
JOURNAL OF ENERGY IN SOUTHERN AFRICA

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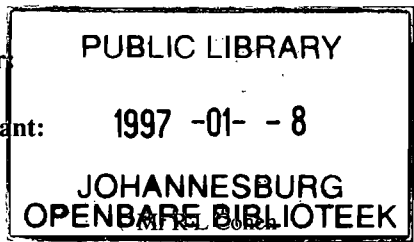
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Special issue: Social determinants of energy use
in low-income households

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“*Electrical energy is the common factor that binds us in our quest for a better quality of life for all our peoples. By concentrating on the positives, on common development factors, we are building bridges for tomorrow. I believe that electricity could be a catalyst not only for illustrating the interdependence of all Southern African states, but also for stimulating a new development in our subcontinent.*”

Dr. John Maree, Chairman,
Eskom Electricity Council.



ESKOM

Profile: Chris Cloete

**Managing Director, Sasol Coal Division,
Sasol Mining (Pty) Ltd**

Chris Cloete matriculated from Ermelo High School in 1965. His interest in the mining industry began shortly after leaving school when he enrolled at the training centre for coal officials at Gencor's Blinkpan Mine. In 1968, he went to the University of the Witwatersrand where he obtained a B.Sc.(Eng.), specialising in mining engineering. In 1981, he was awarded the Master of Business Leadership (MBL) degree from Unisa, for which he also received an Old Mutual gold medallion.

His other qualifications include a mine manager's Certificate of Competence in coal and metalliferous mining. He also completed the Executive Development Program at Michigan University in the U.S.A.

Chris Cloete's practical mining experience has been extensive. He started as miner and shift boss at Usutu Colliery, moving on to mine overseer (Klein Aub Copper Mine), mining engineer and underground manager (Usutu), and underground manager and acting mine manager (Delmas Colliery).

In 1976 he was sent to Gencor's head office and promoted to project engineer and personal assistant to the operations manager of their coal division. Here he gained valuable group marketing and production experience, and was in the position to make recommendations which affected the coal division. In 1978 he was appointed as senior project engineer responsible for large projects.

Chris began working for Sasol in 1978 as mine manager at their Sigma Colliery. He became a member of Sasol Group Management in 1980 when he was appointed assistant general manager (mining). In 1981, Sigma won the National Productivity Institute (NPI) achievement award. In 1982, he was



promoted to deputy general manager (mining) and transferred to Secunda Collieries. A few years later he was promoted to general manager (mining), and in 1991 Secunda Collieries won the NPI award for outstanding achievement in productivity improvement. In 1993, Chris Cloete was promoted to the position of managing director of the Sasol Coal Division.

He is also a director of Sasol Mining (Pty) Ltd and the Sasol housing board. Other directorships that he holds are of the Highveld Ridge Reconstruction and Development Committee (HRDC) and the Richards Bay Coal Terminal Company. He is a council member of the

Department of Mining Engineering's Advisory Board of the University of Pretoria. He is also a member of many professional societies and institutes.

Chris Cloete is married to Marie (Rierie) (née Janse van Rensburg) and has three children - Yvonne, Christiaan and Lise-Marie. His extramural activities include an interest in the arts - he is chairman of the Johannes Stegmann Theatre. He is also very involved in promoting inter-cultural relations between the various communities in South Africa.

His sporting interests include keeping fit in general and playing golf. He also enjoys reading.

Introduction

This special issue of the *Journal of Energy in Southern Africa* has focused on some of the research results derived from a national research project which covered what can be broadly described as the social determinants of energy use in low-income households in South Africa. The research was funded by the Department of Minerals and Energy's (DME) Directorate: Energy for Development. The design of the Directorate's 'Metropolitan Programme' of research was based on some basic demographic realities facing the country this decade.

Before giving some background to the projects on which the papers in this issue are based, it might be useful to place the programme as a whole in perspective.

Project context

Low-income households represent the bulk of the population in South Africa. In 1993, of the 7,5 million households in South Africa, 70% (or 5,25 million households) were defined as 'low-income'. The urban/rural split is 30% and 40% (2,25 and 3 million respectively). In the urban areas, 1,5 million households live in informal dwellings and only 0,75 million in formal housing. Most of the growth is taking place in the informal housing sector. The four main metropolitan areas of Gauteng, Western Cape, Port Elizabeth/East London and the Durban Functional Region account for some 70% of the urban poor.

The 'constituency' of the Directorate: Energy for Development, with respect to urban areas, is thus clearly the 2,25 million low-income households, with 66% (1993 figures) being 'informal' dwellings of some kind or another. These dwellings have been categorised by the Urban Foundation⁽¹⁾ into 'informal planned' (site-and-service), 'informal unplanned' (i.e. squatter shacks with minimal or no basic services), backyard shacks, and hostels. On the formal side there are 'old' and 'new' formal township dwellings which may be electrified or non-electrified.

The provision of good quality housing for the bulk of poor households, with integrated services, will not occur overnight. Also, changes in energy use patterns do not occur without secure and rising income, literacy, and the adoption of the values of a 'consumer society'. From the evidence available since 1986, when the 'Electricity for All' drive was launched

by Eskom, and the President's Council legalised what it termed 'orderly planned settlement' (i.e. site-and-service squatter settlements), it can be seen that comparatively few informal settlements have been electrified. In electrified townships there is also often a slow load growth.

The phrase '...multiple fuel use is the norm...' is becoming increasingly used in reports and articles, almost as if it has just been discovered. In a sense this is so, purely because research has only recently been undertaken into fuel use in this country. Initially, and perhaps naively, it was expected that households would 'switch' to using electricity over night. This pattern did occur in areas where there was a pent-up demand for electricity and people had saved up their money for that event. But, on the whole, the substitution of hydrocarbons by electricity has been gradual - just as it is elsewhere in the world. The substitution of one fuel by another has been well documented and the work of Leach⁽²⁾ on the 'energy transition process' has been highlighted in Viljoen's⁽³⁾ study of the phenomenon in South Africa.

Research by the then National Energy Council (NEC)^(4,5) revealed that low fuel consumption growth in South Africa was not only a rural phenomena but that it also occurred in peri-urban and urban communities; in fact, anywhere where people lacked access to resources. It became apparent that electricity planning required knowledge of socio-economic variables, as well as technical innovation towards low-cost solutions. Progress towards technical solutions has been a lot more successful than progress towards understanding the dynamics of energy use in the household.

Understanding the process of fuel switching and multiple fuel use, of which the electrification process is a part, is crucial for forecasting demand and developing supply option scenarios. The alternative is to go ahead with schemes to electrify all people's dwellings regardless of the consequences. The electricity supply industry (ESI) seems split between these positions and is increasingly interested in the dynamics of demand. Needless to say the research approach adopted by the ESI tends to look at energy use and people in a one-sided or fragmentary manner, with the emphasis on electricity. The preferable approach is not to isolate electricity from energy use in general, nor to isolate energy use from the overall context of

using and managing resources in the domestic situation.

In the past a very energy-focused perspective was adopted which sought to get answers by means questionnaire-based surveys. This undoubtedly produced a lot of essential data. However, the questionnaire is of limited use where more in-depth knowledge and understanding is required of how individual householders make decisions about the allocation of budgets to their different basic needs, how they plan and act to cover these needs, and how the situation which they are in influences their behaviour. This context is primarily social, that is, people's values, roles and actions are highly contingent on the social environment.

Thus this sort of deeper understanding which is being sought about the energy user cannot be derived from a one-hour interrogation by means of a questionnaire. Lately anthropologists have been used regularly in research to derive insights about people from participant observation and in-depth studies initiated by the DME^(6,7,8,9) demonstrating how valuable such investigations could be in elucidating the reasons for the often complex and apparently contradictory energy use practices of householders in low-income settlements. These studies often made sense of earlier findings and created a new 'benchmark' in the research literature.

Background to the projects

From the EPRET* studies of the EDRC it was apparent that new energy policy research was required to fill the gaps in existing data in low-income urban settlements. To this end a proposal, 'The Energy and Urban Development Research Cluster', consisting of a 'cluster' of projects, was compiled in 1993 which was designed to research energy use in the four main metropolitan areas on

* EPRET refers to the South African Energy Policy Research and Training Project which was undertaken by the Energy and Development Research Centre (EDRC) based at the University of Cape Town during 1992. Its aim was to investigate policy options for widening access to basic energy services for the urban and rural poor in South Africa.

a longitudinal basis, using a completely qualitative anthropological approach.

In each area 240 low-income households were approached to participate in the project, 60 from each of the settlement categories of 'formal electrified' housing, shacks in the backyards of formal houses, 'site-and-service' or upgraded shack settlements, and shack settlements. The selection of the households was thus not based on strict random sampling procedures but more on who agreed to be involved in the studies. The studies could thus be classified as groups of case studies. The findings from the projects do not claim to be representative of any section of the population. On the other hand, cluster sampling and random sampling techniques may give a representative sample but the results may be completely invalid if the respondents have not really participated fully in the studies.

The outputs of the projects consist of compiled and analysed data on the determinants of domestic energy use and the social context of decision-making: monitoring of the fuel substitution process and the effect of existing and new energy policies on households, community organisations and small businesses in South Africa. A new phase of research (not described here) has seen the facilitation

of end-user and energy provider interactions via workshops, with the aim of not only educating the parties involved but trying to solve some hitherto intractable problems. The phase of research which is described in this issue of the Journal focuses primarily on how end-users act in their social environments and are affected by energy policies which interact with government policy in a number of other sectors, the most notable being housing and the urban infrastructure.

The following papers will probably introduce many into an unfamiliar world, which is generally only seen from the outside. It is hoped that the readers of these papers will be challenged to see many things in a different way; sometimes stimulating, sometimes terrifying. If readers wish to consult the full reports on which these papers are based, they are available from the Directorate: Energy for Development, Department of Minerals and Energy, Private Bag X59, Pretoria 0001, South Africa.

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Current life-strategies and electrification: A comparison of households in two areas of Cato Manor, Durban

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This paper addresses the manner in which people's current life-strategies direct their fuel and appliance needs and choices, with particular reference to their anticipated responses to electrification. The notion of current life-strategy refers to the goals and aspirations pursued by individuals and in which they are presently investing time and resources. The current life-strategies and fuel and appliance preferences of two samples of householders, each drawn from the Cato Manor area of Durban, are compared. One of these samples comprises backyard shack tenants in the formal township of Chesterville. The other is made up of informal householders in the unplanned settlement of Old Dunbar. This comparison indicates that despite similar rural backgrounds and socio-fuel characteristics, informants in each of these two samples are likely to respond very differently to electrification. On the one hand, the backyard shack tenants are unlikely to invest in domestic electrical appliances because, as things stand, they have no desire to invest in urban homes; rather, they are concerned to channel their resources towards investment in their rural homes. On the other hand, the Old Dunbar householders are likely to embrace electrification far more wholeheartedly; this is related to their desire to establish permanent urban homes for themselves and their families. These differences are very clearly linked to the markedly different current life-strategies pursued by the informants in each of these samples. Knowledge of people's current life-strategies thus provides a basis for better understanding and, indeed predicting, fuel-related behaviour in society. It is suggested that these distinctions are by no means particular to the samples dealt with here. Rather, they are likely to be broadly representative of the current life-strategies of aspirant urban settlers on the one hand, and temporary urbanites or oscillating migrants on the other.

Keywords: domestic energy; appliances; current life-strategies; electrification; urban areas; energy utilisation; transitional fuels; paraffin; fuelwood; qualitative research; liquefied petroleum gas; Chesterville; Old Dunbar; informal settlements; backyard shacks; low-income households

Introduction

This paper compares fuel and appliance preferences, with particular reference to the prospect of electrification, among two largely unelectrified household samples in the Cato Manor area of Durban (see Figure 1). One sample is drawn from backyard shack tenants in the old electrified township of Chesterville. Only a small proportion of these tenants presently have access to electricity. The other sample consists of free-standing shack dwellers in the new unplanned and entirely unserviced settlement of Old Dunbar.

Anyone who purveyed survey data on the socio-economic and fuel use characteristics of these samples would probably conclude that they represent much the

same consumer niche. Most of the householders in the two samples are fairly young, most are of rural origin and most moved to an urban area for the first time relatively recently. Those among them who are employed are low-paid blue-collar, menial or domestic workers, and most have a number of dependants who either live with them or in a rural home elsewhere. Aside from the few backyard shack tenants who have makeshift access to electricity, all rely solely on transitional fuels, mainly paraffin, to meet their domestic needs. In general terms, therefore, backyard shack tenants in Chesterville and informal householders in Old Dunbar appear to be part of a common 'socio-fuel set'⁽¹⁾; that is, they have broadly the same biographical, social, economic and fuel use characteristics. To the observer, all that would seem to distinguish them is the type of settlement, and hence, the type of housing, in which they live.

Notwithstanding these similarities, householders in the two samples, in fact, have markedly different attitudes towards the prospect of electrification which, in turn, gives rise to quite different appliance preferences. On the one hand, informal householders in Old Dunbar aspire to ownership and use of electrical appliances, and would therefore more than welcome electrification. Backyard shack tenants, on the other hand, are generally quite ambivalent about the benefits of electricity to themselves. While all desire electricity for illumination, most tenants claim that they would not invest in electric cookers and other electrical appliances were their shacks to be electrified. Rather, they would continue to use paraffin and gas for cooking and heating purposes.

It is the authors' contention that these contrary responses to the prospect of electrification can be accounted for largely in terms of the differential 'current life-strategies' held by each set of informants. Although the vast majority of householders in the two samples originate from the countryside, the nature of their links with their rural homes differs markedly between the two. Most backyard shack tenants disclaim any desire for permanent urban residence, instead preferring to direct their resources towards consolidating their homes in the rural areas. In direct contrast, all of the informal householders are intent upon securing and investing in permanent urban homes for themselves. These differing current life-strategies, it is suggested, give rise to quite distinct attitudes towards energy sources and appliances among people who otherwise appear to have much in common⁽¹⁾.

The socio-economic features of the two samples

The township of Chesterville and the nearby unplanned settlement of Old Dunbar are situated in the broader Cato Manor area, some six kilometres from the Durban Central Business District (CBD).

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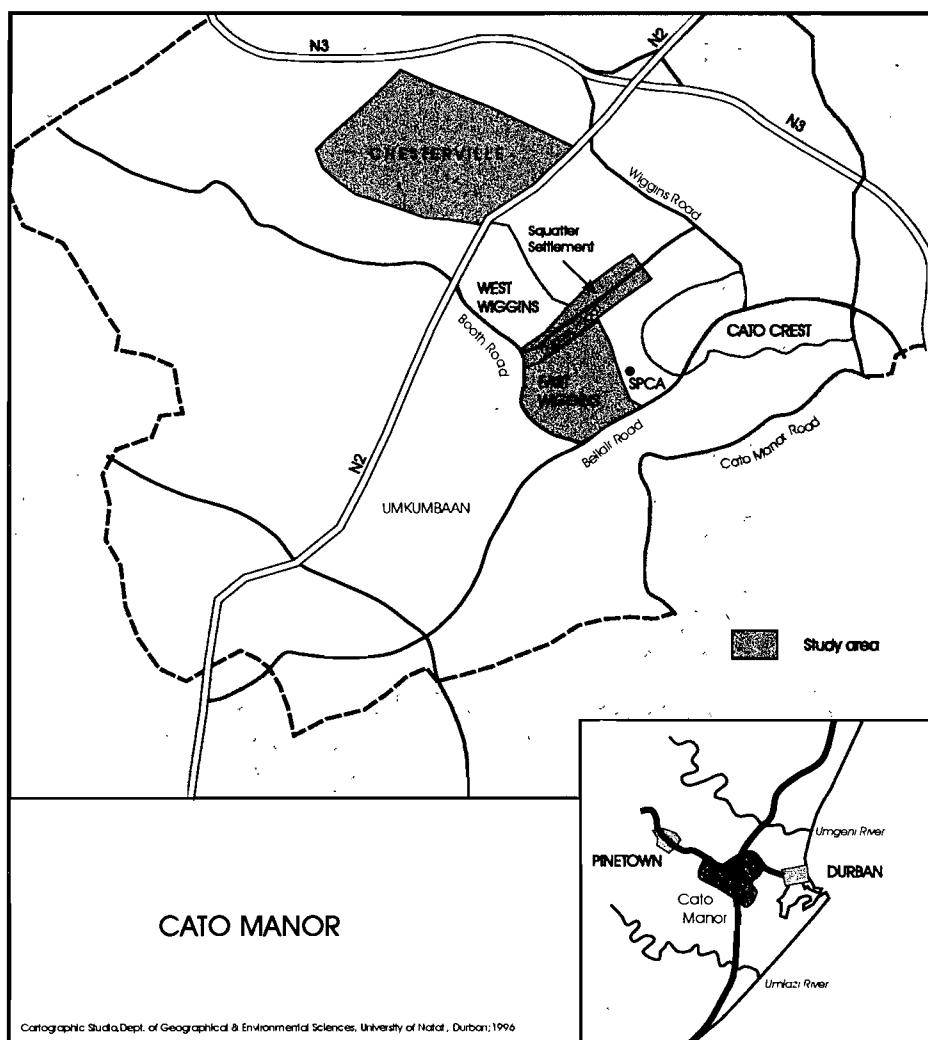


Figure 1: Map of the Cato Manor area, indicating the main study areas

Chesterville was promulgated in the 1940s and has a formal housing stock of just over 1 100 dwellings^[2,3]. All of these dwellings were electrified during the late 1950s. Many formal householders in Chesterville have constructed backyard shacks on their properties. The Chesterville Civic Association estimated in 1995 that there were some 2 000 backyard shacks in the township (personal communication). Some of these shacks are occupied by close family of the householder, and in these cases, their occupants tend to operate as part of the main household for domestic purposes. The authors' informants were all tenanted backyard shack dwellers who were not related to members of the main household. Most of their shacks are constructed from wattle-and-daub, corrugated iron, wooden planks or a mixture of these. Most consist of only one room, and many adjoin one another. Rentals vary from between R40 per month for an unelectrified room to as much as R100 per month for a room with makeshift access to electric lighting and a plug point. Most rentals are somewhere between these two extremes. In electrified

and partly electrified shacks, the rental covers electricity costs. It should be noted that the higher rental often paid for electrified rooms is not always linked solely to the provision of electricity. Other factors, such as better security, a more sturdy structure or better furnishings, may also be taken into account by landlord and tenant.

Old Dunbar is of an entirely different ilk to Chesterville. Situated on land from which Indian folk were forcibly removed during the apartheid era^[4,5], the area first began to be resettled by African people in 1992 when sites in the nearby informal settlement of Cato Crest were exhausted. By 1995, it was estimated by the Old Dunbar Civic Association that the settlement had a population of between 10 000 and 12 000 people. The Old Dunbar community is probably the most marginalised in the broader Cato Manor area. Testimony to this is the complete absence of any basic services at the time of writing and particularly, the removal by the Durban Corporation in early 1996 of the three watering points upon which the

entire community was reliant. Residents now have no immediate access to water. Despite very clear neglect by city authorities and low prioritisation by the Cato Manor Development Association (CMDA), which is promoting and co-ordinating housing development in the Cato Manor area, Old Dunbar residents remain hopeful that they will be granted the right to reside permanently where they are, or, failing this, elsewhere in the immediate vicinity.

Figure 2 compares the basic social and economic features of the backyard shack and Old Dunbar samples. ** Most of the socio-economic and biographical commonalities alluded to earlier are clear from this tabulation, but a number require clarification. The significantly higher mean household size of the Old Dunbar sample (3,8 people versus 1,7 people for the backyard shack sample), coupled with a much lower mean household per capita income (R208 in Old Dunbar versus R327 among backyard shack tenants), suggest that households in the Old Dunbar sample are somewhat worse off than backyard shack tenants. This is misleading because although mean per capita income is higher in the backyard shack sample, virtually all employed backyard shack tenants contribute to supporting dependants who live elsewhere, usually in a rural home. Some Old Dunbar householders also have absent dependants, but this burden is far slighter across the Old Dunbar sample as a whole. In circumstances where there are variable numbers of absent dependants or, indeed, a second household to which an individual contributes variable amounts of money, household per capita incomes have little meaning without detailed figures on precisely how much is consumed by, or contributed to, dependants who reside elsewhere.

