The Energization of KwaBhaza:

a case study in rural energy and development

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Abstract

Energization can be described as a form of integrated energy delivery. In the case of the KwaBhaza Pilot Project, PV and LPGas were combined in a package and offered to rural households. While the approach to off-grid electrification and distributed energy services tends to emphasise the technical aspects of delivery (Kotzé 1998), this work provides some insight into the anthropological aspects that hinder the implementation of such initiatives. In this context, 'anthropological aspects' do not refer to cultural conditions in the field but rather the anthropology of development, expressed as an holistic examination of the project and a critical assessment of the development framework within which it operates. It is with this in mind that the objectives of energization, as a development initiative, are thoroughly explored.

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Chapter 1 – Introduction

1.1. Introduction

The claims made for energization are substantial. As an alternative to grid electrification in rural areas, energization is to satisfy the energy needs of rural communities, and in this way assist in their development. It is also to contribute to some of Eskom's supply-side concerns such as its DSM (demand-side management) strategy and RDP commitments. In his review of several of the country's solar household energy projects Banks (1998) noted that the KwaBhaza Project, the current pilot phase of energization, is the only off-grid project in which an effort is being made to meet a household's cooking and heating requirements. In a land where access to electricity is greatly desired by rural inhabitants, not least because of the relief from the burden of wood collection that it brings to rural women (Annecke 1998), energization is an exciting initiative.

As defined in Eskom's Pilot Project Proposal, energization is the establishment of a sustainable energy initiative that is to bring 'energy upliftment' to rural communities. It rests on three pillars: a community-based and appointed *Energy Agent*, on-site meetings in the community called *Energy Days*, and a *funding mechanism* which is to enable recipients to pay off the capital costs of the PV and LPGas equipment. The *energization process* brings these three components together and uses them as the basis for offering the energization *product package*.

At the household level energization is defined as a 'combination of energy sources to ensure an efficient, cost-effective energy package' (Eskom 1997a:4). In fulfilment of the requirements of an energy 'package', energization meets all the possible energy end-uses of a household. This entails providing 'essential electricity' for lighting and entertainment (radio and television) coupled with LPGas to satisfy thermal needs (cooking, ironing, water heating and space heating).

'Essential electricity' is a term that emerged from the observation that, in general, newly electrified rural households tend to utilise grid electricity for lighting and media. In the energization project 'essential electricity' it is to be provided through either 'individual photovoltaic (PV) panels, communal battery charging, a generator – running off a suitable fuel: LPGas, petrol or diesel, or a limited capacity grid supply e.g. 2,5 amp' (Eskom 1997a:4). In the case study examined in this thesis, the KwaBhaza Pilot Project, a solar home system (PV) supplies the essential electricity component.

As a concept, energization draws from the philosophy of Integrated Energy Planning (IEP) in that it considers different energy sources to meet supply-side and demand-side needs. However, it is applied with certain constraints. Firstly, energization does not compete with grid electricity but is aimed at areas that will not receive full electrification in the short term. Energization is targeted at rural communities that are not on the five-year grid electrification plan.

Secondly, energization entails the provision of a standard of energy supply. Taking into account the cost, efficiency and health and safety of the users, energization aims to provide modern energy sources. 'Modern energy sources' may be defined as those that are clean, labour effective, affordable, safe and accessible (Hazard 1998). With this mandate, energization excludes paraffin and wood as possible thermal energy sources in favour of LPGas.

As an alternative to grid electrification, energization identifies with the social development goals of Eskom's rural electrification programme. It aims to meet the energy needs of remote rural communities and contribute to the 'energy upliftment' of these communities. In this sense energization is essentially a development initiative.

On the other hand, energization also makes sense in terms of Eskom's supply-side concerns and the LPGas industry's commercial interests. Energization is driven and managed by Eskom's marketing department in conjunction with the LPGas Association, the organisation representing the stakeholders in South Africa's LPGas industry[1]. Eskom's marketing department brings a discernible marketing influence to the project and the implementation of the Pilot Project is characterised by a 'marketing drive' approach.

The conflicting agendas of the social development and more economically-oriented approaches are a source of tension within energization. This is seen throughout the thesis and can be observed in the comparison between the planning and implementation in KwaBhaza.

Overall, the objectives of the thesis are twofold: firstly, to assess whether Eskom meets its own objectives as planned and secondly, to assess whether energization meets the needs of the community as it is intended to.

Eskom's energization objectives are laid out in the Pilot Project Proposal, the energization planning document. The context of these plans are examined by locating energization within Eskom's RDP commitments and the RE programme, and in doing so, the thesis intends to elucidate whether energization satisfies the objectives set by Eskom on its own terms. A critique of the Pilot Project Proposal in the light of some development debates contributes to this.

Secondly, in assessing whether energization meets the needs of the community as it is intended to, the thesis examines the KwaBhaza Pilot Project as an energization case study. A detailed documentation and discussion of the events during the implementation of energization in KwaBhaza elucidate the discrepancies between planning and implementation. The critique of the Project Proposal also contributes to the assessment of whether energization meets the needs of the community in that it is undertaken with the author's experience in KwaBhaza in mind.

1.2. Overview

Chapter 2 places energization within the context of development. An historical perspective on development is offered to point out milestones in the history of development, all of which have a bearing on contemporary notions of what development entails. Particular attention is paid to the tensions between 'economic growth' and 'social development', two distinct aspects that have tussled since they were made explicit in the development arena. This review highlights the degree of emphasis that social and economic factors have received within the various paradigms that have shaped the history of development.

[1]Including Cadac, Afrox, BP, Shell and Total.

unfolding of events 'on the ground' in KwaBhaza. In so doing, it attempts to bring the characteristics of energization to the surface to reveal the (sometimes subtle) dynamics at work in the project.

Chapter 6 brings the thesis to a conclusion by assessing the findings and recommending measures that can be taken to promote the successful provision of rural energy. The conclusion elucidates whether energization satisfies the requirements of an energy and development initiative – in terms of the communities' needs on the one hand and as defined by Eskom on the other. This reveals the strengths and weaknesses of energization as an alternative method of meeting rural energy needs, and as a method by which energy can contribute to meeting the requirements of development. It is from this position that recommendations seek to improve alternative rural energy provision methods at three levels: in their contribution to development in South Africa; within Eskom's general concept of energization; and within the KwaBhaza pilot project in particular.

Chapter 2 – Energization and the Development Context

'Almost every human endeavour in the last forty years has been undertaken in the name of development' (Rist 1997).

2.1. Development

It has been argued that Truman's inaugural address marked the beginning of the development era as we know it today[2] (Sachs 1992). On 20 January 1949, Truman called for action on the part of 'developed' nations to assist those he labelled as 'underdeveloped'. In the famous 'Point Four' of his address he advocated a 'bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas' (Truman in Sachs 1992:6).

As Truman suggested, development meant encouraging industrial progress through capital and technology transfers to the Third World[3]. Development theory was based on the industrialisation experiences of Europe and the United States and sought to imitate that process. It was thought that through stimulating growth, and more specifically economic growth in these areas, the development process could take its proper course. The goal of development was the production of modern, developed societies in evidence in the First World.

Development experts reasoned that economic growth, enhanced by the technological achievements already available in the First World, was the means whereby people's lives in underdeveloped countries could be improved. Existing social, cultural and institutional conditions in these areas were seen as a hindrance to economic growth (James 1995:3). It was understood that these 'backward' values would naturally undergo transformation in the development process. Although measures were taken to improve the basic services and infrastructure found in the underdeveloped countries, these pragmatic approaches were 'overshadowed by the general obsession with all-out industrialisation and GNP[4] growth which dominated the 1950s' (Esteva in Sachs 1992:12).

In 1960 W.W. Rostow published the *Stages of Economic Growth*[5]. He believed that a given society could be characterised by the single variable of economic growth. Rostow proposed that, under the influence of economic growth, societies undergo a linear process of change from their traditional status, through a series of stages towards the final destination of modernisation[6], a stage characterised by 'high mass consumption'. It was also in the 1960s that the term 'social development' was distinguished from 'economic development'. The strategy of focusing on

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[2]It has been pointed out that the origins of development can be traced back much earlier than the mid-1900s. Hettne (1990), for example, links development to the evolution of 'stateness', the gradual process which culminated in state-forming and nation-building in the seventeenth century. Larrain (1989) believes that it is closely bound to the evolution of the capitalist system. Berthoud proposes that, roughly speaking, 'development has been promoted by two institutions, the state and the market, *indissolubly* linked by the project of modernity' (in Sachs 1992:73).

[3]The Third World roughly refers to countries in Africa, Asia and Latin America.

[4]Gross National Product – the most prominent development indicator.

[5]The political dimensions of the document, also called the *Non-communist Manifesto*, cannot be ignored.

[6]Taken from James (1995:3).

economic growth alone had not produced the expected results and in 1962 Ecosoc[7] recommended the integration of these distinct aspects of development.

Sociological and psychological theories arose in the mid-1960s to explain the modernisation process in terms of these variables (McClellend 1966, Germani 1965). Like Rostow's, these theories were constructed from differences between developed and underdeveloped societies in terms of particular variables 'which by aggregation and juxtaposition constituted abstract models' (Larrain 1989:98). They attempted to explain the process of transition from underdeveloped to developed based on the assumption that modernisation was endogenous and would occur once certain obstacles were removed.

The recognition of social and cultural factors in the development process marked the first significant shift in the development industry. However, this major structural change did little to affect the success of development projects. Notions of economic growth were still at the forefront of the United Nations development agenda. Although social development was openly included in its policy, it was clear that change at this level did little to change the manner in which development was carried out. Unrisd[8] later acknowledged that social development 'was seen partly as a precondition of economic growth and partly as a moral justification for it and the sacrifices it implied' (Unrisd in Esteva; Sachs 1992:13).

Alternative approaches began to emerge in the early 1970s. Even though development included social development, the failure of development to bring about improvements in the Third World were evident. In many cases capital and technology-intensive development efforts had not brought about economic growth and where they had, they were accompanied by increased inequality. Equity objectives thus came to the fore with the goal of redressing poverty, inequality and unemployment *within* a growing economy in development policy. This approach was termed 'redistribution with growth' and represented an effort to engineer equitable social development within the framework of economic growth (James 1995:4).

In the late 1970s the 'basic needs' approach argued that poverty could not be adequately addressed unless the basic needs of the poor were met. This was an offshoot of Maslow's 'pyramid of needs', a psychological theory that proposed that an individual's higher needs could not be met unless the basic needs at the bottom of the pyramid were met first. 'Although it was embedded within an economic development framework, this approach argued for increased government intervention to meet the needs of the poor' (James 1995:4). This re-orientation sought to allow the deprived to participate in the development process and contribute to the economic development of the Third World.

The Third World debt crisis[9] in the 1980s resulted in cuts in development expenditure and a curtailing of international lending. Development aid and multinational expenditure became less freely available and were offered conditionally. These conditions became known as 'structural adjustment programmes' (SAPs). They promoted trade liberalisation, privatisation and economic austerity by dismantling bureaucratic control in Third World countries (Kabeer 1994:8). It was

[7]The Economic and Social Council of the United Nations.
[8]United Nation Research Institute for Social Development.
[9]Many Third World countries were unable to pay off development loans granted by international lending organisations. The size of the loans and of the accumulating interest in relation to Third World countries' GDPs resulted in the 'debt crisis'.

these influences that proposed that underdeveloped countries achieve development by liberal economic policies.

The first *Human Development Report* published by the United Nations in 1990 emphasised that human well-being should be at the centre of the development process. The report defined human development as the 'process of enlarging people's choices' and aimed to bring the comforts and the services enjoyed by the modern world to the underprivileged Third World. In this context, economic growth is theorised as one of the ways by which social development can be achieved. It is seen as a *means*, and not an end in itself, whereby people can enjoy long, healthy and creative lives. This more refined link between social development and economic growth prompted the view that '[a]lthough there is a lot of emphasis on 'social development', there has been a swing back to the centrality of economic growth as the path to sustainable development' (Lund 1998:1).

These trends in development theory and practice are not confined to the specific era in which they arose. Rather, they have produced an amalgamation of concepts, methods and practices that have a bearing on development as it is practised today. This has been defined as a development 'discourse' by post-modern development analysts seeking to explain the 'post-development era'. Escobar (in Rahnema 1997:86) explains that development discourse is more than a body of knowledge. He defines it as a 'space for the systematic articulation of knowledge into concepts, theories and practices'.

Various threads of this discourse that are pertinent to the energization project and serve to contextualise it are discussed below.

2.1.1. Participatory Development

In the *Coycoyoc Declaration* published in 1974 after an international conference in Coycoyoc, Mexico, it was said that development that did not satisfy the basic needs of humans was a 'travesty of development'. This was an example of the tension between the targets of development (the people) and the means of bringing about development (technology and capital accumulation) . The belief that people should be helped by development is not new; it was alluded to in Truman's 1949 address where he spoke of "helping people help themselves" (Rist 1997: Appendix II). What did arise during the 1970s was the call to involve people intimately in the development process; not only in the consultation process but in development planning.

'Participatory development' emerged in development thinking and was promoted as a vital component for the success of development projects. It became the catchword in development planning and policy documents and was incorporated into the development discourse. Away from the dominant voice of international development, participatory methods and techniques were being used to help those most in need of assistance (Schumacher 1974). At the micro-level, the aim of participatory development was to empower people to identify and solve their own problems outside the framework of pre-determined development plans.

Significant in this approach was the attempt to dismantle the dominant power relation between the 'expert' development worker and the 'client' of the development process. Participatory Action Research (PAR), for example, entails the involvement of the people in such a way that they are made aware of their political, social and economic circumstances by way of power-sharing and information exchange. Thoeretically, it embraces the pluralism and contextuality of

the circumstances of the disadvantaged (often the rural poor) and opposes the top-down prescriptive method of development.

2.1.2. Gender and Development

The struggle for the recognition of women as equals over the last four decades of development has been labelled at once a success and a failure (Chowdhry in Merchand & Parpart 1995:38). Women in Development (WID) issues have been increasingly included in international development and have featured significantly in development policy. However, WID practitioners in general have remained situated 'squarely within the modernisation paradigm' (ibid: 34), an ideology argued by feminist writers to be rooted in colonialism and a male-dominated liberal discourse on markets.

2.1.3. Development in South Africa

Under the apartheid government, South Africa was isolated from the development taking place between the First and the rest of the Third World in the form of technology transfer and foreign aid. However, some aspects of international development were being mirrored on a smaller scale within South Africa between the 'developed' whites and the 'underdeveloped' blacks (Tapscott in Crush 1995:182). Theories of modernisation were used to substantiate and justify the *separate development* ideology of the apartheid government.

Mounting protest against apartheid and increased side-stepping of the National Party Government influenced development literature from the late 1970s. *Separate development* was phased out of official literature and was simply referred to as *development*, 'an economic activity devoid of political substance' (Tapscott in Crush 1995:182). Terms such as 'basic needs' and 'integrated rural development' permeated development rhetoric in the 1980s which assiduously avoided mentioning political reasons as the cause of poverty and misery in the *bantustans* (ibid:182). Social, cultural and ecological factors were instead identified as constraints to development. In this sense Ferguson's description of rural development in Lesotho as an 'anti-politics machine' may be accurately applied to the South African case: 'it is an instrument designed for the suspension of politics from even the most sensitive political operation' (Ferguson 1990:250).

Despite the ostensibly apolitical nature of mainstream development up until the first democratic elections in 1994, a new notion of development was suddenly thrust into the South African political arena. The Reconstruction and Development Programme (RDP) was drafted by the African National Congress (ANC) before the democratic elections of 1994. Its objectives could be reduced to the simple manifesto 'A Better Life for All', a statement which became the ANC's election campaign slogan. Its primary aim was to redress past inequalities by developing the people marginalised by the apartheid government. After the ANC won the elections, the RDP was launched by the Government of National Unity.

2.2. The Reconstruction and Development Programme (RDP)

The historical and political context of the RDP makes it a unique development document. Although it incorporates conventional concepts of development, its main focus is to address the racial inequality that resulted from more than forty years of oppression by the apartheid

government. As its name implies, the Reconstruction and Development Programme combines notions of social and political restoration with those of social and economic development. 'Reconstruction' speaks of the provision of services and jobs to previously disadvantaged citizens as well as the economic restoration of the nation as a whole. It is through the social and economic 'development' of South Africa that these objectives can be achieved.

2.2.1. The Principles of the RDP

The basic principles of the RDP include the need for an integrated and sustainable programme which must become a *people-driven* process: 'Development is not about the delivery of goods to a passive citizenry. It is about active involvement and growing empowerment' (ANC RDP 1994:5). The establishment of peace and security is another priority to enable nation-building, an activity that links reconstruction and development.

> The RDP is based on reconstruction and development being parts of an integrated process. This is in contrast to a commonly held view that growth and development, or growth and redistribution are processes that contradict each other. Growth – the measurable increase in the output of a modern industrial economy – is commonly seen as a priority that must precede development. Development is portrayed as a marginal effort of redistribution to areas of rural and urban poverty . . . The RDP breaks decisively with this approach . . .The RDP integrates growth, development, reconstruction, redistribution and reconciliation into a unified programme. The key to this link is an infrastructural programme that will provide access to modern and effective services such as *electricity*, water, telecommunications, transport, health, education and training for all our people (ANC RDP 1994:6, my emphasis[10]).

Lastly, the RDP is to bring about the democratisation of South Africa through clearly identified, substantiated and integrated goals.

2.2.2. Key Programmes

From these principles, five key programmes were identified as:

- Meeting basic needs;
- Developing human resources;
- Building the economy;
- Democratising the state and society;
- Implementing the RDP. (ANC RDP 1994:7).

A priority of the RDP is to meet people's basic needs. This is to occur through people being made part of the decision-making to meet their needs – 'jobs, land, housing, water, *electricity*, telecommunications, transport, a clean and healthy environment, nutrition, health care and social welfare' (ANC RDP 1994:7, my emphasis[11]). These basic needs are to be delivered through 'major infrastructural programmes' (ibid:8) that are in turn envisaged to stimulate the economy.

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[10]Under the title 'Electricity for all' the ANC's RDP promotes an electrification programme that will give about 72% of households access to electricity by the year 2000. It then states that '[b]oth grid and non-grid power sources (such as solar cells and generators) must be employed' (ANC RDP 1994:33)

[11]The government's RDP White Paper Discussion Document replaces *electricity* with *energy* (1994:8).

Human resources are to be developed through a transfer of skills, education and training, both in formal educational facilities and 'all areas of society – homes, workplaces, public works programmes, youth programmes and rural areas' (ANC RDP 1994:8). A gender-sensitive affirmative action programme will also encourage the development of human resources as well as promote the democratisation of society, 'thus allowing all people to participate on the basis of knowledge, skills and creativity' (ibid:9).

The RDP proposes that building an economy entails recognising the strengths and addressing the weaknesses in the economy. It points out that a fundamental weakness is the inequitable distribution of ownership, employment and skills. In improving these areas, Eskom plays a significant role. The strengths include well developed agriculture, commerce, industry, mining, infrastructure and financial services as well as a 'a large surplus of electricity' (ANC RDP 1994:10).

2.3. Rural Electrification and Development

Before discussing Eskom's role in the RDP, it would be worthwhile touching on the debates surrounding rural electrification and development. Eskom's rural electrification programme is arguably its most important contribution to the RDP. Its other 'most tangible commitment' is the reduction in the real price of electricity (Eskom: Powering the Future 1995:2). This section traces the broad trends in rural electrification and highlights its correspondence with prevailing development paradigms over the last forty years. It then sketches some of the major debates regarding the impacts of electrification in rural areas, and discusses some of the points that have been raised in opposition to conventional views of rural electrification.

2.3.1. Broad trends in rural electrification and development

Trends in the interface between rural electrification and development exhibit three distinct stages[12]: economic growth, equity and economic efficiency.

The first stage (from 1950 into the 1970s) was marked by modernist optimism and an emphasis on *economic growth*. Following the success of rural electrification in the United States, international development agencies made funding available for rural electrification projects in the Third World. Evident in this approach was the 'trickle down' theory, a belief that access to electricity in rural areas would indirectly lead to the accrual of benefits, such as employment opportunities for the poor, even if they did not have access to electricity (ibid:4). Grid electricity was seen as a technological advancement that would simultaneously encourage the modernisation of rural people and promote economic growth.

Once it had become evident that focusing on economic growth alone would not produce the expected results, development planners turned their attention to *equity* objectives. The 'redistribution with growth' and 'basic needs' approaches are examples of efforts to redress poverty, inequality and unemployment in the Third World. However, economic growth was still the means whereby this was to be accomplished. Rural electrification projects were thus a means

[12]This section draws on James (1995).

to address regional imbalances and/or rural-urban biases in underdeveloped countries whilst promoting economic growth.

As a result of the Third World debt crisis, development planners and funding agencies decided to cut back on rural electrification funding. From this point on, financial grants were given largely on the basis of the project's *economic efficiency*. Third World countries were also required to curtail their expenditure on energy which led to suggestions that grid electrification was not the best way to meet rural energy needs. Presented with the problem of 'how to satisfy the variety of energy needs of the population of a given area over a given period of time most efficiently and at least cost, [it was thought that grid] electrification should be considered as only one of the available options to satisfy these needs' (James 1995:5).

2.3.2. Impacts of Rural Electrification

2.3.2.1. Small and medium-sized enterprises (SMMEs) and commerce

There is some opposition to the conventional assertion that rural electrification will unequivocally result in the diversification and expansion of the commercial sector and small-scale enterprises in rural areas. While there is consensus that electricity may in fact stimulate growth, it has been argued that its impact varies significantly from one locality to the other (James 1995:10).

Experience in other countries has been said to indicate that electrification acts only as a 'development trigger' in a society once it has reached a certain stage of development – a stage of 'readiness' for electrification. In other words '[t]he more developed an area, the greater the impact of electricity on economic growth' (Foley 1990:109). Access to electricity may tip the balance for local entrepreneurs to invest in existing businesses but does not actually *cause development to occur*.

It is interesting to note that in his analysis of the SMME sector in rural South Africa, Rogerson (in Thom et al. 1995:7) notes that 'rural electrification is a marginal issue in the overall picture of the myriad of constraints that confront rural SMME development in South Africa'. Rather, he argues that it is 'the apartheid legacy of disadvantaged communities being situated in remote areas with limited access to markets, finance or information' which poses the greatest constraint to rural economic development.

Electricity is also assumed to encourage the formation of household businesses and increase productivity. Barnes (in James 1995:12) concludes that in the long term, electricity seems to benefit household manufacturing. In his studies of rural electrification programmes in other Third World countries[13], he found that the availability of electric lighting enabled household industries to increase working hours which led to increased output and income. For those that can afford them, electrical cooking appliances may also lead to time savings and thus increased productivity (James 1995:12).

2.3.2.2. Quality of Life

Although there seems to be consensus in the literature that although the benefits of rural electrification on quality of life have fallen short of expectations, access to electricity has

[13]Columbia and India.

improved the lives of those that can afford it. A better quality of life is realised mainly through improved lighting. Rural households often cannot afford to buy appliances and/or pay for the electricity required for additional end-uses (James 1995:13). For those that can, access to electricity and appliances may well contribute to eliminating the drudgery of household work for women as well as increase leisure time.

Better lighting is assumed to extend the active time of the household and provide better conditions in which children can study. While lighting alone may be argued to be an insufficient incentive for rural electrification, Cecelski has cautioned that the simple amenity value of electrical lighting should not be underestimated (in James 1995:13).

2.3.2.3. Equity

As already mentioned, reducing regional and urban-rural inequality became a rural electrification objective in the late 1970s. It was assumed that access to electricity would increase the quality of life of rural people, in particular the poor, and would correct rural and urban imbalances and narrow the gap between the poor and relatively wealthy at the village level.

This notion has been contested. Experience of other rural electrification initiatives has seemed to indicate that it is the better off and influential inhabitants that reap the benefits of rural electrification. It is also these people that are able to gain access to appliances and take advantage of electrification subsidies if they are offered (James 1995:16). On the other hand, it has been argued that although this may be the case in the short term, the trickle-down effects of economic growth make the long term benefits of rural electrification less inequitable (ibid:16).

2.4. Eskom's role in the RDP

Eskom's national electrification program began as early as 1989 (Steyn 1996:1). In the years leading up to the election of the Government of National Unity in 1994 , the ANC looked to Eskom for the means to solve South Africa's domestic energy problems and Eskom quickly gained a high political profile.

Within the promise of 'A Better Life for All', and with Eskom's approval, the ANC coined the slogan 'Electricity for All' which was also used in the election campaign. 'This ambitious statement created high, probably unrealistic, public expectations about the potential rate and coverage of the programme' (Steyn 1996:1) and was discontinued by Eskom when it committed itself to a more formal contribution as part of the RDP.

Eskom has stated that it 'takes a positive view of the RDP and is committed to helping the country and the government achieve the objectives of the programme' (Eskom: Powering the Future 1995:2). The utility proposed ten ways in which it would contribute to the Programme until the year 2000. Apart from commitments to develop human resources and democratise Eskom itself, these included:

- Reducing the real price of electricity by 15%;
- Electrifying an additional 1 750 000 homes;
- Contributing R50 million per year to the electrification of schools and clinics and other community development activities;

- Encouraging small and medium enterprise development;
- Protecting the environment; and
- Financing the commitments from South Africa and own resources and from overseas funding.

In contributing to both the social and economic development of South Africa, the above commitments fulfil the objectives of the RDP. If realised they meet the demand for electricity as a basic need, help to build the economy and aid in the development of human resources. The social and economic development aspects of these commitments will be discussed in turn.

2.4.1. Social Development

Eskom's commitment to household electrification represents close to 70% of the national electrification programme targets. It is Eskom's main thrust in improving living standards and thus contributing to the reduction of social inequality in South Africa. The aim is to provide 1,75 million private homes with access to electricity by the year 2000 and impact on the lives of about 11 million people (Eskom in Development 1996a). Combined with this effort, reducing the price of electricity makes it more affordable for households who 'need to acquire it at the cheapest possible levels'. Eskom believes that low-cost electricity is an 'important tool in the development of communities' (ANC RDP: Eskom reaction and comment 1995:8).

Energy is also seen as a vital input for the growth of local industry. Eskom offers direct financial assistance to local businesses through the Small Business Development Programme and seeks to increase its purchasing of goods and services from small businesses. The utility has set a target of 50% for such goods and services to be procured from small businesses in the short to medium term (Eskom in Development 1996a). Eskom also argues that access to affordable electricity gives emerging entrepreneurs the opportunity to start their own business (ibid). By extending and strengthening the local economy, Eskom will allow for the growth of small and medium-sized enterprises. These in turn are to provide jobs – another basic need in terms of the RDP.

The electrification of schools and clinics is a means whereby Eskom proposes to contribute to both human resources and community development. This is to be achieved largely through improved education and training facilities, enhanced by access to technologies such as overhead projectors and televisions. The electrification of health facilities also falls under the banner of community development within Eskom.

These development efforts are to be concentrated in rural areas where the poorest of the black population resides. Due to the remoteness of some rural areas, non-grid electrification of schools and clinics is sometimes the best option. The electrification of rural schools is being undertaken by Eskom NGE (non-grid electrification), a part of Eskom Technology Group, which is acting as project manager for the DME (Department of Minerals and Energy). The Independent Development Trust (IDT) is facilitating both the grid and non-grid electrification of clinics.

2.4.2. Economic Development

Eskom's contribution to social development through the RDP finds a place within its capacity as a parastatal. The public utility was not paying tax[14] and in the absence of a new energy policy,

[14]An act was passed by Cabinet in 1998 requiring Eskom to pay tax and bonds.

took on the task of allocating public resources for electrification. As a national utility run on business principles, Eskom seeks to promote economic development by operating on an efficient and cost-effective financial basis. It is Eskom's *vision* to provide the world's lowest-cost electricity and its *strategy* to develop Eskom as a business that maximises the value of its products and services to South Africa (Eskom in Development: 1996a).

In terms of its commitments to RDP, Eskom aims to reduce the real price of electricity by 15%. Providing the world's cheapest electricity is the most tangible way in which Eskom promotes economic development in South Africa. Since energy is considered to be an important input for the manufacturing industry, access to inexpensive electricity is to provide opportunities for the local economy as well as 'very competitive investment prospect for foreign and local energy-intensive industries' (Eskom in Development: 1996a).

The benefit of the electrification programme is not only to provide domestic households with electricity but also to contribute to economic development. Dr. John Maree, chairman of the Electricity Council in 1996, declared that '[e]xperience in other countries shows you don't achieve breakthrough economic growth until the majority of the population has access to electricity' (Eskom: Powering the Future 1995:2). Access to electricity is seen as a key component in a type of 'kick-start' scenario for the economy. Bringing electricity to businesses as well as people causes a strengthening of the local economy. Among its effects is the stimulation of the manufacturing industry, notably small and medium-sized enterprises.

2.5. The Rural Electrification Programme

Eskom's electrification programme has taken place largely in rural areas[15], a trend that will certainly continue in the future. Because licences have been granted to the municipal distributors for the electrification of urban areas, Eskom has limited access to these areas. The utility has thus concentrated its efforts on less densely populated regions where the majority of the population does not have access to electricity[16] in order to achieve electrification targets. The re-incorporation of the homelands and the integration of old homeland electricity distributors into Eskom has resulted in Eskom becoming the only prominent distributor in rural areas (Steyn 1996:3).

The grid electrification of rural areas has largely been funded by Eskom bonds raised both locally and internationally. However, return on investment has not occurred at the expected rate and the financial viability of a grid-based rural electrification programme is a growing concern for the following reasons:

- Capital costs per connection increase the further Eskom goes into rural areas. This is both because of the greater costs of increasing the main line and the greater costs of reticulation. In rural areas households tend to be more scattered;
- In terms of development, the rural electrification project has been criticised as a sector-specific delivery programme, poorly integrated and co-ordinated with other development

[15]The NER database defines *urban* areas as falling within a formally proclaimed local authority area before the 1995/6 local government elections. Densely populated and peri-urban areas adjacent to formally proclaimed authority land have been termed *functionally-urban*.

[16] As on 31 December 1996, 73% of the rural population did not have access to electricity (NER 1996:11).

activities (Steyn 1996:4). Assimilation of electricity into energy use strategies has therefore not occurred at the expected rate;

- Following from this, consumption in rural areas has been lower than expected. Initial sales to customers in these areas has shown that consumption is not sufficient for ongoing financial viability (Eskom 1996b:23);
- High distribution losses have been exacerbated due to consistently low consumption rates (Thom et al 1995:iv);
- The extension of the national electricity grid has resulted in pressure on the national load. Although residential electrical energy consumption amounts to only 15% of total national consumption, the residential load constitutes 75% of the total national variable load (Eskom Annual Report 1996:5). The cost of increasing generation capacity to satisfy the increasing peak demand is not in Eskom's best interests and Eskom has decided not to commit to new capacity or new energy sources until at least the end of 1997 (Eskom Annual Report 1996:21)[17].

Realising that its approach to rural electrification would not generate the funds expected, Eskom began exploring rural electricity provision alternatives. These included investigations into technologies that reduced the cost of transmission, reticulation and house-wiring and electricity dispensers[18].

The need to reduce costs also resulted in a re-evaluation of the level of supply. It was reasoned that instead of offering the conventional 60A, lower levels of supply could meet customers' energy needs. The lower than expected consumption of rural customers was an incentive for this approach. Pilot projects were instituted to test the applicability of providing a 2.5A and 20A current-limited supply[19]. This 'lifeline' supply was to provide electricity for 'essential' electricity needs in rural households such as lighting and media[20].

Because of the possibility of facing demands to increase the supply level, Eskom promoted liquefied petroleum gas (LPGas) alongside current-limited supply in these pilots (Eskom 1995 in James 1996:29). This represented a shift away from conventional electricity supply towards an IEP approach – the supply of a variety of energy sources to meet the needs both of the users and the suppliers.

2.6. Need for Energization

As already mentioned, 'energization' implies the *delivery* of *integrated energy*. In terms of 'delivery', it is seen as analogous to electrification in the electricity sector. Rather than limiting the choice of energy to electricity, it involves supplying a household's energy end-uses through a package consisting of alternative energy sources.

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[17]In order to contain demand, Eskom devised a residential demand-side management (DSM) plan which is designed to influence the customer to use electricity efficiently and to change the national electricity load profile.

[18]For example, installing circuit breakers rather than prepayment meters.

[19]At the Tambo pilot site, 2.5A and 20A were offered. At the Mafefe site, a 60A supply was also included.

[20]Lighting and media were considered by Eskom to be 'essential' electricity needs but as James (1997:23) notes 'There seems little basis . . . to suggest that lighting is more essential than cooking'.

According to Eskom (and similar to the definition of IEP used above) 'integrated energy' means two things: integration within the energy sector and integration between the supply- and demand-side. The former involves decisions between various energy sources 'tak[ing] into account their efficiencies and costs' (Eskom 1997a:4) while the latter means 'matching supply-side resources with demand requirements' (Eskom 1997c)[21]. The energization concept proposes a combination and optimisation of these two types of integration resulting in the provision of an efficient and cost-effective energy package that is within the economic means of communities (Eskom 1997a:4)[22].

