ANNEX 6
RURAL FIELD STUDY GURUÉ, MOZAMBIQUE

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Acronyms and Abbreviations

DDEC	Director Distrital de Educação e Cultura (Distrital Director of Education and Culture)
DDMAS	Direcção da Mulher e da Acção Social (District Directorate of Women and Social Action)
DDS	Director Distrital de Saúde (Distrital Director of Health)
EDM	Electricidade de Moçambique
EP1	Ensino Primário do Primeiro Grau (First Grade Primary Teaching)
EP2	Ensino Primário do Segundo Grau (Second Grade Primary Teaching)
EPC	Escolas Primárias Completas (Complete Primary Schools)
MZN	New Mozambique Metical (MZN 26 = 1 USD)
TDM	Telecomunicações de Moçambique
UP	Unidade de Produção (Production Unit)

A6.1 Introduction

The present report is a result of the field work undertaken in Gurué district, Zambézia Province, as part of the "Evaluation of Norway's Power Related Assistance" in Mozambique.

This report mainly presents the results obtained in the field and a comparison, where possible, with preliminary data obtained on a baseline study undertaken in 1999 in order to understand as far as possible the main changes occurred locally, in terms of socioeconomic aspects as a result of the electrification project. As a final result of the preparation of this report, it should constitute baseline information potentially to be used later for the measurement of the impact of the rural electrification project in Gurué in a longer term extension.

A6.1.1 Objective

The main objectives of the evaluation in the field are to:

- document and assess the results of the Norwegian power related assistance in terms of:
  - results of the rural electrification within the family sector and in the local economy; and
  - identify successes and challenges;
- collect information from a selected sample of projects and programs which can constitute a baseline for measuring results of key elements.

A6.1.2 Methodology

The field work in Gurué was undertaken from 10th to 30th of April of 2007, led by one main consultant supported by five interviewers.

The approach taken was to measure change over a 10-year period. Quantitative and qualitative data from before the electrification project (1999) was collected by recall from respondents. At the same time, the same question was asked to collect data about the present situation.

For the collection of quantitative data, questionnaires were administered to 100 households in five areas of Gurué city and surroundings. The interviewees comprised 46 women and 54 men. This sample cannot be considered statistically representative of the entire district but it does provide a qualitative overview of the district and an indication of the impact of the rural electrification project in Gurué's neighbourhoods.

The selection of the neighbourhoods was done taking in consideration the areas selected for the 1999 baseline study according to its prediction of the areas that would probably benefit from electricity from Cahora Bassa. The 1999 baseline selected and implemented questionnaires in:

- Bairro Cimento - central part of the city;
- Bairro Barragem - peri-urban zone;
- Bairro Miaco - peri-urban rural (more distant from the centre but still in the municipality), and
- Chá Magoma, where a transformer would be installed.

Our study did not cover all of these neighbourhoods because, in the end, some did not get electricity. Hence, a new selection was made according to the real situation and, with the support of the office of the local administration, new neighbourhoods that, in fact, benefited from the electrification were selected. The selection of the new neighbourhoods obeyed the same principle as the 1999 baseline study, by selecting the central part of the municipality

plus some peri-urban and rural zones. Bairro Cimento, Bairro Barragem, Bairro Contap, Bairro Moneia, and Bairro Serra were the selected neighbourhoods and 20 questionnaires where implemented in each borough *(bairro)*. Since, in Chá Magoma, the factory was electrified but none of the households surrounding it were, we present herein only the field interview with the firm's representative.

In addition to the questionnaires, over 30 meetings were held with key informants from the district government, the municipal administration, and the district directorates from health, education, police, women and social action, EDM, TDM, the private tea companies, the boer beans factory, and others. The information collected in these meetings helps to explain some of the results obtained from the questionnaire. Additional information was also collected on the District Development Plan for 2006-20011.

Regarding the quantitative data presented, the number of respondents varied for specific questions. Though we interviewed 100 household representatives, sometimes they did not answer some questions. In some cases, the specific question was not applicable to their situation (e.g., questions about a business when they had none), in others, they simply did not know the answer (e.g., questions about expenditures made a decade ago). Flat refusals to answer a question were rare except when businesspeople were asked whether they paid their workers salaries. The statistics are produced from the valid answers to applicable questions except when the percentage of non-response is very high for unexplained reasons.

A6.1.3 Background

A6.1.3.1 District General Information

The District of Gurué has over 6,121 km² and is located in the mountainous area north of Zambézia Province, 350 km from Quelimane, the provincial capital.[1]

Gurué is delimited by Lúrio River, which separates it from Niassa Province, and a natural border separates the Mutuali Administrative Post from Nampula Province. In the south, the Licungo and Luá rivers mark the limits with the adjacent Namarrói and Ile districts. In the east, the Luá River limits the district from Alto Mulócuè district, and, in the west, the Mulombo Administrative Post limits Gurué district from Milange district.[2]

According to 1997 census, Gurué district had of over 197,179 inhabitants (96,675 men and 100,504 women). More than 90% of the population practices agriculture, mainly subsistence farming. Additionally, four private tea companies employ local labourers. The *Strategic Development Plan* of Gurué estimates that, because the annual growth rate of the population is of over 2.57%, the district's current population is 242,787 inhabitants, of which, over 50,537 are from Gurué Municipality, up from 41,044 in 1997.[3]

Gurué has three administrative posts—Gurué, Lioma and Mepuagiua—and 16 localities. The Gurué city centre is located on a mountaintop and the peri-urban areas are on the surrounding slopes.