The higher proportion of absent dependants in the backyard shack sample can be inferred by comparing the incidence of 'split' and 'contained' households in the two samples: 93% of backyard shack tenants are part of split households, between which income must be distributed, whereas 61% of Old Dunbar householders are in this position. Furthermore, although not reflected in Figure 2,

** The authors' samples are too small to draw general conclusions about the larger populations of backyard shack tenants and informal householders in Chesterville and Old Dunbar respectively. Nonetheless, this information permits certain inferences to be drawn about the current life-strategies of those who make up each sample. Although the samples are small, percentages were used rather than pure numbers because the sample sizes are different. Percentages have been rounded off.

BASIC FEATURES		Chesterville backyard shack tenants (n = 15)	Old Dunbar informal householders (n = 18)
Distribution in sample of:	woman-led households	57%	44%
	man-led households	21%	17%
	conjugal households	21%	39%
Mean household size:		1,7 people	3,8 people
Mean age of adults:		29 years	37 years
Proportion in sample of:	women	50%	26%
	men	29%	22%
	children	20%	51%
Proportion of households containing children:		29%	72%
Proportion of:	'contained' households	7%	39%
	'split' households*	93%	61%
Mean individual income among pensioners and formally employed adults:		R460	R439
Mean household per capita income:		R327	R208
Place of origin:	rural 'homeland' or farm	93%	70%
	urban area	7%	30%
Location of other home:	rural 'homeland' or farm	87%	55%
	urban area	7%	20%
	no other home	7%	25%
Duration of residence in an urban area:	since birth	7%	30%
	five years or less	67%	25%
	between 6 and 10 years	13%	20%
	more than ten years	13%	25%
Mean duration of residence in present settlement:#		2,8 years	0,8 years

Figure 2: Basic social and economic features of the two samples

* A split household is one in which immediate family members or other dependants of the head or conjugal couple generally reside elsewhere. A household where one conjugal partner is mainly absent would also be so classified. In most cases, the existence of such a split in the household indicates that funds have to be spread between at least two different locations. A contained household is one with no absent dependants; thus, there are usually no external financial obligations.

The figure for backyard shack tenants excludes the one tenant who was born in Chesterville (i.e. n = 14).

the Old Dunbar households which are split usually have only one or perhaps two dependants residing elsewhere, while backyard shack tenants often contribute to the support of a much larger group of kinsfolk.

This distinction between the two samples in terms of absent dependants no doubt narrows the per capita income differential between them. It is also indicative of a far more deep-seated distinction between the two, one which has important implications *vis-à-vis* attitudes towards and responses to electrification. In order to understand this, it is necessary to turn to the concept of 'current life-strategy'.

The concept of current life-strategy

As used here, the notion of current life-strategy derives from, but also differs in important respects, from the concept of 'life-strategy' as developed by Bozzoli^[6] in her study of the lives of women from Phokeng in the former Bophutswana. In Bozzoli's terms, an individual's life-strategy can only properly be determined in retrospect, that is, it is a historiographical construct established by reference to the choices and contingent actions pursued by an individual during his or her life-course. Furthermore, in Bozzoli's

treatment, life-strategies are responsive and changeable. Thus they are not fixed, but instead evolve and mutate as people progressively weave passages for themselves from the range of alternative courses that arise at various junctures in their lives. As Bozzoli puts it:

...the consciousness of these women of Phokeng is organised around...their "life-strategy". It appears that each woman views herself as a decision-making existential being, who has pursued a strategy of her own. The strategy is not an independent one, but is linked to and dependent upon the possibilities open to the woman, which are provided by the changing material world in which she has lived. (p.236)

At one level, the authors' notion of current life-strategy violates and impoverishes Bozzoli's concept because they mean by it nothing more than the goals and aspirations articulated and actively pursued by an individual at any given time. It is precisely this sort of fixity and singularity that Bozzoli wished to avoid. Nevertheless, it is the view of the authors that people's current life-strategies - the ideals and goals they profess to hold and in which they are presently investing time and resources - do, to a large extent, guide their immediate actions, including their fuel-related activities. Like Bozzoli, it is acknowledged that current life-strategies change, but it is also maintained that *present* aspirations and goals give direction to *present* actions and choices. As such, a perspective on people's current life-strategies may assist in understanding and possibly predicting, their actions and choices.

The current life-strategies of the two samples and how these may impact upon consumers' attitudes towards and responses to electrification are now examined in more detail.

'This place is not home': The current life-strategies of backyard shack tenants

The current life-strategies of the backyard shack tenants are strongly oriented towards maintaining and investing in their rural homes.^Δ None of those who are attached to households in the countryside professes to want a permanent urban home. Indeed, all state quite the opposite,

Δ The exceptions are two tenants who do not have rural homes. One was born in Chesterville and the other, who is of rural origin, no longer has a place in the countryside that can realistically be called home. The ensuing discussion excludes these two tenants.

and none have taken any steps to begin establishing such a home. To paraphrase the sentiments of many of our informants: 'This place is not home'.

This apparently single-minded commitment to the countryside is evident in a variety of ways. All of the rural-based tenants visit their homes in the countryside regularly, in some cases, every weekend. For the most part, they are scrupulous about saving money and spend precious little on improving their living circumstances and lifestyles in the urban setting. This is clearly related to, and provides further evidence of, their current life-strategies: they are in the urban setting for the singular purpose of supporting, and earning money to invest in, their rural homes.

Another marker of the backyard shack tenants' current life-strategies is the 'individualistic incapsulation' which so many of them exhibit. The notion of incapsulation was first introduced by Philip Mayer⁽⁷⁾ in his work among Xhosa residents of East London during the 1950s. By incapsulation in this context, Mayer meant an attitude and way of living taken on by groups of migrants in the urban setting. These groups were characterised by their rejection of urban life-ways and their concomitant attempts to separate themselves from urban society. In short, these were people who 'incapsulated' themselves in an attempt to preserve their rural identities. The term *individualistic* incapsulation is preferred by the authors when referring to their backyard shack tenants informants because they tended to avoid association not only with Chesterville's formal householders, but also to a large extent with *one another*. There is little demonstrated sense of mutual identification, cooperation or camaraderie in their incapsulation; certainly they do not constitute interactive *groups* as did Mayer's⁽⁷⁾ so-called Red Xhosa in East London. Rather, these are individuals who are in the urban area with a single purpose in mind, namely to support rural dependants and maintain a rural home. Even strong relations of amity, it seems, are sacrificed in this pursuit. Like the spirit of parsimony mentioned briefly above, the individualistic incapsulation exhibited by the backyard shack tenants is part and parcel of their current life-strategies: since their intent is not to become integrated into township or urban life, they prefer to avoid developing strong social ties in this context.

A further indicator of the backyard shack tenants' commitment to the countryside lies in their selection of urban accommodation. As will be discussed, residents of Old Dunbar live where they do precisely

because they are dedicated to acquiring a formal urban base for themselves and their families. Their invasion of vacant land in Cato Manor is largely strategic because they believe that residence there renders them eligible for formal housing in terms of the 'Cato Manor Renewal Programme'. In principle, such strategies are open to anyone who wishes to secure urban property rights in this area, yet the backyard shack tenants in this sample fail to pursue them. Instead, they prefer to reside in accommodation which, as things stand, precludes them from staking claim to portions of the Cato Manor 'development cake'. They do this because they presently have no intention of urbanising. They elect to live in backyard shacks precisely because this sort of accommodation is best suited to the lifestyle they have chosen and wish to uphold. Backyard shacks are a relatively cheap form of accommodation; possessions are likely to be more secure during the day and over weekends when the occupants are away at work or visiting their homes; and, most importantly, residence in rented accommodation does not require substantial investment by the occupier, who is then able to direct more of his or her earnings towards the rural home.

There is one other point is worth making about the backyard shack tenants. This is that the largest proportion of those who are employed are single women who are supporting minor children. The significance of this relates to these tenants' dedication to directing resources towards the rural home. A general reading of recent literature on migrancy in this country suggests that dedication to supporting rural-based dependants is particularly pronounced among women migrants; men are apparently far less conscientious and generous in this regard^[6,8,9,10]. Not only do the women described in these studies pursue similar strategies to those in the backyard shack sample, but they also often ultimately *realise* their ideal of a secure home in the countryside. Thus there is every reason to believe that the current life-strategies of a significant proportion of the backyard shack tenants will persist largely unchanged, and that they may well achieve the goal of a secure and viable rural home for themselves and their children.

In sum, the majority of backyard shack tenants can properly be described as oscillating migrants who support rural dependants. All who claim to have primary homes in the countryside are strongly committed to retaining them and none aspire to either dwelling ownership or permanent residence in the urban setting. Their commitment to rural life engenders

among them a spirit of what has been referred to as individualistic incapsulation, resulting in superficial relations and highly reserved interactions with others in their immediate neighbourhoods. It also leads them to follow an extremely frugal existence in the city because their essential purpose is to be able to contribute as much of their earnings as possible to their rural households.

Here to stay?: The current life-strategies of Old Dunbar householders[♦]

The current life-strategies of the Old Dunbar residents are entirely contrary to those of their counterparts in the backyard shacks. Probably the most crucial distinction between these folk and the backyard shack sample is that the former no longer have *primary* homes in the countryside; as has already been mentioned, the vast majority of backyard shack tenants do have such homes. Although many of the Old Dunbar householders claim to have other homes elsewhere, there is an important qualitative difference between the sense of 'other home' expressed by backyard shack tenants versus that expressed by Old Dunbar householders. Unlike the backyard shack tenants, who consider their rural homes to be their primary places of belonging and affiliation, the alternative homes of these Old Dunbar householders are secondary places of belonging and affiliation - places where they have a right to reside, usually by virtue of kinship ties, but which are not *their* homes per se. Since most do not have primary homes elsewhere, Old Dunbar householders' mission is to establish these in Cato Manor. Their overriding intention and the central driving force of their current life-strategies is thus to secure a permanent home here for themselves and their families.

Although the Old Dunbar householders are unanimous in their desire to remain in the area, the conditions under which they would do so differ among them. There are those who have settled here because they believe that residence in Old Dunbar provides them with a fair chance of acquiring a formal dwelling of their own. Were this not the case, at least some of them would make the same attempt elsewhere. An indication of the opportunistic nature of these people's residence in Old Dunbar is the not too uncommon practice of keeping

[♦] This heading has been taken from Hindson and McCarthy^[8]. However, unlike them this has been posed as a question since in this paper, it better reflects the informants' uncertainty about their futures.

FUNCTION		HEAT SOURCE/APPLIANCE							Not applicable or default
		Paraffin stove	Paraffin stove and gas hob	Wood fire and paraffin stove	Wood fire	Wood brazier	Gas hob	Electrical hotplate or iron	
Cooking	CH	73%	13%	-	-	-	-	13%	-
	OD	85%	10%	5%	-	-	-	-	-
Reheating food	CH	73%	-	-	-	-	13%	13%	-
	OD	100%	-	-	-	-	-	-	-
Heating iron	CH	67%	-	-	-	-	13%	13%	7%
	OD	85%	-	-	-	-	10%	-	5%
Space heating	CH	33%	-	-	-	-	-	-	67%
	OD	70%	-	-	5%	5%	-	-	20%
Heating water for: - Beverages	CH	73%	-	-	-	-	13%	-	-
	OD	100%	-	-	-	-	-	-	-
Washing clothes	CH	-	-	-	-	-	-	-	100%
	OD	10%	-	-	-	-	-	-	90%
Washing dishes	CH	7%	-	-	-	-	13%	-	80%
	OD	80%	-	-	-	-	-	-	20%
Bathing	CH	73%	-	-	-	-	13%	7%	-
	OD	100%	-	-	-	-	-	-	-
CH: Chesterville backyard shack tenants OD: Old Dunbar residents									

Figure 3: Means of cooking and heating in the two samples

a number of informal dwellings in the larger Cato Manor area. These people are thus 'hedging their bets' by keeping a stake in a number of locations. Aside from the more blatant opportunists, there are others who say that they will remain in Old Dunbar 'no matter what'. Some have nowhere else to go, while others work nearby or have secured places in local schools for their children. Whatever the case may be in individual instances, what binds all of these folk is their *present* quest for residential permanence in the Cato Manor area. This contrasts starkly with the majority of Chesterville's backyard shack tenants who, it seems, wittingly cultivate impermanence.

The Old Dunbar householders' dedication to making permanent homes for themselves is also reflected in family and household structure. As is evident from Figure 2, most of these householders are resident in Old Dunbar with their children and, if they have them, spouses. Just as the absence of co-resident family members among backyard shack tenants can be taken as an indication of their primary commitment to keeping rural homes, so too can Old Dunbar householders' residence with most of their immediate family members be taken to indicate their intention to make permanent homes for themselves in the area.

In short, the current life-strategies of the informal householders in Old Dunbar are directed towards urban settlement, if not in Old Dunbar then somewhere else in the Cato Manor area; they are, therefore, aspirant urban settlers. Some are more circumspect than others about securing such sites and obtaining the kinds of services and housing they would like, but on the whole, these folk are adamant that they are there to stay. Their commitment to the community and to residence in the area hinges upon their lack of primary homes elsewhere and is evident, *inter alia*, in the composition of households, most of which include minor children of the core householders; in the high level of community organisation and in the close support networks and other neighbourhood ties that have evolved over the short period of the settlement's existence.

The relation between current life-strategy and energy-related choices

Paraffin is by far the primary domestic fuel in both samples. As Figure 3 shows, it is used by at least 73% of backyard shack tenants and at least 85% of Old Dunbar households for cooking, reheat-

ing food and heating water for beverages and bathing. The low usage of electrical appliances for cooking and heating among backyard shack tenants is due, at least in part, to their lack of access to electricity. Only two (13%) of the shacks have makeshift access to electric lighting *and* plug points; four (27%) have access to electric lighting *only*; and the remaining nine (60%) have *no* access to electricity. Over and above their lack of access to electricity, various extraneous considerations cause backyard shack tenants to be reticent to purchase and use electrical appliances. These considerations, which are directly related to their current life-strategies, will be discussed below.

Means of illumination and ownership and use of entertainment appliances in the two samples are compared in Figure 4. Save for access to electric lighting among some of the backyard shack tenants, there is little to distinguish the samples with regard to illumination. It is, however, worth noting that only one Old Dunbar household had no entertainment appliance of any sort, whereas almost half of the backyard shack tenants were in this position.

This distinction in terms of entertainment appliances is hardly major; certainly, the samples are too small for this finding to be of any statistical significance. Nonetheless, it does help to illustrate how

	Chesterville backyard shack tenants	Old Dunbar informal householders
Lighting		
Candles	40%	45%
Paraffin lamp	7%	35%
Candles and paraffin lamp	13%	20%
Makeshift electrical	40%	-
Radio or hi-fi set		
Makeshift electrical	7%	-
Car battery	-	15%
Dry cell battery	47%	80%
Do not own one	47%	5%
Television		
Electricity	-	-
Car battery	-	15%
Dry cell battery	-	-
Do not own one	-	85%

Figure 4: Entertainment appliances and illumination in the two samples

current life-strategy may impact on energy-related behaviour. Many of the backyard shack tenants live alone or as couples, and as has been indicated, most eschew close relations with others in the immediate neighbourhood. In these circumstances, one might expect backyard shack tenants to prioritise entertainment appliances; in the absence of family and other company, their spare time might be greatly enhanced by radio, recorded music or television. Moreover, given that mean household per capita income is higher among the backyard shack tenants, entertainment appliances and the energy they consume are, theoretically, more affordable to them than Old Dunbar folk. Yet almost all Old Dunbar householders - who *have* company and who apparently can *least* afford to purchase and run entertainment appliances - own and use such appliances, while less than half the backyard shack tenants are in this position.

It is worth noting at this point that no backyard shack dwellers in the sample make use, either individually or communally, of entertainment appliances owned by formal householders. For example, none of the tenants view television with the landlord and his or her household. Nor was it found that there was joint cooking arrangements between tenants and landlords, or for that matter between one tenant and another. As has already been suggested, the social distance kept by the backyard shack tenants is part of their individualistic incapsulation.

The matter of differential ownership and use of entertainment appliances is easily understood when considered against the

background of the current life-strategies held by each set of informants. On the one hand, the Old Dunbar folk are concerned to consolidate urban homes for themselves, and a part of this involves creating as much of a homely environment as possible in such difficult circumstances. Entertainment appliances are integral to this. The backyard shack tenants, on the other hand, deny any desire for urban permanence, instead preferring to support, invest in and develop their rural homes. They would rather direct the largest proportion of their resources to their rural homes and will economise in any way possible to achieve this.

The part played by current life-strategies in directing fuel and appliance use and preferences, however, goes far beyond this example. Informal householders in Old Dunbar are presently lobbying and competing for basic services, including electricity. There is no doubt that once the process of electrification begins in this settlement, those who can afford the connection fee will acquire electrical appliances and will, at least initially, switch to electricity for most domestic purposes. Whether they will continue to use electricity for most purposes in the long term is another matter^[12]. Whatever the case may be, the point is that Old Dunbar residents are enthusiastic about the prospect of electrification and will, if at all possible, invest in electrical appliances when their homes are electrified.

Backyard shack tenants in Chesterville are unlikely to embrace electrification with anything like the same vigour and enthusiasm as their counterparts in Old Dunbar. In our informal discussions with

them, it has been our strong impression that the majority of the backyard shack tenants would eschew investment in electrical appliances even if electricity were accessible to them. This does not derive from an aversion to electricity per se, nor is it related to ignorance about the benefits of electricity relative to the transitional fuels which most of them presently use. On the contrary, like so many others who eagerly await electrification throughout the country, they believe that electricity will greatly enhance the quality of their lives. Along with virtually all users of paraffin, gas and candles in the regions covered by the SDEU (Social Determinants of Energy Use) project^[1,13,14,15], they also have a host of complaints about these transitional fuels, ranging from the various health and safety-related implications associated with paraffin, gas and candles to the multiple inconveniences these cause in their daily lives.

Backyard shack tenants' anticipated conservatism in relation to electrical appliances is instead primarily economic and derives, ultimately, from the current life-strategies they hold. Their position as temporary sojourners in the urban areas engenders an intentionally intractable relationship with fuel and appliances. Investment in electricity and electrical appliances entails committing resources to an urban lifestyle which, for them, is simply a means to an end. Quite simply, it is a personal extravagance that is incompatible with the pecuniary values attached to and defined by their current life-strategies.

Conclusion

The authors have tried to show how knowledge about people's current-life-strategies may contribute to a better understanding of their actions and attitudes in relation to energy and appliance choices. Commitment to an urban way of life within the Old Dunbar sample engenders among these householders an enthusiastic desire for electrification and transition to electrical appliances. In contrast, while not denying the benefits of electricity, most backyard shack tenants in this sample embrace the prospect of electrification with much less enthusiasm because they prioritise their material commitments to their rural homes and absent dependants above the benefits to themselves of electrical appliances. In order to achieve greater understanding of, and indeed more accurately predict, the energy needs of different categories of people, it is therefore crucial that attention be given to the choices that people make and to the values, ideals and aspirations

that inform these choices. Discerning people's current life-strategies assists greatly in achieving such insights.

A number of further points are worth making in conclusion. The first is that this analysis has been framed in terms of differences between backyard shack tenants and unplanned shack dwellers because, in terms of the design of the study, the authors were directed to collect data according to these housing categories. In fact, the crucial distinction is not so much between backyard shack tenants and informal householders, but rather between what may loosely be termed oscillating or circular migrants on the one hand, and non-migrants or urban settlers on the other. It is a distinction between people of rural origin who work in the city but who do *not* wish to settle there; and people of rural origin who live in an unplanned urban settlement and *do* wish to settle there.