Although Eskom is the country's *electricity* utility, the manner in which national resources are allocated to supply the country's *energy* needs are of concern to it. An unrestricted grid electrification programme, especially since it is progressing deeper into the rural areas of South Africa, would threaten Eskom's performance as a business. Moreover, a consideration of different energy sources shows that coal-generated grid electricity is not the most energy efficient means of providing for all the energy end-uses of the entire population, and in particular its thermal needs (Hazard 1998). Eskom finds itself in the position of having to meet the political expectations of electrification while trying to 'retain Eskom's sound financial position' (Eskom Annual Report 1997:50), an official objective of Eskom's IEP strategy. The former may lead to inefficient national resource allocation and the latter may necessitate collaboration with other energy sub-sectors. From promoting a single energy solution in 'electricity for all' Eskom has come full circle to advocating an IEP strategy. 'Let's make the most of our energies' is now its call.

Although Eskom's formal RDP obligations end in the year 2000, electrification is expected to continue at a reduced rate thereafter. Even so, the majority of South Africa's rural population will remain without access to grid electricity for some time. It is estimated that 3.2 million homes will still be without electricity at the end of 1999, 75% of them in rural areas[23]. If the government instructs Eskom to address this need, it will affect Eskom's business strategy. Eskom has indicated that continuing with the present pace of electrification could jeopardise its plans to keep the real price of electricity down (Hazard 1998).

Eskom thus needs to find a sustainable future role in energy provision in rural areas. By arguing for efficient energy resource allocation, Eskom seeks to play a role in administering a variety of energy sources to rural communities. It is argued that energization is the method by which this can be achieved.

In terms of Eskom's supply-side considerations alternative energy provision strategies constitute part of Eskom's DSM strategy. In this regard energization does not significantly affect the country's load profile[24] and thus delays the need to increase capacity. Moreover, it is still under

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[21]This definition was taken from earlier, informal energization documents.

[22]This is different to Mohan Munisinghe's depiction of IEP (in Loon 1996:10). He proposes the integration of supply and demand within each energy sub-sector.

[23]This figure is obtained by extrapolating the NER statistics from 31 Dec 1996. This estimation shows that at the end of 1999, 56% of rural households will be without electricity while only 17% of households in urban areas will be unelectrified. The number of electrified households falls 7% short of the ANC's RDP projection of 72% (ANC RDP 1994:33).

[24]Energization is not necessarily separate from electrification. A future option is to include current-limited supplies of electricity for 'essential electricity' (see 'Description of Energization').

debate whether RDP connection targets include non-grid connections. In this regard, energization could contribute to fulfilling RDP targets before and perhaps after the year 2000[25].

Although the old economic framework remains strong in thinking about development, Eskom is aware that concentrating on economic growth is not sufficient. Its attitude and commitment to the RDP show that this is the case. Evidence of this outlook can be seen in the Energization Project too, which explicitly targets meeting the social needs of the underdeveloped. The separation of energization from Eskom's main business, grid electricity, allows the marketing department to approach energization with no vested interests (Hazard 1998).

2.7. Status of the Project

Energization was first tested by Eskom's marketing department as part of the Chief Executive Challenge[26] project. It was implemented in the small settlement of Papendorp, a remote extension of the town of Ebenezer (near to Paternoster) on the Cape west coast. In this case, the form of energization consisted of a PV system combined with LPGas.

The project reached a stage where an energy agent was elected, a gas depot was installed by Afrox, the LPGas supplier, and two demonstration systems were installed. However, the project was halted because the residents of Papendorp desired to be electrified, as Ebenezer had been. Energization was not implemented and the settlement was then fully grid electrified.

Following this trial project, Eskom decided to embark on a more official pilot phase. The Energization Pilot Project Proposal was written and six more remote rural sites were selected in the Eastern Cape, Northern Province and KwaZulu-Natal. Each of these sites was matched with a particular gas company's LPGas supply division.

The selection of these sites had to satisfy four criteria, two of which have to do with the proximity of grid electricity: the area could not be on the five-year grid electricity plan and had to be more than 5km from the existing grid. Eskom also required that an access road to the site be able to support a one-ton truck (for LPGas deliveries) and that school in the area be PV electrified so that the residents would have some familiarity with photovoltaic electricity. Although the concept was introduced to all of these communities with varying degrees of acceptance, institutional and financial problems resulted in energization being fully implemented at only one site: KwaBhaza in KwaZulu-Natal.

[25]The restructuring of the electricity supply industry and the privatisation of Eskom will mean that electrification will be financed through a government Electrification Fund. A portion of the monies may well be allocated to non-grid electrification.

[26]An Eskom management course designed to improve lateral thinking in the organisation.

Chapter 3 – Critique of Eskom's Energization Objectives

3.1. Introduction

The Project Proposal provides some reasons for Eskom's involvement in the project, describes the concept of energization and sets out the method by which it is to be implemented. A critique of this document intends to clarify and disaggregate the energization objectives set out by Eskom on their own terms. On the other hand, the fieldwork experience (the case study in KwaBhaza) is used to weigh up these objectives in the light of the community's needs. This thorough assessment of the objectives also serves to measure the objectives against implementation.

The size of the Project Proposal makes it impractical to present in full. Instead, important parts of it are selected, quoted and then discussed. To denote the Proposal, a different font is used. For example energization is introduced by comparing it with energy supply strategies abroad:

Energization is not new, it is a concept that has been practised overseas for decades, but has not been implemented in South Africa.

If a more detailed description of the excerpt is required then that particular passage is repeated:
. . . but has not been implemented in South Africa.
And then discussed afterward.

The format of this chapter roughly follows the format of the objectives as they are presented in the Project Proposal. The first set of objectives are macro-level objectives. These deal with the larger context of the energization pilot project. The second set of objectives (called the micro-level objectives) deal with the more immediate aspects of energization including the product package and the energization process. Firstly though, energization is placed within the development context as defined in the Proposal.

3.2. 'Energy Upliftment'

Eskom promotes energization as 'energy upliftment'. 'Upliftment', like 'development', is a general term implying both economic and social improvement, an upgrading from traditional to modern. In this way it draws on notions of modernisation, and preceded by 'energy' refers to the provision of modern energy sources[27]. In this context, energization is proposed as the means by which the domestic energy sector can be developed.

The following passage points out the major benefits of energization both on the demand-side and on the supply-side:

[27]Eskom defines 'modern energy sources' as those that are clean, labour effective, affordable, safe and accessible (Hazard 1998). Later on the Project Proposal states that 'energy upliftment' is to be promoted by bringing "more efficient, convenient and cleaner energy sources".

Energization, or the provision of balanced energy solutions, is an alternative to grid electrification for rural communities. It will satisfy the energy needs of these customers, will achieve the Eskom RDP targets and will also address some of the organisation's demand side management. As grid electrification could take another 20 - 30 years to reach rural communities, energization will provide many of these communities with economically stimulating 'energy upliftment' now.

This passage clearly shows Eskom's double agenda. Energization is the solicitous provision of a grid electrification alternative to rural communities on the one hand, while on the other, it is a marketing-driven initiative aimed at promoting economic development while satisfying some of Eskom's supply-side concerns.

The important points of the above excerpt are considered in turn:

Energization, or the provision of balanced energy solutions, is an alternative to grid electrification for rural communities.

'Balanced energy solutions' refers the complementary nature of the energization package in meeting the energy end-uses in rural communities: 'essential electricity' for lighting and media and LPGas for thermal applications. Although energization may be seen as a 'whole' energy solution in this light, it is not an 'holistic' energy solution – it cannot possibly meet all the energy needs in rural communities. Moreover, it was found that recipients considered it to be inferior to grid electrification.

Energization is perhaps more accurately an energy solution for rural communities who have no alternative. As the Project Proposal states, it is aimed at rural communities that could only be electrified in the next 20-30 years. These communities would certainly prefer grid electrification, especially in light of the political aspirations for grid, but energization represents some form of improvement for them. Energization is therefore the utility's supply-side alternative to grid electrification.

It will satisfy the energy needs of these customers, will achieve the Eskom RDP targets and will also address some of the organisation's demand side management.

The idea of meeting all of the energy end-uses (PV for lighting and entertainment, and LPGas for thermal applications) is tied to the idea of an energy 'customer'. Defining the user as a 'customer' avoids the complexity and variety of energy-use patterns prevalent in rural areas. Firstly, it ignores the social and cultural context of energy-use and secondly, it ignores the fact that energy is purchased for use in the household, a unit for which energy requirements differ significantly within rural communities. As a 'whole' solution that provides for all of the end-uses of rural 'customers' it was found to fall short of meeting the complete set of energy needs on-the-ground in rural households.

Energization is a method of bringing energy upliftment to the rural disadvantaged now! The urgency of Energization cannot be over-emphasised.

Energization is both an energy provision process and an energy package. A combination of these – the *process* of providing the energization *packages* – is described above as a 'method' of uplifting the energy sector in rural communities. In this way, it follows the methodology of

development: the belief that modernisation can be brought about through planning at the 'top' and implemented 'downwards' towards a pre-determined target group.

With the possibility that the targeted rural communities may only be connected to the grid in the long term and if energization is considered to be equal to electrification, then this is a significant improvement in rural residents' circumstances. The above extract highlights the social development possibilities of energization. It presents a solution for the citizens most in need of development – citizens in rural communities who are furthest from the grid and are feeling the consequences of Eskom's least-cost connection strategy.

The urgency of the above excerpt can be interpreted as a measure of the responsibility that Eskom feels towards the unelectrified rural population. However, the main reason for the urgent tone is advocacy role that Eskom is taking on in energization. They are pressing for government support in off-grid electrification and wish to re-open the debate around off-grid energy policy (Hazard 1998). Eskom are also advocating on behalf of the LPGas Association who wish to establish the role of LPGas in rural energy provision strategies. The restructuring of the electricity supply industry had allowed the inclusion of energization in energy policy. It was recently presented at the Renewable Energy Strategy Planning Workshop for debate as an off-grid strategy to be included in the White Paper on Energy Policy (November 1998).

3.3. Pilot Project Objectives

These are presented separately in the Proposal and have been called macro- and micro-level objectives.

3.3.1. Macro-level objectives

The macro-level objectives presented in the Project Proposal are to:

- identify and find solutions to the constraints
- create successful demonstration sites for subsequent reference for the national roll out planning and meaningful influence
- gather the relevant information for planning and facilitating a national Energization implementation plan for rural South Africa.

Although the purpose of a pilot project is to test a concept, and by doing so identify and find solutions to the problems of implementation, the notion implied in the first objective suggests a certain dominance of the planning agenda over the recipients. It suggests that the plans, written by the suppliers who are removed from the local level, already constitute a formulaic solution. Consequently, the hindrances that arise during implementation are then interpreted as problems that can be solved by the suppliers without critical reflection or engagement with the recipients of the project.

Problems that emerge during implementation result from a myriad of factors, some of which can be solved by technical solutions and alterations that can be made to the implementation process. However, the complex social and political environments within which a development

intervention acts often mean that it is not merely a case of finding solutions to constraints. 'Constraint' suggests that minor adjustments to the plans will result in the inevitable acceptance of the development offering by the local people. Problems that arise can point to critical changes that must take place in the plans themselves for the intervention to be more successful.

The second objective indicates that the success of energization at the pilot level is pivotal for larger scale implementation to take place. It is assumed that once these 'model' sites[28] have been created, further stages of implementation will be enabled. This is to occur by referring to the successful sites and replicating them. In addition, these successful demonstration sites are envisaged to meaningfully influence energy policy or at least reopen the policy debate around non-grid household electrification and LPGas (Hazard 1998).

The third objective indicates that the aim of the pilot project is to provide a point from which energization can be launched across rural South Africa. Within the pilot projects, information is to be gathered to facilitate the implementation of plans for a national rollout.

This implies that energization may be planned and implemented in a similar fashion to grid electrification. It again takes the success of energization as a given once solutions to the constraints have been found, and extends this to the national level. Like grid electrification, it does not take into account the diversity of rural communities – a consideration that should receive attention due to the fact that energization is targeted at more remote rural areas, where poverty and multiple fuel-use are generally more prevalent.

In summary then, the above three pilot project objectives result from the need to test the concepts outlined in the Proposal but still remain within the bounds of these concepts. In other words, energization as presented in the Proposal is the template for future energization projects. It is in the pilot stage that the concept will be tested, constraints identified, solutions found and the process template modified. Once this has taken place, and the energization process has been refined, successful demonstration sites will be created. While this occurs, information is to be gathered to plan subsequent, larger scale implementation stages. These are to be assisted by referring to the demonstration sites and the effect that these sites have on policy. This is to culminate in a national rollout across rural South Africa.

The success of the stages of events outlined above (from the pilot project to the demonstration site to national roll out) depends on the transition between planning to implementation. The macro-level objectives suggest that a successful implementation may be achieved simply by identifying and finding solutions to the hindrances. They do not include critical reflection or the possibility of significant structural changes. Rather, they tend to imply that the energization process in the pilot project and larger scale implementation thereafter, will remain situated within the template envisaged and defined in the Pilot Project Proposal. During the case study it was found that energization did undergo some major structural changes but these were as a result of unforeseen institutional problems rather than in response to critique (internal and external) or negotiation with the recipients.

This criticism of the rigidity of energization must not be too heavily emphasised. The energization process defined in the Project Proposal is not overly prescriptive or confining and

[28]The plural is referred to here as the Proposal was to be implemented at six different sites. However, KwaBhaza was the only site in which installation occurred.

does contain scope for alterations. As the following excerpt indicates, the plans leave room for a degree of flexibility:

During the pilots the process will also be tested, modified as necessary to produce a standard energization process model for replication in full national roll out.

This comment clearly illustrates the dynamic between of rigidity and flexibility in energization. On the one hand, flexibility should be encouraged because it tends to make energization more appropriate for the variation of needs in rural areas. In this sense, modifications, although perhaps not a strong enough term for the type of changes required, make energization more appropriate for the community. On the other hand, the above excerpt indicates that these changes are occurring with the larger picture in mind; a striving towards an replicable and mechanistic energization process that can be implemented on a national scale.

To determine whether it is possible for energization to be successfully implemented, it is necessary to establish exactly what energization wishes to achieve. Measuring the success of implementation entails firstly, determining whether energization satisfies Eskom's energization on their own terms and secondly, whether it satisfies the needs of the pilot community as it is intended to. These issues will be examined by going to the core of what energization is and how it is to be implemented in the Pilot Project Proposal.

3.3.2. Micro-level objectives

The micro-level objectives of the pilot project are to test whether the processes and concepts theorised in the planning stage can be successfully implemented. However, the process of implementation does not only concern the recipients at the end of the process, but all those that are influenced by the process.

These objectives are to test the reactions of all the stakeholders of the pilot, namely the customer, the community leaders, the suppliers, the funders, and ultimately the policy makers.

It is important to note that defining the stakeholder as a 'customer' tends to exclude those within the target market who choose not to be included in the energization project. Although referring to recipients in this way may mean 'potential energization customers' or simply 'someone who buys'; it is ambiguous in that it suggests that all people in the target market will purchase energization packages. It is perhaps because Eskom tends to view society in terms of their potential consumption of energy, even as it expands into other energy sources besides electricity. All South African people are thus referred to in terms of Eskom's strongest relationship with them – as 'customers' or potential 'customers'.

In terms of this study it was found that the level of service offered by the package, affordability and political issues were the factors that hindered the acceptance of energization by the entire community. Although the reactions of the community leaders were favourable in this case, it was found that they did not represent the attitudes of the entire community. Political division, mainly as a result of the desire for grid electricity but linked also to community power struggles and even national politics, was the main factor determining the choices of residents to become energization 'customers'.

In the initial pilot project stage implemented in KwaBhaza, the objectives are to test:

- the product package
- the energization process, including the energy agent and the funding mechanisms[29]
- the sustainability of the programme
- the technologies

Using these objectives as a basis, the main components of energization will be considered in turn.

3.4. Product Package

The Eskom Project Proposal describes the product package in the following way:

The product package combines two normally competing energy sources, namely electricity and LPGas. Currently there are many solar homes pilot studies but that is testing the solar homes systems in isolation. There is no other pilot study currently being done that offers a balanced energy solution that satisfies all energy needs and the basic applications of lighting, entertainment, cooking, water heating and space heating. The need for cooling could be satisfied either with LPGas or if a larger PV system is chosen. Cooling cannot be satisfied with PV on the basic system that is on offer.

The concept of energization hinges on the combination of two different energy sources. The remark that electricity and LPGas are competing energy sources is more applicable to grid electricity but the shift is made to non-grid (solar) energy where the competition between them is to be negated by a proposed synthesis. These energy sources are unproblematically combined as a 'package'. This is a neat conceptual arrangement that takes two existing products on the market, solar home systems and LPGas hardware, and packages them as a single product.

There is no other pilot study currently being done that offers a balanced energy solution that satisfies all energy needs . . .

The idea of an energy product package entails defining the needs of the target market and offering a solution to this need. However, these are defined on Eskom's own terms rather than on the terms of the recipients. For example, a 'balanced energy solution' is Eskom's idea of balance; balance between 'essential electricity' for is appropriate for lighting and entertainment and LPGas which is considered more appropriate for thermal needs. For argument's sake, it may be that for a particular recipient, a balanced energy solution would entail supplementing their wood collection with paraffin.

'Energy needs' too, are defined on Eskom's terms. Like grid electrification, energization is a service provided to rural recipients that has the potential to meet all of the household's energy needs. In addition, like grid, energization does not consider energy-use strategies of community that have been shown to affect the assimilation of electricity in the rural electrification programme. Thus, energy needs does not refer to the complete energy requirements of rural households but rather the 'needs' which Eskom perceives and is able to supply.

[29]Although the Proposal does not specifically mention the testing of the Energy Day as part of the energization process, it is considered in length in the Proposal and forms a part of the critique.

In short, the notion of a product package strongly suggests an economic framework of supply and demand. It visualises a market for energy according to the needs of 'energy customers' and proposes offering an 'energy package' to meet these needs; it aims to *supply* energy where it sees the possibility of *demand*. However, these definitions of supply and demand are defined according to Eskom's perceptions of the demand and what they are able to supply. It suggests that energization will succeed by virtue of the fact that it is a superior product on offer to rural households.

This energy package is offering access to more efficient, convenient and cleaner energy sources. Thereby bringing with it energy upliftment to communities who would have to wait many years for any type of upliftment.

Previously, we have seen that energization is described as a 'method' of bringing 'energy upliftment' to rural communities. The starting point of this method is outlined in the extract above. It is to be achieved through an energy package that satisfies all the end-uses of a rural communities (except perhaps cooling). The Proposal states that the attributes of this product are that it *offers access* to a standard of energy not currently available in rural areas. This is simply stated, however it is clear that there are huge logistical chasms between merely defining an energy package and giving rural inhabitants access to it. More accurately, it is conceptually that the 'energy package *offers* more efficient, convenient and cleaner energy sources'. It is by the energization process, that *access* to these packages is to be provided. This is explained in the following extract in reference to rural communities that would have to wait 20 - 30 years for grid electrification:

Energization for these communities would mean the provision of an energy package that consists of essential electricity, in the form of a photo voltaic (PV) system to provide for the lighting and entertainment needs, and LPGas to satisfy the thermal needs of cooking, water heating and space heating.

The term 'essential electricity' is derived from findings that recently electrified rural households tended to primarily use electricity for lighting, media and refrigeration. Due to the expense of cooking and heating appliances and the high cost of running these appliances, it was found that many rural households continued to use other fuels for thermal applications. The notion of 'essential electricity' has been adopted and included in the energization proposal.

Although the idea of 'energizing' a community makes sense in terms of meeting end-uses, it is clear that the drawbacks in meeting energy needs at the household level makes it impossible to meet the energy needs of a particular community or rural communities as a whole. It was found that residents in KwaBhaza preferred to meet their energy needs by a combination of traditional (wood and agricultural wastes), carbon-based (paraffin, candles and coal) and chemical fuels (dry batteries) alongside LPGas. From the initial evidence, those households that were given access to PV continued to use a variety of fuels.

Reference to the multiple fuel use prevalent in rural areas is indicated in the extract below:

Furthermore research has shown that the consumption figures of newly electrified customers, more especially rural customers, do not justify the supply capacity and

therefore infrastructure that they receive with full electrification. Their usage patterns and energy needs are also different to urban customers.

This excerpt acknowledges that energy-use patterns in rural areas are different from those in urban areas where grid has been proven to be appropriate. Moreover, it indicates that these energy-use patterns are a cause of concern for Eskom: the capital costs of grid electrification infrastructure are not justified by the revenue received from rural customers.

Rather than reflecting on the reasons why rural grid electrification is problematic and proposing a solution based on the needs of rural recipients as defined by them, or another more people-driven process, energization is Eskom's supply-side solution to the problem. It is defined by the utility and also maintains a framework and rigidity similar to grid electrification. On the one hand, it makes sense for the utility in terms of resource allocation, but on the other hand it neglects the complex factors (of which energy-use patterns are only a part) that prohibit effectively meeting demand-side needs.

Although the provision of energy packages takes place by the sale of a package to individual households, the extract above does not distinguish between rural communities and the individuals who would purchase the package. It suggests that in offering the product package to individual 'customers', the entire community will be energized; it does not consider those in the community that will not take part in the intervention. This is clearly a disadvantageous for poorer residents who would obtain both the opportunity and the status of being connected if Eskom brought grid electricity to KwaBhaza.

Specifically, the product package offered at the KwaBhaza site consists of the following components[30]:

- 2 × 4.5kg cylinders
- 2-plate stove with connections
- 49W PV panel
- battery with regulator
- 2 × 9W lights
- outlet for a black and white television set and radio

The question of whether these constituents enable energization to satisfy the energy needs of the community is fully explored in the case study.

The concept of an energy package that combines these discrete components, and therefore PV and LPGas, is enforced in the Proposal. As the definition in the excerpt above makes clear, it is the physical (PV and LPGas) equipment that constitute an energy package. However, since energization professes to satisfy the energy needs in rural communities (and is considered an alternative to grid electrification), the notion of an energy package would be complete only if the fuel is supplied along with the package. Since PV does not require an input except for adequate sunlight radiation, the Project Proposal suggests (it does not explicitly state) that LPGas will be provided with the package.

[30]It was not only the "outlet" but also a black and white television set that was included as an option and offered to customers in KwaBhaza.

It is suggested that the energization offering be seen as one package, and that one payment per month be made and collected by the energy agent. There will be a flat rate charged dependant on the option the individual customer chooses. The intention is to then hand the money over to the LPGas representative, who delivers LPGas and equipment on a regular basis, who then pays this into an account. The paper work between the energy agent and the funding agency can be handled separately. The charge for extra gas refills will be determined by the energy agent (recommended by LPGas supplier) and collected on a cash basis.

This excerpt suggests, as was the case in implementation, that gas refills are to be included in the monthly payments for the equipment. Although it is proposed that an agreement with the LPGas representative would facilitate the payment of the loan amounts this was not found to be workable in practice. The gas distributor was unwilling to get involved in the project other than on a strictly commercial basis.

The coherence of the loan repayments (taken out to cover the capital costs of the PV and LPGas equipment) and the cost of monthly gas refills, was found to be a crucial point in implementation. It may be argued that demanding that energization be paid for as a package restricts access for people who cannot afford to pay for the equipment and running costs of an energy package. This is contingent not so much on the choice of package offered (since the Proposal points out that there are different options from which a customer can choose) but on the increased cost of including a gas refill in the package.

On the other hand, splitting the LPGas and PV components are opposed by Eskom's wish to offer an energy solution that is comparable to grid and the LPGas suppliers need to secure a minimum gas consumption in the community. Gas consumption is secured only by agreeing to go ahead with the project if a minimum number of customers sign up. This is explained in more detail in the Energization Process.

This introduces the subject of the cost of the system. The Proposal makes it clear that repayment will occur on a monthly basis but does not say what this figure will be. It does suggest that the final figure will only be decided upon during implementation. However, for a number of reasons, it has already been largely determined.

Firstly, the components of the product package (which is 'to be used in 95% of the cases') and the associated costs have already been decided upon[31]:

PV system (including installation)	2200
LPGas hardware	363
Total	**R 2563**

The price to the end-user can be calculated as follows:

Total package cost	2563
Less subsidy[32]	1500

[31]These are the figures used when the proposal was written in August 1997. Inflation between the time of writing and the time when the systems were finally offered caused a discrepancy between these costs and the actual costs of the systems.

Subtotal	**1063**
Less deposit	100
Total	**R 963**

This amount is either payable in cash or financed over 36 months through the Energy Agent.

From the above it can be seen that although the exact final cost to the customer is only to be decided during implementation, the monthly repayment option will have the following characteristics: it will be a flat rate charge repaid over 36 months and will be derived from a capital cost of R963 combined with the cost of either one or two gas refills. Thus, the final price depends on other factors such as the interest rate of the loan, the cost of maintenance and the cost of gas refills. The final price is to be 'tailored' during the implementation process according to their expenditure on energy (suggested to be around R52 in the Proposal – see below) or the price that people are prepared to pay (determined in the Pre- Market Research – also see below).

References to 'tailoring' or 'adjusting' the final cost of the offering is akin to the 'modifications' that were to take place in the energization process mentioned earlier. Like this aspect of the project, a largely pre-determined framework governs the scope of flexibility of the pricing of the package and the payment arrangements.

Even though a degree of community consultation was undertaken, it was found that this did not meaningfully question the payment structure or provide a clear idea of what the community as a whole would be prepared to pay. Instead of participation that empowered the community to decide for themselves the type of package and payment structure they would prefer, the consultation process concentrated on extracting information for insertion into the energization plans.

3.5. The Energization Process

The energization process set out in the Proposal consists of a series of steps broken up into three phases. The process itself combines two distinct means of providing energy to rural households. On the one hand, it uses the business framework of offering a 'product package' to rural 'customers' that requires certain facilities and infrastructure be set up. On the other, it aims to produce a sustainable energy project that satisfies the needs of rural customers who are too far from the grid to be electrified in the near future.

The marketing approach can be clearly seen in the following excerpt:

The process, which is set out in detail later in the document, aims to involve the community every step of the way and to get their understanding and buy in. In addition,

[32]The Project Proposal clarifies that "The pilot project assumes a subsidy of R1500 per connection funded through REFSA [Renewable Energy for South Africa] ".

the process checks everything very systematically, especially such things as disposable energy income, affordability, customer choice, and gets a commitment at each stage.

In this way it minimises risk and thoroughly markets the whole energization package. The process also draws on the extensive experience Eskom and the LPGas industry has in working with disadvantaged communities.

The process involves the community in a 'semi-prescriptive' way (Hazard 1998). Being rural, the education level in the community is assumed not to be very high and some decisions must be taken on their behalf. The role of education in this process is alluded to in the above extract. Getting the community's 'understanding' of the benefits of the project entails information dissemination that will presumably result in their decision to contribute financially to the project (getting their 'buy in').

In the case study it was found that although the process required the community's co-operation and input on some aspects, the details of the project had largely been decided before implementation. The process was found to be rigid and prescriptive in that it had already defined the parameters of the community's influence. As a supply-driven process, energization does not allow the community to meaningfully influence the project but rather holds them at a distance by marketing the product to them.

This highlights an important aspect of the process – that of participation. The energization process requires the community's co-operation and commitment, and Eskom seeks to obtain it by involving them 'every step of the way' in order to gain their 'buy in'. Phrasing the community's agreement to the project in such a way indicates that the parameters of the project have already largely been determined: the community are required only to agree to the terms offered by Eskom.

This type of participation does not maintain an equal balance of authority with the community, arguably the most important group of stakeholders in the project. The reason for this is clearly set out in the excerpt from the Proposal above: Eskom do not wish to risk involvement in the project if it is to have negative financial impacts on them. Rather than getting intimately involved with the recipients to establish their needs, the suppliers would prefer to involve the community on condition that they agree to the their terms. Eskom has the authority to sever the relationship at any stage if they do not approve of its proceedings.

If major problems arise the site can be aborted prior to each commitment stage. Should the community be unhappy or reject the process at any stage, alternatives need to be found, or the communities commitment to the process questioned.

It is clear from the above that the authority in the process rests with Eskom. Having approached the community and presumably obtained some form of interest or commitment from them, the threatening tone of the above passage indicates that the power lies with Eskom in determining whether energization will be implemented or not. It does not appear that there is much room for negotiation although there is a possibility that alternatives may be found.

Keeping in mind Eskom's experience in Papendorp and the objections that arose in the KwaBhaza Project, the problems of which the above package speaks are the expectations of grid

electricity. It was found that energization was considered inferior to grid electricity and even more exasperating was the fact that it was offered by the company able to provide grid – Eskom.

In other documents (the Business Plan) the energization process is referred to as the 'marketing process' which again demonstrates energization is seen as a 'product package' which is sold to rural 'customers' on the market. In line with this idea, the discussion about the energization process in the Proposal is preceded by information about the Target Market, which includes 'demographic and psychographic information' about the customers at which energization is aimed. This information is taken from the '*SA to Z: SA Consumer Market*', an Eskom publication which describes conditions in the South African consumer market. Population, employment and monthly income statistics for rural settlements are presented as well as energy-use data and average monthly expenditure. This information is extracted and presented in the following manner:

Multiple Energy Usage (%of total rural settlements)

% usage	Main energy source	Average energy spent per month
12%	Coal	R31,40 per month
74%	Wood	R 8,30 per month
2%	Batteries	R14,80 per month
72%	Paraffin	R29,50 per month
11%	Gas	R62,50 per month

Rural Settlements and Electricity and Other energy sources

Energy Source	% households	Average monthly expenditure	% of household income
Electricity only	4	R206,00	23
Electricity + Other Energy	7	R133,00	15
No Electricity - Combination of other energy sources	89	R52,70	6

Average monthly energy spend R52,70 = 6% of total monthly income

The highlighted result of the target market review is the figure of R52,70. This is quoted as the average amount that unelectrified rural households spend on energy each month. The purpose of highlighting this figure is to provide a guideline amount to charge energization customers.

Research indicates that the average amount spent on energy in rural communities is R52,70. This is the figure around which a product offering must be tailored.

This extract suggests that if residents currently spend R52,70 on energy they would be willing or able to afford the energization package. This indicates that the energization package, the 'product offering' is seen to largely replace the fuels in an average household. It further assumes that this average household energy data is sufficiently accurate to use as a guide.

It was found that the figure of R52,70 is comparable to the amount regularly spent on fuel by the poorer members of the KwaBhaza community. On the other hand, many of the other figures do not agree with the data obtained in the case study. This issue is explored in Chapter 5 where the data sets are compared in more detail. From this exercise it emerged that it is not so much the figures that are of importance, but the context and the manner in which they are presented.

After this statistical review in the Project Proposal, the energization process is laid out. As already mentioned, it consists of three phases each of which contain a series of steps. The activities that involve the formulation of the package and interaction with the community at the pilot site are summarised below[33] and the activities of each phase discussed and commented on in turn:

Phase 1

This phase entails the introduction of the concept to the community and the conclusion of the details of the package. Of importance is the Market Research that is carried out to provide input to the development of an energization offering, a package suggested in the Proposal to be aligned with the needs of the pilot community.

- Obtain approval from community leaders for detailed market/community research [No commitments to supply merely share results of the study]
- Community Market Research (Pre)
- Develop a specific and complete energization offering including minimum customer acceptance level to proceed with project and final Business Plan

The comment that Eskom not commit to energy supply but 'merely share the results of the study' indicates their wariness of raising expectations. Eskom are emphatic about stating their position to prevent the possibility of miscommunication. Agreeing to supply energy to the area without a full demonstration and explanation of what energization entails may result in a misconception of the capabilities of energization (especially PV electricity since people tend to be more familiar with the potential of gas). This is especially so because people associate Eskom with the arrival of grid electricity.

In the case study, it was found that there were some misconceptions regarding the capabilities of PV. However, this in no way threatened the success of the project since the community leaders were well informed and were of the opinion that energization was inferior to grid electricity.

The last point in the excerpt (to Develop a specific and complete energization offering . . .) indicates that the specifics of the offering are only to be concluded once the Market Research has taken place (the exact monthly repayment figure, for example). The formulation of a 'specific' energization offering indicates that energization is to be adapted to various contexts.

The ability of energization to adapt to different contexts cannot be assessed because KwaBhaza is the only energization project on line. It was previously argued that due to the rigid structures underlying the energization process, it is doubtful whether the energization is able to cater for the diverse energy-use patterns in rural communities. Following from this, the use of market research to develop a specific energization offering may result in adjustments to the nature of the packages

[33]The full energization process is presented in Appendix A.

and the process but in general, energization remains squarely within the framework determined by the suppliers.

