

# **Solar electrification by the concession approach in the rural Eastern Cape:**

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**• PHASE 2: MONITORING SURVEY - NOVEMBER 2003**

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## EXECUTIVE SUMMARY

The present report focuses on the results of a second visit to households using Solar Home Systems (SHS) in the concession area of Eskom-Shell Ply in the Eastern Cape. It is to be regarded as a follow-up to the report circulated in March 2004, which described the origins of the research undertaken by the Energy Research Centre at the University of Cape Town on off-grid electrification, the objectives of the government's non-grid electrification programme, and the barriers to the setting-up of the institutional framework for providing SHS for rural households. The first report also provided the results of extensive fieldwork and surveys undertaken in 2001 in the Eastern Cape. This report concerns the follow-up study and presents the results from a return visit, at the end of 2003, to some of the same households that had been interviewed two years earlier.

The government's decision to provide solar power for households unlikely to receive grid electricity in the near future has already had a considerable impact. To date, about 20 000 SHS have been installed under the government's off-grid electrification programme, a figure derived from the information furnished by the service providers interviewed. The solar systems installed are small, with a total output of 50Wp that is sufficient to provide for 4 energy efficient lights, a black and white TV, a small radio and small appliances such as a cell phone charger.

Six concessions have been established to provide rural populations with SHS using a capital subsidy of R3500 amounting to 80% of the costs of installing each system. The South African concessions are based on a fee-for-service model whereby the customer pays a monthly service fee in exchange for the use of a SHS. At the time of both the first and second surveys, SHS customers in the Eastern Cape were paying the full amount of the fee-for-service, that is, R58 per month. SHS customers in other areas were already benefiting from a nationally funded operational subsidy of R40 per customer, paid for by the local authority.

### *1. Background to the second survey*

In planning for the second survey of households in the Eastern Cape two years after the first, it was discovered that many households had had their SHS removed since the first interview. Among the sample of households, half of the dispossessions were because a section of the concession area had been grid electrified. The remainder were because of non-payment of the monthly service fee. A decision was made to include these households in the second survey in order to fully capture the views of households (some now using grid electricity) concerning their SHS and to understand the experiences of households whose SHS had been removed.

### *2. Methodology*

The first of the two surveys in the Eastern Cape, undertaken in June 2001, involved face-to-face interviews with a total of 348 households, 232 of which had SHS and the remainder were either grid-users or non-electrified households living in the same area. The return visit to 46 of the SHS-users took place at the end of 2003, when trained interviewers administered further face-to-face interviews using a detailed questionnaire. Households selected for the second visit were chosen from those interviewed in 2001 and living in the Flagstaff, Matatiele and Bizana areas.

It must be emphasized that the sample size in the second survey was small. The large distances between homesteads and the limited funds available for the research dictated this. The results presented here should therefore be read as indications of trends rather than as statistically significant results.

The questionnaire itself was divided into 13 sections. The second survey questionnaire included both "closed" and "open-ended" questions, the latter permitting respondents to express themselves freely in their own words on their experiences with the SHS. Replies were given in the respondent's own language and were noted verbatim by interviewers. Although the use of open-ended questions made more demands on the interviewers (who had to be selected from local people and trained) and translators, the inclusion of qualitative data adds much insight into customer satisfaction with solar electricity.

A measure is derived using the citations of respondents to quantify the number of positive, negative, ambivalent or neutral responses. The sum total of positive and negative views is a useful tool to measure the overall satisfaction of customers.

A further source of data in the second survey came from a series of interviews with community representatives whose knowledge of the specific communities and their particular problems added insights not directly available from household interviews.

### ***3. Socio-economic context and characteristics of households***

Interviews with representatives of rural communities underlined the extent of poverty in the concession area of the Eastern Cape, the inadequacies of infrastructure (roads, schools, public services) and the high incidence of unemployment. Several community representatives pointed out that the number of workers made redundant and returning home to the rural areas was on the increase. In some areas, the total population increase was putting further demands on already limited local resources.

Rural populations are not uniformly poor. The first report revealed the magnitude of differences in average monthly income of SHS-users compared with that of grid-users living in the same area and that of non-electrified households. This finding, in fact, reflects the relative efficiency of the means test used by the service provider. Having a regular salary was a prerequisite for a successful applicant for a SHS. The first report exposed the fact that subsidized SHS had excluded the poorer households.

Calculating the average income of SHS-users compared with households whose systems had been removed for non-payment (11 households), confirms that the average monthly income of previous SHS-users, R1115 is well below that of SHS-users R2307 per month. Due in many cases to exceptional circumstances, unemployment or death of the earner, these households had fallen through the means test. For households now with grid electricity, the average monthly income is R1989.

The average monthly per capita income for SHS-users is R542 compared with R196 for households whose system had been removed for non-payment.

### ***4. Reasons for removal of the SHS***

The fact that the grid was extended into part of the concession area demonstrates the difficulty of the service provider to obtain accurate and timely information about plans for grid electrification.

Respondents whose system had been removed for non-payment in response to an open-ended question, gave a wide variety of reasons which included that the SHS had not been working, that the head of the household had died or had lost his job or that the panel had been stolen or struck by lightning. There appears to be little flexibility or the ability to deal with exceptional circumstances on the part of the service provider, an aspect much regretted by customers.

Some customers whose system had been removed for non-payment stated that the technicians had not listened to their explanations and the majority felt saddened or 'bad' about losing their SHS. All but one of the households whose systems had been removed for non-payment answered that they would like their SHS to be re installed.

### ***5. Use of Solar lights***

Three-quarters of SHS-users regularly use all three of their inside lights. (4 households have more than one system therefore can use more lights). About one quarter of SHS-users however, use daily only one inside light and for some of these, the system was faulty and allowed the use of only one light. It must be remembered that the majority of SHS-users (all but three) have large homesteads requiring lighting in the remainder of rooms with fuels other than solar.

By far the most appreciated advantage of inside solar lighting is the brightness and the possibility of undertaking evening activities previously not possible. Such activities included opening the shop for longer hours, reading or doing housework. Several respondents emphasised that their home now looks beautiful and no longer suffers from the smoke and mess caused by candles or paraffin.

For households in which there was a member studying or doing homework, the use of solar lights is considered an important advantage, although some respondents complained that the number of hours of solar lights was insufficient for studying.

Both SHS-users and those households whose system had been removed view the changes and improvements brought about by having inside lights as highly positive.

Outside lights are similarly greatly appreciated by the majority of households. The reasons are varied but having more security and being able to see intruders or animals are frequently mentioned. Children and adults can move freely between the different buildings of the homestead. Having outside lights also allows members to work at night outside.

### ***6. Use of the solar system and experiences***

The first report on the Eastern Cape provided considerable detail on the use of the solar system which is not repeated in the second report. There are wide variations in the number of hours of use and therefore in the satisfaction with the system. For households who habitually retire to bed soon after the sun goes down, the number of hours they can use the solar system for is without problem. For others who need to extend the working day into the evening hours, the limited number of hours of solar lighting can be a difficulty especially in winter.

The first survey had shown a certain amount of ambivalence in how households perceive the SHS. Users have both positive and negative views of their system, which has several consequences. Ambivalence creates an element of discomfort that the individual will seek to reduce. One way may be to exaggerate the negative or the positive aspects. The implications for service providers are important. To satisfy rural dwellers with solar systems as an alternative to grid electricity may require offering more personalised and even more individualised customer care.

### ***7. Payment for the solar system***

Payment of the monthly service fee is one of the aspects that generate a good deal of negative feeling. This is not related to the location of payment points nor to the manner in which customers are received at the points of payment but rather to the amount paid – in relation to “what the system is capable of”. There is indeed considerable disappointment regarding what the SHS can be used for which is expressed in views concerning the amount of the monthly service fee. When asked whether the solar system is worth paying the monthly service fee, only 4% of SHS-users answered in the affirmative.

There is a virtually total absence of knowledge on the part of consumers, concerning the government’s capital subsidy that enabled the installation of SHS. Only 4 of the households who have been users for a number of years knew of the existence of a subsidy. The comments of respondents concerning the revelation of a government subsidy were indeed numerous and varied. Many felt that everyone in the area should be entitled to a SHS whilst others felt that the money would have been better spent on supplying the grid.

### ***8. Problems with the solar system***

In the early years of supplying SHS in rural areas, the number of faults and problems with the system were relatively numerous. Results of the questionnaire-questions suggest that problems are still frequent. Out of the 46 households revisited in 2003, only 6 (13%) had had no problems

at all with their SHS in 2 years. The component to have caused the most frequent problems was still the battery in 2003, followed by the panel, which, judging from respondents' comments appeared to lack adequate solidity to withstand high winds.

In 2001, some customers had had to wait a disproportionate length of time for repairs to the SHS but on the whole, the response rate for repairs appears to have improved considerably between the two surveys.

However, routine maintenance according to the comments of households is not consistent. Some SHS-users stated that routine checks were made every month, others claimed that such checks took place only once a year while other customers denied that any routine check had been made on their system.

Where routine checks had been made, customers were satisfied with how problems with the SHS had been handled. Where few or no routine visits had taken place, customers were far more likely to say that they were not at all satisfied.

### ***9. Use of TV and Radio***

All but three SHS-users have a TV but not all of them can operate the TV with the solar system. The reason given most frequently is the insufficient power of the SHS. One uses a generator. Of previous SHS-users, a smaller proportion uses a TV including those who now have grid electricity. Two households whose system had been removed had bought their TV because they had solar. Some previous SHS-users said that now they have insufficient money to buy a car battery or generator to power their TV. The majority of SHS-users have a radio but not all use solar for operating it. One has a radio too large to use with the SHS and others use dry cell batteries.

### ***10. All fuels used by the household***

How households use fuels to fulfil their needs not covered by solar power vary considerably. The findings of the first survey, confirmed by the second suggest that despite having to use other fuels for lighting parts of the homestead, SHS-users are able to reduce spending on candles and paraffin for lighting. These differences are small but most households are able to say that they are now spending less on these two fuels. In fact, 81% of SHS-users are spending less on candles compared with only 9% of previous-SHS-users.

The amount households are spending in total per month on all fuels is a considerable portion of their income as was pointed out in the first report. It is higher if the cost of return journeys to buy fuels is taken into account. SHS-users at the time of the second survey are on average paying R180 per month for all fuels excluding the fee for solar. This compares with an average of R157 in 2001. Variations in the local prices of fuels no doubt explain some of this difference.

A particularly interesting result is found for households whose system was removed because of a grid connection. All of this sub-sample are gas-users who are continuing to use gas after obtaining the grid. Their total average monthly expenditure on all fuels (excluding grid electricity) is therefore relatively high: R240. Households whose system was removed for non-payment, (none of whom are gas-users), spend a relatively low monthly average on fuels: R59. This is because their fuel needs are met almost exclusively by collected – not bought – fuel wood.