If this assessment is correct, and if these informants are in any way representative of migrants and non-migrants in South African urban society more broadly, then the findings recorded here have important implications for policymakers and service-providers[§]. Perhaps most significantly, they suggest that the stronger are people's rural ties, and the more committed are they to investing in a rural home, the less likely they are to embrace electrification wholeheartedly in the urban context. This may be particularly so among women migrants, who are often far more conscientious in their support of rural-based family members than men. At the very least, the transition to electricity among temporary urbanites with strong rural commitments is likely to be far more drawn out than among those who are committed to urban settlement. This is so not only because temporary urbanites or migrants tend to have divided domestic economic responsibilities, but also because of the attitude of impermanence which they hold. Certainly, transition to electricity and use of electrical appliances may be more expeditious among those whose rural homes are electrified, but even then, the desire to invest in the rural home may be prioritised above the purchasing and use of electrical appliances for cooking, heating, and entertainment in the urban context.

The implications of this for electrification planning should be clear. Although all of the householders in the two samples desire electricity, only those in Old Dunbar wish to make extensive use of electrical

appliances. In contrast, the backyard shack tenants desire electricity primarily for illumination and are therefore unlikely to become major consumers of electricity in the short to medium term. This is not to suggest that electricity providers should prioritise electrification of other types of dwellings ahead of backyard shacks, nor that temporary urbanites of the sort described here should be last in line for electricity in the urban setting. As White and her colleagues^[12] observe, electricity should be viewed as a basic right regardless of whether or not it will be used for high consumption functions such as cooking and heating. Furthermore, electrification of backyard shacks is crucial if fires caused by candles and paraffin lamps are to be curbed^[18], and if the serious landlord-tenant tensions which emanate from 'electricity-sharing' are to be eradicated^[12].

Finally, this analysis is of course, generalised. No doubt there are some householders in Old Dunbar who hold much the same current life-strategies as many backyard shack tenants, while more recent research undertaken by the authors, which includes a number of new informants, shows that the current life-strategies ascribed to the original sample of backyard shack tenants are by no means universal among all backyard shack tenants of rural origin^[19]. But this only serves to underline, firstly, that ongoing qualitative research is crucial if the multifaceted and nuanced nature of behaviour in relation to fuel and appliances in society is to be uncovered. Secondly, what is of significance in understanding people's energy-related demands and aspirations is not so much the type of housing or settlement in which they live - not simply whether or not they have, or desire to have, access to electricity - but the direction in which they intend to take their lives. Knowledge of people's current life-strategies helps to identify these intentions and hence, to understand - in *their* terms - their fuel and appliance needs and choices.

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§ The current life-strategies of these backyard shack tenants resonate strongly with the ideals, documented in the 1980s, of hostel residents in the Western Cape^[15,16]. This does indeed suggest that the Chesterville sample are part of a much larger category of folk who remain committed to rural residence.

Paraffin etiquette: The differing social meanings of paraffin in two informal settlements

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In informal settlements around South Africa, people tend to balance precariously on the boundary between survival and destitution. As a result, every household participates in a network of social relationships which, by means of an exchange of various resources, operates as a cushion against destitution. This paper considers the place of paraffin in these exchange networks in the informal settlements of Mandelaville in Soweto and Old Dunbar in Cato Manor (Durban).

The informal rules which govern these exchanges in the survival networks in each of these settlements are virtually identical, except for one important exception. While paraffin forms the basis of the majority of exchange relationships in Old Dunbar, Mandelaville residents firmly reject its exchange, to such an extent that it is virtually taboo to request a loan. Instead, people in Mandelaville prefer to borrow money with which to purchase paraffin.

Through an analysis of the kinds of exchange relationships which exist in each of these settlements, the authors conclude that paraffin occupies a crucial place in the exchange ideologies of people in both settlements but that it has a different social meaning and relevance in each. In Old Dunbar, due to its extensive exchange, the fuel is understood to create and lubricate progressively more comprehensive social relations (in which, for example, it becomes appropriate to rely on people for food supplies). In contrast, in Mandelaville, an attitude verging on taboo suggests that such exchange has the potential to be divisive. In these situations where survival is so inextricably linked to their support networks, people are likely to do their utmost to avoid disrupting them, thereby further threatening their own fragile stability.

This phenomenon demonstrates that development programmes such as the electrification drive currently being undertaken in South Africa, are likely to have different *social* consequences in different contexts. The authors argue that it is important for the agents of development, such as policymakers, government delivery institutions, aid donors and development agencies, to remain sensitive to the effects the changes that they are implementing may have on particular communities.

Keywords: domestic energy; energy policy; fuel exchange; transitional fuels; informal settlements; paraffin; Mandelaville; Old Dunbar; social aspects; low-income households

Introduction

People in low-income settlements often balance precariously between survival and destitution. In these circumstances, many householders cooperate closely with neighbours to form support networks which act as a cushion against des-

titutionⁱⁱ. Within these networks, there is a constant flow of resources according to need: money is borrowed and lent, meals are shared and daily necessities are loaned or given. Those who have resources at any particular time assist and provide for those who are temporarily without, knowing that similar support will be forthcoming for them when they are in need. In this way, economically marginal households are able to subsist from day to day and from month to month.

This paper considers the place of paraffin in exchange and support networks in the informal settlements of Mandelaville in Soweto and Old Dunbar in Cato Manor (Durban)ⁱⁱⁱ. Networks like those alluded to above are prominent in each of these settlements, with one important exception, and the informal rules which govern

exchanges are virtually identical in each. The exception relates to paraffin. In Old Dunbar, the borrowing and lending of paraffin is integral to many exchange partnerships, while in Mandelaville residents recoil at the very idea of asking for paraffin from neighbours.

This paper describes in more detail the differing etiquettes relating to paraffin in each of these settlements. The authors' purposes in doing so are twofold. Firstly, to provide those concerned with energy with some perspective on the *social*, as opposed to purely utilitarian, purposes that fuels may serve, as well as the local-level social meanings that may be attached to them. Secondly, and at a more pragmatic level, it is hoped to show that development programmes - in this context, specifically the electrification drive - are likely to have different *social* consequences in different contexts, some of which may be negative. Even if these negative social consequences are not deemed to outweigh the advantages brought by development, it is important that agents of 'modernisation' remain sensitive to the ways which the changes they bring about may affect particular communities.

The two settlements: Old Dunbar and Mandelaville

The unplanned settlement of Old Dunbar in Cato Manor sprawls on a steep embankment amidst the new formal developments of East and West Wiggins and Bonella^{iv}. Vacant land in Cato Manor began to be invaded in the late 1980s, with Cato Crest - the first full-scale

ⁱⁱⁱ Old Dunbar is described more fully elsewhere in this issue (see Jones and Aitken, 'Current life-strategies and the prospect of electrification').

^{iv} These figures provide no more than a rough estimate. The team responsible for administering the survey claim that their efforts were severely hampered by a particularly uncooperative Civic body. The authors' experiences of the present Old Dunbar Civic have been very different.

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ⁱ See, for example, Wilson and Ramphela^[1] and Stack^[2]. For other energy-related studies which demonstrate this, see work by Ross^[3], Annecke^[4], Jones *et al.*^[5] and Mehlwana *et al.*^[6].

ⁱⁱ Helen Meintjes, Tebogo Mafokoane and Caroline White are responsible for research in Mandelaville, while Robert Aitken and Sean Jones are conducting research in Old Dunbar.

unplanned settlement in the area - absorbing most of the incoming population. By the early 1990s, the density of this settlement had reached such a level that migrants to the area began seeking alternative sites to erect their shacks, which led to establishment of Old Dunbar. Indications are that people first began settling the area early in 1992, but by most accounts, the largest influx of residents took place in the early and middle months of 1994.

An independent demographic survey conducted in Old Dunbar in 1995 realised a figure of just over 2 000 shacks and an estimated population of some 11 000 residents (personal communication)^v. Formal unemployment appears to be extremely high, although many residents' employment falls within the boundaries of the informal sector. As research elsewhere has shown, however, such activities are usually by no means sufficient to close the poverty gap^{vii}. Unemployment in the authors' sample of eighteen households was fixed at about 50% among women and 53% among men, while the mean household per capita monthly income was R208^{vi}. Households in the sample also varied in size, from one member to as many as eleven members. Some households had no visible income, while 73% had total monthly incomes of less than R500. Most of the core household members were of rural origin, and the largest proportion of them had moved to an urban area for the first time as adults, many of them as recently as the early 1990s.

Mandelaville is clustered on what was once an open recreational space amidst a sea of 1960s 'matchbox' houses in central Diepkloof, Soweto. Today there is no more space available for any more dwellings to be constructed. Shacks press in upon each other in disordered fashion, with often only a few centimetres between neighbouring zinc walls.

Like Old Dunbar, unemployment is rife in Mandelaville. People, particularly young men, hang about smoking, drinking, and "rapping" in the streets. Small informal businesses, such as spaza shops, fresh produce vendors, takeaway stalls and plastic jewellery hawkers, abound. Six of the fifteen households in this sample rely on such activities for at least a portion of their income. The incomes of these households range from zero to a total of about R2 400 per month, with eight of the fifteen falling below R700 per month. Per capita monthly income averaged about R213 per month. Taken as a whole, the Mandelaville sample can be classified as urbanised. Only two of the core household members in the sample were adults when they left the rural area

of their birth for the first time. The rest are either urban-born or have lived in an urban area since childhood.

These brief descriptions suggest few significant differences between Old Dunbar and Mandelaville^{vii}. The residents of both areas are poor and settled illegally in their respective areas, and in both areas, residents struggle on in squalid and difficult conditions. In terms of per capita income, Old Dunbar households are slightly poorer than those in Mandelaville, but neither sample can be considered anything but impoverished. The only major distinction between the two relates to origins. While most of the key household members in Mandelaville have spent the bulk of their lives in a town or city, or were born in Gauteng, many of those in Old Dunbar are recent arrivals from the rural areas.

Similarities between the two communities also extend to fuel use. Neither of the settlements are electrified and in each, paraffin is the primary fuel in an energy "mix" that includes candles, some gas and wood. Coal is common in Mandelaville, but only for space-heating in winter, where braziers made from punctured paint tins are utilised. Paraffin is used by virtually all households in both Mandelaville and Old Dunbar, all year round, for a wide range of end-uses such as, cooking, lighting, water- and space-heating. It is readily accessible from the ubiquitous spaza shops as well as from people who sell only paraffin or coal. Prices and quantities do, however, vary^{viii}. In Old Dunbar, paraffin is available in units of one, two and five litres with prices ranging from R1,30 for a litre to R5,20 for five litres. In Mandelaville, paraffin is usually purchased in one-litre quantities, for between R1,50 and R1,70 per litre, although a few people buy a five-litre tin when they can afford it. Coal can be bought from delivery trucks for R19 per 70-kg bag. But because most households cannot afford to buy such large quantities they purchase their coal from small businesses inside Mandelaville which sell 5-litre bucket-loads of coal for R2,50.

Paraffin and exchange networks in Old Dunbar

In view of their socio-economic circumstances, it is not surprising that people in Old Dunbar and Mandelaville frequently resort to drawing on the resources of neighbours and close friends. A description follows of the support networks which provide this cushion against destitution and the place of paraffin within

the network. The following case, which documents an exchange partnership between two householders, begins to demonstrate how such networks operate in Old Dunbar. It also shows very clearly the central place that paraffin can occupy in exchange relationships in this settlement, as well as how the need to be part of a system of inter-household support may even, in some cases, result in switching from utilising the so-called 'higher-order' fuel types.

Case 1: Thokozani and S'bongile

Thokozani is a 35-year-old man who shares an informal dwelling in Old Dunbar with his distant relative, Blessing, who is a student at the local technikon. Thokozani is employed as a petrol pump attendant at a garage in a Durban suburb, for which he earns R720 per month. Because he works the night shift, Thokozani frequently spends much of the day at home.

S'bongile is a single mother who has two young co-resident children. She is self-employed, tending a vending stall at the Congella station. She leaves Old Dunbar very early in the mornings and usually returns by about 15h00 each afternoon. S'bongile's profits are, of course, variable, but she estimates that she has an average take-home pay of R300 a month. The disparity between her income and that of Thokozani is less than it seems because Thokozani contributes to the upkeep of absent family members.

S'bongile frequently returns to Old Dunbar without having made sufficient money to purchase paraffin. She usually has some food, however, because she purchases various staple foods in fairly large quantities when business is good.

v Surveys were conducted in Old Dunbar and Mandelaville in August and September 1995. In each of these locations, any figures relating to incomes cannot be taken as more than approximate indices of economic status. Firstly, due to reliance on informal sector activities and sporadic engagement by residents in 'piece work', household incomes in each of these settlements are highly variable. Secondly, calculations of this type do not take into account other incoming contributions such as food assistance, handouts by church-groups, support from absent family, and so on. Finally, per capita incomes are here calculated on the basis of *co-resident* household members. However, some householders support absent dependants.

vi This applies if the samples are representative, which cannot be asserted with any confidence. Since this paper deals only with the authors' respective samples and their immediate neighbours, however, it is legitimate to say that the *informants* in Old Dunbar are slightly poorer than those *informants* in Mandelaville.

vii All prices quoted here were applicable at the time of the surveys in August and September 1995.

When she needs paraffin, she approaches Thokozani for assistance. If Thokozani, who generally purchases paraffin in one-litre containers, can spare any from his present supply, he will give S'bongile what she needs. Otherwise, he provides her with the necessary cash to purchase paraffin. When discussing 'borrowing' with Thokozani, he rejected the notion that S'bongile would have to pay him back in kind, explaining that he frequently borrows other things from S'bongile. By way of example, he pointed out that the paraffin stove on which he was cooking at the time is the property of S'bongile, who had lent it to him because she owns two stoves.

Exchanges between Thokozani and S'bongile are remarkably frequent. In the preceding week, Thokozani could recall lending S'bongile paraffin on three occasions and food (tomatoes and cabbage) on two occasions. However, Thokozani had received only cabbage leaves from S'bongile. The apparent imbalance in the exchanges was brushed aside by Thokozani, who assured us that 'it is only this week that I am doing well', implying that a balance would be achieved at a later point.

In recounting the history of this relationship, Thokozani said that he had brought a gas hob with him when he moved to Old Dunbar. Although he prefers gas, particularly because of its intense flame and the fact that it does not blacken his pots like paraffin does, it very soon became apparent to him that continued use of gas would limit his chances of being able to borrow fuel in emergencies. He explained that he had been 'caught out' on a number of occasions, discovering before or during meal preparation that the cylinder had run out of gas. There had been little means of recourse when this had occurred. Like most others in Old Dunbar, Thokozani prepares the principal meal of the day in the late afternoon or early evening. Yet at this time, there is nowhere close by where he can refill his gas cylinder should he run out, the nearest refilling point being a petrol station some four kilometres away. Furthermore, during his early period of residence in Old Dunbar, Thokozani knew no other people there from whom he might have borrowed a gas cylinder.

After a number of such incidents, Thokozani borrowed S'bongile's spare paraffin stove. Although he still uses the gas hob for certain purposes, paraffin has now become the primary domestic fuel used by him and Blessing. Not only is paraffin very much more easily accessible to him, but his switch to this fuel now places him more effectively within the framework of interhousehold exchanges.

The case of Thokozani and S'bongile is a good illustration of the kinds of exchange partnerships that occur in Old Dunbar. In this case, the partnership initially operated principally around the exchange of fuel and fuel appliances, but it has now developed to an extent that other commodities are also borrowed and lent. In a sense, paraffin - and in this case also a paraffin stove - acted as the means to establishing a more encompassing relationship of trust and mutual assistance binding two households.

The case also shows how Thokozani had to adjust his primary fuel type in order to facilitate his involvement in such a partnership. The problems he experienced on his arrival relate specifically to the place of paraffin as the primary domestic fuel in Old Dunbar. Because the vast majority of his neighbours use paraffin, and because gas is less easily borrowed and exchanged, by relying exclusively on gas for cooking, Thokozani effectively excluded himself from the possibility of establishing a fuel exchange partnership with any other household(s). Thus, Thokozani's switch to paraffin not only eased his access to his primary fuel type, but also paved the way for exchanges of fuel and other commodities with S'bongile.

In order to understand why Thokozani could develop closer, mutually supporting relations only by switching to paraffin, one has to recognise that paraffin is at the centre of most exchange partnerships in Old Dunbar. This is so in two senses. Firstly, paraffin is one of the most commonly exchanged commodities between households. It is also forges relationships which start with exchanging paraffin, often evolving to encompass other commodities at a later stage. By switching to paraffin, Thokozani therefore set himself up as a potential exchange partner, not only of paraffin but of other items as well.

But why should this be so? Why should exchanges of paraffin be so common at an interhousehold level and why should these exchanges serve as the foundation for more inclusive exchange relationships? To understand these matters, one needs to consider the place of fuel *vis-à-vis* food within the domestic sphere of Old Dunbar households. It is also necessary to understand the feelings that people in Old Dunbar have about their ability (or failure) to feed their dependants.

Sharing and mutual support are strong features of interhousehold relationships in Old Dunbar. At the same time, though, it is important for people in impoverished circumstances to maintain their self-esteem by feeding their dependants. It is a matter of pride that households have food; it is

demeaning if they do not. For example, a household's limited financial resources might permit only one of two options: to spend what funds they have on foodstuffs and borrow the fuel to cook these, or to spend the money on fuel and borrow the food. In the authors' experience, the course people follow is almost invariably the first. To be without paraffin can be construed as an oversight. Further, the need to borrow paraffin indicates that one at least has food to cook. To admit to a complete lack of food, on the other hand, cannot be construed as an oversight; meal preparation is far too central to the daily routine in Old Dunbar for the acquisition of meal ingredients to merely have been forgotten. It is only once they have achieved a considerable degree of intimacy that householders will begin to borrow food from their neighbours. This is because those with whom they are intimate and hence, whose own periodic shortcomings they have come to know, no longer threaten their sense of pride to the same degree.

For these reasons, interhousehold exchanges will tend to begin with paraffin. As the relationship becomes more established, the partners may start to exchange peripheral foodstuffs, that is, foodstuffs that are not vital or central to meal provision, such as tea, coffee, sugar, salt, and so on. The lack of these sorts of goods is not indicative of an inability to feed one's dependants. Then, when the relationship has evolved even further and the degree of intimacy has increased, there may begin exchanges of basic staple foods, along with the admission that times are lean and resources have, for the time being, run dry. What began with exchanges of fuel has therefore developed into a more inclusive exchange partnership.

The high priority people in Old Dunbar give to having sufficient food is reflected in the manner in which budgets are managed. In most households where there are women present (the large majority of the Old Dunbar sample), staple foodstuffs are bought on a monthly basis. Purchasing patterns for paraffin are very different. While a few households buy paraffin in bulk and attempt to ration its use in the same way as they do staple foods, more commonly people purchase paraffin on a weekly or daily basis. When asked about these contrasting purchasing practices, the authors were told that "paraffin is easily borrowed" implying, perhaps, that food is not so easily - or at least, not so comfortably - borrowed.

The relevance to the present discussion of these different purchasing and apportioning patterns is that households may run out of money with which to purchase

paraffin, but they are less likely to run out of staple foods because these are bought in bulk and consumption is tightly controlled. Most households in Old Dunbar are thus more likely to need to borrow paraffin than they are food. In sum, paraffin is at the centre of exchange partnerships, firstly, because people are more likely to run out of paraffin than food; and secondly, because it is the commodity they find the most comfortable to borrow. It is for these reasons that paraffin is a very commonly exchanged item in Old Dunbar and that these exchanges often act as antecedents to the borrowing and lending of other commodities, as has been previously mentioned.

Paraffin and exchange networks in Mandelaville

Strong support networks of the kind that are found in Old Dunbar are also present in Mandelaville. The case of Thandeka and her friends illustrates this.