Phase 2

This stage is the crucial link between the specific energization offering produced in Phase 1 and the actual installation of the packages. It is the stage in which the majority of the interaction with the community takes place to persuade them to buy the energization product. This is achieved through a number of marketing techniques that lead to the goal of this stage – reaching the minimum acceptance level (the requirement that a minimum number of people support the project). Included in this phase is also the initiation of three ideas that are discussed later: the energy agent, the demonstration house and the Energy Day concept. These three concepts have specific functions but also serve a marketing role.

- Present proposal to community leaders [It will be a conditional offer linked to a required minimum acceptance level] [34]
- Appointment and training of Energy Agent
- Installation of demonstration house
- Market energization package to community
  - Marketing and Demonstration (Energy Day 1)
  - Safety aspects reinforced
- Achievement of the minimum acceptance level heralds Energy Day 2 - Celebration that the project will proceed

The majority of the marketing takes place in this phase of the process. The marketing activities undertaken in KwaBhaza involved cooking a meal for the community on gas and the handing out promotional gifts and pamphlets. Promoting the safe use of LPGas was found to be necessary because of the fears that many people had of the fuel and it was clear that this was a perception that the LPGas Association wished to change.

The notion of marketing energization to a community is an integral part of the energization process and is freely and unproblematically carried out. However, the intentions of the LPGas Association and Eskom should be examined. Keeping in mind that the grid electricity is greatly desired in rural areas and that expectations of grid are the main factor causing the rejection of energization, the marketing and demonstrations activities are not purely an attempt to inform people about energization.

The fact that energization is only being carried out in areas that Eskom estimate will take 20 - 30 years to be electrified is reason to believe that energization is the better option than waiting for electrification. At least, this is the view of the suppliers that have a knowledge of the different energy sources and their applications. In this context the suppliers may see it as their role to inform the uneducated rural customer of the advantages of these energy sources, and in particular PV.

[34]These activities are presented in more detail in the Pilot Project Proposal.

However, the enthusiasm of the suppliers in convincing rural people that energization is the answer to their energy needs may stray into modes of advertising inappropriate to the traditional rural context. This may result in people buying into the idea of energization and the glossy presentation of a modern lifestyle that it seems to offer rather than a sober assessment of its advantages and disadvantages.

Phase 3

The focus of this stage is the installation of the energization packages once deposits have been collected. The Proposal makes it clear that installation is to be enabled through a combination of efforts by the energy agent and support from the suppliers. Even after installation, continued support and interaction with the community is emphasised. Although the nature of this support was not assessed in the case study because it had not reached this point of implementation, it is vital in such a project where interaction and the transfer of skills is necessary.

The completion of this phase is marked by a review of the results of the energization process, to refine the current pilot and presumably to provide input for future projects. In the words of the project document:

- Collect financial contributions of 'signed on customers'
- Supervise and support agent during installation phase and thereafter maintenance
- Post-installation customer review (Energy Day 3)
- Post-installation research (Acceptability, actual costs, usage, matters for refinement)
- Sign off meeting with community leaders with full review of results and ongoing supply, service and sales support from Energy Agent
- Three month overviews with Energy Agent until deemed no longer necessary

The above process has also been prepared as a draft critical path for energization projects.

The idea of a 'draft critical path' is similar to the description of the energization process as a 'template' used earlier. This again refers to the rigidity of the energization process within the bounds set in the Proposal, but with the incorporation of a degree of flexibility.

The case study in KwaBhaza followed the planned process and met all of the steps outlined above. In this way it was successfully implemented. However, it was found that the problems at the household level (in terms of meeting energy needs) and at the community level (in terms of opposition to energization) remained.

3.6. Energy Agent

The concept of the energy agent is the mechanism to ensure that energization is sustainable. It entails training a community-appointed member (and possibly some assistants) to install and maintain the energization packages and provide fuel (LPGas). The agent is to be the centre of an

'energy business' that will be set up and this has an added advantage of contributing to the economic development of the community.

The details of the role of the energy agent as a community-based agent are described in the Project Proposal:

The Energy Agent concept, also discussed in detail later in the document, is one of ensuring continued service and assistance to end-users once installation has taken place. The Energy Agent provides a service that ensures convenience and less travelling for the end-users. They no longer have to go to town to acquire their energy.

The emphasis on sustainability in the above extract refers both to PV systems and LPGas. The energy agent is maintain the PV systems and instruct people in their use of them. He would also educate users with regard to their LPGas equipment and provide them with LPGas from the gas depot which is set up in the area.

Setting up a depot in the area and in so doing making it more accessible, is a distinct advantage of energization. This not only so because it brings the fuel closer to people in the community (which is more fully discussed in Chapter 5), but also because it brings people who wish to purchase LPGas into the community.

They no longer have to go to town to acquire their energy.
This statement suggests that the majority of rural inhabitants travel into town to purchase fuel. Keeping in mind that rural areas are characterised by inadequate transport this notion is questionable. It was found that in general, people tended to purchase energy from within the community. In KwaBhaza, wealthier residents had their own transport and were able to drive into town for supplies. Many of these members owned stores or *spazas* shops that supplied most of the community's needs.

The main functions of the energy agent are outlined as follows:

The agent will be required to offer a full service to the community in terms of their energy needs. This includes the installation of the PV panels, their maintenance, the sale of the LPGas equipment and gas and the associated collection of revenues. He will also provide energy advice to customers as to the most effective use of their energy package.

As well as the sustainability that the energy agent brings to energization and the convenience of installing a gas depot, the energy agent is required to fulfil the tasks defined by Eskom to ensure the smooth running of the project. Although this passage seems to suggest that PV and LPGas may be offered separately, the energy agent is also expected to treat them as a package. He is to collect the revenues for all of the activities mentioned above (sales, installation and maintenance) as a single payment for the energy package. Considering that the repayments of the loan (for the PV and LPGas hardware) and gas refills are separate, there is no reason why the energy agent should collect these repayments together. This issue is further explored in the case study.

The agent will be required to offer a full service to the community in terms of their energy needs.

Importantly, the excerpt again emphasises that energization satisfies all energy needs, not only of the household, but of the entire community. A comparison with grid electricity is again made and energization is equated with this form of energy supply. Whereas grid electricity would be maintained by Eskom at the utility's cost, energization includes the appointment of a community member who is to perform this task. This aspect of the project is also expressed as being beneficial to the community in that it provides employment and promotes business development.

According to the Proposal, the implementation of the energy agent concept does not necessarily entail business creation but may involve the expansion of an existing business:

Ideally, the agent would be the spaza shop owner, as he/she might have some business sense and the necessary infrastructure to operate in. However, this is not essential as the energization process does also lend itself to business development. The community will have a large influence on the choice of energy agent within the financial restrictions of the bank.

The Proposal does not provide specifications for the appointment of the energy agent except that his/her financial situation must be approved of and that the community must have a say. It is assumed that the 'extensive experience Eskom and the LPGas industry has in working with disadvantaged communities' will facilitate a fair appointment.

However, this cannot be easily ensured. In KwaBhaza, the election of the energy agent took place in a community meeting where it is certain that a number of political forces were at play within the community and between the community and Eskom. It was found that the headman or *induna* had an influence on the appointment of the energy agent.

As the discussion of the process mentioned, the development of the energy agent's business consists of training him/her with the necessary skills to operate. This training is detailed in the Proposal's appendices and includes 'dealing with money and customer service'. Formal training programmes such as these are beneficial in that they equip individuals to perform the tasks set out for them. In rural communities where unemployment rates are high (estimated at 51% in the Proposal) this is advantageous in that it offers employment opportunities rural people. However, it is questionable whether the appointment of these assistants is undertaken fairly. Like the election of the energy agent, it is likely that the traditional power structures had an influence.

3.7. Energy Days

The Project Proposal introduces the concept of an Energy Day in the following way:
An important part of the process is the energy day concept. This is the formal introduction of the product offering to the community, who have had access to the demonstration house over the prior few weeks to familiarise themselves with the technologies and to formulate any questions which they may need answered. The day will be a festival type of meeting, where the local government dignitaries are invited, along with the community leaders, funding and supplier representatives and other VIPs. Ideally, ladies from the community will be asked to cook on some of the appliances to test them and to demonstrate the safety and beneficial aspects. The energy day is also

the initial sign on of customers. At this stage it should be made clear that the offer is conditional to a minimum amount of customers taking up the offer.

The Energy Day concept is presented in the Proposal as the main interface between the suppliers and the community. Whereas a community meeting held prior to the installation of a school PV system requires only the consent of the community in the form of a yes/no (Buttle 1998), energization Energy Days are not as simple. Because energization involves the sale of stand-alone package and requires a minimum acceptance level, Energy Days contain a large marketing component that promotes the package to potential buyers.

Although not as explicitly mentioned in the Proposal, participation and information exchange is also a part of the Energy Day concept. It is assumed that residents will ask questions once they have familiarised themselves with the technologies through the Demonstration House[35]. In the case study it was found that residents readily engaged in discussion and asked questions. Some of the discussion revolved around the issue of grid electricity (although this was dealt with in previous community meetings), and in terms of clarifying energization there was not sufficient time to answer all of the questions.

The energy agent, having been through his/her training is also to assist in the educational and promotional activities. In KwaBhaza, he assisted in the activities of the Energy Day and also explained the details of energization to those who asked.

Ideally, ladies from the community will be asked to cook on some of the appliances to test them and to demonstrate the safety and beneficial aspects.

Getting 'ladies from the community' to cook at the Energy Days may be interpreted as a form of participation. 'Hands-on' activities are often seen to be effective mediums of education. During the Energy Day in KwaBhaza, this activity included testimonies from the 'ladies' of their experiences with LPGas.

The second Energy Day has also been referred to as a 'Celebration Day' in the step by step activities of the energization process (pg. 38). Whereas the primary objective of the first Energy day is to promote the package, the purposes of Energy Day 2 are to celebrate the attainment of the minimum acceptance level and encourage further engagement with the project. This activity could not be assessed since it did not take place during the course of the research. As the excerpt below shows, once energization is accepted and established in the community, a more forceful marketing approach is adopted by Eskom.

A second energy day will be held, where problems and questions from the initial sign on customers will be addressed. Further marketing and demonstrations will be given, to sway those who are still hesitant. There will be on-going communication with the community as to the satisfaction levels.

As with the First Energy Day, the Second Energy Day also provides an opportunity for customers to officially indicate their support by agreeing to put money forward. The above extract illustrates the emphasis on marketing in the process and suggests that an effective marketing strategy will convince residents of the significant benefits of energization. The predominant tone here is one

[35]More than one demonstration system was installed in KwaBhaza. This concept involves placing both the PV and LPGas equipment in selected houses so residents in the community could have access to them.

that assumes that the concept will generally be well received by the community despite the admission that some may be hesitant.

In the case study it was found that some residents were not only hesitant, they were openly opposed to the idea. Attendance at the Energy Day was in itself found to be an indication of support for the project and it is perhaps these residents that may be persuaded by the marketing strategies. Residents that were opposed to the project, however, did not even attend the meetings.

To summarise, the purpose of the Energy Days is to promote the energization concept mainly through demonstration and marketing. At the Energy Day it was found that a fair amount of discussion took place between the suppliers and the community members, who wished to clarify specific issues. As already discussed, the type of marketing undertaken at the Energy Days may not be an ideal framework in which to inform rural people about the advantages and disadvantages of different energy sources. Simple and precise explanations as to the benefits and drawbacks of energization are perhaps more appropriate.

3.8. Funding Mechanism

The funding mechanism is not mentioned in the body of the Proposal but is described in detail in the Proposal's Appendix 2. This section outlines two possible loan models that would be used to allow customers to pay off the capital costs of the energization package. They are called the *loan guarantee model* and the *loan model* and are differentiated by the relationship between REFSA (renewable energy for South Africa) and the IFA (intermediary financing agency) who are to jointly deliver credit to the rural customers.

Testing this mechanism involves testing the process of providing credit from an institutional level down to the actual repayment of the loan on the ground by the rural customer. It has already been discussed that although the exact final monthly repayment figure will only be decided during implementation, its approximate value is already determined by a number of characteristics set in the Proposal (flat-rate monthly repayment over 36 months at around R52 a month).

Thus, this objective mainly refers to the process by which credit is provided to rural customers within the parameters set out in the Proposal. It involves both an assessment of the institutional arrangements (between REFSA, the IFA and the energy agent) and the conditions at which the credit is offered (those not already determined in the Proposal such as the interest rate, flexibility of the repayment structure and administration charges). It would also test the procedure followed by the funding agency with regard to loan defaults.

It has already been mentioned that because the Proposal suggests that the 'energization offering is seen as one package, and that one payment per month be made and collected by the energy agent', payment for the equipment capital costs and payment of gas refills will be combined. Thus, the funding mechanism is linked to the strategy of combining the capital cost loan repayment with LPGas fuel costs.

Consequently, this aspect of the project enforces the adherence to the planning document where the cost of the package is concerned. In light of the economic means of rural residents, the cost of

the package (of which financial assistance is an important part) is arguably the most critical aspect of the project where flexibility is required. Although a degree of flexibility was encountered in KwaBhaza, the general payment structure of the package remained intact.

3.9. Sustainability

The sustainability of the project has 3 main elements to it: the affordability of the product offering, the Energy Agent and the funding mechanism.

The issue of the sustainability of the project is a crosscutting one in the Proposal. For example, it refers to both the institutional robustness required to maintain the project and ensuring the correct operation of the equipment. It is mostly mentioned with regard to the energy agent, who is to install and maintain the energization systems. In addition though, the Proposal talks of project sustainability in terms of the affordability of the packages and the method of repayment.

Perhaps the most important issue concerning the sustainability of PV projects is the cost of repairs for rural recipients. Even though the energy agent is on hand to maintain the systems, failure of the system due to a faulty component may result in the customer defaulting on repayments. In KwaBhaza, some potential recipients were attracted by the possibility of being able to own the system and have electricity 'for free'. If this is widely felt, then the issue of sustainability, in terms of affordability of energization *inclusive of unforeseen repair costs* is certainly worthy of noting.

Eskom sees the issue of sustainability in the following light:

Sustainability of the project hinges around three elements:

1. The Energy Agent, who must be a business person from within the community. The Agent will be trained in the areas of LPGas and photo voltaics. The training will include installation and maintenance, correct and wise use, appliances and safety. In addition, the Agent will be taught the necessary business skills.

2. the product offering, which is well defined, simple and affordable

The Proposal recognises the importance of ensuring that the 'product offering is within the economic means of rural communities' if it is to be sustainable. This specifically refers to the repayment of the capital costs on a credit basis but would also refer to the monthly cost of gas refills (see 'Funding Mechanism' above). An important factor when considering the sustainability is connected to the reliability of the system components, especially the battery and lights which are only guaranteed for a year (Eskom 1997b:14).

In the Proposal, sustainability also seen to hinge on the fact that the product offering is well defined and simple. This point suggests that a neatly defined product offering will encourage sustainability because of the ease by which financing can be obtained. A better defined, neater package is also easier to explain and market to rural communities.

3. the funding mechanism, which must provide for flexible payment options

In terms of the capital cost repayment, it is recognised that the conditions at which credit is provided will influence the sustainability. In particular, 'flexible payment options' are a factor that will allow debtors to meet their financial obligations. In the context of rural income and expenditure patterns, such an approach caters for the needs and conditions in rural areas. More important though, is the issue of a flat-rate tariff which militates also against sustainability.

3.10. Technologies

The aim of testing the technologies is not expanded on in the Pilot Project Proposal but presumably refers to the modern energy sources that the energization package provides: the solar home systems and the gas appliances and hardware. It focuses on the performance of the equipment and their social acceptance. These aspects will be discussed in turn.

Firstly, testing the technologies refers to the technical performance of the equipment. This performance is determined by the quality of the equipment and, in the case of the solar system, by the specifications in the tender document (which is prepared by Eskom). The role of the energy agent in maintenance and dealing with technical problems obviously has an effect on this aspect of the project.

The second aspect of testing the technologies refers to the interface between the rural customer/s and the equipment. According to the SA to Z information in the Proposal, only a small percentage of rural households use fuels that can be classed as modern (Batteries - 2%, Gas - 11%). The Proposal implies that the majority of these households are not accustomed to using gas, and that very few, if any, are familiar with the workings of solar systems. Testing the technologies would therefore entail monitoring the reaction of these customers to this modern equipment and whether their behaviour effected the sustained working of the equipment (for example, whether they maintained the systems). Although these aspects cannot be assessed at this stage, the energization process monitors such factors after installation.

3.11. Conclusion

This critique of the Pilot Project Proposal has served to disaggregate the objectives of energization. In addition, it has attempted to clarify the concept of energization and the envisaged implementation process as laid out in the planning document. What emerges in this review of the Project Proposal is the tensions within energization mentioned in Chapter 1. On the one hand, Eskom are promoting 'energy upliftment' and the satisfaction of the energy needs of rural communities. On the other, energization is Eskom's way of meeting some of its supply-side concerns: satisfying some of its DSM concerns, possibly meeting RDP targets and influencing energy policy.

This analysis has begun to show the influence of the supplier's writing and planning the implementation process. Although Eskom's intentions to sustainably meet the community energy needs are clearly shown the Project Proposal, this is in terms of *their* view of a balanced energy

solution and *their* perceptions of the needs of rural people. From this basis, the various mechanisms and structures devised in the Proposal, intend to result in the 'energy upliftment' of the rural community.

The KwaBhaza Project is the environment in which the objectives of energization, as, defined on Eskom's own terms, are to be tested. This entails monitoring the discrepancy between planning and implementation. Moreover, it is within the pilot project that the ability of energization in meeting the needs of the community as they are intended to, is to be assessed.

Chapter 4 – Methodology

4.1. Introduction

This chapter explains and reflects on the methods used in investigating the KwaBhaza Pilot Project as an energization case study. It speaks of the means by which the implementation of energization was assessed and methods that were utilised to assess the needs of the community on their terms. A reflexive component is included to make sense of the complications within research carried out at the intersection of development discourse and the realities of implementation.

4.2. Process and methods of information collection

4.2.1. Local level fieldwork

Originally the fieldwork was to consist of two components: a pre- and post-energization study. Each was to be a month long. This format was designed to provide a context for an assessment of the impact of energization on households in KwaBhaza. However, due to changing circumstances, the research programme departed from this format and only the first took place. Instead of a post-energization study, two additional fieldwork trips, shorter in length, monitored the energization process.

The majority of the data collection took place during the first field trip which was originally intended to be the pre-energization. This was a five-week visit undertaken towards the end of 1997 (see dairy of events – pg. 51) . The formal data collection process consisted of survey and in-depth interviews. This approach was taken because '[q]ualitative and quantitative data inform each other and produce insight and understanding in ways that cannot be duplicated by either approach alone' (Bernard 1993:142). A survey of randomly selected households affected by the energization project[36] was conducted with the aid of structured questionnaires. This consisted of forty-two interviews. From this survey, nine households were chosen for in-depth interviews which were more open-ended and utilised participatory techniques.

The author chose to reside in KwaBhaza to participate as fully as possible in the social life of the community. The insight gained from this participant observation established an intuitive understanding of the information collected through more formal techniques. As Bernard

[36]See map (overleaf). Interviews were conducted with residents in all parts of KwaBhaza except Zindongeni (which is small, close to and similar to Maqeleni) as well as the villages of KwaGobho and Ngululi. Residents from these villages had attended energization community meetings.
Note: the tribal district borders are represented by a double line and their names are underlined e.g. Sithole, Mthembu, Majozi.

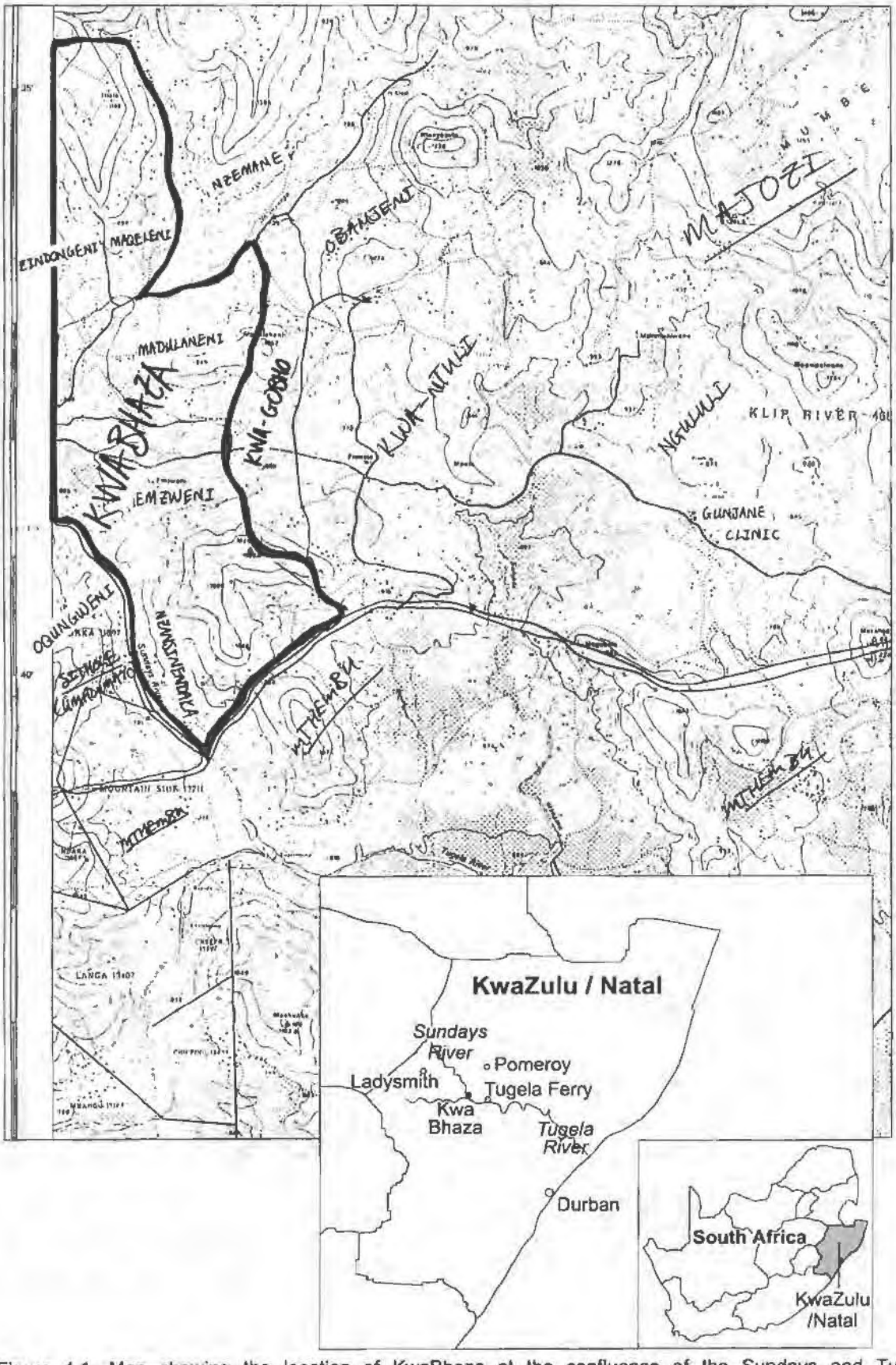

Figure 4.1. Map showing the location of KwaBhaza at the confluence of the Sundays and Tugela Rivers

(1993:142) notes, '[p]articipant observation makes it possible to collect both quantitative survey data and qualitative interview data from a representative sample of the population'.

4.2.1.1. Survey interviews

The survey interviews were intended to be a baseline study. An objective was therefore to collect basic biographical information, obtain an idea of income levels and explore expenditure on energy and energy-use patterns. It also investigated the current development status in KwaBhaza, people's aspirations for development and issues of health and safety regarding energy-use. Since Eskom had already engaged with the community, questions in the survey also probed residents' understanding of the energization project.
Specifically, it investigated the following topics:

1. biographical information
2. household income
3. energy-use and expenditure on energy, and
4. health and safety
5. prioritisation of development needs
6. understanding of the energization process.

4.2.1.2. In-depth interviews

Households were chosen for in-depth interviews with two criteria in mind. The first was that a variety of respondents be represented in this stage of the research. Not only was the area of residence considered but also the economic circumstances of the household. The second factor was the response to the question of whether the household would be getting the energization package. An equal number of households that had indicated they would be getting the package was balanced with those who said they would not (or were not sure). The original idea behind this was to form a control group for the post-energization study.

The in-depth interviews were used to verify and substantiate the data obtained in the survey. Due to their length[37], they could be split into two parts and conducted separately. The first part investigated the life-strategies in which households were engaged and intimately explored energy-use patterns. Life-strategies were examined with the use of participatory techniques which included an exercise to track the movement of resources into and out of the household. Details of energy-use patterns were probed in an open-ended questionnaire that methodically collected fuel end-use and appliance information.

The second part again used participatory techniques to determine access to, control over and responsibility for income. This was accompanied by an open-ended questionnaire that looked in detail at all aspects of the energization process.

4.2.1.3. Methodological Issues

- <u>Definition of the household</u>

In the previous chapter it was seen that the Project Proposal defined the recipients of energization as 'customers'. The use of this term emphasises the purchase and payment of energization. To

[37]Some in-depth interviews continued for three hours.

examine energy-use patterns and the appropriateness of energization in meeting energy needs it is more appropriate to speak of the 'household' as the unit of population using energy.

However, the composition of the household is not obvious, especially in rural areas where household fluidity is more prevalent (Spiegel 1996), and requires some form of definition. The research methodology defined the household unit as those members that *eat* with the respondent or *contribute money* to the household. Firstly, this centres the household around the most energy-intensive activity (cooking) and includes absent members of the household that are remitting from urban areas.

This definition does not agree with what is visibly apparent in rural KwaZulu-Natal which requires further clarification. Dwellings tend to built in clusters in which an extended family resides. These clusters are more accurately referred to as *homesteads* and may consist of a number of *households* according to the definition used. It was also found that although cooking is the most energy-intensive activity in the household, households that used wood mostly collected it and thus obtained it for free[38]. This is problematic because household units that are economically and geographically coherent are rendered separate by this definition. For example, people may live in the same homestead and share the costs of paraffin, batteries and candles but would be considered separate households if they ate separately.

- Areas covered

It has already been mentioned that households in the areas that were affected by the energization project were interviewed. In addition to KwaBhaza, this included the villages of KwaGobho and Ngululi because residents here had attended energization meetings (see map – pg.42). Although energization was aimed at residents of KwaBhaza, the Energy Days were open to anyone who wished to attend.

In KwaBhaza, random households were selected by interviewing a respondent from every fourth homestead. The reason for this was because it was estimated that there were two hundred homesteads in the village and it was decided that fifty interviews[39] would constitute a reasonable sample. However, during the course of the research it was discovered that there were fewer than two hundred homesteads in KwaBhaza. Thus, additional interviews were performed in Emzweni rather than the whole of KwaBhaza. This was partly because of time constraints and partly because of the assumption that energization was aimed at residents of Emzweni rather than the more isolated areas of KwaBhaza.

Describing KwaGobho as a 'village' is misleading. It is a narrow strip of land adjacent to KwaBhaza and in fact used to be part of KwaBhaza. Every fourth household in KwaGobho *neighbouring Emzweni* was interviewed. This was also done partly because of time constraints but mainly because one of the residents here was a demonstration house recipient. Residents from Ngululi (12 km away next to Gunjane Clinic) had reportedly attended the energization community meetings and four households from this region were interviewed.

The total number of interviews performed in the different regions were as follows:

KwaBhaza n = 32	Emzweni (22)

[38] "Free" is used here in a financial sense.

[39] This was based on an absolute value rather than a percentage of the homesteads.

	Madulaneni (5)
	Nzansinendaka (3)
	Maqeleni (2)
KwaGobho n = 6	
Ngululi n = 4	
Total n = 42	

Table 4.1. Regions in which survey interviews were performed

- Expenditure on energy

The method used to gather energy expenditure was the following:
The respondent was asked the *quantity* of fuel bought.
The respondent was then asked *how often* the quantity was purchased.
To establish whether the fuel was used continuously the respondent was asked whether when the fuel ran out they *immediately bought more.*

During the research it was thought that the question may have been incorrectly understood by the respondents. It was thought that they may have been indicating how long the quantity of fuel lasted rather than how often it was purchased. For example, if a household purchased paraffin in quantities of 2 litres every week but the paraffin only lasted four days, the information may have been recorded in such a way that it suggested that the household purchased 2 litres of paraffin every four days. This may have resulted in inflated energy expenditure figures.

3.2.1.4. Informal Research

The formal research methods used during the first period of fieldwork provided a body of quantitative data supported by contextual qualitative investigation. Other more informal methods were employed during this period as well as in the subsequent field trips.

- Interviews with teachers

Informal interviews were conducted with the principals and teachers of both Emzweni Primary and Velaphi High School. Interactions with them ranged from short conversations to loosely structured interviews.

The school staff in Emzweni are influential members in the community. Many had attended the energization community meetings and were aware of the issues surrounding the project. Having received a better formal education than most members of the community, they were able to provide insight and input on broader project matters (such as it being offered within the context of the rural grid electrification programme). Frequent, unmediated discussion with the teachers was possible because they spoke English.

- Key Informants

Formal interviews were conducted with the aid of interpreters. Establishing relationships with the interpreters allowed much informal information exchange to take place.

Two interpreters were used. The first was mainly used in the formal stage of the research; the survey and most of the in-depth interviews. He served as an excellent key informant because his

father was a prominent community member and was involved in the energization project[40]. He also spoke excellent English having attended an English school and college in Johannesburg. Although he resided in Johannesburg, he had lived in KwaBhaza for most of his life and had an excellent knowledge of the social and political dynamics in the community.

The second was a scholar who attended Velaphi High School. Although his English was not as good as the first interpreter's, his knowledge of current affairs in the community made him an excellent key informant.

- Participant Observation

During the initial fieldwork period and subsequent trips, the author stayed at the energy agent's residence. The author lived in a hut in the homestead and was in a position to freely observe daily life. Participant observation both within the homestead and the greater community provided an invaluable aspect to the research.

4.3. Diary of events

Periods of fieldwork are denoted by shading.

1997	April		First energization community meeting (Pre-energization market research)
	August	22	Energization Pilot Project Proposal published
	October	14	Second energization community meeting (Demonstration House recipients and energy agent elected)
	October	16	Research agreement with Eskom
	October	20-22	Scoping visit
	November	10	Beginning of first fieldwork period
	November	13	REFSA under review
	November	22	Energy Day 1 (postponed)
	December	12	End of first fieldwork period
1998	February	9	Submission of First Energization Project Report
	February	23, 24	Demonstration system 1 & 2 installed
	April	14	Beginning of second fieldwork period
	April	16	Demonstration system 3 installed
	April	18	Energy Day 1 (postponed)
	April	19	Energy Day 1
	April	22	End of second fieldwork period
	June	1	Submission of Second Energization Project Report
	July	13	Presentation of seminar to Eskom
	July	22	Supply-side interviews (KFC, REFSA)
	July	23	Installation of gas cage
	July	24	Beginning of third fieldwork period
	July	28	Supply-side interviews (Zama Gas, Total)
	July	29	End of third fieldwork period
	August	1	Submission of Third Energization Project Report

[40]His father was elected as the Energy Agent (see below).

August	3 - 7	Supply-side interviews (LPGas Assoc, Eskom NGE in JHB)
August	8	Third energization community meeting
October	17	Fourth energization community meeting
October	26	Installation begins

4.3.1. Other Activities

It has already been mentioned that the research departed from the format set out in objectives. The first fieldwork period was to be followed up by a 'post-energization' study but due to changing circumstances, this did not occur. Installation only occurred much later and subsequent research concentrated on the process leading up to implementation. This occurred in the form of two shorter field trips in April and July 1998.

The April excursion was mainly in order to attend the Energy Day (the official community meeting at which residents could sign-up for energization systems). At this event, the research comprised of discussions with various supplier representatives and general observations of the proceedings. The installation of the third Demonstration System was also observed.

Other activities during this trip included collecting information to plot an 'appliance map'. Position co-ordinates and appliance information were gathered from each homestead in the Emzweni area. Since each home was visited, this also entailed a significant amount of informal discussion with residents.

The trip in July was included within the plans to interview supply-side stakeholders. Its main purposes were to check the responses of residents to further delays in the process and to assess the impact of the demonstration systems on household energy use. The researcher also accompanied a KwaBhaza housewife on a wood collecting expedition to observe this activity.