### ***11. The purposes for which fuels are used***

Households were asked which fuels they used for different household purposes that included: cooking, lighting, water heating, space heating, space cooling, TV, radio, fridge, freezer and ironing. They were asked which fuel was most frequently used followed by the second most frequently used fuel and then the third.

Among all households there is a dominant use of fuel wood for the purposes of cooking but also for water heating, space heating and ironing. Those whose system was removed for non-payment almost exclusively use fuel wood. Among previous SHS-users now with grid electricity, only two households use grid electricity for cooking. Note can be made of the fact that in the first survey in which grid users living in the same area were interviewed, it found that 20% were cooking with electricity. The extensive use of fuel wood in this part of the Eastern Cape is of particular interest to the service provider who has been incited by the government to improve the access of households to modern fuels.

### ***12 Household electrical appliances***

A surprisingly large number households own appliances they cannot use with a SHS. 52% of SHS-users and the same percentage of households whose systems have been removed own such appliances. These appliances cover a wide range of types running from: kettles, irons, hot-plates, stoves, roasters, fridges, freezers, washing machines, heaters, vacuum cleaners, colour TVs and even a lawn mover and a computer.

When asked what appliances the household would like to buy in the near future, the list is equally long and includes as well as the above, microwaves, hair dryers and video players. Interestingly enough mention is made of a solar stove and a solar pot that households would like to buy in the future.

### ***13 Perceptions of SHS and solar power***

A series of six "open ended" questions was asked at the conclusion of the interview with both SHS-users and previous SHS-users. These questions were designed to probe respondents' perceptions of the value of solar power for their own household and for their community.

The first question asked was "*How did the solar system change the lives of members of your household*". This was followed by five others: "*How do/did you feel about not being able to cook, iron run a to cook, iron run a fridge with your solar system?*", "*What did/do you like most about the solar system?*", "*What do/did you dislike most about the system*", "*Would you advice other people in your community and elsewhere to get a solar system?*" and "*Should everyone in your community have a SHS?*".

Many different types or categories of responses from users and previous users were generated by these questions. There was no restriction on the number of elements that each respondent could mention and some respondents mentioned as many as 4 different ideas.

The comments of respondents, noted verbatim, are illustrative of the sometimes-intense reactions of customers to their solar system. They provided a means of categorising responses as positive, negative, ambivalent and neutral. An important finding from this survey is that in general, positive views predominate amongst customers, despite the sometimes strongly negative and occasionally bitter feelings expressed. The fact is interesting that previous SHS users, contrary to what might have been predicted, are on the whole more positive than SHS-users. This finding is further supported by the fact that all but one of the households whose system had been removed for non-payment would like to have the SHS reinstalled.

### ***14. Concluding remarks***

This report, which ideally should be read in conjunction with the first report written after the base line survey in 2001, has presented the results of a follow-up survey of 46 of the same households interviewed in November 2003.

Views of SHS-users are positive provided that the system is functioning properly and this is not always the case. Negative views are generated by a poorly functioning system and are reinforced by delays in repairs. It might be possible to propose a more widely recognised rebate

system to customers whose system is not functioning such that they do not pay for the time the system is out of order. Further negative views are generated by the cost of the monthly fee-for-service that the majority of households feel is not matched by the services the solar system is capable of. SHS-users were expecting more than just light from their SHS and in some cases, negativity turns to bitterness.

It is important to note that a greater percentage of respondents would advise others to apply for a SHS in 2003 than was the case in 2001. 57% of SHS-users would have advised others to get a SHS in 2001 compared with 64% in 2003. A surprising finding is that households that had had their SHS removed, either for grid electricity or for non-payment, are more likely than SHS-users to say they would advise others to obtain a SHS.

### **Key Issues**

- Customers are still not adequately represented by an independent body or organisation. This could be of considerable advantage for customers and service providers alike. The NER has this function but remains unknown to the vast majority of rural consumers.
- Customers need to be far better informed. This applies to the technology of the SHS but also to the capital subsidy and the intentions of the government. It is a missed opportunity that the majority of customers interviewed knew nothing of the government capital subsidy and even less about the amount of the subsidy. Keeping customers informed about, for example, future grid plans no matter how far into the future, and keeping them informed about the developments of the service provider company and advances in solar technology would seem to be a way of assuring greater customer fidelity.
- The provision of a SHS in the Eastern Cape is on the basis of a means test that excludes the poorer rural household. Solar systems were in fact, removed from households unable to pay the monthly service-fee and often for reasons related to exceptional circumstances. A strong feeling was expressed by interviewed customers that solar electricity should be available for everyone in isolated communities. Important issues remain the reduction in the installation cost, the quality and robustness of systems and the reduction in the cost of maintenance

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## Abbreviations and acronyms used

SHS	solar home system
PV	photovoltaic
DME	Department of Minerals and Energy
NER	National Electricity Regulator
Wp	Watt-peak
RESCO	rural energy service company
NECC	National Electrification Co-ordinating Committee
ESCO	energy service company

## 1. Introduction

The present report focuses on the results of a second visit to households using Solar Home Systems (SHS) in the concession area of Eskom-Shell Ply in the Eastern Cape. It is to be regarded as a follow-up to the report<sup>1</sup> circulated in March 2004 which describes; the origins of the research on off-grid electrification, the objectives of the government's non-grid electrification programme, the barriers to the setting up of the institutional framework for providing SHS for rural households. The first report provided the results of extensive fieldwork and surveys undertaken in 2001 in the Eastern Cape. This follow-up report presents the results from a return visit, at the end of 2003, to a number of the same households who had been interviewed two years earlier.

The government's decision to provide solar power for households unlikely to receive grid electricity in the near future has already had a considerable impact<sup>2</sup>. Six concessions have been established to provide rural populations with SHS using a capital subsidy of R3500 amounting to 80% of the costs of installing each system. The South African concessions work on a fee-for-service model whereby the customer pays a monthly service fee in exchange for the use of a SHS<sup>3</sup>. At the time of both surveys, SHS customers in the Eastern Cape were paying the full amount of the fee-for-service that is to R58 per month. SHS customers in other areas were however, benefiting from a nationally funded operational subsidy of R40 per customer paid by the local authority<sup>4</sup>.

In planning for the second survey of households in the Eastern Cape two years after the first, it was discovered that many households had had their SHS removed since the first interview. Among the sample of households, half of the dispossessions were because a section of the concession area had been grid electrified. The remainder were because of non-payment of the monthly service fee. It was decided to include interviews with all these households in the second survey in order to capture the views of households (some now using grid electricity) concerning their SHS and to understand the experiences of households whose SHS had been removed.

In Section 3, the focus is on the monthly income levels of households retaining their SHS compared with the income of those whose systems have been removed. In the sections following, the analysis deals with many different aspects of the use of a SHS. Such aspects include: the experiences of using inside and outside solar lights, Section 5. Monthly payment for the system and the contact that SHS-users had with the service provider staff are dealt with in Section 7. Section 8 analyses the nature of the problems that users have had with the SHS over a two-year period. In Section 10, a description is given of all other fuels which households use in conjunction with solar and the average monthly expenditure on these fuels is analysed. The various purposes for which households uses different fuels are treated in Section 11. Section 12 discusses the number and type of appliances that households own and but cannot use with their solar system. Section 13 provides an analysis of customer perceptions of their SHS and its advantages and limitations. This includes the analysis of perceptions of households in which the SHS had been removed. The analysis of citations from customers provides a means of assigning positive, negative, ambivalent and neutral values to views, which totalled, show an

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<sup>1</sup> Solar electrification by the concession approach in the rural Eastern Cape: Phase 1. Baseline Survey, Hazel Ranninger, Energy Research Centre, University of Cape Town, March, 2004

<sup>2</sup> To date, about 20 000 SHS have been installed under the government's off-grid electrification programme. This figure is derived from the information that service providers had furnished.

<sup>3</sup> The SHS have a total output of 50Wp, sufficient to provide for 4 energy efficient lights, a black and white TV, a radio and small appliances such as a cell phone charger.

<sup>4</sup> The operational subsidy of R40 per month per customer may not be continued in the near future. (Communication from the DME).

overall positive response of customers despite the frequently strong, negative views associated with the amount of the fee-for-service and other aspects of the SHS.

The data from the two sets of interviews two years apart, provided the possibility of making apparent the changes in peoples' lives and livelihoods resulting from the use of their solar system over a relatively long time period. Where there are differences or trends between the two surveys, these are discussed.

## 2 Methodology

The first of the two surveys in the Eastern Cape, undertaken in June 2001 involved face-to-face interviews with a total of 348 households, 232 of which had SHS and the remainder were either grid-users or non-electrified households living in the same area. A return visit to 46 of the SHS-users took place at the end of 2003, when trained interviewers administered another detailed questionnaire.

Households selected for the second visit were chosen from those interviewed in 2001 and living in the Flagstaff, Matatiela and Bizana areas.

It must be emphasized that the sample size in the second survey is small. The large distances between homesteads and the limited funds available dictated this. The results presented here should be read therefore as indications rather than as statistically significant results.

The questionnaire itself was divided into 13 sections:

- A. Installation of the SHS,
- B. Use of solar lights
- C. Use of the SHS and experiences
- D. The contract
- E. Problems that might have been experienced by the household regarding the SHS
- F. Use of TV
- G. Use of radios/hi-fi
- H. All fuels used by the household
- I. Purposes for which fuels are used
- J. Household Energy Appliances in use
- K. Household member information
- L. household Income
- M. Expectations and perceptions of the SHS

### 2.1 Inclusion of qualitative data

Quantitative and qualitative methods are frequently dichotomised in research such that only one or the other technique is used. However, both methodologies were used in this survey. This

permitted respondents to use their own words to answer some questions or describe how they do things, which has the advantage of not imposing predetermined moulds or structures that may actually camouflage how respondents think and feel. To understand these latter aspects, became essential in view of the amount of ambivalence on the part of SHS users revealed in the first survey.

Thus an unusually large number of "open-ended" questions were included in the return visit interview. This was to allow for the full expression of views, sentiments and opinions about solar electricity beyond what had been ascertained from the first survey. Questions were modified to gain insight into household's reactions in the face of the removal of a solar system where this was the case. This approach permitted a far greater input and contribution from respondents during the second interview. As nearly as possible, the answers to "open-ended" questions were noted down verbatim by the interviewers and in the language of the respondent<sup>5</sup>. The "open ended" replies were post-coded and where appropriate (for a total of 9 questions), each comment was assigned to a category of positive, negative, ambivalent or neutral. This made it possible to compare the total number of positive or negative responses to certain key questions. Ambivalent responses were defined as those that include both positive and negative ideas in the same comment. Neutral responses were those that were neither positive nor negative. In order to illustrate how respondents had responded in relation to their experiences with the SHS, direct quotations are included in this text.

