# An assessment of the pre-electrification process in the Tambo village pilot project

Draft Document

---

Bronwyn James (EDRC)

---

March 1996
EDRC

# ACKNOWLEDGEMENTS

The author would like to extend her appreciation to

- Phumla Mei (ARDRI) who facilitated the group discussions, as well as undertook the education programme which followed this research.
- Eskom for funding the research undertaken at Tambo village.
- Mel Patrick, of the East London office of Eskom, for providing information and making time available.

# TALE OF CONTENTS

Participatory methods were used in the research

# CHAPTER 1: INTRODUCTION

## 1.1 TAMBO VILLAGE PILOT PROJECT

Electrification of rural areas present a significant challenge due to the high cost of electrification, distribution losses and low consumption rates in these areas. Eskom has undertaken to achieve 70% of the targets established by the National Electrification Forum (NELF), of which it is estimated that two-thirds of NELF's 2.5 million connections will be made in rural areas. However, as the NELF database defined rural areas as all areas outside of promulgated municipal areas, peri-urban and dense settlements are included in this projection (Thom et al 1995). Once these dense settlements have been electrified, less dense and more remote areas will be included in the electrification plans. Consequently, as the electrification programme moves into these rural areas the costs are expected to rise.

Within this context, Tambo village pilot project was conceptualised as part of a broad initiative in Eskom to reduce the costs of electrification in rural areas. The Eastern Cape SACS office was requested by Eskom's Distribution Technology Department to pilot a current-limited electrification project in their region. The provision of a current-limited supply to households was considered to be appropriate for rural areas situated far from the existing electricity infrastructure.

The aims of the pilot project at Tambo were to

- develop and implement a 2.5A current-limited supply technical system, which would make provision for a small number of medium load (20A) connections;
- assess the applicability of such technologies on a national basis;
- test the acceptability of a current-limited supply with rural people;
- test the acceptability of a local system and institution for revenue collection;
- reduce the infrastructure, connection, maintenance and administration costs associated with electrifying rural areas; and
- assess the short and long term cost savings (Eskom 1995a, Patrick 1995).

## 1.2 OBJECTIVES OF RESEARCH

During July of 1995 Eskom requested the Energy and Development Research Centre (EDRC) to undertake a pre-electrification study at Tambo prior to commencement of the installation of the infrastructure. Eskom was primarily concerned with the fuel-use patterns and the acceptability of the current-limited supply at Tambo village. As case studies of rural electrification were a component of the EDRC project entitled *The role of electricity in the integrated provision of energy to rural areas*, the project team undertook to do the research. The research needs of both Eskom and EDRC were integrated into the investigation at Tambo village. The aims of the research were to

- investigate the fuel consumption patterns;
- assess the availability and cost of fuels;
- explore the socio-economic conditions;
- assess the acceptability of the provision of a 2.5A supply and the proposed local system for revenue collection; and
- assess the consultation process followed by Eskom.

## 1.3 METHODOLOGY AND PROCESS

The fieldwork for the research took place during September 1995 and was undertaken by Phumla Mei from the Agriculture and Rural Development Research Institute (ARDRI) at Fort Hare University and Bronwyn James from the EDRC at the University of Cape Town. The research design was based on participatory learning method principles, using a range of group processes and activities.

During the course of this report we will offer some insights into problems which were experienced at Tambo. However, it must be emphasised that the pilot project at Tambo offers a unique experience for Eskom, the 'community' and researchers to reflect and learn from the issues which have emerged. Our wish as researchers is that the lessons which have emerged become integrated into the implementation practice of rural electrification projects, particularly those where further 2.5A supplies may be implemented. Furthermore, it is hoped that the perspective which we bring will contribute towards the debates concerning rural electrification policies and practices.

This section of the paper will give an outline of the research process followed.

### *1.3.1 The research process*

Initial contact with the Tambo village community was made through the joint Tambo Village Resident's Association Management Committee (TRAMC) with which Eskom had been conducting its negotiations to implement the pilot project at Tambo. A telephonic request was made for a committee meeting and a community meeting to be arranged.

On arrival for the committee meeting we found that there had been confusion over whether our meeting was to take place. A number of other meetings for 'Released Area 60' (RA 60)[1] residents had been cancelled and committee members were under the impression that the meeting we had arranged had also been cancelled. However, after locating a number of committee members we were able to have a meeting, although not all members were available to attend. Other non-committee members also joined the meeting. At this meeting we introduced ourselves, explained the aims of the research and requested that we be introduced by the committee to the general community meeting. An investigation of the history of land settlement of Tambo village as well as Eskom's consultation process and relationship with the joint committee were also undertaken. It became clear at this meeting that not everyone on the committee understood the implications of having a current-limited supply at Tambo village. Amongst the committee members who had attended meetings with Eskom there was also evidence of different levels of understanding and the existence of misconceptions concerning the pilot project. The reasons for this became clearer later on in the week as we were able to address the question of why people did not understand the implications of having a 2.5A electricity supply. These will be elaborated on in the section concerning Eskom's consultation process.

The general community meeting held the following day was not well attended, with approximately only sixty households represented. A number of people, particularly the youth, only attended the meeting as the water committee was to sign up people for work after the meeting. We were introduced to the community and were able to organise six group sessions for the rest of our time at Tambo. In order to allocate people to groups the settlement was divided into six geographic areas. One person from each area was requested to inform other people in the group of the meeting aims, time and venue.

The group sessions focused predominantly on people's understanding of the implications of having a 2.5A supply, the acceptability of the current-limited supply and how effective

[1] Released areas refer to land in the former 'white areas of South Africa which were designated for development of neighbouring black areas, such as the former Ciskei in the case of RA 60, by the 1936 Development Trust and Land Act.

Eskom's consultation process had been. The need to investigate these issues determined the type of group process undertaken. Rather than work in an in-depth way with a smaller number of people the decision was taken to have as many groups as possible meeting only once. The number of people attending the group sessions ranged from twenty to fifty. Approximately two hundred people were part of the research process. The groups which met towards the end of our time at Tambo were consistently larger than those we met with at the beginning of our research process. The reason for this possibly lies with the fact that those who had already met with us had communicated to others the nature and aim of our work at Tambo. It was clear that people valued having an opportunity to raise questions and issues concerning the 2.5A supply.

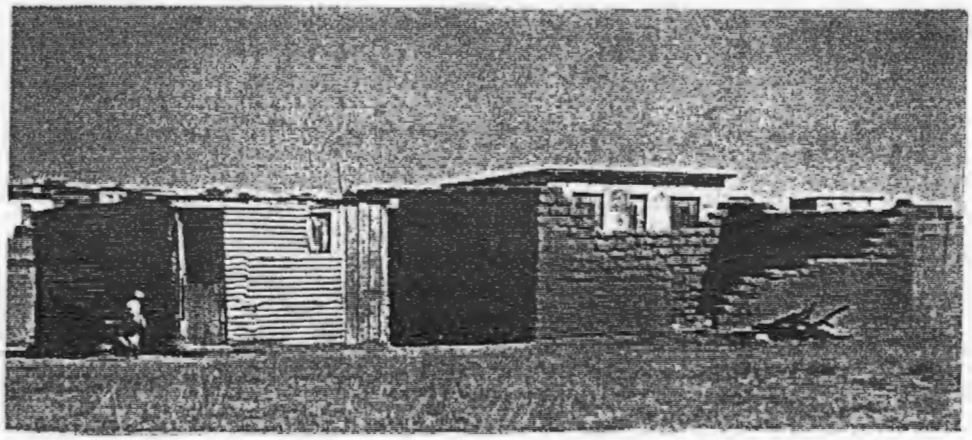
This approach was important considering the lack of understanding of the 2.5A supply. However, in-depth investigation of fuel consumption patterns and the socio-economic circumstances of the people at Tambo village was not possible given the limited time available to undertake the research. We are, nonetheless, able to present an overview of the fuel types used, fuel preferences, fuel expenditure in relation to household expenditure, fuel-use and appliance combinations, income opportunities, social infrastructure and, household types and size. Various participatory activities were undertaken in order to reach an understanding of these issues. The way in which these activities were designed ensured that information and perceptions of one group were checked and explored by other groups, thereby enabling us to build a picture of the issues outlined above. For example, with one group we explored fuel preferences for different end uses such as cooking, lighting and heating. With the next group we examined the particular fuel and appliance combinations used for various end uses[2]. Any discrepancies which emerged were interrogated and an attempt was made to understand these differences in the context of the social and economic circumstances.

As it had become evident that there was conflict between some of the village committees and that information concerning the 2.5A supply had not reached the majority of community members, a meeting was arranged with all committees at Tambo village for the final day of the research process. At this meeting we aimed to report back on our research process; to explore the way in which the various community structures work with each other in order to coordinate and broker development initiatives; and to investigate how effective and accountable these committees are. Only three committee members attended the meeting. It was evident from discussions during the week and with these three committee members that conflict between committees exist, particularly between the civic and ANC structures. This will be elaborated in further discussion in this report.

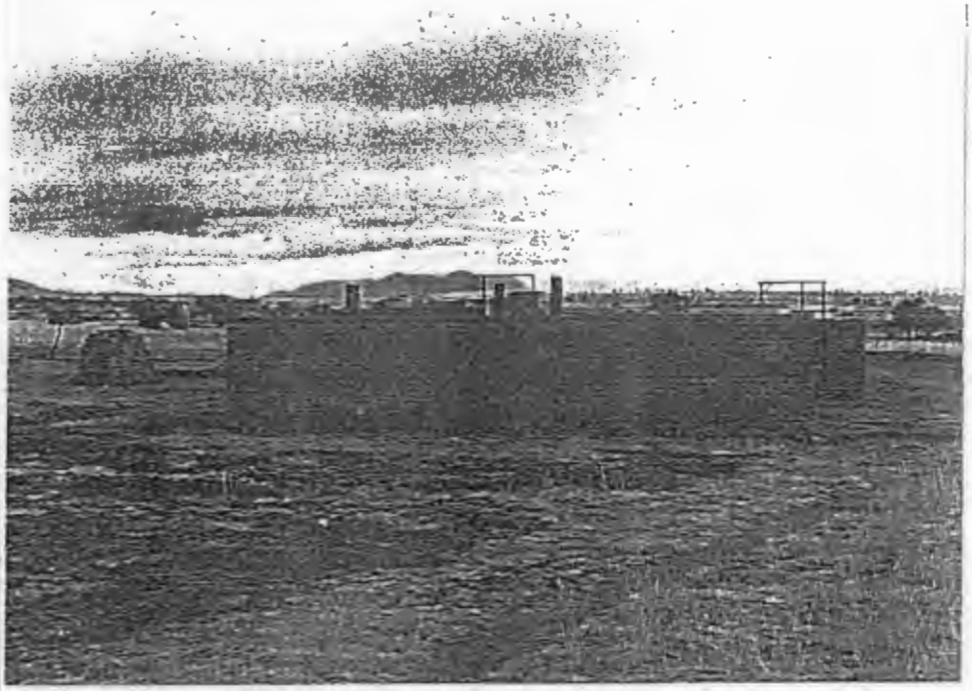
### *1.2.2 Report outline*

A profile of Tambo village is presented in chapter two, with a focus on the history of land settlement, social infrastructure and survival strategies. This chapter provides the context for discussion on energy use in chapter three. The different energy services are discussed, as well as the availability and cost of different fuels. Chapter four presents an over view of the pilot project proposals. This is followed by an assessment of the acceptability of the 2.5A supply. The consultation process followed by Eskom is examined and shortcomings of the process are highlighted. Issues for further research are included in the concluding chapter which emphasises some of the key findings of the research.

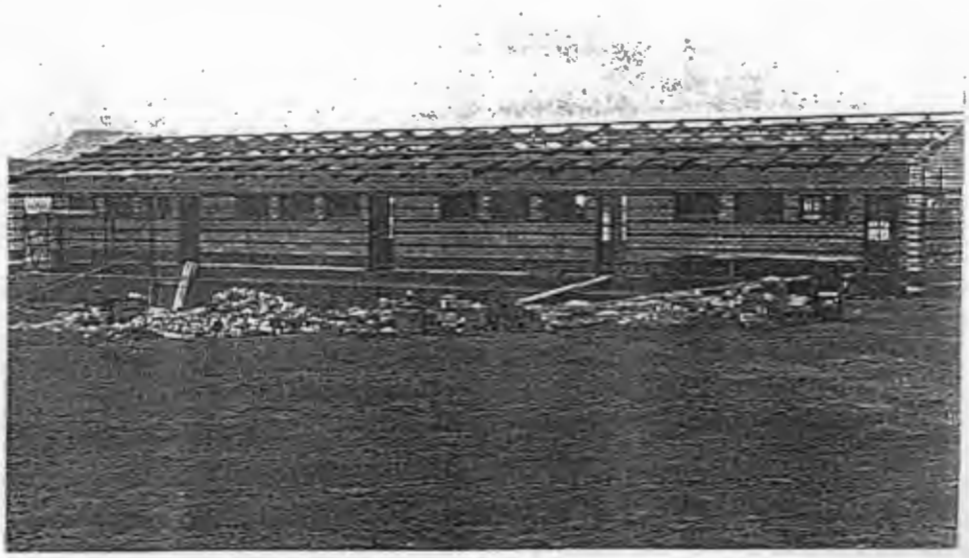
[2] Such an approach is an essential part of participatory research and is known as triangulation.



A tin shack with
a house in progress

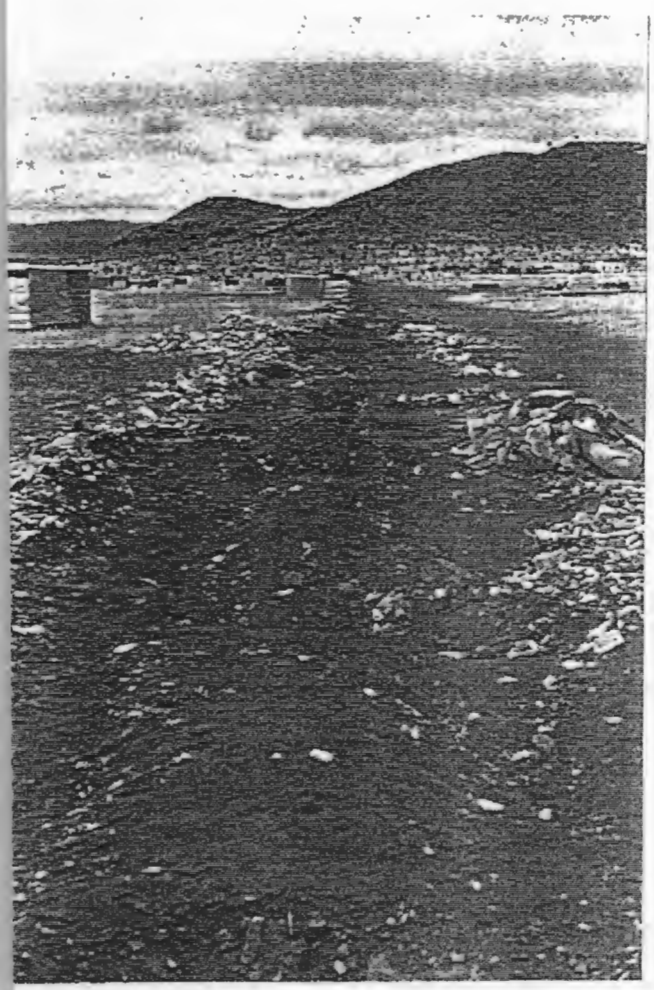


A brick house awaiting
funds to pay for labour
costs and materials

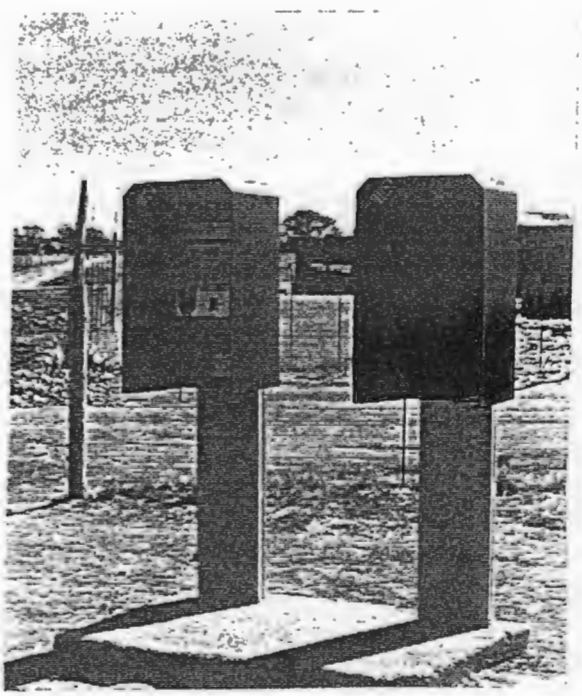


Primary school

Water is collected from stadpipes



Water pipe trenches



Public telephones: right hand telephone vandalised

# CHAPTER 2: PROFILE OF STUDY AREA

## 2.1 BRIEF HISTORY OF TAMBO VILLAGE

Tambo village is located in RA 60 some thirty kilometres from Queenstown and nine kilometres from Whittlesea. It is pertinent to briefly explore the historical origin of RA 60 as this has defined the context within which development has and will continue to take place in Tambo village. The narrative presented in this section draws on discussions with various community members, as well as documentation from the Border Rural Committee (BRC 1995)[3].

Land settlement in RA 60 has been characterised by conflict over different community claims to the land.