Case 2: Thandeka and friends

Thandeka Nywheba's partner, Lamla (also the father of her youngest child), was retrenched from one of the Reef mines and so returned to his rural home of Machabini in the Transkei. Thandeka remained in Mandelaville with her youngest child in the hope of securing employment. In the meantime, she earns a precarious income from selling sweets and vegetables to passers-by, and from whatever smatterings of piecework she can secure. She has a few friends in the settlement, also single mothers, with whom she participates in a sharing and support arrangement. "We are helping each other often. When I have no mielie-meal to make pap, then I borrow [from one of them]"; she says, explaining how she survives from day to day with an unreliable cash flow. In addition, this same group of women eat together each Sunday. They rotate between each other's homes, and in so doing, balance out the exchanges over time. Thandeka explained how she appreciates the arrangement: "If I give, they give also ... It is nice."

By cooperating in a social network based on the exchange of food, Thandeka and her friends ensure their own and each other's, daily survival. They are particularly close friends and have moved shacks so that their lives are spacially intimate as well, but most Mandelaville households function within at least similar - albeit often not as integrated - systems of food exchange. But although close support networks operate in both Mandelaville and

Old Dunbar, borrowing preferences are entirely contrary in these two settlements. Whereas Old Dunbar residents prefer to borrow paraffin before food, people in Mandelaville are much more comfortable borrowing food or money, which means that paraffin is only very rarely exchanged. To borrow paraffin is considered to be "shameful", one informant contended firmly. "It's like borrowing underwear." Most people share this abhorrence at the idea of exchanging paraffin. Rather, those who run out of paraffin and have no cash try to get it on credit from their local spaza or to borrow money to buy it.

When asked to explain this preference for borrowing money rather than paraffin, another informant asserted (as though the answer was self-evident): "Money is money, and paraffin is paraffin!" He and other Mandelaville residents differentiate money, food and paraffin as commodities that are associated with different principles. Unlike money, people do not have the right to demand the return of paraffin. As one woman put it: "You can't expect people to return paraffin". Paraffin is seen as less quantifiable than money or food, but at the same time it is a very valuable resource. "It's too expensive to borrow", people assert. "It is not for free. You can't go to the river and get it!"

As a result, it seems that not only are people unable to request paraffin from their friends, they also will not lend it because they feel unable to ask for it to be returned. Paraffin is treated in much the same way as small amounts of food, such as rice, sugar, coffee. When given in small quantities, these are commodities which people are reluctant to ask to be returned. Instead, by lending each other money with which to purchase paraffin, friends support each other's day-to-day survival, while still ensuring that they protect their own interests. While they can ask for the money to be returned, asking for paraffin or asking for its return, does not fall within the gamut of acceptable behaviour.

A few Mandelaville residents say that they would consider it rude if a friend requested paraffin from them, though when pressed, they all claimed that if they had any extra available, they would probably oblige. But the concession would be made grudgingly. It would count as a mark against the person who made the request, for in so doing, the receiver would have overstepped the categorical difference between money and paraffin, the former being easily lent to those one trusts, the latter not. Could it be that asking for paraffin, rather than the money to purchase it, suggests to the lender that one is trying to get something for nothing

- behaviour which violates the rules of etiquette and decency? Further, few people in Mandelaville keep spare paraffin. Most buy only enough to fill their appliances and perhaps retain a small amount for emergency use. "You can't keep more than five litres", it was said, since it is dangerous when there are children around, as well as being a fire hazard. The large-scale absence of paraffin exchanges among these informal householders therefore also has a practical element to it.

In contrast to Old Dunbar but exactly parallel to the way food may be borrowed there, the very uncommon borrowing of paraffin which occurs in Mandelaville, happens only within networks of close friendship between people who have already established firm support relationships which have involved the exchange of food and money. Occasionally, it seems, reciprocal support relationships are cemented by other exchanges to the position where it is acceptable to ask for paraffin in an emergency. The following case describes the one situation of this nature encountered by the authors.

Case 3: Tinyiko and friends

Tinyiko Baloyi stays in a yard of four shacks in Mandelaville. The women living in the yard, who have developed a pattern of eating together when their male partners are absent, also give each other paraffin whenever necessary. They never return the amounts borrowed, but they also only ever take very small quantities from each other (never more than half a litre). They do not measure out exact amounts, but rather take the empty appliance to one of their yard companions who will decant fuel straight into it. Sharing paraffin remains strictly within the confines of the yard, whereas these same women will sometimes borrow foodstuffs from close friends outside the yard. Interestingly, none of them currently has access to credit from any spaza, so their only recourse in emergencies is their friends. The yard provides a safe and private, almost intra-domestic, situation within which to allow this.

Conclusions

The findings presented here demonstrate how the social meanings that attach themselves to commodities may differ widely between communities. People in Old Dunbar appear to have no inhibitions about exchanging paraffin with other householders. Indeed, such exchanges are often the initial basis upon which more encompassing exchange relations and

networks of support are developed. In direct contrast, paraffin borrowing and lending are almost taboo in Mandelaville - this despite the fact that people in this community commonly exchange a variety of other commodities within well-developed neighbourhood support networks. And even when paraffin exchanges do occasionally occur in Mandelaville, these are only acceptable between those who have *already* built up a relationship founded on the exchange of food and money. The two situations are, thus, mirror images of one another. Cooperation between households in Old Dunbar is often built on a foundation of paraffin, whereas in Mandelaville it is the exchange of food that forms the basis of such cooperation. But whilst the exchange of food is only regarded as acceptable between those who have established close relations through paraffin sharing in Old Dunbar, paraffin sharing is rare and stigmatised in Mandelaville.

These differing social meanings of paraffin and the contrary etiquettes to which they give rise are sociologically interesting in and of themselves. However, the reason for making this comparison in this research is not simply to show that people are curious. On the contrary, local meanings have important implications for the manner in which services, policy and development, more generally, are received at the community level. In view of the preceding discussion, it should be clear that electrification may have very different *social* consequences in the two settlements dealt with. Since exchanges of the primary fuel type in Mandelaville are taboo, replacement of this primary fuel with electricity is unlikely to affect the strong support networks which exist there. Precisely what the social consequences of electrification will be in Old Dunbar is another matter altogether. In this community, paraffin is *both* the primary fuel type *and* a very commonly exchanged commodity. As has been suggested, more encompassing exchange relations are often founded on exchanges of this primary fuel.

This raises the question as to whether electrification will effect an alteration in the essential nature of interhousehold support networks in Old Dunbar. It is maintained that people in this settlement begin to exchange food only once they have exchanged other commodities, pri-

mary among which is paraffin. Thus, will the relations of support which have evolved here erode when this settlement is electrified? Alternatively, will members of this community continue to forge such relations in the absence of paraffin to ease them into food exchange, which they find altogether more embarrassing?

A different set of questions comes to mind *vis-à-vis* electrification in Mandelaville. For example, it is well known that households often illegally 'share' a single electricity supply source, most often by means of makeshift connections. Will this practice be frowned upon in Mandelaville because people's ethic of 'no exchange' with regard to paraffin is transferred to electricity; or will electricity take on its own set of meanings and related social principles? Thus it is worth noting that research undertaken in Cato Manor and Soweto^(5,8) suggests that neighbourhood amity, and particularly interhousehold support networks, are nowhere near as strong among electrified householders as they are among those communities described here. Therefore, does electrification negatively affect interhousehold relations, and if so, why does it do so? Alternatively, is the absence of strong support networks in electrified communities the result of an entirely unrelated set of factors?

These questions can, of course, only be answered *post facto*, but they do suggest two general points worth mentioning. The first is that the manner in which people interact *with* fuel, and the manner in which they interact *around* fuel, are determined to a greater or lesser extent by the meaning they attach to it. Since these interactions are obviously of immense significance to energy suppliers, it is important that they become aware of what these socially defined and context-specific meanings are. The second point is that the electrification drive is bound to have *different* social consequences, both positive and negative, in *different* social settings. Indeed, this applies to any development programme which is defined at a national level and which is informed by narrow notions of modernisation rather than by a goal of *holistic* betterment. Thus electrification in some parts of the countryside may effect significant changes in farming methods and hence, also possibly in the social and cultural organisation of peasant communities. While productivity may benefit, will the

social and cultural effects be detrimental to these communities?

Developers need to strive for holism. Their project designs should be informed by *all* the likely local-level consequences of their actions and should cater for these wherever possible. Holistic development rather than modernisation per se should be the goal. A thorough understanding of the local socio-cultural context is one of the essential means of achieving such a goal, while cooperation with other service providers is another. Energy suppliers are not exempt from this responsibility.

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'We live in paraffin and burn in it': Fire, fuel use and social dislocation in an East London township, 1986-96

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Over the past year increasing numbers of residential fires have been reported in informal settlements in metropolitan centres in South Africa. The increasing frequency and severity of these paraffin-driven shack fires has raised a number of vexing questions about contemporary urbanisation trends and settlement patterns in South African cities, and about fuel use practices in low-income neighbourhoods. Many people are now asking: what are the social consequences of repeated residential fires on these communities? The paper addresses the question by investigating the psychological, social and economic impact of continuous fire disasters in Duncan Village, East London, where over 4 000 families have been rendered homeless over the past decade.

Keywords: domestic energy; paraffin; Duncan Village; fires; informal settlements; transitional fuels; social aspects; energy utilisation; low-income households

Introduction

Over the past year, increasing numbers of residential fires have been reported in informal settlements in metropolitan centres throughout South Africa. In the Western Cape, the high-density shack settlement of Maconi Beam was burnt to the ground twice in the first few months of 1996, leaving a dozen shack dwellers dead and thousand more homeless. These disasters were almost immediately followed by another runaway shack fire in the Glendene squatter camp which left over 1 500 people homeless. In Gauteng, several smaller residential fires have been reported in the high density shack areas, such as Phola Park and Alexandra. In July 1996, one of the largest shack fires ever reported in South Africa occurred in Duncan Village, East London. This fire, started by a paraffin flame stove in a densely settled shack area, destroyed over 1 000 homes in a single afternoon⁽³⁾.

The increasing frequency and severity of shack fires in metropolitan areas has raised a number of vexing questions about contemporary urbanisation trends and settlement patterns in South African cities, as well as about fuel use practices in low-income urban neighbourhoods. Analysts are asking whether the current wave of urban disasters might not better be described as *structural* disasters,

linked to the social and economic forces, than as *natural* disasters. Fires, in particular, have raised public consciousness about the dangers of unplanned informal settlements, the high levels of dependence on paraffin as the primary domestic fuel among the urban poor, and about the types of appliances and fuel safety standards applied in these areas. What is the responsibility of the State in ensuring that the urban poor have access to safe, affordable shelter and domestic energy sources which will not threaten lives and possessions? How can local-level fuel use practices be modified to minimise the potential for fire disasters in shack areas? And, most importantly, what are the consequences of repeated residential fires on the social fabric of urban communities?

This paper is primarily concerned with the last of these questions. It seeks to document the long-term consequences of repeated fire disasters in a single urban community. The case selected for investigation is Duncan Village in East London which has experienced over 400 residential fires since 1986. These fires have collectively destroyed over 4 500 homes. In other words, a fire breaks out, on average, once every ten days and approximately one home has been destroyed every day for the past ten years. These staggering statistics point to the gravity of fire as a social problem in this township. In this article, the phenomenon of fire disasters in Duncan Village is explored and related to local living conditions, fuel use practices and changing urbanisation

patterns in the city. The social, economic and psychological consequences of these fires on the lives of ordinary township residents, are also analysed. What does fire mean for ordinary people in Duncan Village? How is it experienced and understood? What impact does it have on the vectors of social power and the dynamics of urban social relationships at the local level? By addressing these questions, the aim is, firstly, to deepen public knowledge and understanding of the problem of residential fires in high-density, low-income urban areas and, secondly, to present urban policymakers with a glimpse of the long-term consequences of unmanaged urbanisation and unsafe fuel use practices in overcrowded metropolitan areas.

The anatomy of fire

Duncan Village is a highly congested and impoverished township with over 100 000 residents situated within a few kilometres of the East London city centre. It is the only African township in the city with easy access to the city centre. This has made Duncan Village a target of intense and continuous population influx. It is estimated that between 30 000 and 50 000 new residents have set up home in the township since 1986⁽⁶⁾. This influx has been tolerated and managed by the Duncan Village Resident's Association (DVRA), a civic body which seized control of the township from the former Gompo Town Council in 1986. One of the explicit aims of the DVRA has been to reverse apartheid urbanisation planning in the city, which since the 1960s had been responsible for forcibly displacing between 60 000 and 80 000 Duncan Village residents from the city to the Ciskei dormitory township of Mdantsane, some 40 kms away^(4,8).

From the outset the DVRA argued that the long history of forced removals made it impossible for them to deny Africans access to land in the township. The civic organisation claimed that it would have

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failed in its duty to the 'oppressed people of the Eastern Cape' if it had not created opportunities for settlement close to economic hub of the city. As a result, the DVRA permitted 18 000 new shacks to be erected in Duncan Village between 1986 and 1996 without any new land being added to the township. This meant that population densities sky-rocketed, reaching over 3 000 people per hectare in some areas by 1995. This process was heavily criticised by the East London municipality, who urged the civic body to halt further urbanisation until such time as an orderly urbanisation strategy had been devised for the township⁽¹¹⁾. Suspicion and mistrust between the DVRA and the white-dominated municipality, however, ran too deep for any political agreement to be reached before the 1994 elections.

One of the consequences of this was that it delayed infrastructural development in the township. Between 1962 and 1983, very little investment was made in Duncan Village because it was official policy that the entire township would be demolished⁽⁸⁾. When this policy was finally rejected by the municipality in

1983 and the forced removals were stopped, new political struggles broke out between the DVRA and the black local authority, the Gompo-Town Council. The political violence associated with the DVRA's rise to power culminated in the Duncan Village uprising of August 1995. This took a heavy toll on the township's infrastructure as electrical installations, schools and government offices were destroyed or damaged. Most of these installations have still to be repaired. After forty years of systematic neglect, it is not surprising that three-quarters of the population live in wood-and-iron shacks with no access to on-site water, sanitation or electricity.

The combination of exceptionally high residential densities, the use of highly flammable materials in shack construction and the virtual total dependence on paraffin as a domestic fuel has made Duncan Village extremely susceptible to fire disasters. Prior to 1986, there were never more than ten residential fires in a given year. After 1986, the number of fires per annum rose steadily from 24 in 1986 to 47 in 1995, with an average of 36 fires a year over that period. The East London

Fire Department records reveal that 57% of these fires occurred in one section of the township, Duncan Village Proper (DV Proper). Only 44% of fires occurred the other two residential zones, C-Section and Duncan Village Extension (DV Extension). A breakdown of the distribution of fires by area is shown in Table 1.

The table shows an uneven but steady escalation in the number of residential fires over the past decade. This escalation has been accompanied by increasing residential densities. As a result, individual fires have also become more destructive over time. This is demonstrated in Table 2, which measures the number of housing units destroyed by fire per year since 1986. The table shows that between 1991 and 1995, 1 776 houses were destroyed in 191 fires at a rate of 9,2 homes per fire, whereas only 565 homes were destroyed in 168 fires at a rate of 3,3 homes per fire in the previous five years. To use a more specific case, in 1995 35 fires claimed 416 homes, while the same number of fires claimed only 119 homes in 1988. Due to the increased population densities, residential fires in Duncan Village have become three times more destructive in the 1990s than they were in the 1980s.

In addition to these linear progressions, the fire statistics also revealed distinctive cyclical patterns. Residential fires, for instance, have followed a predictable seasonal pattern. The figures reveal that 42% of the fires occurred in the winter months (May to August), while only 24% were recorded in the summer months (November to February). The greater use of domestic fuels, especially for heating, during the colder winter months is the major reasons for this variation. It should, however, be noted that a large number of fires (34%) broke out between seasons. This appears to be associated with the high wind speeds experienced in the city, especially in August. Significantly the most fire-prone shack areas in Duncan Village are situated on a unprotected hillside which is exposed to the powerful north-westerly winds.

An assessment of the timing of fires also reveals that, contrary to expectations, relatively few fires occurred at meal-times. The majority of fires occurred at night when people were asleep: 57% or 205 of the 360 fires occurred between 20h00 and 04h00. During the day, fires were less frequent and usually broke out when a paraffin appliance was left unattended. It was also found that high levels of alcohol abuse was another contributing factor to the timing of fires. When men had been out drinking at night, they would

Year	DV Proper	C-Section	DV Extension	Total
1995	29	4	14	47
1994	25	4	8	37
1993	19	3	10	32
1992	24	5	9	38
1991	19	6	9	34
1990	21	2	14	37
1989	21	6	16	43
1988	27	10	8	45
1987	13	8	6	27
1986	10	7	7	24
Total	208	55	101	364

Table 1: Distribution of fires by residential area in Duncan Village, 1986-1995

Year	Number of Units					Total Fires	Total Units
	1-3	4-6	7-10	11-50	50+		
1995	35	4	—	5	3	47	416
1994	23	6	4	3	2	38	294
1993	23	—	2	6	1	32	290
1992	22	8	3	4	2	39	526
1991	22	2	3	7	1	35	250
1990	20	6	5	3	—	34	190
1989	34	7	2	—	—	43	98
1988	35	7	2	1	—	45	119
1987	18	5	1	1	—	25	115
1986	17	1	2	1	—	21	43
Total	249	46	24	31	9	359	2341

(Source: Records Office, Fire Department, East London)

Table 2: Total number of dwellings destroyed by year, 1986-1994

often arrive home drunk and hungry. In their haste to prepare a meal, they would use paraffin appliances carelessly or would fall asleep next to a flame stove or candle. Table 4 provides a detailed breakdown of the fuel use activities associated with fire.

This table convincingly demonstrates that the majority of fires in Duncan Village were caused by people going about their daily domestic activities: cooking, lighting and heating their homes. The heavy reliance on cheap, unsafe paraffin appliances in shack areas is one of the major causes of fire. With unemployment rates in many shack areas exceeding 40% of the adult population^(cf.6), household heads are always keen to economise. This often results in the purchase of cheap and unsafe appliances. The reliance on technically inferior flame stoves, for instance, contributes to the high incidence of fire. Another problem is the use of *ufinya-futhi* (naked paraffin lights) and candles for lighting in shack areas. Both options are much cheaper than the standard gas or paraffin lamps on the market but neither have a glass cover to protect the naked flame. This makes them extremely dangerous to use. The DVRA has tried to reduce the use of these devices by banning candles in many shack areas. However, it was found that very few people in Duncan Village Proper follow the DVRA's directives.

The fear of fire

Phumeza Nono is a domestic worker in East London who lives on Sandile Street in Duncan Village. She arrived in East London from the Mooiplaas rural location in 1987 and after working for a period as a live-in domestic in the white suburbs, she purchased a backyard shack in Dunga Street. Phumeza's first experience of fire was in 1989 when she lost her shack and her possessions when a paraffin pressure stove burst in her neighbourhood and burnt out 35 shacks. The fire left Phumeza destitute and she returned first to her rural home in Mooiplaas before returning to East London to take up a job as a live-in domestic. By 1990, she had saved enough money to purchase a second shack in Duncan Village - this time in Sandile Street where she felt her small family would be safer. In June 1993 fire once again ripped through her neighbourhood and destroyed her home. For a second time, Phumeza had lost all her possessions. On this occasion she was fortunate because welfare assistance was forthcoming and she was soon able to rebuild her shack.

