Energy for microenterprises

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EXECUTIVE SUMMARY

The main objective of this report is to determine the energy consumption patterns and energy preferences of microenterprises in urban and rural poor townships of South Africa. This is considered to be critical in establishing: firstly, the role that electrical energy plays in the development of the microenterprise sector in South Africa; and secondly, estimating the impact that increased demand for electricity from this sector will have on the total demand for energy in this country.

There is a serious dearth of information and research on the issue: we identified only four studies into the energy use of microenterprises — in Khayelitsha (Western Cape), QwaQwa, Hartbeesfontein and Elandskraal. In addition, the author carried out in-depth interviews with microenterprise owners in the Western Cape. Despite this inadequacy, our review of the available literature and research into microenterprises in South Africa indicates that a large percentage of microenterprises in non-electrified areas are forced to rely on less efficient, more costly sources of energy than electricity. Those who did use electrical energy found it to be:

- cheaper (it was observed that the energy expenditure of micro-enterprises operating in areas where electricity was available was lower than those in non-electrified areas);
- more reliable;
- easy to use; and
- a critical factor in raising the quality of the goods and services provided by these microenterprises.

Most entrepreneurs interviewed in this study expressed considerable interest in accessing electricity.

From these observations, we conclude that access to electricity can play a central role in:

- expanding the microenterprise sector as a whole;
- transforming microenterprises from low value enterprises into higher value, more productive and profitable enterprises, by making available to them a resource which can significantly raise levels of productivity and efficiency;
- wider electricity use by microenterprises in residential areas which will have a favourable impact on system load factors (as load profiles are more constant than domestic loads) and will thus reduce the overall cost of electricity provision to these areas.

Flowing from the findings of this report, it is recommended that:

- Microenterprises should be given representation on the governing councils of restructured local electricity distribution authorities.
- Agencies allocating finance and training for the sector should prioritise the granting of assistance which increases usage of electrical energy.
- There should be careful design of the electricity distribution network to maximise profitability as well as to meet the load requirements of microenterprises.
- Where electricity is not available, bulk distribution and improved pricing of alternative fuels are essential.
- Owing to the time restriction and insufficient information available for this report, further studies should be carried out to establish the impact of electricity on microenterprise development.

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CHAPTER ONE

Introduction

There can be no doubt that one of the most critical challenges facing South Africa in the current period is the generation of economic growth. The past decade has witnessed widespread economic stagnation — negative growth rates in the 1990s; crises in the manufacturing sector; and consequently, a massive increase in unemployment, with over 40% of the black labour force being unemployed.

Key to the revival of the South African economy is the restructuring of the manufacturing sector. This sector has proven in many newly industrialising countries to be instrumental in stimulating growth and macro-economic stability, by not only meeting domestic economic needs, but by producing competitively priced goods for export markets.[1]

Internationally, small firms have demonstrated the capacity to make a substantial contribution to increasing the competitiveness of their economies. Yet small and micro enterprises in South Africa have historically had to contend with two powerful forces which stunted their growth: firstly, the apartheid regime, imposed a barrage of restrictions which prevented the emergence and growth of dynamic black owned small business in South Africa. The dominance of the large corporations in the South African economy constitutes the second significant obstacle against which small firms have to contend, since they have a history of crowding out small, independent competitors. These factors have resulted in a particularly skewed pattern of small enterprise development in South Africa: microenterprises and small businesses are located largely in the commercial sector engaging in petty trading activities. They have failed to penetrate the manufacturing sectors, and tend to be driven by subsistence rather than by profit motives.

There are three major reasons for promoting the emergence and strengthening of dynamic small and micro enterprises in South Africa:

- Since it is primarily through micro and small firms that blacks can enter the economy as entrepreneurs, these firms play a critical role in the process of democraticising the South African economy, to redress the stark racial imbalances found there.
- As more blacks enter the economy as small entrepreneurs, income is increasingly being distributed along more equitable lines.
- Dynamic small firms can play an important role in contributing towards the economy's competitiveness, both as end producers for the final market, and as subcontractors complementing the performance of larger firms.

Agencies attempting to promote small and micro sized firms in South Africa need to recognise the multiple obstacles which impede the growth of these firms. A great deal of the research on small firms has focussed on their financial, marketing and skill constraints, yet little attention has been paid to their technological constraints. This paper attempts to address this deficiency by focussing on the energy considerations affecting small firms, recognising that energy is one of the critical resources needed to liberate microenterprises from low value, low productivity, and low income activities. We argue that access to energy is vital if microenterprises are to enter into more productive activities and to thus enhance their competitiveness. In addition, the development of small enterprises will have important implications for total energy demand, the pattern of energy consumption and the mix of energy carriers.

1. Newly industrialising countries such as Korea, Taiwan and Malaysia, provide good examples of the efficacy of growth strategies which target the restructuring of the manufacturing sector. See Wade, R. 1991. *Governing the market*, Princeton University Press.

Modern technology relies largely on electricity as an energy source, yet most microenterprises are forced to rely on inconvenient and expensive fuels. This study aims to establish:

- the general energy consumption patterns of microenterprises and the relative cost of different fuels;
- the preferred energy carrier for microenterprises; and
- the contribution of electricity to the competitiveness of microenterprises.

1.1 Methodology

The data on which this report is based was gathered both through a literature review and the collection of primary data from small business entrepreneurs. Case studies of microenterprises in both electrified and unelectrified areas were conducted in order to compare the impact of electrification on their performance. In addition, managers of two agencies which support small business development — the Small Business Development Corporation (SBDC) and the Eskom small business unit — were interviewed.

Time, methodological, and financial constraints prevented the gathering of more extensive primary data, especially on a national scale, thus this paper is unable to develop a rigourous analysis of:

- the potential contribution that this sector could make to the economy if it were well supplied with electricity; and
- the potential contribution of this sector towards increasing the electricity system's load factor leading to an eventual decrease in unit cost of electricity per kWh in those areas where they operate.

1.2 Outline of report

The report commences with a general discussion of the definition, characteristics and constraints of microenterprises internationally and in South Africa. In Chapter 3 — we examine the benefits which microenterprises in different economic sectors can derive from the usage of electricity. Chapter 4 traces the energy consumption patterns of microenterprises in South Africa, using case study data. Chapter 5 comprises a comparative case study of enterprises in both electrified and unelectrified townships. Chapter 6 presents the major observations and policy conclusions emanating from the study.

CHAPTER TWO

Characteristics of microenterprises

2.1 Definitional issues

The 1972 International Labour Organisation (ILO) Mission to Kenya on employment and growth brought widespread international attention on the phenomenon termed the 'informal sector'. According to the ILO definition, this sector — which is characterised by its evasion of regulation, ease of entry with low capital and skill requirements, use of labour intensive techniques and family labour in the enterprise — is responsible for employing large proportions of the economically active labour force in most developing countries.

Although the term 'informal sector' has gained widespread currency in development circles, it has been subject to much criticism: firstly, that it evokes an image of dual economic sectors, locating this sector on the margins of mainstream economic activity. Data emerging from many developing countries provides evidence to the contrary, showing that there is a strong inter-relationship between the 'informal sector' and the mainstream economy (and in fact, that in several economies it is the informal economy which constitutes the main fabric of the economy). The second problem with the concept is the homogeneity which the term 'sector' implies. It suggests that one can identify within the sector a similar set of activities, when in reality, the concept encompasses a highly diversified and heterogeneous set of economic activities, ranging from marginal trading activities to sophisticated engineering works serving big industry.

Because of these conceptual weaknesses, the term 'microenterprise' is used instead of 'informal sector' throughout this paper. Several criteria are used to define a microenterprise, including number of employees, size of turnover, and size of initial start-up capital. Thus an enterprise with less than 10 employees, which was started with a capital base of R5 000 or less, and whose turnover is relatively small (less than R1 million per year) may be defined as a microenterprise

Microenterprises may be found in a number of sectors: in manufacturing (which tend to be in the labour intensive sectors such as garment, furniture and footwear manufacturing); in services (such as hair/beauty services, transport); and in commerce (trading activities).

2.2 Developmental role of microenterprises

There is much debate in the international literature over the developmental impact made by microenterprises. Left-leaning scholars have tended to dismiss small and micro enterprises as constituting that part of the economy which occupies a highly vulnerable and unsustainable position vis-a-vis large firms, and which perpetuates poverty amongst both employees and entrepreneurs. A contrasting position, which emerged from the ranks of the ILO and associated scholars, bases its argument on the premise that the crises pervading most developing economies make it structurally impossible for sufficient jobs to be created to absorb available labour. In this context, it is argued, policy makers have little option but to seek to identify ways of improving the position of the vast numbers of people already participating in microenterprises. They point also to the growth spin-offs that emanate from segments of the microenterprise sector, which can serve as a training ground for entrepreneurs and school-leavers deprived of these opportunities elsewhere. The positive role of microenterprises in providing basic low cost consumer goods to the poor is also pointed to.

Without undertaking a comprehensive comparison of the developmental impact of microenterprises in different parts of the world, it is difficult to come to any serious conclusion on this issue. We would argue that it is precisely in assessing the wide differences between the various types of enterprises in the microenterprise sector that the answer might lie. That is, enterprises engaged in different types of activities would yield very different developmental impacts. Thus for example, small manufacturers serving middle income consumers are likely to yield relatively high incomes for themselves and their employees, and may demonstrate significant growth potential, in compariaon to, for example, petty traders operating outside train stations. This reasoning leads us to conclude that any attempt to measure the developmental impact of the microenterprise sector as a whole will be fundamentally flawed, as it will fail to distinguish between the different characteristics and constraints affecting different sectors and types of firms within the microenterprise sector.

2.3 Characteristics and size of the microenterprise sector in South Africa

The South African labour force is presently growing by about 2.9% per annum, while labour absorption in the formal sector stands at about 10%. In other words, nearly 90% of school leavers are unlikely to find employment in the formal economy. As an increasing proportion of the labour force finds itself unemployed or underemployed, informal employment becomes one of the few alternatives still available.

Due to the unregulated nature of most microenterprises, it is very difficult to estimate the size of this sector, and its contribution to GDP. The table below shows various estimates of the approximate contribution of this sector to GDP and employment. Although estimates vary widely, it is evident from Table 2.1 that microenterprises play a major role in the South African economy.

Study	*% contribution to GDP*	*% contribution to employment*
Kirsten	6.5	1.72m
CSS	7.9	2.72m
SARB	10	na
Abedian	12	na
Kantor	16–40	na
SBDC	30	na

TABLE 2.1 Contribution of microenterprises to GDP and employment
Sources: Kirsten (1988); Central Statistical Service (1990); Abedian & Desmidt (1990); Kantor (1989); SBDC – various publications.

As in most other developing countries, microenterprises are to be found in the retail, service and manufacturing sectors.

- Retail: this sector comprises mostly of traders. It includes:
  - the buying and selling of new commodities, especially essential goods produced in the formal market; and
  - the buying and selling of second hand commodities such as clothes, furniture, motor vehicle spares, etc.
- Services: a significant number of people are engaged in the provision of personal services such as shoe repairing, hair dressing and barbering services, portrait photography, traditional healing (sangomas), herbalism (nyangas), etc. Many of the operators in the service sector are women and operate from home. Non-personal services are provided by the tinkers, backyard mechanics, spray painters

and panel beaters, and home appliance repairers whose specialities range from Primus stoves to microwave ovens.

- Manufacturing: this sector consists of small scale owners operating enterprises outside the regulatory framework of the state. These include activities such as carpentry, tailoring, metal work, and the production of other cheap durable goods, largely serving low income consumers.

Table 2.2. shows the distribution of microenterprises between the various sectors, as estimated by different studies.