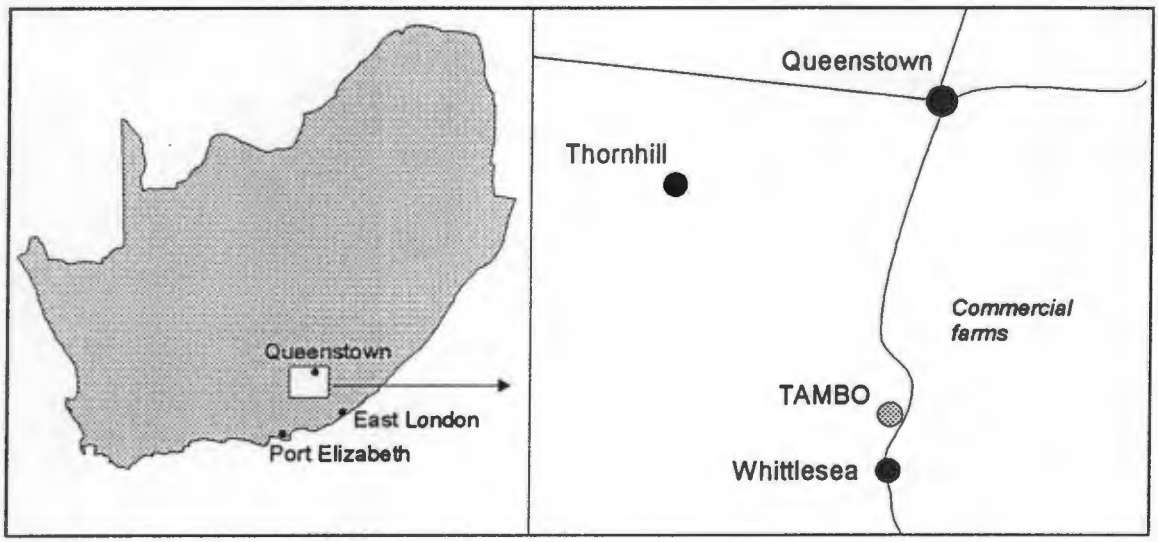



Figure 2.1: Location map of Tambo village

In 1976 Thornhill, situated approximately forty kilometres from Queenstown, was established as a resettlement camp for people from Herschel who were opposed to being incorporated into an independent Transkei. With promises of being provided with services and land equal to that at Herschel, 35 000 people settled in Thornhill where they experienced extreme hardship because of the lack of facilities and adequate land. The Thornhill community comprised four groups. Three of these groups supported a tribal authority system, while the fourth did not. This ANC aligned group became known as 'Group 4'.

Pressure from the Herschel community at Thornhill led to the purchase of additional land by the Ciskean and South Africa Governments in the 1970s and 1980s. As the Ciskean administration was based on the tribal authority system, those Thornhill groups which recognised the authority of the chiefs were allocated land. However, because Group 4 refused to be incorporated into a Tribal Authority, their claim to land was not successful.

In 1990, after Mandela's release, Group 4 decided to take matters in their own hands and occupied unallocated state land on RA 60. By 1991 the occupation of land on RA 60 around

[3] The Border Rural Committee (BRC) is currently working with several communities in the Land Reform Pilot programme in the Eastern Cape of which RA 60 forms a component.

the area of Merino Walk by Group 4 was taking place in a systematic manner. The occupation of RA 60 by Group 4 has resulted in an intense dispute over the RA 60 land. The residents of Hewu district in the former Ciskei area claim that this land was intended for their use.

The Hewu district of the former Ciskei was organised under the Zulukama Tribal authority. According to the Hewu, RA 60 was proclaimed in 1972 before any thought had been given to the resettlement of communities from Herschel. They argue that RA 60 was intended for them as the nearest major settlement. The BRC points out that although land has been purchased for the Herschel communities, the Hewu people have not been as fortunate. With close on 50 000 people moving in to the north and south of them conflict was inevitable. There have been frequent disputes over grazing, impounding of cattle and even violent conflict. At various times people from Zulukama tried to occupy white farms being bought for Thornhill and Zweledinga.

After Group 4 occupied merino Walk in 1991 similar occupations by Hewu communities occurred at Tambo, Brakkakloof and Mc Bride. According to the Tambo residents we spoke to, people built shacks out of plastic and 50kg mealie bags. The reason for this was the fact that they were afraid to invest their money in building materials as they were not sure what would happen to them. Gqozo's soldiers attempted to remove them on a few occasions, but they were able to resist removals. By the end of 1991 many people started to flock to the area because of the shortage of land in the Hewu area. Of the total 14 500ha on RA 60, approximately 8 000ha has been occupied by Hewu people.

It is interesting to note that single women with dependants have gained access to land in their own right in Tambo village. This phenomenon seems to be true in other areas of RA 60, such as Merino Walk, where it was found that single, divorced and widowed women with dependants were more able to secure access to residential land in the context of land invasion where the rules of allocation were in a state of flux (Middleton 1995).

Although these land occupations were supported by the Zulukama Tribal Authority, most of the people on RA 60 do not accept the Tribal Authority. They prefer to work through structures such as the ANC, SANCO and Profusa who have all be represented on the RA 60 co-ordinating forum. To date neither the Hewu Land Committee nor the Zuluama Tribal Authority have accepted that their claim to RA 60 is resolved and continue to pursue it, as well as attempting to reclaim influence in RA 60. Towards the end of 1994 large sections of grazing land on RA 60 were burnt. SANCO believes that this was an attempt to sabotage their control and development strategies of the area.

The contest over land in RA 60 was further complicated by the actions of the Advisory Commission on Land Allocation (ACLA)[4]. After a failed attempt to resolve the issue of competing land claims ACLA awarded RA 60 to the Zulukama Tribal authority, with recognition of the need to find alternative land for Group 4. However, the ACLA findings were not implemented and in 1994 the Department of Land Affairs agreed to recognise the four main settlements of Tambo, Brakkakloof, McBride and Merino Walk on RA 60.

[4] The Advisory Commission on Land Allocation was set up in 1993 by the Land reform bills passed by the former government.

## 2.2 SOCIAL INFRASTRUCTURE

### *2.2.1 Community structures and development*

The Tambo Village Residents' Association Management Committee (TRAMC), a SANCO structure, was elected in 1991 to represent the community's needs regarding land and the provision of services. As discussed above, negotiations with Land Affairs have resulted in the recognition of the Tambo community's legal right to the land. Since 1993, discussions between the residents' committee and the Cape Provincial Administration (CPA), the Provincial Government and Telkom have resulted in the provision of water, the construction of roads, the construction of a primary school and the installation of public telephones. The chairperson of TRAMC has been particularly active in ensuring that these services are provided at Tambo. Various local level committees have been elected to co-ordinate and liaise with service providers; viz. water, agriculture, nutrition, pre-school and school committees. However, SANCO has remained centrally involved in the activities of these committees. No RDP committee or any other structure which is responsible for coordination and integration of development initiatives exists at Tambo. Other community structures at Tambo include the ANC committee, the ANC Youth League and the ANC Women's League.

| COMMITTEE | WOMEN | MEN |
|---|---|---|
| Water committee | 2 | 7 |
| Agricultural committee | 7 | 1 |
| School committee | 3 | 4 |
| Pre-school committee | 10 | |
| Nutrition committee | 12 | |
| TRAMC (SANCO) | 11 | 4 |
| ANC committee | 5 | 7 |
| ANC Women's League | 15 | |

Table 1: Gender composition of committees of Tambo.

As shown in Table 1, women are well represented on all structures, with often more than fifty percent of the committee being women. This is possibly more a reflection of the demography of the Tambo village, where women are in the majority, than on the level of empowerment of these women. Some women are much more able to participate fully in committees, whilst others are not. Although, this was not explored in great depth in the research process it was evident that one of the factors which has influenced this is the fact that the areas from which these women originate are different. Where women came from 'traditional' areas they were less able to challenge power relations which determined their different roles and responsibilities. In group discussions, these women were less vocal and needed to be encouraged to speak, whilst other women were comfortable with asserting their opinions. Furthermore, one of the women who was on the TRAMC stated that she found it difficult to participate in the TRAMC discussions because she had received little education and was unable to understand the language used in the committee meetings. This will be explored in more depth in the final chapter of this report.

A power struggle between the ANC committee and TRAMC has arisen. While the issues surrounding this conflict are complicated it is worth exploring them briefly as they have had a direct impact on the way in which the 2.5A pilot project has developed. It is important to understand the conflict in relation to broader political processes in the country. Community based organisations have found it difficult to define roles for themselves in a context which has necessitated a shift from an activist to a developmental role. While TRAMC has facilitated the provision of much needed services in Tambo village their approach has militated against building self-reliance and capacity of the people for whom these services are attended. A developmental approach to the provision of services, such as water or electricity, would include investment of time and resources into building people capacity to control their own development process.

The ANC at Tambo has found itself in a weak position because of the lack of direction and definition of the role it is to play. Coupled with this, the chairperson of the ANC is away from Tambo attending school. Very little information flows from regional and provincial ANC structures to the local level structures. With the result there seems to be a disjuncture between the expectations of those involved in ANC structures at a local level and the national policies and programmes of the ANC and the Government. For example, at the community meeting one of the members of the ANC committee questioned why Eskom was bringing electricity to Tambo. He understood that the government had promised to provide electricity and did not want a 'private company' making money through providing electricity to Tambo.

According to the committee members we were able to speak with the ANC structures at Tambo very rarely attend meetings. The ANC has accused TRAMC of monopolising development projects in the community. The chairperson of TRAMC has come under attack from the ANC for attempting to control the development processes in the community. As the joint committee meeting we had planned did not transpire we were unable to understand and unpack the issues of conflict and resistance fully. However, it is clear that the process which TRAMC has followed in order to ensure the provision of services has not been inclusive and has resulted in certain factions in the community being marginalised. While it is not our intention to undermine the effort and commitment of TRAMC, and the chairperson in particular, there are important lessons which can be drawn from the situation at Tambo which could assist in adopting a more developmental approach to working with community development. These learnings will be reflected on in the chapter concerned with Eskom's consultation process with the Tambo community.

### 2.2.2 *Water*

Prior to 1993 the only water available to the residents of Tambo village was from three stock dams. On many occasions there was no water in the stock dams and water was either collected three kilometres away from the river on the other side of the road from Queenstown and Wittlesea or purchased from Wittlesea. In 1993 funding from the Independent Development Trust (IDT) was secured for a water project. After discussions with the TRAMC, the CPA agreed to supply water via a water reticulation scheme with community standpipes was planned. Further funding was also provided by the CPA for the project and in 1994 the project commenced. Community members were employed as labourers on the water scheme and the implementation of the project has been co-ordinated by the water committee. To date twenty taps have been installed with a further twenty under construction.

At present community members are not required to pay for water, but there are plans to charge people once the scheme has been completed. There is, however, a certain degree of resistance to paying for water. The reason for this is that water is available from standpipes, rather than reticulated to individual homesteads. Many people at Tambo felt that if a tap was available at each homestead, consumption could be metered and people could pay for

the amount of water which they used. The standpipe system, on the other hand, has resulted in a system where some people used more water than others, yet would be required to pay the same amount. Clearly, it will be necessary for the CPA and the local authority to undertake to develop a system of payment with the participation of all the residents of Tambo if they wish to avoid a situation of non-payment for water.

### 2.2.3 Housing

It was only in 1993 that people began to build houses with materials which required a capital outlay. Although their land rights were not yet secure, once the plots had been surveyed people set about building houses.

The majority of people have built small tin structures, with a view to building larger, more permanent structures at a later stage. Today, the village is a combination of tin structures, mud brick houses and conventional brick houses. There is usually more than one housing structure on each plot, with many houses in the process of being built. The predominant housing strategy is for people to reside in the small tin structures whilst building more permanent structures. It is not uncommon for these permanent houses to be built over a long period of time, where progress only takes place when money is available for building. This situation is in keeping with the livelihood strategies evident at Tambo, where incomes are variable and unstable. Many households have chosen to build structures from bricks, rather than other materials. This long term investment is considered to be an appropriate and wise choice, even if it means that it can take up to a year to secure enough income to build the house.

### 2.2.4 Education

When Tambo village was surveyed two plots were set aside for a primary school and a high school. Four classrooms of the primary school are currently under construction. Eskom will provide electricity to the school. School pupils from sub- A to standard nine attend school on a neighbouring farm where the farm house is used as a school building. Teachers are paid by the Department of Education at Bisho and the Department of Public Works has stated that it will ensure that a high school is built towards the end of the year.

The creche is a small two-roomed tin shack. Children attending the creche are fed a daily meal prepared by two women volunteers. Food parcels administered by SANCO are made available to the creche. The women who worked at the creche, as well as the women on the committee were unable to say where the food parcels for the creche came from. The chair of TRAMC made sure that the food parcels were delivered to the creche. Some of the women were under the impression that the food parcels were administered by the Red Cross in Port Elizabeth. Others, however, stated that the food parcels were initially part of the NNSDP fund set up by the Department of Health prior to the democratic elections in 1994. The chair of the TRAMC was not available during the time of our fieldwork and we were unable to confirm this with anyone else. This situation is indicative of the problems which lie at the heart of the community decision-making processes at Tambo. On the one hand resources are made available at Tambo through the efforts of the TRAMC and the chairperson. On the other, however, because the creche committee has little access to information and control over the process in securing the food parcels, they remain dependant on the TRAMC.

The creche is funded through donations from parents and two teachers are employed. The pre-school committee are planning to send an application for funding to build a new creche to the Provincial Government.

### 2.2.4 Health Care and Sanitation

Health care facilities are inadequate at Tambo village. A mobile clinic visits Tambo twice a month and charges people R 4 per consultation. Although there are two hospitals in the area, one at Dongwe, in the former Ciskei, and another in Queenstown, transport costs are prohibitively high for Tambo residents. No ambulances are available to transport the ill to

hospital and Tambo residents must rely on individuals and taxi owners for transport to the various centres. The fare to hospital varies from one individual taxi owner to the next and is dependent on the time of the day when transport is required - during the night the fare is usually double the day-time fare. A trip to Dongwe, for example, can cost someone anything between R 100 and R 140 at night. The clinics in Wittlesea and Queenstown also provide health care to the residents of Tambo village. The return taxi fare to Wittlesea and Queenstown is R 6 and R 10 respectively.

The CPA has provided communal toilets throughout the village, although, the number of toilets is inadequate. While some people have built toilets in their yards, the majority of households have not. Health problems associated with inadequate sanitation were not explored in our research process, but it is evident that there is a need for improved sanitation at Tambo.

### *2.2.5 Other community services*

Telkom has installed two call phones at Tambo, one coin and the other card operated. During the period we were at Tambo the coin operated call box was vandalised and the money stolen. It is evident that the lack of street lighting enables thieves to operate easily, thereby rendering the much needed facility for communication vulnerable.

At present there is no building in which community functions and meetings can take place. However, there are plans to construct a community hall. Apparently the Provincial Department of Public Works has stated that it will be allocating funding towards this end in the near future.

## 2.3 SURVIVAL STRATEGIES

Survival at Tambo is contingent on the ability to derive an income. There are few natural resources which could provide a buffer against poverty. The low rainfall in the makes crop cultivation unviable and although the region is suitable for extensive sheep farming, few people at Tambo have stock. Further, access to grazing land has not secured. Although wood is available, it is in short supply.

As with most rural areas in South Africa, there are few formal sector employment opportunities in the village itself. Engagement of formal employment requires that people either travel to work daily in places such as Queenstown or Wittlesea, or work as migrants. Migrants are predominantly men, although a small number of women are employed as domestic workers in Queenstown and as nurses in Dongwe and Queenstown. Other formal sector jobs in the area include employment in the civil service in Wittlesea and Queenstown and contract work (for men) as builders. While migrant remittances are an important source of income many women in the groups related that this was not a reliable source of income. What is interesting is that there are a number of households where all household members have moved to Gauteng to seek employment. These households return to Tambo once a year over the Christmas period. In the one group where we undertook a mapping exercise of their area seven out of forty-five households were staying in Gauteng.

Although there are relatively few formal employment opportunities for both men and women, the informal sector is predominated by women. Where women do not have access to formal employment, informal sector activities, such as spaza shops, shebeens, hair dressing salons and herbalism are engaged in as a means of deriving an income. Informal activities engaged in by men include various types of building work at Tambo.

The only formal store which exists at Tambo is owned by a man who teaches away from Tambo. He employs a person to run his store whilst he is away. There are no income generating projects at Tambo, although people are employed as labourers on the various infrastructure projects such as the water project.

By far the greatest source of income are pensions, and to a lesser extent welfare and disability grants. If people are registered in Wittlesea in the former Ciskei they receive R 820 every two months, whereas those who are registered in Queenstown receive a monthly pension of R 410.