Using both quantitative and qualitative methods places even greater importance on the training of interviewers. The quality of the data obtained, especially qualitative data, depends to a very large extent on the professionalism of the interviewers. To be a good listener and encourage respondents to "speak their minds" are two of the essential qualities of interviewers that come only after years of experience. Potential interviewers were selected from applicants living in the local communities and successful applicants were provided with two days of intensive training which included: how to interview, a briefing on solar technology and the provision of guide lines on the fuels used for different purposes by the households. Interviewers were also given special training on more delicate questions such as those dealing with income and non-payment.

## 2.2 Return visit after two years

Although rural populations are generally thought to be more "stable" than urban populations, two years is long enough to expect some changes in the composition of households. Members move away, others return home to live, members die and infants are born. It is not always possible to find the individual who was previously interviewed. The interviewers had been instructed to interview the same household member as had been interviewed two years previously. For a variety of reasons, this was not always possible. In such cases, the instruction to interviewers was to ask to interview the person most familiar with the use of the solar system and knowledgeable about the purchase of all fuels utilized by the household and the most informed member concerning household incomes. Appointments were systematically made with the member of the selected households in order to avoid the time wasted in finding the household member not at home. It is important to note that there were no refusals to participate in a second interview. Indeed, though the interview lasted on average two hours, many respondents indicated how much they had enjoyed and had learned from the interview.

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<sup>5</sup> The technique used in most multi-language interviews is for the interviewer to translate and ask the question in the language of the respondent, and to note down the replies in English on the questionnaire. This had proved unsatisfactory in the first survey, in that interviewers tended summarise into a few words what the respondent had actually said.

## 2.3 Information from the Community and Focus Groups

As at the time of the first survey, a series of interviews (8 in all) were conducted with representatives of outlying villages around the three communities. These interviews provided essential background information on life in the communities, on their infrastructure, on the number of specialists or trades people working in the area and a measure of social cohesion. More detailed information was also sought on local fuel prices and on electrification plans for the community as well as on projects involving job creation or income generation. Furthermore, community representatives provided insight into the most urgent needs of the community that households would not have been able to provide.

Focus groups were held in Bizana, Flagstaff and Matatele to which a dozen or so local SHS-users or previous SHS-users were invited. The value of such group discussions lies in indicating whether or not a consensus exists on key issues. Participants were first asked to list the most important and urgent needs of their community and then prioritise these, before the discussion focused on the use of solar systems. Analysis of these discussions is complimentary to the analysis of data from household interviews.

## 3 Socio economic context and characteristics of households

The socio economic context of the Eastern Cape and the characteristics of households interviewed were described in detail in the report of the first survey and are not repeated here. However, a few further details are given concerning the four communities where the households re-visited in 2003 live. Bizana's total population at the time of the 2001 census was 41 120. The three other towns, Mt Fletcher, Matatele and Flagstaff are smaller, with populations of 12 767, 5213 and 3067 respectively. The re-visited households all live in villages or hamlets at relatively large distances from these towns. Infrastructure such as roads, schools, transport and water supply are sorely lacking. The population in this area has recently been on the increase due to the return home of workers after being made redundant. Unemployment rates are particularly high.

Comparisons of monthly incomes of different sub-samples (SHS-users, grid-users and non-electrified households) in the first survey suggest that rural populations are not uniformly poor. In 2001, SHS-users were found to be wealthier, and more securely employed than grid users and on average, considerably wealthier than non-electrified households. This is largely the result of the means test imposed on applicants for the SHS. Leading figures interviewed in the different communities, however, confirm the extent of severe poverty in the area. 5 of the 8 representatives interviewed, characterised their communities as extremely poor with high rates of unemployment and malnutrition. SHS-users belong to a group of better-off households in the area.

The mean total monthly income (from all sources) of SHS-users in 2001 was R2307. Comparing the households interviewed two years later who still possess their SHS with those households whose system had been removed for non-payment, reveals that the latter were the poorest amongst the SHS-users. (See the Table below). The mean total monthly income from all sources for SHS-users interviewed in 2003 was R2341. For households whose systems had been removed for non-payment, the mean total monthly income in 2003 was R1115. For households whose systems were removed because they got grid electricity, the mean total monthly income is R1989.

Table 3.1 Average total monthly incomes (in Rand) of Eastern Cape SHS-users in 2003, compared with those whose systems had been removed for grid and for non-payment

Sub-samples	N	Minimum*	Maximum	Mean
SHS-users 2001	232	R100	R17040	R2307
SHS-users in 2003	25	R500	R6160	R2287
Previous SHS-users; systems removed because of grid	9	R400	R5000	R1989
Previous SHS-users; systems removed for non-payment	9	R150	R3100	R1115

\* Households with no income were eliminated from this calculation. It should be noted, however, that in the communities in which the interviews took place, the 2001 census data reports a relatively large number of households with no income in the towns of Bizana, Mount Fletcher, Flagstaff and Matatele.

A further feature of households, which bears directly on the income available to each member, is the number of persons living permanently in the household. Table 3.1 shows the quite striking differences between the average number of household members in the three sub-samples; households who still use their solar systems, SHS households who have been supplied with grid electricity and households who have had their systems removed for non-payment.

Table 3.2 Average number of household members

Sub-samples	N	Minimum	Maximum	Mean
SHS-users in 2003	25	1	12	4.28
Previous SHS-users: systems removed because of grid	10	3	10	5.8
Previous SHS-users; systems removed for non-payment	11	2	13	7.6

Since there are quite large differences in the average sizes of households according to the sub-sample, it is useful to calculate the per capita monthly income for each group.

Table 3.3 Mean per capita income according to sub-samples

Sub-samples :	Minimum	Maximum	Mean
SHS-users 2001	R17	R3408	R542
SHS-users in 2003	R65	R1975	R627
Previous SHS users: systems removed because of the grid	R88	R1250	R362
Previous SHS – users removed for non-payment	R23	R700	R196

Clearly, households with the least available per capita monthly income were those whose solar systems had been removed.

## 4 Installation

The majority of SHS-users have had their systems for three or more years. Two have been using their system for four years. For households no longer having a SHS, the average duration of using the system is just under two years. One household claimed to have had their system for five years before it was removed for the grid though this is unlikely.

### 4.1 Reasons for system removal

Of the 21 households visited whose SHS had been removed, 9 had obtained grid electricity. Other reasons for removal given in responses to an "open-ended" question are indicated in the Table below. These are categories of responses that result from the post-coding of the various replies to the question. Note that 5 responses, "SHS was not working" masks that because the system had not been working, households had stopped paying, the debt on the monthly service fee had mounted until the service provider had repossessed the system. The same is true behind the explanations from the respondent that the payer had lost his job, or had died. Repossession was, in all cases, for non-payment. One system struck by lightning had also been repossessed.

Table 4.1 Reasons why SHS was removed (*more than one response possible*)

Code-categories of responses	Frequency of mention*
Obtained the grid	9
SHS was not working	5
Was not paid for/could no longer pay	2
Payer lost job	2
Payer died	1
Struck by lightning	1
Stolen	1
They never asked anything/they simply removed it	2
Maintenance was too slow	1
Other	2

\* Multiple responses possible

One household claimed that the service provider had removed the system apparently because it was not working and had never returned it. What seems evident, in reading the full comments of some of these households below, is the need for service providers to take into account in their relations with customers, such exceptional circumstances as described by customers

Citations of what respondents had said are given in italics. R precedes the ID number where the SHS has been removed. U indicates that the household is still a SHS-user.

*"It wouldn't accept the card and they told us that we should have another one. Instead they came to remove the one we had and wouldn't listen" (R/2/116)*

*"They were rude in their actions because they never asked me anything, they simply removed the system" (R/2/189)*

*"They removed it because we had been provided with grid electricity- otherwise I had no problems with it" (R/2/229)*

That solar systems had to be removed because of the arrival of grid electricity is surprising. This no doubt reflects the considerable difficulty Eskom-Shell had experienced in obtaining sufficiently reliable and timely information from Eskom concerning their local plans for electrification.<sup>6</sup>

National policy could be clarified and strengthened on this point. This issue is discussed in more detail at the end of this report.

## 4.2 Reactions to system removal

An "open-ended" question asked households to describe, *"How they felt about having their solar system removed"*. The Table below summarises the main categories of responses.

Table 4.2 Feelings about removal of SHS (N=21)

Code-categories of responses	Frequency of mention*
We did not mind because we had grid	8
We were very sad	6
We felt bad because we had got used to it	4
We did not mind because it was not working	1
Solar is not the same as grid/resists stormy weather	2
Other	3

\*Multiple responses possible

Responses such as "we felt bad," "pained" or "very sad" were the most frequent impromptu statements from households whose system had been removed for non-payment in answer to this question. Interviewers confirmed the expression of regret and disappointment in notes made at the end of the interview. Re-possession of systems causes a good deal of distress. Not only do households lose the advantage of lights they had grown accustomed to, they also lose the higher social status associated with having electricity. (See Table 13 ) The removal of the panel is furthermore, particularly obvious to neighbours<sup>7</sup>.

<sup>6</sup> During an interview, the manager of Eskom-Shell had commented on the extent of these difficulties. In the absence of any concrete agreement on the boundaries of the concession area, Eskom-Shell had had to use the local government Integrated Development Plans in their decisions concerning areas for the expansion of solar.

<sup>7</sup> Solar Vision, the service provider in the Limpopo province, removes the battery (not as visible as the panel) as a first step towards re-possession of the system, if payment is not forthcoming.

*"I feel bad because it was of great help to me particularly when we hold church services at my place"* (R/2/113)

*"I was sad but do not mind because it cost me a lot of money already and yet continued to have faults"* (R/2/118)

*"I feel bad because I had got used to them (solar lights), and now that they are no longer there, it feels lonely"* (R/2/12)

*"It was very sad. Even though the head of the household later got another job, they would not listen when I tried to reason with them"* (R/2/125)

*"I felt very bad because I had become used to having it and was still hoping that they were going to improve the system so that it could be used for cooking as well"* (R/2/127)

*"We did not worry ourselves about that because we were no longer benefiting from them (the lights) anyway"* (R/2/147)

## 5 Use of solar lights

The use of solar lights by SHS-users was described in the first report<sup>8</sup> in terms of the hours of use and the power of the systems that dictates the upper limit to the number of hours of daily use. For the majority of the households revisited, the daily length of use of the solar lights is between 3 and 4 hours. 4 of the 25 revisited households have more than one system, which permitted them to use their solar lights for up to 8 hours. (One household had 3 systems, 2 of which were demonstration models provided by Eskom-Shell).

The majority of households use all of their solar lights provided they are working. One quarter of households however, (24%) use only one inside solar light daily. Others (4 in total) with more than one system use daily 3 or 4 lights.