Study	*Type of activity*	*% distribution of microenterprises*
CSS	Retailing	46
	Services	31
	Manufacturing	23
Kirsten	Retailing	55
	Services	22
	Manufacturing	23
GEMINI	Retailing	70
	Services	14
	Manufacturing	16
ACHIB*	Retailing	40
	Services	26
	Manufacturing	14

Note: The GEMINI study was conducted in two townships; Mamelodi in Pretoria and Kwa Zakhele in East London. Kirsten's sample includes rural areas.
**African Council of Hawkers and Informal Businesses*

TABLE 2.2 Type of microenterprises in South Africa
Sources: CSS (1990); Kirsten (1988); GEMINI (1991), cited in Manning & Mashigo (1993)

The data reflected in the table also highlights the relatively small proportion of microenterprises which are engaged in manufacturing in South Africa. A 1989 study (World Bank 1989) of microenterprises in 7 African countries showed that in 6 of the 7 countries microenterprises were responsible for 59% or more of total manufacturing employment. The scarcity of manufacturing microenterprises is more conspicuous when South Africa is compared to other developing countries as shown in the Table 2.3 below.

Country	*% of microenterprises in manufacturing*
Lesotho	36
Kenya	45
Ivory Coast	23

TABLE 2.3 Proportion of microenterprises involved in manufacturing in several African countries
Sources: GEMINI (1991), cited in Manning & Mashigo (1993)

The relatively small proportion of manufacturing microenterprises in South Africa is attributable largely to the apartheid regulatory structure. In terms of the 1923 Urban Areas Act, the (white) urban local authority controlled the allocation of all 'formal' trading sites within a 'black' townships, and also had the right to prohibit hawking (and later peddling) if it so wished. The two Land Acts also denied African people the opportunity to own land. A 1963 circular to all local authorities around the country limited black business ownership to a single enterprise. Up until 1976,

black entrepreneurship was limited to about 25 trades and professions, which was expanded to 52 in the late 1970s. Dry-cleaning shops, bookshops, motor garages, petrol stations and even pharmacies could not be legally established in the townships until after 1976, and manufacturing activities were possible only after 1979.

2.4 Major constraints facing South African microenterprises

The following have been identified by numerous studies to constitute the most serious constraints impeding the growth and emergence of microenterprises (Schacter 1992; Manning & Mashigo 1993). Any policy which seriously attempts to promote small and micro enterprises must concentrate its efforts on addressing and alleviating these constraints:

2.4.1 Access to product markets

Microenterprises are constrained from accessing many product markets by both external factors — linked to the nature of the market environment in South Africa — and by internal factors — capacity-related problems such as quality, consistency and delivery times. On the one hand, microenterprises attempting to enter most product markets are continually confronted with inaccessible markets which are dominated by the products of large firms. They tend thus to be confined to uncompetitive markets, where profits are lowest, and into which large numbers of small entrepreneurs are crowded. Another feature of the market is that microenterprises tend to be confined to serving low income consumers. This limits the range of products and the scale of production carried out by the microenterprise.

On the other hand, capacity problems — skill, technical expertise, and business contacts — prevent microenterprises from breaking into markets which require consistently high quality. One of the key marketing challenges facing microenterprises is this to develop the access, capacity and skill to serve more sophisticated consumer markets.

2.4.2 Access to capital

The most widely cited obstacle facing small firms is their inability to access finance from the formal financial system. Black entrepreneurs — historically prevented from owning property through both legal and socio-economic measures — lack the collateral required by banks to access capital. In addition, small, less resourced and black-owned firms tend to lack the traditional accounting skills which demonstrate sound business acumen. Further, cultural barriers operate against less sophisticated clients wishing to enter the formal banking system — language, literacy, gender tend to constitute serious barriers to entry into the system.

2.4.3 Skill constraints

One of the pre-requisites for success in small businesses is that the entrepreneur possesses a range of skills necessary to run a business — s/he needs to have technical, managerial, accounting and marketing expertise. Since blacks in South Africa have been systematically prevented from accessing most skills,[1] it is clear that this is a major barrier to the emergence of dynamic small firms.

2.4.4 Inadequate infrastructure

Legislation imposed during the apartheid era effectively prevented serious economic activity from taking place in the black townships. Despite the lifting of this legislation in recent years, its toll continues to be felt throughout the black areas of South Africa. Research into microenterprise manufacturing in 1993 (Manning & Mashigo 1993) found that township infrastructure was wholly unsuitable for manu-

1. It was illegal for African workers to be trained as artisans until 1979, so there are few formally trained artisans in the African community, even at present.

facturing — electricity supply and telephones were either lacking or unreliable; transport to and from townships was inadequate, crowded, and often dangerous; and there was an almost complete absence of banking and other services vital to running a business.

2.5 Macro-environmental considerations affecting microenterprises

Whilst a small business promotion strategy must address the constraints identified above, a comprehensive strategy to promote the sector must seek to influence the macro environment in which small and micro enterprises operate. Key features of the macro context which require attention are: macroeconomic policy; technology policy; the institutional and regulatory environment; and the global environment.

2.5.1 Macroeconomic policy

The impact of the macro economy on the performance of microenterprises is patently clear and need not be spelled out in detail: inflation impedes microenterprises' ability to plan for the future; low or negative growth rates imply unhealthy macroeconomic conditions, including poor demand for goods and services.

Policy makers need to focus on the impact that broad macroeconomic policy has on small firms. Trade policy provides a clear illustration of this: high tariffs erected to protect big business create a bias in the market against small firms (by giving the large corporations preferential access to subsidies etc). Selective lowering of tariffs — in certain markets — may thus help to level the playing fields somewhat, and allow microenterprises to compete more equitably against the large producers and retailers.

2.5.2 Technology policy

Government's current policy towards the technological needs of business is blatantly biased in favour of large firms, and virtually ignores the needs of smaller firms. Thus no attention has been given to identifying the technical and technological needs of microenterprises and small firms — most of which are likely to be fundamentally different from those of large, sophisticated firms. A reorientation of South African technology policy is thus vital for the promotion of small firms.

2.5.3 Institutional and regulatory environment

Although explicit racist regulations against small black firms have been removed in recent years, the damage caused by these laws cannot be over-estimated. In order to redress this legacy, a clear and wide ranging support programme to promote small businesses in which government plays a central role must be developed. In order to shape an institutional and regulatory environment in which small and micro enterprises can emerge and grow, government needs to manipulate the following instruments at its disposal:

- Competition policy: to curb the powers of the large corporations found to be guilty of engaging in anti-competitive behaviour against small, independent competitors.
- Budgetary support: to allocate significant — but sustainable — financial support to promote access to resources which microenterprises cannot afford to purchase on the market.
- Legislation: to lift those remnants of legislation found to continue to constrain small firms operation.

Procurement policy: to undo the current policy bias in favour of procuring goods and services from large, white owned firms, and to seek to source also from small and black owned firms.

2.5.4 The global context

As the world economy becomes a more open one, microenterprises — along with other firms in South Africa — will become more vulnerable to competition from other economies. In order to assist small firms in their struggle to survive the effects of import competition (in many product markets), a comprehensive strategy incorporating the elements discussed above must be developed.

2.5.5 Conclusions

It is clear from the preceding discussion that access to an adequate energy or electricity supply is just one factor determining the performance of microenterprises. It is nevertheless an important one, as is evidenced by several studies:

Table 2.4 illustrates the three major factors found by various studies to contribute to productivity of enterprises (Institute for Futures Research 1991). It is evident from this table that technology is a major factor affecting the productivity of the microenterprises. Since modern technology is electricity dependent, one can conclude that electricity is a prime agent in upgrading the productivity of this sector. This argument is supported by evidence emerging from our data in the following chapter, which shows that the competitiveness of microenterprises improves with access to electricity.

Data emerging from a study into manufacturing in microenterprises (Manning & Mashigo 1993) found that those enterprises which served more affluent markets tended to use more sophisticated technology (electricity dependent), in order to enhance their productivity and quality. The implication of this finding is that access to electricity is a pre-requisite for an enterprise to enter new, more affluent markets.

	Denison 1994	*Kendrick 1973*	*Christiensen Cummings Jorgensen 1983*
Capital	20	18	42
Technology	62	72	44
Labour quality	18	10	14

TABLE 2.4 Major factors contributing to productivity of enterprises
Source: Institute for Futures Research (1991)

Chapter 3 explores some of the main advantages which microenterprises can derive from accessing electricity in South Africa.

CHAPTER THREE

The benefits of electricity supply

In general, a wide spectrum of benefits can be ascribed to the use of electricity. This chapter explores the main advantages to be gained from electricity usage, focussing on the impact of electricity on different segments of the microenterprise sector.

3.1 The impact of electricity on microenterprises

It was noted earlier in the report that one of the most striking features of the microenterprise sector in South Africa is the relatively small size of the manufacturing sector. Although it is difficult to measure the causality in precise terms, the absence of electricity in most Black townships until very recently does appear to be have contributed towards this dearth of manufacturing. This view is articulated by the key government and private sector agent responsible for small business promotion — the Small Business Development Corporation (SBDC). The SBDC argues that the rapid electrification of black urban areas is one of the major catalysts for the emergence of manufacturing in the black townships.[1]

Yet inadequate access to electricity continues to plague most township based microenterprises. The rate of electrification has been slow, and those areas which are electrified continue to experience frequent blackouts. This forces microenterprises which are highly energy dependent to either use alternative energy sources; or to move out of the townships into the city centres. The former option may have the effect of undermining the enterprises' efficiency or productivity (forcing them to use less efficient energy sources), whilst the latter option may have negative developmental impact: firstly, it could stunt the development of black areas, since capital which could have circulated in the townships is forced out; and secondly, it removes microenterprises from their main customer bases. Clearly, therefore, access to electricity must be recognised to play an important role in creating the conditions for microenterprises to emerge and to expand.

3.1.1 The impact of electricity on the manufacturing sector

Electrification allows manufacturers to use power driven tools and equipment, which:

- helps microenterprises to 'graduate' into more lucrative markets, where quality and diversification are key to competitiveness of enterprises.
- facilitates an increase in productivity (measured by the amount of inputs necessary for a given unit of output);
- reduces the time and effort required to perform an operation;
- enhances microenterprises capacity to perform several activities concurrently;
- increases product variety;
- improves the customer/manufacturer relationship due to improved capacity to meet customer's requirements in time; and
- allows enterprises to operate at night and therefore increase output.

3.1.2 The impact of electricity on the retail sector

The most useful benefit which micro retailers derive from electricity is access to refrigeration. Electric driven refrigeration offers important economic and nutri-

1. Of course, other factors must be recognised to have played a significant role, such as changes to legislation enabling blacks to enter hitherto restricted trades (see Chapter 2).

tional benefits: not only does it reduce costs for the entrepreneur (through reducing the need for regular deliveries) but it also enables the final consumer to purchase fresher produce. Other benefits derived from electrification include:

- the possibility of buying fresh food in bulk directly from producer/farmers;
- improved lighting condition inside the shop leading to a reduction in shoplifting;
- improved air conditioning which invites clients to browse for longer periods and thus make more purchases;
- enhanced shelf display which attracts more customers (especially those who prefer a supermarket atmosphere); and
- a reduction in reliance on the use of noisy and expensive generators for refrigeration purposes.

3.1.3 The impact of electricity on the service sector

In the service sector, fuelwood is most popularly used for cooking. The considerable amount of time and effort spent on fuelwood collection impacts negatively on the performance of these enterprises, as it impinges on the time needed to perform other tasks. Moreover, combustion of fuels such as coal, paraffin, fuelwood, in confined spaces (as is the case in the townships), has led to significant respiratory disease, accidental burns, loss of life through fires, eye strain from smoke and serious atmospheric pollution (Van Horen 1994). Electricity eradicates many of these problems and enhances the working conditions of entrepreneurs in the service sector.

In the case of the repair industry, the contribution of electricity is similar to that in the manufacturing sector. For example, it offers the opportunity to upgrade the quality of the product being repaired and to increase task variety. Other advantages include:

- the possibility of acquiring electrical tools such as metal cutting machinery, drills, welding machines, hair-dryers, etc;
- the ability to use convenient testing equipment;
- the use of electrical air compressors for fixing tyres;
- less dependence on batteries;
- the possibility of fixing electrical appliances. (This constitutes a fairly large market both within and outside the townships);
- the improvement of the working conditions of employees of microenterprises.

Although the capital costs of electricity are frequently higher than those for other energy sources, the use of this more efficient source of energy is likely to result in the lowering of other costs, and to increases in profit margins.