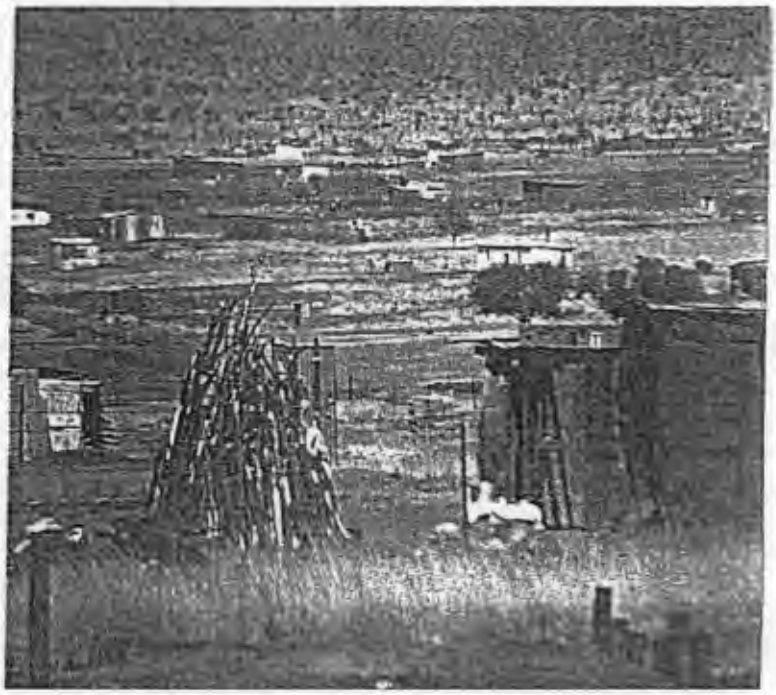
Most households are engaged in a number of income generating activities, particularly those reliant on pensions where informal sector activities such as the selling of beer, to supplement their income. Household income ranged from R1 820 per month to R 80 per month, with the majority of household incomes ranging between R 410 and R 550 per month[5]. Except for households where men were unemployed or were not engaged in informal sector activities, the male- headed households had consistently larger household monthly incomes.

There are a large number of female-headed households at Tambo. Although we are unable to give the exact number of female-headed households, it is interesting to note that in two of the group discussions approximately 40% of the women were household heads. Clearly, it may be misleading to generalise such a finding for the whole village. However, there are two factors which have resulted in the large number of female-headed households at Tambo. First, there is the prevalence of male migrancy. Secondly, single, divorced and widowed women with dependants have been able to gain access to land in their own right and this has also contributed to this skewed demographic characteristic.

The fact that there are many female-headed households is significant as this provides an indication of the extent of impoverishment at Tambo. Due to the limited opportunity for women to gain access to employment within the formal job market, female-headed households find themselves in a precarious situation at Tambo.

[5] Household income was investigated with only two of the groups in the research process. It is important, therefore, to point out that these figures are not representative of household income at Tambo. However, they provide an approximate indication of household income levels.

Wood bundle



Food prepared on a woodfire at the creche

Aloe leaves used for fuel

# CHAPTER 3: ENERGY USE

## 3.1 INTRODUCTION

This chapter will explore fuel-use patterns for cooking, space heating, lighting and media. Due to time constraints it was impossible to investigate the energy-use patterns in as much depth as we would have liked. However, the information presented in this chapter provides some interesting insights into the fuel-use strategies at Tambo.

## 3.2 ENERGY SERVICES

### *3.2.1 Fuels and appliances used for cooking*

Table 3.1a is an example of a pairwise ranking activity undertaken with a group of twenty women. This activity was used to determine the fuels used for cooking and the reasons why fuels are used and preferred. The fuels currently used were elicited from the group participants. Each fuel was entered on both the horizontal and vertical axis. Following this, each fuel was ranked against each of the other fuels. The reasons for using and preferring the different fuels were explored. When triangulating this information with other groups it was found that these fuel-use patterns for cooking appear to be relatively consistent throughout the village.

| | Dung | Wood | Paraffin | Gas |
|---|---|---|---|---|
| Gas | Dung | Wood | Paraffin | |
| Paraffin | Paraffin | Paraffin | | |
| Wood | Wood | | | |
| Dung | | | | |

Table 3.1a: Pairwise matrix ranking of fuels currently used for COOKING.

| RANK | FUEL |
|---|---|
| 1 | Paraffin |
| 2 | Wood |
| 3 | Dung |
| 4 | Gas |

Table 3.1.b: Ranking from pariwise activity above.

From the group discussions it was clear that multiple fuel-use strategies are employed for cooking. Paraffin is used extensively for cooking, but few households rely on it exclusively. Fuelwood is used in conjunction with paraffin in the majority of households, although there a few very poor households which use fuelwood exclusively. Although dung is used in conjunction with paraffin and wood, it is not extensively used. Gas is used by very few households, with more households using dung than gas.

Paraffin is the primary fuel used for cooking in the majority of households at Tambo because it is considered to be convenient and quick to use. Both wick (or 'flame' stoves as they are known locally) and Primus stoves are used, although the majority of households have the former appliance. The reason given for this is that the wick stoves are cheaper. A one plate wick stove costs in the region of R 18, and a two plate wick stove costs R 30. A Primus stove with only one plate costs between R 30 and R 40.

Paraffin is purchased predominantly from Whittlesea and Tambo. There is no discrepancy in the price of paraffin between the spaza shops at Tambo and the stores at Whittlesea. However, when people buy paraffin from Whittlesea they incur the cost of transport, thereby making paraffin from Whittlesea more expensive. Twenty litres of paraffin is usually purchased from Whittlesea and costs R 23, while smaller quantities are usually purchased from the store or spaza shops and costs R 1. 50 per litre.

The women complained of the paraffin fumes which were emitted, and suggested that they suffered from headaches and chest pain as a result of extensive cooking with this fuel.

Also, a common complaint was the fact that paraffin did not last very long. Consequently, paraffin was considered to be expensive. This was particularly the case where young children did the cooking. The older women said that it was difficult to 'control' the children's use of paraffin.

Of all the women who participated in the group discussions concerning fuel-use, there were only three women who stated that they did not use paraffin at all. The reason for this was that they could not afford to use paraffin. These women were household heads of extremely impoverished households, with little opportunity to secure any form of income. Woodfuel was used as the primary fuel for cooking in these households, with dung used as a secondary fuel. When woodfires were used for cooking, the preference was to make a fire outside the house. However, in the presence of bad weather and strong winds, woodfires were often made inside the houses.

Due to the natural environmental conditions, wood is not in abundant supply at Tambo. Since settlement in 1991 scarce wood resources in the areas have come under considerable stress. Trees were chopped down when houses were built, with few homesteads having any trees in their yards. The wooded areas around the surveyed homestead plots are fast becoming depleted, with only young *acacias* dominant on the landscape.

There are two areas at Tambo where wood is collected from-from the hill at the west of the settlement and an from area which has been earmarked as grazing land. However, there is little dry wood available in these areas. The areas earmarked for grazing has been substantially depleted of its wood resources, while the trees on the hill are young and therefore provide little dry wood.

As a result of wood scarcity, women have begun to chop down the young trees, as well as collect wood from commercial farms situated on the opposite side of the national road to Queenstown. This land belongs to commercial farmers and there is considerable risk in collecting wood from the fairly well wooded areas along the river banks. Women reported that they had been shot at when collecting wood from this area.

There have been some negotiations with Department of Land Affairs to purchase land from the commercial farmers for use as arable land by residents of RA 60. However, as the women pointed out, there is a conflict of interest in the potential use of this land as this is the only source of woodfuel. If this land was to be used for cultivation of vegetables and grains, the trees would have to be cleared, thus resulting in further depletion of wood resources. It should be pointed out that rainfed cultivation is not viable in this region due to the low rainfall of 400 - 500mm per annum (LAPC 1995) and it is possible that the need for arable land will not be fulfilled.

When no wood is available and women do not have time to collect wood from the areas across the road, dry aloe leaves are collected. Aloe leaves, however, burn very quickly and can only be used for cooking food which is requires little cooking time, such as porridge.

Surprisingly, there are few women who buy woodfuel. As mentioned above, of all the group participants only two women bought wood from Whittlesea. Used in conjunction with paraffin then, green wood and wood from the occasional trip to the commercial farms fulfils the woodfuel needs of the majority of households.

We were not able to determine how much a bundle of wood cost as both women purchased wood in bakkie loads. A full load costs R 60, and a half load cost R 25. These loads were sold in Tambo by a man from the Whittlsea area, but wood can also be purchased in bundles from Whittlesea, although none of the women could tell us how much this cost as they did not buy it.

As there are few cows at Tambo, dung is not readily available. It is also interesting to note that there seems to be a stigma attached to using dung as a fuel. In the discussion concerning dung, one of these women, stated that

> I wonder if there are not many people who use dung, but are ashamed to say so.

It is important to consider how this may have influenced the research. It may be that there are more households using dung than were prepared to admit during the research process.

Gas, on the other hand, was only used by households with a stable source of income. Two women who participated in the group discussions had gas stoves, which were used in conjunction with paraffin Primus stoves. Only two of the group participants, a man and a woman, stated that they used a gas ring cooker. The man said that he had bought the gas cooker because he often had to cook for himself due to the fact that his wife was a weekly migrant worker. He felt that cooking with gas was much cleaner and quicker. When his wife was at home paraffin was used in conjunction with the gas cooker. This is a clear indication of how power relations, which manifest themselves in the control over fuel and appliances, influence fuel-use.

The woman participant who used gas, however, used gas when money was available. Although she preferred to use it all the time, there were times when she needed to save money and thus, used paraffin. Thus, multiple fuel-use is informed by the amount of income available in the household, as well as the way in which expenditure of income is prioritised.

In the group discussion concerning gas it was clear that there were a number of misconceptions. Many of the women were under the impression that gas was a dangerous fuel, although none of them had ever experienced any of the dangers, such as explosions, associated with gas. The participants who used gas argued that it was cheaper and more efficient because it cooked food more quickly. Also, it was considered to be a much more healthy fuel than paraffin as it did not emit fumes. At the end of the discussion on gas, many of the women expressed a desire to know more about gas as they had 'never thought about it'.

Although income is one of the variables which inform which fuel is used it is evident that other factors are also important. One of the reasons consistently given by older women pensioners for the use of paraffin was the fact that the young children in the household were responsible for cooking.

> I would use wood because it is free, but the grandchildren do the cooking and it is safer for them to cook with paraffin.

Even though fuelwood is more affordable these women have chosen paraffin as the primary household fuel because of they believe that it is safer for children to cook on a Primus stove than on a woodfire. Thus, the amount of labour and the gender division of labour in the household is an important factor in determining the fuel choices of households.

The matrix ranking activity on fuel and appliance combinations for different cooking services is reflected in Table 3.2. Along the horizontal axis, the participants listed the various fuel and appliance combinations currently used for cooking. The different types of food cooked were listed along the vertical access. The different fuel and appliance combinations were ranked against each other for each specific cooking service. The score out of twenty denotes how frequently a particular fuel and appliance combination is used, rather than the number of households which use it. The matrix should be read along the horizontal axis.

| COOKING | Primus | wick paraffin | outside fire | inside fire | gas stove | gas ring cooker | dung fire |
|---|---|---|---|---|---|---|---|
| Morning tea porridge | 11 | 20 | 2 | 1 | 1 | 1 | |
| Mealies | 9 | 14 | 10 | 1 | 1 | | |
| Vegetables | 10 | 20 | 5 | | 1 | 1 | 2 |
| Samp & beans | 9 | 15 | 8 | | 1 | | |
| Meat | 10 | 20 | 15 roast | | 1 | | |
| baking bread | 5 | 17 | 2 | | 1 | | 13 feasts |
| tea/ coffee | 11 | 20 | 2 | | 1 | 1 | |
| Feasts | | | | 20 | | | 10 |

Table 3.2: Appliance and fuel combinations currently used for cooking: matrix ranking.

The matric ranking reveals that the use of multiple fuels for cooking is influenced by specific cooking requirements. Water is predominantly boiled on paraffin stoves as it is quicker than on woodfires. It is clear that while paraffin wick and Primus stoves also are used extensively, wood is often preferred for cooking specific food. The method of cooking mealies and meat on a fire is preferred because of the particular taste that a woodfire gives, while some women prefer to use a woodfire for cooking samp and beans. In households which use paraffin as a primary fuel for cooking, the use of woodfires for samp and beans is one of the strategies employed to ensure that their paraffin supplies are not depleted quickly and to contain expenditure on fuels.

If the paraffin expenditure behaviour of different women is examined, it is clear that budgeting through supplementary wood use is an important strategy. For women with a variable and unstable source of income wood is used when there is no income available to buy paraffin. These women bought paraffin in small quantities from the local spazas and store.

> It is difficult to say how much paraffin I use. When I have money I buy paraffin, but if I have no money I use wood.

Households which receive pensions or have relatively stable monthly incomes have different fuel expenditure patterns. These households buy large quantities of fuel when they receive their income and supplement this with smaller paraffin purchases or collected wood.

> I buy paraffin once a month - usually twenty litres - when I have money from my pension. I buy it when I buy my groceries. When it is finished, if I have some money left over then I buy from the spaza. If I have no money left I use wood.

Where households receive pensions on a two monthly basis, budgeting and management of expenditure is more difficult. All the women who buy twenty litres of paraffin at the beginning of each month, or every two months, stated that this does not last a full month. If there was money available, small amounts of paraffin were purchased towards the end of the month. On the other hand, if no money was available these women switched to using wood.

The need to prepare large quantities of food, such as for feasts means that fuelwood is preferred. Fires are made outside the home and the large quantity of food for feasts is cooked in three legged pots. When dung is available, some of the women suggested that dung was a good fuel for baking bread for feasts. The dung is placed around three legged pots in which the bread is baked.

The preparation of the midday meal for the children at the creche also takes place on a woodfire. Due to the limited funds available for the creche, paraffin appliances had not been purchased. Also, it was considered too expensive to cook such a large quantity of food with paraffin.

Another factor influencing the choice of fuels at Tambo was the type of pots which were used for cooking. Although three legged pots were used for feasts, most women did not own these 'Xhosa' pots. As a result of the damage caused to other pots, such as the aluminium pots, it was not considered prudent to use them on woodfires.

In sum, there appears to be a pattern whereby paraffin is the preferred fuel for its convenience, speed and even safety. However, paraffin use is conditioned by budgeting strategies where fuelwood or dung is used when cash runs low. For slow cooking and feasts, paraffin clearly is expensive compared to a slow burning fire.

### *3.2.2 Fuel and appliances use for lighting*

Paraffin lamps and candles are used for lighting. One of the women said that she did not use candles at all because they were dangerous. Her grandchildren stayed with her as her daughter had a job in Gauteng. As her grandchildren were young, she felt that they were not responsible enough to use candles. She had two paraffin lamps which were used to light her two-roomed house. However, the majority of households use both candles and paraffin lamps.

> Although it would seem that candles are cheaper, I would have to buy many candles because the wax burns very quickly. In this way I would end up spending more money. It is better to use a paraffin lamp because it is not as expensive.

A number of women in the group discussions said that although they would like to use only paraffin, they could not afford to buy more than one paraffin lamp. Thus, although paraffin was considered to be cheaper than buying candles, the cost of buying additional lamps often militated against the exclusive use of paraffin.

> I used to buy only candles, but I had to go and buy and buy and buy, I found that it was much more expensive to use candles. Now I have only one lamp, although it would be better if I could buy another one.

The light emitted from paraffin lamps is considered to be better than candle light. Paraffin lamps are also considered to be less dangerous than candles.

In those poor households where wood was used extensively, it was found that very few candles were bought. The wood fire was often used as a source of lighting. In two of the households which used wood extensively, the presence of school going children meant that candles had to be bought. However, one of the women stated that she encouraged her children to do their school work in the afternoon so that she would not have to buy too many candles.

Although none of the participants in the group discussions used other fuel and appliance combinations for lighting they mentioned the fact that there were a few households who used gas and diesel generators. Two households have diesel generators, which provide electricity for lighting, cooking and refrigeration. As we were not able to interview any members of these households, it is not clear if other fuels are used to meet the energy requirements of these households. The same applies to the households using gas for lighting. The use of gas and gensets for lighting is the exception rather than the norm at Tambo.

### 3.2.3 Fuel and appliances used for space heating

| | dung-fire | wood -fire | paraffin stove | paraffin heater |
|---|---|---|---|---|
| Paraffin heater | paraffin heat | wood - fire | paraffin stove | |
| paraffin stove | paraffin stove | paraffin stove | | |
| wood - fire | wood - fire | | | |
| dung - fire | | | | |

Table 3.3a: Pairwise matrix ranking of fuels currently used for SPACE HEATING.

| RANK | FUEL |
|---|---|
| 1 | paraffin stove (wick) |
| 2 | wood-fire |
| 3 | paraffin heater |
| 4 | dung-fire |

Table 3.3b: Ranking from pariwise activity above.

It is interesting to note that paraffin wick stoves are the predominant means of space heating at Tambo. During the winter, dual energy services of space heating and cooking are important in determining the fuel-use patterns of the household. Paraffin appliances, such as Primus stoves and heaters, are used for both cooking and heating. Although there are not many households which have heaters, these are also used for cooking:

> When I see that it is cold and I know that I am going to use the heater then I boil water, cook samp and bake bread on it.

In this way expenditure on paraffin can be minimised by ensuring that a number of energy service needs are met at the same time. Paraffin wick (flame) stoves are also used for heating, where household members will gather in the kitchen whilst food is being prepared in order to stay warm. For people who cannot afford paraffin, dung is used for space heating. However, it was felt that dung was not a good fuel for space heating as one could not 'enjoy' the heat as dung smokes a lot. Furthermore, the heat from a dung-fire does not last long.

Although there was consensus that woodfires made inside the house were not healthy, and that they caused damage to the thatch and walls, there were a number of women who stated that they did make fires inside. In fact, woodfires were preferred by some women for space heating because the heat emitted from fires is better than that from any paraffin appliance. If woodfires are made inside for heating, cooking on the fire also occurs. Although wood was the predominant fuel used for cooking by some of these women, others explained that during the cold nights in winter they switched from paraffin to wood because of its superior heating quality.