Year/ Area	Lighting	Cooking Wood Fire	Open Ignition	Malicious Cause	Unknown	Total
1995	19	10	1	2	15	47
1994	19	4	1	2	11	37
1993	18	3	2	2	6	31
1992	21	9	2	—	5	37
1991	24	4	1	1	3	33
1990	19	2	6	—	9	36
1989	29	9	2	1	3	44
1988	19	10	5	3	2	39
1987	15	10	1	1	1	28
1986	8	3	—	8	3	22
Total	191	64	21	20	58	354

(Source: Records Office, Fire Department, East London)

Table 3: Causes of fire by fuel use activity in Duncan Village, 1986-1994

For almost two years, Phumeza Nono was spared the tragedy of fire. Then, suddenly in October 1995, a massive fire broke out again on Sandile Street. When the authors arrived at the fire site, she was crying, sitting on a wooden bench staring at her charred home. She recalled that she was woken at about 03h00 by the familiar acrid smell of smoke and immediately sprang to her feet, grabbed her one-year old daughter and fled. She said that the intensity of the heat was so great that she assumed that her other children had already left the shack. However, when she emerged from the dense smoke, she realised that her other two children were still trapped in the blaze. Instinctively, she rushed back into the fire, amidst cries from onlookers that she would be burnt to death if she went back inside her shack. A few minutes later, she emerged with the remaining members of her family in tow. She had saved her children but had lost her home, again. Phumeza Nono explained that she was not crying about her lost possessions. Her tears, she said, were for the children that she had so nearly lost. In despair she sighed: '*Siyatsha yile parafini sihlala kuyo*' (We live in paraffin and burn in it).

The human tragedy of fire, as this case shows, is clearly immense. Fire tends to pick on the poorest of the urban poor. It destroys their homes and claims their possessions. These people are seldom left with more than the clothes on their backs and the money in their pockets. Many fire victims are unemployed and have no way of replacing what they have lost. They are, consequently, totally dependent on welfare organisations for survival after fires. In some cases, such as the Dunga Street fire of 1989, such support is not forthcoming and those who do not have savings are forced either to find shelter with relatives or to leave the area

altogether. In Duncan Village Proper the authors were struck by the number of people who, like Phumeza, had been the victim of more than one fire. One informant explained at a fire site in 1996: 'This is now the second time that I have experienced fire here and again all my belongings have been burnt out. It seems to me that I am owned by fire. It claims my salary and consumes my labour.'

The impact of fire on the urban poor, however, goes far beyond the trauma of lost possessions and dragging frightened children from burning shacks. It hits at the very fabric of this urban society and at people's perceptions of themselves and the city. Fires are constant, uncontrollable and random. As a result, people become conditioned to think of themselves as powerless victims caught up in the vortex of a destructive system over which they have no control. Like many of the other mysterious aspects of urban life, fire is too ubiquitous to be ignored: it has to be explained to the people to enable them to deal their fear, anxiety and anger. In Duncan Village, such explanations take various forms. One of the local metaphors used to understand and explain fire is that of witchcraft. This is not surprising given that the use of fire features prominently in Xhosa witch beliefs. Fire (*umlilo*), distributed in the form of *vutha*, is a malevolent force used by witch familiars to perpetrate evil deeds^(cf.7).

In Duncan Village, it is said that where there is fire, there is always the possibility of witchcraft. Residential fires seem to carry all the hallmarks of witchcraft activity. They strike in the small hours of the morning and exercise such power that they tear entire neighbourhoods apart. Fire arrives unannounced and disappears unexplained. The devastation wrought by fire also seldom affected the life of only

one person. Fires, like witches, seem to embody the same selfish and gluttonous desire to destroy the lives of others. The ease with which local people, traumatised by the sudden shock of fire, resorted to the witchcraft idioms in their attempts to deal with fire was powerfully brought home to the authors by an incident in Sandile Street on the 3rd July 1995. Press reports⁽²⁾ of the incident read as follows:

Armed police prevented an enraged crowd from meting out mob justice to a sixteen-year-old girl who allegedly caused a fire which left 200 people homeless in Duncan Village yesterday.... While the fire was raging residents caught and bound the alleged culprit whom they claimed has started a fire twice before and shouted that they wanted to hold a people's court, police said.

Police Internal Instability Division members who were on the scene to assist firemen fired rubber bullets to disperse hundreds of angry residents and rescued the girl. The mob who were wielding sticks and throwing stones again tried to attack the girl as police escorted her to an armoured vehicle with her arms held behind her back and bundled her inside. She was guarded by police clad in bulletproof vests and holding tear gas canisters at the ready.

As the police escorted the girl away, the crowd bayed '*makatshiswe, makatshiswe*' ('let her burn, let her burn'). There was no doubt that they meant what they said. Had the police not arrived timeously the girl would have been burnt by the mob. So intense is the fear of fire that those who cause it are liable to be made to endure it. To corrupt Monica Wilson's famous injunction⁽¹³⁾, fire, like witchcraft, is truly the 'the collective nightmare of the group' in Duncan Village.

The fear of fire in Duncan Village is a generalised fear, yet it is also a particularly feminised fear. This is because women are the dominant neighbourhood life within shack areas⁽⁶⁾. They are consequently easily associated with fire and the havoc it wreaks. The saying, 'we live in paraffin and burn in it' carried particular meaning for women. It ensured that they were more vigilant in their fuel use practices than men and that they acted in such a way that they could not be accused of anti-social behaviour. Gendered witch-hunting rituals served to remind women to take their socially ordained roles as mothers and homemakers extremely seriously. Furthermore, the tyranny of fire has deeply entrenched a culture of fear, mistrust and fatalism which has eroded the social fabric of the township and encouraged social dislocation and conflict.

Patronage and community conflict

When the DVRA took control of Duncan Village in 1986, they immediately set out to challenge the old influx control laws by opening up new areas in the township for settlement. The aim of the DVRA was to try to accommodate larger numbers of blacks in the township without allowing the urbanisation process to become disorderly and uncontrolled. To achieve this, the DVRA insisted that new arrivals be registered with the civic before being allocated a site. Only site applicants who genuinely required accommodation in the city and could show (via a letter from the civic in their places of origin) that they were 'good citizens' were supposed to be considered. In theory, the DVRA had devised a sound basis for managing urban influx. In practice, the system was less easy to implement. One of the major problems was that residential fires frustrated the DVRA's planning efforts, undermined their ability to control the local population, and often ignited deep community divisions. Some of these problems are highlighted in the case of Area 7, a fire-prone, unplanned informal settlement in Duncan Village Proper.

In 1992, this shack area was a strip of vacant land, occasionally used for the planting and harvesting of maize. The land was not occupied because the DVRA believed that the gradient was too steep for safe settlement. This changed in June 1992, when a massive fire broke out in Gwijana Street and destroyed over 400 backyard and free-standing shacks. The fire, which left between 1 500 and 2 000 people homeless⁽¹⁾, was one of the largest ever to hit Duncan Village and attracted widespread publicity. On the same weekend as this fire disaster, the DVRA executive were away at the funeral of an MK-+ cadre in the Cambridge township. As a result they were not available to manage the fire victims. This angered the homeless who decided among themselves to settle illegally on unoccupied land utilised as maize gardens. A deal was struck with the gardeners in the area, who agreed that the fire victims could use the land.

On Monday morning, the DVRA ordered the fire victims to move. They refused and petitioned local East London ANC and ANC Youth League structures for support. The powerful city ANC branch was sympathetic to their request and urged them to continue building their shacks. The DVRA responded to the ANC initiative by denying all fire victims in the new area access to welfare assistance. The

divisions between the DVRA executive and the ANC-supporting residents deepened in 1993 when the DVRA excluded people from the area access to a massive food relief scheme organised by foreign aid donors in Duncan Village as a whole. In response, local residents strengthened their alliance with the local ANC, which managed to pressurise the discredited Gompo Town Council to install taps in the new shack area. The taps were installed, but the project was never completed, allegedly because the DVRA intervened to stop it. In August 1995, when several shacks burnt down in the area, the fire victims again received no welfare assistance from the DVRA. By 1996, the DVRA's persistent pressure was beginning to pay off. Many residents now said that they feared that if they did not resolve their tensions with the DVRA executive soon they would be excluded from the benefits of the R140 million presidential Reconstruction and Development Programme (RDP) project in the township.

In Duncan Village Proper, fires also proved to be extremely divisive in individual neighbourhoods. The fires that initiated the most conflict were those which received sizable amounts of welfare assistance. The Sandile Street fire of July 1995 provides a good example. After this fire, truckloads of food, clothing and building materials were brought to the fire site. According to the local press: "...about eight truckloads of timber had been received from Mercedes Benz South Africa, while more timber, doors and window frames worth about R15 000 had come from D&A Timbers"⁽²⁾. The arrival of these materials caused conflict. On the one hand, allegations were made that the donations were not reaching fire victims and were being siphoned off by local DVRA representatives. On the other hand, those who had not been affected by the fire became envious of the amount of assistance given to the victims. Many were asking questions like: "Why had so much arrived for so few?" or "Why did we not receive the same treatment when our houses burnt down?"

To compound matters, a decision was taken by the DVRA to create spaces of 1,5 metres between all shacks in the area. This meant that a third of those who had lost their homes would not be able to build in the same area. However, many realised that if they did not build immediately they could lose out on the donated materials at the site. The question soon became: "who would be entitled to build and who

⁺ During the apartheid era, MK was the fighting unit of the African National Congress (ANC).

would not?" This generated fierce debate, even physical fights, among the residents. Some argued that mature adults should be given first choice to build because they were "not careless with fire" and that young people "living together" or children who lived in shacks without adult supervision should be asked to move elsewhere. On the other hand, there were those who argued that many of the older people should leave the area because they were approaching retirement age. As the debate raged, the internal divisions grew and, when no consensus was reached, everyone - young and old, men and women - began rebuilding their shacks exactly where they wanted. The DVRA's attempt to replan the area had failed, as it did at most of the other fire sites visited by the authors during 1995.

Domesticity and urban insecurity

While fire has a profound impact on community and neighbourly relations, it always left an indelible imprint on domestic groups. Social research in Duncan Village in the 1950s revealed that multigenerational households were the norm in the township, especially in the old wood-and-iron shack sections of the township (cf.9,10). The dominant trend in the 1990s is towards much smaller households. The reasons for the changes in domestic group composition are highly complex, but fire has played a decisive role in fragmenting and dispersing larger domestic units in Duncan Village Proper. Young adults have been particularly attuned to opportunities created by fire to break away from their parental homes. They have capitalised on the abundance of free building materials to carve out their "own places", especially in the free-standing shack areas.

This dispersal of the domestic groups did not, however, always imply that these groups disintegrated socially. Young adults who moved out of their parents homes did not always have jobs and often returned to their parental home for meals, recreation, or to borrow money, appliances and other items. Often they even continued to participate in household decision-making, despite being physically located in other areas. This meant that domestic life in Duncan Village was highly diffuse and that there were high levels of interhousehold mobility. The authors found that some parents were happy to part company with their children. As one mother explained:

It is not good for my son to live here anymore. He is old enough to work now and must support himself. There is also the problem of privacy in these shack areas and it is better that he takes his girlfriends to his own place.

Household fission associated with fires, however, loosened social bonds within

“...the majority of fires in Duncan Village were caused by people going about their daily domestic activities: cooking, lighting and heating their homes. The heavy reliance on cheap, unsafe paraffin appliances in shack areas is one of the major causes of fire. With unemployment rates in many shack areas exceeding 40% of the adult population (cf.6), household heads are always keen to economise. This often results in the purchase of cheap and unsafe appliances. The reliance on technically inferior flame stoves, for instance, contributes to the high incidence of fire. Another problem is the use of *ufinya-futhi* (naked paraffin lights) and candles for lighting in shack areas.”

township families, increased generational conflict and undermined the ability of parents to exert control over their children. The fragmentation of domestic groups in Duncan Village Proper weakened families as economic units and

exposed them to intense internal conflicts and divisions. However, this process also left a mark on the spatial configuration of the settlement as a whole. In the struggle for space that followed fire, established male household heads usually got first choice of the available space, while new households and, particularly, young or female-headed ones, had to wait in line.

The disadvantages experienced by female-headed households were compounded by the gendered distribution of welfare aid. At all fire sites, building materials were distributed to men, and food and blankets to women. Female household heads who could not afford to purchase their own materials or did not have male kin to queue for them, tended to lose out. Young couples were also at a disadvantage because the principle of seniority was applied in the welfare queues. In spatial terms, this meant that the new shack areas, created as a result of fires, tended to be dominated by women and young unmarried couples.

The other consequence of fire on domestic organisation in Duncan Village was that it encouraged new arrivals in the city to maintain active connections with their ancestral homes in rural areas. In Duncan Village Proper, 26% of all households heads have retained a house elsewhere: 19% of these household heads live in municipal houses, while 31% live in free-standing shacks which are prone to damage or destruction by fire. The retention of a second home and, in some cases, even the acquisition of a "country home" in the former Ciskei or Transkei among urban-born residents was, at least partially, a product of the insecurities wrought by fire. Even more common in Duncan Village was the practice of sending children out of the city to be socialised with close kin in the countryside. Over 50% of households in Duncan Village Proper have children living outside of the city⁽⁶⁾. In discussion with many of the women who were in agreement with this practice, it was highlighted that this was in order to protect their children from the threat of fire.

Conclusions

The case material presented here leads to a number of conclusions that can be drawn about the social impact of residential fire in this urban setting. Firstly, it has been shown how fire incidents derailed the plans of the DVRA to control urban growth and shack development. At most fire sites, the DVRA tried to impose some restrictions on the rebuilding of shacks. These directives were, however, ignored,

with the result that more rather than fewer shacks were rebuilt. In Duncan Village, fires have clearly been one of the driving forces behind urban densification.

Secondly, fires generated a culture of fear and fatalism. The horror of fire was so immense that the people of Duncan Village often turned on members of their own community to purge it of "evil forces". The use of witchcraft as a means with which to identify and deal with fire is symptomatic of the acute social stress and strain engendered by these disasters. Since fire appeared as random, uncontrollable and constant in people's lives, it is not surprising that local people began to see themselves as victims, that they believed in their own powerlessness, and came to view the city as insecure, unstable and violent.

Thirdly, feelings of insecurity and anxiety were entrenched through a network of local-level social relations of dependency and patronage that emerged around fire. In the 1980s and 1990s, the DVRA jealously guarded its role as community gatekeeper. It set itself up as the only conduit through which outside agencies, like the Red Cross, could interact with local people. This gave DVRA officials enormous power to control and direct welfare aid. More importantly, it allowed the DVRA to use fire relief as a means of rewarding loyal supporters and of punishing critics. This was illustrated in the case study of Area 7. It has also been shown that the conflicts that surrounded welfare assistance and other resources associated with fires, tend to undermine community solidarity and weaken people's capacity to deal with disaster.

Fourthly, at the level of domestic organisation, fires put enormous pressure on domestic groups to split and disperse. This enabled young adult and school-going teenagers to break away from their parents home and set up their own shacks. This, however, also undermined family

solidarity and encouraged generational conflict in fire-prone areas. The social pressure created by fire has also been reflected in the internal shifting and sorting of domestic groups between shack areas. It was observed that vulnerable domestic groups, such as female-headed households and young, unmarried couples, were often pushed out onto the fringes of the settlement. In the intense competition for space that always followed fires, only those with local-level social influence and power were guaranteed sites. This constant competition and infighting for space further eroded the urban social fabric and encouraged social disintegration and inertia.

In Duncan Village, fire is clearly no mere epiphenomenon which delays real urban development and temporarily disrupts the normal functioning of urban social relations. It is an extremely powerful social force in its own right which has left an indelible mark on the social fabric of this urban community. In view of the analysis presented here, it is argued that it is essential that local stakeholders and government officials begin to recognise the social power of fire and acknowledge the long-term social and economic damage that can be done if it is allowed to take hold in densely settled, metropolitan shack areas. Urgent attention needs to be given to identifying high-risk areas and arriving at strategies that will contain shack densities and improve fuel safety.

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A note on the paraffin distribution chain

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This brief paper suggests a number of modifications to a model of the paraffin distribution chain which has been used in recent research concerned with curbing the incidence of paraffin ingestion among children. As it stands, this model ignores certain inter-household and intra-settlement movements of paraffin. These movements are significant with regard both to planning strategies intended to curb paraffin ingestion and to understanding the prices paid by end-users for paraffin. By creating awareness of these caveats, it is hoped to stimulate others to contribute towards further refining the model of the paraffin distribution chain.

Keywords: paraffin distribution chains; paraffin ingestion; child resistant containers; paraffin safety caps; paraffin prices; models; low-income households

Introduction

Research conducted under the auspices of the Social Determinants of Energy Use (SDEU) project^[1,2,3,4,5] demonstrates very clearly the inadequacy of the standard model of the paraffin distribution chain as it has recently been presented in energy-related studies in Southern Africa^[6,7]. The caveats highlighted by this research may appear petty on the face of it, yet they do have important implications *vis-à-vis* such pressing concerns as paraffin ingestion among children^[7] and the paraffin pricing structure. In this brief paper, a number of modifications to the standard model of the paraffin distribution chain are suggested and some of the implications of these adjustments considered.

A revised model of the paraffin distribution chain

The conventional distribution network ascribed to paraffin generally regards retailers as the points from which domestic end-users are supplied. Among most South Africans who rely on paraffin for domestic purposes, the retailer is represented by neighbourhood spaza shops and general dealer stores, although some users may be supplied by supermarket chains and petrol outlets. Figure 1 reflects a model of the paraffin distribution chain that was used to design a pilot child resis-

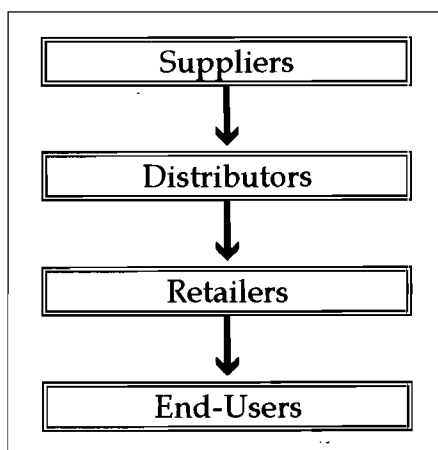


Figure 1: The conventional model of the paraffin distribution chain

tant container (CRC) intervention strategy in the former Bophutatswana^[6].

The model of the paraffin distribution chain sketched in Figure 1 does not take cognisance of a prominent stratum of paraffin movement *within* communities. The clear assumption in this model is that the ultimate link in the distribution chain is between retailers and end-users; that is, once paraffin has passed from the retailer to the householder, it has reached its end-user(s). However, research conducted in *all* the metropolitan areas covered by the SDEU project indicates that there are often a number of subsequent links in the chain^[1,2,3,4,5]. These other links may be categorised into two broad types. The first are non-commercial exchanges of paraffin which occur between households¹. The second are commercial exchanges of paraffin between members of a community

and householders who are not spaza proprietors but who nonetheless trade in paraffin.

Non-commercial exchanges refer particularly to the sharing of paraffin that is often at the centre of local survival networks. These networks emerge as an alternative mechanism for procuring goods in times of need, and paraffin is one of the goods that is commonly exchanged between low-income households which rely on transitional fuels. Exchanges of paraffin between households have been observed, to a greater or lesser extent, in all the regions under study by the SDEU project, although the precise nature of these relations have distinctly regional charactersⁱⁱ.

Paraffin traders are individuals, or a number of individuals within a household, who trade in paraffin which they purchase in bulk and then sell on demand to neighbouring householders. Like those of the spaza operators, the markets of these paraffin traders are very localised, consisting mainly of the immediate neighbourhood within which the household is located. Unlike spaza operators, however, paraffin traders deal solely in paraffin; they sell no other goods. Moreover, they operate from the shacks in which they live rather than, as is often the case with spaza dealerships, from separate or adjoining premises. The operations of most paraffin traders are extremely small-scale and supplement various other incomes. However, a woman in one of the Durban samples purports to subsist solely off her meagre profits in the paraffin trade. In short, paraffin traders are householders who engage in small-scale retailing of paraffin from their homes. The extent to which householders act as paraffin retailers is as yet unknown and requires more systematic investigation. Nonetheless, the practice has been observed in at least three of the four metropolitan areas covered by the SDEU projectⁱⁱⁱ.