A6.1.3.2 Electrification Project General Information

To increase the economic activity of Gurué and surrounding areas, which have considerable agricultural and agro-industrial potential, and as part of the Mozambique's strategy for rural

[1] Governo do Distrito de Gurué (2006)
[2] ibid
[3] ibid

electrification, the Governments of Mozambique and Norway signed an agreement in 1998 to build a high-tension line between Alto Molócuè and Gurué.

A6.2 Household Profile

A6.2.1 Family Status of Respondents

Based on the sample of 100 of individual interviewees, 42% of the interviewees were the heads of the households (39 men and 3 women); 38%, its spouses (only 1 man); and 20%, other people living in the household (14 men and 6 women) (see questionnaire in Annex 2).

In terms of family members, before 1999 it seems to have been more common to have two people in a family though many had between three to six people. At present, the number of families with just two people has decreased a lot. In fact, 64% had five or more members, up from 49% in 1999 (Table 1). These figures coincide with the national statistics about the characteristics of a Mozambican family.[4]

Table 1. *All family members before and now*

	Period			
	1999		2007	
	Total members of the family including children		Total members of the family including children	
	Count	%	Count	%
0	1	1.0%		
1	4	4.1%	2	2.0%
2	16	16.3%	7	7.0%
3	14	14.3%	10	10.0%
4	14	14.3%	16	16.0%
5	12	12.2%	18	18.0%
6	13	13.3%	8	8.0%
7	6	6.1%	9	9.0%
8	7	7.1%	12	12.0%
9	2	2.0%	8	8.0%
10	3	3.1%	5	5.0%
11	1	1.0%	2	2.0%
12	3	3.1%	2	2.0%
13	1	1.0%		
15			1	1.0%
18	1	1.0%		
Total	98	100.0%	100	100.0%

A6.2.2 Wealth

The families' wealth was determined based on the interviewers' observation of the people's conditions, the way their house was constructed, and the belongings that could be seen. From 100 interviewees, 82 valid responses were received and, of these, 6.1% were considered rich families; 57.3%, medium income; 34.1%, poor; and 2.4%, very poor.

[4] INE (2004) (PowerPoint presentation)

A6.2.3 Housing, Sanitation and Water Supply

Housing

Of the interviewees, 44% moved to their current houses due to actual or anticipated employment, family issues, business purposes, and access to roads, education, health, or potable water. One interviewee reportedly built a house in the new location with the money from ABB, received as compensation for being displaced from the project implementation area.

As for reasons related to employment, some interviewees reportedly moved into the city due to their job; others had been living in a company house but, when their contract expired, were compelled to move; others moved to be nearer their jobs; and yet others abandoned agriculture and came to Gurué in the hopes of finding employment with private companies.

As for family issues, reasons were given such as taking over the family's house or getting married and moving into their husband's house.

Other reasons were given that more clearly reflect the impact electrification. For example, 13% of the 45 respondents reportedly moved to their present location in order to have access to the electricity since their previous neighbourhoods had none. Other people simply said that they wanted to live in the city, but, as we know, many of the amenities that a city offers depend on electricity, e.g., the possibility of doing a lot more things due to a longer period of public lighting. Security reasons was also mentioned. Of those that had moved, 30 respondents reportedly leave their lights on at night for security reasons.

As for the type of housing, the 1999 baseline report describes the houses as being "built with burnt or sun dried clay bricks covered with grass or corrugated iron roofing. Housing density is high, as space is limited by the tea plantations surrounding the city. The suburbs are very similar in terms of construction types and social situation. In the rural areas further away from the city, apart from tea plantations, residents live in a more dispersed fashion. Houses in these rural areas are built with the same materials as in the peri-urban areas."[5] This pattern of construction and use of materials seems to have persisted to the present.

On average, people seem to have more rooms now than back in 1999. Now, 77% have at least three rooms whereas before 1999 only 60% did (**Table 2**).

[5] Groenendijk, C.A., 1999: 3

Table 2. *Number of rooms before and at present*

	Period			
	Before 1999		2007	
	Number of rooms		Number of rooms	
	Count	%	Count	%
0	1	1.1%		
1	3	3.4%	3	3.1%
2	31	35.2%	20	20.4%
3	44	50.0%	62	63.3%
4	6	6.8%	10	10.2%
5	3	3.4%	3	3.1%
Total	88	100.0%	98	100.0%

A6.2.4 Water and Sanitation

Only 1% of the interviewees used a water pump before 1999 and the same percentage persists now. The availability and access to tap water seems to have changed only marginally.

As for sanitation, 2% of the respondents had neither a bathroom nor a latrine, a percentage that has not changed over time. However, those having a bathroom increased from 26% to 33%, while those using a latrine decreased from 72% to 62%. This reflects an improvement of the quality of life and, probably, health.

A6.2.5 Asset Ownership

Housing

Of the respondents, 37% said that the house or accommodation they lived in was owned jointly by the husband and wife; 31%, by the husband; and 5%, by the wife, while 4% rented the premises and 23% gave various other answers, e.g., the house belonged to their employers, parents, or other family members. Though the data states that the house belongs to the wife, it would be more accurate to say *female member*, not wife, since these women were mostly single, divorced or widows. In any case, female-headed households comprised 4% of the respondents.

Land

Of the 70 valid answers for the period before 1999, over 69% owned farm land, 21.5% were tenants or had a shared tenancy, and over 3% rented land for farming. At present, of the 69 valid answers, over 62% owned the farm land they were using, 20% were tenants or had a shared tenancy, and 5% rented the land. Hence, the situation seems to have changed but very little if at all.