### 3.2.4 Fuels and appliances used for media

| | PM 9 | PM 10 | Car Battery | Cell batteries |
|---|---|---|---|---|
| Radio | 8 | 3 | | |
| Hi-fi | | | 1 | |
| Wall clock | | | | 10 |
| TV | | | 4 | |
| Cost of batteries at the different centres | | | | |
| Tambo | R 7.50 | N/A | | |
| Queenstown | R 5.99 to R 6.99 | R 24.00 | R3.50 charge | R 0.99 |
| Wittlesea | R 6.99 | R 23.00 | R3.50 charge | R 0.99 |
| Number of batteries purchased | | | | |
| | one or two per month | one a month | every 3 or 4 weeks | 1 per 6 mnths or more. |

Table 3.3: Matrix for current battery use.

The values entered in the Table 3.3 above reflect the number of people in the group who used the appliances (vertical axis) and battery (horizontal axis) combinations. The use of batteries for various appliances, such as radios and televisions, was only explored with one of the groups in the research process. The purpose of this activity was to determine which appliances the participants owned, the type of batteries used, the cost of these batteries and how often they were purchased. Of the twenty one group participants, only three women did not own any of the appliances shown in the matrix above. These women stated that they could not afford the cost of buying appliances. Only one woman owned a radio, clock, hi-fi and television. She was also one of the few women who could afford to buy PM10 batteries, instead of the smaller PM9 batteries which did not last as long. The most commonly used batteries, the PM9, were readily available at Tambo, whereas the other batteries were bought in Whittlsea and Queenstown. Car batteries were charged in Whittlsea and Queenstown. Thus, the cost of transport to either one of these centres should be added to the cost of charging a car battery.

### 3.2.5 Fuels and appliances used for ironing and refrigeration

Due to the constraints on time, only cursory attention was given to ironing and refrigeration in the research. Although we were able to determine the predominant fuels used for ironing and refrigeration, we were not able to explore the patterns of fuel-use in any depth.

Irons are heated predominantly on paraffin stoves. When money is scarce, other energy services, such as cooking and lighting, are prioritised above ironing. However, most of the women stated that they rarely lit their stoves for ironing only. Ironing is usually done before or after other energy services are used, such as cooking and boiling water, in order to economise on the use paraffin. In poor households, where women use fuelwood almost exclusively for a variety of energy services, irons are heated on woodfires.

Very few households own refrigerators at Tambo. Those spazas which sell chickens and other perishable goods do have refrigerators, whilst those spazas which sell a small variety of goods, such as paraffin, sugar and tea, do not have refrigerators. Besides the spaza shops, refrigerators are owned by the store owner, as well as a small number of households. As

mentioned, there are two households which use gensets to operate electrical refrigerators. However, the predominant fuel used for refrigeration is gas.

### *3.2.6 Conclusion*

Within the context of multiple fuel-use, paraffin is the predominant fuel used for cooking, boiling water, lighting and space heating. The following important trends in energy-use emerged:

- Paraffin is the dominant and preferred fuel because it is readily available and more affordable than other fuels. Also, it provides a better quality service than wood or candles.
- Very poor households relied more heavily on wood and dung, but both fuels not readily available. With few cattle in the village and an environment which is not suitable for extensive cattle farming, dung is likely to remain scarce. Furthermore, the extensive denudation of the wooded areas at Tambo will continue. The problems of securing energy faced by these impoverished households are likely to become exacerbated in the long term.
- Gas is not a well used or affordable fuel for the majority of people at Tambo. However, it is likely that with an education programme there may well be a small number of households which could afford to purchase gas appliances and use gas.
- Where fuels can perform a number of energy services, such as cooking and space heating, they are chosen above other fuels. As a result of the versatile nature of paraffin, it is chosen as a household fuel because it lends itself well to this important energy saving strategy.
- The division of labour and the type of labour available in the households influenced fuel choice. This was particularly evident in households where older women pensioners allocated the responsibility of cooking to the younger children. As a result of the perceived dangers of allowing children to cook on woodfires, paraffin was the predominant fuel used in the households.
- Fuel switching occurs in the majority of households. This fuel switching is a budgeting strategy related to the periodicity of income.
- The type of energy service required also influenced the fuel-use patterns. Paraffin was preferred for cooking activities requiring a short time. Wood was preferred for cooking activities requiring a long time, as well as where large quantities of food were cooked.
- The ability to afford appliances also influenced the fuel-use patterns at Tambo. Although paraffin was preferred for lighting, it was often the case that households could not afford to buy more than one lamp. Thus, although paraffin was considered to be cheaper than candles, the capital required to buy an additional lamp resulted in the use of candles in conjunction with paraffin.

# CHAPTER 4: THE 2.5A SUPPLY PROJECT AT TAMBO

## 4.1 TAMBO VILLAGE PILOT PROJECT: SITE SELECTION

Tambo village was selected for the current-limited supply pilot project. After receiving the directive from Eskom's national office, the Eastern Cape Regional office began the process of selecting a site. The CPA, which is involved in the supply of water to rural communities, was consulted about a suitable village and after visiting a number of sites Eskom decided that any of the villages in RA 60 would be an appropriate site for the pilot project.

Although not situated in a rural area which is far away from the existing electricity grid, it was felt that the villages in RA 60 were suitable because the settlement patterns were not dense and electricity consumption rates were likely to be low. The villages were also considered to be large enough, with a degree of permanent occupancy, to justify the implementation of the project. From the perspective of the Eastern Cape Regional Office, the fact that the villages in RA 60 were accessible by road and it was possible to communicate telephonically, would facilitate efficient management of the project.

A joint meeting of community based organisations from all the villages in RA 60 was held where Eskom communicated its wishes to select a site in RA 60 for the pilot project. It was here that one of the most important factors in determining the selection of Tambo village as a pilot project came into play, namely, the existence of 'strong community leadership' (Patrick 1995). This was considered to be important because Eskom felt it would be able to rely on the leadership to ensure that everyone in the village would accept the project. Also, strong leadership would provide a relative degree of certainty that tasks within the village would be undertaken. The chairperson of the structure, TRAMC, displayed these leadership qualities at the joint meeting. Using the fact that infrastructural development, such as the surveying of the plots and implementation of the CPA water project, had progressed further at Tambo than in the other villages, Eskom was able to suggest and ensure that Tambo was selected as the village for the pilot site.

## 4.2 TAMBO VILLAGE PILOT PROJECT: PROPOSAL

It was proposed that a 2.5A limited supply would be provided to households. The capacity of the 2.5A supply would provide for energy services requiring less than 560 W, such as lighting, media (radio and TV), refrigeration and sewing. All energy services requiring an excess of 560 W, such as cooking, ironing, boiling water with a kettle, heating water in a geyser and space heating would not be provided for. (At present, low wattage irons and kettles are being manufactured for use with the 2.5A supply. It will be important to ensure that these appliances are marketed appropriately in order to ensure they are easily accessible and affordable.) The pilot project would also make provision for those households with greater capacity demands by supplying 20A to them.

As the 2.5A would not provide for all end-uses, the project at Tambo was also concerned with ensuring that energy needs could be met through the improved supply of gas. Eskom initiated discussions with LPG suppliers to promote the use and improve the supply of gas. At the time of the research discussions were being held with the gas suppliers, although there seems to have been little subsequent development with regard to this.

A connection fee of R 40 was proposed for the 2.5 A supply. Households wanting a 20A supply would be required to pay the difference between the cost of the 2.5A supply and the 20A supply. With a maximum capital expenditure of R 2 500 per connection, it was proposed that a connection fee of R 650 for a 20A supply be charged. This fee was derived through calculating the cost of technical components (such as the meter and ready board), the cost of upgrading the network, as well as labour and transport costs. The standard

homelight connection fee of R 45 was also included in the R 650 connection fee. This fee would also be charged for upgrading from a 2.5A to a 20A supply.

Based on the assumption that there is a strong link between income and energy consumption in households, it was hoped that this connection cost differential would provide a signal to households to select the appropriate supply capacity. Thus, it was expected that households which could afford to have a 20A supply installed would consume more electricity. It was anticipated that this cost differential would begin to address the problem of the high cost of supplying medium and high load capacities to households with low consumption rates.

The tariff rates for the 20A and 2.5A would also be different. With the provision of a pre-payment meter and ready board, the 20A supply tariff would be charged according to the standard homelight tariff of 23c/kWh.

The 2.5A tariff, however, would be based on an entirely different system. Regulated by a circuit breaker housed in a 'mini' ready board in each dwelling, households with a 2.5A supply would not have their individual electricity consumption metered. Instead, it was proposed that a system of group metering be introduced, where households paid a flat rate monthly tariff based on the average consumption of the group to which that household belonged.

Besides cost savings reflected in the technology, a local agency and system for revenue collection were to be established which would eliminate the costs associated with individual metering and billing. Based on the concept of local savings clubs ('stokvels'), Eskom suggested that households in the village be divided into groups on the basis of the location of the thirteen transformers necessary for reticulation of the area. With each transformer servicing two pre-paid meters twenty six groups or stockvels would be established; each group attached to one meter.

For the fist month, the group would be evaluated and the consumption estimated. Based on a unit charge of 23c/kWh, the average payment for the month would be estimated. For the following months, the actual consumption of the group for the first month would provide the basis for establishing a flat rate for each of the groups. It was proposed that the monthly tariff be slightly higher than the actual consumption to provide for variances in monthly consumption (Eskom 1995c).

A two-or-three-person committee per stokvel, comprising a chairperson, secretary and an additional member, would be elected. The meter committees would be responsible for

- setting the monthly contribution to be paid by each of the stokvel members;
- the collection of revenue;
- purchasing electricity coupons;
- keeping records of monthly payments and coupon purchases; and
- making recommendations to TRAMC with regard to the action to be taken with those who defaulted on their monthly payments (Eskom 1995c).

It was suggested that the stokvel committee members would carry out these functions as a service to the community (Patrick 1995).

Each metering committee would be accountable to the members of the stokvel, as well as to the TRAMC. The TRAMC was to ensure that

- 'suitable' members were elected onto the committees;
- the metering committees fulfilled their function;
- problems raised by the metering committees were dealt with;

- residents' complaints against the metering committees were dealt with; and
- decisions were to be made as to whether payment defaulters should be cut off or re-connected (Eskom 1995c).

By shifting these responsibilities to the TRAMC and metering committees, the operating costs associated with electrification projects would be reduced. However, as will be explored, a number of these proposals were rejected by the residents of Tambo village. The connection fees for both the 2.5A and the 20A supply were adjusted through a process of negotiation and the idea of implementing a stokvel system was abandoned. Thus, changes were made to the way in which the flat rate tariff was established, and an alternative system for revenue collection was devised. These issues will be explored in the following section.

## 4.3 ASSESSMENT OF THE ACCEPTABILITY OF THE 2.5A SUPPLY

There are a number of issues regarding the acceptability of the 2.5A supply at Tambo which emerged from the research. As a point of departure, this section will examine the selection of Tambo village as a pilot site. The nature of the settlement, its locality and the criteria used to select the project will be discussed. as they have impacted on the implementation process of the pilot project. Secondly, a discussion of the local agency for revenue collection and the flat rate tariff will reflect on the concerns raised by different people at Tambo, discuss the changes which were made to the original conceptualisation of these proposals, and point to areas which may impact on people's ability to use their electricity supply on a sustained basis. Thirdly, the attention given to the integrated provision of energy in the pilot project will be explored. Of particular importance to this discussion is the emphasis placed on the promotion of gas alongside the provision of the 2.5A electricity supply. Finally, this section will reflect on the potential of the 2.5A supply to meet electricity needs. Although it will be pertinent to explore this issue in the post-electrification study, there are a number of points that can be made at this stage. This section will focus predominantly on end-uses which will not be catered for with a current-limited supply of 2.5A, as well as the expectations of different people at Tambo.

### *4.3.1 Selection of the site*

As mentioned, Tambo village is not in a deep rural area. Due to its location alongside the main road between Queenstown and Whittlesea, the village is easily accessible. From Eskom's perspective this site was appropriate. Given the constraints on Eskom staff, with many other electrification projects to manage, easy access to the site was an important consideration. However, the location of the settlement has also had an adverse impact on the levels of acceptance of the project by the residents of Tambo. With a fairly well developed electrification infrastructure in the area a number of other settlements have been electrified or are in the process of being electrified with a standard 40A supply.

From the group discussions it was clear that the people at Tambo were not happy with this:

> Why is Eskom coming up with this plan now and not doing the same in other villages here?

Comparisons were made between the connection fee for a 40A supply and 2.5A supply. It was felt that the small difference in cost between the 2.5A on offer at R 40 at Tambo and the 40A on offer at R 45 at other villages was not fair.

> If this problem is to do with money, where did Eskom get money to supply the other villages? Is this the same Eskom? The same Eskom who puts in a big supply for R 45 and now it is charging R 40 for a small supply.

Also, the discrepancy in the cost of a 20A supply at other villages and Tambo village was considered to be inequitable.

> Why is this big supply now R 650? In other villages it is only R 45.

A number of group participants suggested that people from other settlements had implied that Tambo residents were being deceived by their leaders and Eskom.

> The people from the other places around here are saying that our leaders have deceived us. Where did the money come from for the other villages? Who is this Eskom now? Why is Eskom experimenting with us?

Although these allegations are unfounded, these questions are indicative of the fact that the majority of Tambo residents did not have access to information concerning the project. Thus, with no understanding of the aims of the project or the need for Eskom to explore more cost effective ways of electrifying rural areas, people felt suspicious that they were being cheated by Eskom. The fact that their leaders had supported the implementation of the project resulted in the mistrust of the leadership. Thus, the existing power dynamics between the various political groupings at Tambo were exacerbated, with ammunition being provided against the TRAMC. For example, group participants unfoundedly accused the TRAMC chairperson of receiving payment from Eskom for his role in ensuring that people accepted the project.

The sentiment that Eskom was 'experimenting' with people was expressed in a number of the group discussions. Clearly, the concept of a pilot project has an 'experimental' component to it, as it aims to test the viability of the set of ideas and principles of the project. However, the idea of testing the viability of the project was not the cause of concern. Rather, this reflected the sense of powerlessness which people felt. Regardless of the concerns raised, people felt they were being forced into accepting the project without any opportunity to inform decisions and shape the nature of the project.

The degree to which the provision of a 2.5A supply was accepted by the Tambo village residents was also informed by Eskom's policy with regard to the electrification of new houses on the household plots. Although the strategy of building new houses over time is a characteristic of many rural areas, it is clear that this situation is more prevalent at Tambo. Being a relatively new settlement, many people are still in the process of constructing new dwellings. Eskom will charge an additional fee for connecting new dwellings.

> Eskom will connect my shack while my house is being built. Then they will come again and connect my house when it is finished. But I will have to pay R 40 for this. I do not think this is right.

While this policy is perhaps justified in terms of the costs associated with connecting new houses, this situation is likely to have financial implications for both Eskom and those households which find themselves in this predicament. It is important, therefore, that the history and nature of land settlement is investigated prior to the implementation of electrification projects.

### *4.3.2 Local agency for revenue collection*

The stokvel concept was found to be totally unacceptable to the majority of people who participated in the pre-electrification study.

Resistance to this concept was grounded in the fear that it would create conflict. It was suggested by those people who participated in the group discussions, that it would create a situation where individuals within the group would attempt to control the behaviour of others, particularly with regard to how much electricity was being consumed.

> I will shout at her next door if she leaves her light on all night because I am trying to save.

The possibility that some would attempt to control other group members use of electricity was considered to be inappropriate.

> We won't be using electricity equally. We'll have a problem if we form a group, yet we consume differently. If I use a TV all night I will have other people in my group coming to inspect me. Those that use more appliances will not tolerate people coming in and saying switch off this and that.

Furthermore, there was concern that if the meter reading at the end of the month was higher than expected then everyone in the metering club would have to pay more money, even though they had not used more electricity.

> If this meter committee reads the meter - what will happen if the reading is higher - will people have to pay more, even if they have few appliances?

While the stokvel concept had been proposed to and accepted by TRAMC, it was clear that it would not suit the circumstances at Tambo village. As the concept was developed by Eskom without any form of participation of both men and women at Tambo village, it became possible for local people to absolve themselves of responsibility for and ownership of the project.

> All right. We want lights, we want electricity. We are not opposed to this. Let Eskom come and install these meter boxes for the groups and those with money will have electricity. When the electricity is here, we who don't have money will make a plan.

In other words, it was threatened that possibilities of gaining access to an electricity supply without paying for it would be explored.

A great amount of time and effort had been spent by Eskom developing the concept. However, with the knowledge that it would not work the system was substantially revised. The stokvel concept was abandoned, and replaced by a system where one individual elected by the community would be responsible for the collection of revenue. People who defaulted on their payment would be cut off by Eskom or someone authorised by Eskom. Thus the notion of shifting this responsibility, and thus the cost, from Eskom to a local agency was compromised. A connection cost of R 10 was established. Furthermore, a uniform flat rate of R 15 per month for all the residents of Tambo was agreed upon.

### *4.3.3 Flat rate of payment*

From the discussion above it is clear that the concern over differences in electricity consumption within metering groups was bound up with the fact that a variable flat rate for electricity would be charged. In all the group discussions it was evident that the perception existed that the flat rate of payment would result in those who consumed more electricity being subsidised by those who consumed less. As one elderly woman pensioner stated:

> We are not disrespecting Eskom, but we want individual meters. The shebeen queens will play their music and have their lights on all night, whereas I will only have my one light. I don't think it is fair that everyone in the group must pay the same amount.