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i See the paper by Meintjes *et al.*, also in this issue, on paraffin etiquette, for a thorough discussion of these exchanges in the unplanned settlement of Old Dunbar in Cato Manor, Durban.

ii These differing characters are clear from the discussion in the paper by Meintjes *et al.* on paraffin etiquette published elsewhere in this issue.

iii See for example, White *et al.*⁽²⁾, Mehlwana *et al.*⁽⁴⁾ and Jones *et al.*⁽⁵⁾.

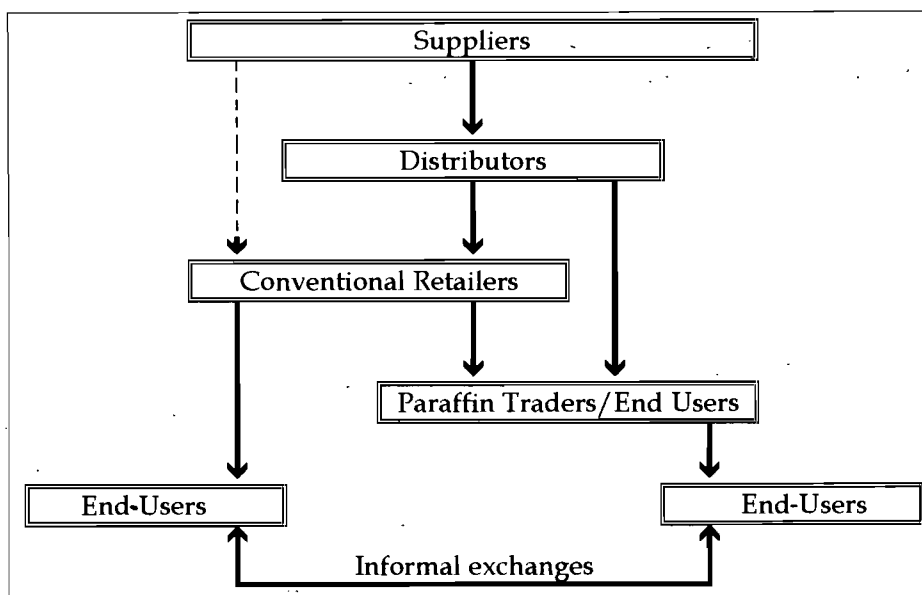


Figure 2: A revised model of the paraffin distribution chain^{iv}

The conventional model of the paraffin distribution chain does not reflect the kinds of interhousehold movement of paraffin alluded to above. As should be clear, the household into which paraffin is brought from the retailer is not necessarily the terminal point in the distributive chain; the paraffin may not yet have reached its end-user or end-users. Paraffin may circulate between households as part of a wider system of informal exchanges, or it may be sold not by any of the conventional or commonly recognised retailers, but rather by a paraffin trader who, in terms of the orthodox distribution chain, would be classified as an end-user. Figure 2 indicates how the paraffin distribution chain might be adapted to reflect the flows of paraffin that occur at an interhousehold level.

The distribution chain and paraffin ingestion

This revised model of the paraffin distribution chain has important implications for strategies intended to curb incidents of paraffin ingestion among children. In a study conducted in two health wards in the former 'homeland' of Bophutatswana during the early 1990s, Krug and colleagues^[6] recommended that

^{iv} The authors' knowledge of what occurs in the preliminary levels of the chain is extremely limited. Discussion with Anthony Williams of EDRC has resulted in the insertion of the broken line. This indicates that some conventional retailers may obtain paraffin directly from the distributors.

'all paraffin be sold in CRCs'. While acknowledging that many householders in their samples kept more than one paraffin container, these authors failed to explore the reasons for this practice. Research conducted as part of the SDEU project shows that in many of the areas covered by the project, paraffin users do indeed keep more than one container; often, too, these containers are of differing sizes. In the unplanned settlement of Old Dunbar in Durban, the reasons for this relate directly to the operation of exchange relations^[5]. Since people commonly lend and borrow paraffin from neighbours and other exchange partners within their personal networks, they must necessarily keep more than one container. Moreover, because paraffin is exchanged in variable quantities and in response to particular needs, people need to keep differently-sized containers.

The point to be made here is simply that should interventions through CRCs be implemented on a large scale, such a strategy should take note of the revised model of the paraffin distribution chain. For instance, were intervention to occur between 'retailers' and 'end-users' as per Figure 1 - as was the case in the study by Krug and colleagues^[6] - the significance of the interhousehold movement of paraffin, as depicted in the lower strata of Figure 2, would be lost. If intervention is to achieve maximum effectiveness, there needs to be a CRC involved in each and every interhousehold exchange of paraffin. Clearly, much the same applies to intervention through paraffin safety caps (PSCs). A proper understanding of the

interhousehold and intra-settlement movements of paraffin is, therefore crucial if there is to be effective intervention to reduce the incidence of paraffin ingestion among children in the region.

The distribution chain and paraffin pricing

A second area in which the revised model of paraffin distribution may be of some utility is in understanding the pricing structure of paraffin. The conventional model of paraffin distribution, as depicted in Figure 1, offers a rather fixed and simplistic view of paraffin distribution. One might be forgiven for assuming that at each descending level of the conventional paraffin chain, there is a concomitant price increase. However, as the revised model of the paraffin distribution network implies, the chain is not fixed but highly variable, thus possibly resulting in a similarly variable pricing structure. The manner in which this might affect pricing is a matter for future investigation. However, it is worth mentioning that, although the paraffin price is regulated, the authors' research indicates that prices paid by end-users vary quite substantially according to which spaza shops and other retailers they use.

Conclusions

This paper has addressed the limitations of the conventional depiction of the paraffin distribution chain. On the basis of the research conducted in the four metropolitan areas covered by the SDEU project, it has been argued that the rigidity and simplicity of the conventional chain obscures interhousehold and intra-settlement movements of paraffin, as well as generally imputing a more inflexible chain than is actually obtained. The implications are thus twofold: firstly, those seeking to make interventions, particularly with regard to the distribution of CRCs and PSCs, need to be aware of these movements; and secondly, the revised paraffin distribution chain presented here may assist those concerned with investigating the paraffin pricing structure.

It is clear that far more research is required if the manner and condition in which paraffin reaches end-users, as well as the prices they pay for paraffin, are to be understood. There are likely to be other amendments that could be made to this revised model of the distribution chain. It is hoped that these brief comments will

prompt others to investigate and further develop the model which has been offered here.

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Energy constraints in low-income households in the Western Cape

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This paper investigates, by means of case studies, one of the many energy complexities with which poor urban households have to grapple. This is the correlation between fuels used and household budgets, on the one hand, and nutrition, on the other hand. The availability of fuels influences what people can cook. Household income levels and the expenditure budget, however, also continue to be the main determinants of how fuels are used in many households.

By pointing to some of the complexities of urban household energy use, this paper demonstrates that policy interventions should be all-embracing and directed more to the root causes of the problem than the symptoms. It reiterates the need for integrated energy planning, which calls for an in-depth investigation into the energy options available. The information presented in this paper has been drawn from the authors' recent research report⁽¹²⁾ which looks at social determinants of fuel usage.

Keywords: integrated energy planning; transitional fuels; domestic energy; paraffin; liquefied petroleum gas; electricity; low-income households; energy utilisation; shacks; Khayelitsha; Joe Slovo; informal settlements

Understanding fuel usage through case studies: An introduction

Understanding people's or households' life histories can reveal many complexities associated with the use of fuels by urban (as well as rural) communities. A lot has been written - albeit in a quantitative fashion - about how the urban poor use a range of fuels. There remains an epistemological vacuum in this scientific knowledge: most of the current literature does not sufficiently explore in depth how individuals who make up the households interact with their fuels. There is little information on how both micro- and macro contexts equally shape and influence individual and household consumption of fuels, and, indeed, the perceptions they have about this usage.

The aim of this paper is to show firstly, that the erratic and meagre income of many poor households, and that a lack of alternative fuels other than paraffin make it difficult for them to plan for their energy budgets. The result is that very poor households end up paying more for their fuels than households that have a better income and access to electricity. Secondly, fuels to which households have

access determine to some extent the nutrition of these households.

These themes are explored by evaluating the life experiences of selected households. These cases give a glimpse of the contexts in which different households make decisions about how they budget for their cooking fuels.

The data in this paper is derived from a study funded by the Department of Minerals and Energy (DME) which is

currently being conducted in four types of settlements in the Western Cape (Figure 1). These areas are (1) formal houses and (2) electrified informal shacks (Site B) in Khayelitsha, (3) squatters in Joe Slovo, and (4) backyard shacks in Langa. The sample consists of sixty households (fifteen in each settlement) selected for in-depth study over three years. This paper focuses on households from only two of the settlements: those in the formal area in Khayelitsha and squatters in Joe Slovo. They were selected because they exhibit different characteristics in structure and composition.

A brief overview of Khayelitsha and Joe Slovo

Khayelitsha

Khayelitsha is situated about 28 kilometres from the centre of Cape Town. It is the largest black residential area in the Western Cape, estimated to be around 2 085 hectares, with a population of 359 600⁽²⁾. This might be a conservative estimate, however, since the size and

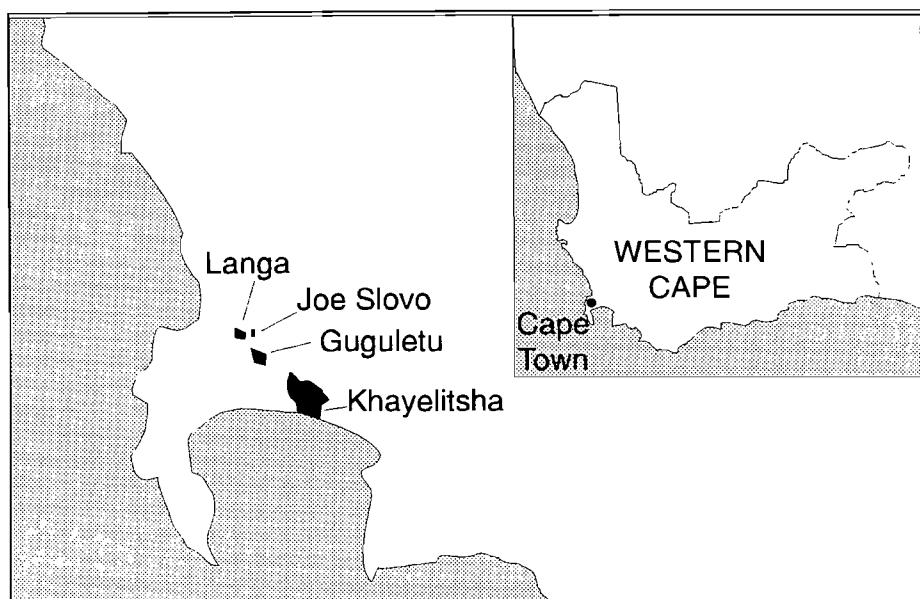


Figure 1: Khayelitsha and Joe Slovo within the context of other major Cape Town black townships

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population of the area is in constant flux. The core houses of Khayelitsha were built in 1984. Khayelitsha was seen as a political solution which offered the chance to promote the ethnic solidarity required by the ideology of the government of that time and its defence strategists, since the buffer zone between blacks and whites would be 'coloured' settlements⁽³⁾. Khayelitsha then was part of a modernised form of apartheid's influx regulations.

Khayelitsha is a conglomeration of different housing units catering for a variety of households. It consists of five types of residential units:

- the 'match-box' formal houses for what the previous government viewed as legal residents (the authors' sample is taken from this sector),
- planned informal settlements,
- dwellings made from sandbags for people who could not afford to pay higher rents,
- upmarket houses for upper income categories, and
- 'unauthorised' squatter settlements.

All the standard core houses have two rooms (bedroom and kitchen), though some dwellings have been extended. They were electrified between 1989 and 1994. SALDRU⁽²⁾ estimates that almost 90% of formal houses have prepayment electricity meters. Selected households for this study were drawn from this type of residential unit.

Joe Slovo

Joe Slovo is a shanty settlement situated on the eastern side of Langa township, in the narrow strip of land between hostels and a 'coloured' settlement. Joe Slovo is densely populated and in a constant state of flux, as people continue to move in from settlements nearby. It consists mainly of ex-hostel dwellers from the overcrowded Langa hostels and discontented former backyard tenants. The settlement was established at the beginning of 1994 and by the middle of the year was densely populated by shackdwellers. Attempts by local authorities to evict people proved fruitless. The land on which the settlement is situated is not earmarked for residential purposes as there are high-voltage electricity power lines running above it. Joe Slovo is completely unserved, with no running water and ablution facilities, roads or health services. The area is also crime-ridden as there is complete darkness at night. Fires caused mostly by paraffin and overcrowding occur repeatedly.

It is against these defining features that the authors have contrasted household

Hh features	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10
Type	WH	MH (N)	WH	WH	MH (N)	MH (E)	MH	WH	WH	MH (N)
No & sex of breadwinners	1=W	1=M	1=W	1=W	1=M W=F	1=W	1=M	1=W	1=W	1=M
Size	6	5	5	4	4	3	1	3	1	3
Income (R)	410	646	700	250	3 300	410	-100	200	480	300
Cooking fuels	Par	Par	Par	Par LPG	Par LPG	Par	Par	Par	Par	Par
Cooking times	2 x	3 x	3 x	2 x	2 x	2 x	1 x	2 x	1 x	3 x
Monthly quantity	42 L	21 L	20 L	20 L 3kg	20 L 10kg	70 L	20 L	25 L	20 L	20 L
Monthly costs (R)	62	28	22	21 11	28 23	62	22	27	22	22
Buying mode	S	S	S	S	S	S	S	S	S	S

Table 1: Cooking fuels in Joe Slovo

KEY:

- J1-10 = Joe Slovo households
- WH = Women-headed households
- MH = Male-only households
- MH (N) = Nuclear households but headed by males
- MH (E) = Extended households headed by males
- S = Buying in small quantities
- B = Buying in bulk
- Par = Paraffin
- L = Litres

energy use in these two areas. The sample consists of ten households from Joe Slovo and twelve from Khayelitsha.

Long- and short-term budgeting for cooking fuels

Studies have shown that most poor urban households have to rely on inconvenient and expensive paraffin because it is the most accessible fuel and can be purchased in small quantities^(1,4,5,6,7). In the Joe Slovo and Khayelitsha sample, many households depend on paraffin for cooking. In one month, these households consumed an average of 30,5 litres of paraffin per household.

The case below demonstrates how a poor household has to spend approximately 15% per month of its income on purchasing paraffin.

Case 1: 'We buy only the paraffin we can afford today' (J1)

Catherine, a frail-looking pensioner of 69-years-old in Joe Slovo squatter camp, is the sole income provider. She receives

around R410 per month and has to support five other household members: her two unemployed daughters (aged 44 years and 46 years respectively), and the three young children of one of her daughters. There is no source of income in this household apart from the pension money. One of her daughters has not had work for the past year and the other is physically handicapped. Attempts to get financial assistance for her from the State's Welfare department have been unsuccessful.

Since there is very little money, Catherine finds it difficult to budget adequately for fuel used by her household. Like many other households, the only affordable fuel she has access to, is paraffin.

She once said, 'In this house we only buy the paraffin we can afford today.' Because she has to balance energy needs with other non-energy needs, she normally buys paraffin in small quantities. Almost every day she buys one or two litres of paraffin for cooking. Each litre costs R1,55 from spaza shops in her neighbourhood. In one month, Catherine's household consumed 42 litres of paraffin, which cost R62. Of particular note was that this household spent more on fuel

Hh features	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12
Type	WH	WH	MH (N)	WH	MH	MH (E)	WH	MH (N)	WH	MH	MH (N)	WH
Age & sex of breadwinners	1=M	W=34	M=66	W=83	M=22	M=34 W=39	W=69	M=41 W=39	W=42	M=65	M=58	F=68
Size	5	6	9	4	2	5	3	6	3	1	6	2
Income (R)	0	600	410	410	670	1 200	410	1 998	700	410	410	392
Cooking fuels	Par	Par	Par LPG	LPG	Par Elec	Par LPG	Par LPG	LPG	Par Elec	Par	Par LPG Elec	Par
Cooking times	2 x	2 x	3 x	3 x	2 x	2 x	2 x	1 x	2 x	1 x	1 x	2 x
Monthly quantity	63 L	21 L	21 L 19kg	16kg	20 L -	8 L 12kg	40 L 19kg	19kg	5 L -	40 L	168 L 9kg	6 L 10kg
Monthly costs (R)	92	28	26 57	41	23 40	8 17	42 61	57	5 150	42	193 17 10	44
Buying mode	S	S	S	B	S	B	S+B	B	B	S	S+B	B

Table 2: Cooking fuels in Khayelitsha

- KEY:**
- K1-12 = Khayelitsha households
 - WH = Women-headed households
 - MH = Male-only households
 - MH (N) = Nuclear households but headed by males
 - MH (E) = Extended households headed by males
 - S = Buying in small quantities
 - B = Buying in bulk
 - Par = Paraffin
 - Elec = Electricity
 - L = Litres

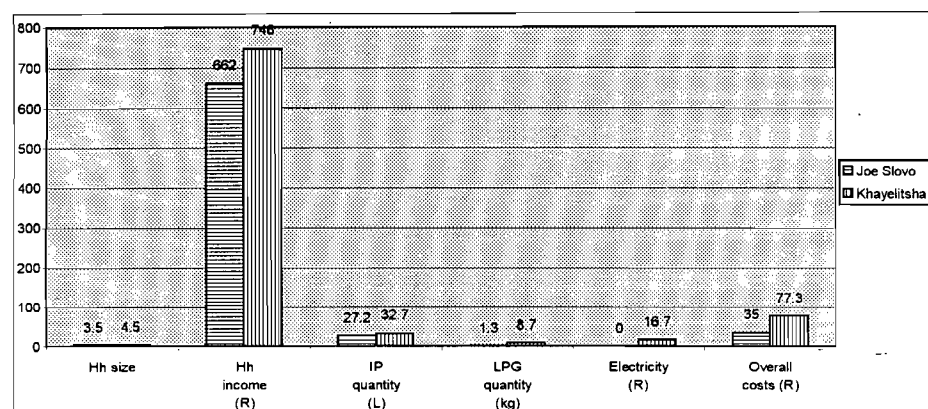


Figure 2: Average costs and quantities of fuels in Joe Slovo and Khayelitsha

than other households in the Joe Slovo sample survey.

There are many households in Joe Slovo like the one described above. For instance, eight out of the ten households surveyed depended solely on paraffin for cooking, while in Khayelitsha only three out of twelve households depended solely on paraffin. Another seven used paraffin along with either LPG or electricity; only one household used solely LPG for cook-

ing. Although all twelve households in Khayelitsha have had access to electricity since the beginning of the 1990s, paraffin is still widely used for cooking, pointing to the centrality of paraffin in most people's everyday lives.

A large proportion of paraffin is used for cooking.* Although most households use it, it is significant that purchasing patterns differ. As Annecke⁽⁹⁾ observed in her Durban study, the ability of households to

earn a regular income is an important factor in fuel use and budgeting. She noted that most low-income households have incomes that are erratic as well as very low. This, in itself, determines how fuels, especially paraffin, are purchased, as household income has to be spread over a number of household needs. This inhibits most households from buying fuel in bulk. Buying fuels in small quantities per month becomes more expensive than when they are bought in bulk (Figure 2).

The differences in budgeting for (cooking) fuels in Joe Slovo and Khayelitsha are discussed in more detail.

The average size of the ten Joe Slovo households was 3.5 people, with an average household income of about R662 per month that is, a per capita monthly income of R189.** This figure is less than the Household Subsistence Level (HSL) of R270 mentioned by the Institute for Planning Research as the minimum monthly per capita expenditure for a household in order to satisfy its basic needs⁽¹⁰⁾. Some households, however, had a per capita income of around R100 per month. One extreme example was a household (J8 in Table 1) with a R68 per capita income (see Case 1 above). In Joe Slovo, the main source of income was derived from informal activities and part-time jobs, and in most of these households

* There are other uses though. In Joe Slovo, paraffin is also used for lighting, heating water and for space-heating. This also applies in Khayelitsha where some paraffin is used for space-heating and heating water. However, none of the surveyed households in Khayelitsha used paraffin for lighting.