4.3.2. Supply-side stakeholder interviews

The energization project is marked by the involvement of many supply-side stakeholders. Representatives from each of these companies were interviewed to gain an understanding of their reference frame – the way in which they see energization – and their role in the project. This was performed by structured interviews with the following persons:

Interviewee	Company	Location
Lee Mchunu	Eskom NGE	Pietermaritzburg
Sibusiso Ngubane	(formerly) REFSA	Pietermaritzburg
Charles Fraser	Ithala Bank (KFC[41])	Pinetown
Sid Fincham	Total	On-site in KwaBhaza
Parmesh Singh	Zama Gas[42]	On-site in KwaBhaza
Cathy Laing	Eskom Marketing	Megawatt Park, Johannesburg

[41]KwaZulu Finance and Development Corporation
[42]Zama Gas is the distributor delivering to KwaBhaza

Colin Bain	LPGas Association	Johannesburg
Rodney Buttle	Eskom Technology Group	Johannesburg

Table 4.1. List of supply-side stakeholders interviewed

Other less formal interviews and discussions took place with Glynne Rosselli, Mark Williams and Chris Hazard of Eskom Marketing in Bellville and Wiseman Hlope of Eskom NGE on-site in KwaBhaza.

4.4. Objectives of the Fieldwork

4.4.1. Research Objectives

The contribution to the energization project entailed giving 'independent input on the energization process by analysis of both the planning and local levels'. This dual approach was realised by a combination of interviews with the supply-side stakeholders and fieldwork components in the community. As already mentioned, the fieldwork was supposed to consist of a pre- and post-energization study but only a first was carried out. Other contributions were:

- To verify information obtained by Eskom about the local level concerns regarding the energization project.
- To expand our knowledge about the social and economic circumstances confronting rural people and their affect on energy-use patterns.
- To help in the establishment of rapport with the community as a resource for both Eskom and the community
- Help in the dissemination of technical knowledge about the energization package
- Tracking and analysing policy and discourse of the supply-side

These contributions were to assist Eskom in the 'formation of a financially viable package for both Eskom and the community [in order to] promote the successful implementation of the package and thus a cheaper means of providing rural energy for Eskom'.

4.4.2. Discussion

Within the objective 'to give independent input on the energization process by analysis of both the planning and local levels' were two main aims. The first was to assess the impact of energization at the household level. The second aim entailed examining both the planning (supply-side) and local (demand-side) levels to assess energization holistically. It looked at the KwaBhaza Project as an energization case study and compared the implementation process with how energization was planned to be carried out, as outlined in the Pilot Project Proposal.

Contrary to the second aim, the first (assessing the impact of energization on households) does not consider the planning process. It would be performed from within the suppliers' perspective to evaluate the project's success and was to be achieved by carrying out in-depth household 'post-

energization' studies after implementation. These would then have been compared with the 'pre-energization' studies from the first fieldwork period. As already mentioned, this aim could not be fulfilled due to changes in the implementation process.

Assessing the KwaBhaza Project as an energization case study became the main focus of the research and the topic of this thesis. Rather than being located within the supply-side, the study critically examined the planning process and its implications for the project. To shift the focus, it sought to explore the local level from a rural person's perspective or at least independently of the suppliers. It concentrated on determining whether the objectives set out in the Project Proposal meet the needs of the community as they were intended to.

An important aspect of looking at energization was the interaction between the planning and local levels. A key insight here was the alterations that were made to the project design during implementation. Rather than assuming that the driving force (the supply-side) only impacts the local level in a predictable way, the mutations and nuances resulting from the meeting of these levels received attention. Put more simply, the research noted the effects of local conditions on the plans throughout the course of implementation. In the cases study, this is framed by the author's research inputs into the project and his interactions with Eskom.

4.5. Role as academic researcher: Reflections and Critique

Current ethnographic (anthropological representation) theory has come to a point where the anthropologist's position of authority in relation to the subjects of the research is being questioned (Marcus and Fischer 1986:67). Consequently, the manner in which information is collected during the research and the way in which it is presented have also shifted. It can no longer be assumed that cultural knowledge is objective; that it is 'out there' to be gathered. Rather, it is recognised that the research process, from the fieldwork and analysis to presentation, is mediated by the researcher.

Making the position of the researcher explicit is known as 'reflexive' ethnography. The researcher reflects on his or her influence on the research process. This acknowledges that the research process is an intervention and the researcher as the subject through which this intervention is conducted. An excerpt from the author's fieldwork diary reveals this subjectivity:

> The next step is talking to Glynne, exploring more of the supply-side, more conceptualisation and report writing, ending up with the writing of the thesis. This [fieldwork] is the crux of my work and the diary a way of preserving that reality.
> Away from energy, work, research, Eskom; this experience has become part of me and lives with me. It is personal.

Text that acknowledges the effects of the researcher in the research process is described as 'modernist' by Marcus and Fischer (1986:67). They contrast it to the authoritative assumptions that 'realist' presentation carries:

> If *realist* texts continue the convention of allowing the ethnographer to remain in an unchallenged control of his narrative, *modernist* texts are constructed to highlight the eliciting discourse between the ethnographer and subjects or to involve the reader in the work of the analysis.

This type of ethnography represents a dramatic shift in cultural representation. Whereas realists firmly rely on a conventional notion of a shared cultural system on which to build their texts, (post-) modernist writers reject the assumptions of these structures. Instead, they hold the conventional concept of culture itself in question.

> They are at the very least uncertain about the coherence of culture in the terms in which anthropology has developed the concept. Starting from such uncertainty, they can do no other than to concentrate upon the immediacy of the discourse and the dialogic experience of fieldwork (ibid:68).

Although this is a somewhat perplexing situation, de Vries (1992:81) notes the benefits of this method of representation.

> Thus a theoretically reflexive ethnography should not be considered 'good' in that it resolves a given technical problem, but because it is controversial in that it casts doubt on the very discourse in which the research problem is embedded. . . Through the production of an ethnography we enable others to question the ability of our sociological concepts to capture the complexity of the realities we pretend to know, hence exposing the ambiguities, contradictions and potential (political) usage's of the theoretical discourse we introduce.

Such a methodology was employed in the research that was undertaken in KwaBhaza. The author questioned the framework within which energization was embedded and openly critiqued the energization discourse. However, such an approach is not without its contradictions. The author also wished to remain credible and provide useful recommendations to Eskom.

The role of the researcher as mediator between the suppliers and the recipients of development is controversial for similar reasons as those mentioned above. In critiquing energization, it was found that the author has to take care to maintain academic rigour and consider the effects of the research discourse he introduced. On the other hand, it is inevitable that the discourse introduced cannot be completely free from the researcher's position and opinions.

4.5.1. Researcher's agenda

It is acknowledge here that the author had an agenda while working on the project. Although in the actual information collection process and analysis the author tried to remain impartial, the way in which this information is presented was influenced by a concern of the effects on energization on the entire KwaBhaza community. Specifically, the author advocated that energization be made available to the poor and marginalised members of the community.

4.5.2. Activist/Observer

In the light of this agenda the author experienced an ethical dilemma. He was tempted to take an active role and tell community members to insist that the PV and LPGas components be offered separately, an arrangement that he had lobbied for within Eskom without success. He was torn by loyalty towards Eskom, his employer, and people in the community with whom he had formed relationships during the fieldwork. This excerpt from the fieldwork diary captures the situation:

> . . . I find myself in an ethical dilemma. Do I tell the Ndlovu's to insist that gas and solar be offered separately? I don't see any reason why it should be together and the gas cage has already been installed. The suppliers would probably say that gas consumption will not be enough and mobilisation by the community would be a breach of trust. . . I'm thinking of a demand by the community that Eskom offer it separately, before they sign up for the systems. . . But how do I go about telling them and how will action on my part translate to action by the community?

The author did not speak to anyone in the community about insisting that the package be split. This was partly because of loyalty to Eskom but also because he felt that the force of other vested interests in the project would only complicate matters. He felt that it was more appropriate for research to be observational rather than also becoming embroiled in the power struggles already present. Although knowledge gained through research can be a powerful political tool, the way it is utilised is guided by ethical constraints.

4.5.3. Changing view of the self

The author noticed a change in his own view of his position between the first fieldwork trip in 1997 and subsequent ones. Acutely aware of the cultural difference between himself and his respondents and hosts during the first trip, the author was not sure how he should socially 'fit in' in KwaBhaza. He found that he tended to adopt the identity of a 'researcher' which played itself out as a distancing or objectification of residents in KwaBhaza. In other words, the author tried to negate any other attitude which he felt would affect the validity of the research information. This resulted in a separation between the researcher and his subjects.

This phenomenon was only realised during the research trips in 1998 when the author felt more at ease in KwaBhaza. He was more able to be himself during these fieldwork periods. It was found that acknowledging the reality of his identity, both in terms of cultural difference and his position as a researcher, was a better approach. It resulted in the establishment of better relationships with people (especially in the homestead where he was staying) and a freer research environment. The author also found that bringing his supervisor and other researchers into the village helped in this regard. As the host's brother said "it shows that the relationship is growing".

4.5.4. Eskom employee/Student

The author was employed by Eskom during the time of the fieldwork and was introduced to the community through the Eskom Project Leader. It is therefore not surprising that people in the community assumed that he was part of Eskom. However, the author wished to gain an understanding of people's attitudes towards the project and it was thought that his identification with Eskom would militate against this. He decided to compromise, saying that he was from the University of Cape Town but that Eskom were paying him as a student researcher. He felt that defining himself as a student would allow people to talk more freely about Eskom and the project.

This dual identity was useful. It meant that as an Eskom employee, the author remained under the covering of the *induna* who supported the project. As a student, he was able to discuss the merits and criticisms of the project rather than being unconditionally supportive. However, he found that switching identities was not unproblematic and many people still assumed he was from Eskom.

4.5.5. Bias of key informants

It has been mentioned that the interpreters doubled as key informants. Both of the interpreters used were suited to the job but were not wholly independent. It was found that the information received from these informants was influenced by their social position and interests in the project. For instance, the interpreter convinced the author to avoid interviewing residents of a certain homestead because of tension between their families. In another situation, he withheld information about opposition to the project in the village, even though the author specifically enquired about the matter. This was at a time when Eskom still had to establish the degree of support for the project in KwaBhaza. The informant later admitted that this was done because he feared Eskom would stop the project if they found out.

The fact that one of the interpreters was the energy agent's son is problematic for both of the reasons mentioned above. These are some of the reasons that another interpreter was used. Even so, both of these researchers are male which points to a marginalisation of the concerns of women in the research. Although the author tried to rectify the situation, a suitable female interpreter could not be found. Women refused to help with the fieldwork unless accompanied by another man. The reason for this was the incorrect social signals that would be given.

Chapter 5 – Case Study

5.1. Introduction

This chapter examines the implementation of the KwaBhaza Pilot Project. Having looked at the Pilot Project Proposal and the concept of energization in detail in Chapter 3, an examination of the implementation process intends to bring to the surface the complexities of putting the energization concept into practice. This chapter is framed by a narrative of the author's experience of the implementation process and is interspersed with discussions around the salient points pertaining to the objectives of energization.

Presenting the implementation process from the author's point of view focuses on his input to the project, his activities and the results thereof. However, this manner of presentation does not assume that the project takes its cue from him or that he has any influence in the project at all. It is inevitable that when centring the case study around the author, the narrative contains an element of bias. Consequently, it must be made clear that the views presented here are certainly different to viewpoints of others involved in the project.

5.2. Format

The events that occurred in KwaBhaza are described in chronological order. This narrative is split into three main parts, each of which is followed by a discussion. Discussion subjects are addressed according to the most pertinent topics raised in the previous narrative. The following table is an outline of the narrative and the discussion subjects:

Date	***Narrative***	***Discussion Subject***
1997	5.3. Pre-fieldwork	
Nov/Dec	5.4. First Fieldwork Trip	
		5.5. 'Energy Upliftment'
		5.6. REFSA
		5.7. Income
		5.8. Energy-use and Expenditure on Energy
1998		
February	5.9. Conference Paper[43]	
February	5.10. First Energization Research Report	
April	5.11. Second Fieldwork Trip	
June	5.12. Second Energization Research Report	
		5.13. Product Package
		5.14. Energization Process

[43]Although it was presented in April, the conference paper was written in February.

		5.15. Energy Day
July	5.16. Third Fieldwork Trip	
August	5.17. Third Energization Research Report	
		5.18. Demonstration Houses
		5.19. Energy Agent
		5.20. Funding mechanism
	5.22. Post-fieldwork	Discussion

5.3. Pre-fieldwork

Before the first fieldwork trip in November 1997 the energization process was already underway in KwaBhaza and in the other five energization sites in the Northern Province and Eastern Cape.

5.3.1. First Community Meeting

Once Eskom had obtained the community leaders' approval at these sites, they held community meetings to inform the target communities of the intentions and to conduct detailed market/community research. Eskom explained to the meeting attendants that the community would probably not be receiving grid in the near future and presented energization as an alternative. Residents also had an opportunity to ask questions which they did. Other activities that took place at the meeting in KwaBhaza (and presumably at the other sites as well) were the demonstration of the PV and LPGas equipment and the distribution of pamphlets from Cadac and the LPGas Association.

5.3.2. Pre-Market Research

The research was conducted by Marketing Intelligence, a consultancy specialising in community-level market research. The research results from all six sites were combined and evaluated together by the consultancy and presented to Eskom in one *Energization Customer Research* report. In KwaBhaza it was undertaken with all of the eight women that attended the meeting. The research investigated various subjects such as energy-use and expenditure on energy, daily activities and supply preferences. As the Proposal states, at this stage Eskom gave 'no commitments to supply, merely share results of the study' (Eskom 1997a:7).

5.3.2.1. Cost Structure

At this stage, the initial offering to the sites was a joint photovoltaics and gas offering. It was only *suggested* in the Proposal 'that the energization offering be seen as one package, and that one payment per month be made and collected by the Energy Agent' (Eskom 1997a:9). Thus, one of the tasks of the market research was to establish residents' feelings about the degree of coherence of the energy package. Specifically, respondents were asked whether gas refills should be paid for together with the capital cost repayment for the PV and LPGas equipment or separately.

The report indicates that respondents in KwaBhaza wished to pay for gas as they needed it rather than purchase a set amount every month. The reasons given in the report are:

'You can monitor usage (LA)[44]
You can pay for exactly the amount that you use (LA)
You can make it last / use sparingly and only make use of special things (LA)'
(Marketing Intelligence 1997)

However, since the report combines the responses from all of the sites, it appears that the majority of the respondents wanted the cost of the gas refills to be included in the cost of the PV and LPGas equipment.

5.3.2.2. Payment Amount

The cost of the package, installation fee and monthly repayment amount, were other issues that were researched. Although the initial figure around which the offering worked was R52,70 (the figure obtained from the *SA to Z: SA Consumer Market* publication) the research intended to establish what people could afford or what they were prepared to pay.
The report indicates that people in KwaBhaza were unwilling to volunteer information. Quoting the respondent/s, the report says:

'Don't have the vaguest idea of costs (LA); (MA)[45]
Don't know, it will vary from family to family (LA)' (Marketing Intelligence 1997)

However, again taking the combined responses of residents in all six pilot sites, the conclusion of the research, according to the report is that:

> *The amount for installation and monthly rate differ greatly - the average installation fee appears to be in the region of R50 to R80 and the monthly flat rate about R20.* (ibid)

The responses to the community/market research and the conclusions drawn from these responses seems to be significant when presented as above. However, it must be kept in mind that the purpose of the research is mainly to probe for acceptability for energization rather than collect hard statistical data. With a sample size of only eight respondents in KwaBhaza (and similar sample sizes at the other sites), the information is hardly representative. Also, since the results from all of the sites are combined, the conclusions of the research are not site-specific.

5.3.3. Second Community Meeting

At the following community meeting in KwaBhaza, the research results were presented back to the meeting attendants who apparently approved of them. A question and answer session again took place at this meeting. The discussion centred around the viability of grid coming to the area and the reasons that energization was being offered instead. Eskom again clarified that the area was not on the five-year grid electricity plan and that grid may even take up to thirty years to reach KwaBhaza.

Once these issues had been addressed, Eskom offered to bring energization to KwaBhaza on condition that a minimum number of residents 'bought into' the project. An initial indication of

[44] "(LA)" stands for 'Ladysmith' and indicates the KwaBhaza site.
[45] "(MA)" stands for 'Malegale', one of the other site in the Northern Province.

the level of interest in the community was to be judged by taking down a list of names. It was made clear that this was an informal register; the official sign-up was to occur on the 22nd of November, the date set for the first Energy Day. The communities acceptance of the project was displayed by the fact that seventy-one signatures were obtained at this meeting, a number above the minimum acceptance level of 50 required by the LPGas suppliers.

5.3.4. Identification of Energy Agent and Demonstration House Recipients

At this stage Eskom also indicated that they wished to identify the energy agent and (two) recipients for the Demonstration systems that were to be installed in homes in the village before the Energy Day. People for these positions were to be nominated by community members present at the meeting.

5.3.4.1. Energy Agent

For the position of energy agent, a Mr. W Ndlovu was nominated. He apparently indicated that he did not wish to be the energy agent but the *induna* (headman) and others in the community insisted that he accept the position. He is considered to be a trustworthy member of the community and, having worked in Johannesburg, has some business experience. His position on the Community Committee further qualifies him.

Mr W Ndlovu's reluctance to accept the position the position was partly due to his personal circumstances. Having worked in Johannesburg for many years he has come back to his rural home in KwaBhaza to retire. He indicated that the reason he did not wish to take the job was because of his other business activities – he also runs a *spaza* shop and makes concrete building blocks – and was worried about not having time for these. However, the desires of the *induna* and other in the community were too much for him. In his words, they "forced him" to take the position.

5.3.4.2. Demonstration House Recipients

As well as serving to familiarise the community with the technology, the Demonstration House concept was to serve the purpose of testing the financial mechanisms (methods of payment). Two community representatives with different economic status were to be chosen: one with a formal job and another in a lower income bracket, for example, someone who receives a pension. The candidates nominated were the energy agent, Mr W. Ndlovu, and a Mr. Ndlela from KwaGobho[46]. Although Mr. Ndlela's family owned a store in KwaGobho, he insisted that it was his wife who owned it and that he himself was a pensioner.

However, the Eskom Project Leader who was facilitating the meeting evidently did not think that either of these members fitted the description of a lower income household and he suggested that another person be nominated. A Mrs M Dlamini was then nominated but it was thought that she was too poor to be able to afford the system and therefore test the mechanism. She herself indicated that this was the case since she wasn't old enough for a pension and didn't earn any formal income. The Project Leader then decided that the original two members that were

[46]KwaGobho is a small village next to KwaBhaza (see later under 'Desription of KwaBhaza'). Meeting attendence was not restricted to the KwaBhaza area.

nominated should have Demonstration systems installed in their homes. Mr Ndlela and Mr W Ndlovu were officially identified for the roles.

The installation of the Demonstration systems and the training of the energy agent did not occur before the author's first fieldwork trip in November (they were in fact only installed in February the following year)

5.3.5. Scoping Visit

The first fieldwork trip to KwaBhaza was preceded by a two day scoping visit towards the end of October 1997. The author met with Eskom's Project Leader in Pietermaritzburg who took him through to KwaBhaza. There he was introduced to the *induna*, the principals of both schools and the energy agent (Mr W Ndlovu) who was to be his host during his five-week stay in the village.

The author was also introduced to the energy agent's son who was to be his interpreter during the following fieldwork trip. Both the survey and the in-depth questionnaires were being formulated at this stage and the energy agent's son provided some input into these documents. This also served to familiarise him with the purpose of the research and the issues that were to be investigated.

5.3.6. REFSA

Even though community meetings were taking place and the author was readying himself to do research in the community, Eskom had not confirmed that REFSA (Renewable Energy for South Africa) would be involved in the project. REFSA had been established by the DME in 1995 as an 'implementing arm' to finance and implement renewable energy projects in South Africa. In KwaBhaza their role was to underwrite the loans from the IFA (intermediary financing agency) and to channel the subsidy that had been approved in principle by cabinet.

However, questions regarding the capability of the group in performing such tasks had arisen. In the three years of its existence, REFSA had been unable to get any projects off the ground. Although the subsidy had been approved by cabinet, the Subsidy Manuel still had to be ratified by the Minister of the DME. This action would release the funds and allow REFSA to fulfil their role in KwaBhaza and in the renewable energy projects in which they were involved.

At the time of the author's involvement in the KwaBhaza Pilot Project, Eskom had not obtained clarity from REFSA's stakeholders whether they were able to channel the subsidy and underwrite the loan. Energization was going ahead on the understanding that Eskom would 'crisis manage' when the time came.

On the 5th of November, the Energization Task Team informed REFSA that further hold-ups would impact the KwaBhaza community who were expecting to be offered energization (of which the subsidy was an essential part) by the 22nd of November. The Energization Task Team was confident that the DME would move on the issue and the author was given the go-ahead to perform the research. A decision was to be given to the Energization Task Team by the 7th but it was again postponed until the 12th November. By this time the author was already in the field.

5.4. First Fieldwork Trip

The first fieldwork trip began on the 10th November and it was only during this time that the author was able to explore and find out more about the village.

5.4.1. Description of KwaBhaza

KwaBhaza is a rural community in the midlands of KwaZulu-Natal. It is 25 km south-west of Pomeroy, the nearest town, and about 80 km south-east of Ladysmith. Although the village[47] in known by residents as 'KwaBhaza', it is more often referred to as 'Emzweni' by outsiders. KwaBhaza consists of five sections, Emzweni being the most central and largest. The area of Madulaneni is adjacent to Emzweni and the next largest, while the remaining three are significantly smaller and more isolated[48] (see map). Sixty-four homesteads, about half of the total population of KwaBhaza, are situated in Emzweni.

Although it is situated on the banks of the Sundays River, KwaBhaza is located in a dry climatic belt which begins in the Tugela Valley to the south and extends past Pomeroy to the north. KwaBhaza is surrounded by raised ground in all four directions, from gentle rolling hills in the East to towering mountains to the West and North. To the South looms Emzweni Hill. The region probably receives about an average of 667mm of rain per annum[49] most of which falls during the summer. The winter months of June and July are dry and cool while the summers are long and hot.

KwaBhaza literally means 'place of Bhaza' and is named after the headman or *induna*, Bhaza Ndlovu, who first settled in the area. The present *induna* is a Mr. S S Ndlovu who is a direct descendant of Bhaza Ndlovu. KwaBhaza is located within the larger Majozi tribal district which is part of Msinga. This district is named after the Chief, *Nkosi* Majozi, to whom *induna* Ndlovu reports. The Sundays River forms a boundary between the Majozi tribal district and the Sithole district (also known as Umhlumayo)[50].

5.4.2. The REFSA Situation

Shortly after arriving in the field, the author contacted Eskom to discover the outcome of the meeting on the 12th. He was informed that no decision had yet been reached with regard to REFSA's status and the Energy Day would have to be postponed. Eskom informed the author that the project would still continue and he was to remain in the field. Five days later, on the 17th, the Eskom Project Leader drove through from Pietermaritzburg to let the energy agent know that the meeting would not take place.

On the 22nd there were still members from the community that had not heard that the meeting had been cancelled. Two ladies had gone to the school (Emzweni School hall was where the Energy Day would have been held) and only then found that the meeting was postponed. They

[47]The term 'village' describes a collection of (scattered) homesteads.
[48]These are Maqeleni, Zindongeni and Nzansinendaka.
[49]This figure was obtained from the SAWB for a weather station at Tugela Ferry about 30 km away in a similar climate.
[50] See map (pg. 42): the tribal district borders are represented by a double line and their names are underlined e.g. Sithole, Mthembu.

confronted the author while he was carrying out the survey research and demanded to be interviewed.

5.4.3. Development

During the interview it was evident that they had attended the other community meetings because they knew a fair amount about the project. Their purpose in meeting with the author was to express their eagerness for Eskom to come to KwaBhaza. They were very much in favour of the energization project and were unhappy that the meeting had been cancelled. However, they were loathe to engage with the author around what energization should entail instead saying "we'll take what Eskom gives"[51]. This statement typified the attitude of many people in KwaBhaza who desired development, in whatever form but were unwilling to enter into negotiation around the details of development. Contrary to the author's expectations of the possibilities of participatory development it seemed that members of the community were unwilling to participate in the development process.

5.4.4. Current Development Status in KwaBhaza

The eagerness for development in KwaBhaza is understandable when one considers the current development status of the area. As one would expect in a rural area in South Africa, access to basic services is limited and poverty is widespread.

The infrastructure of KwaBhaza is largely concentrated in Emzweni. The only store in the area is also located in Emzweni and the means of access to KwaBhaza, a single gravel road joining Ezakheni[52] to Pomeroy, passes through Emzweni. A single telephone line runs next to the road, only deviating to connect Emzweni Primary and Velaphi High School. Both schools have been non-grid electrified with photovoltaic (PV) systems. The two manual water pumps that provide residents with access to fresh water are also located in Emzweni, one of them close to the Primary School.

Despite this infrastructure, access to health and transport facilities are still a problem. KwaBhaza residents pay R12 return for a taxi ride to Pomeroy and half as much to get to Gunjane Clinic, 12 km away.

To investigate the applicability of an energy project in the light of the above factors, people's aspirations for improved services were investigated. Informants were asked to rate the service which they would most like to see improvement in. The questionnaire required that the respondents rank the services according to their desire to see improvement in that service. 'Electricity' was explained as the aspiration towards better energy sources than current ones rather than specific manner of energy delivery. The table below shows that people's most pressing need is for access to clean water; in KwaBhaza the need for water exceeded the need for electricity by 15%[53].

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[51] "We'll take what Eskom gives" was used to illustrate the attitude of some of KwaBhaza's residents in a paper written by the author for presentation at the Domestic Use of Electricial Energy conference.

[52] A township outside Ladysmith

[53] Informants were asked to rate the service which they would most like to see improvement in. The questionnaire required that the respondents rank the services according to their desire to see improvement in that service.

	All Areas (n=42)	*KwaBhaza (n=32)*
Service	*Rating (%)*	*Rating (%)*
Water	100	100
Electricity	93	85
Telephone	51	48
Roads	43	39
Clinic	41	51
School	8	2
Transport	0	0

Table 5.1. Ranking of services that residents would most like to see improved [54].

This may be interpreted as evidence that, in general, the burden of water collection is seen as more strenuous than energy-related activities. However, it must not suppress the significance of energy-related burdens. With regards to wood collection, it was found that the average amount of time taken for a trip was over three hours and that of the households in which women collected wood, 50% did so every day of the week except Sunday. Two-thirds of respondents indicated that wood collection was their greatest burden. The danger of the responsibility of wood collection was also lamented with nearly three-quarters singling out snakes as the greatest danger. Following close behind as sources of danger were criminals (especially rapists) and the danger of axes.

Burning wood and paraffin were also seen as significant burdens because of the unhealthiness of such practices. This issues was explored by asking whether these fuels affect the eyes or the throat so that *it is a permanent problem*. Over half of the respondents indicated in the affirmative: that wood affected their eyes and that paraffin affected both their eyes and their throat in an ongoing way.

5.4.5. Discussion topics

The main topics emerging from the fieldwork were the following:

5.4.5.1. Energy Upliftment

Although people seemed unwilling to engage in discussion around the type of development that they wanted, it was clear that there was a need and a desire for development in KwaBhaza The author set about substantiating what people in KwaBhaza meant by 'development'. It was found that it meant different things to different people. These definitions were recorded and compared with Eskom definitions of development and in particular the notion of 'energy upliftment' – the term used to describe the development that energization would bring to KwaBhaza

'Electricity' was explained as the aspiration towards better energy sources than current ones rather than specific manner of electricity delivery.

[54] The discrepancy in the ranking of 'Clinic' is because of the influence of the four households interviewed in Ngululi who all rated the importance of a clinic last. Residents of Kwa-Bhaza are 12 km from the Gunjane Clinic in Ngululi.

developmental advantages associated with meeting these needs, both economic and social. In accordance with Eskom's other commitments to the RDP, energization also seeks to promote small and medium enterprise development (mainly through the setting up the energy agent) and contribute to general community development.

The influence of Eskom's marketing department is particularly noticeable in the way that energization is conceived of as a 'product package' available on the market for energy consumers. The process or method by which these packages are provided are also indicative of a marketing framework. It includes many of the stages evident in a conventional marketing process such as market research, a form of product design and packaging and finally a marketing effort. These aspects are unique to energization as a development initiative.

A combination of these strategies results in a market-oriented energization process that is also assumed to bring the conventional developmental benefits of rural electrification. This can be clearly seen in the Business Plan submitted to the KwaZulu Finance and Development Corporation (KFC), the intermediary financing agency for the project. Due to the nature of the document, the economic aspects are understandably emphasised and it is useful to observe energization from this point of view.

The Business Plan emphasises economic development as the means by which social development is to be achieved. Implementing the energization project in the rural community will 'encourage economic activity and provide employment opportunities and empower the rural community to provide a better lifestyle for themselves' (Eskom 1997b:2). This improvement in the quality of life is to be achieved through '[t]ime savings from an improved home energy system which allows for remunerative activities to take place' (ibid:7).

In line with Eskom's attitude to community development, energization is to 'support the development of micro-businesses and create sustainable income-generating activities for these communities' (Eskom 1997b:7). Energization's energy agent concept also 'lends itself to business development' (Eskom 1997a:10) by the formation of a rural energy business. The energy agent him/herself is to contribute to 'economic upliftment . . . by keeping the money within the community' (Eskom 1997b:3).

In light of the above, it can be deduced that the purpose of energization is not only to satisfy the energy requirements of rural customers. Neither does it stop at the provision of appropriate energy to the household for their 'energy upliftment'. Rather, the provision of energy to the household is the means whereby energy provision can help in bringing about the upliftment and empowerment of the entire society. As the Business Plan states, the 'success of the project facilitates economic empowerment and social upliftment of the community, through small business development, the circulation of funds within the community and a more efficient use of energy resources' (ibid:20). In this way, the energization pilot in KwaBhaza is essentially a development initiative.

5.5.1.1. Energization and Development: supply-side theory

Energization is theorised in terms of two basic models: the developmental and the commercial model, or a combination of these (Hazard 1998). For example, an energization project that would be classified as a commercial model would entail the unsubsidised sale of photovoltaics combined with the sale of appliances, cylinders and LPGas at retail prices ('free for all' model).

A developmental approach on the other hand would involve the leasing of PV systems, which are owned by the utility who take care of the maintenance costs and with the probable involvement of government funds (the 'utility owned' model) to enable those that cannot afford these energy services on a retail basis.

The KwaBhaza pilot project combines these two concepts and is labelled a 'mixed model': the recipient is expected to pay for the energy package but at a reduced cost. The capital costs are more than halved by the subsidy and LPGas appliances and cylinders are also provided at a significantly reduced cost through an arrangement with Cadac. The LPGas Association arranged that the first 50 gas systems (two 4,5kg cylinders and a two-plate stove) could be purchased from Cadac at R363. This price was held for two years while the implementation process was being sorted out (Bain 1998). The repayment of these capital costs is being facilitated by micro-loans which are being offered at low interest rates. This model uses the development mechanisms available in government, development banks and businesses to allow the customer to eventually own the system.

In both cases this arrangement ensures the ownership of the equipment but not the use of it. Since the purpose of energization is to provide for all of the energy needs of the household, the energization process includes the setting up of a gas depot in the area which is to supply a quantity of gas to the recipients on a monthly basis. The 'energy development' of the household is now possible by the purchase of an energy package through a series of monthly repayments.

The energization project draws heavily on the marketing approach but supports government intervention in the form of a subsidy where the market fails, in this case to give the poor an opportunity to participate in the project. An important aspect of the energization process is that it promotes access to energy, which is essentially a development activity, but within the framework of the market. A result of this is that those that can afford the energy packages benefit from the development aspects alluded to above while those that do not, lose out on the subsidy, decreased capital costs of the LPGas equipment and the credit facility[55].

This is different to Eskom's rural electrification programme because the funds are allocated from government rather than the utility however, the situation is likely to change with the restructuring of the electricity supply industry. Another important difference is that grid electrification entails the connection of all the homesteads in the community because of the expense of 'fill-in' connections. Thus, the poor, even if they are not able to use electricity, have the status of a grid connection and access to electricity if their circumstances improve.

5.5.1.2. Local level definitions of development

As a way of comparison with these views, residents were asked what development meant to them. It was found that residents seemed to have a more holistic view of development that centred around the attainment of a modern quality of life. Contrary to Eskom's views, access to income was not specifically raised but is presumably seen as part of a modern lifestyle.

A teacher at the Primary School said the following:

[55]See Banks (1998) for a fuller discussion of the issue of a SHS subsidy

> Development is something that is new in an area; something that will help the community. For example, for people that use wood, gas will be a development which will protect the environment - plants are very useful in photosynthesis.

Another teacher commented more on the benefits that development will bring to people:

> Development is to uplift the people; to uplift the standard of living; to grow; to improve - as you [Eskom] has done here. Now that Eskom has intervened we can use televisions. We are now a step ahead.

A student said that the purpose of development is to:

> make life easier; to improve the standard of living. It is civilisation which is starting to know about the things that can help and starting to live in the modern world. To improve our belongings which can help us improve in everyday life.

One of the residents suggested an almost ideological state:

> Development is civilisation. We don't like to remain aside [in the development process] we want to have what others have - like this solar. It is like lights on the road, television, radio and where there is music - like in Tugela Ferry.