Within the context of subsidisation for electrification, it is clear that those who use less electricity will be less subsidised than those who have more appliances and consume more electricity. Doubt was raised by a number of people, particularly poorer women with no stable source of income, as to whether they would be able to pay the flat rate on a regular basis.

The issue of a variable flat rate, which is linked to average group consumption, has been revised. A uniform flat rate tariff of R 15 per month has been accepted by a range of people through a participatory education process (see appendix 1). Considering that one of the central problems with the stokvel concept was the idea of paying a fixed amount regardless of how much electricity was consumed, it is curious that this flat rate tariff was accepted. A uniform tariff is clearly more equitable than a variable flat rate. However, it will be important to monitor the acceptance and impact of the flat rate tariff, particularly with regard to its impact on the sustained use of electricity. In view of the different energy-use strategies at Tambo, it is possible at this point to highlight potential problems of a flat rate tariff.

First, it is clear that energy saving strategies are employed by the women at Tambo. Attempts to combine different end-use applications in order to use paraffin sparingly, and thus spend less money on fuel, was evident. Also, switching to less expensive fuels when

money was not available, or needed to be spent elsewhere, was prevalent. With pre-payment meters the opportunity to use and pay for small amounts of electricity exists. Although the cheapest electricity card is R 10, electricity use can be managed and extended over time. If necessary, this card can last for periods in excess of one month or households can choose to be without electricity. For many households, this kind of flexibility is in line with their dynamic household livelihood strategies. Furthermore, it provides the option of using electricity as one of a number of fuels available to the household. A flat rate tariff does not allow for a similar strategy to be employed for electricity use.

Secondly, it is also likely that the flat rate of payment will be a barrier to use of electricity for the very poor at Tambo. Quite simply, very poor households may simply not be able to afford to pay a fixed rate on a sustainable basis. Considering that monthly income is unstable, it may be that sustained use of electricity with a flat rate is impossible for those with little surplus income.

> I have one room. I don't have a radio or television. I cook with wood. If I do use electricity at all I am sure I will only use the lights for a very short time.

It is worthwhile noting that a recent analysis of the SALDRU/World Bank national poverty survey showed that 60% of electrified households also used candles for lighting. Some low income electrified households (per capita monthly expenditure of less than R 130) were observed to rely on only candles for lighting (Davis and Ward 1995). While the data is unable to capture any shifts over time, it does suggest that these households are unable to afford electricity on a *sustained* basis. Furthermore, this data is based on households which have pre-payment meters. With the flat rate tariff, no allowances are made for the fact that there may be times when households cannot afford to use electricity. If people are unable to pay they will be cut off and have to pay a reconnection fee. This will further compound the ability of the very poor to use their electricity supply.

Thirdly, for those households which receive pensions on a two monthly basis, monthly payments may be difficult. The reason for this is that some pensioners suggested that it was difficult to manage household budgets over a two month period. However, given attempts to standardise pensions in South Africa , it is unlikely that this situation will persist. If affordable, payment of R 30 every two months may well be an appropriate interim measure for some of these households.

Fourthly, the issue of what will happen when people are absent from Tambo was also raised by a number of people. There are houses which are vacant for much of the year when all the household members migrate to urban centres, such as Gauteng. The flat rate tariff was not considered to be appropriate for these households. Although Eskom has stated that people are able to pay in advance for as many months as they wish, it is unlikely that those who migrate to urban centres will be willing and able to do so. Payment for an electricity service which they are not using will place an added burden on these household's ability to survive.

> If I'm not here for some months what is going to happen? Eskom is not fair. We should be paying according to how much electricity we use and the appliances that we use. Is Eskom here to develop us or just cause chaos?

In sum, it is clear that a flat rate tariff will suit some households, particularly those which can afford appliances. For many households, the flat rate tariff of R 15 per month will be cheaper than purchasing batteries, candles and paraffin to fulfil lighting and media energy needs. However, it is the poor at Tambo who will feel the impact of the flat rate tariff. Therefore, it will be crucial to monitor the flat rate tariff at Tambo, particularly with regard to the way in which it impacts on the sustained use of electricity, as well as its impact on household energy strategies.

### *4.3.4 Public lighting*

Although not directly related to the provision of a current-limited supply, the need for public lighting was consistently raised in all the groups. The women were particularly vocal about the need for street lights as it was felt that this would assist with preventing crime, as well as improving safety and security in the village.

The provision of lighting at public amenities, such as the public telephones was considered to be especially important.

> If there were lights at the telephones it would be much safer for us who use the telephones and then these thieves would not be able to steal the coins.

In two of the groups, the fact that there had been three rape cases in the past year was raised. Two elderly women and one child were raped at night when walking to their homes. The women said they feared for their safety and suggested that street lights would definitely ensure greater security when moving about the settlement during the night.

One of the women suggested that if Eskom could not provide street lighting, then the possibility of providing a light in the yards of households should be explored.

> You see, because of the darkness my goat was taken out of the kraal and slaughtered in *my* yard. They left the skin there. They took it and cooked it. If it wasn't for the darkness, they would never be able to do this.

However, it is Eskom's policy not to wire houses. Many people in the group discussions indicated that they would not be able to afford the cost of wiring their houses.

> Eskom said that they would put in one light only. Also, I understand that Eskom does not want to take work away from people at Tambo. Is it not possible for Eskom to wire our houses? In the neighbouring villages the wiring of houses is expensive. If Eskom did this it would be much cheaper because it is a big company.

In fact, there is evidence to suggest that the cost of wiring houses militates against rural people making full use of their electricity supply (DRA report). While it arguably not Eskom's responsibility to wire houses, the suggestion that yard lights be included in the 2.5A supply option, is indicative of the ability of the group participants to think creatively about possible solutions to their security problems. Eskom's policy decision not to provide public lighting lies with the absence of an authority to take responsibility for the payment of such a service (Thom et al 1995). However, with the establishment of local government the potential exists to begin to resolve the question of providing public lighting.

### *4.3.5 Integrated energy supply*

Eskom's primary reason for promoting the use of gas at Tambo was the possibility of facing demands to increase supply levels in the absence of other fuels to fulfil energy needs (Eskom 1995). LPG is considered to be a high quality and efficient heating fuel which could meet rural energy needs effectively.

However, there are a number of concerns with the high cost of LPG. At a national policy level, these concerns include the equalisation levy imposed on LPG; inflated distribution costs as a result of high railage rates and ineffective retail distribution chain, as well as the various mechanisms which protect the local producers and suppliers, such as prohibitions on the importation of butane and propane (DMEA 1995). While the responsibility of resolving these issues lies with the state, it is evident that it is in Eskom's interest to ensure that this does occur, particularly in view of the fact that provision of a current-limited supply is likely to become more widespread. [6]

[6] Although the Tambo village pilot project was initially one of two projects implemented to test the viability of the current-limited supply, the 2.5A has been already been included as one of the supply options in the proposed new residential tariff policy.

It is, however, a little ironic that the 2.5A supply option has resulted in increased concern over ensuring effective provision of other fuels, such as LPG. Given that multiple fuel-use and fuel switching are predominant energy strategies in rural households which have been electrified, ensuring the availability of safe and affordable fuels should be important, regardless of the level of supply being provided.

Furthermore, strategies to ensure access to safe and affordable fuels must be guided by the needs of rural people. It must be recognised that the fuel-use strategies differ from one locality to the next, as well as from one household to the next. Local conditions and circumstances within households will determine the different fuel-use patterns and needs, thereby necessitating an integrated approach to energy planning and provision which will cater for different needs.

At Tambo village, for instance, paraffin is the dominant fuel. The group discussions concerning the use of gas did indicate that there is room for an education programme about gas. It was evident that the women were particularly interested in knowing more about gas and its associated benefits. Such an education programme could enable people to make informed choices about different fuel options which are available to them. Thus, rather than promote the use of gas, this would result in a situation where women and men were better placed to make decisions about fuels which would suit their circumstances. At present, very few people use gas. While lack of information about gas may contribute towards this situation, it was evident that only those households which have sufficient income, and which have prioritised the purchase of appliances, use gas. Given the current situation with regard to the cost of this fuel and its associated appliances, promotion of gas would not be an effective strategy in meeting the energy needs of the majority of the households.

Furthermore, focusing on the provision of gas alongside electricity does not take account of the important role that other fuels, such as paraffin and wood, play in the fuel-use strategies of households at Tambo. If we are concerned with ensuring that the households at Tambo have access to safe and affordable fuels, all fuel options must become part of an integrated energy provision strategy. Given Eskom's role and function as a national utility, there is considerable doubt as to whether Eskom is best placed to implement such a strategy.

### *4.3.6 Potential of 2.5A supply to meet energy needs*

Notwithstanding the need for Eskom to cut electrification costs and reduce the impact of newly electrified households on the national load factor it is important to assess whether the 2.5A supply does meet the electrification needs and demands of rural households. Nationally, rural households consume an average of 80kWh per month and it is expected that a 2.5A supply will meet the electricity needs of households such as those at Tambo. Underlying this expectation is the assumption that few rural households use electricity for energy services with thermal applications, such as cooking and space heating.

However, in a recent analysis of the SALDRU/World Bank national poverty survey it was found that one third of electrified households use electricity for cooking, often in conjunction with other fuels. The majority of these households fall within a 'high' income group of a per capita monthly expenditure of more than R 270[7]. A similar pattern was found for the energy service of water heating. However, the survey also revealed that 10 - 20% of low income households use electricity for thermal applications (Davis and Ward 1995).

Thus, as Davis and Ward (1995) argue, the assertion that newly electrified households only use electricity for lighting and media is an over-simplification. Not only do a substantial number of rural households use electricity for thermal applications, but even a modest rise in income levels is associated with more extensive use of electricity. Clearly, our

[7] This group refers to those above the poverty line, with R 270 figure being the minimum monthly expenditure required to satisfy basic needs (Davis and Ward 1995)

understanding of energy use in the context of electrification is limited. Quantitative data provides for useful information on the broad trends in energy use with access to electrification. However, there is a paucity of information with regard to the factors which determine these energy use patterns in the context of electrification. Furthermore, the way in which rural survival strategies inform energy use patterns is not well understood. Until this situation is addressed, it is unlikely that a fuller understanding of the role of electricity in fulfilling energy service needs in rural households will be achieved.

For this reason it is difficult to make assertions about whether the 2.5A supply will in fact meet the electricity needs of those at Tambo. However, in view of these broad trends illustrated by the survey analysis, it is important to interrogate the assumption that few rural households will use electricity for thermal applications. There are a number of points which emerged from the group discussions which may lend substance to this argument. Although they refer to different people's expectations and perceptions of possible electricity use, they are important considerations. Moreover, it will be crucial to explore these issues in the post-electrification study.

From the research it is clear that most people will not apply for the 20A supply. This could provide an indication of the way in which household electricity service needs inform the choice of a particular electricity supply. However, the high connection cost makes such an assertion problematic as it is clearly unaffordable for the majority of households at Tambo. In fact, discussions concerning the need for a larger supply were dominated by concerns over the high connection fee. For this reason it is difficult to assess whether people felt that the fulfilment of lighting and media energy needs would in fact be sufficient. Although there was acknowledgement of the fact that the high cost of purchasing appliances may prevent people from using a 20A supply most people found issue with the high connection fee, rather than with the problem of finding enough money to purchase appliances.

As discussed in the section concerning the energy use at Tambo the predominant fuel used is paraffin. There are very few households which use gas, which necessitates sufficient surplus income to purchase appliances. It is likely that only high income households which already have appliances (such as the two households with diesel gensets) or those which run spazas will apply for the 20A supply. For those households which could possibly accumulate sufficient savings to purchase appliances, such as hot plates, the initial high connection cost for the 20A supply will definitely militate against gaining access to this type of supply. However, after negotiations with the committee to lower the connection fee to R 200 this situation may well change. Clearly, all households have energy needs which include thermal applications. However, whether needs become effective demand for electricity will depend on factors such as income levels, expenditure priorities and costs. Thus, the connection fee is an important parameter.

Given that many households rely on variable and unstable sources of income for survival, the way in which households budget, save and prioritise expenditure become important considerations in their ability to afford the initial outlay for a 20A supply. Thus, households may not be in a position to afford the cost of either R 650 (the initial connection fee) or R 200 (the final negotiated connection fee) at present. However, as conditions change within the household this may well change. This also holds true for households which can presently afford the connection cost of a 20A supply. Thus, these factors are also important in determining the sustained use of electricity for a variety of end-uses. As circumstances and expenditure priorities in households change, the decision to use electricity for certain end uses will also shift. If the multiple fuel-use strategies, where women switch from one fuel to another in accordance with the household circumstances, are an indication of what could transpire with access to electricity it is likely that electricity use will be variable. For example, the woman who uses gas as a primary fuel for cooking also uses paraffin when she wants to save money. It is likely that a similar pattern would exist with access to electricity.

The points above, however, remain speculative and need to be tested in a post-electrification study. It will be crucial to explore those factors which determine the switch from fuels, such as paraffin and gas, to electricity. An interesting finding of the analysis of the SALDRU/World Bank survey analysis with regard to a shift from the use of paraffin to electricity is worth noting. It was found that paraffin and electricity are less likely to be combined due to their similar function as versatile fuels which can be used for a variety of end-uses. With increase in household income there is a switch from paraffin to electricity (Davies and Ward 1995). While income is clearly not the only factor determining fuel switching, this is an important consideration at Tambo, given that the majority of households use paraffin. What this seems to suggest is that the potential for fairly extensive use of electricity exists. The provision of a 2.5A supply would then serve to curtail any shifts which may otherwise occur, thereby placing a ceiling on the potential use and consumption of electricity.

It is likely, however, that the 2.5A supply will meet electricity needs in many households. Having said that however, a number of concerns where raised in the group discussions. First, the inability of the 2.5A supply to provide sufficient power to operate an iron was considered to be a problem by both low and higher income households.

> I have seen at my sister-in-law's home that ironing is much easier with electricity. This iron that I use take a lot of time because I have to put it on the stove again and again.

Although not readily available, it is possible to buy irons which are able to operate with a 2.5A supply. Electrical irons are amongst those appliances which are sufficiently low in cost to be affordable for lower income households. For this reason, care should be taken to ensure that low wattage irons are easily accessible and affordable for people who have access to a 2.5A supply.

Secondly, a number of women asked whether it would be possible to use only a stove or hot plate for cooking with the 2.5A and forfeit the use of other appliances.

> What I would really like to do is cook with electricity. If this electricity is small then can I not say that I won't have lights and power for the TV? Then I can use it only for cooking. I have seen how much easier it is to cook with electricity. Its is not dirty like paraffin and wood.

Obviously such a request reflects a lack of understanding of the limitations of the 2.5A supply and the amount of power necessary for the operation of thermal appliances, such as stoves and hot plates. However, it is important to consider this request in view of the fact that this energy service was prioritised by certain women.

Thirdly, a group of men expressed concern about the fact that certain power tools could not be operated with a 2.5A supply. Although these men were from households with low incomes, they felt that by limiting the supply the potential for them to begin any small scale enterprises, such as carpentry, welding and poultry projects, was curtailed. They suggested that they had been considering the option of buying tools in the group, either by seeking funding for a carpentry project or by saving money amongst themselves. Notwithstanding the debates surrounding the sustainability of income generating projects such as the need for markets for goods produced, access to credit, materials and training, it is important to consider the impact on these sort of ventures of a 2.5A supply. Clearly, this points to the need for integrated development planning in areas where electrification is to take place. If electricity is delivered as one of many initiatives within a given locality it is more likely that the energy service needs for business, or any other service, will be met. For example, if a small carpentry project was to be implemented the provision of a 20A supply could be budgeted and planned for.

In conclusion, a current-limited supply may be an appropriate strategy given the low consumption rates in rural households. Furthermore, consumption in most newly electrified villages has remained low (less than 100 kWh/month) even three to four years after electrification. However, growth is in the order of 10% to 20% per annum (Davis 1995).

However, it is problematic to equate low consumption rates with the use of non-thermal appliances only. Until more qualitative information is available on energy use with access to electricity it is important that Eskom proceeds with caution in the widespread implementation of the 2.5A current-limited supply. It would be more appropriate for a degree of flexibility to be incorporated into the design of the technology devised to supply a limited current which can provide for some thermal applications, for example, by providing a 5A or 10A supply.

## 4.4 ASSESSMENT OF THE CONSULTATION PROCESS

### *4.4.1 Introduction*

In the last group session of the research process approximately fifty people attended the session. Although it is extremely difficult to run a participatory process with such a large number of people, it was clear that word had spread and those who had missed their allocated group discussion times joined the last session. The reason for this is that this was the first time that people felt that they had an opportunity to raise some of their concerns, ask questions and begin to develop an understanding of the implications of having a 2.5A supply of electricity. It became evident that the problems experienced at Tambo were a result of inadequacies with the consultation process. Before exploring this in depth, it is important to briefly outline the approach followed by Eskom.

Once Eskom had selected Tambo village as the site for the pilot project it began to liaise with the TRAMC. A number of meetings were held with the TRAMC where the project philosophy and approach was discussed. One mass meeting was held to explain the project to the 'community'. At this meeting Eskom attempted to explain that this project would provide the opportunity to test whether this technology was appropriate for rural areas. The implications of having a 2.5 A supply were also explained.