Other

Ownership of bicycles and motorized transport had increased. From the list of goods in the questionnaire, 51% of respondents said that, *before 1999*, they had a bicycle, 16% had a scooter or motorbike, 8% had a private car, 3% had a 3-wheel tractor, and 5% had a water storage tank. In 2007, 67% had a bicycle; 22%, a scooter or motorbike; 8% have a private car; and 8% have a water storage tank though no one had a tractor (Table 3).

This pattern of slightly increasing asset ownership reflects decreasing poverty. This supports the wealth rank evaluation previously mentioned in this report, which shows that over 57% of the households are at a medium level though, of course, the wealth range is measured within the local context of Gurué.

Table 3. *Ownership of a means of transportation, 1999 and 2007*

	Before 1999		2007	
	Total responses	**% Yes**	**Total responses**	**% Yes**
Bicycle	99	51%	100	67%
Scooter or motorbike	97	16%	99	22%
2-wheel tractor	97	0%	98	0%
3-wheel tractor	97	3%	98	0%
Private car	97	8%	97	8%
Water storage tank	95	5%	97	8%

A6.3 Livelihood Impact

A6.3.1 Access to Land

For the period before 1999, of the 99 valid answers, over 66% of respondents reported that some family members do, in fact, farm. This percentage fell to 60% of 100 valid answers though, given the sample size, this drop is not significant, nor have the modes and frequency of access to farm land changed significantly.

A6.3.2 Availability of Irrigation

For both periods, only one respondent mentioned using irrigation to farm and that was by gravity. Hence, none of the interviewees required supplemental energy for irrigation.

A6.3.3 Food Security: Production Sufficiency

Currently, far fewer people are extremely vulnerable due to food insecurity as gauged by the amount of food they have in storage. Before 1999, of the 88 people who practice subsistence farming, 2% had stored enough food to last 24 months; 19% had enough for 12 months; 8%, for at least 6 months; 57%, for 2 to 4 months; and 14%, for merely one month.

Now, of the 90 respondents who practice subsistence farming, 2% had stored enough food to last 24 months; 16%, for 12 months, 10%, for at least 6 months; 63% for 2 to 4 months; and 9%, for merely one month.

A6.3.4 Other Sources of Income

A6.3.4.1 Family Businesses

Before 1999

Of the 97 valid answers, over 21% of the respondents reported having a business before 1999. From these, six have had their business at home and 14 elsewhere. The types of business that were conducted at home comprised food stands or tiny restaurants *(barracas)*, film projections, fish sales, milling, and the sale of beer. The businesses conducted outside of the home included hairdressing, food stands or *barracas*, grocery stores, and other shops. Other sources

of income included a petrol station, bread-making, selling of fish, selling of clothes, and the rental of a warehouse.

Since many people did not, in fact, have a business, only 18 answers are valid for the question about the use of electricity in the business. Of these, 72% of the respondents did not use electricity for their business, 11% used electric lighting, and 17% used electricity for work as well as lighting. For the question if electricity had been a major factor for them to start a business, 81% of the 16 respondents said no while 19% confirmed that it was crucial.

Of the 20 family businesses that had employees before 1999, only 8 admitted paying salaries to their employees. Most of businesses employ one or two people; few more than that. Two interviewees had five employees. None had more than that.

At Present

A third of the 99 respondents reported that a family member in the household was running a business (Table 4). In our sample, between 1999 and 2007, the percentage of families with a member who ran a business within their home increased by 100% and those that do so outside the home increased by 43% (Table 5). Despite this increase, the types of businesses and their locations have not changed much since 1999 except for the appearance of a tinsmith and a mechanical workshop.

Among the 32 business owners, 56% do not use electricity for the business, 3% use it only for lighting, and 41% use it for both lighting and work. This represents a large, significant increase in the use of electricity for work

Of 30 people who answered the question if electricity had been a major factor for them to start a business, 63% said no while 37% confirmed that it was crucial to their business. Thus, electricity has become crucial for an increasing fraction of the small businesses in our sample.

Table 4. *Is anyone in this household running a business?*

	Before 1999		**2007**	
	Frequency	**% of respondents**	**Frequency**	**% of respondents**
No response	3	n.a.	1	n.a.
No	77	79.4%	66	66.7%
Yes	20	20.6%	33	33.3%
Total	100	100.0%	100	100.0%

Table 5. *Does a family member run a business and, if so, where?*

	Before 1999	2007
No response	2	2
No business	78	66
Business at home	6	12
Business outside	14	20
Total	100	100

Table 6. *Use of electricity by those running businesses*

Are you using electricity for your business?	Count		%	
	Before 1999	2007	Before 1999	2007
No	13	18	72.2%	56.3%
For light	2	1	11.1%	3.1%
For both light & equipment	3	13	16.7%	40.6%

Table 7. *Cross tab: Is anyone in this household running a business? Was electricity access a major factor in your decision to start business?*

Period				Was electricity access a major factor in your decision to start business?		Total
				No	Yes	
Before 1999	Is anyone in this household running a business?	Yes	Count	13	3	16
			%	81.3%	18.8%	100%
2007	Is anyone in this household running a business?	Yes	Count	19	11	30
			%	63.3%	36.7%	100%

Table 8. *Number of businesses with employees & number of employees*

Number of employees in the business	Before 1999	2007
No response	7	3
Not applicable	77	66
1	13	18
2	1	7
3	0	2
5	2	3
6	0	1
Total	100	100
Total employees	25	59

Table 9. *Businesses with salaried employees*

Number of employees in the business	Number of businesses paying salaries	
	Before 1999	2007
No response	12	12
Not applicable	80	74
1	6	10
3	0	1
5	2	3
6	0	1
Total	100	100

Of their 59 employees, the businesses only admit paying a salary to 34 (for this question, non-responses suddenly increased). Most businesses employ one or two people. One interviewee had six employees, the maximum number encountered in the sample.