### 5.1 Changes or improvements for the household brought by having inside solar lights

An "open-ended" question gave respondents the opportunity to describe the changes or improvements that had taken place as a result of having solar lighting. The responses were numerous but could be grouped into about a dozen or so coding categories. The Table below compares the responses of households who had had their systems over a relatively long period of time with those of households whose systems had been removed.

Table 5.1 Changes or improvements brought by **inside** lights

Code-categories of responses	SHS-users (N=25)	Previous SHS-users

<sup>8</sup> Solar Electrification by the concession approach.....op.cit.

		(N=21)
	Frequency of mention*	Frequency of mention*
Good/Bright lights	11	10
Brighter lighting/better than paraffin/candles	8	2
Can power TV	1	1
Can power radio	1	1
Can/could open shop at night	1	
Can/could cook/clean at night	2	
Can/could read at night	1	2
Homestead/home now beautiful	4	
Less smoky/less messy	2	1
No difference/still using a generator	1	
No longer use/d candles/paraffin/use less	4	7
Children study/studied longer/ do/did better in school		4
Makes/made no difference/little or no change		2
Added to misery		1
Other	1	2

\*Multiple responses possible

For both SHS-users and for households who no longer have their SHS, the quality of solar lights is greatly appreciated. Being able to switch on and off a light is highly valued. This was frequently spontaneously mentioned as a source of improvement and change. Other responses make it clear that it is the enlargement of household activities possible in the evenings that households appreciate most, whether it is watching television, reading, studying, preparing food or doing housework. That the household no longer has to buy candles or paraffin for lighting is mentioned among the improvements. There were several respondents who mentioned that solar lighting made their home look more beautiful or less messy (the result of using candles or paraffin). The desire to exhibit an improved social status brought by a SHS was also noted in the earlier survey.

Other households mention only their negative perceptions of solar and many of these are the households in which the solar system had never worked properly. Where this had happened, especially in conjunction with severe financial constraints, responses convey considerable bitterness. "*It added to my misery.*"

Table 5.2 Changes and improvements brought about by having **inside** lights: assigned positive, negative, ambivalent and neutral responses according to sub-samples

Responses	SHS-users (N=25)	Previous SHS-users (N=21)
Negative	0	2
Positive	23	18
Ambivalent	0	0
Neutral	1	1

From the above Table it is clear that as far as inside lights are concerned, the majority of households are entirely positive. The designation of responses as 'negative' 'positive' 'ambivalent' or 'neutral' are based not on the coded categories of responses as above but on the transcriptions of respondents' replies from which citations are also drawn.

## 5.2 Use of outside solar lights

Responses to the question concerning the changes and improvements to the household resulting from having lights outside the house, must be understood in the context of the isolated and dispersed nature of rural homesteads, often composed of several buildings separated by darkness. To have a bright outside light is greatly appreciated for the security it brings, for making it possible to see any movement from a distance, whether it be animals or intruders. The light permits anxiety-free movement between buildings for adults and children. The outside light also enables households to undertake activities outside that they were unable to do before.

The Table below lists the code categories of responses to this question from both SHS-users and households who no longer have their system.

Table 5.3 Changes and improvements brought by having **outside** lights

Categories of responses	SHS-users (25)	Previous SHS-users (21)
	Frequency of mention*	Frequency of mention*
Bright outside lights	5	10
Can/could see all movement outside/distance away	5	3
Adults/children can/could move around without fear	6	11
Prevents intruders/thieves/wild animals	9	4
Can/could work outside	2	
House looks beautiful	6	
No change because we use generator	1	2
Little/no change because SHS not working		2
Don't use outside lights	2	

\*Multiple responses possible

*"Their brightness made it easy to move around the house without fear, and the children enjoyed the benefit as they were no longer afraid to be sent out in the evening" (R/2/144)*

*"It was bright outside and there was no more stealing of the livestock" (R/2/183)*

*"It was good to have outside lights especially since we live here all alone"(R/2/189)*

*"My home is now good-looking- inside and out. Because of the solar lights, I can now sit outside the house at night and converse with my neighbours without fear" (U/2/3)*

It must be remembered that for half of households that had previously had a SHS, when the system was removed the advantages of having solar lights must have been painfully missed. For the remainder, grid replaced the solar.

Table 5.4 Changes and improvements brought about by having **outside** lights. Positive, negative, ambivalent and neutral responses according to sub-samples

Responses	SHS-users (N=25)	Previous SHS-users N=21)
Negative	0	2
Positive	21	19
Ambivalent	0	0
Neutral	3	0
No answer	1	

Concerning the outside light made possible by the SHS the responses are again overwhelmingly positive.

### 5.3 Solar compared with other sources of light

A short series of questions asked respondents to compare solar lights with other forms of lighting: candles, paraffin lamps, gas lamps and grid electricity, according to whether they were brighter, easier to use, safer or effectively the same. The results, which reveal some interesting divergences of opinion, are given below.

Table 5.5 Solar lighting compared with other lighting sources:

<i>Solar compare d with:</i>	<i>SHS- users</i>				<i>Previous SHS- users</i>			
	<i>Brighter</i>	<i>Easier to use</i>	<i>Safer</i>	<i>Same</i>	<i>Brighter</i>	<i>Easier to use</i>	<i>Safer</i>	<i>Same</i>
<i>Candles</i>	100% yes	100% yes	100% yes	100% no	100% yes	95% yes	100% yes	100% no
<i>Paraffin lamps</i>	100% yes	100% yes	100% yes	100% no	100% yes	100% yes	100% yes	100% no
<i>Gas lamps</i>	96% no	56% yes	56% yes	96% no	81% yes	95% yes	100% yes	100% no
<i>Grid</i>	100% no	64% no	40% yes	88% no	95% no	43% yes	62% yes	38% yes

The Table shows the small but interesting differences in perception of different sources of lighting compared with solar. 56% of SHS-users think that a gas lamp is easier to use than solar

though they don't think that gas is as bright as solar. Possibly, the fact that a gas lamp can be carried around the homestead gives it this advantage.<sup>9</sup> There is also a doubt about the safety of grid electricity: 40% of both sub-samples consider that solar lighting is safer than grid electricity.

## 6 Use of solar system and experiences

About a quarter of households use or used their solar system for lights only. There are several reasons for this, including lack of suitable appliances such as a black and white TV or a small radio. For other users, the system has not been working well enough to use more than just one light. A few households had an inverter, just 3 households among the SHS-users interviewed and 6 among the previous users of SHS. A detailed description of the number of hours and the seasonable variation in the number of hours of use of solar light is provided in Chapter 9 of the report of the first survey. In this section, attention is given to how respondents described their experiences with their SHS.

An "open-ended" question was asked about how households felt about the number of hours they could use their SHS.

For a quarter of SHS-users the number of hours of use was fine and presented no problem. For the remainder, the question opened the way for a number of negative responses as the Table 6 shows. There are obviously large variations in the number of hours households need lights for in the evenings, depending on the ages of members and the various activities the household is engaged in after dark.

Table 6.1 "How does the household feel about the number of hours you can use the solar system for everyday?"\*

Code-categories of responses	Frequency of mention*
Fine/OK/No problems/Satisfied	6
Too limited to use several appliances at same time	2
Hours too limited/We work in the evenings	9
Hours too limited in Winter	7
Needs more power/more hours	5
Hours too limited/lights not always functioning	1
Other	1

\*This question was asked of SHS-users only

\*\*Multiple responses possible

Where households have long working days, prolonged into the evening hours, the limited number of hours of use of the solar lights can be a problem.

*"We are able to use the system until it's time to switch it off and go to sleep" (U/2/9)*

*"We are not happy with it (number of hours) because it does not fulfil our needs. We were hoping that we would be able to have lights and power our TV set as much as we want"(U/2/1)*

<sup>9</sup> Since many households have rooms that are not lit with solar, there may be a potential market in developing a mobile solar light chargeable on the same system.

*"I am not happy about the number of hours. When the idea of a solar system was first introduced to us, we were told that it would help us on our electric needs. The fact that you can't have lights and play your radio at the same time does not sound OK" (U/2/8)*

*"Not happy because if you watch TV during the day you are limiting the hours for lights at night" (U/2/10)*

What seems clear from the above statements is that there is a host of reasons why people answer in a particular way. In the first case above, the users are happy about the number of hours they can use their system for because the SHS fits nicely into their normal routine. In the second case, one can speculate about how a first disappointment about what the household could do with their system has spread over to other aspects, making them negative towards the whole system.

## 6.1 Ambivalence

Analysis of data from the first survey and reported in the report, revealed a tendency for some SHS-users to have both positive and negative opinions about their systems. Ambivalence creates a discomfort that the individual will seek to reduce. Exaggerating the negative aspects or ignoring the positive aspects may be part of the process of reducing ambivalence. There are many instances of ambivalence in everyday life but here, the implications for service providers and indeed, for the government's off-grid electrification policy are perhaps far-reaching. To satisfy rural dwellers with solar systems as an alternative to grid electricity may require reducing ambivalence and offering more personalised and even more individualised customer care. Customers with both positive and negative views about their systems suffer from a good deal of uncertainty. They may need more reassurance than others. A single improvement in even one aspect may tip the balance in the positive direction.

## 6.2 Changes in homework and studying

Among households in which there are people studying or doing homework there is some support for the belief that lighting from the SHS has had a positive effect on performance. This is particularly marked for those whose systems have been removed. A little more than half of SHS-users and three-quarters of previous SHS-users have someone studying at home. In 2001, the proportion of SHS-users with persons studying in the household was considerably higher (73%).

Table 6.2 Categories of responses to whether solar light has brought changes or improvements to studying

	SHS-users N=25	Previous SHS-users
Code-categories of response	Frequency of mention*	Frequency of mention*
Could study longer hours	1	3
Doing better in school/developed interest in study	1	10
Boosts morale		1
I can help them with their homework	3	
No change in their performance	5	
Too short a time for homework	1	1
Can watch education programs on	1	1

television/radio		
When solar is faulty, can't do their homework	1	
Children too young to do homework	2	5
Other	1	

\*Multiple responses possible

One respondent summed up the changes which lights had made by saying :

*"I can now help them with their homework while at the same time cooking. Solar makes all this easy"*  
(U/2/25)

Caution, however, is necessary before establishing any direct relationship between use of solar lighting and school performance.

## 7 Payment for the solar system

Payment of the monthly service fee is one of the aspects that appear to have generated a good deal of negative feeling.

The majority of respondents, regardless of the sub-sample, were satisfied with the location of the points of payment of the monthly service fee. Given the difficult terrain and the distances, this represents a considerable achievement for the service provider. There were however, some divergences. In response to a question concerning how the respondent was received at the payment-point when making payment, about one third of SHS-users said that they were not well received and a quarter said that they were received rudely. But there were very few SHS-users who complained about long queues at payment points. Surprisingly, among respondents who no longer had their SHS, there was unanimity about being well received.