Thereafter, a series of meetings between Eskom and the TRAMC were held, during which agreement was reached over a number of issues. Guidance was sought from the TRAMC about different aspects of the project, such as the stokvel concept. It was expected that the TRAMC would ensure that the rest of the people living at Tambo were kept informed, ensure that people paid their connection fee, and answer any questions about the project. Furthermore, it was assumed that the TRAMC would play an important role in ensuring that Eskom was kept abreast with the opinions and attitudes of the 'community' towards the project. In fact, many concerns and questions about the project, which had been directed to the TRAMC by various community members, were raised in the meetings with Eskom. The interaction between Eskom and the chairperson of the TRAMC was particularly good, with his guidance sought on many issues. Prior to the research process for this study Eskom was under the impression that the majority of people were in favour of the 2.5A supply being provided.

This approach to community consultation is in line with Eskom's national policy. Eskom works predominantly with committees, either with those which are already established or those which it helps set up. Dissemination of information about the project to the broader community occurs via mass meetings. The central assumption of such an approach is that these committees represent the interests of the 'community'. Thus, it is not considered necessary that there is broader participation in the local level planning and implementation of the project. Once construction begins, education processes which deal with the practical use of electricity and safety issues, do sometimes occur.

Within the constraints of a target driven electrification programme, such an approach may be suitable for the delivery of the standard 40A supply. However, it is evident that this approach was not appropriate for the Tambo village pilot project. Many of the problems which arose during the planning and implementation process at Tambo were a result of the lack of participation of the 'ordinary' women and men in the village. There were three broad

implications of not ensuring appropriate participation at Tambo. The first is concerned with the lack of accessible information about the project. Few people knew anything about the project. Also, where people did have access to some information, it was not always in an accessible form due to the technical language used. The result was a range of misunderstandings and misconceptions about the project. Secondly, some aspects of the project design were not appropriate for the conditions at Tambo. The example of the stokvel concept is a case in point. As a local agency for revenue collection was not devised in a participatory way, it was rejected and much of Eskom's effort and time into devising the system was wasted. Finally, Tambo community members were not in a position to assess whether the 2.5A supply was in fact going to meet their electricity needs. No attention was given to building people's capacity in order to analyse their own situation and thus make informed choices. So, for example, people focused their energy on the high cost of a 20A supply, rather on whether they actually required and could afford to use this level of supply in a sustainable way.

This section will outline some of the key issues with regard to the shortcomings of the consultation process. Suggestions as to how this approach may be improved will be made. It is important to bear in mind that the process at Tambo has offered an enriching learning experience for all involved. The challenge will be to devise a local level process which will provide for the enormous time constraints faced by Eskom staff, as well as engender participation of ordinary rural men and women. This will be particularly important in electrification projects where a current-limited supply is implemented.

### *4.4.2 Who is this Eskom?*

> The white said its his business. He'll bring in the electricity for lights, radio, televisions and fridge. Its his company - he's connected with them from Gauteng. Its R 40 for the electricity connection, but we're unemployed. The electricity is not from the Government - this is our problem. We thought the Government would give us electricity and then we would start to pay.

It was apparent that people had very little understanding of what Eskom was, or why it, rather than the 'Government' was providing electricity to the village. The fact that Eskom is a public utility, with a specific mandate from Government to provide electricity was not known by the majority of people at Tambo. Most people were under the impression that Eskom was a private company which was trying to make a profit through the project at Tambo. A number of accusations were made about the Eskom staff member who had been involved with extensive negotiations with the TRAMC. It was suggested, rather unfoundedly, that he 'owned the business' and that he was trying to 'make money from poor people'.

Coupled with these misconceptions about Eskom were the high expectations for free services, which had been fuelled by political campaigning prior to the 1994 elections. Group participants pointed to the fact that they had been promised electricity. For some this meant that no connection fee would be charged. This view was, however, not held by everyone.

Furthermore, the reason why Eskom was attempting to pilot the 2.5A supply was not well understood. As mentioned, people questioned why such a strategy was being adopted when other villages were receiving a standard 40A supply. Thus, the fact that Eskom is attempting to develop strategies to reduce the cost of electrification was not known to the majority of people. Where people did know that the 2.5A project was an attempt to reduce the costs of electrification, people were unable to understand why this was necessary. Given the fact that other villages were receiving a standard supply, the need to reduce costs was questioned. As the people at Tambo did not have information about the cost involved in electrifying rural areas, they could not begin to understand the need for cost cutting strategies.

The lack of understanding of Eskom's role in the provision of electricity had two important implications. First, these misconceptions compounded the power dynamics at Tambo by providing space for accusations and allegations to be made. For those opposed to the TRAMC, these arguments were used in attempt to discredit the TRAMC. Secondly, it was difficult for people to accept the 2.5A project as they had no basis from which to judge the validity of the supply on 'offer'.

Both the issue of the role of Eskom, as well as the rationale for the 2.5A supply were addressed in the education programme which took place at Tambo after the initial research was undertaken (refer to appendix 1). It is imperative that care is taken to ensure that the ordinary women and men in rural villages have access to this information, especially where there is a shift in Eskom's policy and approach to electrification. Given Eskom's proposal for a new residential pricing policy, where different connection fees and tariff levels are set for different supply capacities, it will be crucial to include such information in the process followed in rural villages.

### *4.4.3 Do committees represent communities?*

> We are not against development. We just want clarity and education. Can Eskom come and work in groups? He must stop working with the committee only. Information must not be channelled through committee members only because they don't report back properly.

At the centre of the problems experienced at Tambo lies Eskom's assumption that community leaders represent the needs and interests of the community. As a result, it was not considered necessary to ensure broad participation of the community in the project. Due to the complexities of the local power relations, it is necessary to examine this assertion carefully.

There is little doubt that the TRAMC has an interest in serving the needs of the Tambo community. The existence of a number of services, such as the primary school and the water reticulation system, bear testimony to this. Also, it is true that access to electricity is an aspiration of the majority of the Tambo residents. However, when one examines the electrification project process it is clear that the interests of the Tambo community were not always necessarily being served by the TRAMC. This is not to suggest that the TRAMC, or the individuals serving on it, have underhand motivations. It is our firm belief that their attempt to enhance the lives of those at Tambo is sincere.

In order to begin to understand why it is important to question the assumption that committees represent the interests of communities, it is necessary to reflect on the power relations inherent in the project process. First, it is necessary to examine the power relations between Eskom and the committee. On the one hand, Eskom needed a site to test the 2.5A supply, with its flat rate tariff and local agency for revenue collection. On the other hand, Tambo was not on the electrification plans and would only receive electricity if it accepted the pilot project. Thus, the TRAMC was placed in a difficult position of attempting to keep both Eskom and the people at Tambo happy. The possibility of not receiving electricity if the pilot project was not accepted, was a powerful tool which Eskom could use in order to ensure that plans for Tambo went ahead. With Eskom in control of electrification, the TRAMC found it necessary to show a willingness for the project to be implemented.

Secondly, uneven power relations within the committee were also evident. In many of the joint meetings with Eskom, the fact that only the chairperson and a few others spoke at meetings was noticed (Patrick 1995). When we explored why this occurred with the committee members we were able to speak to it was suggested that this was a result of the lack of understanding. One of the women committee members said that the language at meetings was difficult to follow. She stated that she very rarely understood what was being said about the electrification project in meetings as the educated men used language which was inaccessible. Many terms were not translated into the vernacular and no attempts were made to ensure that the technical language was simplified in order to ensure understanding.

It is also important to point out that the committee members who attended the group discussions were often unable to answer questions about the project. Given the social relations of power it is not surprising that the committee members with the least understanding of the project were women. With little access to and control over resources, such as education, the women on the committee were generally less educated than the men. Thus, they were less confident in raising concerns and questions about the project. Also, the power relations between these women and the TRAMC chairperson in particular, were such that they felt that they could not challenge or contradict what he said. If the majority of committee members were unable to understand the implications of the 2.5A project, it is difficult to expect that the rest of the Tambo community would gain such an understanding.

Although not intended, the fact that committee meetings were not accessible to all members has resulted in the entrenchment of the unequal power relations between the chairperson and other members. The fact that no attention was paid by Eskom to building the capacity of the committee led to the chairperson being significantly more knowledgeable about the electrification project, and thus more able to control it. His frequent absences from Tambo, due to his sub-regional SANCO responsibilities, were significant as he was not available to deal with the concerns about the project which were being raised.

Finally, it is important to consider the relations of power within the community at large. In view of the fact that the only opportunity to raise questions about the project was at mass meetings, this point is especially important to explore. It is within this context that the factors which constrain different people from participating in development processes become evident. According to the group participants mass meetings are generally not well attended at Tambo. One of the reasons why people have not attended the meetings held about the electrification project is that some people felt that it would be pointless to attend as they were too poor to afford it. Another reason given was that meetings were held at times when some women were busy preparing food. Thus, the most marginal people at Tambo remained excluded from the project process.

Furthermore, many of the women in the groups stated that they did not feel confident enough to raise questions at these mass meetings. They, too, found the language which was used at the meetings difficult to understand. Again, this points to the relative powerlessness of these women in relation to the community leadership.

It is evident from the discussion above that power relations have constrained people, particularly the women and the very poor, from participating in the electrification project. Without having interviewed each TRAMC member it is inappropriate to make assertions about the underlying reasons that the committee, or specific individuals on it, may have for exercising their control and authority. Nonetheless, the process followed by Eskom at Tambo served to entrench the existing power relations. It is arguably not Eskom's role to challenge these power relations. However, as Eskom was not conscious of these power relations, the fact that people had little understanding of the project remained hidden. Also, Eskom was not aware of the extent of the resistance to certain concepts, such as the flat rate tariff and the stokvel system.

Clearly, it is imperative for Eskom to work with community leadership. Each project requires that certain management functions are performed. It is not practical or desirable that all village members are involved in the management of electrification projects. However, as Lyra Srinivasan points out:

> It is easy to confuse the voice of the forceful leader with the will of the silent majority. Local committees themselves can become a controlling power unless their accountability is properly safeguarded, and broad participation has been encouraged in appropriate ways from the beginning (Strinivasan 1992: 71)

It is necessary at this point to examine the nature of an approach which will foster participation, as well as how such an approach could be integrated into Eskom's practice.

### *4.4.4 A participatory approach*

A participatory approach will acknowledge that issues of power lie at the centre of any development process. On the one hand it is understood that participation is constrained by power relations within the community. This approach questions the assumption that there is an homogenous set of community interests and needs. It is also based on the assumption that some people, for example an educated man on a committee, are more able to participate in development processes than others, for example, an illiterate woman on social welfare, because of the power relations between them. On the other hand, this approach acknowledges the power relations between outsiders, such as researchers, development workers and service providers, and the different people within the community. Rather than seeking to control the development process a participatory approach emphasises co-learning, with a focus on developing people to utilise their own abilities to diagnose, analyse, plan, create, innovate and act (Strinivasan 1992).

Many of the problems experienced at Tambo are the result of the absence of any national institutional arrangement to support the provision of electricity within a rural development framework (Thom et al. 1995). Furthermore, Eskom's role and function as a national utility has manifest itself in a target-driven, marketing approach to electrification with a focus on the delivery of electricity. Thus, there is little attention paid to developing skills and expertise within Eskom to build a range of rural people's capacity to make choices about their development priorities and needs. While it is arguably more appropriate that this role be played by a government agency, which could facilitate an integrated approach to energy planning and provision, it is unlikely that this will occur in the short term.

It is, therefore, crucial that the lessons which have emerged from the Tambo village pilot project are integrated into Eskom's practice, particularly with regard to attempting to understand local power relations. Clearly this will have training and staffing implications for Eskom. Staff members who work with communities which are being electrified should have appropriate skills and an understanding of participatory development practice and theory. As Eskom moves towards the more widespread implementation of the 2.5 A supply it will become crucial that local power relations are examined and worked with in a sensitive manner to ensure that the people which Eskom is providing with this energy service are fully aware of the implications and are able to make the choices which best suit their needs and livelihood strategies.

# CHAPTER 5: CONCLUSION

This report has examined energy use patterns, as well as the acceptance of the 2.5A supply project at Tambo village. Attempts have been made to link the socio-economic conditions of people at Tambo with their fuel-use strategies, and the potential of a 2.5A supply to meet electricity needs.

It was found the paraffin is the predominant fuel used for cooking, water and space heating and lighting. Two important trends emerged, which will have an impact on the way in which people are able to use electricity on a sustainable basis. The first trend suggests that due to the versatile nature of paraffin, with its ability to provide for a number of energy services, it is chosen as a household fuel because it lends itself well to this important energy saving strategy. The second trend which was evident indicates that fuel switching occurs in the majority of households as a budgeting strategy. When there is no money available for paraffin, households switch to cheaper fuels, such as wood.

These fuel-use patterns were considered when assessing the acceptance of the 2.5A supply. A number of important issues with regard to the acceptance of this supply have emerged from the research. Firstly, it was found that the location of the settlement has had an adverse impact on the levels of acceptance of the project by the residents of Tambo. A number of other settlements in the area have been electrified or are in the process of being electrified with a standard 40A supply. Comparisons between the 2.5A supply, with its associated costs for households, and the 40A supply were made. Many people felt that this was not equitable. Also, being a relatively new settlement, many people are still in the process of constructing new dwellings. People expressed their dissatisfaction with Eskom's intention of charging an additional fee for connecting new dwellings.

Secondly, the stokvel concept, with its variable flat rate were considered to be totally unacceptable by Tambo residents. On the one hand, fear was expressed about the conflict a group metering approach would cause. On the other, it was felt that it was not equitable to pay an amount which was equal to the average group consumption. It was pointed out that people will have different appliances and therefore, would use different amount of electricity. The fact that a flat rate based on the average group consumption would result in those with more appliances in the group being more subsidised than others was also pointed out.

Thirdly, the variable flat rate was replaced by a uniform flat rate for the whole village. While this is arguably more equitable than the group flat rate, it is likely that the flat rate tariff will have a negative impact on the sustainable use of electricity at Tambo. As mentioned, energy saving strategies are employed by the women at Tambo. Attempts to combine different end-use applications in order to use paraffin sparingly, and thus spend less money on fuel, were evident. Also, switching to cheaper fuels when money was not available, or needed to be spent elsewhere, was prevalent. On the one hand, a flat rate tariff does not allow for a similar strategy to be employed for electricity use. On the other, a flat rate may eliminate the need for such strategies.

It is also likely that the flat rate of payment will be a barrier to electricity for the very poor at Tambo as they may well not be able to afford to pay a fixed rate on a sustainable basis. Although the flat rate tariff is likely to suit some households, it is the poor at Tambo who will feel the impact of the flat rate tariff. It is important that this aspect of the pilot study is well monitored in order to ensure that the flat rate tariff does not have a negative impact on the ability of poor households to meet their energy needs.

Fourthly, Eskom's policy of not providing public lighting should be revised as a matter of urgency. In order to provide for improved security and safety at Tambo, it is necessary to

provide public lighting. With the establishment of rural local government the potential exists to begin to establish mechanisms for the payment of such a service.

Fifthly, Eskom's attempt to promote gas alongside the use of electricity does not take account of the important role that other fuels, such as paraffin and wood, play in the fuel-use strategies of households at Tambo. If we are concerned with ensuring that the households at Tambo have access to safe and affordable fuels, all fuel options must become part of an integrated energy provision strategy. While it is necessary that the supply side issues of all fuels are resolved to achieve this, it is crucial that such a strategy is led by the particular fuel needs at Tambo.

Finally, the research attempted to determine whether a current-limited supply will meet the electricity needs of the Tambo residents. This question is difficult to answer. On the one hand, it is difficult to separate people's aspirations from their actual need and their ability to pay for electricity. All households have energy needs which include thermal applications. However, whether needs become effective demand depends on factors such as income levels, expenditure priorities and costs. Thus, the cost of connection for a 20A supply becomes an important consideration in determining demand. Some rural households will be able to use electricity for thermal applications, but in conjunction with other fuels. Even a modest increase in income may result in an increased demand for higher power supply. For this reason, it is important that Eskom proceeds with caution in the widespread implementation of the 2.5A supply in rural areas. It would be more appropriate for a degree of flexibility to be incorporated into the design of the technology devised to supply a limited current in order to provide for some thermal applications, for example, by providing a 5A or 10A supply.

Aside from assessing the acceptance of the 2.5A supply, the research also examined the consultation process followed by Eskom. One of the major lessons which can be learnt from the Tambo village project is that participation is essential to any development process. It cannot be assumed that a committee represents community needs and interests. Lack of participation in the planning of the pilot project had resulted in a number of problems which had to be dealt with, thereby causing delays in implementation. On the one hand, residents of Tambo had become frustrated, misunderstandings abounded and certain elements of the project, such as the local agency for revenue collection, were not suitable for local conditions. On the other hand, Eskom wasted time, resources and effort devising plans which were later revised to suit local conditions. Eskom's commitment to addressing the varying concerns at Tambo village, however, did exist. Resources were found to engage in further participatory processes which were aimed to achieve this end. However, if Eskom had followed a participatory process from the inception of the project it is likely that these issues would not have emerged. The challenge for Eskom in the future is to integrate a participatory approach into its consultation process with communities.

### *5.1 Issues for further research*

There are a number of important topics to be investigated in a post-electrification study. It is crucial that this research be undertaken at a household level. Also, the investigation of electricity use should be situated within the context of household survival and energy use strategies. It will be important to include a range of different households in the investigation. Households should be selected according household income, as well as the household size and structure. The specific areas of focus with regard to electricity use which should be investigated are outlined below.

- Monitoring the efficacy of the local revenue collection arrangement. It will be particularly important to assess the cost savings of such an approach.
- Monitoring the flat rate tariff in order to evaluate its impact on the sustained use of electricity, as well as on household energy and survival strategies.