A6.3.4.2 Other Sources of Family Income

Other sources of income for both periods are small businesses, subsistence farming, agriculture and livestock (combined), government subsidies or pensions, transfers from family workers abroad, and a family member in permanent or casual employment. Of these, employment and business income are most frequently reported. Since our sample was in an urban and semi-urban area, in most cases subsistence agriculture was to gain supplemental food and income.

Table 10. *Other sources of family income, 1999 and 2007*

Before 1999	***At present(2007)***
Only 1% of the respondents reported getting income from agriculture and livestock.	no change
No one reported receiving a governmental subsidy or pension before 1999.	From the 90 valid answers, 4% reported receiving a governmental subsidy or pension.
Only 3% got any transfers from family members working.	Of 90 valid responses, only 4% got any transfers from family members working abroad.
Of the 90 valid answers, 54% of the family units received income from a working family member; 11% had a family member who had a causal job.	Of the 92 valid answers, 57% of the family units received income from a working family member; 11% had a family member who had a causal job.
Of the 86 valid answers, 18.6% received had business income.	Of the 91 valid answers, 34%% received had business income.

DDMAS started this year to develop a project with a group of unemployed female heads-of-household. From DDMAS, they receive, on loan, 5.000 MZN in cash, a freezer, a scale, and six boxes of cool drinks, as a "kit". Apart from this, another 11,000 MZN is available for situations when they have problems making their monthly repayment. In the beginning of the project, difficulties arose because some houses did not have electricity. To resolve that, DDMAS spoke with the EDM.

Of the 50 women, 25 now have electricity and have received the kit for earning income. After a two-month grace period, they start paying monthly instalments for a year. The monthly payment is initially 1.000 MZN but *in*creases over time as they supposedly become more successful. The total loan is for 29.350 MZN. Seven of the beneficiaries have begun making their monthly instalments.

Another project being studied is to provide low-cost connection for electricity. DDMAS is negotiating with EDM on behalf of the women to see if all of them can benefit. This type of connection exists for 15 families in the Bairro do Aero Porto, for 10 families in Bairro 25 de Junho, and for 5 families in the Bairro 1° de Maio.

A6.3.5 Impact of Electricity

A6.3.5.1 Impact on Business

Over time, some businesses start up while others fold. Of the 20 valid answers from respondents that had had a business in 1999, two had closed it down by 2007. Of the 33 families with businesses in 2007 (including the two that had packed up), we got 27 answers. Of these, most (44%) reported no change while 22% had increased their business and 26% had decreased (Table 11). In general, the businesses that suffered no change were those that do not require electricity. These were mainly traders.

The two people that closed their businesses reported having had cash flow problems and difficulties with the supply of electricity between 17h and 18h. Two of their TVs had blown

up due to oscillations in the electrical current. With this disaster, their movie projection business closed down.

Those with decreasing sales blame additional competition from new entrants that sold or produced the same things as they did. For example, competition has reportedly intensified for small bakers, flour millers, people who charge car batteries, and traders in the local market. Interviewees also complained about the increase in the costs of the goods (including electricity), which hampers theirs businesses. That, according to interviewees, limits the possibility of increasing the business.

Those (22%) whose businesses had increased attributed this mostly to their efforts to provide the best products possible or to their being available for business during hours with the most affluence of clients, e.g., for providing drinks in the evenings. Some people who sell beverages also attributed increased sales to their ability to offer cool drinks due to the existence of refrigeration and fairly continuous electricity.

Table 11. *What happened to your business after the electricity project came?*

	Frequency	% of respondents
Business closed	2	7%
Business decreased	7	26%
No change	12	44%
Business increased somewhat	6	22%
No response	9	n.a.
Not applicable	64	n.a.
Total	100	100%

Impact on Earnings from Employment

One of the main objectives of the electrification project was to create the necessary conditions to intensify investments and create jobs in local industries and trade.

Of the respondents, 26% reported that a family member had found permanent employment *after* the project came. An additional 7% reported that a family member had gotten casual employment (Table 12). Two family members in different households had actually worked on the electrification project as stone masons or construction workers for the assembly of the high tension poles.

Others reported obtained work as teachers, nurses, accountants, electricians, guards, a pharmacist, a plumber, a carpenter, a shop employee, the deputy manager of a local bank, and functionaries in schools or the district administration.

Table 12. *After project came, did a family member find employment?*

	After 1999		
	Permanent employment	Temporary employment	Job associated with project?
No response	3	7	2
No	71	76	91
Yes	26	17	7
Total	100	100	100

A6.3.6 Major Findings

Living Standard

Overall, the people's living standards, conditions, and livelihood have improved moderately. Family size has slightly increased but so has the number of rooms in the average dwelling. Subsistence agriculture is still the main occupation but home business activities have increased by 50% though very few new types of businesses have appeared. Moreover, only about a third of all businesses require electricity as a production factor. Overall, therefore, improvements at the home or household level are directly attributable to the availability of electricity for a significant minority of our interviewees. Indirect effects and favourable impacts on the socio-economic environment have also occurred as discussed in other sections.

Small Business Opportunities

Electricity has increased the opportunities for small businesses while also stimulating competition. Electricity helps those who are clever, understand market mechanisms, and can exploit niches to grow their businesses.

Employment

Many (43%) of the households interviewed have a member that found employment after the project was implemented. Most of these jobs were in the formal sector; others were in the informal sector. Curiously, no one in our sample reported obtaining a job in the tea plantations though the data we collected from the enterprises show many people working in the plantations as casual or seasonal labour. The explanation may be that those are rural jobs while our sample is urban and semi-urban.