And another said that:

> development is good. It will make them [those receiving it] brave to do many things. Like electricity: they will not have to go and collect wood. I am powerless to collect wood. Now I'm only left with water [to improve].

A politician from Johannesburg who lived in KwaBhaza as a boy remarked that:

> development is the upgrading, particularly of people, in an area. Shops, larger shops like Checkers and tarred roads are examples of development. Schools too should be nearer for children, particularly in summer [when the rivers are full]. Development is about urgent things in human life, like churches.

He then went on to describe *economic development* in terms of access to employment, to houses and tarred roads (which must be maintained). Interestingly, he said that the 'separate development' strategy of the apartheid government was more successful, "it was good in administration . . . and worked with people on the ground, at the grass roots level".

Perhaps the most comprehensive explanation of development was given by the wife of the energy agent in KwaBhaza. She described development by pointing out concrete examples of physical improvements in life:

> *Inthuthuko*[56] can be seen in the improvement of our houses. From *Gogo's* [Grandmother's] hut which is made of soil with [beehive] thatching to a house of concrete and blocks is development. The house will last longer and won't need rebuilding when I am old and on pension. *Gogo* would approve of this.
>
> In cooking practices: we used to cook on the open fire and then we built the house with a coal stove inside it which has a chimney and we now use Eskom's 2-plate gas stove. The open fire is not good because it blackens the pots and is smoky.
>
> This light is development too [pointing to the CFL]; candles are very dark.
>
> The fact that we can educate our son to technikon level is development. In the past people used to go to school until standard two when they could write a letter in Zulu and it was said "that is

[56] 'Development' in Zulu

enough", and then children did school until matric but now even that is not enough to get jobs. So sending someone to technikon is an improvement.

There are a number of aspects in the above definition that are worthwhile highlighting: Firstly, development does not mean a rejection of traditional values but rather a dual existence of traditional life and modernity. The family still use the traditional beehive hut (*Gogo's* hut) even though they have a more modern house. They still enjoy sitting around an open fire there and still use candles. Moreover, there is inter-generational harmony: she is sure that her mother-in-law would approve of the improvements.

Secondly, the force of development is one that accounts for the obvious improvements in life and may be seen in these examples. In this way development is only defined as such *if it brings improvement*. 'Improvement' in this case is subject to the judgement of the person affected by the technology or intervention. In other words, something is only considered development *if it represents improvement within the circumstances of individual families*.

On the ground, the residents of KwaBhaza say that they are "desperate for development" and the employment levels in the area are lamented. People indicate that for them development means improvement in the quality of life, environmental sustainability, economic and social empowerment and greater access to modern infrastructure and amenities. However, individuals in the community are willing to contest the means by which development is to be brought to KwaBhaza.

Although scarce, development also occurs at a community level. These activities are overseen by the Community Committee – an extension of KwaBhaza's traditional power structures that consists of ten members including a chairman, treasurer and secretary. The *induna* is a *de facto* member.

The most recent activity of the Committee was the construction of a school in the Maqeleni region of KwaBhaza in 1995. Local materials, business and labour was used in the construction by way of funds allocated by the IDT. However, the Community Committee has not been active since then.

It was found that members of the community did not equate energization with grid electrification. The package was considered to be an inferior form of energy delivery even by those that were willing to accept it. To overcome this perception, the energization process proposes marketing techniques and information dissemination. However, as the next section shows, the preferences for grid electrification are as much political as energy-related, if not more so.

5.5.2. Electrification

The formulators of the energization concept are not located within the electrification department and have the scope to think laterally about Eskom's involvement in other energy sectors. Their vision of 'matching supply side resources with demand requirements . . . to form an integrated energy offering' (Eskom 1997c:1) is not bound by paradigms of conventional grid electrification. From this point of view the combination of PV to provide 'essential electricity' and LPGas for thermal applications makes sense as a household energization strategy as well as on a national scale. Energization is a facet of Eskom's broadening role in development in South Africa underpinned by the philosophy of 'making the most of our energies'.

Eskom as a whole is being steered by the RDP commitments and the implications of meeting those electrification targets. The increased number of household connections has meant that Eskom has needed to look into ways by which they can avoid investing in new generating capacity. This has resulted in their involvement in a number of diverse fields. Projects in energy-efficient housing and solar water heating systems are examples of these initiatives. Eskom Electrowise advisers are also employed to advise people on the most efficient use of electricity as well as to promote the sale of electricity by information dissemination.

In short, energization does not represent such a radical diversification of activities for such a large company as Eskom. However, this is sharply contrasted on the ground in rural areas where Eskom is seen as the company that supplies electricity. Moreover, electricity is only known as 'cable electricity' or 'card electricity'. People's experience with electricity is often derived from visits into towns and cities or conversations with relatives or friends who live in urban areas and use electricity.

It has been said that energization is the de-marketing of electrification[57]. One of the most persistent problems mitigating against alternative energy provision is the 'electricity for all' campaign launched during the 1994 elections. As Steyn (1996:3) remarked, this statement 'created high, probably unrealistic, public expectations about the potential rate and coverage of the programme'. In this context energization (and other PV projects for that matter) are seen as inferior to grid electricity as an energy supply source.

The political opposition to energization has been one of the main stumbling blocks of the concept. The first pilot project undertaken in Papendorp by a team from the marketing department encountered political opposition mainly because of its proximity to the grid. It has since been electrified at a greater cost than the usual cost per connection criteria. Other sites identified within the current energization pilot project phase refused to accept the energization concept, feeling that it would jeopardise their chances of receiving grid (Hazard 1998).

It should be noted that a requirement for being chosen as an energization pilot site required that the school in the area already be PV electrified. Before this system is installed, the community[58] are informed at a community meeting that the area would not be receiving grid electricity in at least the next five years and that the off-grid connection of the school would at least give them access to some form of power at the school. It can be concluded that although communities consented to an off-grid system being installed in the school, some communities, after a time of internal consultation, felt that agreeing to solar home system installation would jeopardise their chances of receiving grid.

At the KwaBhaza site, the same Eskom NGE representative that co-ordinated the school system installation, is energization's Project Leader. Having already met with the *induna* of KwaBhaza, he utilised this contact when he approached the community with the energization project. He received the *induna's* approval that the project go ahead. The energization concept was then introduced and explained at the first community meeting[59] held in KwaBhaza. The questions

[57]The interviewee wished to remain anonymous.
[58]'Community' in this context refers to those that attend the meeting and not the entire society.
[59]This type of community meeting is different to an Energy Day.

about grid were the main focus of the question-and-answer sessions between members of the community and Eskom (Mchunu 1997).

Eskom's approach was to reason with the community about the remote chances of grid coming to the area and offer energization as an immediate opportunity of access to energy. Having chosen the pilot site because it satisfied certain criteria, Eskom needed to establish the communities attitude to the concept so that the pilot project process could begin. According to Eskom, one of the benefits if Khanyisa[60] is that '[y]ou get electrical power without waiting'.

The proximity of grid electricity in three directions is of importance. On Eskom's electrification plans, KwaBhaza lies under the jurisdiction of its branch in Dundee to the north. To the east in the direction of Pomeroy, Gunjane Clinic has been non-grid electrified (with a generator) and is itself 13 km from the grid. Lastly, the electrification programme has brought grid electricity to rural area of Oqungweni in Umhlumayo to the west. This is the direction in which the grid is closest to KwaBhaza, over 15km away.

The Project Leader explained at the community meeting that KwaBhaza was not going to be electrified within five years (it is not on the five-year plan) and it could even take twenty to thirty years. He went on to say that it was too expensive to electrify KwaBhaza: it is currently too far from the existing grid and the households are too scattered. Taking the topography into account, Eskom estimates that it will cost nearly a million rand just to get the main line to KwaBhaza[61]. The Project Leader advised that even if grid was coming to KwaBhaza within the next five years, it would be better for them to accept energization in the meantime. People were also informed of the payment structure for the energization package. Specifically, it was made clear that a R1500 government subsidy was being utilised to reduce the cost of the systems.

From the point of view of rural people who are isolated from Eskom's activities and circumstances, the situation looks markedly different. Even with little evidence of the possibility of grid coming to the area, people are patiently expectant. In the area around KwaBhaza there is evidence of electrification activity. Rural areas around the closest town, Pomeroy, are being electrified and the grid has been progressing from Ladysmith in the West. From that direction, the township of Ezakheni and the rural areas around it have been electrified up until the village of Oqungweni in the Sithole (Umhlumayo) tribal region. It is understandable that the expectations of grid electricity in KwaBhaza are high considering that Oqungweni and KwaBhaza meet at the Sundays River (which is also the boundary between the Sithole and Majozi tribal districts). It is estimated that the grid lies 15 km to 18 km from KwaBhaza in that direction (only the Western part of Oqungweni is electrified).

Not surprisingly, people in KwaBhaza do not see the national scale of the electrification plan and many don't understand Eskom's least cost approach to electrification. They protested the fact that KwaBhaza would not being receiving grid saying that "[part of] Oqungweni, which is only 15 km away, has been electrified and the households there are just as scattered".

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[60] 'Khanyisa' means 'light' in Zulu and is the name given to energization in KwaBhaza. The quote is taken from the pamphlets distributed at the community meeting which explained the concept.

[61] Eskom indicated that it would cost R60 000 per km to get the main line to KwaBhaza (Mchunu 1998).

While some of the residents were prepared to "take what Eskom gives", others were speculative with regard to Eskom's involvement in solar energy when their business was electricity. One resident remarked that this arrangement makes him

> think that Eskom is being paid by the [solar] suppliers or the government. The subsidy makes him feel that Eskom is being paid to speak on behalf of the other companies. If it was another company, they would have been prepared to take the packages (or whatever) and wait for grid from Eskom. But since it is Eskom, they decided not to electrify KwaBhaza because they were getting paid by the other companies

The above remark is not so surprising when one considers the circumstances: although Eskom is a para-statal and has made a commitment to the South African government, they are still operating as a business. Their interest in alternative energy sources may be confusing if one is aware that they are an electricity supply company and indeed, it is obvious that the energization project will not benefit Eskom in the short term. The quote above highlights this point; if another company arrived in the area offering solar systems, it would be understandable because it would be clear that the reasons for there involvement would be of a business nature. Eskom involvement in the project may be questioned: what do Eskom have to gain from being involved in PV and LPGas?

Eskom's involvement, which ties the energization offering to expectations of grid electricity do not sit well with those wishing to see grid electricity. There were also misunderstandings about the subsidy. The concern was raised whether acceptance of the subsidy in the energization project would prevent a second subsidy being given when the area was due to be grid electrified.

The energization project is aimed at those areas that do not expect to see the grid in the foreseeable future and presents itself as an opportunity for access to 'more efficient, convenient and cleaner energy sources' (Eskom 1997a:5). To those that need it, energization seeks to 'bring. . . with it energy upliftment to communities who would have to wait many years for any type of upliftment' (ibid:5). Although this would be appealing to some, the community is not a single homogenous unit who are all desperate for access to energy, but a socially, economically and politically diverse group of people, whose different circumstances will result in different reactions to the energization project.

To those who are not desperate for access to better energy sources, Eskom's urgency to supply them with energy or at least to pilot this project may easily be misinterpreted. For those people that see Eskom as a single entity, it would certainly appear that they are withholding grid and offering an inferior energy source. The issue of the subsidy also lead to questions about applicability for grid. In KwaBhaza, someone with this point of view asked "why doesn't Eskom use the money from the subsidy to bring us something that we want - grid!".

Photovoltaics have the property of being expensive in relation to the power that they generate[62]. For wealthier members of the community who have access to formal income, PV is not considered a good energy source. The LPGas component of the package is not an issue for wealthier households because they can already afford LPGas. Such households would rather spend their money on a generator and if they already have one, would rather refuse PV if they

[62] If one paid 30,79 c/kWh (the November 1998 price of prepayment, 20A grid electricity) for the electricity generated by a 50W_p panel, it would amount to about R2,31 a month.

thought that would prevent the arrival of grid. It is often these residents that are able to exert a large influence on other members of society. Experience in other communities where PV has been offered has shown similar dynamics (Banks 1998). This was found to be the case in KwaBhaza where a group of residents mobilised against the energization project. However, this was only discovered in the later stages of the research and is more fully discussed in the 'Second Energization Research Report'.

There are others in the community who have a different view altogether. Those who were in favour of the energization package remarked, "Because we need development we do not ask who it is from" and even though they are able to access resources they see the energization package as a good deal and declare that "half a loaf is better than no bread". These residents are prepared to accept what Eskom has to offer them and are prepared to take the 'half loaf' rather than waiting indefinitely for a full one.

Others in the community were concerned about the development taking place in urban areas when little evidence of it was seen in rural areas. A teacher said "we like this [energization] project; it shows that the government has not forgotten about us". Others saw the energization project as a temporary measure that was being offered while it took time for grid to come to the area. Somewhat confusingly, some residents interpreted the Energization Project as renewed interest on Eskom's behalf. Energization seemed to strengthen their hopes that Eskom would provide grid to KwaBhaza.

The debate between grid and energization comes down to whether they are mutually exclusive. The perception of Eskom as a single company co-ordinating both grid and energization might lead to the conclusion that acceptance of energization would jeopardise the chances of grid. A less suspicious view might be that although Eskom is one entity, they have in mind what is best of the community and are helping them out in the short term with energization because they know that it will take a long time for grid to reach the area.

On Eskom's side, the energization task team are communicating with Eskom in Dundee (under whom the KwaBhaza area falls) and have their assurance that KwaBhaza is not on the five-year electrification plans. On the one hand, as Eskom point out, the five-year plans are susceptible to change but on the other, it may take twenty to thirty years for electricity to reach KwaBhaza. The energization Task Team take the position of assuring people that the grid is not coming to the area in the near future as well as assuring them that it will not effect their chances of receiving grid.

5.6. REFSA's dissolution

The energization process was devised with the assumption that there would have to be subsidy as well as a loan mechanism. The basic offering was to cost about R2563 in 1996. However, this amount was considered too expensive for systems to be sold on a retail basis. The cost was envisaged to be reduced by an off-grid subsidy that had at that time had been approved *in principle* by cabinet.

Experience in South Africa and abroad has shown that where PV systems are installed in rural households without cost to the user, many fall into disrepair (Hochmuth and Morris 1998, Morgenstern 1997). A method to combat this is to ensure that the recipients contribute towards the system to encourage ownership. The remainder of the cost was therefore to be paid off by the customer who could make use of a loan provided through an intermediary financing agency (IFA).

REFSA (Renewable Energy for South Africa) was integral to this plan because it could channel the R1500 government subsidy as well underwrite the loans granted by the IFA. REFSA was formed in 1995 to assist in providing off-grid technologies to rural areas. The Directorate has the following vision:

> to ensure access to adequate and affordable energy to developing communities through a balanced mix from available energy resources at a reasonable cost, so as to satisfy their energy needs and thereby to contribute to the sustainable socio-economic development of the country as a whole, and at the same time to promote the effective utilisation of the country's vast renewable energy resources.
>
> (Kotzé 1995 in Geerdts 1996:4)

REFSA was established as an 'implementing arm' of the DME and was supposed to co-ordinate financial arrangements as well as implement renewable energy projects. The wisdom behind this arrangement was that it be sufficiently removed from the bureaucracy of the DME to channel finance and facilitate implementation. The organisation was based within the CEF (Central Energy Fund) group of companies. It utilised CEF infrastructure to give it greater autonomy from the DME. The activities of REFSA were guided by a Board of Directors, which comprises of representatives from Eskom, the DME, the International Development Trust (IDT), the Development Bank of South Africa (DBSA) and the International Finance Corporation.

REFSA was involved in several rural energy projects during its existence, including the KwaBhaza pilot project, none of which got off the ground before it went under review in November 1997. Exploring the exact reasons why this occurred are not part of the scope of this thesis but some of the possible dynamics will be briefly mentioned.

The reason that REFSA was dissolved was because its competency was questioned. Having been established as an implementing arm of the DME, it could not produce evidence of its success in this capacity. The significant amount of groundwork that members of REFSA had done which were leading to implementation was not sufficient justification where household connections were the hard numbers required. The decision to review REFSA was thus made for political reasons and involved contention over REFSA's function, structure and performance. Personal politics and larger political interests were part of the contention and debate. In essence, the organisation that was to bridge the gap between politics and rural action, was marred by bureaucratic power struggles.

The Energization Task Team, having gone ahead with the KwaBhaza pilot project on the assumption that REFSA would be able to deliver, tried to prevent the review process from going ahead. The DME was informed that the decision to review REFSA would affect the people on the ground, who expected to see implementation before the end of 1997. KwaBhaza was an opportunity for REFSA to finally deliver the goods, requiring only the ratification of the subsidy manual to release the subsidy funds. However, these factors proved insufficient and REFSA was drafted back into the DME.

5.7. Income

For the residents of KwaBhaza, the cost of the packages is an important factor when considering whether to buy a system. At the first energization meeting a figure of R50 was apparently mentioned and this is the figure which was generally quoted when people were asked how much they were prepared to pay for the systems[63].

Research into the income and expenditure patterns of residents revealed that they were complex phenomenon. Expenditure on a new energy package would not simply require a re-allocation of income as suggested by the Pilot Project Proposal. Moreover, obtaining reliable income (and expenditure) data itself proved to be difficult and time-consuming.

The presentation of income data is spilt into two parts depending on the regularity of income. More stable sources of income are presented below[64].

Income source	*No. h/holds (n = 42)*	*%*	*Income (R per month)* *Average*	*Std dev.*	*Range*
Pensions	26	62	527	159	400 - 920
Formal employment	5 (known = 4)	12 (10)	2360	779	1500 - 3040
Remittances	14	33	280	224	20 - 400

Table 5.1. An indication of the more stable monthly income sources in the KwaBhaza area

5.7.1. Pensions

Pensions are one of the pillars of the rural economy. It is both their reliability and stability which contributes to this. Pensions also have social advantages in that they provide a stable income for the elderly[65] who usually contribute to the household. Nearly two-thirds of the households interviewed received income from pensions.

5.7.2. Formal Employment

Of the five households that have members that work formally, two are single member households which derive income from working at Velaphi High and Emzweni Primary School[66] and another has two members which work formally (which accounts for the upper limit of the range). Of this

[63]It is probable that this figure was derived from the R52,70 quoted in the project proposal which comes from the *SA to Z: SA Market Information* statistic.
[64]The label "(known = 4)" refers to the number of households for which income figures were obtained. In this case 5 households acknowleged that they received formal income but the amounts of only 4 households were 'known'.
[65]Pensions are collected on production of an identity document to prove that the recipient is older than 60 years.
[66]These are the 'households' that stay in the teachers' quarters. One of these households did not wish to disclose her income.

total of six people that derive income from formal employment, four teach. As the table shows, income from formal employment is by far the largest income source in the area. On average, households receive nearly four and a half times more from formal employment than pensions.

5.7.3. Remittances

Remittances are derived from activities by members of the household in urban areas. 'Urban areas' generally refer to Johannesburg and Durban but some households had relatives working in towns nearby. Although remittances are not stable, respondents gave a monthly figure which was the usual amount sent. It must be kept in mind that the remitter has to support him/herself in the urban area as well and in this sense the 'household' can be seen as a combination of the rural and urban existence. This means that the remitter may decide to send more money home to pay for the energization system rather than expect the remittee to cope with the usual amount.

5.7.4. Cash Crops

The sale of crops is the other pillar of the rural economy. While there are conditions under which one may receive a pension, anyone willing to take the risk may plant and harvest the only cash crop of the region – *dagga* or cannabis. *Dagga* growing is prevalent throughout the KwaBhaza region but is more intense in the marginalised areas. It must be kept in mind that not all households condone or take part in the practice. Those that do grow it do so in small fields near the homestead.

Apparently, the generalised workings of the activity is that people in the more isolated areas supply the crop to people in Emzweni. The crop is exchanged for basic supplies (perhaps groceries) or money. The traders in turn either sell it to dealers that come to the area from Johannesburg or Durban or go into the cities themselves. The cultivation and trading of *dagga* is a practice that many poor households take part in because of the limited options available to them.

Table 3.11. below is an indication that people do not disclose such information readily and that estimations of income from the practice vary by a factor of ten. Households were marked as growing *dagga* if a bed of the plants was noticed at the homestead or if people openly admitted to growing it. Less than a third of the households that grew it could give an estimation of the income derived from it. A rough estimation of profits is all that can be supplied because it depends heavily on weather conditions and police activity[67].

Income source	*No. h/holds (n = 42)*	*%*	*Income (R per month)*		
			Average	*Std dev.*	*Range*
Cash crops	16 (known = 5)	38 (12)	333	379	100 - 1000
Self-employed	8	19	692	755	3 - 1800
Informal labour	4 (known = 3)	10 (7)	198	22	175 - 220

Table 5.1 An indication of other less stable sources of income defined in the survey

[67]Police helicopters sometimes fly over the area and spray the fields to destroy the crop.

5.7.5. Self-employment

People that are 'self-employed' derive income from a range of activities. In the data there is a distinct difference between households that derive income from more formal activities such as running a *spaza* shop from the house, making concrete bricks and building houses to other smaller scale activities such as selling grass mats or other goods. It is the more formal activities such as running a *spaza* shop or other small businesses which make it the most lucrative income-generating activity in this section. The large discrepancy in range of income is an indication of the variation of these activities.

From the in-depth interviews it was found that income from all of the activities classified as 'self-employment', as well as the income derived from informal labour, takes place more than was mentioned in the survey interviews. The figure of 19% of households is certainly an underestimate.

5.7.6. Informal labour

Similarly, the figure of 10% is not a true indication of the extent that paid labour is undertaken for other members of the village. The jobs are often paid in kind or with supplies which is possibly why so few households mentioned it as a source of income. Informal labour is a less distinct and less reliable activity than those grouped under self-employment.

Doing odd-jobs for one's neighbours is a component of the meshed and intertwined nature of the rural economic system. Odd-jobs pay off credit, to ensure a portion of the harvest or livestock or for money. Informal labour and growing *dagga* would be the two activities in which the very poor would engage to survive.

5.7.7. Summary

Overall, it was calculated that on average households received R883 a month[68]. With an average household size of 7.2, this translates to R122,60 per person per month – an extremely low figure[69]. However, in-depth interviews with nine of the surveyed households allowed an opportunity to examine income and expenditure more closely. It was found that the income data derived from the half-hour survey interviews was inaccurate. The in-depth interviews revealed that people engage in a variety of income generating activities and tend to mention only the formal sources, such as pensions, in the shorter interviews. Although only estimated from nine households, it was found that the average increase in income levels was 57%. Using the information gathered from these households, a more realistic, although still low figure of R182 per person per month was calculated.

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[68]This is comparable with the figure from the *SA to Z* statsitics which put average household income in rural settlements at about R880 per month. However, the average household size is greater than the 5,8 quoted in the *SA to Z* publication.

[69]This figure was obtained by dividing average household income with average household size. Averaging 'household income per capita' of all households yields a figure of R183,50. This is higher because wealthier households tended to have fewer members.

It must be borne in mind that the data and averages presented above are only a representation of the situation. One of the key aspects of the project is to recognise that at the local level the situation is more complex. Averages are especially misleading in that they don't represent the poor adequately; another theme of this study. Because of the discrepancy between the income levels of those households that receive formal income and those that do not, the graph below shows the income levels of all the households that were interviewed. 'Corrected income' levels are also given based on the data from the nine in-depth interviews. It is not claimed that this is by any means accurate but gives some idea of the situation.

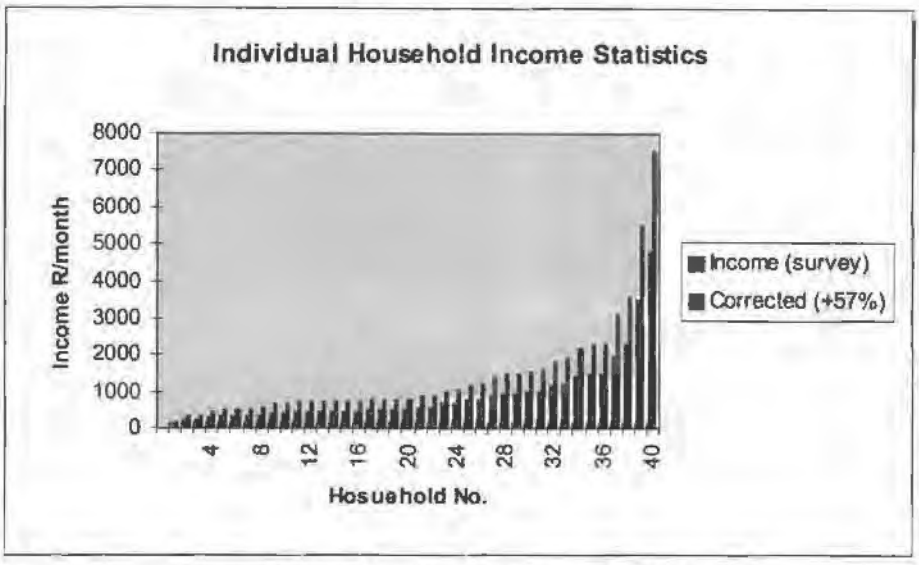

Figure 5.1. Individual household income distribution

It is clear from the above that there is a severely unequal distribution of income within the sample. Even if the corrected income figures are taken 57,5% of the households in the sample still receive less income than R1000 a month[70].

As in other economically poor areas, life-strategies are marked by a juggling of available income (Annecke 1993). Even with a constant source of monthly income, overall income and expenditure levels tend to fluctuate during the year. Agriculture is seasonal and income from this source depends on the quality and frequency of the harvest. Remittances are not as reliable as pensions and the income to the rural household is reduced by the need to maintain a dwelling in an urban area. Although people are able to reduce expenditure on food by growing their own crops and keeping livestock, expenses such as school fees, building materials and clothes put a strain on the pocket. However, most residents are part of a *stokvel* or contribute to the church or funeral committee. Many rely on the credit offered at the *spaza* shop. Expenditure is also plagued by unforeseen costs such as medical fees but people tend to take things as they come, seeking the support of the community to see them through.

This suggests that the residents that have signed up for the energization systems are those that feel they are able to meet monthly repayments over the required period of three years. In terms of the credit facility offered through the KFC it seems likely that these are residents who have

[70]Based on uncorrected income levels, 75% of households receive less than R1000 a month.

access to stable income such as a formal job, a pension or even a remittance[71] are candidates who would take advantage of this method of payment. Those residents that depend on irregular and unstable income sources, who are certainly not able to afford the capital costs of energization, are not assisted by the credit facility. This issue is further explored in discussing energy expenditure in the next section.

5.8. Energy-use and expenditure on energy

5.8.1. *SA to Z* information

The first step in the energization process towards understanding the local level is through an analysis of energy-use and expenditure patterns of the recipients. Although undertaken only during the initial stages of the planning process, this methodology is indicative of the framework within which energy-use and expenditure is viewed by the suppliers. Like grid electrification, energization is seen as being able to fully satisfy people's energy needs.

Within this framework, the notion of 'energy upliftment' does not imply an addition of energization's modern energy sources to the traditional and carbon-based fuels currently in use in rural communities, but a replacement of them. The extent to which these displaceable energy sources are used and the amount spent on them is presented in the Energization Pilot Project Proposal (taken from the *SA to Z* study):

Average monthly energy spend R52,70 = 6% of total monthly income

Multiple Energy Usage (%of total rural settlements)

% usage	Main energy source	Average energy spent per month
12%	Coal	R31,40 per month
74%	Wood	R 8,30 per month
2%	Batteries	R14,80 per month
72%	Paraffin	R29,50 per month
11%	Gas	R62,50 per month

Table 5.1. The *SA to Z* data presented in Eskom's Pilot Project Proposal

The above table shows that the majority of rural households (nearly three-quarters) rely on wood and paraffin. Coal, batteries and LPGas are not as extensively used but complete the energy mix in unelectrified rural settlements.

With these statistics in mind it is interesting to hypothesise about the impact of the energization package. It seems likely that energization would replace coal, wood and especially paraffin. According to the table these are the three most used fuels. However, the table excludes candles – an important and widely used lighting fuel. If energization aims to improve access to energy at a comparable cost to the monthly energy spends tabled above, then it is aimed primarily at those households using paraffin or a combination of wood and paraffin. Less importantly, the package

[71]It is possible that in the case of a remittance, the household may decide that the earner working should send more money home to pay for the system.

could aim to replace coal and batteries (although reported to be used by only 12% and 2% of the rural population respectively). Households already using LPGas would presumably welcome access to PV for better lighting and entertainment.

5.8.2. The Local Level

A household survey was undertaken to examine energy use patterns in more detail. The survey comprised of interviews with 42 households (approximately 28% of the total in KwaBhaza) and examined fuel use patterns and energy use. The energy-use and expenditure data gathered from this study is collated in a similar way to the data in the Proposal taken from the *SA to Z* study to allow a comparison between them.

(Note: '% households' is used rather than '% of total rural settlements' is used and 'Energy Source' replaces 'Main energy Source[72]')

% h/hs (buy=use)[73]		Energy source	Average energy spend per month
(5%)	10%	Coal	R27,20 per month
(7%)	95%	Wood	R34,90 per month[74]
(29%)	83%	Batteries	R45,00 per month
(52%)	90%	Paraffin	R41,50 per month
(12%)	19%	Gas	R67,10 per month
(88%)	*100%*	Candles	*R20,60 per month*

Table 5.1. Energy-use and expenditure data from the survey of KwaBhaza

Similarly, the 'Average monthly energy spend' was calculated to be very high at R141,30.

It can be seen from the above table that a significant number of households do not use the fuels that they purchase continuously. In other words, households are able to do without the fuel for some time and or switch between multiple fuels. The difference between those households that use a fuel intermittently and those that use it regularly is greatest for batteries – households are presumably able to do without entertainment (the main end-use of batteries) between purchases; and is also high for paraffin – households would probably utilise wood and candles. Wood is predominantly collected.

The graphs below show the differences between the local level research and the national figures from the *SA to Z* guide. The local level research shows that all fuels are used by a greater proportion of the population and it can be concluded that multiple fuel use is more prevalent in KwaBhaza than the national averages would seem to indicate.

[72] '% of total rural settlements' is presumed to be an average of household energy use over the total rural population. It is unclear what 'Main Energy Source' denotes.
[73] The figures in brackets denotes the households for which frequency of purchse equals frequency of use.
[74] It is important to note that the figure for expenditure on wood is misleading. The average monthly expenditure for *those households that buy wood* (25%) is R113 a month. The figure of R34,90 results from averaging this expenditure over *all of the households that use wood*, those that buy and collect (see below for further explanation).

5.8.2.1. Extent of energy-use

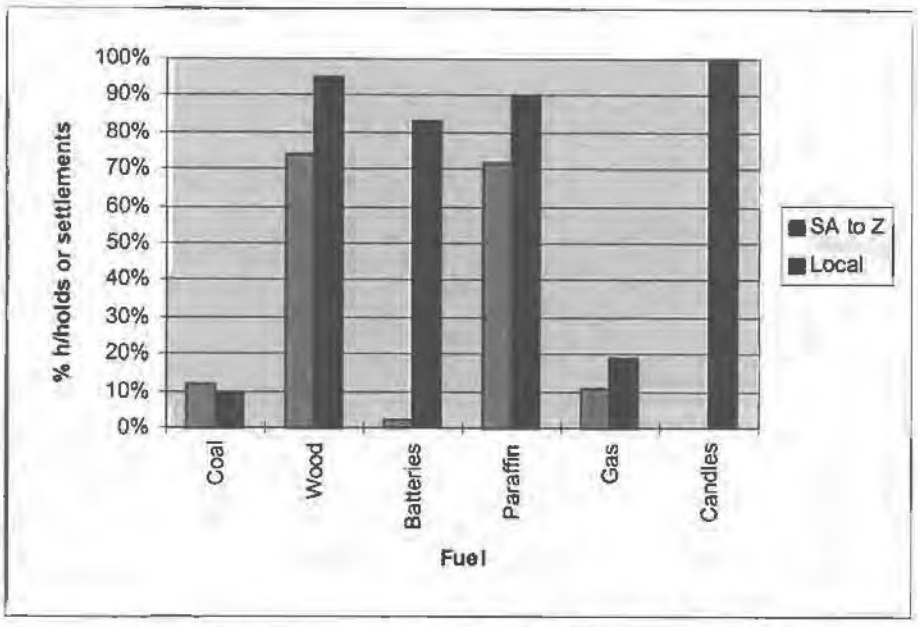

Figure 5.1. Comparison of the extent of energy-use by fuel

For all of the fuels in the above graph except for coal, the author's survey research showed that energy sources tended to be used by a larger percentage of the sample. The extent of wood and paraffin use was found to be comparable to the national *SA to Z* data but the incidence of battery use was found to be significantly higher. It was found that dry batteries were almost exclusively used and were purchased by the majority of the population. They were mainly used for powering entertainment appliances (radios and tape recorders) but were also used for torches.