- Assessing the extent to which people are able to use electricity in different rooms from the room in which the miniboard is placed. This would require an investigation into the ability of households to afford to wire their dwellings, or purchase extension cords.
- Investigation of the extent to which households which have been provided with a 20A supply are able to use this supply.
- Investigation of whether the electricity needs of households with a 2.5A supply are being met.

## REFERENCES

BRC. 1995. Land Reform Pilot Proposal in the Eastern Cape. East London: Border Rural Committee.

Davis M. 1995. Electricity consumption growth in newly electrified settlements. Cape Town: Energy and Development Research Centre.

Davis M & Ward S. 1995. Household energy-use patterns in rural areas: The effects of access to electricity. Cape Town: Energy and Development Research Centre.

DMEA. 1995. South African Energy Discussion Document. Pretoria: Department of Mineral and Energy Affairs.

DRA 1989. Edendale-Imbali Complex Electrification Survey. Report produced for Eskom Power Marketing. Durban: Data Research Africa.

Eskom. 1995a. Eastern Cape Region Pilot Project Proposal: Circuit Breaker Tariff. East London: Eskom.

Eskom. 1995b. Form 15 for Tambo Village Circuit Breaker Tariff: Pilot Project. East London: Eskom.

Eskom. 1995c. Tambo Village Limited Pilot Project: Guidelines for establishment and operation of meter committees. East London: Eskom.

Patrick M (Eskom East London) 1995. Personal communication 1995.

Srinivasan L. 1992. *Options for Educators: A Monograph for Decision Makers on Alternative Participatory Strategies.* New York: PACT/CDS.

Thom C, Davis M and Borchers M. 1995. Review of South African experience in rural electrification. Cape Town: Energy and Development Research Centre.

# Appendix 1: Education process design

TAMBO VILLAGE EDUCATION PROGRAMME

1. WHO IS ESKOM?

- ESKOM AND THE RELATIONSHIP WITH THE GOVERNMENT.

  Chart 1: INPUT BY ESKOM (OR PHUMLA IF NOT POSSIBLE)

  PHUMLA TO READ PARTS OF THE GREEN PAPER PROVIDED. I HAVE TRIED TO MAKE THIS INPUT AS SIMPLE AS POSSIBLE.

  Eskom Electricity Council is responsible for making policy (rules) about electrification. Representatives from Eskom, organised labour, agriculture, industry, consumers sit on the Eskom electricity council. These representatives are appointed by the Minister of Public Enterprises, Stella Sicgau. The Eskom Electricity Council reports to the Minister of Public Works. The Eskom Electricity Council has set policies which are in keeping with the electrification targets set by the RDP. By the year 2000 2.5 million households should be electrified in South Africa. As well as the Eskom Electricity Council a National Electricity Regulator has also been set up. It is the responsibility of the Electricity Regulator to make sure that the policies set by the Eskom Electricity Council are implemented. Eskom is one of the authorities responsible for providing electricity in South Africa. Eskom provides electricity to the local authorities in towns and cities, to farmers, to mines and other large industries, as well as to people in rural areas.

- WHY 2.5 AMP

Chart 2.

CHART 2 EXPLAINS WHAT IT COSTS ESKOM TO PROVIDE ELECTRICITY TO ONE HOUSEHOLD. THIS WILL PROVIDE THE BASIS FOR AN EXPLANATION AS TO WHY ESKOM IS PILOTING 2.5A SUPPLY.

To bring electricity to Tambo village is expensive. To bring electricity to one house in a rural situation would cost anything between R 2 500 and R 4 500 (Write these figures on news print). This cost is made up of the following:

- bringing the electricity to the village (cost will vary according to how far away from the present electricity lines are - the further away the more expensive it is to provide electricity)
- bringing the electricity lines to each house (cost will vary according to how close the houses in a village are - the further apart the houses the more expensive it is to provide electricity).
- meter and ready board

ON CHART 2.

Eskom charges people R 45 to get a 20A supply of electricity in their house. In other words, Eskom bears most of the cost of electrifying households. Eskom tries to get back the money it puts into providing electricity to people by charging a tariff of 25,81c for every unit of electricity used. However, this amount does not result in Eskom recovering the money it has put into electrifying households. Eskom is at present trying to think of ways in which to make sure that it has enough money to meet the target set by the RDP. One of the ways in which it is thinking of doing this is to reduce the cost of providing electricity to households. One way of reducing costs is changing the kind of technology used in the provision of electricity. However, before Eskom can decide whether the new technology works and is acceptable to people they want to test it in various places. Two places in South Africa have been chosen for this. One in the Northern Province and here at Tambo. Luckily at Tambo the lines bringing electricity to Tambo do not have to be constructed. To bring lines 1 km it costs R 35 000. (Refer to chart).There are two things which Eskom is trying to test at Tambo which will save more money: one is to provide a 2.5A supply which is cheaper than supplying the normal 20A supply. By providing a smaller supply Eskom is able to save money on the cables and wires which bring the electricity to each house. The second thing which will make providing electricity cheaper is by not providing meters to each person. Providing a 20A supply to Tambo would cost R 2 500, whereas providing a 2.5A supply will cost Eskom R 1 800. (Refer to

the chart to show where these two cost cutting measures will have an impact on the supply of electricity). Eskom believes that if this kind of electricity supply works and is acceptable to people they will be able to use it in other places. This will mean that other areas which would not be electrified because of high cost will receive electricity

## 2. WHAT DOES HAVING A 2.5A SUPPLY MEAN FOR ME?

This part of the session is divided into three parts:

1. explanation of what a Watt is
2. demonstration with generator, miniboard and appliances
3. activity which will enable people to work out what combination of appliances work on a 2.5A supply.

**1. Explanation of what a Watt is (Phumla this section has been changed a bit so that construction of the materials is simpler - The concepts, however, remains the same. Mel will go through it with you on Monday.)**

(It is not important that people come out of this session knowing what an amp, volt or watt is - what is more important that they understand what the implications of having a 2.5A supply are. The best way to describe how electricity works is to compare it with water. MEL, COULD YOU DO A LITTLE SHOPPING FOR THIS SECTION? REFER TO THE DIAGRAM ON THE CONSTRUCTION OF A WATER PIPE FOR THE 2.5A AND 20/60A SUPPLY FOR WHAT IS NECESSARY. ALSO, IT WILL REQUIRE A LITTLE BIT OF FIDDLING ON YOUR PART IF YOU DON'T MIND. This is what is required: construction of two noticeably different sized water pipes (preferably see through) with a tap/valve on the one end. Also, a bathroom scale where the glass cover over the weight disc has been removed and a piece of paper (which represents different amounts of water which can be derived from each pipe system) has been stuck onto the disc underneath the needle. This will be a bit fiddly as we have to make sure that the weight of the water in the bucket for each different system corresponds with the delineated portions of the paper on the disc.

PHUMLA I WOULD SUGGEST THAT YOU TRY THIS OUT BEFORE YOU ACTUALLY GO INTO THE FIELD. The aim of this activity is to ensure that people understand the difference between a 2.5A supply and a 'normal' supply of electricity. By demonstrating with water people will be able to visually see the difference between having a large supply (big water pipes) and a smaller electricity supply (smaller water pipes). The scale will demonstrate how much electricity can be used once in the house. Also, will be able to link the fact that the green and red portions are measurements of electricity and are called Watts. It is important for people to understand that the watts refer to the amount of electricity available to them so that when buying appliances they will buy ones which will be able to work on the 2.5A system.

EXPLANATION: Electricity comes into the house through a wire. Because electricity cannot be seen it is quite difficult to explain how it works. However, the way in which water and electricity work are quite similar and so I am going to demonstrate to you with water first.

Here are two different sized pipes with a tap/valve on the one end. [Make sure the tap/valve is wide open. Pour water into the big one and refer people to the amount of water which comes from the tap/valve. Repeat the same process with the small pipe system. Make sure that you pour water into the system for the same amount of time for both water pipe systems] Because the pipe is bigger it can let more water through than the smaller pipe. This is the same with electricity. The bigger the system, the more electricity it will allow to come through. The big water pipe system is the same as the supply of electricity which Eskom has provided to other places in South Africa. The small water supply system is like the one which Eskom would like to test at Tambo and is testing at Mafefe in the Northern Province. The amount of electricity which will come through the wires into the house will be small. You can never get more water than the amount which the pipes let through. [Repeat the process again, first with the big pipe system, but this time let the water flow into the bucket whilst on the scale. Refer people to the needle - it will be pointing to the red section of the disc. Again, make sure that you pour water into the system for the same amount of time for both pipe systems.] The red section and green sections on the disc represent how much water one is able to use. In order for the needle to reach the red section, i.e. in order to use a lot of water, there has to be a big

supply. This is the same for electricity supply. The bigger the supply of electricity, the more one is able to use [Repeat again with the small pipe system]. However, as you can see the needle has only moved into the green section with water from the small pipe system. With the small supply of electricity, therefore, you can only use a small amount of electricity. You can never use more electricity than the amount which is supplied. [Pour water in the big pipe systems again but this time close the tap/valve a little to demonstrate that within a certain amount of electricity supply one can use less than the amount of electricity available.] As you can see, when you close the tap/valve a little the needle only moves a little, in fact it has not passed the green section. This means that you can control how much water you use. In the same way, you can do this with electricity. Although you may have a certain amount of electricity which comes into your house you can choose only to use a little of it. Remember, however, that you cannot use more electricity than the amount which is supplied to your house.

CHART 3: Refer to chart 3 to explain what a watt is.

This is a picture of the red and green portions of the disc which we used to measure how much water we could use. When we measure electricity we use the word Watt to describe how much electricity we can use and how much we do use. As we saw, with the small electricity supply we could only use as much as the green section. With the big electricity supply we could use more electricity as the needle moved into the red section. With the supply to be provided at Tambo village the green portion is equal to 560 watts. This means the amount of electricity which can be used by one house is equal to 560 watts.

**2. Demonstration of 2.5A supply with various appliances.**

[Divide people into small groups.]

Explain that each different appliances will need different amounts of electricity to be able to work. The amount of electricity that each appliance needs to work is also measured in Watts. Every appliance has the amount of electricity needed to make it work , i.e. the Watts, written on it. A number followed by a W will show you the number of watts which the appliance uses to make it work. Sometimes you will notice that electricity is also measured in kilo Watts. This is usually happens when the appliance needs a lot of electricity to make it work. 1 kilo Watt is equal to 1000 Watts. Therefore if an appliance needs 2000 watts to work you could say that it needed 2 kilo Watts to work. (Write this on the chart). [Give each group appliance/s and ask them to try and find the wattage of each appliance. Make sure that people in the group help those who cannot read. Also, make sure that everyone knows what they are looking for: write 120W, 60W on newsprint to guide the groups. Once each group has looked at all the appliances record each appliance and its wattage on the newsprint. Then set up the generator and miniboard. Demonstrate the use of the appliances which will work with a 2.5A supply. Then plug in the iron to show what will happen when an appliance which needs too much electricity to work is plugged in. If possible plug in a number of appliances that will be able to work at the same time, eg a radio and a light bulb.]

**3. Activity which will enable people to work out what combination of appliances work on a 2.5A supply**

This activity will reinforce what has been learnt through the demonstration. Divide people into 4 or 5 smaller groups. Give each group the cards with appliances on them, as well as the long rectangular card which represents the amount of electricity which a 2.5. Explain that each rectangular card represents 560W - the maximum amount of electricity which can be use in each household. The aim of the exercise is to place the various appliance cards on the rectangular card to see if the appliances could be used at the same time. Because the size of each appliance card is proportionately worked out it will be easy to see what kinds of appliances you can use together. Also, the cards for the iron and stove are much larger than the rectangular card - this will show that one cannot use these appliances.

Process to follow in Tambo

1. Discuss the fact that Eskom has now done away with the metering concept and that a flat rate of R15 per household per month will be charged by Eskom. Connection fee for a 2.5A supply will cost R 10 per month, while a 20 A supply will cost R 200 per month and the household will be provided with a pre-payment meter. (If Mel draws a chart here use it to

explain how the tariff for electricity is usually made up and how much of it Eskom will be subsidising at Tambo).

2. Eskom is proposing that 1 person in the community collect the money for Eskom. How should this person be selected? What criteria? Discuss this.

3. Eskom would also like to put in some meters to meter individual consumption of households in Tambo village. This is in no way going to effect the specific houses which have meters - it will be for the purposes of monitoring the electricity consumption and the project as a whole. How should these people be selected. What do people think about this idea?

4. Any outstanding issues to be discussed.

5. Close.

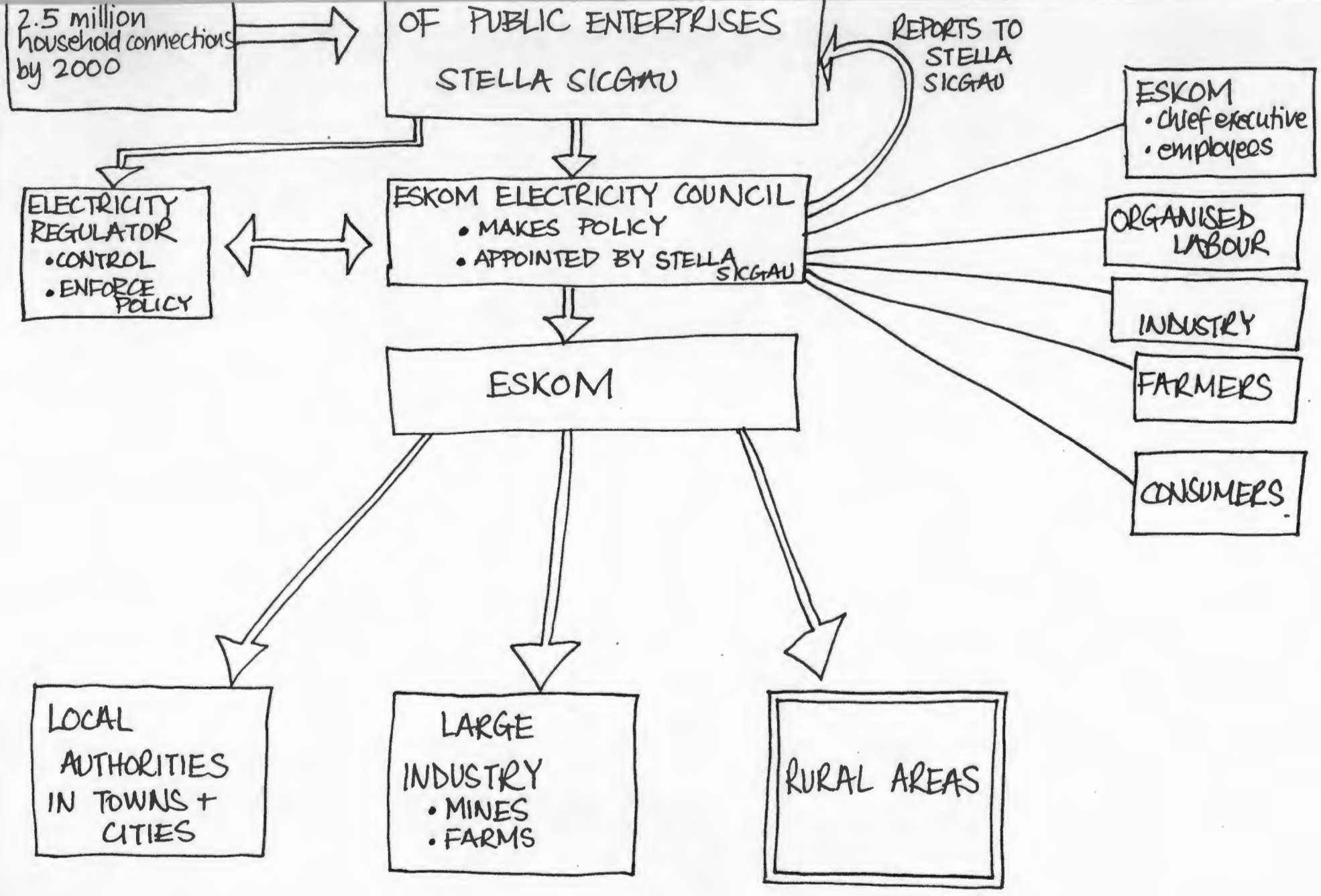
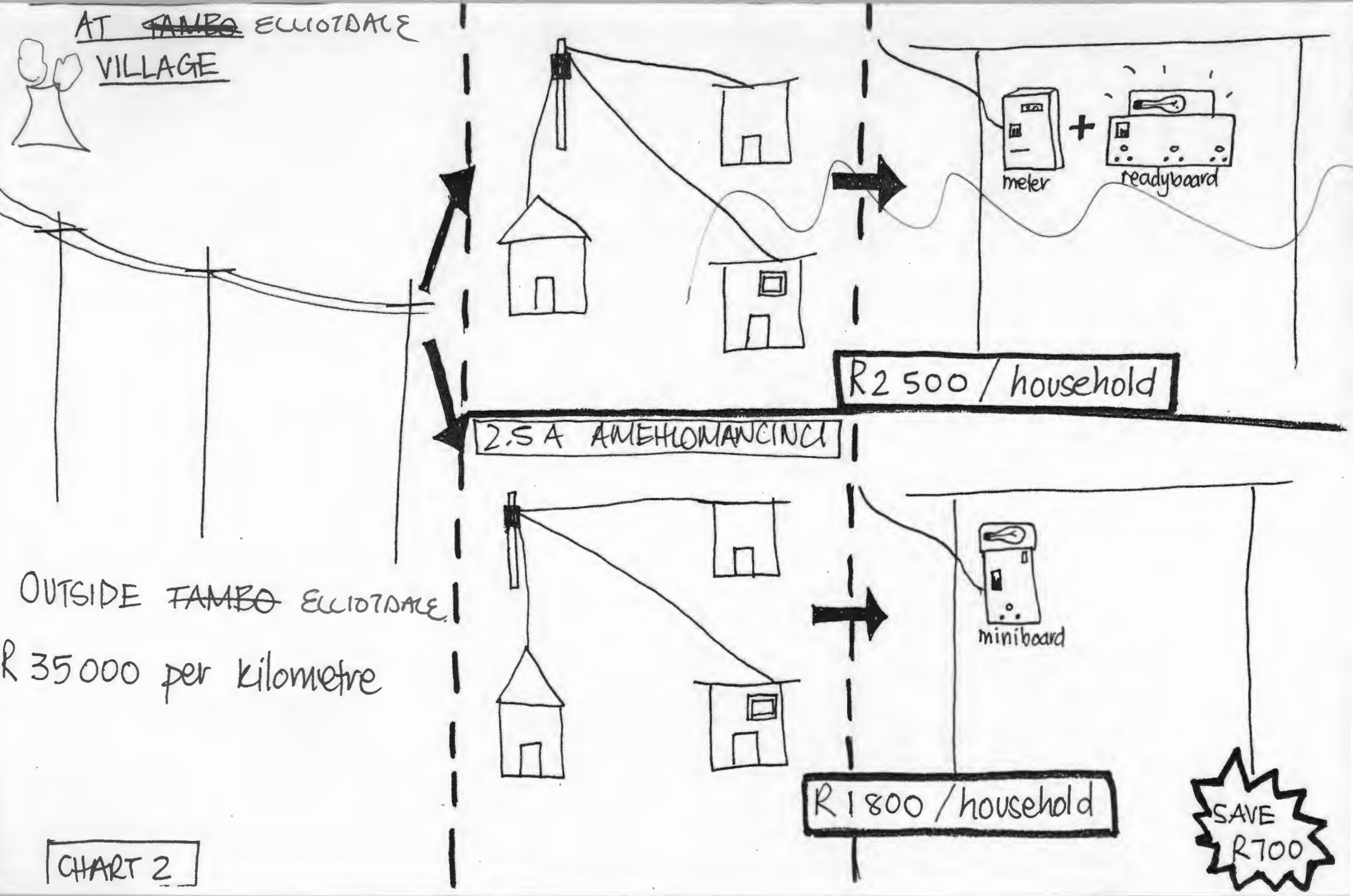