A6.4 Energy Situation

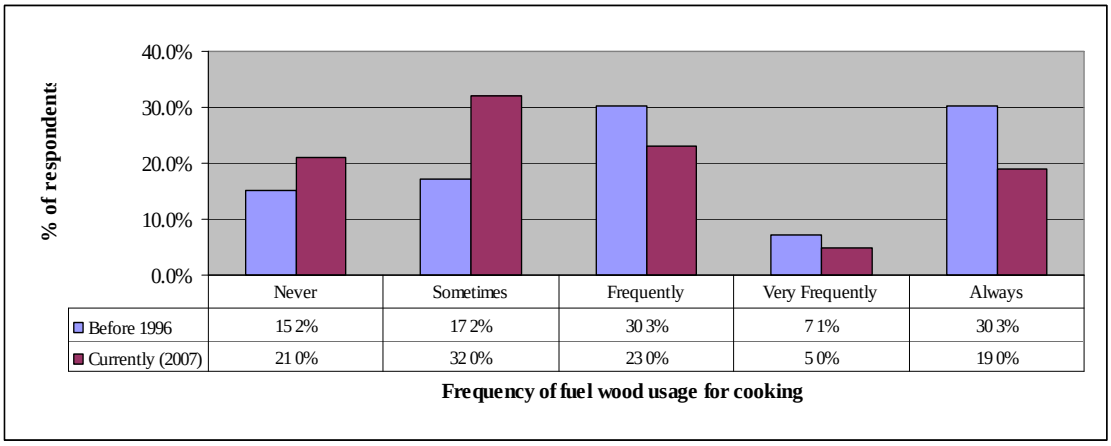
A6.4.1 Energy Consumption

For the period before the project and at present, the interviewees were requested to indicate the energy sources or fuels they use. The questionnaire listed the following energy sources or fuels: fuel wood, charcoal, electricity, gas and kerosene for cooking, heating, lighting, business, and other important applications.

A6.4.1.1 Cooking

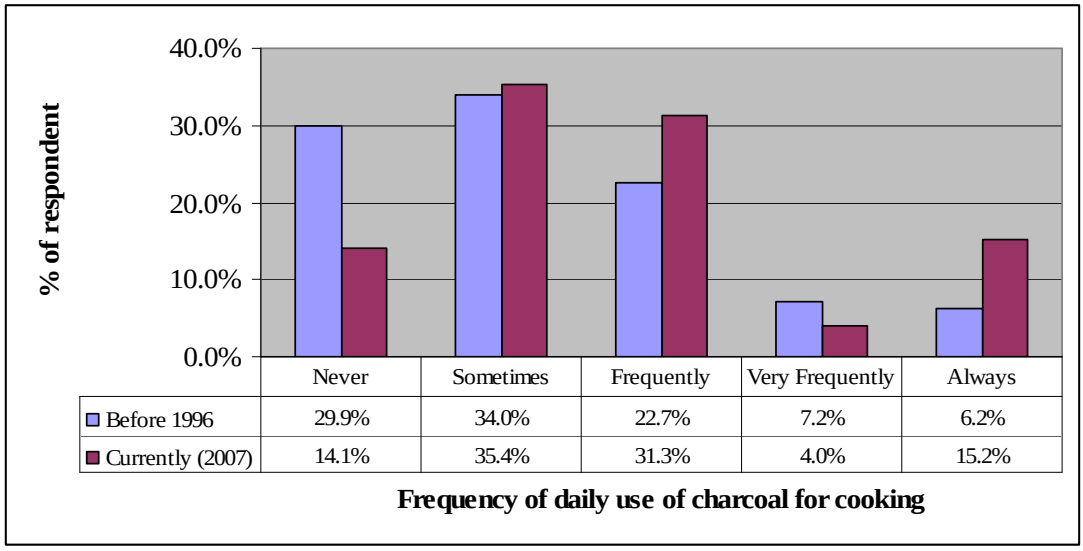
Fuel wood: Of the respondents, 85% used fuel wood for cooking before 1999 whereas now 79% (99 valid answers at present) do so. Also, far fewer people always use it for cooking and many more use it only sometimes (Figure 1). A shift is happening.

Figure 1. *Frequency of fuel wood consumption for cooking, before and at present (%)*



Charcoal: That shift is to charcoal. Of the 97 valid answers for before 1999, 70% of the respondents used charcoal for cooking whereas now 86% do so (99 valid answers). Moreover, more people (6% before; 15% now) are *always* using charcoal for cooking (Figure 2).

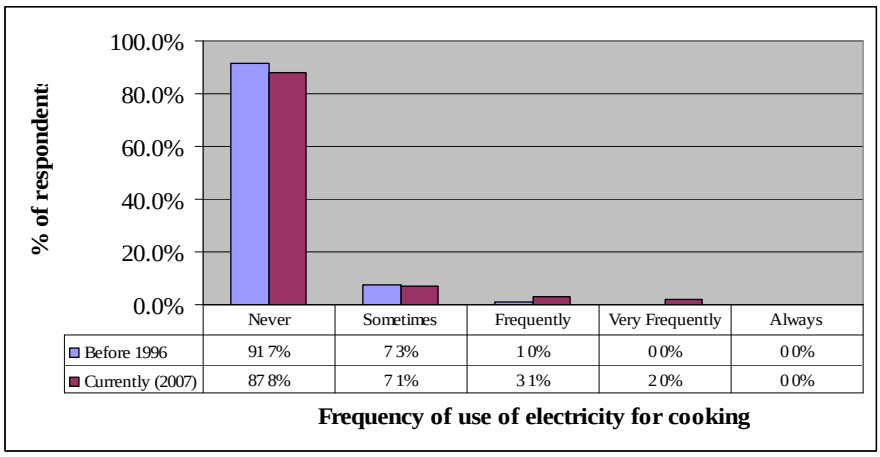
Figure 2. *Frequency of use of charcoal for cooking, before 1999 and at present*



Electricity: **Before 1999, 8% of the respondents (96 valid answers) used electricity for cooking; now 12% do so (**

Figure 3). But, by far, most users only use it sometimes. Charcoal and wood remain the main sources of energy used for cooking.