Table 7.1 Satisfaction about method of monthly payment

	SHS-users N=25	Previous SHS-users
Highly satisfied	16%	33%
Satisfied	56%	33%
Not satisfied	28%	33%

Respondents were then asked to give the reasons for their answers to the above question:

Table 7.2 Reasons for levels of satisfaction concerning the method of monthly payment

	SHS-users N=25	Previous SHS-

		users N=21
Code-categories of responses	Frequency of mention*	Frequency of mention*
Card helps with budgeting	2	
Served immediately	6	
You can buy the card any time of day	2	1
Outlet is close by	3	5
No long queues	5	
Served politely		1
No problem in paying R58	1	2
Good to pay once a month on same date		1
Even without money, one is forced to pay	2	
Have no alternative		3
Card is too expensive/faulty		5
Cost of journey too high	2	
Have to pay even if not using system	1	2
Card box makes noise when working properly		1
Other	3	

\*Multiple responses possible

*"Nobody came to explain to us as to why the amount we pay was increased from R52 to R58" (U/2/16)*

*"I have not experienced any problems. You get served immediately" (U/2/1)*

*"The outlet officer won't provide me with a new card when I come to pay for it after some time because they know that I am unemployed and inconsistent in my payment" (U/2/2)*

*"You pay before you use solar and that makes things easier in terms of budgeting" (U/2/10)*

*"Because the money is too much and you still have to pay even if you don't use the system or it is faulty"(R/2/118)*

*"They increased the amount we paid and promised that there'll be improvements in the system, but there are still no improvements."(R/2/125)*

*"The card system can be trusted because there is a sound from the box that indicates that it is working" (R/2/187)*

Here it is clear that the average satisfaction for the group is composed of many, many different elements

Table 7.3 Reasons for levels of satisfaction: assigned positive, negative, ambivalent and neutral responses

Responses	SHS-users N=25	Previous SHS-users N=21
Negative	7	10
Positive	17	10

Ambivalent	0	0
Neutral	1	1

The vast majority of SHS-users do not consider the amount paid each month for the service fee to be worth paying.

Respondents were asked if they considered the amount of the monthly service fee to be worth paying for their solar system. The table below gives the results.

Table 7.4 Whether the solar system is worth the monthly service fee (R58)

Percentages	SHS-users N=25	Previous SHS-users N=21
Yes	4%	33%
No	96%	66%

An "open-ended" question followed in which respondents could indicate why they had responded in a given way.

Table 7.5 Reasons for saying solar system was worth paying for or not

	SHS-users N=25	Previous SHS-users N=21
Code-category of responses	Frequency of mention*	Frequency of mention*
To keep the company from going Bankrupt	4	
Too much considering what the SHS consists of	16	8
Amount too much/Too expensive		2
Too much because no promised improvements		1
To avoid repossession	2	
Should not be responsible for paying for services not had	1	
We can afford it		5
We need the lights		1
No problem, could use the system during the month even if no money		1
Cost a fortune because always faulty		2
Had no choice		1
Other		1

\* Multiple responses possible

Considering whether the SHS service was worth payment of the monthly fee of R58 provoked a predominantly negative set of responses.

*"I think that the amount is too much for lighting only. For instance, for R50 you can use electricity for cooking and power other appliances"*(U/2/15)

*"I think that the payment is high. Paying R58 to service a battery is too much as far as I am concerned"* (U/2/16)

*"The amount is high because you can't use solar to run your fridge, to cook and iron. If it were capable of doing these things, I could hang in there"* (U/2/19)

*"The solar cost me a fortune because it was always faulty"*(R/2/188)

*"The solar is very problematic in that it keeps on counting even when you haven't made use of it. In the end you are left with a huge debt"* (R/2/228)

Table 7.6 Reasons given for saying it was worth paying the monthly service fee or not: assigned positive, negative, ambivalent or neutral responses

Responses	SHS-users N=25	Previous SHS-users N=21
Negative	17	13
Positive	0	5
Ambivalent	0	3
Neutral	5	1

Despite the negative comments related to paying the monthly service fee, 80% of SHS-users and 86% of those whose system had been removed said that they were able to make regular monthly payments. An explanation for this apparent contradiction is that money for the payment of the service fee is available but there is a reluctance to devote this sum to the SHS as it currently is. Reasons for being unable to pay varied but not having the money or having lost a job or other exceptional circumstances were the most frequent explanations.

4 SHS-users had stopped monthly payment because the system was not working properly. The figure is higher for those whose systems had been removed.

## 7.1 Suggestions for making payment easier

All respondents were also asked in an open-ended question for their suggestions for making payment easier. The following table lists the categories of responses to this question.

Table 7.7 Suggestions to make payment easier

	SHS-users N=25	Previous SHS- users N=21
Code-categories of responses	Frequency of mention*	Frequency of mention*
Present system is fine/is OK/satisfied	3	2
One month gives time to get the money together	1	
Need local outlet /Shop/School/co-op	15	4
Buy as much as you want/can afford/like the grid	1	1
Need someone to collect the money/someone you know	3	
Reduce the price/too high for what you get	1	7
Better to pay via the bank	1	
Need better computer system/give a receipt	2	3
Transport costs should be reduced	7	
When the power cuts off, should stop counting		1
Other	2	2

\* Multiple responses possible

Customers had a variety of suggestions for making payment easier for people. Even though the majority did not have far to go to get to the centre where payment was made, for 11 households, the distance to the payment place was more than 20 km and for 5 households it was as much as 58 km. Not surprisingly then, a frequent suggestion was to have an outlet closer to homesteads or for someone known to the household to collect the monthly service fee. Suggestions such as being given a payment receipt, payment via the bank, improving the computer system were also made in response to this question.

## 7.2 The contract

In 2001, SHS households had been asked if they had signed a contract with Eskom- Shell before their system had been installed. At that time, about 83% recalled signing a contract. When the same question was asked in year 2003, the results are reversed. Of the SHS-users, only one respondent recalled having signed a contract whilst the remainder stated that they had not done so. Among those households whose system had been removed, the recall is higher with two-thirds stating that they had signed a contract. It seems likely that the majority of customers have simply forgotten that there was a contractual agreement. It is true that originally, the contract written on the reverse side of the application form was easily overlooked. A copy of the contract specifying with the rights and duties of the SHS-user and those of the service provider should perhaps be in the hands of the customer.

### 7.3 Knowledge of government subsidies

Knowledge of the subsidies provided by the government to make possible the installation of SHS is not widely known among users. Among those who had had their system for a number of years already, only 4 (16%) said that they knew there was a government capital subsidy for the installation. Of these only one knew the amount of the subsidy.

Table 7.8 Knowledge of government capital subsidy

	SHS-users N=25	Previous SHS-users N=21
Yes	4	2
No	20	19
No answer	1	

After asking respondents whether they knew of the government subsidy, interviewers were instructed to read a short paragraph to respondents, which explained the government capital subsidy<sup>10</sup>. (The operational subsidy was not mentioned in the interview since customers in the Eastern Cape were still paying the full R58.) The interviewers noted all comments and questions from respondents following this. Not surprisingly, the comments were numerous and varied. The main categories of responses are presented in the Table below.

Table 7.9 Comments and questions on government subsidy

	SHS-users N=25	Previous SHS-users N=21
Code-categories of responses	Frequency of mention*	Frequency of mention*
We can't see this because we are/were paying so much	1	5
Then we should be paying less money	3	2
If the government is paying, we should own these systems	1	
Seems a waste of money when they are faulty	1	
We were not informed/did not know	3	4
Then everyone in the village should have a solar system	6	
What is Eskom-Shell doing with all the money then?	2	1
Not right because we have already paid R150	2	
Eskom-Shell should do better then	1	1
Could not see or notice the subsidy	1	2

<sup>10</sup> 'Government has committed itself to providing electricity for all South African households. Where it is not possible to extend the grid electricity, rural households are being offered solar home systems at subsidized rates. For each solar home system installed, as yours here, the service provider (Eskom-Shell) received a subsidy of R3500 to help them make the installation in your home'

Government should increase the subsidy so that we can notice	1	1
Government should provide larger systems/supply all needs	1	
Because of the subsidy, we can afford it		1
Need electricity for other things like cooking		1
<u>Other</u>	<u>3</u>	<u>2</u>

\*Multiple responses possible

The “invisibility” of the subsidy according to respondents compounds the view that the monthly service fee is too high.

That customers did not know that the government was providing subsidies to make off-grid electricity possible for rural people is disappointing. Customers have very little knowledge of what the installation of a solar system actually costs. It is now unfortunately impossible too late to estimate how much better or more positive opinions concerning the SHS might have been had customers been correctly informed about the government off-grid programme. The categories of responses coded from this “open-ended” question were larger than for any other question in the interview.

*“Although we cannot say for sure that it has been a waste of money given that we don’t know how much it costs all in all to install the systems, but that seems to be a lot of money, particularly that this thing (solar) is now not working” (U/2/2)*

*“Does this mean that if you have this system your chances of having grid are zero? If that is the case they should come and remove their solar” (U/2/16)*

*“If that is the case then everyone should have solar”(U/2/21)*

*“Then why doesn’t Eskom-Shell install solar systems in each and every household when it has got all that money” (U/2/31)*

*“Why were we not informed about this when we still had the systems”(R/2/231)*

*“ Why is Eskom-Shell nt providing us with larger systems that can meet all of our electric need?” (U/2/2)*

*“More SHS should be installed in rural areas”(U/2/5)*

*“ We should own these SHS if the government is paying for them”(U/2/14)*

*“ Why then do they remove the systems if the government is helping? This makes it difficult to believe that the government is indeed helping out.” (R/2/110)*

## 8 Problems with the solar system

That the problems experienced with the solar system were a source of frustration had emerged clearly from the first survey. When the problem is not rapidly solved and the household has to wait for the repair of the system they cannot use, the frustration mounts because they pay the full monthly service fee even though the system is not working.

Of the total of 46 households re visited in 2003, six households (13%) had had no problems with their solar system in the past two years, neither with the functioning of lights nor with any of the system components. For the households concerned, this must have been very reassuring. But other households had experienced one or more problems, sometimes repetitive and sometimes involving several of the components.

All components of the system have been susceptible to problems. By far the most frequently specified problems concern the battery. One household had had as many as seven problems with the battery in a two-year period. But in the two years since the first survey, the speed of intervention by the technical staff when a problem has been reported appears to have improved considerably.

Table 8.1 Frequency of problems experienced with the SHS components during the last two years

	Panel	Battery	Charge control	Card
SHS-users (N=25)	9	15	4	3
Previous SHS-users	4	9	3	7
Total	13	24	7	10

### 8.1 Frequency and nature of problems with panel

Table 8.2 Frequency of problems with the panel\*

Number of times	Frequency
1	5
2	1
3	2
4 or more	1

\*Question asked of SHS-users only

In an "open-ended" question respondents were asked to describe the problems they had had with the panel.