2.5 million household connections by 2000
OF PUBLIC ENTERPRISES
STELLA SICGAU
REPORTS TO STELLA SICGAU
ESKOM
• chief executive
• employees
ELECTRICITY REGULATOR
• CONTROL
• ENFORCE POLICY
ESKOM ELECTRICITY COUNCIL
• MAKES POLICY
• APPOINTED BY STELLA SICGAU
ORGANISED LABOUR
INDUSTRY
FARMERS
CONSUMERS
ESKOM
LOCAL AUTHORITIES IN TOWNS + CITIES
LARGE INDUSTRY
• MINES
• FARMS
RURAL AREAS

CHART 1


AT ~~TAMBO~~ ELLIOTDALE VILLAGE
meter
+
readyboard
R2 500 / household
2.5A AMEHLOMANCINCI
OUTSIDE ~~TAMBO~~ ELLIOTDALE.
R 35000 per kilometre
miniboard
R1800 / household
SAVE R700
CHART 2

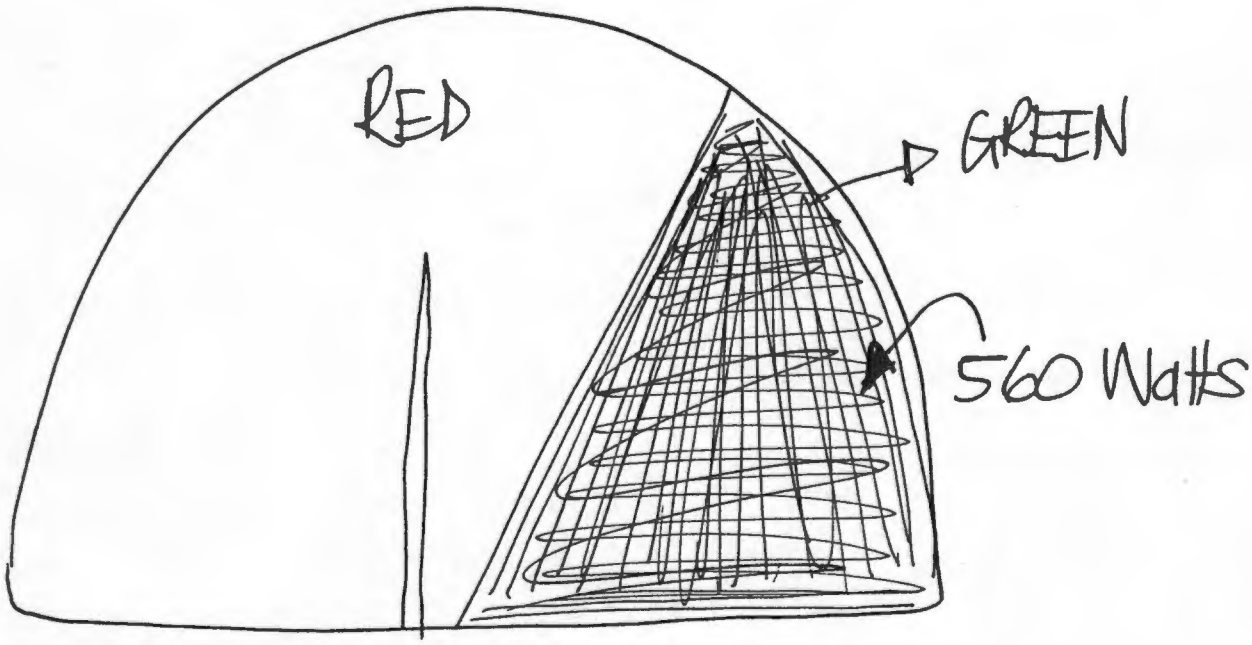
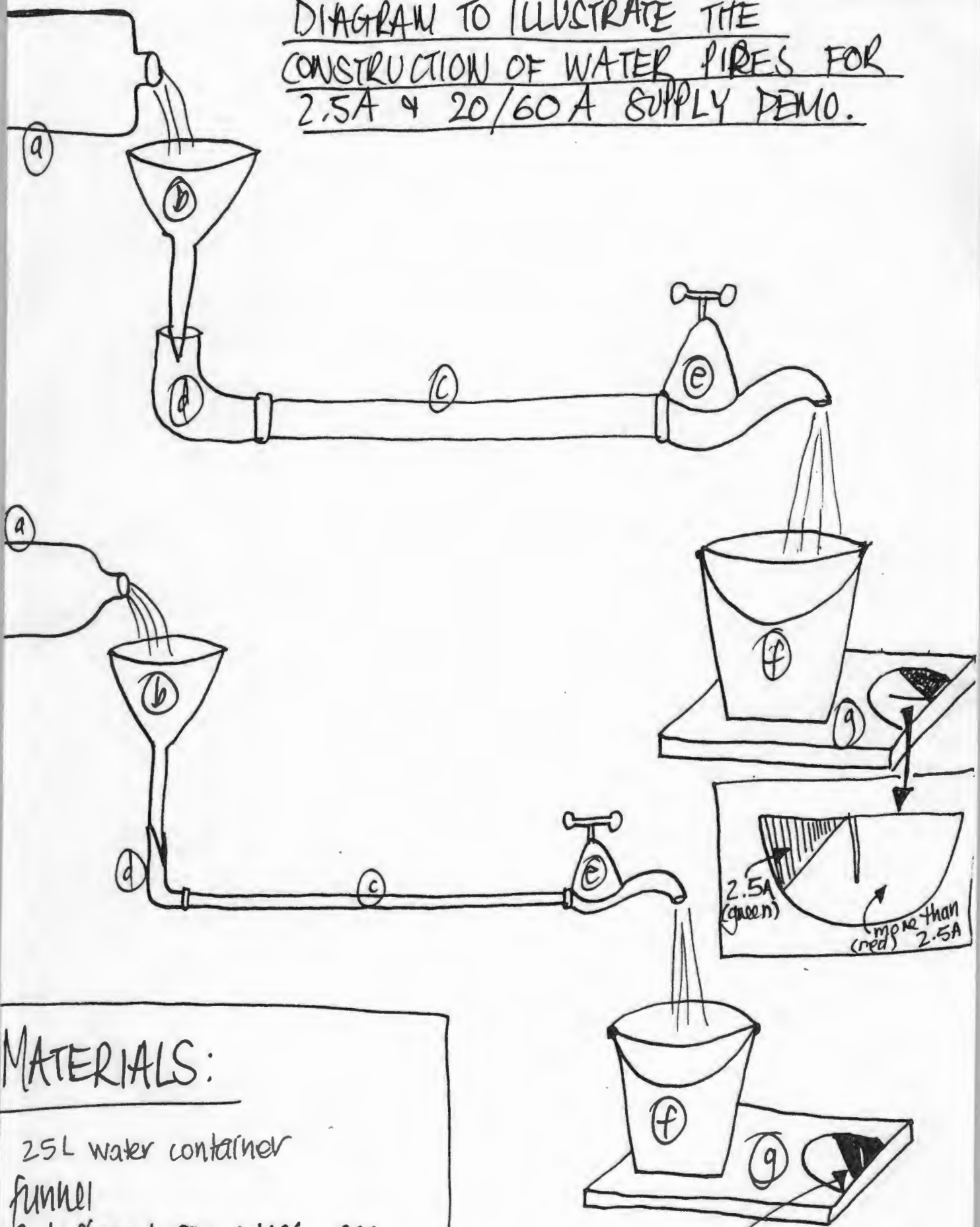



CHART 3

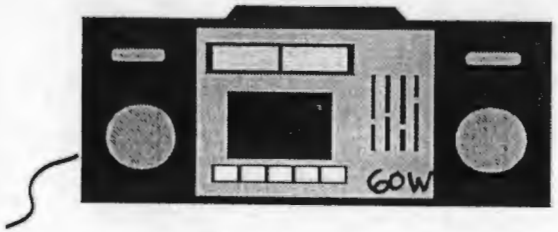
# DIAGRAM TO ILLUSTRATE THE CONSTRUCTION OF WATER PIPES FOR 2.5A & 20/60A SUPPLY DEMO.

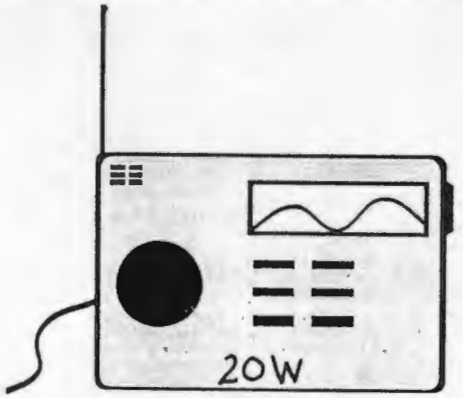


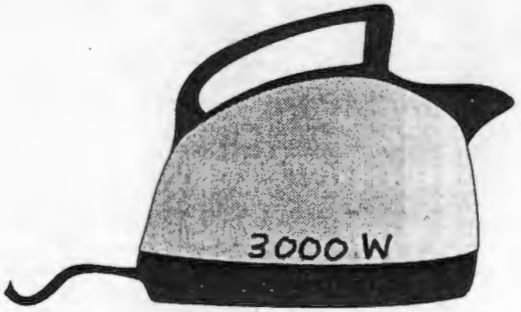

## MATERIALS:

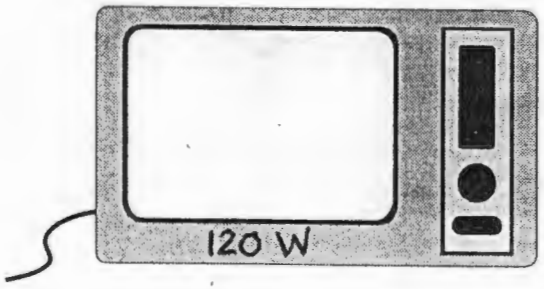
- 25L water container
- funnel
- 2 different size pipes - see through if possible
- 2 connections
- 2 taps/valves
- bucket
- g) bathroom scale

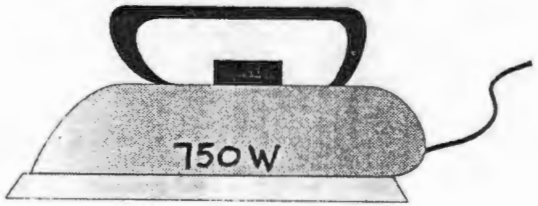
Cover to disc with piece of paper which represents 2.5A + 20A.

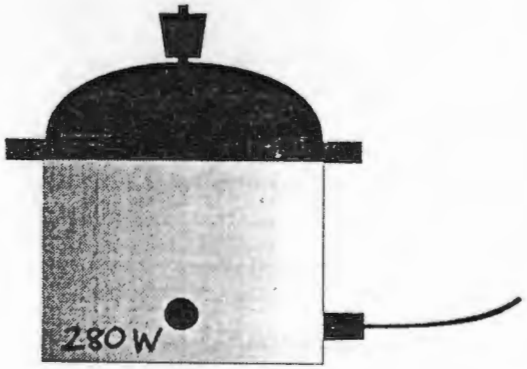

60W

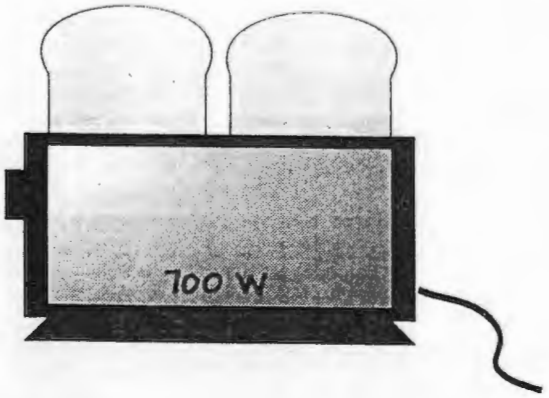

20W

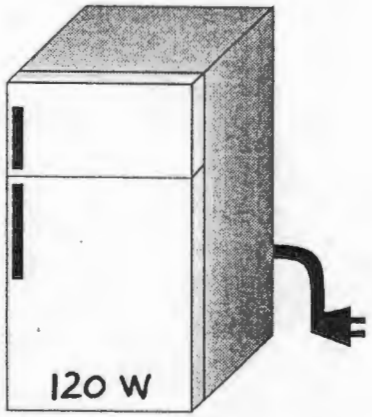

3000 W

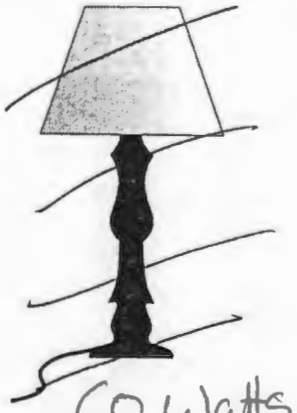

120 W


750 W


280 W


700 W

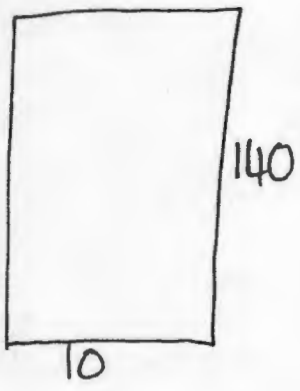

120 W


60 Watts

## 2.5 A SUPPLY GAME:

For this Game you will need cardboard for:

1) 140cm x 10cm [x 4]




These cards represent the 2.5 A supply ie 560 W

For each appliance cut cards in the following way + stick the picture onto the card:

20 W = 5 cm
60 W = 15 cm
100 W = 25 cm
120 W = 30 cm
280 W = 70 cm
400 W = 100 cm
750 W = 187,5 cm
1000 W = 250 cm
3000 W = 700 cm
4000 W = 1000 cm

either/or situation

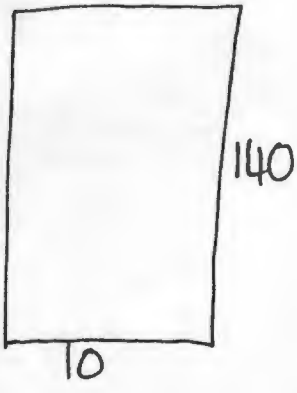
for those I don't think it's necessary to make them this big BUT they must be substantially bigger than the 140cm + 250cm cards to show just how much electricity is necessary.

In the end you will have 4 games: each with one rectangular card and a whole lot of appliances.

# 2.5 A SUPPLY GAME:

For this Game you will need cardboard for:

1) 140cm x 10cm [x 4]




These cards represent the 2.5 A supply ie 560 W

For each appliance cut cards in the following way + stick the picture onto the card:

20 W = 5 cm
60 W = 15 cm
100 W = 25 cm
120 W = 30 cm
280 W = 70 cm
400 W = 100 cm
750 W = 187,5 cm
1000 W = 250 cm
3000 W = 700 cm
4000 W = 1000 cm

In the end you will have 4 games: each with one rectangular card and a whole lot of appliances.

for those I don't think it's necessary to make them this big BUT they must be substantially bigger than the 140cm + 250cm cards to show just how much electricity is necessary.