Figure 3. *Electricity consumption for cooking purposes, before 1999 and at present*

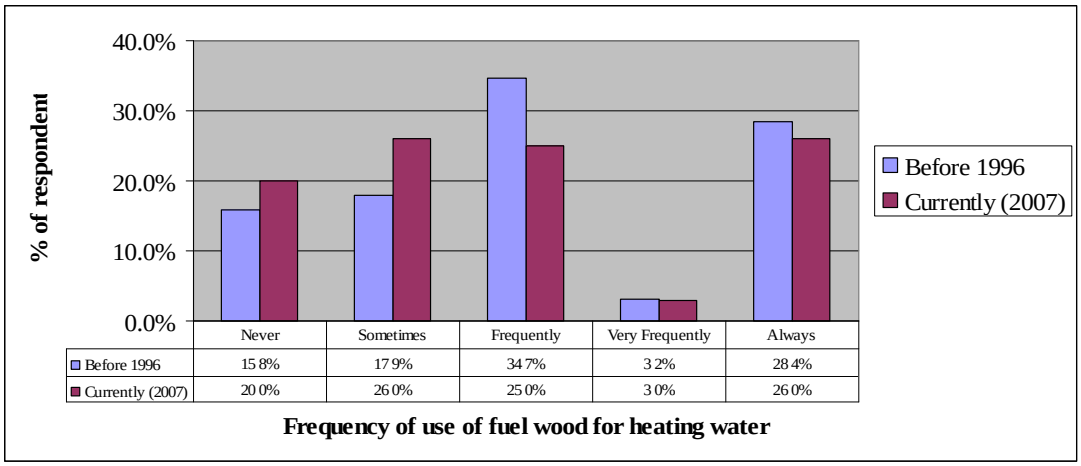


Gas and Kerosene: Both before and after the project, only 2% of the respondents use gas for cooking and, similarly, 2% use kerosene.

A6.4.1.2 Heating Water for Bathing or Washing

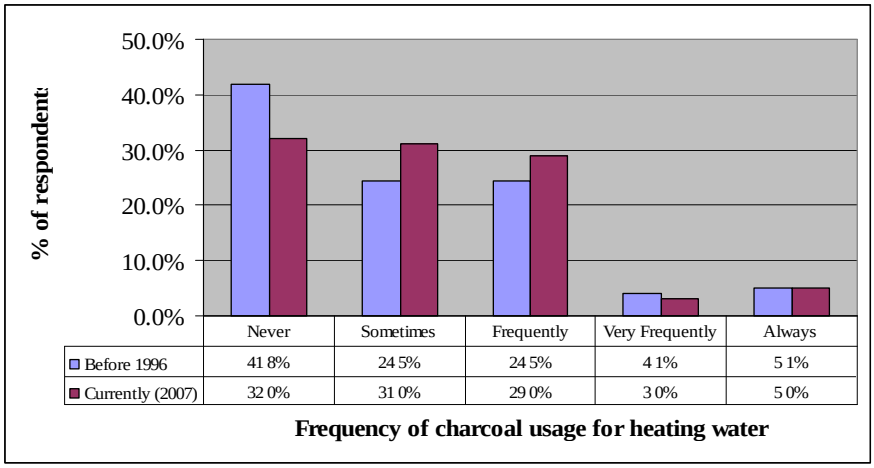
Fuel wood: Before 1999, 84% of the respondents (95 valid answers) used fuel wood for warming water for bathing or washing and, now, 80% do so. Seemingly, however, the *frequency* of use has declined slightly. Before, 66% used fuel wood for this purpose frequently, very frequently or always; now 54% do (Figure 4). Conversely, an *increased* percentage use it never or just sometimes (33% before; 46% now).

Figure 4. *Fuel wood consumption for heating water for bath or washing, before 1999 and at present*



Charcoal: While the use of fuel wood is declining, the use of charcoal is increasing. Of the respondents (98 valid answers), 58% used charcoal for heating bath or wash water before 1999 whereas, at present, 68% do (100 valid answers) (Figure 5).

Figure 5. *Charcoal consumption for heating water for bathing or washing, before 1999 and at present*



Electricity: Both before 1999 and now, 93% of the respondents never use electricity for heating bath or wash water.

Gas: In both periods, only 1% of the respondents used gas for heating bath or wash water.