3.2 Conclusion

It is clear that electricity can play a major role in the development of microenterprises in the townships. Not only does this source of energy enhance the conditions of work and life for inhabitants of the townships, but electricity can facilitate microenterprises entry into more lucrative markets, stimulate the production of goods and services of a substantially higher quality, and in general contribute towards the dynamism of the sector. The next chapter traces the energy consumption patterns of microenterprises in South Africa, using fieldwork data.

CHAPTER FOUR

Energy consumption patterns of microenterprises

This chapter aims to establish which energy sources are most commonly used in microenterprises. The current energy consumption patterns of a sample of microenterprises in electrified urban areas in the Western Cape, and unelectrified rural areas in QwaQwa are examined. Data from 6 detailed interviews, is used to compare the preferred energy sources in areas which have electricity to those used in areas without electricity. The preferred energy sources of rural areas are also discussed, using material from a study in QwaQwa, Edendale and Imbali.

4.1 Current energy consumption patterns

The average electricity consumption of recently electrified Khayelitsha households which operate businesses is 474 kWh/month, while those without businesses consume 324 kWh/month (Thorne & Theron 1993). In Langa and Gugulethu, which have been electrified for about forty years, the electricity consumption of households without businesses averages 474 kWh/month, whilst those with businesses consumed an average of 1 358 kWh/month.

A 1992 survey (Thorne & Theron 1993) of 108 households in Khayelitsha, Langa and Gugulethu found 18 home-based microenterprises. Of these 11 were retailers, 3 were tavern owners and 4 manufacturers. The retailers vary from small 'spaza' traders to general dealers. Although entrepreneurs would not reveal their incomes, their monthly expenditure figures are used to assess their financial potential. Table 4.1. outlines the results found in the interviews.

Type	*Area*	*Elec in kWh*	*Monthly expenses*	*Total energy cost/mth (rands)*				
				elec	*wood*	*paraffn*	*candle*	*gas*
service	Gugs	554	1 159	65	0	0	0.70	0
service	Bong	484	1 500	150	2.5	0	0.60	0
service	Gugs	2 089	6 000	289	0	0	1.25	49
retailer	T2V3	185	1 039	100	1	2	0.30	12
retailer	T2V3	205	840	80	0	0	0	0
retailer	T2V3	90	781	40	0	0	0.35	24
retailer	T2V3	737	629	100	1	2	030	0
manufact	Gugs	1 228	1 749	0	1.2	70	0.30	0
manufact	Bong	n/a	4 288	250	5	0	1.35	0
manufact	Gugs	980	2 469	180	2	0	0	0
manufact	T1V2	286	463	80	3	42.3	0	0
retailer	T2V4	326	1 316	120	0	3.75	0	35
retailer	Gugs	1 757	1 868	400	3	2.4	0	0
retailer	T1V2	163	668	40	15	0.90	1.80	15
retailer	T1V2	162	347	40	3	0	0	0
retailer	T2V1	157	835	10	0	45	0	11
retailer	T2V1	167	2 650	60	0	37.5	0	0
retailer	Bong	n/a	1 520	900	1	1.6	0.33	0

Table 4.1 Summary of monthly expenditure pattern in the sample of 18 microenterprises

The table evaluates the current energy usage in terms of the following:

- monthly electricity consumption pattern
- monthly total expenditure
- energy expenditure pattern of microenterprises

4.1.1 Monthly electricity consumption

An examination of the average monthly kWh consumption from Table 4.1 shows that Gugulethu, which was one of the first townships to be electrified, has the highest consumption rate (at about 1 300 kWh/month). The other areas, which have been electrified for shorter periods, show considerably lower monthly consumption. This reflects a general pattern: that the rate of electricity consumption increases over time as people purchase new appliances and abandon the use of other fuels.

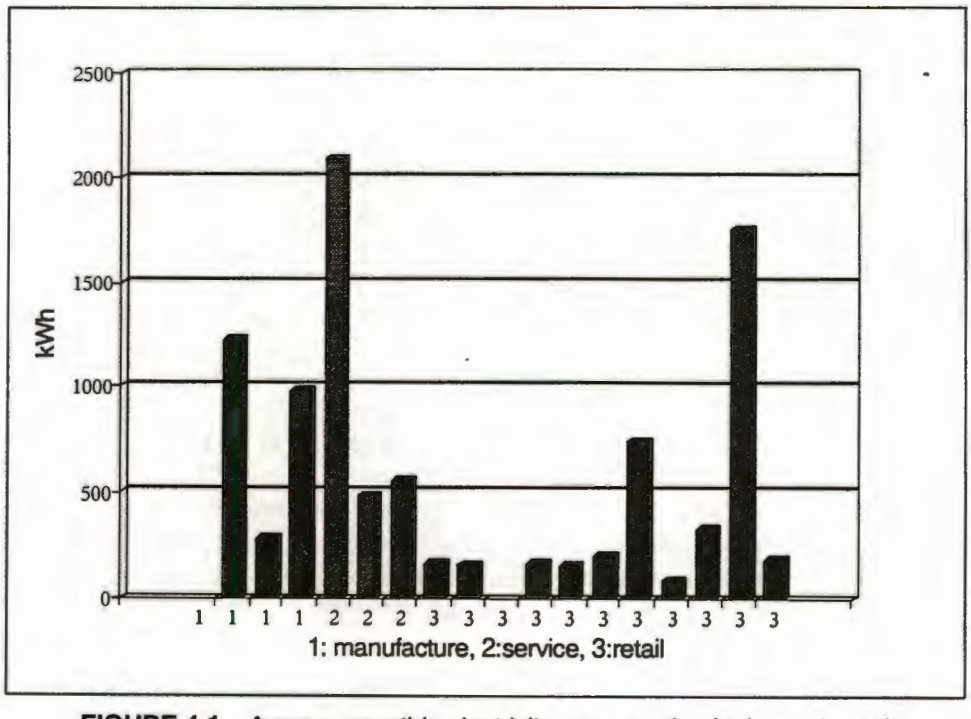

FIGURE 4.1 Average monthly electricity consumption by home-based microenterprises in Khayelitsha, Langa and Gugulethu

Figure 4.1. examines the distribution of energy consumption between different economic sectors — manufacturing, service and retail sectors — and shows that each of these sectors contain high electricity consumers. It must be noted that all of those in the service sector interviewed in this survey are tavern owners and the electrical appliances most commonly used by them are freezers and refrigerators. Unfortunately, the sample is too small — and is also skewed in favour of the retail sector — for significant comparisons to be made about relative consumption patterns of different sectors.

4.1.2 Monthly expenditure of microenterprises

Since no information about incomes could be obtained, the total monthly expenditure can be taken as a guide to the relative income and cash flow of the business owners.

The high level of expenditure in the service and manufacturing sectors suggests that business owners in these sectors have a relatively higher turnover than in the retail sector.

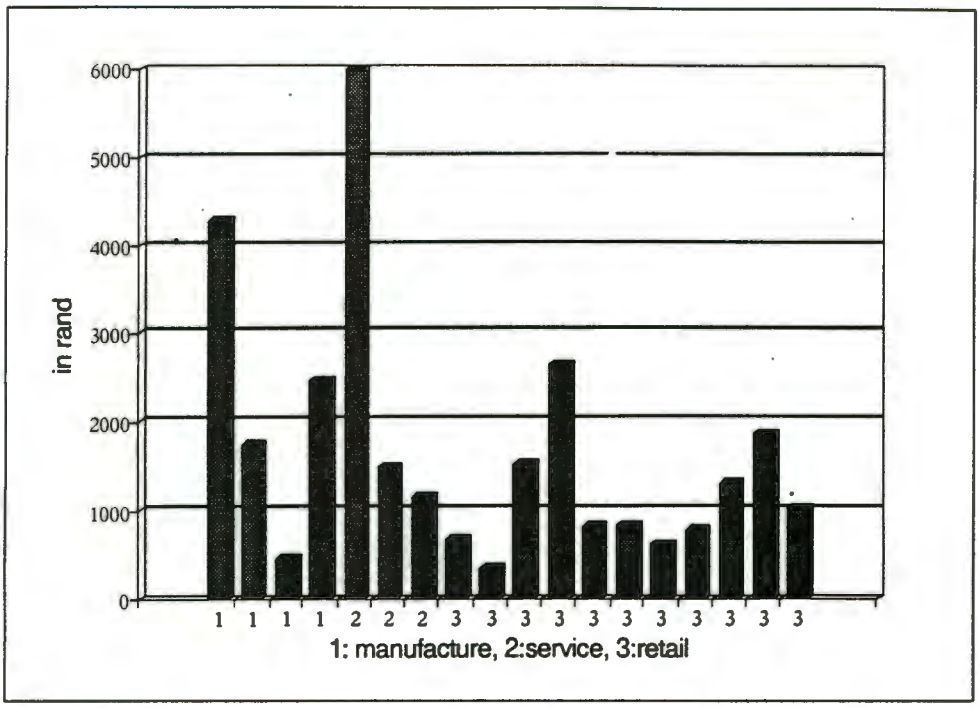

FIGURE 4.2 Total monthly expenditure by home-based enterprises in Khayelitsha, Langa and Gugulethu

4.1.3 Energy expenditure pattern of microenterprises

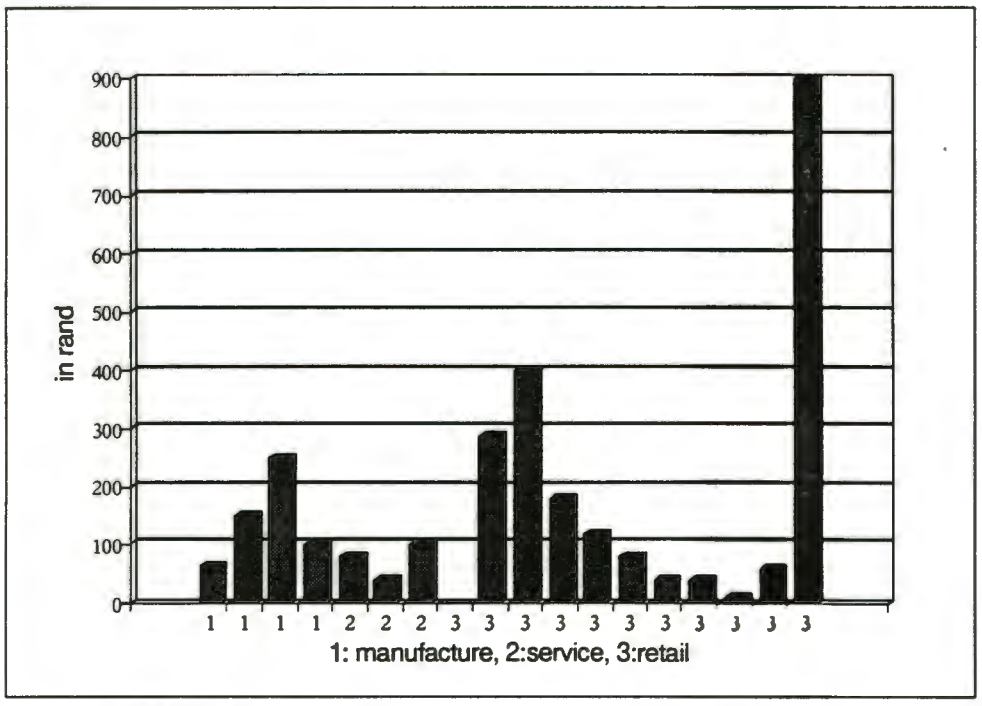

FIGURE 4.3 Monthly electricity bill by home-based enterprises in Khayelitsha, Langa and Gugulethu

Figure 4.3. shows the wide divergence in the energy expenditure of microenterprises in different sectors. This can be explained largely by the variety in the types of enterprises interviewed, ranging from small, roughly built home 'spazas', to well-established general dealers equipped with 6 fridges.

Figure 4.4. compares the total monthly expenditure with the monthly electricity expenses for the sample of 18 microenterprises.