Table 8.3 Problems with panel as described by respondents (more than one response possible)

	SHS-users(N=25) Frequency of mention*	Previous SHS-users (N=21) Frequency of mention*
<i>Doesn't work when windy</i>	4	1
<i>Moves on the pole/dropped down from pole</i>	4	
<i>They said it was not charging</i>	1	2
<i>Got broken by thieves</i>	1	
<i>Was stolen</i>		1
<i>Technician did not say</i>		1
<i>Other</i>	1	

\*Multiple responses possible

Roughly half the problems described seem to suggest a lack of solidity in the installation of the panel. The panel “moves on the pole”, “had dropped down” or “does not work when it is windy”. In two cases, the panel was broken or stolen by thieves.

Table 8.4 Length of time before panel was repaired

	SHS-users with problems	Previous SHS-users with problems
1-2 days	5	
3-4 days	2	
1 week		2
2 weeks		1
3 weeks		1
3 months	1	
No answer/not sure	1	

Two of the SHS-users and two of the previous SHS-users report having received a new panel.

## 8.2 Frequency and nature of problems experienced with the battery

Table 8.5 Frequency of problems with the battery

Number of times	Frequency
1	7
2	1
3	2
4	2
5	1
6	1
7	1

\*Question asked of SHS-users only

Table 8.6 Problems with battery as described by respondents (more than one response possible)

	SHS-users (N=25)	Previous SHS-users (N=21)
Problems as described by respondents	Frequency of mention*	Frequency of mention*
<i>They were deceiving us and giving us old batteries</i>	2	
<i>Power was always cutting off/battery was old</i>	9	2
<i>When acid is finished battery does not work</i>	2	
<i>Battery was leaking</i>	1	

<i>Only one light would work</i>	1	1
<i>Always said battery is faulty but did nothing to repair it</i>	1	2
<i>Said it needed replacement, new battery does not work either</i>		1
<i>Other</i>	3	

\*Multiple responses possible

Householders appear to be more knowledgeable about the battery and aware that the life expectancy is limited. The problem is that aging batteries perform intermittently or poorly. Two households suspect that they might have been provided with old batteries to start with.

Table 8.8 Length of time before battery was repaired

	SHS-users with problems	Previous SHS-users with problems
1-2 days	8	1
3-4 days		2
1 week	1	4
2 weeks		1
3 weeks	1	1
1 month	1	
3 months or more	2	

Five of the SHS-users and six of the previous SHS-users report having received a new battery.

### 8.3 Frequency and nature of problems experienced with the charge controller

Problems with the charge controller were less frequent, but as Table 8.3.2 shows, the length of time waited for repairs was longer.

Table 8.8 Frequency of problems with the charge control

Number of times	Frequency
1	3
2	1

\*Question asked of SHS-users only

Table 8.9 Problems with charge control as described by respondents

	SHS-users (N=25)	Previous SHS-users (N=21)
Problems as described by respondents	Frequency of mention*	Frequency of mention*
<i>Would not work</i>	1	
<i>Cut off before the end of the month</i>	1	
<i>The lights in another house</i>	1	

<i>would not work</i>		
<i>Would not accept the card</i>	1	4
<i>Continued to cut off even with new card</i>		1
<i>Would switch off before thirty days</i>		1
<i>Other</i>		1

\* Multiple responses possible

Table 8.10 Length of time before charge controller was repaired

	SHS-users with problems	Previous SHS-users with problems
1-2 days		
3-4 days	1	
1 week	1	1
2 weeks		
3 weeks	1	1
3 months		
No answer/not sure	1	1

One SHS-user and one previous SHS-user reported having received a new charge controller.

#### 8.4 Frequency and nature of problems experienced with the card

Table 8.11 Frequency of problems with the card

Number of times	Frequency
2	2
3	1

\*Question asked of SHS-users only

Table 8.12 Problems with card as described by respondents

	SHS-users (N=25) Frequency of mention*	Previous SHS-users (N=21) Frequency of mention*
Problems as described by respondents		
<i>Would not accept card/system would not work</i>	3	4
<i>Continued to cut off even with new card</i>		1
<i>Switch off before 30 days</i>		1
<i>Other</i>		1

\* Multiple responses possible

The most frequently mentioned problem was that the card was not accepted in the system, or "did not work" despite it having been paid for.

Table 8.13 Length of time before card receiver was repaired

	SHS-users with problems	Previous SHS-users with problems
Immediately		1
1-2 days	4	
3-4 days	3	1
1 week		
2 weeks		1
3 weeks		1
3 months	1	
No answer/not sure		3

One of the SHS-users and four previous SHS-users reported having received a new card

### 8.5 Routine maintenance

SHS-users were asked how often their SHS had been routinely checked in the last twelve months. Previous SHS-users were asked how many times the SHS had been checked during the period when they had it. SHS-users were asked when the system had last been checked.

In response to the question about how many times the system had been routinely checked in the last twelve months, responses were fairly varied. For four of the SHS-users, the answer was that the system had not been checked in the last twelve months. For others it had been either regularly checked or every month. One respondent stated that the technician lives close by. In another case the respondent claimed that the technician had visited, yrt not checked the system.

Table 8.14 Number of routine checks to SHS in last twelve months

	SHS-users (N=25)	Previous SHS-users (N=21)
0	4	1
1	12	10
2	1	
3	2	1
4		3
12/every month	4	
"Regularly"	2	
No answer		6

In a final question in this section, SHS-users were asked how satisfied they were with the way in which the problems had been handled.

Table 8.15 Satisfaction with way SHS problems had been handled

	SHS-users (N=25)
<i>Highly satisfied</i>	0
<i>Satisfied</i>	9
<i>Not satisfied</i>	9
<i>Not at all satisfied</i>	6

Not surprisingly, there is a correlation between levels of satisfaction concerning the way SHS problems have been handled and the frequency of routine visits by technicians. Where routine visits were monthly customers are satisfied. Where few or no visits had taken place customers stated that they are not or not at all satisfied.

## 9 Use of TV and Radio

All but three SHS households have a TV but not all of them can operate the TV with the solar system. The reason given most frequently is the insufficient power of the solar system. (In one case, the TV is broken.) Three households only had bought the TV because they had solar. Almost half the sub-sample states that they cannot watch TV for as many hours as they would like to. The average number of hours of viewing is just over four hours per day with one household viewing up to 9 hours a day (using more than one solar system).

Of households whose SHS has been removed, a smaller proportion have a TV. 6 (out of a potential of 9 households who now have grid electricity) now power their TV with grid electricity. One household uses a car battery to power the TV.

Only two previous users of SHS had bought their TV because they had solar. Half of households whose SHS has been removed are now unable to use the TV for as long as they would like. The most frequent reason is lack of money to buy a car battery or a generator

All but four SHS-users have a radio that the majority are able to operate with the solar system. Among households with radios that they can not use with solar, one has a radio too large to be operated with solar, one has a faulty radio and in one case, the SHS was not working. For the majority of SHS-users and for previous SHS-users households are able to listen to the radio for as many hours per day as they would like.

## 10 All fuels used by the household

Because the fuels used by households for their needs other than lighting are varied, a complete section of the questionnaire dealt with the use of different fuels by the household, the quantities of fuels used and the total monthly expenditure on these fuels at the time the interview took place, (November 2003) and in the middle of winter. The following table is a summary of the principal figures concerning each fuel. Where appropriate, figures are given for 2001 and 2003. This makes it possible to explore the extent to which spending by SHS households on some fuels may be less as a result of using solar.

Table 10.1 Use and average monthly expenditure on different fuels SHS-users and previous SHS-users, 2001 compared with 2003

Type of fuel	SHS-users 2001 N=232 2003 N=25	Previous users of SHS (all) 2003 N=21	Previous users of SHS removed for grid 2003 N=10	Previous users of SHS removed for non-payment 2003 N=11
<b>Candles</b>				
Users 2001	71%			
Users 2003	64%	91%	80%	100%
Average monthly expenditure				
2001	R18			
2003	R9	R22	R21	R23
Spending less	81%	11%	13%	9%
Spending more	6%	42%	38%	45%
Spending same	12%	47%	50%	45%
<b>Paraffin</b>				
Users 2001	89%			
Users 2003	96%	48%(10)	80%(8)	2 cases only
Average monthly expenditure				
2001	R54			
2003	R45	R47	R53 (9)	2 cases only
Spending less	41%	18%	22%	
Spending more	5%	9%	11%	
Spending same	55%	73%	67%	
<b>Gas</b>				
Users 2001	48%			
Users 2003	80%	43%(9)	100%	0
Average monthly expenditure				

2001	R90			
2003	R75	R116(9)	R116 (8)	No cases
Spending less	10%			
Spending more	0			
Spending same	90%	100%(9)	100% (8)	
<b>Fuel wood</b>				
Users 2001	33%			
Users 2003	67%	95%	90%	100%
Average monthly expenditure				
2001	R102			
2003	R81			
Spending less	0%	0		
Spending more	6%	0		
Spending same	94%	100%		
<b>Dry cell batteries</b>				
Users 2001	32%			
Users 2003	16%(4)	71%(15)	80%	64%(7)
Average monthly expenditure				
2001	R19			
2003	R18	R13	R11	R16
Spending less		7%		
Spending more		13%		
Spending same	100%(4)	80%(12)		
<b>Car Battery</b>				
Users 2001	14%			
Users 2003	12%(3)	19%(4)	No cases	No cases
Average monthly expenditure				
2001	R15			
2003	R22 (2 cases)			
Spending less				
Spending more				
Spending same				

Generator fuel				
Users 2001	5%(12)			
Users 2003	8%(2)	0		0
Average monthly expenditure				
2001	R131			
2003	R310 (2cases)			0
Spending less				
Spending more				
Spending same				

In interpreting the results in this table, it is important to remember that the sub-samples interviewed in 2001 were substantially larger than those interviewed in 2003. The results must therefore be taken as indications of trends rather than statistically significant.

In 2001 71% of SHS-users were using candles, a figure which drops to 64% in 2003. It must be noted that all but 2 SHS-users have more than three rooms in their homesteads whereby requiring the use of candles or other forms of lighting in addition to solar. 91% of previous SHS-users are currently using candles and the percentage remains high (80%) amongst grid users. 100% of previous SHS-users whose system was removed for non-payment are currently using candles.

For SHS-users, the average monthly expenditure on candles in 2001 was R18. This figure has dropped to R9 in 2003. Logically, one would expect SHS-users to be spending approximately the same in 2003 on candles unless paraffin or gas lamps may have replaced candles. The average monthly expenditure on candles is considerably higher for those whose systems have been removed, including those now using the grid. From the table above, the savings made by SHS-users on candles appear to be important.