Gas and coal were only used by a small percentage of the population. The fact that they were only available in towns and were fairly expensive meant that they tended to be used by the wealthier members of the community. Candles on the other hand are used by all members of the population, including the wealthy.

5.8.2.2. Expenditure on energy

Monthly expenditure in KwaBhaza is greater in nearly all of the categories and significantly so where batteries are concerned. The 'Average monthly energy spend' figure is nearly three times greater than the figure of R52,70 quoted from the *SA to Z* document. Keeping in mind that a large number of households are not able to purchase a specific fuel when they require it, it is probable that purchase itself is irregular and the actual expenditure is not as high as it appears.

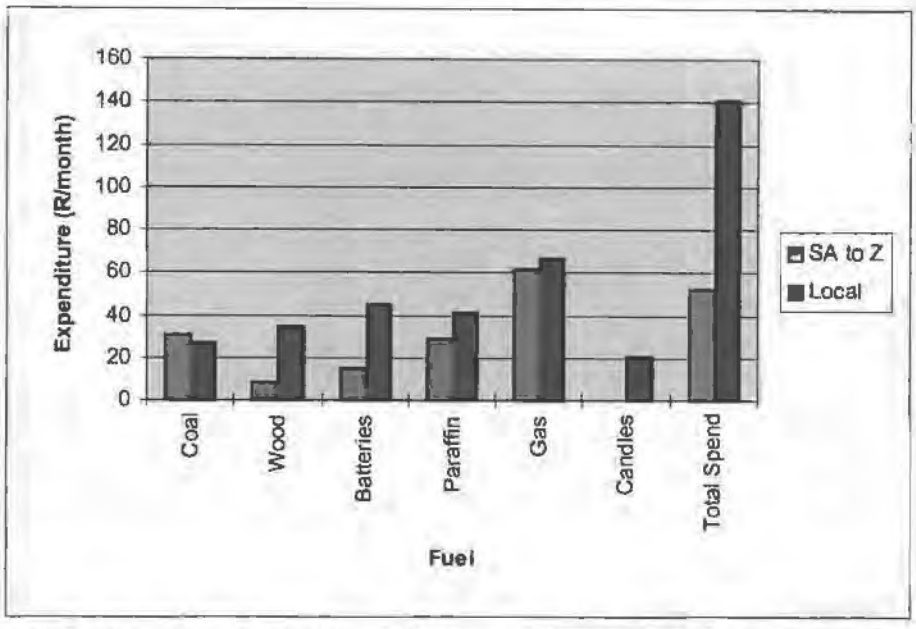

Figure 5.1. Comparison of expenditure of energy by fuel and 'Total Monthly Energy Spend'

The exception in the above graph is again coal in that expenditure on coal in KwaBhaza was found to be less than the national average quoted in the *SA to Z* document. For the other fuels, expenditure on gas was found to be comparable while for wood and batteries expenditure in KwaBhaza was found to be at least three times the amount in the *SA to Z* document.

Wood is mostly collected but when it is purchased it is generally done so by wealthy households in large amounts which accounts for the large discrepancy even though it is averaged over all of the households that use wood (collect and purchase). The amount spent on batteries is significantly greater too, because of their high cost and the widespread use of batteries.

Keeping in mind the high incidence of the use of paraffin, batteries and candles and considering that these are the expenditure on these fuels is at least three times greater than the figures from the *SA to Z* data is the reason that the average monthly energy spend (denoted as 'total spend' on the graph) is nearly three times greater than the figure from the *SA to Z* document.

5.8.3. A Closer Look

In order to examine the appropriateness of presenting energy use and expenditure as averages, the table below disaggregates the overall average energy-use data presented in Table 5.5. above into specific end-uses and main/supplementary fuel categories. This more detailed presentation of energy-use patterns aims to highlight the disadvantages of determining the initial energization offering from general averaged information. It aims to more accurately examine the appropriateness of energization in terms of the specific energy-use patterns of the KwaBhaza community.

Fuel (% h/hs)	**Main**	**Supplementary**
Wood (95%)		
- Cooking	83%	12%

- Space heating	83%	7%
Paraffin (90%)		
- Cooking	7%	69%
- Heating water	17%	55%
- Ironing	45%	29%
- Lighting	–	40%
Batteries (83%)		
- Entertainment	78% - Dry Batteries 5% - Car Batteries	
- Lighting	–	33% (torches)
LPGas (19%)		
- Heating water	10%	5%
- Cooking	7%	7%

Table 5.1. Energy-use data disaggregated into specific end-uses and main/supplementary fuel-use categories

This reveals the following information about the different fuels: firstly, it indicates that wood is a primary fuel for cooking and space heating in winter. The same fire is used for these simultaneous applications. Importantly too, of the 95% of households that use wood, 88% collect wood while 7% do not; 25% both collect and purchase. This means that wood is predominantly obtained for free[75]– a factor neglected by presenting wood as a fuel towards which income is allocated.

From this data it is reasonable to assume that wood use would continue in many households after they purchased the energization packages. Although households would have the opportunity to use gas by virtue of the fact that a stove is included in the package, wood use would most likely continue for space heating in the winter months. During this time it can be speculated that the same fire would be used for cooking as well.

Secondly, Table 5.6. indicates that paraffin is an important secondary fuel for many end-uses, rivalling wood (used by 48% of households) as a main fuel for ironing. Paraffin may be displaced by gas to an extent, but it is likely that it would initially be grafted into energy-use strategies.

Thirdly, dry batteries appear to be the main energy source for entertainment and provide an important lighting function. Although the former may be displaced by the energization packages, the latter would not – expenditure on torch batteries would probably continue in many households.

Lastly, the data shows that LPGas is mainly used for thermal applications. The provision of cylinders and a gas stove for these households is superfluous.

[75]It must be recognised that wood collection places a burden on the women of the household. Although it may be obtained without expenditure of income, it is costly in terms of time and effort.

It is also important to note that of the 95% of households that use wood, 90% also use paraffin. This shows that the primary combination of fuels in KwaBhaza is wood and paraffin. Wood satisfies the thermal needs of households while paraffin is a versatile fuel that can be used for lighting, or thermal applications such as ironing and heating water. Of the 90% of households that use paraffin, 75% purchase it in quantities of five litres or less. This indicates that the majority of households are loathe to contribute large amounts of money to a large quantity of paraffin even though it works out cheaper by the litre. This has obvious implications for gas purchases, a fuel that can only be purchased in discrete amounts and in the case of the energization package, refilling a 4.5kg cylinder.

5.8.4. Energy Expenditure and Income

As mentioned in the previous section, 57,5% of all households earn less than R1000 a month. All of these households use wood and paraffin as their main fuels. Of these, 96% use wood as the main fuel for cooking and space heating while 96% use paraffin as a supplementary fuel (13% for lighting and 83% for cooking). All except one of these households collect wood with 30% collecting and purchasing. Of these households, only one uses LPGas.

Interestingly, averaging the maximum energy spend of households that earn less than R1000 a month is slightly above the overall average (R141,30) at R142,10. However, the amount that these households could say they regularly spend on energy is significantly below the average (R71,90) at R57,20. This implies that expenditure on energy for these households fluctuates and a significant amount only occurs when there is 'money in hand'.

As expected, although regular actual expenditure on energy tends to be lower in poorer households, the proportion of income allocated to energy tends to be greater (Davis and Ward 1995:9).

Income bracket	***<R1000 per month***	***>R1000 per month***	***Average***
No. h/holds	23	17	Total = 40
Average income	R632,30	R2405,30	R1385,80
Energy Spend	R142,10	R140,20	R141,30
Regular Energy Spend	R57,20	R91,80	R71,90
Min % of income spent	9%	4%	5%

Table 5.1. Comparison of energy expenditure patterns between households earning less and those earning more than R1000 per month

In other words a greater proportion of income goes towards energy than in relatively wealthier households. This is even more significant if one takes into consideration that the dominant fuel used by these households tends to be wood which is generally not purchased. It may be concluded that in general, the poor spend an exorbitant amount on candles, paraffin and batteries. Contributing to this is the fact that poorer households tend to live in isolated areas where the costs

of these fuels are higher and their income patterns militate against bulk purchasing (especially with paraffin) which leads to increased fuel costs.

5.8.5. Conclusion

Although expenditure on energy for the poor is close to the figure quoted from the *SA to Z* data, the above argument reveals that energy-use data is complicated and should not be presented merely by expenditure per fuel. It shows that by far the majority of households use both wood and paraffin which allow for a high degree of control over expenditure. Wood is generally collected and of the households that do purchase it, the majority collect as well. Paraffin too, is generally purchased in small quantities to allow greater control over expenditure and it is used mainly as a supplementary fuel.

It is generally poorer households who tend to use a combination of wood and paraffin to satisfy their energy needs. Moreover, the proportion of income spent on energy would appear to be greater than relatively wealthier households although poorer households were found to be slightly larger than the average[76]. It is important that this be recognised in the context of the life-strategies of rural people. Those that do not have access to formal income rely on pensions, remittances, agriculture and informal labour. For the majority of the population life-strategies involve balancing resources depending on their immediate circumstances. A set amount of income is not always allocated to energy expenses because of the need to have money available for unforeseen, higher priority expenses such as medical costs, school fees, Christmas presents and building materials. In this light, multiple fuel use is a dynamic and versatile strategy employed by rural people to cope with changing circumstances.

5.9. Conference Paper

The paper entitled "Deep Rural Defined: Energization Viewed from the Grass Roots" summarised the author's findings from his field trip in KwaBhaza. It was presented at the Domestic Use of Electrical Energy (DUEE) Conference and was also used as a discussion document at a meeting of the supply-side stakeholders involved in the Energization Project.

The central theme of the paper examined the statement "we'll take what Eskom gives". As already mentioned this statement was a reflection of the people of KwaBhaza's desperate situation as far as development was concerned. Along with this desire for development, however, was an unwillingness to provide input into what development should consist of.

> It was found that people were loathe to provide input regarding alternatives to energy provision or suggestions for components of the package. Ideally, integrated energy planning should involve consultation with the community to allow people to choose the options that would most suit them. For this to occur, there must be accurate and reliable information transfer to make be aware of the alternatives available.
>
> It is both the lack of development and the wariness with which people view development initiatives which results in the response, "we'll take what Eskom gives". In this light, it is critical that Eskom ensures that the package is affordable and suitable for peoples' needs. A

[76]The average household size for the 57,5% of the sample that earn less than R1000 a month was calculated at 7.5 compared to 7.2 for the entire sample.

desire for development and pressure to accept the package could result in people committing themselves to something which they cannot afford or do not wish to pay for in the long term.

The paper also looked at income and expenditure. The author acknowledged that the income data collected during the surveys was grossly inaccurate but nevertheless used the average income figure to ask: "is it possible that households receiving R117 per person per month will be able to afford the R65–R80 monthly repayment rates of the energization package?". As a way of answering this question and to emphasise the variety of circumstances that residents in KwaBhaza face, the paper presented a case study to illustrate that income and expenditure are embedded within life-strategies of residents in KwaBhaza.

Household 7
Remittance and shared pension

Mrs. F lives with her mother-in-law and 8 children in the Emzweni area of Kwa-Bhaza. Her husband works in Johannesburg and sends home R200 every month to help with household expenses. She doesn't share food and cooking expenses with her mother-in-law, who receives a pension, but they split other costs.

The family has some livestock and her mother-in-law is presently getting some men to prepare a vegetable garden so that the household can begin growing their own crops. Mrs. F sometimes makes money from helping to build houses: for a two-roomed house she will receive R200.

Her husband will return from Johannesburg for Christmas and Mrs. F says that it is he who will make the decision as to whether they will take the energization package. When he comes home, he brings money to pay for presents for the children for Christmas and to pay for their school fees in the new year. The family pays a total of R125 per year for five children plus R5 to pay the security guard who watches the solar system.

Her mother-in-law wants the electricity because of the lights that she has seen in houses in Johannesburg. She remembers people demonstrating gas at the community meeting but is not sure why there is a solar 'slate' in the package. She doesn't think it strange to talk electricity and demonstrate gas; she "will take what they give."

The paper concluded by suggesting that the package be made more flexible to suit the texture evident in KwaBhaza. Moreover, it recommended that the pilot project was the environment in which this should take place.

> In principle, energization has the potential to provide the solution for energy poverty for a great many people in South Africa. Benefits in quality of life may be easily realised. However, before these profits are reaped it is essential that the issues of affordability, suitability and sustainability are thoroughly addressed. The issue of access to energy for the poor and the benefits which can be gained from making the package flexible must be considered. Critical and reflexive thinking around these areas must stimulate new approaches and perspectives. It is through the pilot projects that Eskom can learn about the local complexities and peculiarities to gain a more textured picture of the community.

5.10. First Energization Research Report

In addition to the paper, the author submitted a research report to Eskom which aired similar views. The report criticised the Energization project as being 'top-down'. It pointed out that

deriving a means of providing 'energy upliftment to the rural disadvantaged'[77] through a mechanistic process that was planned to be replicable was contrary to the variation, texture and difference both within and between communities.

The report suggested that if the purpose of the KwaBhaza Pilot Project was to 'identify and find solutions to the constraints'[78] then flexibility around all aspects of the package must be promoted. It went on to say that the pilot should be able to adjust to the constraints and particular circumstances that would arise during implementation. This course of action was recommended because it would best prepare energization for differing conditions in other rural areas and allow for creative thinking around the project to take place.

The report provided a brief critique of the Pilot Project Proposal focussing on issues around the package, cost and energization process. Thereafter, it presented an overview of KwaBhaza focussing on the geography of the area, general energy-use and income. This information is similar to that in the formal discussion above.

In an effort to illustrate the texture and complexity of the life-strategies of households in KwaBhaza the author presented four case studies of residents in different circumstances. This exercise aimed to question the direct relationship that had been drawn between income and expenditure on energy in the Proposal (the author was warning against the use of the average monthly energy spend figure of R52,70 = 6% of monthly income[79], to determine the monthly repayments).

5.10.1. Key Areas and Recommendations

5.10.1.1. Approach

The report suggested that a key area of the project lay in the overall approach and attitude towards energization. In particular, the central idea of energization, as a PV and LPGas energy package that ignored the income, energy-use patterns and other local complexities of the community needed to be questioned. It therefore recommended that various LPGas and PV options be considered in a more flexible energy offering. The justification being that benefits in quality of life of the recipients will be realised in giving people the ability to choose.

5.10.1.2. Cost

The author recommended that repayments for the PV system be as low as possible to make it accessible to as many people as possible. Furthermore, it suggested that systems of repayment should be flexible to cater for the irregularity of income prevalent in KwaBhaza. Importantly, the report stated that including the cost of gas refills in the monthly payment for the PV system was not appropriate. It emphasised that rural people need control over their expenditure on energy and that including the cost of refills would be analogous to making people use a certain amount of electricity every month.

[77]Quoted from the Pilot Project Proposal (Eskom 1997a:3).
[78]Ibid:6
[79]Ibid:7

5.10.1.3. Package

In terms of the package, the report recommended that the PV and LPGas components of the package (the equipment) be offered separately. Because it was known that the LPGas suppliers wanted to secure a certain amount of gas consumption to justify installing the depot, the report acknowledged that splitting the components of the package depended on whether the LPGas suppliers would agree to the arrangement.

The author proposed that gas consumption in the village was sufficient to justify splitting the package without the need to secure gas consumption through a minimum acceptance level. He estimated that gas consumption in KwaBhaza alone (excluding the surrounding areas) was at least 409 kg/month, close to the 480 kg/month required by the LPGas suppliers to open a depot.

It was also recommended that various gas bottles and appliances be offered separately for those who cannot afford to pay for PV systems. This was accompanied by the suggestion that financing arrangements be made to make the equipment affordable. On the PV side, the report recommended that various options, such as stronger lights or the availability of a system to power a colour television, be included.

5.11. Second fieldwork trip

5.11.1. Finance

Although an important institution involved in energization was lost in the form of REFSA, Eskom decided that they would continue with the project. They attempted to look for funding elsewhere, but none was forthcoming. Determined that the project should go ahead, Eskom decided to supply the subsidy themselves and underwrite the loans. What is more, they desired to offer the systems to the recipients at the same price quoted at the community meeting (at around R50). This meant that the subsidy was increased to R1700 per system – R200 more than the amount originally to be subsidised.

5.11.2. Nature of the energization offering

The main event taking place during the author's second fieldwork trip in mid-April 1998 was the Energy Day. Through meetings and negotiations with various supply-side stakeholders and some discussion around the authors recommendations, the Energization Task Team had established the nature of the energization offering for the KwaBhaza Energy Day.

Contrary to the author's suggestions, it was decided that the energization package should combine PV and LPGas. Moreover, the package was to include a compulsory gas refill every month that was to be paid off along with the capital costs of the equipment. Discussion with the Energization Task Team revealed that some of the supply-side stakeholders had contended that there could not be 'pilots within pilots'. In other words the pilot project should concentrate on implementing the plans as they were written, and not pilot some other concept with them.

However, the lack of flexibility in these areas was contrasted by increased flexibility in other areas. The most basic offering was still a combined PV and LPGas system but the customer was

able to choose between the pole-mounted panel (as envisaged in the original offering) and a cheaper roof-mounted option. In addition, the option of television was also to be included to 'make the customers realise the benefit of what they're getting' (Williams 1998). These changes gave the customer a total of four options.

The author's observation that there was already a significant amount of gas use in the area was used to reduce the minimum acceptance level from 50 to 30 purchases. This is shown in the Business Plan submitted to the IFA:

'Assumption: 30 units must be sold in order to start the Energization process
Total gas consumption per month is
energization: 30 × 4.5 kg = 135kg
existing = 409 kg (Kloot 9 Feb)
TOTAL = 544 kg'
(Eskom 1997b:8)

However, it was evident that the LPGas suppliers agreed to this arrangement with some reluctance. The author later found that they still required 50 systems to be bought for the project to go ahead.

5.11.3. School systems

The conference paper (Kloot 1998) also informed Eskom about the state of the school PV systems. Both systems, at Emzweni Primary and Velaphi High School, were not in working order. Two batteries had been stolen from each system. At the Primary School this had occurred in April the previous year and at the High School the batteries were stolen during the author's first fieldwork trip in November.

One of the reasons KwaBhaza was selected as a pilot site was because the schools had already been PV electrified – it was presumed that the school systems would give the residents some exposure to PV technology. With the systems in disrepair, Eskom felt that they could not effectively market solar home systems to KwaBhaza residents. To rectify the situation, the Energization Task Team contacted Eskom in Ladysmith who employed an electrical contractor to get the systems working by the Energy Day. This came with a whole set of complications that were reported in the Second Research Report.

5.11.4. Appliance Map

For the second fieldwork trip, the author was given the task of compiling an appliance map (see overleaf). This entailed plotting the location of households on a map together with the appliances used in each. The idea was that one would be able to see, at a glance, the coverage of the energization project. The author was also informed that the map was not to cover the region to the extent that the previous fieldwork did but should specifically concentrate on the Emzweni area. The more marginalised areas of KwaBhaza as well as the other village of KwaGobho that were included in the first fieldwork trip were therefore left out of the appliance map and in fact all subsequent research.

5.11.5. Clarification of issues

Even though it had been established that energization was to consist of a combination of PV and LPGas, the extent to which this was to be enforced was further discussed amongst members of Eskom and the LPGas Association and the author before the Energy Day. Other issues were also raised for clarification.

A crucial issue that arose was whether residents already using LPGas would be required to purchase the LPGas cylinders and stove that were offered with the package. Eskom felt that it would be unfair to make people take the LPGas equipment if they already possessed such equipment. It was decided that if the request was put to Eskom, they would allow residents to purchase only PV systems.

Another issue that came up in the discussion was the number of payments that debtors could miss on the loan (at this stage it had not yet been clarified with the KFC). Eskom had originally thought that the customer should be allowed to be a year behind on payments. The author supported this proposal in the light of the cyclical income and expenditure patterns of the majority of rural dwellers, particularly the poor. The LPGas Association thought this was too long a period and would put rural people into a debt cycle. In addition, it was argued that the bank would not allow debtors such flexibility. It was finally agreed that if the issue was raised at the meeting, the community would be told that they could be up to 3 months behind on repayments.

The issue of missed payments again raised the subject of the coherence of the package and the inclusion of a compulsory gas refill in the package. The author argued that if customers missed a payment, they could not be expected to pay for gas refills when catching up loan repayments. The LPGas Association consented that it combining the loan repayment and gas refills was not applicable in this case.

5.11.6. Energy Day

It was planned that the Energy Day be held on Saturday the 18th April. However, a death in the Ndlovu family prevented this from occurring and some frantic adjustments had to be made on Eskom's behalf to arrange for the meeting to be held the following day. Representatives from the DME, BP, Cadac, the LPGas Association and various Eskom Departments were present. The *induna* was not able to attend the beginning of the meeting because he was fetching Chief Majozi (who eventually sent a representative in his place) but many other community leaders were present from the beginning. When the meeting eventually started (two hours later than the planned 10h00) Emzweni School hall was almost full. People continued to arrive during the course of the meeting making overflow inevitable. It was estimated that about 400 people, including children, from KwaBhaza and all of the surrounding areas attended the meeting.

Before the meeting got underway, Eskom had arranged for ten women from KwaBhaza to prepare and cook food using the 2-plate stoves and cylinders that were to be part of the package. The food was supplied by Eskom and was to be served as a late lunch after the meeting. The purpose of cooking the food with gas was to demonstrate that the fuel was fast, clean and safe[80].

[80]The LPGas Association's slogan is that LPGas is 'fast, clean, safe and affordable'.

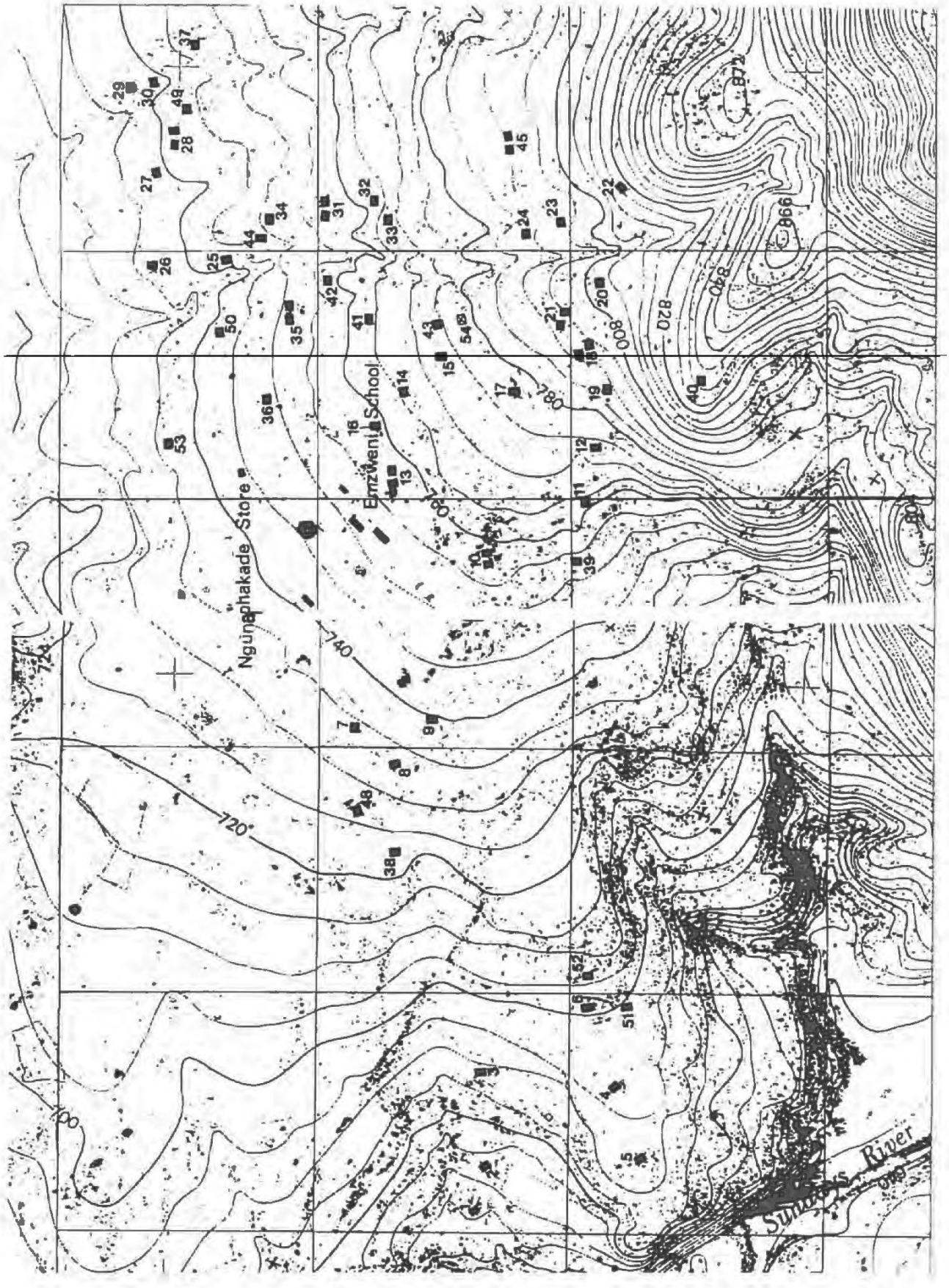

Figure 5.1. Appliance map of Emzweni showing individual homesteads

A demonstration of the solar system was also set up. The battery and appliances were on display inside a school classroom and the solar system outside in the sun. It was planned that the demonstration should simulate the system on offer and should power two lights, a radio and a television. However, Eskom staff were unable to get a picture on the television. It was speculated that the remoteness of the area made it difficult to pick up television reception although the school television demonstrated that it was possible[81]. They were also unable to power the radio because of the incompatibility of the adapters.

Another activity was the giving of gifts and promotional material to community members: LPGas Association and Eskom posters were on display around the school; representatives from Cadac and the LPGas Association handed out LPGas Association stickers and sweets to the children and LPGas Association calendars and pamphlets were also freely available; Eskom also handed out caps, rulers and T-shirts. Educational pamphlets detailing the particulars of the energization concept were also handed out. These explained the concept in Zulu, outlined the different options that were available and gave the cost of each option.

In the meeting Eskom's Project Leader introduced and explained the concept of Khanyisa, the name given to energization in KwaBhaza. He made it clear that four options were available and the customer was able to take out a loan to pay the system off over three years. He also pointed out that the monthly repayment included the loan, service fee and one free gas refill per month.

This was followed by a question-and-answer session between the meeting attendants and Eskom. Someone asked whether it would be possible to buy gas appliances and equipment without the PV system. Eskom responded by saying that this was possible but that they would be offered at normal retail prices. Eskom added that the advantage of buying them as a part of the package was that they were available at a reduced price plus, the cost of whole package was reduced by the subsidy.

The Cadac representative then took the floor to answer any questions about LPGas. Many people were concerned about the safety aspect but the Cadac representative pointed out that it was in fact a safe fuel if one knew how to use it properly. The ladies that had been cooking on the gas stoves were called on to testify to the safety of the fuel.

During these question-and-answer sessions, no-one asked whether they could buy the PV systems without the LPGas equipment because they were already using gas. In keeping with the plan before the meeting, Eskom confirmed that in all cases the package would remain a combined PV and LPGas offering.

The end of the question and answer sessions concluded the formal part of the meeting. Residents were finally reminded that 30 people had to sign-up for the project to go ahead. The meeting was adjourned to give residents the opportunity help themselves to lunch and to indicate their support for the project. Some teachers from the school were asked to assist with this process.

[81]The school television was different to the television to be included in the package. Firstly, it was a larger colour television while the Khanyisa television was a smaller black and white. Also, the television at the school had a booster, a feature not included in the package on offer.

This sign-up was more formal than the previous community meeting sign-up because residents were now sure what they would be getting and exactly how much it would cost. However, customers were told that there was still going to be a delay before they could hand in their deposits and have the systems installed. The next meeting was scheduled for June/July.

In total, eighty-three signatures were obtained at the meeting, a number in excess of the provisional thirty and the fifty originally required by the LPGas suppliers. This finalised that the project would go ahead in KwaBhaza.

5.11.7. Further research

The remainder of the time spent in KwaBhaza after the Energy Day was taken up by gathering information for the appliance map and inquiring from residents about the success of the Energy Day. Some other important issues arose that were mentioned in the Second Energization Research Report.

5.11.7.1. Anti-energization Group

The question of opposition to the energization project had been raised with some KwaBhaza resident's during the first fieldwork trip. Nothing along these lines was discovered during this trip. Only once the Energy Day sign-up had confirmed that the project would go ahead was information forthcoming about the 'Anti-energization Group' as it was called by the author. It found that a week before, some families in KwaBhaza had held a meeting to gather support against the energization project.

5.11.7.2. Energy Day

The response from the Energy Day was generally good although there were some complaints and problems. Some attendants felt that there had not been sufficient time to ask questions. It was also found that the pamphlets were difficult to read as they were not written in more traditional Zulu used in KwaBhaza but were written in a more 'urban' Zulu which tended to have some Xhosa influences.

One women was found to have been misinformed by the teachers that had been assisting in signing up. When signing up, customers were also required to indicated the option they wished to purchase (residents could opt for either a roof- or pole-mounted system, with or without a television). At the meeting the women was told that the roof-mounted system would be blown away by the wind and she should choose the pole-mounted system. Although she had wanted a television, she was also told that a television was not available as an option. Once correctly informed by the author, the women told the author that she wished to change her choice from the 'pole-mounted with no television' option to the 'roof-mounted with television' option.

5.12. Second Energization Research Report

Whereas the first report emphasised a critique of energization and put forward suggestions to make the package more flexible, the second and third reports dealt more with issues of implementation since the nature of the energization offering had, at this stage, been fixed. Issues

such as the Energy Day and the Anti-energization Group received attention, as did more peripheral issues such as the appliance map and the fixing of the school PV systems.

5.12.1. Energy Day

The main points of the Energy Day spoken of above (the pamphlet and problems with signing up) were mentioned in the report. In addition, it was pointed out that although giving away promotional items may be considered a good marketing strategy, it was recommended that this issue should be considered more carefully.

> . . . the issue of trust is important in such a community. Trust is built up silently, not with the distribution of free gifts. Although the community is now used to it after two other meetings, it may create the impression that Eskom wishes to gain something out of the community and are bribing them with sweets and gifts. Awareness of where the power lies in the community would probably create a better impression. Ideally, though, sitting and talking with the *induna* and the elders would be a lot more fruitful than aimless gift distribution. It may even be considered condescending and an arrogant display of wealth to a community who is extremely poor.

It was also speculated that giving away promotional items may divide the community in terms of those that accepted the project and attended meetings and those that did not.

> . . . it must be remembered that it would heighten division in the community. Those that that had not attended would feel even more left out and would be encouraged to fight against energization for a more equitable energy project in the form of electrification.

5.12.2. School PV systems

It has already been mentioned that the Energization Task Team wanted to have the school systems operational by the Energy Day. They contacted Eskom in Ladysmith, the Eskom branch in charge of the school electrification and asked them to get the systems repaired. This entailed replacing the inverters in the faulty lights and moving the battery boxes inside the classrooms to avoid further thefts. Ladysmith Electrical, the contractor employed by Eskom in Ladysmith, performed these tasks. The confusion arose around the additional electrification of the teachers' quarters (on the school property) and the wiring up of the principal's office[82].

The Energization Task Team had contacted Eskom in Ladysmith to get the school systems working again who liased with the Project Leader in Pietermaritzburg and the contractor. Discussion between these four parties precipitated the events surrounding the school systems.

The Energization Task Team initially decided that while the systems were being repaired, the teachers' quarters should be electrified as well. The Team reasoned that electrifying the teacher's quarters would more efficiently utilise the systems. Following these instructions on their first visit, Ladysmith Electrical proceeded to install a readyboard in one of the teacher's rooms at Emzweni Primary and erect poles at both schools that were to support the overhead wiring.

[82]The principal's office at the Primary School. At the High School, the principal's office was already electrified.

After much consultation and lengthy delays, even up until the third fieldwork trip in July, the decision to provide any form of electrification to the teachers' quarters or the Emzweni principal's office, was reversed. The possibility of giving the teachers only lights was considered, but also rejected. Eskom gave technical reasons for this reversal of the decision. However, the author speculated that one of the reasons was that the teacher's represented potential energization customers.

5.12.3. Appliance Map – LPGas use

An important finding while the research for the appliance map was being carried out was a more realistic assessment of the extent to which LPGas was being used in KwaBhaza. It was found that the amount of gas use was almost certainly greater than the estimate during the first fieldwork trip of 408 kg/month; 7 homesteads used gas for cooking and 10 used it for refrigeration – in total 12 homesteads.