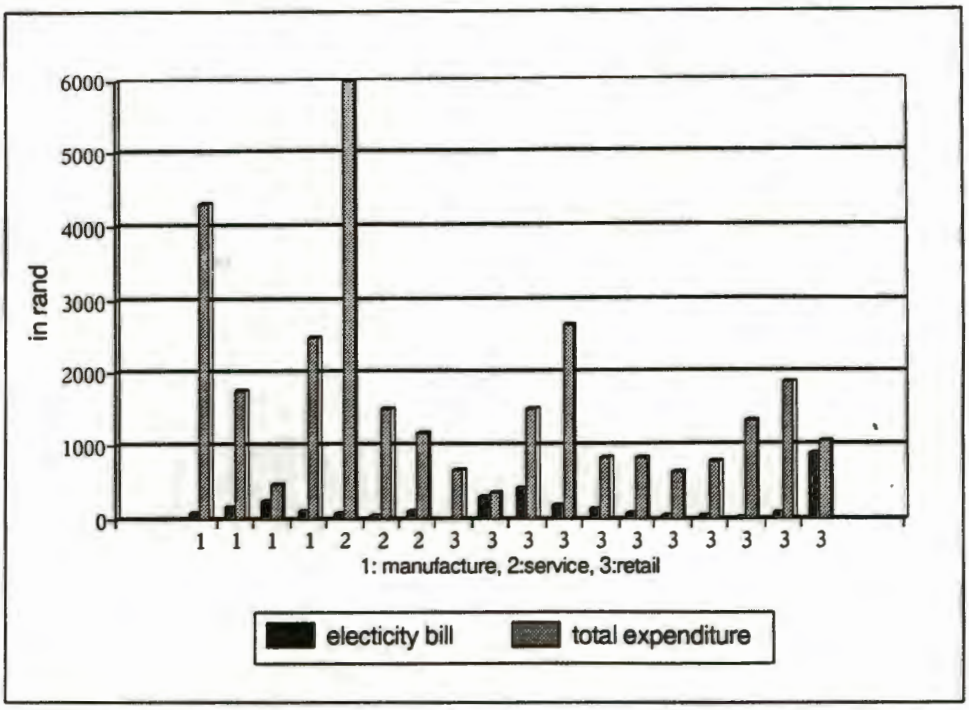

FIGURE 4.4 Comparison between total expenditure and electricity expenditure per month by home-based enterprises in Khayelitsha, Langa and Gugulethu

In all but 3 cases, the electricity bill constitutes only a small fraction of the total expenditure of the enterprise. Consequently, it can be deduced that most microenterprises are in a position to afford electricity.

Figure 4.5. indicates the distribution of energy expenditure relative to the different energy sources available in the surveyed areas. Electricity seems by far the most popular energy source used: it constitutes 87% of monthly energy expenditure. The main reasons given for this are the high level of convenience, cleanliness and safety provided by electricity. The other fuels are used mainly in case of electricity blackouts. Fuelwood is used for preparation of traditional meals in large pots, and for 'braais'.

4.1.4 Electrical appliances/equipment used

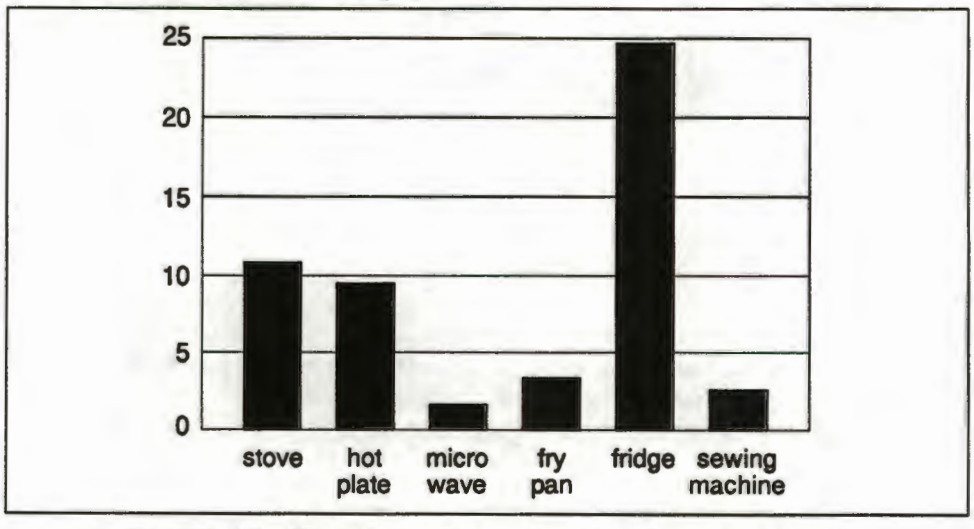

FIGURE 4.5 Electrical appliances used by microenterprises in Khayelitsha, Langa and Gugulethu

Based on data from the survey of 18 microenterprises referred to above, Figure 4.5 shows the frequency of usage of some of the most common electrical appliances. Since the majority of the entrepreneurs interviewed were retailers, the most popular electrical appliance encountered was the refrigerator. It is used for storing cool drinks, meat, vegetables and dairy products. In the service sector, the tavern owners regard the refrigerator as an essential asset. The two major constraints limiting the range of electrical equipment used by microenterprises were: that entrepreneurs cannot afford to buy such equipment; and that they do not feel confident enough about how to use electrical equipment. Because of the skewed nature of the sample, it was impossible to determine what the most common electrical appliance in the manufacturing sector would be, although given the diversity of products being manufactured, it is likely that each sector would rely on different equipment.

4.2 Current energy consumption patterns in rural area of QwaQwa

During a survey carried out by Eskom to assess the infrastructural requirements of QwaQwa in 1989, 50 small businesses — some using electricity and some not — were examined (LHA Management Consultants 1990). Typical microenterprises that prevail in this area are: general dealers; coal and wood yards; garages; panel beaters; and shebeens.

Average monthly expenditure on electricity is given in Table 4.2.

Rural settlement	*No of businesses*	*Average electricity bill (rands)*	
		summer	*winter*
Bolata	2	60	90
Tsheseng	1	70	85

TABLE 4.2 Electricity expenditure/month in QwaQwa
Source: LHA Management Consultants (1990)

Table 4.3. shows the energy usage and costs in a typical rural business which does not use electricity.

Energy source	*Unit*	*Usage/pm*	*R pm*	*% of total*
Coal	kg	137	21.92	15.3
Firewood	bag	0.34	2.49	1.7
Paraffin	litre	43	36.98	26.0
Gas	kg	32	53.12	37.2
Candles	pack	3	4.62	3.2
Battery	battery	0.85	55.81	4.0
Generator	litre	17.87	12.60	12.6
Total			142.81	100.0

TABLE 4.3 Alternative sources and associated costs
Source: LHA Management Consultants (1990)

A comparison of Table 4.2. with Table 4.3. clearly demonstrates that the energy budget for microenterprises without electricity is significantly higher than for those with access to electricity. 63% of the former's energy budget is spent on gas and paraffin.

As Table 4.4. — comparing the energy profile of rural households and businesses — shows, microenterprises spend more on gas and paraffin than households, whilst rural households use more coal than microenterprises.

Energy source	Energy profile	
	Household	Business
coal	49.6	15.3
firewood	6.8	1.7
paraffin	20.3	26.0
gas	3.6	37.2
candles	8.1	3.2
batteries	9.9	4.0
generator fuel	1.7	12.6
Total	100.0	100.0

TABLE 4.4 Energy profile of households and businesses
Source: LHA Management Consultants (1990)

4.3 Observations and conclusions

We deduce from the monthly expenditure graphs that, in general, microenterprises can afford the cost of electricity. The service sector in particular demonstrates a high expenditure potential, although it is likely that manufacturers — had they been better represented in the sample — would demonstrate an even greater expenditure capacity. Microenterprises engaged in manufacturing tend to require a much more diversified range of electrical equipment than do those in other sectors. This is evidenced by the survey results, which show that the fridge is the most common equipment used by the retail and service sectors.

The data presented here shows the predominance of electricity over other energy sources within microenterprises. Increasing other microenterprises' access to electricity can thus be argued to constitute an important element of the promotion of microenterprises. In addition, rising electricity consumption will entail a more even demand pattern for electricity than a purely domestic load. In fact, microenterprises could play a major role in increasing the load factor and could thus contribute to a decrease in average cost per unit kWh. This argument is given further impetus in Chapter 5 when we compare the performance of enterprises with and without access to electricity.

4.4 Case studies on the preferred energy sources of microenterprises

This section of the report is based on interviews with 6 home-based microenterprises to assess and compare preferred energy sources. Three of the microenterprises were situated in an unelectrified area of Khayelitsha. The remaining three operated their business in electrified areas of Khayelitsha and New Crossroads. Each group of three businesses consisted of a manufacturer, a retailer and a service sector microenterprise, to facilitate comparisons between enterprises.

4.4.1 Unelectrified microenterprises

Small retailer in Site B, Khayelitsha

Mr LM of 402, Site B owns a spaza shop in an informal settlement supplied with toilets and stand pipes by the city council. The streets are not tarred and there is no electricity.

— *Enterprise characteristics*
The spaza offers a large variety of basic commodities ranging from matches to chickens, poorly displayed on rough wooden shelves. Improper lighting of the shop causes poor visibility of products.

Most of Mr LM's customers are domestic workers who live in the neighbourhood. There are 5 other such spazas competing with Mr M. His daily turnover is estimated to be around R100, and he employs one person to assist in the running of the shop.

Milk and bread are delivered daily at an average outlay of R30 per week and the chicken is delivered once a week. The other groceries are bought directly from other retailers or wholesalers twice per week. Perishable goods are stored in a gas powered freezer.

— *Energy needs*
Every month, a cylinder of gas costing R60 is required to operate the freezer in the shop. Another cylinder is needed for the stove for household purposes. Car batteries are used for the TV and paraffin for the lamps. The total energy expenses amount to about R170 per month.

Mr LM reported a strong interest in accessing electricity. The main benefits he identified were: that he would be able to purchase an electric freezer, which would be more powerful than a gas freezer; that having access to electricity would reduce the time taken by his wife on household chores, leaving her more time to assist him in the business; and that electricity would allow him to extend the business hours until evening.

Mr LM's consumers are also likely to derive benefit from the electrification of the business: not only will the business be open for longer hours, but it is likely that the quality of perishables would improve due to the use of more efficient electrical freezers.

Carpenter in Site B
Mr S manufactures wooden items including chairs, coffee tables beds and wardrobes in his spare time at home. Because of the unstable nature of his enterprise, he also has a full time job in an unrelated industry.

— *Business characteristics*
The carpentry is done in a garage adjacent to the main house. Mr S is assisted by his brother and children. His production capacity is limited — he can make a maximum of two coffee tables per day — by his reliance on manual tools, and by the fact that he works only at night (using battery-powered lights).

He sells an average of around 10 items per week. His customers are from the neighbourhood, but some come from other townships, as he has established a reputation for producing high quality goods at a reasonable price. The wood is bought locally at various suppliers and no credit payment is accepted. The total sales per week approximate R400.

— *Energy needs*
In addition to battery powered lights, Mr S uses paraffin for his stove and other household appliances, while car batteries are used to power his television. The approximate cost of paraffin per month is R25.00. The reason for consuming paraffin instead of other fuels is that it is the cheapest fuel they can afford.

Mr S also expressed a great deal of interest in electrification, arguing that not only would it facilitate working at night, but that it would allow him to employ electrically operated tools, and thus increase his productivity. In addition, he would be in a position to avoid using paraffin — and thus avoid the black smoke which it emits.

When asked whether he would be able to afford to pay for the electricity costs incurred by the business, Mr S reported that whilst he was able to, it was unlikely that his neighbours in the informal settlement could. To avoid electrifying an area which was unable to pay for electricity costs, he suggested that the other small business owners and himself could be grouped in a business hive supplied with basic facilities, i.e. water and electricity.

Food caterer in Town 1 Village III

Mrs MG lives in an informal settlement with her child and husband. Her husband is formally employed, but her income is vital supplement the family's income. As a result, she has been selling meat, sausages and braaied meat for the last three years. The area in which she runs her business is not supplied with either water or electricity.