89% of SHS-users were using paraffin (for all uses) in 2001, and supporting further the argument that more are using paraffin for extra lighting in 2003, 96% were using paraffin in that year 80% of previous SHS users are using paraffin in 2003. The average monthly expenditure on paraffin is slightly lower in 2003 than in 2001. It is higher (R53) for households who have lost their SHS because of non-payment.

80% of SHS-users were using gas in 2003. Interestingly, all households whose systems were removed for grid are gas users. The average monthly expenditure on gas in 2003 is lower than in 2001 though this may be a result of an artefact.<sup>11</sup> No households whose system was removed for non-payment are using gas in 2003.

A slightly larger percentage of SHS-users are using firewood in 2003 than were in 2001 though the number is considerably less than for households whose systems have been removed for non-payment. Here, 100% are using wood for their thermal needs.

<sup>11</sup> Removing one outlying value has a greater impact on the mean the smaller the sample size

Table 10.2 Average total monthly expenditure on all fuels (excluding solar) according to sub samples

	N	Minimum	Maximum	Mean
SHS-users	25	R18	R511*	R180
Previous SHS-users. Grid	9	R139**	R342	R240
Previous SHS-users. Removed for non-payment	11	R23	R216	R59

\* When spending on generator fuel is included

\*\*All households whose systems were removed for grid are using gas

The total average monthly expenditure on all fuels (excluding the monthly service fee for solar) for SHS users is R180 on top of which the household pays R58 for solar. All households who now have grid electricity are using gas, which explains their relatively high total expenditure on fuels. Households whose SHS were removed for non-payment predominantly use fuel wood for their fuel needs and almost exclusively use collected fuel wood which explains the surprisingly low average total monthly expenditure.

## 11 The purposes for which fuels are used

Households were asked which fuels they used for household purposes that included: cooking, lighting, water heating, space heating, space cooling, TV, Radio, fridge, freezer and ironing. They were asked which fuel was most frequently used followed by the second most frequently used fuel and the third. The table below summarises the information for each sub-group concerning the most frequently used fuel.

Table 11.1 Most frequently used fuels for different purposes

Purposes for which fuels are used	SHS-users N=25	Previous SHS-users, now grid N=10	Previous SHS-users, System removed for non-payment N=11
Cooking	1(44%) 2 (28%) 8 (28%)	1 (33%) 2 (33%) 8(11%) 11(22%) cases	1 (91%)

Lighting	10 (72%) 3 (20%) 9 (8%)	11(100%)	5 (91%)
Water heating	2 (40%) 1 (40%) 8 (24%)	1 (56%) 2 (22%) 8 (22%)	1 (91%) 2 1 case
Space heating	1 (60%) 2 (36%) 8 (4%)	1 (67%) 2 (22%)	1 (100%)
Space cooling	0	0	0
TV	10 (67%) 6 (8%) 9 (4%)	12 (56%) 7 1 case	0
Radio	13 (80%) 14 (12%) 9 (4%)	11 (78%) 12 1 case	12 (64%)
Fridge	8 (25%)	8 (50%)	0
Freezer	8 (4%)	8 1 case	0
Ironing	1(36%) 8(32%) 2 (28%)	1 (22%) 2 (22%) 8 (22%) 11 (22%)	1 (91%) 2 1 case

**Legend :**

1=Wood	7=Coal
2=Paraffin	8=Gas
3=Candles	9=Petrol/diesel generator
4= Plant residues	10=Solar home system
5=Cow dung	11=Grid electricity
6=Car battery	12=Dry-cell batteries

Among all households there is a predominant use of fuel wood (coded 1 in the table) for the purposes of cooking but also for water heating, space heating and ironing. Those whose system was removed for non-payment almost exclusively used fuel wood. Among previous SHS-users now with grid electricity, only two households use grid electricity for cooking. Note can be made of the fact that in the first survey, it was shown that 20% of fairly long established grid users were cooking with electricity. The extensive use of fuel wood in this part of the Eastern Cape is of particular interest to the service provider who has been incited by the government to improve the access of households to modern fuels.

## 12. Household energy appliances

A surprisingly large number households own appliances they cannot use with a SHS. 52% of SHS-users and the same percentage of households whose systems have been removed own such appliances. These appliances cover a wide range of types running from: kettles, irons, hot-plates, stoves, roasters, fridges, freezers, washing machines, heaters, vacuum cleaners, colour TVs and even a lawn mover and a computer.

When asked what appliances the household would like to buy in the near future, the list is equally long and includes microwave, hair dryers and video players. Interestingly enough mention is made of a solar stove, and a solar pot.

## 13. Perceptions of solar power

A series of ten "open ended" questions, were designed to probe respondents' perceptions of the value of solar power for their own household and for their community and these terminated the interview.

A first question asked, *"How did the solar system change the lives of members of your household"*.

A total of 14 different types or categories of responses from users (who were respondents whose who still had their systems as well as those whose system had been removed) were generated by this question. There was no restriction on the number of elements that each respondent could mention and some respondents mentioned as many as 4 different ideas.

The following Table summarizes the responses.

Table 13.1 Ways in which the solar system change the lives of members of the household.

	SHS Users N=25	Households whose SHS had been removed N=21
Code-categories of responses	Frequency of mention*	Frequency of mention*
We had/have good lights	8	8
Could watch TV/listen to radio	6	3
Could read		1
Could/can charge cell phone		1
Children/adults can/could watch education programs on TV	2	1

Children developed interest in their studies	0	2
We were/are enjoying a higher status associated with having electricity	2	1
Are/were no longer scared of burning with candles		1
We spend/spent less on (could do without) candles/paraffin	1	3
We move/moved around the homestead/sleep without fear/the homestead is protected	3	2
We could open the shop in the evening	1	
We use the generator so there i/was little change	1	
There is/was little/no change because we can't /couldn't cook/power other appliances	3	1
It adds/added to my misery/contributed to financial difficulties	2	
Nothing has changed	4	
Could not notice any difference because was always faulty	3	3
Can't light all the house	1	
Other	2	3

\*Multiple responses possible

Table 13.2 "How did the solar system change the lives of members of your household": Positive, negative, ambivalent and neutral responses

Responses	SHS-users N=25	Previous SHS- users N=21
Positive	14	14
Negative	8	2
Ambivalent		4
Neutral	3	1

As earlier, the judgement as 'positive', "negative", "ambivalent" or neutral is based on the comments recorded verbatim by interviewers. Among these are comments such as:

*"There hasn't been much change because I only use solar for lighting. It cannot power other appliances. Whilst other things improve and change, the solar doesn't". (2/U/29)*

*"It has changed our lives because it is as if we live in urban areas now – we have lights" (2/U/31)*

*"There was some change because the children could watch educational programmes on TV and there was the benefit of good light. (2/R/110)*

*"The light was good compared with candles and we could enjoy reading our books (2/R/192)*

*"We were happy to be able to power a TV, radio and lights" (2/R/202)*

*"It contributed to our financial difficulties" (2 /R/ 228)*

*"We were enjoying the higher status associated with having electricity at home" (2/R/147)*

*"Nothing has changed at all because it has brought me more misery. I cant even light all the houses I only use it mainly to power my TV." (2/U/2)*

Households are on the whole positive in their responses to the changes that solar has brought to the lives of members. In cases where the system had been removed 4 households are clearly ambivalent expressing both positive and negative feelings in response to this question.

The second question in this last section asked, *"How do/did you feel about not being able to cook, iron, run a fridge with your solar system?"* There were 12 categories of responses as given in the table below

Table 13.3 Feelings about not being able to cook, iron run a to cook, iron run a fridge with your solar system?"

	SHS-users N=25	Households whose SHS had been removed N=21
Code-categories of responses	Frequency of mention*	Frequency of mention*
Makes me feel very unhappy/very bad/is a total embarrassment	15	11
Makes us angry/is a big problem	1	1
These are our major electricity needs	7	
Solar is useless/ we were cheated	2	2
Disappointed even with solar lights	1	
Nothing is good about it	1	
The amount paid for solar is too high for what it does	3	4
Have not improved system as promised to enable cooking		4
We have electrical appliances we can't use	3	1

These are the needs that solar is supposed to meet	2	
If only we could use it for cooking it would be great	1	2
We want to live like urban people		1
We were told it could be used for cooking		2
System should be improved		1
Other	2	3

\*Multiple responses possible

Table 13.4 "How do/did you feel about not being able to cook, iron run a to cook, iron run a fridge with your solar system?" Positive, negative, ambivalent and neutral responses.

Responses	SHS-users N=25	Previous SHS-users N=21
Positive	0	0
Negative	23	15
Ambivalent	1	3
Neutral	1	3

As can be seen from the table above, responses were uniformly negative concerning the limitations of the SHS.

*"We were not happy about that because we want to live the same life as people in urban areas. But we could not live such a life because the solar is unable to power other appliances" (2/R/110)*

*"We were not happy about this> As a result we were very excited when Eskom-Shell told us that they would improve the system to cater for cooking as well". (2/R/116)*

*"That is bad because if it can't cook, it is useless". (2/R/118)*

*"We feel bad about that because we do have electrical appliances but can't use them because solar is incapable of powering them. (2/U/31)*

*"As far as I am concerned ,this thing (solar) is useless> I was of the opinion that I could use it to power my electric appliances"(2/U/1)*

A third question asked respondents what the household had liked most about the solar system.

Table 13. 5 Things like(d) most about the solar system

Code-categories of responses	Frequency of mention*	Frequency of mention*
Good lights	14	12
Lights for the whole night	1	
Good outside lights	1	1
Makes my home beautiful	3	
Powering TV/radio	6	5
Powering cell phone charger		1

Power does/did not cut off in stormy/bad weather		5
Solar is safe	5	
Helps but does not fill all needs	1	
Except for lights, don't like solar	1	
No longer buy candles	1	
Other	1	3

\*Multiple responses possible

Table 13. 6 What did/do you like most about the solar system? :Positive, negative, ambivalent and neutral responses

Responses	SHS-users N=25	Previous SHS- users N=21
Positive	20	14
Negative	0	3
Ambivalent	3	2
Neutral	2	1
No answer	1	1

*"It is easy to use and you can power your TV". (2/R116)*

*"What I like about it is that the children can now study in peace without being disturbed by a noisy generator." (2/U/1)*

*"Because it helps me in a way although it doesn't address all my electric needs" (2/U/16)*

*"The outside light and the fact that it makes my home look beautiful". (2/U/21)*

*"That is very bad because those are the needs that it is supposed to meet" (2/U/29)*

A fourth question asked *"What do/did you dislike most about the system"*

Table 13.7 Things dislike(d) most about the system"

Code-categories of responses	Frequency of mention*	Frequency of mention*
Money is too much for the power you get	1	7

Can't/couldn't be used for cooking/other appliances	11	5
Can't think of anything disliked		5
Can't couldn't power colour TV	3	
Does not address all needs/major electricity needs	5	
Too few lights	1	
Forced to buy card even if not using it/faulty	1	4
Insufficient hours of use	2	
Time of use very limited in winter/bad weather	3	1
Forced to pay every month	1	
Other	1	2

\*Multiple responses possible

Table 13. 8 What did/do you dislike most about the solar system?