This led the author to assert that an amount above 480 kg/month was being used in Emzweni, the amount required for the project to go ahead. The projected amount of LPGas that would be purchased from the depot would surely be greater because this estimate did not take into account gas use in the stores and *spazas* in Emzweni, the other areas of KwaBhaza or the neighbouring village of KwaGobho. In addition it was reasoned that the depot would be used by those outside of the immediate energization site because it is closer than town for many of these communities. These results prompted the author to suggest that future energization sites with roads able to support a 1-ton truck would most likely have enough gas use to justify the installation of a depot.

5.12.4. Anti-energization Group

The issue of the Anti-energization Group was raised in the report as evidence that energization is seen by residents as a less equitable form of energy compared to grid. It contrasted two groups of people in KwaBhaza: the more wealthy residents that are able to afford energization; and the poorer section of the population that would prefer grid.

It was reasoned that the more wealthy members of the population (those that feel they are able to pay off the loan) would support energization. Although they would probably prefer grid electrification, this sector of the population was probably not optimistic about their chances of receiving grid and would want energization because it represented the most immediate prospect of access to better energy sources. On the other hand, the poorer members of the population would probably prefer grid electrification to energization; a grid connection would offer a household the status of a grid connection as well as the potential, if perhaps intermittent access to modern energy.

Because Eskom dealt with the *induna* in bringing energization to KwaBhaza, the project had the approval of the traditional power structures which no doubt increased support for it. It was reasoned that those against energization were probably the poorer sector of the population. In relation to the traditional power structures, it was thought that they were comparatively powerless and ineffective in campaigning against energization. The report suggested that the most important reason for their lack of success was the belief that grid electricity would probably not come to KwaBhaza anyway.

During the third fieldwork trip, it was found that the presence of an Anti-energization Group was a result of more complex factors. At this time it was rumoured that the group was collecting a petition in support of grid electrification which they would submit to the Eskom electrification office. It was also that this group had apparently spoken to Eskom employees connecting households outside Pomeroy who had assured them that grid would be coming to KwaBhaza.

Contrary to speculations in the Second Fieldwork Report, it was found that at least two influential and wealthy families were behind the Anti-energization Group. Members of these families professed that energization was inappropriate for people in KwaBhaza because it was expensive and the majority of people were unemployed. They were of the opinion that many people did not know what they were signing up for and would withdraw their support. They added that most people didn't know how to use gas and thought it was dangerous.

Ironically, these families already used gas and one had a generator with which they powered the homestead's lights, a colour television, a video recorder and an electric water pump among other things. For this family the energization project does not represent an improvement in access to energy sources. It is logical that such a family would prefer to speak out against energization if they thought that it would jeopardise the chances of receiving grid – an energy source that they, and the community as a whole, would benefit from.

It was only during the third fieldwork trip that the political significance of energization was realised. It was in fact found that political reasons were the motive behind the Anti-energization Group. This is perhaps to be expected for a rural area in the Msinga district where political tensions are especially high.

The energy agent's wife told the author that the residents that were in favour of energization are "desperate for development and so do not ask who it is from". In other words, although most people support the IFP they are willing to accept development from the ANC government. In fact, the same resident remarked that "development that does not aim to help people but is really canvassing annoys us – we want progress, not politics".

The energy agent's wife said that the Anti-energization Group were of the opinion that energization was not really aimed at helping the community but was driven by political motives (perhaps the issue of the government subsidy and Eskom's marketing strategies at the Energy Day precipitated these beliefs). She added that their aim was to expose energization as a 'canvassing drive' and questions its legitimacy as a development initiative.

5.13. Seminar

The author's attitude with respect to the composition of the package culminated in the presentation to Eskom after the second fieldwork trip. The seminar focussed specifically on this issue of splitting the PV and LPGas components and why is was necessary to do so.

Some discussion around this topic revealed that although the PV and LPGas equipment are offered as a package when the system is installed, the payment structure (repayment of loan and

payment for gas refills) may not remain coherent. Although this remains to be seen as the project proceeds, it is reasonable to assume for three reasons.

Firstly, there is nothing that formally binds the repayments together. In the original proposal it was intended that the loan repayments would be handed 'over to the LPGas representative . . . who then pays this into an account' (Eskom 1997a:9) which seems to make the loan and gas repayments more cohesive. However, this is not occurring in KwaBhaza; the gas business is being run on a strictly cash basis and the loans are collected by the energy agent and paid at the Tugela Ferry branch of Ithala Bank. It comes down to a decision from the energy agent who collects the repayments whether payment for gas refills are compulsory.

Secondly, defaults on loan repayments represent another area where the package may split up. When the KFC was managing the loans they indicated that customers were allowed to miss four monthly repayments before they are warned and about six before repossession would occur. The similar scenario would presumably be the case now that Eskom are managing the loans. In the event of a default, the LPGas Association admitted that the customer cannot be expected to pay for the gas refill that was missed.

Thirdly, the gas cage/depot went in before the systems were installed which emphasises the separateness of the components to the residents of KwaBhaza. As already mentioned, there is significant gas consumption in and around KwaBhaza. The gas business was not instituted in conjunction with energization and this will possibly thwart the adoption of combined payment arrangements.

Discussion

5.14. Product package

The final packages offered in KwaBhaza required a deposit of R140 and included a gas stove, 2 filled 4.5kg cylinders and 1 refill provided per month (at R22,50 of the monthly cost). The different options and the relevant costs were as follows.

'Option 1. Roof-mounted PV unit	R55/month
Option 2. Roof-mounted PV unit + black and white TV	R65/month
Option 3: Pole-mounted PV unit	R65/month
Option 4: Pole-mounted PV unit + black and white TV	R77/month'

(Eskom 1998)

5.14.1. Cost

It is interesting to note that for the cheapest system in the above prices, the gas refill comprises up to 40% of the total cost. This is significant for recipients who wish to spend as little as possible on an energization package.

Hypothetically, if the PV and LPGas components were split, the cost of the packages would start at R32,50 which would certainly make them more affordable. However, as the sections on income and expenditure showed, it is not so much the *amount* that is prohibitive as the *flat rate* payments that are required. Even though the energy expenditure levels in KwaBhaza are comparable to the prices offered by Eskom for energization people's circumstances militate against allocating income to the purchase of a product package.

Whether a particular resident wished to commit to spending a set amount on energization would depend on many factors, one of which would be amount and frequency of income. A repayment period of three years is a long time and requires financial stability which is not often evident in rural areas. Candidates for energization are likely to be those whose primary income source is formal employment (whether they live in the area or receive an amount in the form of a remittance) or perhaps a pension (although allocating a minimum of 12% of monthly income is significant[83]).

It would also depend on the extent to which energization replaced fuels. The section on energy-use showed that multiple fuel use is a strategy used by rural people to cope with their changing circumstances. As with grid electrification, it is certain that multiple fuel use will continue post-energization if the decision is taken to purchase an energization package. This would be determined by whether the customer felt that he/she could afford energization and expenditure on other fuels, both of which would have to be managed with other expenses.

Included in these offerings, is the guarantee of the entire system for one year. The cost of component replacement thereafter (batteries and lights) is not included in the costs above. Banks (1998:6) showed that these life-cycle costs are significant. He showed that over a period of twenty years, the cost of batteries was in fact greater than the cost of the panel[84]. This may prove to be problematic if the battery fails while the customer is still paying off the loan. He/she may not be able to afford monthly repayment costs as well as the cost of a battery[85] or may not wish to pay for a faulty system.

5.14.2. Energy Needs

Keeping in mind that Eskom's uses 'energy needs' in reference to the provision of all a household's end-uses including lighting, entertainment and thermal applications, the following sections intends to elucidate the difference between this definition and the energy needs of the community.

5.14.2.1. Solar system output

The PV system provided with the energization package consists of a 49W_p panel. Providing it is functioning correctly, the Business Plan states that the system would be able to provide 240 Watt hours a day. This translates into the following possible end-use combinations:

'(1 × B&W TV + 1 × 9W light) on for 4 hours; or
(2 × 9W lights + radio) on for 8 hours; or

[83]R55 is 12% of R460.
[84]Assuming that the lifetime of the panel is 20 years and the lifetime of the battery is 3 years.
[85]The cost of a new battery is significant. Banks' (1998) estimate is R300.

(2 × 9W lights) on for 4 hours + (B&W TV) on for 2 hours + radio on for 6 hours'
(Eskom 1997b:13)

The assertion that the panel is able to generate 240 Watt hours a day assumes that it receives just under 5 effective sunlight-hours[86] a day. Design considerations (in terms of battery size) usually allow for a period of autonomy (typically three days) for which the system can operate without exposure to sunlight. This means that the above figures are not too rigid – the extent to which the lighting and the appliances can be used depends on the amount of sunlight that the panel receives and the amount of energy stored in the battery.

The possible end-use combinations presented in the Business Plan are guidelines only, and actual use would depend on an individual household's preference. The amount of energy needed for lighting and media would certainly differ between households and would also depend on the option selected by the household (an important factor being whether a television is drawing energy). Energy requirements even fluctuate daily within a single household. In addition, the energy available to the system depends on the amount and intensity of sunlight that the panel receives.

Although not officially part of the project, energization increases the accessibility of PV to residents if they desire to multiply the capacity of their system. Although the retail purchasing of PV is prohibitive because of its high cost, especially considering that the subsidy would not be available for residents purchasing 100W or 200W systems, wealthy residents may decide to opt for this form of energy supply.

5.14.2.2. Lighting

The size of the system is the factor that determines the quality of lighting and the number of lights the system is able to power. Compared to candles or a paraffin lamp, a 9W CFL is a vast improvement[87] but two of these lights would not be sufficient for all households. The system is sufficient for a two-roomed or two one-roomed dwellings close to each other. However, for larger houses and homesteads with more than two dwellings, it is less than ideal. Even if the system was bought for a two-dwelling household, the direct current (DC) voltage drop, a function of the distance between the dwellings, would determine whether the second could be connected[88].

It was found that most households tended to have separate dwellings for sleeping and cooking. Only wealthier households were able to afford to build a house with modern materials and interconnected rooms. In general, dwellings tended to be separate one-roomed structures made from traditional materials (thatch and mud) or a combination of traditional and modern materials (corrugated iron and concrete). Considering that the average number of people in a household[89] in KwaBhaza is 7.2 would imply that more than two dwellings require illumination to fully satisfy the household's lighting needs.

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[86]Effective sunlight-hours are the equivalent hours that the sun is at noonday strength and the panel is operating at peak power.

[87]A school child estimated that the 9W light was 25 times brighter than a candle (Kloot 1998:3).

[88]In answering this question at the Energy Day, Eskom estimated that two dwellings could be a maximum of 20m apart.

[89]The definition of household used in the research includes members that eat together or that contribute to the household financially.

It must also be noted that a problem with connecting rural areas to the grid is that the dwellings tend to be aggregated into *homesteads* within which a number of family units or *households* can be defined. The grid electrification policy is that a maximum number of three connections are allowed at one site (Mchunu 1998). Thus, even full grid electrification cannot be expected to satisfy the lighting needs of all the household's in the homestead unless the owner was willing to do the wiring him/herself.

An advantage with the energization packages in this case is that it is possible to satisfy the all the lighting requirements of a homestead provided the residents are prepared to purchase more than one system. Of course, the downside of this approach would be the significant financial burden on the household.

5.14.2.3. Entertainment

For media end-uses, and to the disappointment of a number of respondents, the system is designed to provide power for a black-and-white television. Colour televisions generally run off alternating current (AC) and require an inverter that would have to be purchased separately. In terms of energy, colour televisions have a higher wattage than black-and-white televisions. Although it is not impossible to run a colour television from the standard system provided, it would depend on how much the television was used would determine whether lighting power would have to be augmented.

Once the option of a black-and-white television was included in the final offer to residents in KwaBhaza, there was some concern whether the promise of television could be carried through. The difficulty of demonstrating the system at the Energy Day indicated that television reception in the area was weak because the village is surrounded by mountains on all sides. It was later thought that these problems were due to the particular make of television provided with the system and could be rectified by choosing a different model. The possibility of needing a booster to pick up the weak television signal was another complication that had to be considered[90].

As the next section shows, investigating the working order of the demonstration systems installed in three houses in the village revealed some complications regarding the use of the energization system to power radios. The most pressing problem, that has been alluded to in grid electrification studies, is the supply of adapters for radios that generally run off 9V dry cell batteries[91].

The issue of mobility was also to be considered. An advantage of running a radio off a dry cell battery is that it can be played in any location that the owner desires. Running it off the energization system means that its mobility is affected by the length of wire by which it is connected. Residents may perhaps decide to run the radio off batteries when required and the energization system when possible.

5.14.2.4. Thermal applications

On the LPGas side, presenting energization as a package that satisfies all of the thermal needs of a household disregards the important end-use of space heating. No heater attachment is provided with the package to warm the dwelling in the cold winter months.

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[90]The colour television at the High School uses a booster to get reception.

[91]PP or PM-9s and -10s

As far as the other thermal applications are concerned, it is difficult to say whether a two-plate gas stove would satisfy the cooking needs of a household. However, electrification has shown that multiple fuel use for continues for cooking once the household is connected to the grid and it is reasonable to assume that the same phenomenon will occur in energization.

Taking current energy use strategies into account, it is fair to say that the gas stove and cylinders could satisfy some of the energy needs required for cooking and water heating some of the time but certainly not all of the thermal needs of all recipients. This would depend on many factors including the preferences of the household, the nature of the meal cooked, the compatibility of pots with the two-plate stove and the availability of gas (dependent also on affordability).

The inclusion of a set amount of gas in the package every month, be it one or two cylinder refills, will not satisfy the needs of all the recipients of the energization package. The average household size in KwaBhaza was found to be 7.2 and it is fair to say that some households may be able to ensure that they use a certain amount of gas per month. However, keeping in mind that household size was found to vary considerably in KwaBhaza from between 1 and 15 members, a set amount of gas would not be convenient for all of the recipients. For some households even one 4.5 kg cylinder-full would be too much while others would need to purchase more gas to satisfy their energy needs.

5.14.3. Conclusion

It can be concluded that a central issue in determining whether an energy package is appropriate is its ability to cater for the diversity of the needs of households in KwaBhaza. Thus, *satisfying the energy needs in rural communities by providing customers with an energy package that caters for all energy end-uses*, an implicit objective of the product package, is not fulfilled by energization because the diversity of the energy needs of the households that make up the KwaBhaza community. Some energy needs are satisfied by the service offered by energization but all of the energy needs in rural communities cannot be satisfied merely by catering for all of the end-uses within a rigidly defined package.

5.15. Energization process

5.15.1. Flexibility

The most important aspect relating to the energization process from the author's point of the view was the comment that there cannot be 'pilots within pilots'. This was the response from the suppliers when the author critiqued the concept of energization in the First Fieldwork Report and recommended that changes be made to the foundation of the concept of energization. More specifically, the author recommended that the PV and LPGas components of the package be split, that gas refills not be included in the repayment costs and that a variety of gas and PV options be introduced to give residents a choice in the means to satisfy their energy needs. Moreover, the author emphasised that the pilot project was the environment within which this should take place.

The comment that there cannot be 'pilots within pilots' indicated that the suppliers wished to keep the energization process simple; they were of the opinion that the process in KwaBhaza should stay within the bounds of the process outlined in the Pilot Project Proposal. In other words, that the pilot project run as follows: the concept should be conceived and planned prior to implementation, tested, and thereafter assessed. Alterations should only to take place once the project has been completed and assessed, and not while it is running. In this way the energization process is rigid.

Within this rigid framework however, the Project Proposal incorporates a degree of flexibility. For example, once the Community Market Research is completed, the suppliers are to 'develop a specific and complete energization offering' (Eskom 1997a:5): – an activity to match the needs of the community with the supply options available. It is evident that there is flexibility around important issues such as the cost of the package and the utilisation of PV and LPGas to satisfy customers' energy needs.

Flexibility was also evident during implementation in KwaBhaza. It may have been because of the author's influence that Eskom decided to diversity the offering: the customer was given the option of two different panel mountings (roof- and pole-mounted) and the choice of a television. There was also some price range: the packages cost R55/month, R65/month or R77/month. This was done even though the Proposal suggested that the 'energization offering be seen as one package' (Eskom 1997a:9). In a sense they did remain 'one package' in that they all combined the PV and LPGas component with a single payment.

These changes, even though they were slightly different to what was planned or suggested in the Pilot Project Proposal, remained within the bounds of what was being piloted in KwaBhaza: a complementary PV and LPGas energization package. The alterations recommended by the author, however, questioned the very foundation of energization and proposed changes that interfered with the piloting of the energization process in KwaBhaza *as it was envisaged by the suppliers*. This was one of the primary reasons that energization remained essentially a combined PV and LPGas initiative with a combined payment structure.

5.15.2. Vested Interests

It was evident in the KwaBhaza Pilot Project that implementation was far more complicated than could be predicted in the planning process. On the one hand this is to be expected: it is the purpose of a pilot project to expose the problems and constraints that are overlooked in the planning stage. On the other hand, a myriad of complexities and unforeseen events, which could not have been discerned in the plans, disturbed the smooth running of the pilot. Decisions had to be made by the suppliers during the course of the project in response to the complications that arose.

The most obvious change was the dissolution of REFSA which resulted in significant changes to the institutional environment. Other less serious changes were measures to assist implementation: for example, the decision to repair the school systems, the installation of a third demonstration system (see Third Fieldwork Trip) and the changes made to the package. When decisions are made in issues such as these, which cannot be predicted in the planning stage, vested interests are of importance.

For example, the decision to keep the energization offering as a combined PV and LPGas offering that is to be paid for with one payment was based on the reasoning that there cannot be 'pilots within pilots'. However an important reason why they were eventually combined, and particularly why the gas refills were included in the package, was to protect the interests of the LPGas suppliers.

Originally, the LPGas suppliers agreed to install a gas depot and supply gas to KwaBhaza on the basis that there was a 'minimum acceptance level'. This was a means to secure an amount of gas consumption which would ensure a degree of financial viability for them. Splitting the PV and LPGas components of energization would not give the gas suppliers this security. For them, the issue is not whether energization is appropriate for the community, but the business opportunities available to them. After all, they joined the project on the understanding that a minimum acceptance level would secure a certain amount of gas consumption (the original 'pilot') and that the project was an opportunity to sell LPGas, which is their business.

Eskom have indicated that they do not have vested interests in the project (Hazard 1998); the nature of their involvement is to seek a sustainable future role in energy provision in South Africa (ibid). Thus, even though Eskom aim is to assist the community, the most basic quality of energization is that it is promoted as an alternative to grid electrification which requires that Eskom keep PV and LPGas together. If these components are separated, the coherence of the package is lost and it could be argued that it is more efficient to allow the concept to run on a retail basis.

On the other hand, this argument neglects Eskom's substantial administrative role in the project. The utility is at present the only organisation with the inclination or ability to arrange funding with the IFA, channel the subsidy (although this need fell away), establishing an energy agent to maintain the PV systems. Furthermore, the utility itself is arguably the only organisation able to promote and market an alternative to grid electrification.

5.15.3. Participation

The community on the other hand, who are to benefit from energization, were left out of the implementation process and crucial decisions such as the one mentioned above. Its interests are represented by Eskom indirectly which aims to provide the community with a grid electrification alternative for its 'energy upliftment'. Because the energization process does not afford the community an equal balance of power in the consultation process, the vested interests of the suppliers determine the path that the implementation process takes.

It is not only the meeting of 'top-down' or prescriptive development with the local level that is the focus of the debate but rather the entire process of development planning *which may include notions of participation.* Whereas 'top-down' development refers to the process whereby development is initiated by planners at the 'top' and implemented 'downwards' towards the local level, participatory or 'bottom-up' development may be defined as a process that 'necessitates the empowerment of disadvantaged and disenfranchised people, on both personal and organisational levels, so that their engagement in . . . development is around their own priorities and on their own terms, rather than according to an agenda the terms of which have already been set

elsewhere' (Shetty in Beall 1997:21). It is arguably this type of participation that should govern development interventions and people's preferences in terms of access to energy.

5.16. Energy Day

5.16.1. Introduction

Although energization is planned by Eskom to be an alternative to grid electrification, it is this form of energy, Eskom's more conventional product, that is the main factor militating against acceptance of energization. At community meetings and the Energy Day, Eskom attempts to overcome this through discussion and marketing.

Energy Days take place in the community once the approval of the community leaders has been obtained and Eskom has performed its market research at previous meetings. So once the energization process has reached this stage, there is already a degree of support for the project. In KwaBhaza, two community meetings had been held prior to the Energy Day, which were notable for two reasons: the marketing that took place and the discussion around grid electricity.

At the community meetings, Eskom's marketing department and the LPGas Association each take care of demonstrating and marketing their respective products. Eskom are in charge of demonstrating the PV system while the LPGas Association are in charge demonstrating the two-plate stoves on offer. Emphasising the safety aspects of LPGas is another facet of this marketing. However, it is Eskom's task to promote the concept of energization as a coherent energy package and an alternative to grid electrification.

Research into the matter made it clear that discussion around grid electricity formed an important part of the initial community meetings. Although this matter has been dealt with more fully in the section on 'Energy Upliftment' it is important with regard to the Energy Day concept. Eskom find themselves in the awkward position of assuring people that grid will not come to the area and at the same time assuring people that energization will not affect their chances of getting grid. What is more, Eskom's conventional position as the national utility and the widely publicised grid electrification programme make this a difficult position.

5.16.2. Marketing and Politics

As is the case at the community meetings, the PV and LPGas components of energization are marketed separately at the Energy Day. In KwaBhaza it was evident that the LPGas demonstration overshadowed the demonstration of the PV system. Only a few people were interested in the PV demonstration which took place in a classroom; it was not able to power a television (due to problems with reception) and was not equipped to power an entertainment appliance. The LPGas demonstration on the other hand was very much at the forefront. Ladies from the community were selected to cook a meal for the attendants in full display and gave testimonies about the safety and advantages of LPGas.

Eskom's main role is the marketing of energization as a form of delivery, comparable to grid electricity, that can satisfy all of a household's energy needs. Since this is their goal, the

coherence of the package is vital and the complementary nature of PV and LPGas are emphasised. In addition, the advantages of LPGas and PV themselves are promoted to give credibility to energization. However, the result of this is an unbalanced and disproportionate emphasis on LPGas.

Although PV is promoted as 'essential electricity' by Eskom, it is clear that it is inferior to grid. Even those residents that were willing to accept it admitted that this was so. For one, the basic offering is not able to power colour television and a maximum number of two dwellings can be illuminated provided they are close together. Secondly, the comparative cost of PV compared to grid electricity is extremely high if one considers the difference in the level of supply. In light of these comparisons it is clear that PV is not the strong point of the energization package. Eskom are confined to pointing out that it satisfies the applications of lighting and media but that it does have limitations.

LPGas, on the other hand is arguably comparable to grid electricity in meeting thermal needs. The fact that a stove is offered with the package means that the appliance acquisition barrier found to be problem with grid electrification (at least for cooking) are removed. The main marketing angle on LPGas is the education of potential customers not familiar with gas in the safe use of the fuel.

For those members of the community that already use LPGas, a combination of the emphasis on LPGas and the limitations of PV electricity may cause them to reject the idea. Moreover, the notion that energization is an alternative to grid electricity and the promotional activities of Eskom's marketing department may result in suspicion with regard to Eskom's involvement. The comment that the activities at the Energy Day were 'canvassing' is an indication that the debate over energization tapped into larger political debates and struggles over access to resources.

5.16.3. Conclusion

The objective of the Energy Day concept – informing people of and marketing energization to the community – seeks customer acceptance for energization. However, it does not recognise the political dynamics (mainly around comparisons with grid electricity) that formed such an important part of the project in KwaBhaza. Thus, the notion of promoting energization to the community at the Energy Days was shifted because of political opposition to energization. At the Energy Day the term 'community' more accurately refers to those residents willing to support the project.

Although in many ways it is inferior to grid electrification, energization represents development opportunities for those who desire to take advantage of them. If it is recognised that the community need is *education* regarding alternative energy sources then transparent and informative discussion and learning would certainly be more beneficial than marketing. Rather than including them in a semi-prescriptive way and keeping the community at a distance through marketing, the Energy Day should be a time for building relationships and trust between the suppliers and the potential recipients.

5.17. Third Fieldwork Trip

It was decided that the author should visit the field a third time since he was conducting supply-side interviews in KwaZulu-Natal. During this fieldwork trip the author investigated the issues surrounding the gas depot that had recently been installed, observed the installation of the third Demonstration House and followed up on issues raised during the second fieldwork trip.

5.17.1. Demonstration houses

5.17.1.1. *Installation of the 3rd demo house*

The process of selecting the recipients of the demonstration systems was described at the beginning of the chapter. Basically, two persons were elected: the energy agent and a Mr Ndlela from KwaGobho. During the election process, there was concern whether Mr Ndlela was an appropriate candidate because it was thought that he owned the store in KwaGobho – Eskom had in mind a pensioner to test the repayment mechanism. After some discussion, it was confirmed that these two electorates would have demonstration systems installed in their homes.

However, when these systems were installed in February 1998, Mr Ndlela complained that the system did not run his fan and his colour television. He had been using a generator to run these appliances and had wanted to use energization instead. This indicated two things: firstly, that there was a communication problem between Eskom and Mr Ndlela – he presumably thought that energization was an alternative to grid in terms of its supply level; and secondly, he was an inappropriate candidate to test the financial mechanisms – whether poorer residents could afford to pay for energization.

Eskom then decided that another Demonstration system should be installed. At another community meeting, a Mr PT Ndlovu was nominated as the third Demonstration House recipient. The income level of this household was considered more appropriate – he sent a remittance home to his wife who resided in Emzweni. Since he only returned from Johannesburg during the holidays, his wife would use the system for the rest of the time.

The system was installed on 25 July while the author was in the field. By this time it had been decided that a cheaper roof-mounted option should be included as an option. This type of system was installed at Mr PT Ndlovu's house.

5.17.1.2. *Assessment of other demo houses*

Once the above system had been operational for a few days that author revisited the home to inquire about the workings of the system and check the impact of the system (both the PV and gas component) on the energy-use patterns of the household. During the course of the fieldwork trip, the author also visited the other two demonstration systems. He monitored the extent to which the systems were being used and gathered recommendations for Eskom.

5.17.1.3. TV reception

Once Eskom had decided to offer a television as an energization option, the viability of such a concept was tested. The black and white television that was to be included in the package was given to the energy agent to run off his household's demonstration system.

However, some difficulties were encountered. He could not get proper reception even after buying a booster and a large roof-mounted aerial. The television was then returned to Eskom's Project Leader who took it back to Pietermaritzburg and had it seen to. When returned to the energy agent it still did not work and it was thought that KwaBhaza must be too remote to pick up television reception.

To confuse matters, the colour television at Emzweni Primary (running off the school's PV system) worked adequately with the same type of booster and aerial. It was decided to try to run Eskom's television off the school system to identify the problem. However, this exercise did not yield any success and it could only be concluded that the type of television supplied by Eskom (whether the specific make or the fact that it was black and white) did not work in KwaBhaza.

5.17.2. Installation of gas depot

The gas depot was installed a few days before the author arrived in KwaBhaza. It consisted of a large slab of concrete, about 5m × 3m, which was surrounded by fencing with a roof of corrugated iron. The materials for the cage and the apparatus for refilling cylinders were supplied by the Gas Distributor, Zama Gas.

During the author's third fieldwork trip representatives from Total and Zama Gas, the LPGas suppliers for the KwaBhaza project, visited the site. As planned, the author conducted interviews with these stakeholders. The energy agent was also trained to refill gas cylinders as a number of residents brought their cylinders for refilling. The fact that people four people brought their cylinders to the depot caused the Total representative to remark that even at that early stage, it was a promising sign of things to come.

5.18. Third Energization Research Report

Some of the issues covered in the Second Research Report, such as the school systems and the Anti-energization Group, drew from information gathered during the third fieldwork trip. This included such issues as the Anti-energization Group and the repair of the school systems which shall not be repeated here.

5.18.1. Recommendations regarding opposition

However, with regard to the Anti-energization Group, the Report included some recommendations to minimise the impact of the opposition to energization. The first was that Eskom move as quickly as possible on the project. The author reasoned that further delays would strengthen the opposition to the project and increase doubt in the minds of those in favour of energization.

Secondly, the Report recommended that Eskom '*limit marketing strategies*'. The author suggested that what Eskom sees as the promotion of products may be interpreted as attempts to arouse political support. It was for this reason that Eskom decided to postpone Energy Day 2 – the 'celebration that project will proceed' (Eskom 1997a:8) until after the 1999 elections.

5.18.2. Demonstration systems

5.18.2.1. TV reception – recommendations

The issue of whether the television supplied by Eskom could pick up reception in KwaBhaza was described in the Report. The author also suggested some measures that Eskom could employ to ensure that, if televisions were offered with the energization, they operated effectively.

> It is critical that it is established whether the model of television provided with the system can pick up television channels in the area. In addition, the facility of testing for reception at a particular homestead *must be supplied.*

It was pointed out that extra costs such as the cost of a booster and aerial, if they were required, and the cost of a television licence should be made explicit to the customer when he/she submitted his/her deposit.

5.18.2.2. Energy-use patterns

The extent to which the demonstration systems altered the energy-use patterns received attention in the Third Fieldwork Report. Although this analysis could not be considered as comprehensive evidence of the impact of energization at the household level, it was presented at an initial indication of the potential problems that may arise.

Firstly, it was found that all of the PV systems were in good working order. They were mainly being used for lights and it could be concluded that they had low duty cycles. Only one system was being used to power an entertainment appliance – a large hi-fi that used a 12V power source. In all of the households, including the one mentioned above, radios were still being powered with 9V batteries.

The reason for this has already been mentioned in the section on Product Package: the correct 9V adapters were not supplied. Inspection of the systems also revealed that mobility was an issue; residents may prefer to use batteries to listen to the radio outside or in other rooms away from the PV power source.

Secondly, it was found that the 2-plate stove supplied with the energization package was only being used in the third and most recently installed demonstration system. The other two households were already using LPGas before they received the 2-plate stove. Although they had used the 2-plate stove for a while, the author found that these households were using larger stoves that were presumably in use before the demonstration system was obtained. As mentioned in the section on Product Package (pg. 98), the remaining household was found to be using wood even though she had a gas stove and two full cylinders.

Discussion

5.19. Energy Agent

5.19.1. Introduction

The concept of the energy agent is integral to the energization process. The problem of the remoteness of the area in terms of transport, finance and services is combated by the institution of a community representative to service the energy needs of those signing up for the energization package. He/she is elected by the community to fulfil the tasks set out by the suppliers which will ensure the success of the project.

The energy agent Business Plan written for the intermediary financing agency) details the 'business operations' of the 'business entity', Mr W Ndlovu, and describes the financial arrangements necessary for the energy agent to run as a business. The document projects the market penetration rate and potential income scenarios for the energy agent's business and presents the concept in financial terms and considers the Agent's profile, cash flow, stock, personnel and record-keeping systems. It also looks at the projected monthly income and generates two scenarios, a slow uptake and fast uptake scenario, to simulate business operations.

This Business Plan ensures that the energy agent has a regular income for a five-year period. It channels the funds generated from the installation costs (R300), service charges (R4,00) and collection fee (R1,50) which are part of the monthly repayments, and gas sales (20c/kg) into the operation of a sustainable business. The business plan also includes an incentive system to encourage sales.

5.19.2. Local Politics

From these descriptions of the role and function of the energy agent, it is apparent that it is certainly one of the most important aspects of the project. As with all steps in the energization process, it is designed to be replicable. It assumes that someone will be elected by the community and that through training will be able to fulfil the role of energy agent who is to implement and sustainably offer a full service to the community in terms of their energy needs. Although the success of this strategy cannot be gauged because the Project was assessed in its initial stages, the circumstances surrounding the energy agent concept in KwaBhaza can perhaps point towards some of the advantages and potential problems.

It must be borne in mind that politics is never dissociated from development. This is clearly spelled out in the section on Energy Upliftment. As discussed in this section, because the community was contacted through the *induna*, and power is concentrated within the traditional structures, this can create division in the community. Similarly where employment is concerned, be it the energy agent or his assistants, the traditional power structures would influence the choice of the energy agent. James (1998:21) points out that CBOs most often reproduce the social stratification's in rural communities. This was found to be the case in KwaBhaza but with an interesting personal dynamic.

It may be supposed that the opportunity to create or expand a business would be welcomed in a remote rural area such as KwaBhaza. The benefits of the energy agent arrangement in that it creates employment opportunities and encourages economic activity in the community is referred to in the literature (Eskom 1997b:20). However, Mr. W Ndlovu, the resident who was elected by those at the meeting in KwaBhaza did not want to take on the responsibility of being the energy agent. Keeping in mind the dissatisfaction of some of the residents with energization, this is not such a surprising reaction considering that it is not so much a business position as a *political* position.

The Anti-energization Group in the community that consisted of some influential community members and openly protested against energization: they had called a meeting to arouse support and were busy collecting signatures for a petition in favour of grid. It was possibly they that were spreading rumours that grid was coming to the area and that energization was a 'canvassing drive' and had ulterior political motives. From this it can be concluded that the energy agent would be at the centre of tension and struggle in the community.