— Characteristics of enterprise

Made of rough unpolished wood, the ceiling of the shack in which Mrs MG operates is black with smoke. In this poorly lit shelter, she sells a variety of meat products at prices ranging from R2 for meat balls to R8 for sheep intestines. Her customers who are primarily from the neighbourhood, and tend to have a relatively low standard of living. On average, there are 30 customers per day, resulting in a gross turnover of R100. She obtains her supply of fresh meat from the butchery in Nyanga as well as from mobile butchers. There appears to be a high demand for this kind of business since there are nine others operating in the neighbourhood.

— Energy needs

Fuelwood is the energy carrier used for cooking the meat. Some eight bundles of wood are needed daily, supplied at a price of R1 per bundle. She explains that fuelwood is the cheapest fuel for her business, but that the risk of fire is very high, especially with children playing nearby. Moreover, she considers the smoke to be a health hazard.

Presently, the meat is simply kept in a bucket where it stays fresh for a maximum of two days only. She comments that given electricity, she could purchase a fridge, and avoid having to purchase meat every two days. This would considerably lower her costs, since she would be able to bulk buy at cheaper prices.

There are nine other similar business operating in that area, and Mrs MG also suggests that these could be grouped in a common area and supplied with electricity.

Summary

All of the interviewees report a keen interest in accessing electricity, citing this as a much more efficient form of energy for their businesses. They cite the improvement in productivity; the reduction of costs, and the heightening of quality as major benefits that would flow from the introduction of electricity into their businesses.

4.4.2 Electrified microenterprises

Food caterer in town centre of Khayelitsha

Mrs Z owns a cafe in the town centre of Khayelitsha. The building is supplied with water and electricity. The Small Business Development Corporation helped her to start her business 6 years ago. Since then the cafe has developed and established an excellent reputation. Cookies, fried fish and chips, and many other commodities are sold.

— Business characteristics

In this well-designed spacious cafe, a whole variety of foodstuffs are displayed in brightly lit shelves. The majority of the food sold is prepared in an adjacent kitchen. A large number of customers from all income groups frequent the cafe — possibly 300 per day — and the gross turnover per day is around R2 000.

— *Energy needs*
Electricity is the current energy source used in the cafe. Although the bill amounts to R1 500 per month, the owner prefers electricity to alternative fuels. She mentions convenience, time saving and cleanliness as some of the major benefits of using electricity. The only problem in relying on electricity is the frequent blackouts which occur. In such cases, the gas stove is used. The following electrical appliances are used in the cafe: stove, freezer, refrigerator, fryer, microwave, air conditioner, cash machine.

The business is a particularly prosperous one, thus the costs of electricity are easily borne by the entrepreneur. Since the business was supplied with electricity from its inception, it is impossible to calculate the economic impact of electricity on its performance. However, it is clear that the access to electricity has impacted somewhat on business' performance — unlike the more modest food sellers in the non-electrified areas, this business has succeeded in attracting more affluent customers by improving the range and quality of the products it sells.

Motor mechanic in Nyanga
Mr WB operates a repair business in his home in Nyanga. He repairs and spray paints cars, and recharges batteries for household use. His business is located in his rented council house which is supplied with electricity and water.

— *Business characteristics*
The majority of the customers are from the surrounding neighbourhood, although travellers having problems with their vehicles occasionally stop by. Mr WB reports an average of three customers per week requiring motor repairs. He recently began recharging batteries in the neighbouring unelectrified townships, and set his fee at R2 per charge for a 12 Volt battery. On average, sixty orders are received per week. There are two other such mechanics in the same area.

— *Energy needs*
Mr WB is heavily dependent on electricity: for battery charging, welding, air-compression, and drilling. His electricity bill is approximately R100 per month. Interestingly enough, in this area, electricity blackouts are very rare.

According to Mr WB, no other fuel could replace the benefits of electricity, and he finds the cost relatively affordable.

Retailer in Khayelitsha Town II
This area of Khayelitsha consists partly of informal settlements and partly formal houses. In 1986, the owner opened a spaza shop. Since there was no electricity at that time, he bought a generator to store cool drinks and food. The area was later electrified, in January 1992.

— *Business characteristics*
The shop is made of concrete walls with a corrugated iron roof. The interior is well-lit, hygienic and well-aerated. Most of the customers are from the neighbourhood and are estimated to total two hundred per day. The owner estimated his total sales to be above R1 000 per day.

— *Energy needs*
Electricity is now the primary energy source in this business, although a diesel generator is used in the event of blackouts. This business represents an interesting case, since it has moved from being reliant on other energy sources to one which is wholly dependent on electricity. According to the entrepreneur, the introduction of electricity has seen a sharp decrease in costs, since he was able to purchase 6 electric fridges and 1 freezer. This equipment has allowed him to purchase in bulk, cutting the cost of deliveries. An additional benefit is the high quality lighting which, according to the owner, reduces the incidence of shoplifting.

The average electricity bill is R100 per month, which the owner reports being easily able to afford.

4.4.3 Costs of electricity

There appears to be a clear relationship between the success of the latter 3 cases and the fact that their chief form of energy is derived from electricity. In all 3 cases, electricity has allowed them to diversify the range of goods and services offered, and to improve their quality, thus allowing them access to a larger and more affluent market. Furthermore, as the businesses become more prosperous, the problem of meeting the electricity costs appears to diminish. This suggests quite strongly that access to electricity is essential for businesses to access wider markets, and to improve the range and quality of their products and services.

This view is shared by many entrepreneurs themselves, as is revealed in studies commissioned by Eskom. In a survey of rural areas in QwaQwa, it was shown that all the small business entrepreneurs have a keen interest in the supply of electricity to their businesses. 100% of these entrepreneurs agreed that they would install electricity for the quoted cost (LHA Management Consultants 1990).

The monthly electricity bill that these microenterprises were prepared to pay is given in Table 4.5. As the table shows, 75% of the sample were prepared to pay a maximum of R65 per month for electricity. In fact, a current amount of R75 is being paid by rural microenterprises supplied with off-grid electricity.

Maximum monthly spending option (R)	*% of businesses prepared to pay*
30	7
40	13
55	5
65	75
Total	100

TABLE 4.5 Likely monthly spending on electricity

Finally, Table 4.6. shows the results of an electrification survey in Edendale/Imbali outside Pietermaritzburg. The table shows that more than 90% prefer to use electricity for all tasks, thanks to the efficiency of electrical energy. The predominant reason for using the other energy fuels is their low price.

Source	*% of group interviewed*				
	cheap	*safe*	*clean*	*efficient*	*% total*
COOKING					
electricity	19.5	10.8	6.6	62.2	94.2
wood	63.4	0.0	0.0	27.3	2.2
gas	33.3	33.3	0.0	33.3	1.2
coal	66.7	0.0	11.1	22.2	1.8
LIGHTING					
electricity	16.2	19.4	31.3	30.1	97.8
paraffin	75.0	25.0	0.0	0.0	0.8
candles	100.0	0.0	0.0	0.0	0.8
REFRIGERATION					
electricity	14.6	23.2	6.9	54.3	99.0

TABLE 4.6 Perceptions of the best energy source

CHAPTER FIVE

The impact of electrification on microenterprise performance: a comparative case study

This chapter continues to explore the effects of electrification on the performance of microenterprises in South Africa. We compare the performance of enterprises in an area which has recently been electrified with one which still does not have access to electricity, arguing that electricity must be recognised to be one of the factors explaining the difference in the performance of these enterprises. It is contended that the data presented here provides strong support for the argument that the provision of electricity is an important precondition for the emergence and growth of diversified, dynamic microenterprises.

The first case which is examined is that of Elandskraal in the Northern Transvaal, which has recently been electrified. The data presented here suggests strongly that this has been an important stimulus to the emergence and growth of microenterprise activity in this area.

The second case study focuses on Hartbeesfontein — located in the Western Transvaal — which was not yet electrified at the time of the survey. This case study is discussed in order to compare the performance of microenterprises based in unelectrified locations, and to project about the potential impact which electrification may have on these enterprises' performance.

Unfortunately, the field of microenterprise development in South Africa is an extremely under-researched one, and very few studies into the conditions under which enterprises operate have been conducted. Even less research into the energy needs of microenterprises has been done in South Africa. This chapter therefore draws primarily on the few case studies of energy needs of the two areas under discussion (Van Rensburg 1990). Although time constraints prevented this study from undertaking more rigourous primary research, it is clear that further research must be conducted into this issue if concrete policy options are to be explored.

5.1 Case study: the effect of electrification on the viability of microenterprises in Elandskraal

5.1.1 Background data on Elandskraal

Elandskraal, with a population of about 7 500, has an unemployment rate of around 45%. Approximately 47% of the inhabitants have less than 3 years of formal education (less than Standard 1), whilst only 4% have completed high school or have further education. 77% of the houses have central water points and the remainder have in-house or piped water. Conditions at both the primary school and the secondary school are both seriously overcrowded (Van Rensburg 1990).

- Administrative authority: The town was until recently administered by the Department of Development Aid of Pietersburg. Industrial and commercial development of Elandskraal falls under the responsibility of the South African Development Trust Corporation (STK).
- Infrastructural development: The total number of stands in 1991 was 2 050, of which only 1 000 are occupied. The toilets are non-flush ones and there are no storm water drainage pipes. The streets are not tarred.

- Housing situation: 76% of the dwellings are permanent structures and the remainder are informal houses or shacks. There is an average cluster of 9 rooms per dwelling, while the average household size is 8 people.
- Communication services: There is no post office in Elandskraal. Public telephones and a post box are situated at a filling station. A 1991 survey showed that a mere 9 houses and 10 businesses had telephones.
- Sources of dissatisfaction: Inhabitants of Elandskraal expressed their dissatisfaction at the following problems:
  - very poor recreational facilities;
  - absence of electricity;
  - scarcity of phones and no post office;
  - unavailability of good health services;
  - lack of teachers;
  - almost no facilities for higher education;
  - lack of full-time doctors.

However, some of these problems were addressed by two events: firstly, the recruitment of teachers to work in the schools, and secondly, the provision of electricity to the township. We now turn to the impact of the electrification programme on the microenterprise community in Elandskraal.

5.1.2 Impact of electricity on microenterprises

Several studies have shown that the microenterprise sector in Elandskraal has experienced significant growth over the recent period since the electrification of the area. One of the most obvious factors explaining this has been the injection of capital into the microenterprise sector by the STK. However, the electrification programme must also be recognised to have contributed towards this development. As has been argued in previous chapters, access to electrical energy is a necessary condition for the growth and dynamism of enterprises. Whilst not necessarily being a sufficient condition for the development of enterprises, the absence of electrical energy is a serious impediment inhibiting growth and development in the sector. This is confirmed by the data emerging from an Eskom and STK study into the impact of electrification in Elandskraal.

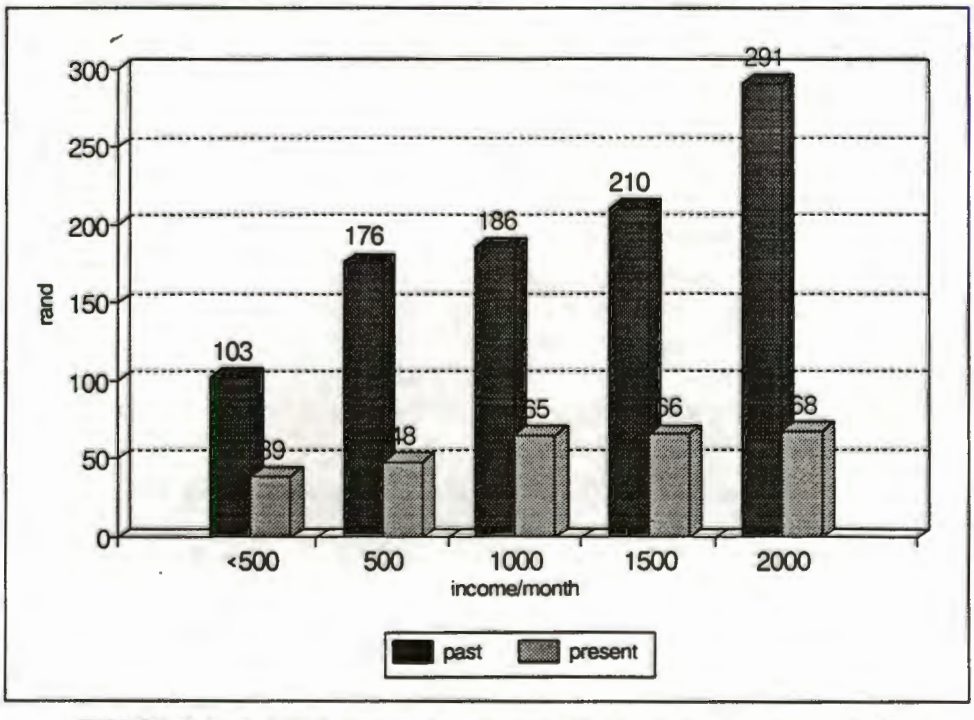

FIGURE 5.1 Average energy expenditure (STK follow-up study — April 1991)

Figure 5.1. compares the average energy expenditure of different income groups before and after electricity was obtained. The advent of electricity saw a sharp decrease in energy costs of all income groups. Table 5.1 shows that the introduction of electricity in Elandskraal has seen a mean reduction of R138 in monthly energy expenditure.