** In its 1993 survey, the South African Institute for Race Relations found that 58% of African households earn below R700 per month while most white households earned above R4 000 a month⁽¹¹⁾.

women were the sole providers of income.

Few households were able to budget in the long term for their fuels. However, there was an exception. One four-person household in Joe Slovo (J5) had an income of R3 300 per month - a per capita income of R825, which is four times the HSL figure.*** Yet, this household paid less (R51) for fuel in one month than household J1, although its income was three times bigger. The higher income of household J5 was reflected in the variety of fuels and the quantities that this household used for cooking. In one month, it consumed only 20 litres of paraffin (which cost R28) and 10 kg of liquefied petroleum gas (LPG)(which cost R23,60). This household was able to budget less for cooking fuels because it could afford to buy in bulk (Table 1). In addition, as a cost-effective strategy, this household also made use of LPG for cooking which reduced the pressure of depending on paraffin. As previously stated, however, households such as this are the exception to the rule.

Although the twelve households in Khayelitsha were slightly better off, some faced the same problems as those encountered in Joe Slovo, especially with regard to income and budgeting for fuels. The average size of the twelve sampled households was 4,5 members. The average income was R748 per month and the average per capita income was R166 per month (R104 less than the HSL rate).

Income in most Khayelitsha households is derived from pensions and formal work. In contrast to Joe Slovo, these income sources were stable. Since some of these households have stable incomes, they are able to plan for their energy expenditure, thereby saving more than households with no dependable income. The following case shows a household in Khayelitsha which, because it has access to fuels other than paraffin and a comparatively higher income, spent less on fuel for cooking.

Case 2: 'The gas we buy is enough for one month': Budgeting for gas (K7)

Eunice and her husband Gladwin live in one of Khayelitsha's electrified formal houses. They are both in their thirties and formally employed. Their combined monthly take-home income is R1 998. They have four children, three of whom are pupils, with one attending a day-care

centre. By Khayelitsha standards this household lives comfortably. By the end of 1995, they had added three rooms to their house.

The last time Eunice used paraffin for cooking (or for any purpose for that matter) was back in 1990. Towards the end of that year, the household purchased a four-burner gas stove through a hire purchase scheme. The stove cost R699. From that year, the household used the gas stove for all its cooking requirements. Eunice does not feel that her household will stop using gas even though electricity has been installed in Khayelitsha. Over the past five years she has used gas and has been able to budget for it on monthly basis. Her stove uses a 19 kg bottle of LPG which is filled by a local gas hawker at a cost of R57. This gas, she says, is sufficient for four weeks. For household end-uses other than cooking she uses electricity, for which she pays R50 per month.

It is important to note, however, that there were other households in Khayelitsha which were worse off than some in Joe Slovo. Some had, for instance, no visible income whatsoever and some had about R45 per capita income per month. There was no visible source of income in household K1. At the time that this study was undertaken, all the members of this household, were unemployed. Household K3 depended mostly on a pension. However, the head of the household was also a traditional healer and did not want to disclose the money he earned from this practice. Thus the recorded per capita income per month is not accurate.

By comparison with Joe Slovo, households in Khayelitsha spent more on (cooking) fuels in the same period - an average of R77,30 (whereas an average of R35 was spent by households in Joe Slovo during the same period). Their high energy spending - especially for cooking - can be attributed to four factors:

- higher household sizes and income - although the latter only marginally so;
- widely practised multiple fuel use in this area;
- availability of electricity for cooking; and
- a proportion of cooking fuels was used for space-heating - as Khayelitsha, because it is nearer to the sea (and often more windy), is colder than Joe Slovo, especially in winter (when this survey was carried out).

As in Joe Slovo, it is worth mentioning that the majority of households in Khayelitsha use paraffin for cooking (although in conjunction with other energy sources, such as, LPG and, to a lesser extent, electricity). Significantly, households that

depended more on paraffin for cooking were the worst off. The following case depicts a downward transition of energy use by showing how a household switched from using electricity to gas and then to paraffin due to reductions in income.

Case 3: 'We cannot afford to use electricity for everything': From 'modern' energy sources to 'transitional' fuels (K11)

Nothembile, aged 53, lives with her spouse who lost his job in February 1995 due to illness. At present there is no one bringing income to the household and they are waiting for his Unemployment Insurance Fund money. Nothembile decided to sell snacks and drinks to school-children but this is not a reliable source of income. She says that since her husband lost his job they have stopped using electricity for cooking, using it rather for lighting, refrigeration and television. She said, 'We try to save costs, we cannot afford to use electricity for everything. Therefore we use gas for cooking, but like electricity, it is expensive. So we cannot use it alone.'

'Fuel-saving' strategies employed by this household changed twice during the research period. At first the household used gas for cooking some foods and paraffin for others, such as samp. Then paraffin was used more often than gas: 'all food must be cooked at first on the paraffin stove, and then be put on the gas stove to simmer', Nothembile emphasised. It is, however, only on special occasions that they use gas - when they cook different meals - usually on Sundays.⁽¹²⁾

Although this household felt that it was saving electricity (and also gas) costs, by using paraffin more often, in one month it consumed 168 litres of paraffin - costing R193. The latter was used in conjunction with 9 kg of LPG which cost R17 to refill. This energy bill should be compared with Nolusindiso's (K7 - Case 5): the latter is using mostly electricity for cooking, cooks twice a day (in contrast to Nothembile who cooks once a day). Yet she buys R150 worth of electricity which also covers other household needs. This means one of two things: multiple use fuels are more expensive than using electricity alone, or Nothembile's household needs more energy than Nolusindiso's.

Energy budgets in both settlements, therefore, are clearly determined by the level of household income and, to a certain extent, by the availability of the energy choices in their respective areas. Most importantly, however, the

*** Income per month of household J8 is the highest of all the households (in Joe Slovo as well as in Khayelitsha).

observation shows that the so-called transitional fuels such as paraffin, cannot be wished away, as many households, because of their low level of income, will continue using them for their basic needs. Even electrified households use paraffin (and, to a lesser extent, LPG) for major end-uses, particularly cooking.

Cooking fuels and diet

(Figures 3 and 4)

Households that depended mostly on paraffin also had very few cooking appliances. They had an average of two paraffin stoves - mainly primus (pressure) and flame (wick) stoves. Operating these appliances was perceived as inconvenient because a lot of time was spent monitoring them - primus stoves have to be pressured at frequent intervals, and flame stoves have to be closely monitored in view of their known hazards. In addition, these appliances served other household end-uses as well, like space-heating, heating water for baths and hot beverages, and heating an iron.

Cooking in most households that use paraffin had to be balanced against other household end-uses. This creates a contradiction: firstly, meals have to be cooked in bulk and, secondly, absence of refrigerating facilities results in these cooked meals perishing (especially in summer). Foodstuffs with a high nutritional value, such as vegetables and meat were, however, seldom cooked in bulk partly because they perish easily and partly because few cooking appliances were available. The most common meals are foods with a high concentration of starch, such as samp and maize, and some tinned meat and vegetables. Samp takes an average of three hours to be fully cooked, and often takes longer when the appliance is required for other end-uses. Mncedi (J7) in Joe Slovo devised a strategy to deal with this constraint. He said:

When I cook samp during the day, I boil eggs in the same pot so that I can have my lunch in the meantime. In this way I do not have to wait for the samp to cook before I can boil eggs and, at the same time I do not interrupt the cooking process⁽¹²⁾.

Most households - because they are obliged to use paraffin and because their

usual foods take longer to cook - prepare their main meals twice a day (while other households cook three times a day). In between, the left-overs of the previous meal are consumed. Figure 3 shows that samp, in contrast to other meals, is cooked more often in both settlements.

As previously mentioned, the usual meals in these households are samp and maize. Fresh vegetables and fresh meat are rare. In most dwellings, these are luxuries reserved for special occasions, such as Sundays. The following example illustrates the strong links between the fuels that people are using and what they eat.

Case 4: 'Paraffin is for samp and gas is for meat'

Novuyani lives with her unemployed son and his wife in Joe Slovo. She receives R410 per month from her pension. Like most households in the area, she finds it very hard to subsist on this. She spends R62 per month on buying paraffin for mainly cooking. She sometimes spends more when, for instance, her other children come to visit her from a nearby settlement. She cannot afford to buy paraffin in bulk because the pension money has to also cover other household needs and debt repayments. Novuyani thus uses a flame stove for all cooking needs as well as for heating. She feels that this limits her household to a specific diet. She said:

Every day we cook samp. If we do not cook it, we have to eat bread and tea for supper. I cannot cook vegetables every day because I only use paraffin and I have only one stove. If I can have electricity, maybe things will be better. It is not nice to eat the same thing all over again. When I cook samp with a flame stove, it takes me more than three hours to cook. When the samp is cooked there is no time to cook other food. When my son is employed, we shall buy gas to cook meat.

In this case an attempt has been made to correlate meals eaten with the types of fuels used for cooking. In most households, samp and maize are cooked on a paraffin stove. Many households cook samp because it lasts longer before it perishes and it can be re-heated. Samp is cheaper than most other foods, but when one includes the costs of cooking, it becomes expensive. In order for a paraffin stove to burn continuously for three hours to cook samp, it has to be filled with two litres of paraffin.

In households where there are energy options other than paraffin, people tend to vary their meals. Here again, income plays a role. An example of varying meal patterns is shown by Nolusindiso's household (Case 5).

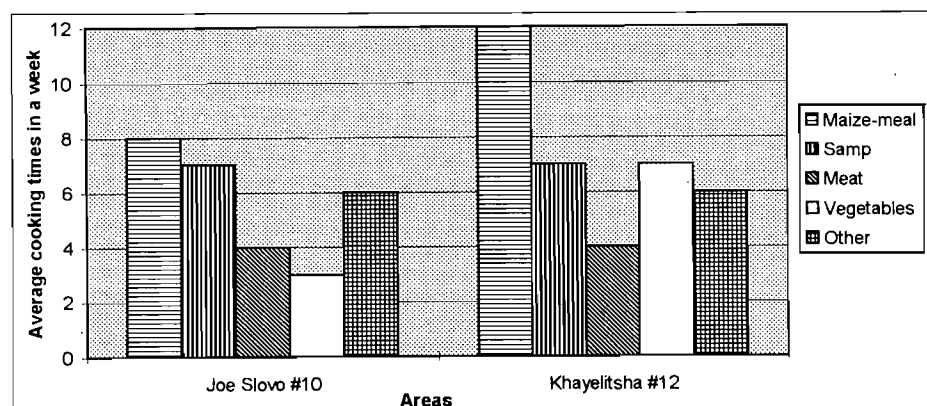


Figure 3: The most cooked meals in Joe Slovo and Khayelitsha

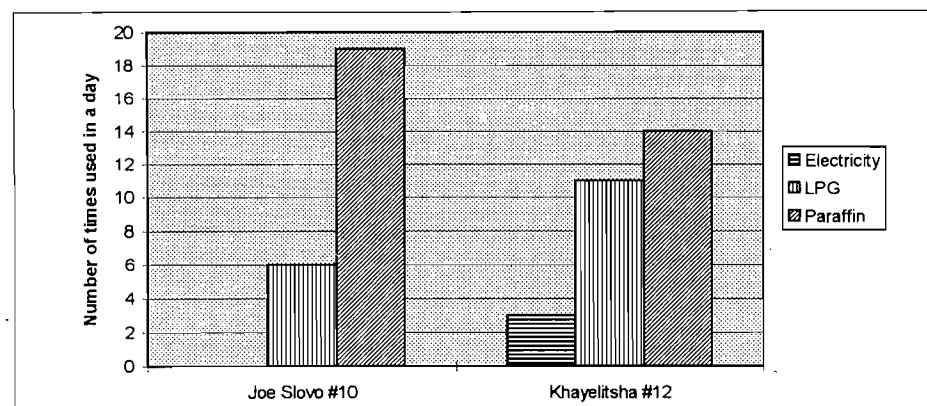


Figure 4: Fuels for cooking in Joe Slovo and Khayelitsha[#]

This energy consumption survey was conducted in the period (winter) where most of the important household end-uses such as the cooking was done. This explains why, for instance, households in Joe Slovo used paraffin 19 times per day.

Case 5: 'It is not healthy to consume too much starch' (K9)

Nolusindiso is a single mother who works at a clinic and earns R700 per month. Her small house in Khayelitsha is well kept. She prides herself on the type of food her household consumes. She normally cooks with an electric hotplate but there is also a primus stove, which is used as a back-up, in case of an electricity blackout. She used to own a gas stove, but has since sold it because she feared for the safety of her children.

Like many others in the sample, Nolusindiso cooks twice a day. Almost all her meals are prepared with vegetables. She loathes tinned foodstuffs because she perceives them to be unhealthy (her working environment might have a lot to do with this). In one week her meals include foods like fish, meat and vegetables.

Even in Khayelitsha (see K1 - where there is no visible means of income) where only one wick stove is used for cooking, the meals that are consumed may contain little nutritional value. For instance, it was observed on numerous occasions that the most frequently cooked meals were samp and, what is derogatively known in local township slang as *ntyoro-ntyoro* (sheep offal) which is usually sold very cheaply (sometimes at 10c a piece).

Transitional fuels and research: Conclusions

This paper has raised a number of issues. Access to fuels other than paraffin can have a positive impact on many households' energy budgets. Although paraffin is comparatively cheap, it is very expensive in the longer term if it is purchased in small quantities. Households which depend on paraffin for cooking and buy it in small quantities spend more on fuels than those using alternative fuels or who buy fuels in bulk. This does not, however, mean that electricity will automatically solve household energy problems but, at least, it can provide end-users with a choice.

Energy poverty has an impact on daily household end-uses, such as cooking, and there are strong parallels between household energy and nutrition. Those households that have a stable income and a choice of energy sources are able to buy their fuels in bulk and their nutrition is better than those who cannot. It should also be noted that the points discussed in this paper with regard to a relationship between cooking fuels and nutrition are not by any means conclusive. There are other complex issues which need to be

considered, such as income, personal preferences and education, to name but a few. The purpose of this paper has been to emphasise some of the issues which need to be vigorously pursued in energy research in order to arrive at a broad and holistic knowledge of the way in which individuals interact with fuels.

Another important point concerns paraffin and gas as 'transitional' fuels⁽¹³⁾. This line of thinking has been adequately criticised by McGregor⁽¹⁴⁾ and others, and it will serve no purpose to repeat those criticisms here. A few points will suffice. It has been demonstrated that urbanisation does not necessarily mean modernisation⁽⁵⁾. Contrary to what the transitional model will lead one to believe, low-income households will continue to use the so-called 'transitional' fuels for some time to come. Thus, policy-oriented research should not see paraffin and other 'transitional' fuels as fuels that people 'will grow out of' when they have been consolidated into urban areas. The evidence points to the contrary. Many households in low-income South African urban areas continue to rely on paraffin as a major fuel to meet their basic needs^(1,15). Even households which have been electrified for some time, continue to use paraffin, especially for cooking, in conjunction with other fuels.

What is the relationship between these points and research? In order to have a broad understanding of the relationship between end-users and fuels, there is a need for qualitative and participatory research which records people's life experiences. Energy is used by households under different and, in the case low-income households, difficult circumstances. It is important therefore to understand how people negotiate and make decisions in these circumstances. This paper has attempted to show that quantitative and qualitative research methods are complementary, and that future research should combine these methods in order to capture a holistic view of household energy use.

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ENERGY STATISTICS

COMPARATIVE ENERGY COSTS IN SOUTH AFRICAN CITIES RELATED TO HEATING VALUE

NOVEMBER 1996											
Energy source	Consumer prices			Cost of energy (c/MJ)			*Relative heating costs			Heating value	
	Coast	Inland	Units	C.T.	Jhb	Dbn	C.T.	Jhb	Dbn		
Coal A (Peas)	297,83	87,78	R/Ton	1,06	0,31	0,69	3,39	1,00	2,20	28,0	MJ/Kg
Elect.	22,54	24,43	c/kWh	6,26	6,79	6,06	19,97	21,65	19,32	3,6	MJ/kWh
Heavy Furnace Oil	85,57	105,52	c/litre	2,09	2,57	2,09	6,66	8,21	6,66	41,0	MJ/litre
Illum. Paraffin	143,22	156,78	c/litre	3,87	4,24	3,87	12,35	13,52	12,35	37,0	MJ/litre
Petrol (Premium)	207,00	213,00	c/litre	5,97	6,14	5,97	19,03	19,58	19,03	34,7	MJ/litre
Diesel (Heating)	217,63	229,03	c/litre	5,61	5,90	5,61	17,89	18,83	17,89	38,8	MJ/litre
Power Paraffin	151,39	165,41	c/litre	4,04	4,41	4,04	12,88	14,07	12,88	37,5	MJ/litre
LPG	138,17	156,18	c/litre	5,04	5,70	5,04	16,08	18,18	16,08	27,4	MJ/litre
Gas Sasol Gas	-	19,95	R/GJ	-	1,99	-	-	6,36	-	-	-

This table shows comparative energy costs (in SA cents/MJ) in selected South African cities (coastal and inland) based on a range of energy sources. The following criteria were taken into consideration in the calculation of the cost of energy:

- (1) Transport costs for coal were obtained from Spoornet. Railage of coal was calculated from Saaiwater to Cape Town and from Saaiwater to Durban respectively.
- (2) The energy cost has been calculated on the bulk delivered price for consumers, i.e. includes 14% VAT and other charges.
- (3) All figures for electricity have been based on energy requirements for large commercial users.
- (4) Electricity prices have been based on typical monthly accounts for large users (see Table 5 in the Energy Price List in *Selected Energy Statistics: South Africa*).
- (5) A 75% load factor has been used in the calculation of the Sasol Gas prices.
- (6) *The relative heating costs are shown in relation to the cheapest source, i.e. coal in Johannesburg.

(Source: *Selected Energy Statistics: South Africa*, No. 39, November 1996)

**ELECTRICITY STATISTICS FROM SELECTED SOUTHERN AFRICAN COUNTRIES
1990 - 1995**

Utility	1990	1991	1992	1993	1994	1995
Botswana Power Corp.						
Maximum demand (MW)	159,60	179,50	193,90	186,90	194,70	n/a
Energy sold (GWh)	1021,10	1128,50	1197,20	1240,60	1106,00	n/a
SWAWEK (Namibia)						
Maximum demand (MW)	225,00	240,00	246,00	279,00	251,00	277,00
Energy sold (GWh)	1790,00	1919,00	1747,00	1747,00	1753,00	2015,00
Swaziland Electricity Board						
Maximum demand (MW)	92,00	100,00	103,00	112,00	115,00	117,50
Energy sold (GWh)	444,10	493,60	523,80	555,20	545,80	603,20
Zambia Electricity Supply Corporation						
Maximum demand (MW)	926,10	943,20	993,30	1003,00	n/a	n/a
Energy sold (GWh)	6412,57	6375,42	6624,99	6779,69	n/a	n/a
Zimbabwe Electricity Supply Authority						
Maximum demand (MW)	1575,70	1607,70	1478,30	1553,60	1615,80	n/a
Energy sold (GWh)	8992,00	9248,00	7731,00	8412,80	9035,90	n/a

Sources:

Botswana Power Corporation, Annual Report, 1994.

SWAWEK Annual Report, 1991, 1995

Swaziland Electricity Board. Annual Report, 1993, 1995.

Zambia Electricity Supply Corporation. Statistical Report, 1993/94.

Zimbabwe Electricity Supply Authority. Annual Report and Accounts, 1993, 1994, 1995.