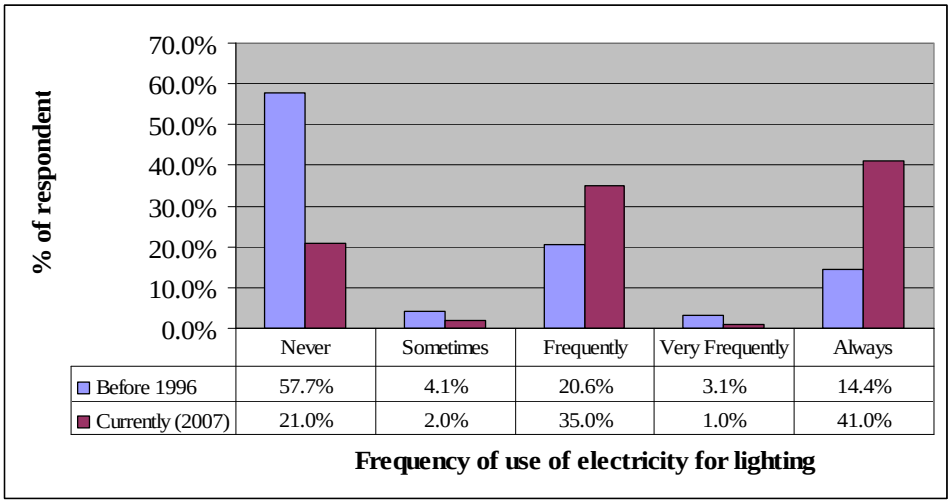
Kerosene: No one reported using kerosene to heat bath or wash water either now or before.

A6.4.1.3 Lighting

Fuel wood: Before 1999, 2% of the respondents used fuel wood for lighting sometimes or frequently; now 1% do — an insignificant change.

Electricity: Of the respondents, 42% (97 valid answers) used electricity for lighting before 1999; now 79% do—a big, significant increase! Moreover, the frequency of use has greatly intensified. For lighting, now 41% of the interviewers always use electricity whereas before 1999, 14% did (Figure 6).

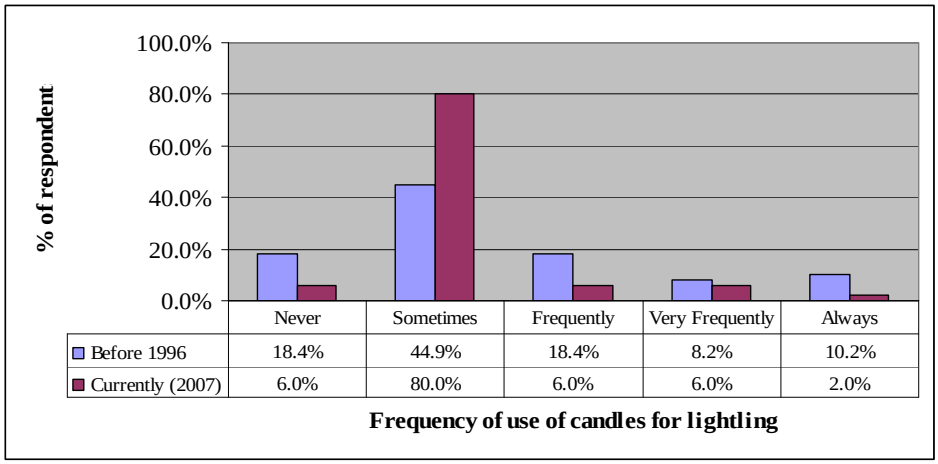
Figure 6. *Electricity consumption for lighting, before 1999 and at present*



Candles: Of the respondents, 82% (98 valid answers) used candles for lighting before 1999 whereas now 94% do (100 valid answers). Despite this apparent increase, far fewer people

(14%) now use candles for that purpose frequently, very frequently or always as compared to before 1999 (37% before; 14% now) (Figure 7).

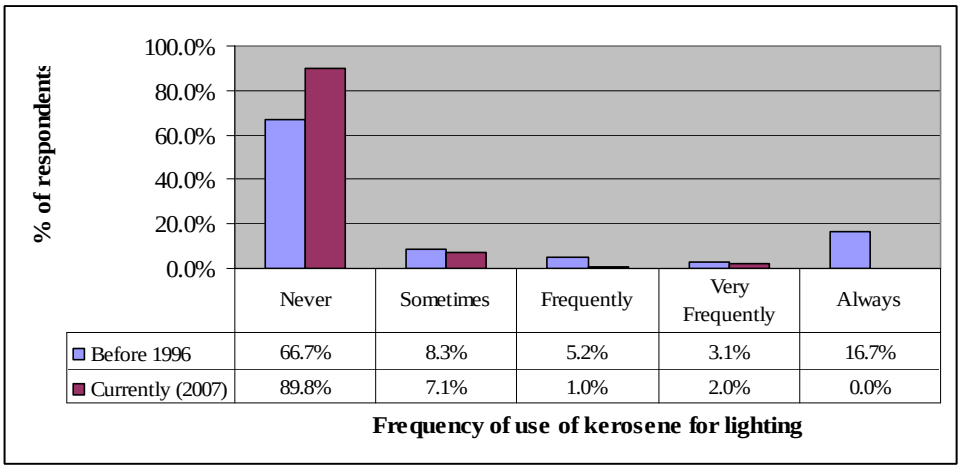
Figure 7. *Candles consumption for lighting, before 1999 and at present*



Gas: No one before or after 1999 has used gas for lighting. The early period had 96 valid answers compared to 98 for the present.

Kerosene: With the appearance of electricity, the decline in the use of kerosene (and kerosene lamps) for lighting has been dramatic. Of the respondents, 33% used kerosene for lighting before 1999 but by 2007 this had dropped to 10% (98 valid answers). Moreover, only 3% of the respondents use it frequently or very frequently and, now, no one relies exclusively on kerosene for lighting. This represents a significant, large shift in consumer household energy consumption patterns, a direct impact of the availability of electricity for lighting.

Figure 8. *Kerosene consumption for lighting, before 1999 and at present*



A6.4.1.4 Home Business

Fuel wood: Both before 1999 and now, only 4% of the respondents (90 valid answers) use fuel wood for home businesses.

Charcoal: In both periods, only 1% of the respondents used charcoal for home businesses.