	Before electrification	*After electrification*
Maximum cost	R291	R68
Minimum cost	R103	R39

TABLE 5.1 Energy expenditure before and after electrification

An interesting trend is that energy expenditure rises significantly as incomes increase. This trend appears to be reversed when electricity is the main form of energy. The implication of this trend for local businesses is that their energy costs are likely to diminish as their businesses grow and become more prosperous.

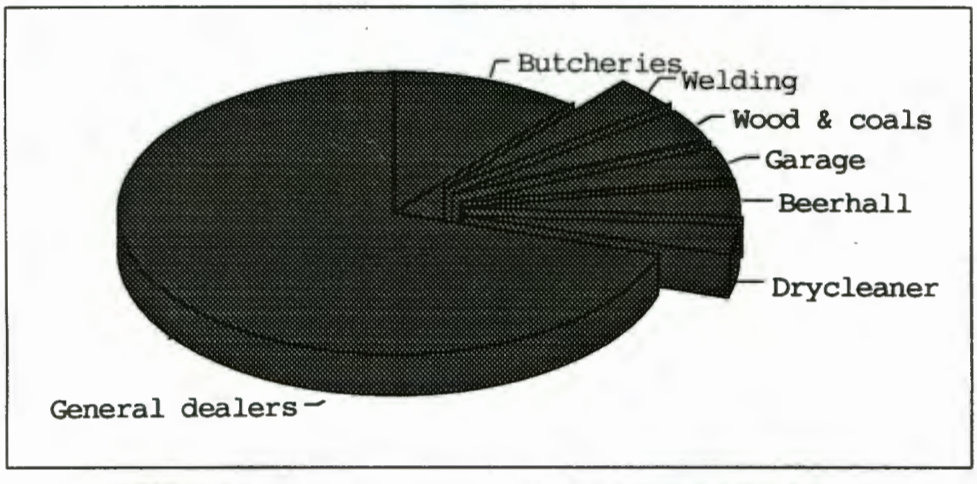

FIGURE 5.2 Microenterprises in Elandskraal before electrification

Figure 5.2. shows the types and extent of microenterprises which operated in Elandskraal before the electrification process. The microenterprise sector was dominated by traders, with a very small manufacturing and service industry.

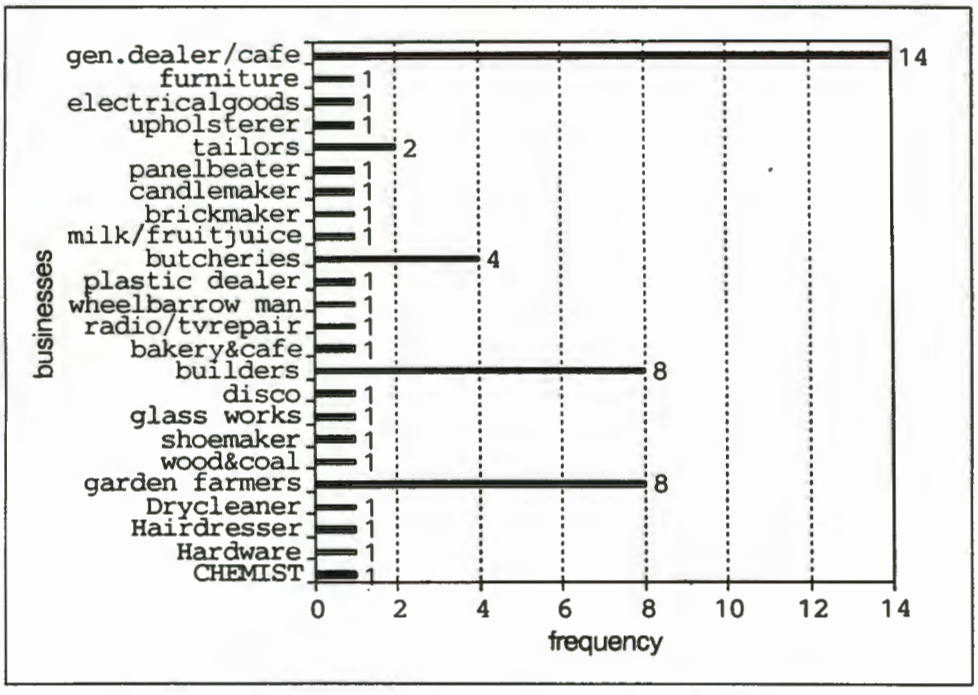

FIGURE 5.3 Microenterprises one year after electrification

Electrification substantially altered this sectoral distribution of enterprises, as is illustrated in Figure 5.3. One year after electricity was supplied to Elandskraal, a large variety of businesses emerged, offering a wide range of products and services. The availability of electricity could be argued to have facilitated the emergence of these businesses in the following way: it lowered the cost of energy, since electrical energy has proven to be cheaper than most other forms of energy; and secondly, it has opened up the possibility for entrepreneurs to engage in those activities which are highly dependent on electricity (furniture and garment manufacturing, building, electrical goods repair, etc).

Figure 5.4. shows the types of electrical goods in which they have invested, subsequent to the arrival of electricity.

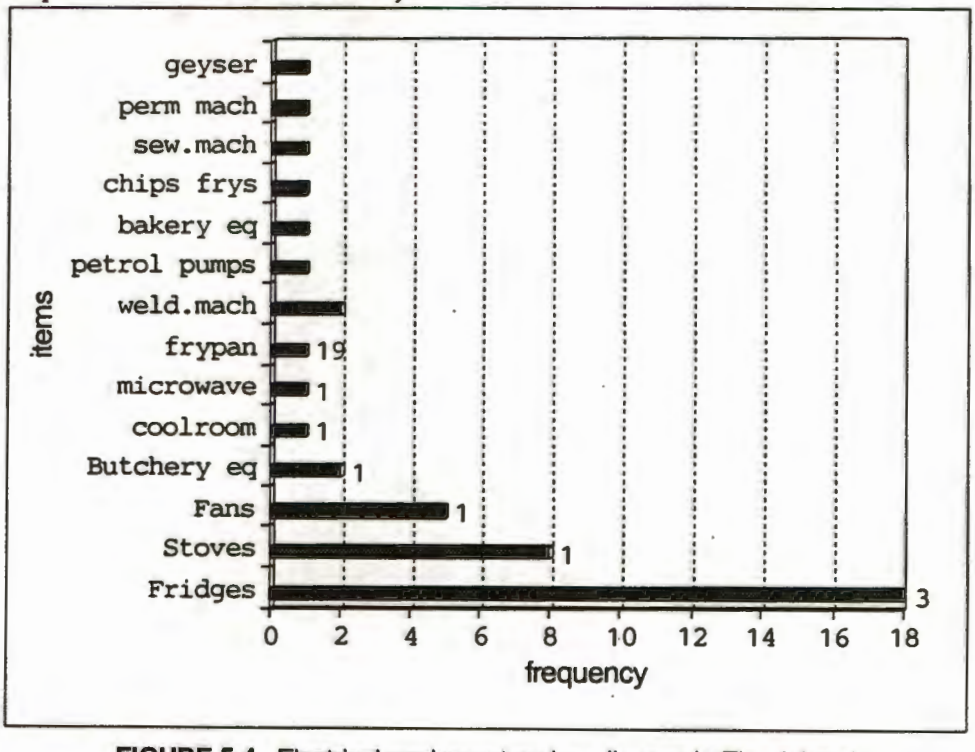

FIGURE 5.4 Electrical equipment and appliances in Elandskraal

Electrical refrigerators were most popular, followed by stoves. This can be explained by the numerous retailers and food caterers that emerged in the period after electrification.

A 1990 study (Van Rensburg) compared the performance of individual enterprises before and after electrification, and came up with the following evidence:

- A welder
  The only welding enterprise in Elandskraal powered his welding equipment with a petrol generator before the arrival of electricity. Despite the high costs needed to be spent on petrol, he was unable to use the equipment for more than a few hours a day, since the generator could be used for no longer than 4 or 5 hours. He managed to buy an electric welding machine when electricity was installed in the area. Since then he experienced the following changes in his business:
  - a faster rate of welding;
  - an increased capacity leading to larger market share;
  - a wider variety of products (he is now manufacturing a range of items such as window frames, door frames and gates, brick moulds);
  - expansion of his labour force (he now employs 5 workers);
  - doubling of output.

- The baker
  Because his was the only bakery in Elandskraal, the baker was serving a very large market. The introduction of electricity increased his production capacity significantly, easing many of the problems he has encountered with supplying such a large market. The use of electrical equipment for bread baking had the following impact on his business:
  - improved his efficiency;
  - enhanced his image as a reliable supplier, and thus;
  - increased his market share;
  - increased his staff from 5 to 24; and
  - expanded his production capacity to meet the increasing demand.
- The butchery
  Before the advent of electricity, butchers were quite reluctant to operate in Elandskraal because of the exorbitant price of other fuels to provide refrigeration. With the supply of electricity, the number of butchers has increased to four. One of them even runs a shop in the modern shopping complex in the area — he owns a walk-in refrigerator, electric saw, an electronic scale and electronic till, etc.
- The shopkeepers
  The retail industry also has undergone a transformation since Elandskraal was electrified. Retailers now benefit from the use of refrigerators, electronic scales and electronic cash registers. Electricity has reduced their dependency on unreliable deliveries, enabling a decrease in selling prices and increasing their customers. This has transformed many 'spaza' shops into more sophisticated and efficient markets, using cold storage and other modern conveniences.
- The shopping centre
  With electrification of Elandskraal, STK has been able to establish a shopping centre where businesses such as butcheries, dry cleaning depots, motor car spares dealers, radio and TV repair shops, green grocers, hair salons, pharmacies and hardware shops operate.

It is clear from the data that the introduction of electricity into the area has promoted diversification amongst the enterprises in Elandskraal, and has therefore contributed towards the economic growth and development process in the area.

5.2 Case study of Hartbeesfontein: pre-electrification survey

5.2.1 Background data

Hartbeesfontein is located in the Western Transvaal, and is essentially a dormitory town located near the economic centres of Rustenburg and Brits. It consists of 2 700 occupied sites. Some 1 000 families are on the waiting list for serviced plots while 400 families are added to the list every month. The Department of Development Aid (DDA) — before its abolition — was planning the construction of some 7 000 sites over the next five years.

- Housing conditions: 81% of the houses are made of zinc/galvanised plates. The average size is two rooms per dwelling, with an outside toilet and no bathroom. All houses are rented at a cost of R1 per month.
- Sewerage: 'Long drop' toilets are currently provided, but provision is being made for water-borne sewerage for the higher income group.
- Health facilities: There is a maternity ward and dental facilities run by 30 nurses. A district surgeon visits on a weekly basis.