Reprinted from:

(Selected Energy Statistics: South Africa, No. 39, November 1996)

Energy news in Africa

Electricity

Swaziland

France's Sogreah company has been awarded the contract to build a power station for the Maguga dam project in Swaziland. The project as a whole has been estimated to cost about R1,1 billion. The power station, with a planned capacity of 15 MW, has been estimated to cost R90 million and will be financed totally by Swaziland. However, the dam, which represents the bulk of the project, will be funded by Swaziland and South Africa on a 40/60 basis respectively.

(Source: Africa Energy & Mining, 11 September 1996)

Zimbabwe

Several contracts have been signed recently to begin work on the renovation of Units I and II (4x120 MW and 2x120 MW respectively) at the Hwange coal-fired power station. This project is central to the Power III programme which has been estimated to cost \$175 million, part of which has been funded by the World Bank.

South African companies are undertaking some of the work. This includes the construction of an additional air cooling tower and the modernisation of the existing cooling system, and the renovation of the system that supplies coal to the boilers.

(Source: Africa Energy & Mining, 24 July 1996)

The Zimbabwe Electricity supply Authority (ZESA) has formally notified Rio Tinto Zimbabwe (RTZ) that it plans to go ahead with a scheme to build a 600-1 200 MW thermal power station near RTZ's unexploited 924 million ton (Mt) coal resource at Sengwa, near Harare. ZESA has set a preliminary date of 2004 for the commissioning of the plant. It will probably be financed and operated by private investors in keeping with a BOO formula already adopted for the third section of the Hwange power station, the first unit of which should start generating electricity in the year 2000.

The construction of a new coal-powered power station, on top of the build-up at Hwange, would lessen Zimbabwe's potentially dangerous dependence on

hydroelectric power. It could also put an end to the controversial Batoka Gorge hydroelectric scheme, which has been strongly criticised by environmentalists.

(Source: Africa Energy & Mining, 11 September 1996)

Hydroelectricity

Sulzer and ABB are to supply two Francis turbines and 17 km of line respectively for a micro power plant named Mourala in the Congo. The project, which is being financed by South Africa, has been estimated to cost R11 million.

(Source: Africa Energy & Mining, 28 August 1996)

The Banque Ouest Africaine de Developpement (BOAD) is to lend about \$10 million to the Ivory Coast to enable it to rehabilitate its five hydroelectric power stations. Re-establishing the country's hydro capacity will help to cover the needs of the sub-region by means of interconnections. The Ivory Coast's exports have already increased because of the expanded capacity of the Vridi thermal power plant and Vridi II. Exports go mainly to Ghana and via Ghana to Togo and Benin. It is hoped that there will soon be an interconnection with Burkina Faso, possibly about 1998.

(Source: Africa Energy & Mining, 24 July 1996)

Nuclear

The Algerian government recently announced the creation of a Nuclear Energy Commission, which will be responsible for promoting the development of nuclear energy and technology and for coordinating research.

Algeria has two nuclear reactors used for research - a 1 MW reactor supplied by Argentina (1989) and a 15 MW reactor from the People's Republic of China (1993).

(Source: Africa Energy & Mining, 28 August 1996)

Oil and gas

Morocco

A project to build a spur to the North Africa-Europe gas pipeline to supply power stations in the Casablanca region and other coastal locations has been set into motion but there is still much uncertainty regarding the scheme.

While the gas project has been slow to mature, the regulations that formed part of a previous programme also backed by the World Bank still have not been tabled before Parliament. This is a pre-condition for pushing through the gas pipeline project, as for other downstream schemes that can be expected to emerge.

(Source: African Energy & Mining, 10 July 1996)

Namibia

The Kudu gas fields, off the Namibian coast, has finally broken ground. Regarded as one of the world's bigger gas fields, Shell holds a 75% interest in it and expects to prove reserves of about 3 trillion cubic feet. Other figures as high as 10 trillion cubic feet have been mentioned. It has been claimed that this field could be sufficient to drive a 1 750 MW power station for about 30 years.

Eskom is seen as a major potential customer, using the gas to generate 1 750 MW for the Cape. However, Eskom claims that its coal-based electricity is cheaper than the projected cost of electricity generated from Kudu gas.

(Source: Mining Mirror, September 1996)

Nigeria

The West African gas pipeline project which is to link Nigeria to Ghana via Benin and Togo will be underway by mid-November. It is hoped that the project can be implemented by January 1997. Any producer or distributor in the participating countries will be able to use the pipeline to buy or sell gas, on an open-access basis, and the company shareholders will be private investors from the four countries. The pipeline might be extended to the Ivory Coast.

(Source: Africa Energy & Mining, 23 October 1996)

South Africa

The United States Energy Department and South Africa's Department of Minerals and Energy are to cooperate to draft a Gas Act that would spur the development of a natural gas market in South Africa and, in particular, facilitate the construction by Enron of a pipeline into South Africa from the Pande gas field.

This legislation could be introduced into Parliament in 1997. The law will supply a regulatory and tax framework.

(Source: Mining Mirror, September 1996)

Waste

Plans to build power stations in Mauritius running on a combination of sugar cane waste and coal that were shelved under the previous government have been revived by agreements between the State-owned utility CEB and the four sugar producers, including Union Saint Aubin. The project is expected to be completed in 1998.

(Source: Africa Energy & Mining, 10 July 1996)

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Sean Jones has conducted research on children's experiences of migrancy, with a particular focus on the quality of their lives in migrant worker hostels. This work has been published under the title, *Assaulting childhood: Children's experiences of migrancy and hostel life in South Africa* (Witwatersrand University Press, 1993). His more recent research, conducted between 1991 and the present, deals with single motherhood and domestic organisation in woman-led households in the Eastern Cape. He is presently a lecturer in social anthropology at the University of Natal (Durban), where he also the director of the Agency for Cultural and Policy Research, an organisation dedicated to applied research on the relevance of social and cultural variables in the field of public policy. He is also the coordinator of the *Social determinants of energy use* in the Durban Functional Region.

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Anthony is currently the Programme Leader of the *Energy and urban development* project at the Energy and Development Research Centre (EDRC), University of Cape Town. Anthony's academic background has been in social anthropology. He recently completed his M.Soc.Sci degree in social anthropology. His main interests are household dynamics among the African communities in the Western Cape, with an emphasis on people's coping strategies. He has written papers on domestic networks and the impacts of violence on family life in informal areas.

Prior to his present occupation, Anthony has worked on other developmental projects in the Western Cape for the Palmer Development Group, UCT's Urban Problems Research Unit, USAID's Community and Urban Services Support Project, and the Human Science Research Council's Marriage and Family Life Project.

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With a background in social anthropology, Helen Meintjes is presently employed as a researcher for the *Social determinants of energy use in low-income urban households* project at the Centre of Policy Studies. She has also been employed as a researcher in the Natural Resource Management Unit of the Land and Agriculture Policy Centre. Helen has also worked on a part-time basis as an administrator and research assistant for a multidisciplinary environmental consultancy, Environmental Options, and as a freelance research assistant for Robin Lee Associates, a youth development consultancy.

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Caroline White's academic interests lie mainly in the field of social anthropology. After lecturing in the Humanities at Griffith University, Brisbane, Australia between 1980 and 1983, she took up the post of Senior Lecturer in social anthropology at the University of Cape Town. She was appointed as Professor and Head of the Social Anthropology Department at the University of the Western Cape between 1990 and 1991. Caroline is presently employed as a Senior Researcher at the Centre for Policy Studies.

She has published widely on social anthropology issues and on women's rights. Caroline has been, and still is, actively involved in many organisations promoting the advancement of women and affirmative action in South Africa. She is also a Commissioner on the Broadcasting Complaints Commission of South Africa and a Council member of Technikon Witwatersrand.

Forthcoming energy and energy-related conferences: 1997/1998

1997

1998

JANUARY 1997

MAY 1998

SEPTEMBER 1998

21-23
AFRIWASTE '97 : INTEGRATED
WASTE MANAGEMENT SOLUTIONS
Johannesburg, South Africa

24-26
EFFICIENT ENERGY UTILISATION
AND MANAGEMENT : A SEMINAR
Johannesburg, South Africa

13-18
11TH WORLD CLEAN AIR CON-
GRESS AND ENVIRONMENTAL
EXPOSITION Durban, South Africa

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14-17
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Recent energy publications

BANK L, MLOMO B and LUJABE P

Social determinants of energy use in low-income households in metropolitan areas (Eastern Cape). Oct-1996. 147p.
Report No. EO9421

The report attempts to explore the social determinants of energy use in low-income households in Duncan Village. It is not primarily concerned with the measurement and quantification of the domestic fuels used by low-income households. Rather, it is more interested in situating local fuel use practices in clusters of social relations, ideologies and identities within and beyond household units. It is not assumed that there is a one-way relationship between social context and fuel use practices.

CILLIERS S

Surge protection and insulation co-ordination for low-cost electrification networks. Jun-1996. 83p.
Report No. EL9106

The primary outputs of the research proposal were: guidelines on surge protection and insulation for low-cost reticulation networks. The subject of the research project is covered by appropriate parts from the Eskom Distribution Standards.

***DE VILLIERS M G**

Effective energy management: Opportunity for increased profitability. Jun-1996. 2p.
ERI Report No. REP 072
R5,70

Briefly describes how to set up an energy management programme and discusses critical success factors for effective energy management in South African companies.

***DE VILLIERS M G**

Scientific perspectives of integrated resource planning. Jul-1996. 4p.
ERI Report No. REP 073
R5,70

Looks briefly at integrated resource planning, relating it to the energy sector where relevant.

DE VILLIERS M G, HIBBERD A C M and DUTKIEWICZ R K

Methodology for the establishment of a national industrial energy sectoral audit scheme: Part 1. (Recommendations on industrial sectoral studies for South Africa). Jul-1996. 20p.
Report No. ED9401

Examines the relevance of industrial sectoral energy studies in promoting the more effective use of energy in industry, and provides recommendations on how sectoral studies could be conducted. Different types of industrial sectoral initiatives by governments in other countries are examined and their relevance to South Africa assessed. Highlights the potential benefits of sectoral energy studies, and the role of sectoral studies for possible further sectoral initiatives is examined. A breakdown of energy consumption by South African industry is provided, as well as guidelines on the division of industry into groups which are relevant to the sectoral approach. Provides recommendations on how a sectoral study should be carried out, which includes the carrying out of a survey, the content of the sectoral report, and the dissemination of the sectoral study results.

DE VILLIERS M G, HIBBERD A C M and DUTKIEWICZ R K

Methodology for the establishment of a national industrial energy sectoral audit scheme: Part 2. (Energy use in the South African clay brick industry). Jul-1996. 96p.
Report No. ED9401

Examines energy use in the South African clay-brick industry and identifies opportunities for the more effective use of energy. Discusses the results of the survey which was carried out to determine present energy consumption patterns. The report includes an analysis of energy consumption and energy costs by type of fuel, region, and type of production technology. Specific energy consumption is calculated in order to compare energy efficiencies for different plants, technologies, regions and countries. Also identifies factors which affect specific energy consumption, particularly those beyond the control of the brick manufacturer.

DE VILLIERS M G, HIBBERD A C M and DUTKIEWICZ R K

Methodology for the establishment of a subsidised national energy audit scheme. Jul-1996. 91p.
Report No. ED9401

The purpose of the study is to make recommendations on a subsidised industrial energy audit scheme for South Africa. It is recommended that energy audit activity is encouraged through awareness creation, energy management training and subsidised audits. It is recommended that a 50% subsidy be provided, with a cap on the subsidy. Estimates are made of the size of the audit market and participation of the market in the audit scheme, as well as the potential energy savings and benefits of the scheme.

DOMAN N P

Development of a low cost, on-line, dissolved, combustible gas in transformer oil monitor. Jul-1996. 26p.
Report No. EL9105

Reports on the development of an on-line monitor by Eskom's TRI for the detection of dissolved combustible gases in transformer insulating oil.

***DUTKIEWICZ R K**

Prospects for coal in Africa. Aug-1996. 7p.
ERI Report No. REP 076
R5,70

Covers energy resources and reserves in Africa utilised for commercial energy, but emphasises coal - including its quality and demand.

***DUTKIEWICZ R K**

Cape Town Brown Haze Study: Progress report. Aug-1996. 5p.
ERI Report No. REP 078
R5,70

Briefly discusses the latest progress made in the Cape Town Brown Haze project being undertaken at the Energy Research Institute.

***DUTKIEWICZ R K**

Air quality challenges: Road transport in South Africa. Aug-1996. 9p.
ERI Report No. REP 077
R5,70

Discusses air quality in South Africa, particularly with regard to motor vehicle emissions. This includes photochemical smog and emissions from diesel engines. Outlines the study on the monitoring systems and the production of an inventory of air quality data related to road transport, research on photochemical smog, in relation to the introduction of unleaded petrol in South Africa.

***HIBBERD A C M, DE VILLIERS M G and DUTKIEWICZ R K**

Energy use in the South African clay-brick industry. Jul-1996. 33p.
ERI Report No. GEN 177
R34,20

The study covers an investigation into energy use in the South African clay-brick industry. The factories surveyed were divided into clamp and non-clamp operations. The report looks at the structure of the industry, types of energy used by the brick industry, energy consumption, energy costs, comparison of clamp and non-clamp operations, potential energy and cost savings in the brick industry, and a comparison of South African energy usage with other countries.

JONES S, AITKEN R and LUCKIN L

Power, posterity and poverty: An ethnographic study of the social determinants of fuel use in Cato Manor, Durban. Feb-1996. 203p. + appendices
Report No. EO9422

Documents and compares patterns of domestic fuel use in a number of settlements in the broader Cato Manor area of Durban. Based primarily on the qualitative research techniques of social anthropology, it seeks to contribute to the development of a sociology of fuel use in the domestic context. It must be stressed that the study is concerned primarily with the social determinants of fuel and appliance use. Its central finding is that the inhabitants of each of the settlements exhibits a set of fairly distinct social characteristics, and that these social characteristics impact heavily on fuel choices and fuel-related practices in the domestic context. The insights realised here are seen to have important implications for the understanding of the multiple func-

tions and meanings that attach to certain energy types. As such, it is claimed that they are of direct relevance to energy policy formulation.

LANE I E

Demand-side management options for the domestic sector. Sep-1996. 189p. + appendices
Report No. ED9207

Produced models and data to estimate the impact of possible demand-side management (DSM) measures in the domestic sector. Mentions that this probably the first end-use disaggregation study on formal urban (all electric) homes in South Africa. The main emphasis of the project was to determine the end-use contributions to demand at the transformer. The main value of the project is seen to be the end-use modelling tools which are currently being used to enable Eskom to do "what-if" scenario planning for residential DSM. The project had significant value in predicting the typical impact of DSM on electricity costs to the consumer under unit cost and time-of-use tariff structures.

LANE I E

Demand-side management options for supply authorities in the manufacturing sector. Aug-1996. 1V.(various pagings)
Report No. ED9205

Covers DSM options for supply authorities in the manufacturing sector. The primary output is the development of a methodology which can be utilised by supply authorities to audit, quantify and activate cost-effective DSM options for existing and planned load. The aim is to identify the potential for DSM programmes and to expose the barriers which currently prohibit the widespread application of such DSM measures in industry. The following outputs were to be produced: a quick load auditing kit, a load auditing manual, an electricity cost change simulator, site auditing and training, a supportable end-use information database, cost/benefit analysis and reporting, the monitoring of incentive negotiations and change (such as, new tariff incentives and how industry responds to them).

LOON M

Integrated rural energy planning for South Africa. Aug-1996. 134p.
Report No. EO9414

Investigates the potential for integrated energy planning (IEP) methodology to be applied to the rural context in South Africa. Also looks at other factors such as, characteristics of existing initiatives in addressing rural energy needs, the institutional contexts in which rural development and rural energy interventions occur, as well as the ability of poor rural people to make their needs heard.

PALMER R

Solar cooker field test baseline study. Jul-1996. 65p. + appendices
Report No. EO9608

Forty households in five study areas were randomly selected and interviewed to form a baseline survey from which 20 households per study area could be selected to have solar cookers placed with them for one year. Ten control households were also selected, as well as a number of institutions. Outlines the methodology, the areas studied, the institutions, the findings (including socio-economic aspects) and recommendations for future studies.

***PINEDA C A and DE VILLIERS M G**

Air pollution study in the Cape Town area by proton-induced x-ray emission spectroscopy (PIXE). Aug-1996. 5p.
ERI Report No. REP 074
R5,70

Reports on the study that was conducted during the 1992 winter period in which the trace element composition of the Cape Town brown haze was determined for a limited number of episodes at two sites. Mentions the results of the most common pollution elements found originating mainly from vehicles, townships, industries, sea salt and crustal matter from macro-PIXE analyses. Also mentions the results of micro-PIXE irradiations.

SNOW A P

Recommendations for the production of technical guidelines [for] integrated energy in the developing sector. Aug-1996. 53p.
Report No. ES9504

The primary output of this project was to generate practical, implementable and acceptable recommendations for the production of technical guidelines for integrated energy planning (IEP) in the developing urban sector. This was undertaken by

means of workshop sessions which formed part of the Southern African Institute of Energy's conference entitled "Household energy for developing communities".

TERBLANCHE P

Literature summary on the health effects of lead with special reference to lead in petrol. Sep-1996. 39p.
Report No. EV9503

A summary, not a review, of relevant literature on unleaded/leaded in petrol. Includes a computerised literature for epidemiological studies on lead and community health for the period 1990-1994. The search was taken from the database of the U.S. Library of Medicine. Specific aspects examined were the contribution of lead in petrol to body burden, blood lead "levels of concern", international trends in reducing lead in petrol, international exposure limits for lead in air, the South African situation.

UNIVERSITY OF CAPE TOWN (ENERGY AND DEVELOPMENT RESEARCH CENTRE)

Analysis of new electrification schemes in the Western Cape (Phase 4). Sep-1996. 106p.
Report No. EO9413

The primary objective of this longitudinal study has been to examine electricity use in low-income urban settlements in the Western Cape. A further objective has been to try and understand factors which result in movement from multiple fuel use

to greater reliance on electricity. To achieve this the study has investigated the ways in which low-income households fulfil their daily energy needs, and the problems they experience with various energy sources, including electricity.

WHITE C F

Social determinants of energy use in low-income households in metropolitan areas (Co-ordination project). Aug-1996. 34p.
Report No. EO9424

Briefly summarises the main features of the samples in this project, some comparative observations, the recommendations and the conclusions. The research covered low-income households in four metropolitan areas (Gauteng, Durban, East London and Cape Town, and examined regional variations in fuel use patterns, including the social implications, and then makes various recommendations based on the research results.

WHITE C F, CRANKSHAW O, MAFOKOANE T and MEINTJES H

Social determinants of energy use in low-income households in metropolitan areas (PWV). Jul-1996. 81p.
Report No. EO9423

Looks at the utilisation of various fuels by selected low-income households in Gauteng, stressing the social determinants for the fuel use patterns. Outlines the research methods used, the fuel used in the various settlements, electricity and transitional fuel use, gender identities, fuel sharing, and insulation of dwellings.

***WONG C T**

Effect of altitude on SI engine using an alcohol blend fuel. Aug-1996. 11p.
ERI Report No. REP 075
R5,70

Describes an experimental investigation into the effect of altitude on a locally mass-produced spark ignition engine using a 10% ethanol blend. Tests were performed in an altitude simulation dynamometer test cell at the Energy Research Institute. Comparative assessments were made of the altitude on fuel economy, carbon monoxide emissions and knock response in terms of knock limited spark advance with the 10% ethanol blend and a straight gasoline.

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The publications can be ordered from:

The Librarian, Chief Directorate: Energy, Department of Minerals and Energy, Private Bag X59, Pretoria 0001, South Africa, unless otherwise indicated. Prices are available on request from the Department of Minerals and Energy.

Reports marked * are available from the Information Officer, Energy Research Institute, P O Box 207, Plumstead 7801, South Africa, at the prices indicated.

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