Pointing out the extent to which the community is divided leads to the conclusion that the energy agent is not able to offer a full service to the community in terms of their energy needs for the simple reason that the community is divided in their attitude to the Energization Project. Not all of the residents are willing to partake in the project. Moreover, the energy agent's political affiliations to the traditional power structures may strengthen resistance to the project and discourage those politically opposed to the project from investing in it. It is speculated that if the position was occupied by an impartial Eskom employee, all members of the community would more readily deal with the energy agent and participate in the project.

The fulfilment of the energy agent objective – offering a full service to the community in terms of their energy needs – can perhaps be considered in terms of those that will accept the project. The ability of the energy agent in offering a full service to the 'community' of energization recipients (if it is possible to define 'community' in this way) in terms of their energy needs depends on whether the energization package can meet the energy needs of households. This aspect, that of the 'product package' has already been discussed.

Another facet of the objective, the energy agent's contribution to the sustainability of the project can only be properly assessed once installation has taken place. The energy agent's service may then be evaluated in terms of his ability to solve the maintenance, technical, payment and people problems that may arise.

5.19.3. Conclusion

It is apparent that the seemingly simple process of the appointment of an energy agent had many dimensions in the case of KwaBhaza. The election of the Agent hinged on a struggle between Mr. Ndlovu's personal circumstances and persuasion by the *induna* and other members of the community that he was the best person for the job. This is enmeshed in local and family politics.

It is fortunate that in KwaBhaza the elected energy agent has the following characteristics: he does not commute between KwaBhaza and the urban areas and plans to remain in KwaBhaza; he has worked in Johannesburg and has some experience in a business environment; he currently runs a *spaza* shop operation – ideal according to the Pilot Proposal; he is the secretary of the

community committee and has some experience of development; and he is considered by many in KwaBhaza to be a trustworthy individual.

In the Pilot Project Proposal the position of energy agent is conceived of in purely financial and technical terms. He/she is referred to as the 'business entity' in the Business Plan and it assumes that through training an input of knowledge and skills will equip this 'entity'. Identifying the role of the energy agent in these terms tends to exclude the often important social and political dynamics in a certain community. At the local level it is clear that political and personal circumstances influence the election of the energy agent which in turn will determine the suitability of him/her. The most important issues, such as experience, trustworthiness and willingness are by no means guaranteed by the energization process. They depend largely on the dynamics at the local level which cannot be predicted or replicated.

5.20. Demonstration Houses

The Demonstration House concept is the main demonstration medium which is linked to the Energy Day concept. Referring to the Energy Day, the Proposal states that it 'is the formal introduction of the product offering to the community, who have had access to the demonstration house over the prior few weeks to familiarise themselves with the technologies and to formulate any questions which they may need answered' (Eskom 1997a:10). This excerpt indicates that Eskom perceives the community as an homogeneous entity, an important assumption where the Demonstration Houses is concerned. It assumes that all residents in the area have access to the Demonstration House.

Investigations in KwaBhaza revealed that this was not the case. The first Demonstration System was installed in the energy agent's home nearly two months before research was conducted in the area. His home is in a central position[92] in KwaBhaza, yet many residents did not know about the system. Those that were familiar with it were found to be members of the extended family. One of the factors that contributes to this is the scattered nature of the settlement. Emzweni is spread out over a large area which would limit visibility of the solar panel to members of that section of KwaBhaza, let alone members of the other parts of the village[93].

It must also be kept in mind that the community of KwaBhaza is not monolithic but is highly stratified and complex. The extent to which knowledge about the system circulated would depend on the social interactions of the energy agent and his family. Visits to the Demonstration Houses too, would depend on the social relations between the visitor and the Ndlovus. The idea of a Demonstration House tries to tap into the social structure but does so clumsily because of the assumption that the familiarisation with the technology may freely take place.

The election of the Demonstration House recipients shows that, even this initial stage, of access to resources through development is influenced by the location of power in the community. The election of Mr. PT Ndlovu was influenced by the *induna* and other members of the Ndlovu family. It follows that in Emzweni both Demonstration Systems are owned by members of the

[92]The Energy Agent's house is known as *Posini* because this is where the post is delivered to Emzweni.
[93]The second system was installed in a home in KwaGobho, another village adjacent to Emzweni.

Ndlovu family. In addition, both are owned by male-headed households that indicates gender bias and is the influence of the male dominated community power structures.

The function of the Demonstration Houses in familiarising the community with the technology is therefore confined by the social interactions of these family units. This reveals the shortfalls of the Demonstration House assumption. As with other marketing strategies, installation of the systems in houses in the community may also heighten political division in the community.

5.21. Funding mechanism

5.21.1. Introduction

The issue of financial assistance and the affordability of the systems is one of the most important in the project. It is examined here by presenting the institutional issues that surround the subject of rural finance. The energization project intends to bridge the gap between the high cost of PV systems and the poverty in rural areas by formulating an energy package 'that is within the economic means of rural communities' and providing credit 'by which rural customers can pay for the capital costs of the energization package' (Eskom 1997a:)

Development thinking proposes that with access to finance/credit, rural people will be able to invest in small businesses and rural industries which will begin the development process in rural areas. The idea being that rural lending puts First World technology within reach of rural people in the Third World. As a component of the RDP in 1994, lending money for rural development was actively promoted by the South African government. It has already been mentioned that one of the biggest constraints to rural economic development in South Africa is access to finance[94].

5.21.2. Institutional Complications

After Eskom postponed the Energy Day they decided to continue with energization and make alternative financing arrangements. Determined that the project should go ahead, Eskom decided to supply the subsidy. It was reluctant to do so before, fearful that it would give the government incorrect signals with regard to off-grid rural electrification. Eskom's desire that the original price of the offering should remain the same resulted in their putting R1700 forward for each household to account for the increase in the price of the systems over the two years that the project had been on-line. As already mentioned this was R200 more than the amount of R1500 outlined in the Project Proposal.

As far as the loan financing was concerned, Eskom now had to deal directly with the KwaZulu Finance and Development Corporation (KFC). When the Project Proposal was written, the KFC was identified as the financing institution by REFSA because of their ability to offer loans at low interest rates (17,5%). The KFC was also attractive because it had been identified by the government as the official development bank of KwaZulu-Natal and was granted significant, although what now seems to be rapidly declining subsidies from the government. The KFC was

[94]Rogerson also named the lack of access to markets and information as being constraints to SMME development and therefore rural economic development.

unwilling to offer individual micro-loans but agreed to lend a lump sum of R175 000 to the energy agent who would deal with individual customers. The KFC would also undertake the training of the energy agent and the staff at the Tugela Ferry Branch who would be handling the administration.

When the loan conditions were discussed with the KFC's Home Improvement Loan Department, the First Energy Day had been held and the offering already presented to the people in KwaBhaza. This offering had been based on original interest rates agreed to by the KFC two years before. Not wanting to increase the monthly payments offered to the applicants, the KFC was willing to provide loans at an interest rate of 18,25% while extending the repayment period by 3 months to 39 months.

The KFC also indicated that a fair amount of flexibility in the repayment structure is allowable since the project is in the pilot stage. Customers could fall up to 4 months behind on repayments before a warning was issued. Two months thereafter, repossession would be considered (Fraser 1998). The customer is also not strictly bound to the monthly repayment rates offered but is able to pay off the loan more quickly if he/she wishes.

Eskom's negotiations with the KFC are another interesting part of financing aspect of the project. Eskom and the LPGas Association put down a deposit towards the loan but even so the KFC were unwilling to underwrite any part of the loan at the present time. This left Eskom with the decision of whether or not to use the KFC because it is they who are carrying the full responsibility of the loans. Although they require KFC's infrastructure, Eskom reasons that they might as well grant loans which means that they can set the interest rates. However, if they choose this option they will have to deal with legal complications because Eskom is not a financial institution.

5.21.3. Conclusion

The main aim of these institutional arrangements is to make the energization package more affordable. The sections on Income and Expenditure on Energy emphasised that it is not so much the amount that is being charged for energization but the commitment to paying off a loan over three years – a substantial amount of time considering that many households receive income irregularly and intermittently. Along with these factors, the actual monthly cost is also a consideration.

The objective of the funding mechanism – to provide credit by which rural customers can pay for the capital costs of the energization package – revolves around the term 'rural customers'. If it refers to members that are able to afford the energization systems then the funding mechanism certainly increases access: the number of 'rural customers' is increased by adding those who would prefer to utilise the credit facility to those that are able to afford the capital costs of the package. It is probable that not all of the customers buying into energization would wish to utilise the credit facility. Those that are able to pay cash for the packages, utilise interest-free community saving mechanisms such as *stokvels* or pay off a portion of the loan in a lump sum to reduce interest, might prefer to do so.

However, if 'rural customers' refers to potential energization customers i.e. the entire community, then the provision of credit will not enable all members of the community to purchase an

energization package. Those members of the community that are not able to afford the terms of the loan repayment (the poorer members of the KwaBhaza society) do not benefit from the credit facility and are therefore not able to participate in the energization process.

5.22. Post-fieldwork

After the third fieldwork trip the author remained in contact with Eskom, the other suppliers and the energy agent's household in KwaBhaza. Information from these sources about the unfolding of the project have a bearing on the issues that were discussed leading up to implementation.

5.22.1. Gas depot

The amount of LPGas sold from the depot in KwaBhaza in the first month after installation indicated that there is significant gas use in the area. It was estimated that at least 1000 kg were sold over this period (Fincham 1998), double the level required by the LPGas suppliers. The reason for such good sales probably has to do with the fact that the next closest depot is more than 25km away in Pomeroy. For residents and shop owners in KwaBhaza as well as in the extensive surrounding areas, the depot is the closest LPGas refilling station. Gas sales will probably continue to rise in the future as more people get to know about the depot and people acquire appliances and cylinders.

5.22.2. Television reception

When installation officially began on the 26 October the problems with television reception had still not been resolved. Eskom then reversed the decision to offer televisions as part of the energization package. The first twenty systems were installed without them. Of the eighty-three residents that indicated their support at the Energy Day, just over half have committed to the project. Initial numbers are that forty-three deposits have been collected. Eskom have indicated that this apparent decrease in interest shows that televisions are an important selling point (Rosselli 1998). It may be speculated that residents are also withdrawing their support because of pressure from community members against energization. It is also possible that the fact that televisions are no longer offered can be interpreted as an inferiority of energization compared to grid electricity.

5.22.3. Funding

The problems that may have been hindering Eskom from funding the energization project themselves were overcome before installation took place. They are now wholly funding the energization project by providing the loans along with the subsidy. However, the assistance of the Ithala Bank is still required for the energy agent to deposit the money at their branch in Tugela Ferry. Eskom have made arrangements to utilise the Bank's infrastructure.

Chapter 6 – Conclusion and Recommendations

6.1. Conclusion

6.1.1. Meeting Eskom's objectives on their own terms

This thesis has shown that energization has arisen as a result of Eskom's supply-side concerns regarding the viability of grid electrification. The low consumption rates following connection to the grid in rural areas has resulted in Eskom looking for solutions by which they can meet the needs of rural people while maintaining a sound financial position. While Eskom's commitments to the RDP secures their relationship with the government up until the year 2000, energization is the result of Eskom's desire to find a sustainable future role in energy provision in South Africa.

Experience in other countries has raised questions about the advantages of rural electrification. In South Africa it is generally seen as a means of bringing development, by improving quality of life and local economic growth, to the underprivileged population which predominantly resides in the rural areas. However, the level of poverty in these areas and low rate of assimilation of electricity into energy-use patterns has resulted in Eskom proposing that the electricity needs in rural can be met with a lower supply level. Since electricity is used mainly for lighting and entertainment, it was reasoned that these are the end-uses most essential for electricity users.

Energization uses this concept of 'essential electricity' and combines it with LPGas for thermal applications. While grid electricity is hampered by the need for expensive transmission and reticulation infrastructure, energization makes use of PV systems and gas cylinders and stoves. In this way, it can be offered to more remote rural areas as a stand-alone 'energy package' and, similarly to grid, contributes to development or 'energy upliftment'.

Since energization is professed to be an alternative to grid electrification in that it meets all of the possible end-uses of a household, these components must remain together to satisfy Eskom's supply-side needs. Only if it is offered as a package, can the supply of an energization be counted as a 'connection', either towards the current RDP targets or as part of the more sustainable role Eskom envisages. Because it is by nature off-grid, energization also satisfies Eskom's DSM needs.

6.1.1.1. Energization Process

In light of the notion that energization should be comparable to full electrification, the energization process was conceived of as similar to this method of delivery. It was designed as a 'draft critical path' that was to be tested and modified during the pilot to produce a standard model for full national roll out. In addition, successful 'demonstration sites' were to be formed from the pilot projects as reference for projects implemented in other localities. The implementation of the energization process in KwaBhaza was ultimately successful in that the minimum acceptance level was reached. It was also successful in that it tested the plans and in some cases found solutions to the problems.

The major problems that arose during implementation were of an institutional nature which raises questions about the replicability of the process on a larger scale. The pilot project did not test the channelling of the subsidy and the administration of the loan from the funding agency. These are two of the most important supply-side mechanisms that needed to be tested to determine whether the concept was replicable in a financial capacity.

A characteristic of the planned process is that it is centred around the marketing and sales of energization 'product packages'. In this way it tries to ensure the acceptance of energization in the community. It does not attempt to tackle the most important determinant of whether the project will succeed or not – community acceptance – which is largely dependent on attitude to grid electricity. This factor cannot guarantee replicability since community's attitudes would differ in different localities.

Another important part of implementation in KwaBhaza were the changes undergone during the process. The changes in the offering between the Energy Day and installation (the exclusion of the television) also raises questions about whether the pilot is representative. The marketing and community acceptance of one product and the implementation of another is the reason for these doubts.

The three main components of the energization process, the energy agent, the Energy Day and the Funding Mechanism will be discussed in turn:

6.1.1.2. Energy Agent

Eskom's objective of setting up a community representative to run a business to oversee and sustain the energization project in the community has largely been successful. The energy agent and his assistants were successfully trained to install PV systems and, with continued assistance and training from Eskom, have begun installation in KwaBhaza. At this stage it appears that the backbone of the energy agent's business is the gas depot. The energy agent derives an income from the greater than expected gas consumption in KwaBhaza.

The sustainability of energization relies substantially on the energy agent. Since the project is in its initial stages, these objectives cannot be commented on at present. Similarly, the ability of the energy agent in sustaining his PV business, which also relies on deposits and continued payments from recipients, cannot be assessed.

6.1.1.3. Energy Day

The main objective of the Energy Day concept was to promote the energization concept to the community. The fact that eighty-three signatures were obtained for purchase of an energization package at the Energy Day is an indication that it was successfully marketed. However, it is clear that the project has always had acceptance in KwaBhaza. Once Eskom obtained the *induna's* permission to hold community meetings, support from the traditional power structures has been in evidence throughout the process. In addition, seventy-one signatures were collected at the second community meeting. Thus, Energy Days served the purpose of marketing energization to those that had not attended the community meetings. To those that had, it served Eskom as a medium for continued education and to assure people of their intentions to carry the project through to implementation.

6.1.1.4. Funding mechanism

The most notable aspect in organising the funding mechanism, which includes both the channelling of the subsidy and the provision of the credit facility, was that it presented extreme difficulties. The dissolution of REFSA was the main cause of this and resulted in Eskom deciding to provide the subsidy and the credit themselves.

The attainment of the minimum acceptance level (assuming it is fifty) at the first Energy Day would indicate that the credit mechanism was successful. It could be assumed that it lowered the costs sufficiently to make the systems affordable for customers. However, it is not known whether these customers would be able to afford paying for the systems up-front or through another credit system. Also, the fact that only forty-three deposits have been collected could be interpreted as evidence that the inclusion of a television is important – it is not so much the availability of credit that affects whether residents want the system, but the services it offers.

6.1.2. Meeting the needs of the community

Energization is essentially a development activity in that it is to provide people with 'energy upliftment'. Just as grid electrification brings with it development and the advantages of development, it is also assumed that energization will 'uplift' people by giving them access to modern energy sources. This is to be done mainly through meeting the energy needs of the community and the development advantages associated with this, but also through the establishment of the energy agent's business.

The KwaBhaza community as a whole did not see energization as being a viable alternative to grid electrification. This was found to be linked to the desire for development in the village and attitudes towards grid electrification. The community was divided in terms of those that wanted to see development to come to the village and those that rejected it and saw energization as inferior to grid electrification.

It is conceivable that the first group would agree that energization is a form of development or 'energy upliftment'. Although these residents would probably also agree that energization is inferior to grid electricity, they are willing to accept it rather than wait indefinitely for grid electricity. On the other hand, those residents against the project would argue that energization is not an adequate form of energy supply for their upliftment. In particular, the shortcomings of PV would be pointed out in comparison to the service offered by grid. It is these residents that are of the opinion that energization would jeopardise the chances of the community receiving grid electricity.

In terms of meeting the community's needs, Eskom intends that energization be used in a similar way as it has generally been shown that grid electricity is used by rural people. In this case, the 'electricity needs' are defined by Eskom as the energy required to power two lights, a radio (or hi-fi) and/or a black-and-white television. As far as 'thermal needs' are concerned, Eskom suggests that a two-plate gas stove, two 4,5kg cylinders and one gas refill per month are sufficient.

6.1.2.1. Comparison with grid electricity

In comparison with grid electricity, energization displays a lack of balance between the PV and LPGas component: whereas LPGas is comparable in terms of price and application, PV tends to be expensive able to meet only the barest lighting and media needs.

Considering LPGas, if the customer considers gas to be as safe as grid electricity, the LPGas provided with the package may be seen as a set amount of electricity to cook with every month. On the positive side, the provision of a stove is more than occurs with connection to the grid and the household could purchase a heater or any other attachment. On the negative side, the carrying of gas bottles to and from the depot may prove burdensome.

PV on the other hand, is mainly inferior because of the supply level. The lighting possibilities of energization are similar to grid electrification in terms of quality of light although the number of dwellings that can be connected with energization is less. Only if two dwellings are close enough together may they both be lit. However, the wish to have more than two light sources is possible with energization although that a much greater cost than grid. Instead of funding only additional wiring (as with grid), the customer is required to purchase an entire energization system[95].

Most importantly though, the PV system on offer with energization cannot power a colour television and, although it can power a black-and-white television and a radio, the possibility of using all of these appliances together is limited by the low input from the 49W panel.

6.1.2.2. Meeting community needs

In terms of the community's needs defined according to their current energy-use patterns and the strategies that will result once the system is purchased, energization only goes some of the way in fulfilling these needs. It is mostly the diversity of energy needs present within households in KwaBhaza that is the reason energization cannot meet all these needs. Considering that multiple fuels are widely used in KwaBhaza and grid electrification studies have shown this to continue after electrification, it is reasonable that the same would apply for energization. The way in which energization will be grafted into the energy-use patterns of residents will occur depends on individual householder's decisions.

It was found that multiple fuel-use was a strategy by which people coped with the circumstances facing them in rural areas. The poor in particular needed the flexibility offered them by using a number of different fuels. Paraffin, candles and batteries were used by the majority of the population and the poor in particular were found to depend more heavily on these fuels. The time consuming and laborious task of wood collection allowed poorer households to obtain this fuel for free. Fuelwood was used predominantly for cooking and space heating. It was also found that in general the poor tended to spend a greater proportion of their income on fuel than wealthier households.

Thus, it can be concluded that energization satisfies some of the needs of those that can afford to pay the rates required for the package. It is conceivable that it may replace paraffin, candles, wood and batteries in these households to an extent. The main/possible reasons that it will not fully displace these fuels are as follows:

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[95]The possibility of a larger PV system is an option. However, it would be more expensive keeping in mind that the extra cost would not be reduced by the subsidy.

- Paraffin use would continue since it can be purchased in small quantities and is versatile;
- Candles would continue being used to light the dwellings in the homestead not connected to the energization package;
- The need for space heating in the winter and the fact that it can be obtained without cost mean that fuelwood use would continue, and;
- Presuming that the problems with adapters are sorted out, batteries may still be used to increase the mobility of the media appliance.

In light of the certainty of the continued use of other fuels, a minimum flat rate payment of R55 per month over three years is far too expensive for the poorer members of society. Thus, the objective of satisfying the energy needs and providing for the 'energy upliftment' of the 'community' are confined to the wealthier members of society – those that are able to afford the terms of the package.

6.1.2.3. Energy Agent

The main objective of the energy agent concept was to provide a full service to the community in terms of their energy needs. Drawing from the above argument it is clear that this definition of 'needs' and 'community' refer to a specific concept defined by Eskom within energization. As concluded previously with regard meeting Eskom's objectives, the energy agent concept has been successful in the context.

Another objective of the energy agent was to assist in bringing development to the area. The energy agent's business was to provide employment (through the Agent him/herself and his/her assistants) through the servicing of energization systems and the sale of gas. It has been this aspect of the project that has arguably brought the most benefit to the people of KwaBhaza. Employment has been offered through the refilling of gas cylinders and the installation of PV systems. The installation of the gas depot has increased the availability of LPGas which will probably increase the use of it in the community – by those who signed up for energization systems as well as those outside the project who are able to purchase gas cylinders and appliances. In addition, it has resulted in bringing people from other areas into KwaBhaza which will probably increase economic activity in the village.

6.1.2.4. Energy Day

As in the above section, considering whether the Energy Day concept meets its objectives in KwaBhaza must take the context of energization into account. The ability of the Energy Day in introducing and marketing energization to the 'community' does not refer to the entire population in KwaBhaza. As already mentioned, the community was divided in terms of the energization concept and attendance at the Energy Day was influenced by this division. The fact that many members of KwaBhaza did not attend because they were unavailable or simply were not interested also has a bearing on the term 'community'. In addition, the fact that Energy Days were open to all, means that the term 'community' in this context refers to all of those that attended that Energy Days.

From the discussion between Eskom and the community at the community meetings and the Energy Day it is clear that a community need at the Energy Day is to be informed about energization and educated with regard the products. At the Energy Day it was found that the promotion of the energization package resulted in an imbalanced representation of PV and

LPGas. Eskom's desire to promote energization as an alternative to grid *inclusive of gas* and the LPGas Association's marketing of gas does not explicitly clarify the limitations of PV. This example shows that the marketing of the suppliers concept of a grid electrification alternative may not be in accordance with the community's need for information.

6.1.2.5. Demonstration houses

The objective of the Demonstration Houses was to familiarise the community with the energization concept in general and the PV systems in particular. The idea in the Project Proposal is that residents can have the chance to formulate questions about the technology that can be answered at the Energy Day. Although this is difficult to assess whether this concept satisfied this objective, it was clear in the field that the social structure of the community militated against the entire community finding out about the system, let alone formulating questions about it.

6.1.2.6. Funding mechanism

From the community's point of view, the issue of the funding mechanism is important for two reasons: firstly, it means that the cost of the systems are significantly reduced by the subsidy and secondly, that there is credit facility by which the energization packages can be purchased. As with the points raised above, the definition of the 'community' is important in this case.

In contrast with grid, energization is an 'all or nothing' form of energy supply. Those that decide to purchase energization systems therefore benefit from the subsidy (finally set at R1700) while those that do not, lose out on this benefit. Energization is therefore inequitable compared to grid. In terms of the credit facility, residents that decide that they can afford to purchase energization systems are able to pay for them over a longer period with favourable interest rates (17,5%).

6.2. Recommendations

The results from the analysis of the objectives of energization, in terms of the suppliers concept of it and its implementation in the KwaBhaza are used in recommending measures to improve alternative rural energy provision methods at three levels: in the contribution to the development of South Africa, within Eskom's general concept of energization and within the KwaBhaza pilot project in particular.

6.2.1. Contribution to development in South Africa

It is clear that on the supply-side the benefits of alternative energy provision are worthwhile. For Eskom, supplying household energy needs with PV and LPGas means that the cost of increasing generation capacity are foregone. It makes sense for the utility that the domestic load in the more remote regions of the country are non-grid electrified. For the nation too, off-grid electrification is a more appropriate allocation of resources in many cases.

The case study showed that the establishment of a gas depot was welcomed for the residents of the community as well as those for whom it was more convenient than travelling to town. In this way it would probably contribute to better meeting people's LPGas needs and to an extent to general development. Although it must be kept in mind that energy demand varies from place to

place, it would seem that providing access to a more modern fuel in the form of LPGas increases people's energy options and allows them to improve their quality of life. In particular, for those that can afford it, access to LPGas may mean the release from the burden of wood collection, if for the option of carry cylinders instead. Thus it is recommended here that the provision of LPGas to rural people be encouraged.

In terms of PV, it would seem that this energy source is the barest of minimum's when it comes to 'essential electricity'. If the developmental benefits of rural grid electrification are being questioned then it follows that a reduced level of supply may also result in reduced development benefits. In addition, the problems of putting rural people in debt, the unreliability of PV systems and inadequate education regarding their use plague this form of energy supply.

However, this must not downplay PV as an option for meeting a need in rural areas. It would seem that the biggest advantage of PV is the provision of a better lighting source although solar lanterns are expensive. Following from the generally high cost of PV and in light of the poverty present in South Africa's rural areas, it is recommended that PV systems not be offered for sale, with or without subsidies. The only method of supply that should be considered is the leasing model whereby systems are owned and maintained by the utility, ESCO (energy supply company) or other appropriate organisation, and offered on leasing terms.

6.2.2. Eskom's general concept of energization

It is clear that the greatest problem currently facing the success to energization, is expectations of grid electricity. Part of the reason for this is that it is Eskom that are offering energization. In KwaBhaza this raised suspicions about the reasons for their involvement. A recommendation in the present political climate could be to form a company not obviously affiliated to Eskom to offer PV and LPGas. The viability of such an arrangement is vexed by the fact that it is Eskom who wish to establish themselves in a more sustainable role in national energy delivery.

However, taking into account the restructuring of the electricity supply industry and the probability of the government allocating monies to off-grid electrification, energization may have a future. Clarification of grid electrification plans and the drawing up of off-grid electrification plans would deal with expectations of grid electricity. If this is the case then the recommendations issued during the KwaBhaza Project may be relevant. Of course, this depends on the model of energization offered and, in particular, how the subsidy is allocated. The following section recommends some measures to improve energization as revealed by the case study.

6.2.3. Energization as implemented in KwaBhaza

The recommendations pertain to the particular form of energization offered in KwaBhaza in the context of the communities' needs. These will be discussed below in the light of the likely future energization model which would entail the leasing of PV systems.

6.2.3.1. Planning

The main criticism of the energization concept is that it is formulated according the supplier's definitions of what is most appropriate. This type of top-down planning does not consult the people who are to be the recipients of the development intervention. It is recommended that for alternative methods of energy delivery to be appropriate they must be formulated with meaningful involvement of the recipients from the planning stage to implementation. Of course, this type of participation requires a radically different perspective on development which questions the very basis of development. Helpful in this circumstance is the suggestion (Beall 1997:22) that 'development' not necessarily be opposed to participation.

> We concluded that there could not be best practice – there could only be good practice and better practice. Better practice is reflexive and adaptable and involves a broad spectrum of organisations . . . It is not just a top-down or a bottom-up process; it is both. Government-led initiatives are not intrinsically better or worse than community-led initiatives. Thus good practice includes both 'our' practice and 'their' practice.

Similarly, the criticisms of the top-down nature of the energization process and the course of the project through implementation draws similar conclusions. In particular is that notion that alternative methods of energy delivery will be replicable in any context. Beall (1997:13) has this to say about the issue:

> . . . *good* practice is always iterative and reflective. It should be process- rather than goal-oriented and should not constitute blueprints, because practice that values difference and works with diversity cannot be formulaic. Thus it is never entirely replicable or transferable, but merely adaptable to specific contexts.

6.2.3.2. Cost

It was also recommended that the cost of the systems be as low as possible to make them affordable for as many people as possible. This applies in any circumstance be it in the monthly cost of leasing a PV system or the subsidised purchase of equipment. As was advocated in the KwaBhaza, it is recommended that the gas refills be paid for separately from the capital (or leasing) costs. In further implementation phases this may be possible because the need for a minimum acceptance level falls away. This raises the important issue of splitting the PV and LPGas components of the package.

6.2.3.3. Package

The reason that it was recommended that the PV and LPGas components of the package be split in KwaBhaza was to allow people to choose the options that best suited them. This recommendation depends on a balance between a measure of flexibility and the fault of having too many options to choose from. However, even if it is decided that PV and LPGas remain together, it is recommended that there should be a variety of options and combinations to choose from. In particular, it is suggested that an option that can power a colour television be made available. Depending on the degree of flexibility, the inclusion of a gas stove with the purchase/leasing of a PV system may be a good alternative to overcome appliance acquisition problems.

6.2.3.4. Constraints

A major constraint to the effective use of PV are the technical problems that seem to accompany this form of energy delivery. In particular, it is recommended that problems around adapters for media appliances encountered in KwaBhaza be resolved. Since it appears that 9V batteries are generally used, an adapter that suits these specifications should be supplied with the system.

6.2.3.5. Energy Agent

Over and above the options included in the package, it would be beneficial for the community that the energy agent is adequately supplied with different supply options. This would also tap into an inherent advantage of both PV and LPGas: their modularity.

In KwaBhaza, this could have been explored by insuring that the energy agent have direct contacts with LPGas hardware suppliers to enable him to provide a variety of equipment: cooking appliances (large LPGas stoves, two-plate stoves, cooker tops), gas cylinders (from small 1,5kg cylinders up to 19kg), gas heaters and even gas lights.

On the PV side, the energy agent could provide 9W CFLs, radio adapters and possibly extension cords. Keeping in mind that lighting is one of the most important benefits and it certain households may only be able to benefit from light in one room, the energy agent could also stock different strengths of lights e.g. 11W or 18W, or be able to place an order from the suppliers for them.

6.2.4. Conclusion

To conclude, the energization project attempts to meet two sets of objectives. As a method of integrated energy delivery, it meets the objectives set by the suppliers on their own terms and goes some way towards contributing to the development of the community. However, it falls short of satisfying the needs and development expectations of the community as a whole in the context of their circumstances and aspirations.

It is evident from the KwaBhaza Project that Eskom's agenda and collaboration with the LPGas Association certainly influenced the design and implementation of the project. While future off-grid energy projects (whether run from within Eskom or without) would not be identical to the concept of energization implemented in KwaBhaza, they would probably face similar circumstances and follow equally tortorous paths during implementation. It is vital that the objective to meet community energy needs be clarified, both in terms of extent and priority, and remain a fixed objective in future integrated rural energy delivery initiaitives.

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Appendix A

The full energization process as presented in the Project Proposal is duplicated below.

Phase 1

- Advise Provincial Government Parties [No firm offer at this stage simply advise that we wish to investigate]
- Arrange funding
- Obtain approval from community leaders for detailed market / community research [No commitments to supply merely to share results of study.]
- Community Market Research (Pre)

- Review and analyse research data
- Obtain electrification life cycle costs/site (grid and non grid)
- Finalise LPGas supply costs and resale prices
- Develop a specific and complete energization offering including minimum customer acceptance level to proceed with project and Final Business Plan
- Prepare tender document - suppliers of technologies must differ per geographical area
- Identify Community Energy Agent/s and conduct initial training
- Award tenders

Phase 2

- Present proposal to community leaders [It will be a conditional offer linked to a required minimum acceptance level]
  - Seek agreement and support for roll out of remainder of process
  - Full demonstration of equipment, capital expenditure and operating expenditure for potential customers, benefits, sign up documentation, community energy agent, appliances, process.
  - If affirmative support, then proceed
- Appointment and training of Energy Agent
  - Safety
  - Business Skills (Cash control, selling and revenue collection)
  - PV installation and maintenance
  - LPGas installation and maintenance
- Appliance supply and usage Installation of demonstration house
- Maintain a research log of relevant data (During)
- Market energization package to community [include essential electricity, LPGas, Appliances, Terms via Energy Agent with funding agent and supplier support]
  - Marketing and Demonstration (Energy Day 1)
  - All cost information readily available
  - Application Form - Start signing customers up
  - Safety aspects reinforced
- [At this point it is still a conditional offer subject to a minimum customer acceptance and only signed acceptances are taken]
- Energy Agent + supplier support continue marketing in community
- Achievement of the minimum acceptance level heralds Energy Day 2) - Celebration that project will proceed. Further marketing and demonstrations and customer education. Explain installation roll out, delivery dates etc.

Phase 3

- Collect financial contributions of 'signed on customers'
- Supervise and support agent during installation phase and thereafter maintenance
- Monthly monitoring and customer usage research. (During)
- Support to Energy Agent

- Post installation customer review (Energy Day 3) - 1 Month post installation
- Post-installation research
  - Acceptability
  - Actual costs/month
  - Usage
  - Matters for remedial/refinement
  - Benefits
- Sign off meeting with Community leaders with full review of results and ongoing supply, service and sales support from Energy Agent
- Three monthly overviews with Energy Agent until deemed no longer necessary

P.01

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