- Physical infrastructure: No informal sector stalls for informal marketing purposes have been established. 1.6% of the population have a telephone while some 83% are very keen to have telephones. Purified water from Vaalskopdam (17 km away) is supplied through standpipes in the settlement. Only a small section of the road surface is tarred. 63% of the inhabitants complained that the roads are regularly in a poor condition.
- Human resources: The primary breadwinner for the average family is the husband who earns a mean of R526 per month. This amounts to 66% of the average total monthly income of R794. The wife contributes an average of 13% to the family income, and the first child 11%. Out of the five schools in Hartbeesfontein, three are primary schools and two secondary (each with 30 classrooms). 60% of the household heads commute to work on a daily basis. 77% of the latter must travel a distance greater than 11 km.
- Electricity: Presently, private generators are supplying electricity to a few businesses and homes. The monthly expenditure on electricity is currently R54 for those owning generators. The demand for electricity is very high, however price considerations are foreseen to be a major constraint for the community.

5.2.2 Economic activity in Hartbeesfontein

Permanent employment	79%
Temporary employment	11%
Self employment	7%

TABLE 5.2 Types of employment

A 1990 Eskom survey of 122 households revealed that three types of employment were dominant, as shown in Table 5.2.

Figure 5.5. shows the gross monthly income per household out of a sample of 122. Thus, 42% of the sample earn between R501 and R1 000 per month, with 18% earning less than R500 per month.

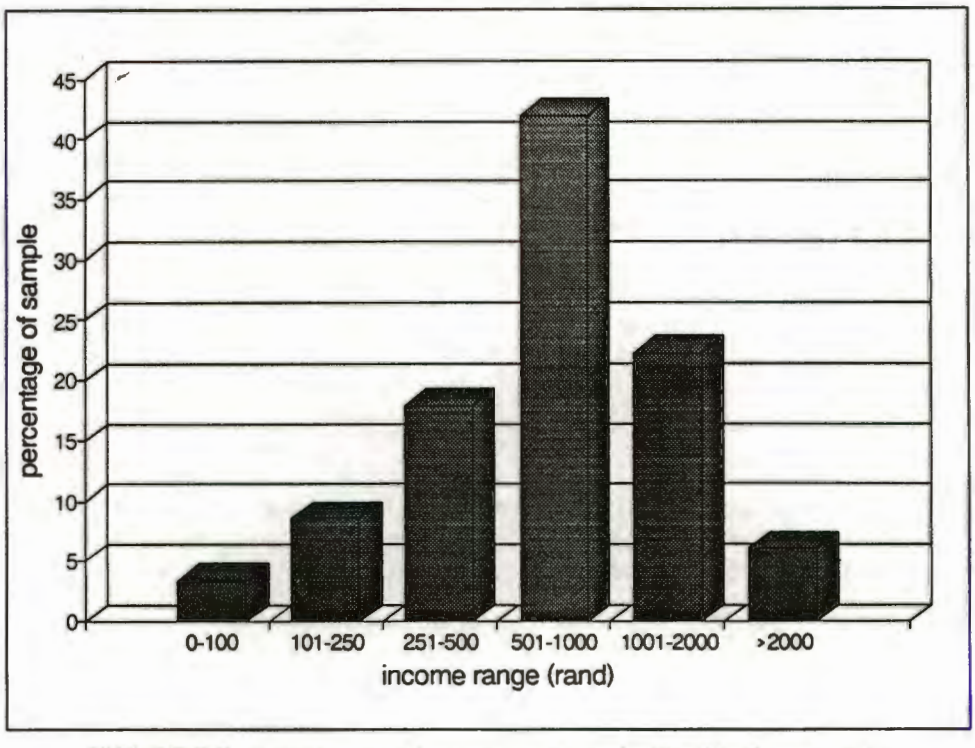

FIGURE 5.5 Monthly gross income per household in Hartbeesfontein

Only two basic types of small scale businesses were encountered during the survey: fresh food produce and informal trading. Table 5.3. below illustrates the reasons for non-involvement in business activity as evidenced by respondents: Whilst 40% expressed no interest in entering business, 53% felt that they lacked sufficient information or capital to enter business.

It is unfortunate that the survey did not pose the question of why existing businesses did not diversify into other business activities, since their answers may have pointed to the blockages limiting diversification.

Reasons	*Percentage*
Lack of interest	40
No working capital	35
Inadequate knowledge	18

TABLE 5.3 Reasons for non-involvement in business activity

An enquiry about the types of business needed in the settlement revealed a high demand for clothing and dry cleaning businesses. Table 5.4 outlines the detailed results of this enquiry.

Businesses needed	*Households (122)*	*Formal traders (8)*	*Spaza shops (5)*
Food	37%	13%	20%
Seeds	20%	13%	0%
Liquor	15%	25%	0%
Clothing	59%	100%	100%
Shoes	44%	75%	60%
Medicine	49%	13%	20%
Dry cleaning	61%	88%	80%
Furniture/appliances	38%	75%	60%
Building product	27%	38%	0%
Cleaning materials	25%	0%	0%
Welders	41%	38%	0%
Tailors	57%	13%	0%
Woodwork	33%	25%	60%
Domestic products	44%	88%	40%
Motor industries	39%	13%	20%
Hairdressers	33%	50%	40%

TABLE 5.4 Desired business activities

These responses suggest that there is adequate demand for certain business activities, implying considerable scope for the development of new small enterprises. The items that would generate viable turnover seem to be medicine, clothing and shoes (it is unclear from the survey whether this is for manufacture or trade in these items), furniture and appliances.

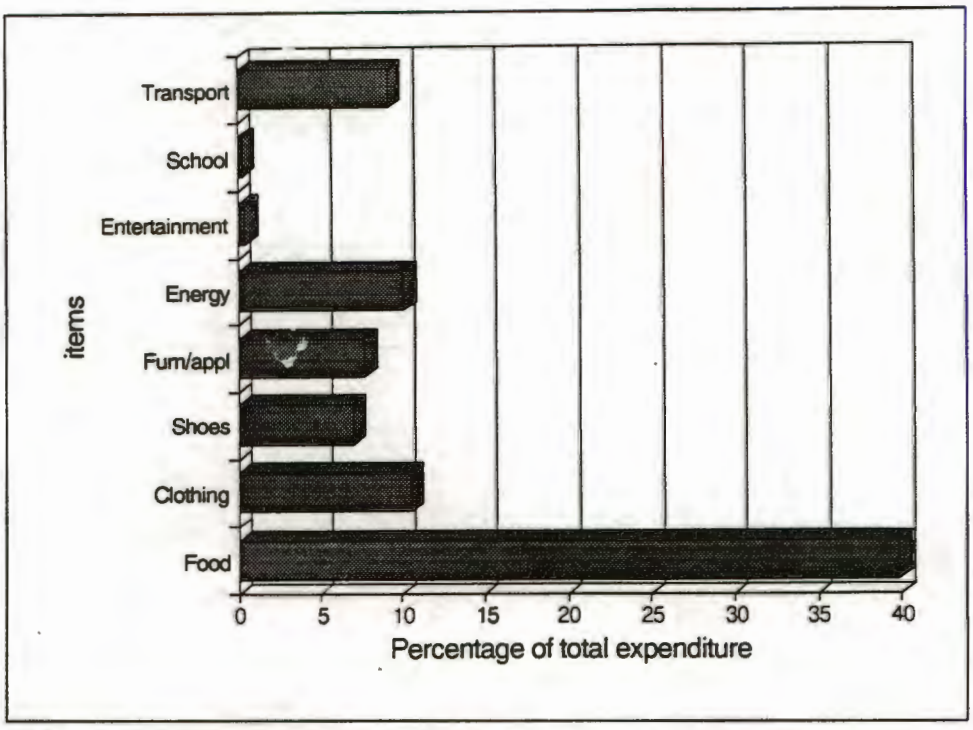

FIGURE 5.6 Monthly spending pattern in Hartbeesfontein

The buying power of the inhabitants can be assessed from their monthly spending pattern shown in figure 5.6, together with the data about the income pattern per household (Figure 5.5). Figure 5.6 reveals that the amount spent on fuels (10% of total monthly expenditure) is nearly one quarter of the amount spent on food.

5.2.3 Microenterprises and their energy needs in Hartbeesfontein

A group of 8 small business owners were interviewed in the Eskom survey, the majority (6) being general dealers with two owning speciality shops (a bottle store and butchery). Four of these entrepreneurs have been in business for more than three years. Figure 5.7 shows that the number of employees is generally less than five.

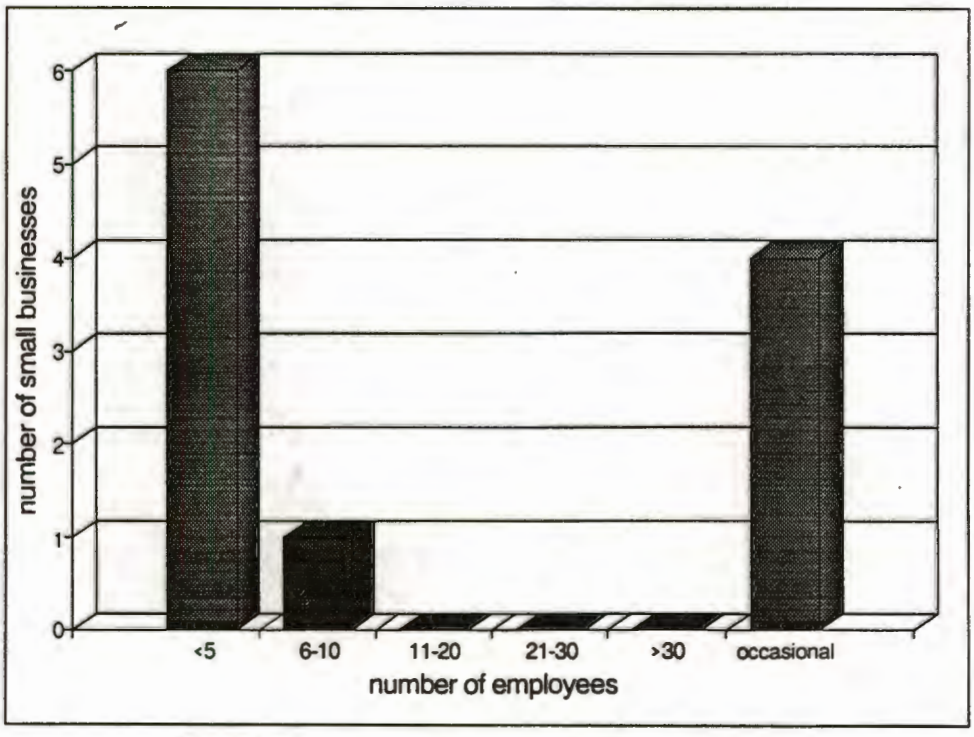

FIGURE 5.7 Number of employees in microenterprises

Table 5.5 shows the energy consumption patterns of these 8 microenterprises. The table reveals that generators, which are the most popular energy carrier, are associated with a very high fuel cost. An interesting point which was observed during the survey is that 79% of the sample of 122 households acknowledged that electricity would be very useful for home businesses.

Energy source	*Number of microenterprises*	*Cost/day (R)*
Electricity	1	1
Generator	7	75.5
Gas	1	1
Paraffin	1	1

TABLE 5.5 Energy consumption patterns of 8 small businesses
Source: Eskom (1990)

The range of services currently provided by microenterprises in the area — shown in Figure 5.8 — provides an indication of the energy needs of the microenterprises. The need for suitable refrigerating systems is evident, especially since this would reduce the need for frequent replenishment of stock. (At the time of the survey, five of the eight business owners replenished their stock on a weekly basis. 50% made their purchases at the nearest town (about 40 km away), while 87.5% travelled about 10 kilometres to purchase their stock.)

However, energy derived from generators is too costly for most microenterprises (see Table 5.5), suggesting that electrically powered refrigerators are the most suitable alternative.

