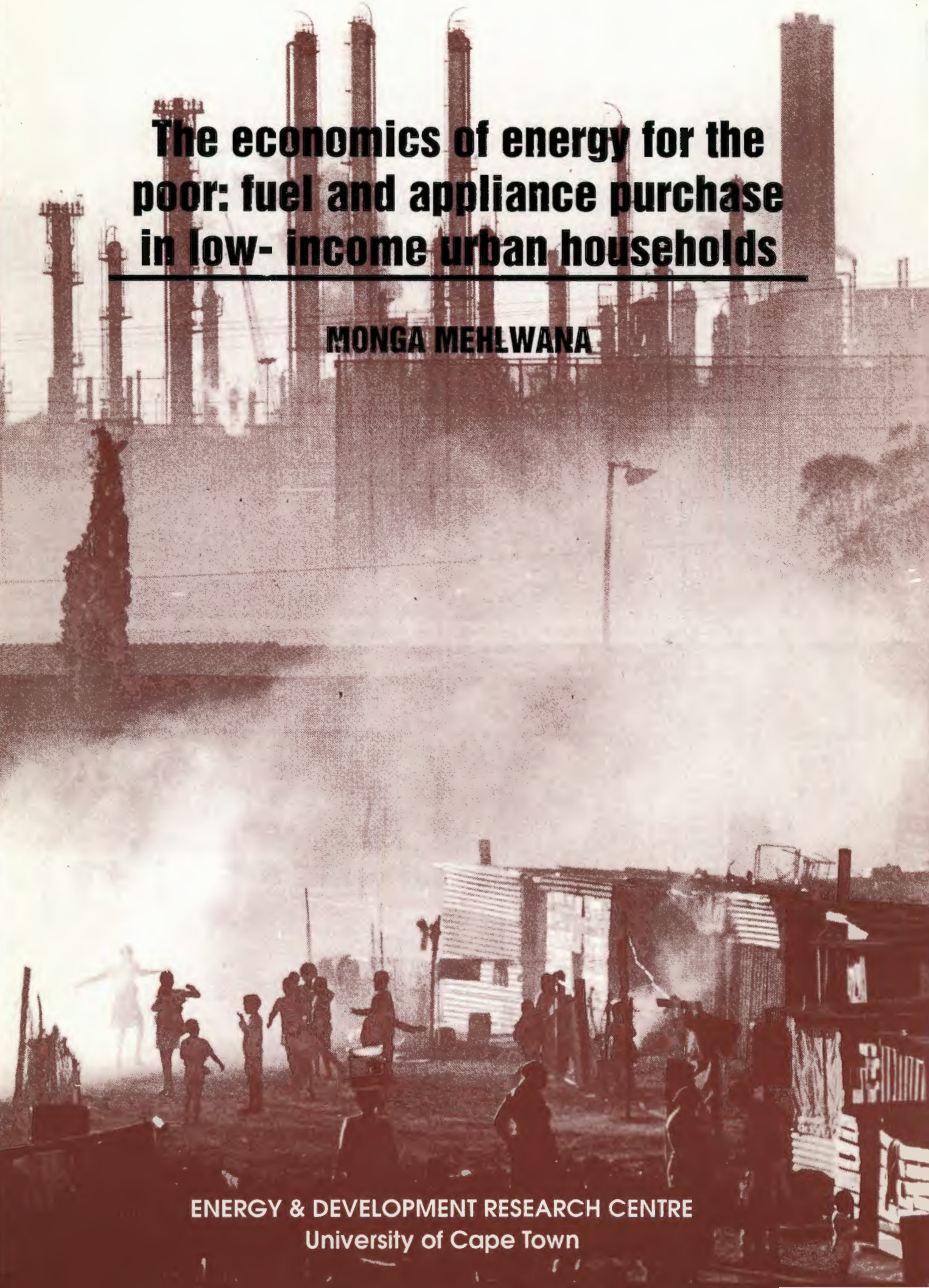

The economics of energy for the poor: fuel and appliance purchase in low- income urban households

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