Positive, negative, ambivalent and neutral responses

Responses	SHS-users N=25	Previous SHS- users N=21
Positive	0	16
Negative	24	4
Ambivalent		
Neutral	1	
No answer		1

*"I can't think of anything."* (2/R/110)

*"There is nothing specific that I disliked."* (2/R/112)

*"The system is good. The only problem is that we 'uneducated' people don't know much about these things"*(2/R/121)

*"It is unable to do much of the things I need electricity for"* (2/U/21)

The fifth question in this final series of questions asked whether the respondent would advise other people in the community to get a solar system. *"Would you advise other people in your community and elsewhere to get a solar system?"*

Table 13.9 Advise other people in the community to get a SHS

	SHS-users N=25	Previous SHS- users N=21
Yes	64%	76%
No	36%	24%

It is important to note that a greater percentage of respondents would advise others to apply for a SHS in 2003 than was the case in 2001. 57% of SHS-users would have advised others to get a SHS system in 2001 compared with 64% in 2003. A surprising finding is that households that had had their SHS removed, either for grid electricity or for non-payment, are more likely than SHS-users to say they would advise others to obtain households.

The following table gives the responses to the question as to why the respondent would advise or would not advise others to obtain a SHS.

Table 13.10 Reasons for advising or not advising others to get a SHS

Code-categories of responses	Frequency of mention*	Frequency of mention* of
Solar safer/better than candles	2	1
So that they get the benefits of solar/lights at night	9	1
It helps save on candles		1
It improves people's lives		4
You can use solar even if the weather is bad		2
Unable to do what grid can do	1	2
Most people are poor, they should not have to suffer more	1	
So that they also feel the pain and suffering we experience	2	
Has been no help. Can't advise people about what I am disappointed with	4	2
Company has proved unreliable/has not kept its promises	1	1
Subsidy is meant for everyone	1	
Now that we have electricity, would not advise them		1
If don't get grid continue with solar		4
Other	7	2

\*Multiple responses possible

Table 13. 11 Reasons for advising or not advising others to get a SHS  
Positive, negative, ambivalent and neutral responses

Responses	SHS-users N=25	Previous SHS- users N=21
Positive	9	14
Negative	9	5
Ambivalent		1
Neutral	6	1

In a final open-ended question households were asked whether they thought that everyone in their community should be provided with a SHS.

Table 13.12 Should everyone in the community and elsewhere have a SHS?

	SHS-users N=25	Previous SHS- users N=21
Yes	64%	62%
No	36%	38%

Table 13.13 Reasons why everyone in the community should have a SHS

Code-categories of responses	Frequency of mention*	Frequency of mention*
Solar is safe/better than candles	1	1
So that they can have the benefits of solar/is their right	4	2
So that they benefit from the government subsidy	4	
It improves people's lives		1
Because we need development in the community		1
Children should learn about electricity		1
Unable to do what grid can do/better to have grid/is affordable	1	5
Most people are poor, they should not have to suffer more	2	

So that they can feel the pain and suffering that we experience	2	
It has been of no help/ can't advise people about what I am disappointed about	1	3
Company has proved unreliable/ has not kept its promises	1	
Now that we have electricity, I would not advise them	1	
Rid the community of crime	1	
Does not satisfy electricity needs	2	
Limit jealousy	1	1
Other	4	8

\*Multiple responses possible

Although such responses are not numerically significant, the views of some households are indeed interesting. The desire that all share in the benefits of solar is mentioned several times. See the citations below. The need to limit the jealousy that develops when some households have solar and others not is also mentioned.

*"Because the solar system helps you save on your expenditure, brings improvements in peoples' lives and you can enjoy the benefits of good light and watching TV" (2/R/110)*

*"If they don't have the grid, it is recommended because the light is good" (2/R/187)*

*"Given that people can see the grid-lines extending to Mt. Fletcher it would seem that I am fooling them"(2/U/16)*

*"There is that R3 500 subsidy which is meant for everyone in the villages to have a solar". (2/U/28)*

*"For those who like to damage or steal other people's property to know how it feels like to have your property damaged or stolen. Those who don't have solar systems in their homes tend to steal other people's solar systems". (2/U/6)*

Table 13. 14 Reasons why everyone should have a SHS

Positive, negative, ambivalent and neutral responses

Responses	SHS-users N=25	Previous SHS-users N=21
Positive	11	10
Negative	12	6
Ambivalent	1	1
Neutral	1	4

The totals of all positive, negative, ambivalent and neutral responses for the six questions were calculated for households still using a solar system and for those whose systems had been removed. (Each total was weighted according to the number of cases)

This permits the comparison of the total number of positive as opposed to negative reactions to solar for two sub-samples. The following table summarises the totals.

Table 13.15 Total Positive, negative, ambivalent and neutral responses for 6 questions

Responses	SHS-users N=25	Previous SHS- users N=21
Positive	116 (4.64)*	122 (5.8)
Negative	99 (3.96)	74 (3.52)
Ambivalent	5 (0.2)	14 (0.6)
Neutral	23 (0.9)	10 (0.47)

\*Weighed according to number of cases

This summary provides a particularly interesting insight. As a whole, and throughout 6 questions, which covered a wide range of subjects including likes and dislikes about solar and whether everyone in the community should have solar, positive responses outweigh negative responses. This tendency towards positive opinions is even more marked for households whose systems have been removed. (In the analysis, the latter sub-sample included previous SHS who now have grid electricity). For the service provider, this is a useful finding since it makes evident both the positivity and the negativity of their customers together with a tendency for some customers to be ambivalent. Relations with customers could be designed which would reinforce the positive and reassure the ambivalent.

A final question in interviews with households whose SHS had been removed asked respondents whether they would like to have their system reinstalled. The results are presented in the tables below.

Table 13.16 Whether previous SHS-users would like their system re-installed

	Previous SHS-users removed for grid N=10	Previous SHS-users removed for non- payment N=11
Yes	20%	73%
No	80%	27%

It is not surprising to find only 20% of households now with grid electricity that would opt for having their solar system reinstalled. Note, several respondents had said that solar was safer more reliable during storms than grid electricity).

It is surprising to discover that three quarters of those households whose system was removed for non-payment would like their system returned. This might be given attention by service

providers. Possibly re installation of a SHS (in perfect running order) could be negotiated with such customers under certain conditions. The fact that households found their homesteads "empty", "scary" or that respondents were lonely when the SHS was removed is of course a further measure of how the system had impacted on people's lives.

## 14. Concluding remarks and key issues

This report, which ideally should be read in conjunction with the first report written after the base line survey in 2001, has presented the results of a follow-up survey of 46 of the same households interviewed in November 2003.

The two surveys differed in several important respects. First, at the time of the second survey, it was discovered that a number of households no longer had a SHS- either because an extension of the grid had provided them with electricity or because the system had been removed for non-payment. These households were nevertheless included in the second survey. Secondly, the sample size of the second survey was much smaller than the first which limits the generalisations which should be made and thirdly, a much larger number of "open-ended" questions was included in the questionnaire that allowed a much freer expression on the part of respondents concerning their experiences with a SHS. Replies to open-ended questions were recorded verbatim by interviewers, which provided a body of citations that have been included in this text. The majority of SHS-users have had their system for more than two years.

Analysis of customer responses shows up both the strengths and the weaknesses of the present "fee-for-service" model. In the Eastern Cape concession area, where customers are paying the full amount of R58 per month for their SHS, there is a widely shared view that this amount is too much for the service that is provided by solar.

Views about solar are dense and they are strongly influenced by different aspects of the system. Views are highly positive regarding the quality of light that solar provides, about the improvements in people's lives that solar makes possible, whether it is having good light for studying or doing homework, being able at night to see animals or people approaching the homestead, or being able to accomplish various tasks in the evenings.

Views are positive provided that the system is functioning properly and this is not always the case. Negative views are generated by a poorly functioning system and are reinforced by delays in repairs. It might be possible to propose a more widely recognised rebate system to customers whose system is not functioning such that they do not pay for the time the system is out of order. Further negative views are generated by the cost of the monthly fee-for-service which the majority of households feel is not matched by the services the solar is capable of. SHS-users were expecting more than just light from their SHS and in some cases, negativity turns to bitterness.

This system, which creates disappointment and ambivalence from customers, could be improved. Better designed, more personalised and individualised customer-relations could go a long way towards reducing negativity. Very few customers mentioned the technical accomplishment that their electricity came from the sun.

Judging from the high percentage of ex-customers (whose SHS had been removed for non-payment) who indicated that they would like "their" SHS re installed, much could be done to tide over the period when exceptional circumstances make payment impossible. Temporarily removing the battery until payment can be made could be a solution. That households whose SHS have been removed seem to be more positive towards solar than is the case of current SHS-users merits reflection and suggests the need for a more flexible policy with customers.

The addition of positive, negative, ambivalent and neutral responses could provide service providers with a rough guide to customer satisfaction. Periodic questioning of customers not only provides a barometer of satisfaction, but also a reassurance to customers that they "count" for the service provider.

Fuel-use for all purposes by the household consumes a large part of the household budget. Service providers would be well placed to ensure that all their SHS customers have better access to modern fuels without high transport costs and that these fuels are made generally available in the area, which would include potential SHS-users.

Changes brought about by solar are slow to manifest themselves. Comparison of the two surveys at an interval of two years and with the same households failed to reveal any signs of income generation except for the longer hours of the spaza shop. But the second survey did not reveal any tangible deterioration in the way households were using or perceiving their system. If anything, positive views have increased if witnessed by the increased number of SHS-users who would advise others to get a SHS. There are also clear indications that SHS-users are saving on the number of candles used and "attachment" to the system and having electricity in the home appears to have been strengthened.

## Key Issues

- Customers are still not adequately represented by an independent body or organisation. This could be of considerable advantage for customers and service providers alike. The NER has been assigned this function but remains unknown to the vast majority of rural consumers.
- Customers need to be far better informed. This applies to the technology of the SHS but also to the capital subsidy. It is a missed opportunity that the majority of customers interviewed knew nothing of the government capital subsidy and even less about the amount. Keeping customers informed about for example, future grid plans no matter how far into the future, and keeping them informed about the developments of the company and advances in solar technology would seem to be a way of assuring greater customer fidelity.
- The provision of a SHS in the Eastern Cape is on the basis of a means test that excludes the poorer rural household. Solar systems were in fact removed from households unable to pay the monthly service-fee and often for reasons related to exceptional circumstances. A strong feeling was expressed by interviewed customers that solar electricity should be available for everyone in isolated communities. An important issue remains the reduction in the installation cost, the quality and robustness of systems and the reduction in the cost of maintenance.

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