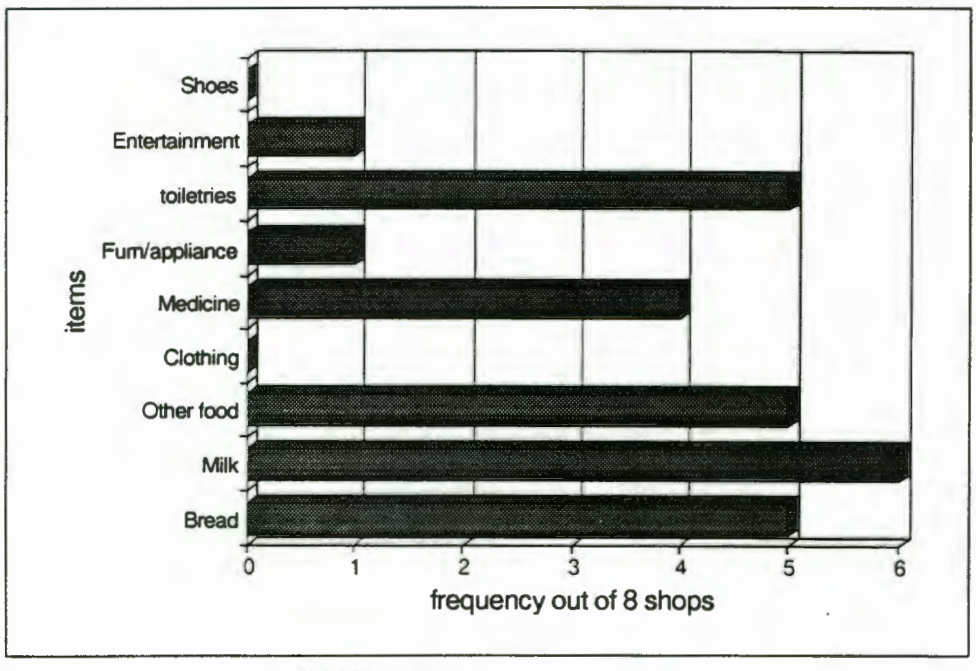

FIGURE 5.8 Type of products sold

Judging by the businesses' monthly turnover — in Figure 5.9 — it would appear that most are in a financial position to be able to afford electricity. Most generate a turnover of more than R5 000 per month, while 3 turn over more than R20 000.

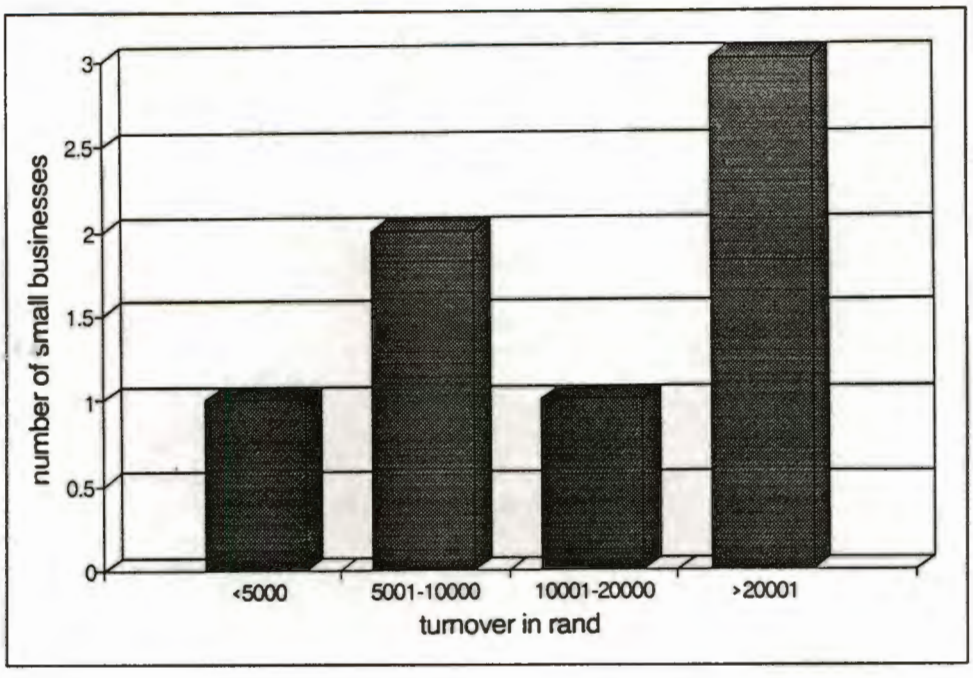

FIGURE 5.9 Current turnover per month

5.2.4 Summary

Despite the relative poverty of the Hartbeesfontein community, there are strong indicators suggesting significant demand for the production of a wider variety of goods and services. The microenterprise sector is currently dominated by trading and food service activities. This stands in sharp contrast to the expressed needs and desires of the 122 households and businesses interviewed in the Eskom survey — respondents expressed a strong interest in accessing a wider range of products and services (including pharmaceuticals, clothing and other manufactured goods). This demand represents good potential for entrepreneurial activities along these lines.

On the supply side, there are equally strong indications of microenterprises' need for the benefits of electrification — primarily access to electrically driven and thus more cost efficient refrigeration. Their relative prosperity — as compared to the average incomes of other householders — suggests that they will be able to pay for electricity.

In this context, the lack of access to electricity appears to represent a major constraint inhibiting entrepreneurs from exploiting market opportunities that have become available in Hartbeesfontein. Whilst it is certain that there are other constraints to be found, the provision of electricity to these businesses is likely to substantially improve the business environment for microenterprises in the area.

5.3 Conclusions

The presentation of these two contrasting cases serves to emphasise the potential benefits which microenterprises can derive from access to electricity. It was shown in the case of Elandskraal that electrification had an impact on the sectoral distribution of microenterprises, allowing for a much wider range of goods and services to be produced in the townships than was previously possible without electricity. It is precisely this challenge which is facing the microenterprise community of Hartbeesfontein, which, without access to electricity, is confined to the production of food and petty trade. Although the demand patterns emerging from the survey suggest that there is a need for more products and services, it appears that electricity is an important factor contraining entrepreneurs from exploiting this demand.

Whilst this report does not argue that the provision of electricity alone is adequate to overcome the constraints which impede the emergence or growth of enterprises in Hartbeesfontein, it suggests strongly that this is one of the priorities if microenterprises — and implicitly growth and redistribution, along with the other objectives of microenterprise development — are to be promoted.

CHAPTER SIX

Conclusions and policy recommendations

This study has explored some issues relating to the energy requirements of microenterprises based in South African townships. The report commenced with a broad discussion on the microenterprise sector, outlining some of the key constraints inhibiting their growth, expansion and diversification into new markets. It was noted that whilst inadequate access to electricity represents merely one of a wider range of problems facing the sector, it is nevertheless a debilitating problem, and is one of the main factors explaining microenterprises' inability to upgrade the quality of their products and enter into higher value markets.

6.1 Current energy consumption

Where electricity is available, it is widely used by microenterprises: it accounts for a fairly high percentage of the average monthly expenditure on energy by microenterprises. (The other fuels are used mostly in case of blackouts.)

- The electricity bill of microenterprises amounts to only a small fraction of their monthly expenditure. This would suggest that the bill is fairly affordable for these enterprises.
- The most common electrical appliance utilised by microenterprises is the refrigerator. However, the predominance of the refrigerator over other electrical appliances in these survey results is likely to be an indication of the bias in the research sample towards the retail sector. Had a larger number of manufacturers been interviewed, it is likely that a wider variety of appliances would have surfaced as important.

6.2 Preferred energy sources

- Interviews in the various settlements showed that the microentrepreneurs are very keen to have electricity, recognising it as easy to use, clean, safe, cheap and versatile.
- A large percentage of the sample survey in Hartbeesfontein acknowledged that electricity would be an important service in the development of microenterprises.

6.3 Contribution of electricity to development of microenterprises

- Firstly, access to electricity makes it possible for enterprises to engage in those activities which are electricity dependent (which tend to be higher value, more lucrative activities). Powerful evidence for this argument has been advanced by the experience of microenterprises in Elandskraal, where enterprises have sprung up in new sectors after electrification.
- Secondly, it improves the quality of existing activities: the quality of the product as well as the standard of the service offered by microenterprises in all sectors.

- Thirdly, it enhances conditions of work, eliminating the need for hazardous and dirty fuels.
- Fourthly, it reduced the costs of energy: This is evidenced by the case of the QwaQwa community where the monthly energy expenditure of microenterprises in the non-electrified area is higher than in the area where electricity is used. Similarly, the study on Elandskraal showed that the energy expenditure before the introduction of electricity is higher than afterwards.
- Consequently, electrical energy must be recognised to be an important factor stimulating the growth and dynamism of microenterprises.

6.4 Policy recommendations

The basic thrust of the argument made here is that electricity is a necessary condition for the promotion of microenterprises which are dynamic and competitive. The main policy implication flowing from this is that access to electricity must be increased. The following are some of the specific mechanisms required to achieve this:

- Develop mechanisms for representatives of microenterprises to gain access to the local electricity distribution authorities. This is considered to be necessary to ensure that the relevant authorities are sensitised to the specific energy needs of the sector.
- Existing and newly-formed small business development agencies should be encouraged to actively undertake the following responsibilities:
  - assist in training microenterprises in the most efficient use of electrical equipment;
  - provide loans to microenterprises for the purchase of electrical equipment;
  - negotiate for special tariffs for microenterprises on the basis that they are the heaviest consumers in townships and help increase system load factors;
  - in tandem with microenterprises' representatives, coordinate with local authorities in setting targets and priorities for electrification programmes.
- Careful design of 3 phase or single phase network or both so as to achieve maximum profitability as well as meeting the load requirements of the microenterprises.

Time and financial constraints prevented sufficient primary research to be conducted on the issue. We thus recommend that further research be devoted to addressing the following questions:

- A more systematic appraisal of the energy consumption patterns of microenterprises in rural and urban poor areas on a national scale.
- An evaluation of the cost structure and productivity of microenterprises using electricity in comparison to those relying on other fuels.
- The contribution of microenterprises towards increasing the electricity system's load factor and thus leading to a decrease in the unit cost of electricity per kWh.

REFERENCES

Eskom 1990. [Hartbeesfontein case studies]. Sandton: Eskom.

Institute for Futures Research 1991. *Energy Future.*

LHA Management Consultants 1989. Infrastrucutral requirements of the rural QwaQwa population. Report on a survey for Eskom.

Manning, C and Mashigo, A. 1993. Manufacturing in microenterprises in South Africa. Research Report to the Industrial Strategy Project, Cape Town, UCT.

Schaefer, M 1992. Microentrepreneurship in South Africa: The impact of regulation and support services. Unpublished report. Washington: World Bank.

Small Business Development Corporation. Several publications.

Thorne, S and Theron, P 1993. Analysis of new electrification schemes in the Western Cape: Phase II. Paper for Department of Mineral and Energy Affairs, Pretoria.

Thomas, W 1989. The training challenge for South Africa's small business sector. Discussion paper for the Training and Development Workshop, UNISA, 1989.

Van Horen, C 1994. Household energy and environment. EPRET Paper 16. South African Energy Policy Research and Training Project, Energy for Development Research Centre, University of Cape Town.

Van Rensburg, D 1990. A profile of Elandskraal: Baseline study against which the impact of the introduction of electricity can be measured. Report on a survey for Eskom.

PROJECT DESCRIPTION

A major two year research project was launched by the Energy for Development Research Centre in April 1992. It aims to investigate policy options for widening access to basic energy services for the urban and rural poor in South Africa. Research papers are being produced in the following areas:

Background papers
Research outline
Integrated energy planning: a methodology for policy analysis and research
Development context for energy planning in South Africa
Background on South African energy system

Energy demand analysis
Energy demand in underdeveloped urban and rural areas

Rural areas
Energy for rural development: an introduction and overview
Energy and small-scale agriculture
Rural household energy supply options
Afforestation and woodland management
Remote area power generation options

Urban areas
Household energy supply in formal and informal urban settlements
Energy and informal sector production

Ancillary sector
Energy and mass transportation*

Key supply sector
Electricity distribution sector*

Cross-sectorial studies
Energy efficiency and conservation*
Energy and environment*
Southern Africa linkages*
Investment requirements and financing mechanisms*
Pricing policy*
Institutional analysis*

Policy options
A concluding document will draw together key policy conclusions
** The scope of these studies is restricted to energy issues concerning the urban and rural poor.*

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PAPER Nº 12

Energy for microenterprises

Hamida Fakira

SOUTH AFRICAN ENERGY POLICY RESEARCH AND TRAINING PROJECT

widening access to basic energy services for the urban and rural poor

ENERGY FOR DEVELOPMENT RESEARCH CENTRE
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