Electricity: Before 1999, 6% of the respondents (88 valid answers) used electricity for home businesses; now 16% do — a significant increase.

Candles: Before 1999, 2% of the respondents (88 valid answers) used candles (frequently or always) for home businesses; now 4% (of 90 valid answers)— but the frequency of use has gone down.

Gas: No one, before or at present, has used gas for home businesses.

Kerosene: No one, before or at present, has used kerosene for home businesses.

A6.4.2 Application of Energy Sources

The objective here is to find out if the households use any of the energy sources under study and, if so, how they are used within the households.

Fuel wood: Increasingly, people are shifting from merely collecting wood to buying or buying and collecting it. Before 1999, 44% reportedly collected or were given fuel wood, 12% both purchased and collected it, and 26% only purchased it. Now, 33% collect, 32% buy it, and 16% both collect and buy it (Table 13). Apparently, fuel wood is becoming increasingly a commercial product with the urban and peri-urban setting of our sample. Might this be due to a decreasing availability of wood sources in and around the city? That is a likely explanation.

Indeed, collecting wood seems to be *more* time consuming now than before. Before 1999, 20% of the respondents who collected fuel wood took less than 30 minutes to get it; 24% took 30 to 60 minutes; 30% required one to two hours; and 26% needed more than 2 hours. Now, only 15% of the respondents who collect fuel wood take less than 30 minutes to get it; 17% need 30 to 60 minutes; 34% need one to two hours; and 34% needed more than 2 hours (Table 14).

The burden on women for collecting fuel wood has apparently been falling. Before 1999, **60%** of the respondents reported that it was usually the wife who collected the fuel wood used by the household; now only 33% say so. Boys, girls, and live-in relatives have taken up the slack (Table 15). Before 1999, boys and girls were the main fuel wood collectors in 20% of the homes, by 2007, that became 38%. According to the 1999 baseline study, 90% of the respondents affirmed that it was women who collected the firewood. This pattern has remained largely the same though girls, boys, live-in relatives, and servants now participate more in fetching the wood.

Despite the decreased involvement of wives in fetching fuel wood, only 17% of the respondents (53 valid answers) confirmed that the responsibility for collecting fuel wood has changed since the project. Seemingly, their perceptions are lagging the facts.

The reasons mentioned for the reduction of women's responsibility for the collection of fuel wood were illness, the support of daughters or, more generally, the children, and a reduction in the household's consumption of fuel wood as, in fact, confirmed by the data about cooking and water heating.

Many respondents do not go far to fetch wood because they get it from the carpentry attached to Centro Polivalente Leão Dehon. As for people who had stopped using fuel wood gave various reasons, e.g., life had improved with the husband's increased income; moving to the city had encouraged the shift; they had switched to charcoal because the fuel wood has become relatively more expensive.

The reasons given for buying fuel wood included having insufficient time to collect it and being suddenly prohibited from fetching scrap wood from nearby industrial sites.

Table 13. *If you use firewood, how do you get it?*

	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
Collects or is given	44	33	54%	41%
Buys and collects	12	16	15%	20%
Buys	26	32	32%	40%
No response	2	0	n.a.	n.a.
Not applicable	16	19	n.a.	n.a.
Total	100	100	100%	100%

Table 14. *Time required to collect fuel wood*

	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
Less than 30 min	10	7	20%	15%
More than half but less than 1 hour	12	8	24%	17%
More than 1 hour, but less than 2 hours	15	16	30%	34%
More than 2 hours	13	16	26%	34%
No response	13	8	n.a.	n.a.
Not applicable	37	45	n.a.	n.a.
Total	100	100	100%	100%
Weighted average minutes required	112	133		

Table 15. *Who collects the wood?*

	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
Single head of household	1	1	2%	2%
Wife	29	16	60%	33%
Husband	2	3	4%	6%
Both man and wife	1	3	2%	6%
Girls	4	7	8%	15%
Boys	2	2	4%	4%
Both, boys & girls	4	9	8%	19%
House worker or guard	4	3	8%	6%
Other	1	4	2%	8%
No response	15	2	n.a.	n.a.
Not applicable	37	50	n.a.	n.a.
Total	100	100	100%	100%
Total respondents	48	48		

Photovoltaic Systems: None of the interviewees has ever had a photovoltaic system.

Dry Cell Batteries: After the project, the use of dry cell batteries—a very expensive energy source—*fell dramatically*. Before 1999, 51% of the respondents (98 valid answers) used dry cell batteries for radios or cassette players. Now, only 20% do (99 valid answers). Dry cells are even used less for torches: 22% before; 11% now (97 valid answers). This may well be due to the existence of street lights and fairly reliable household lighting.

Dry cell batteries continue to be used for watches and, increasingly, for TV remote controllers.

Car Batteries: Before 1999, only 2% of the respondents (99 valid answers) used a car battery for a radio or cassette player. Now, merely 1% do so (100 valid answers). Car batteries are used mainly to charge other batteries. No one mentioned any other application, not even to run a television.

Candles: Before 1999, 46% of the interviewees (92 valid answers) used candles for lighting. Now only 22% do (100 valid answers). Before 1999, over 35% of the interviewees (99 valid answers) used candles exclusively for emergency lighting whereas now 82% do (99 valid answers). This, a dramatic change, is consistent with the reduced use of dry cell batteries for torches and the increased reliance on electricity for lighting.

A6.4.3 Changes in Energy Consumption Patterns due to Project

Some of the changes observed in energy consumption patterns can be directly or indirectly attributed to the project. Others cannot. Over the past 11 years, multiple investments—e.g., roads, schools, communication, banking, and diverse businesses—have been going into Gurué. These too have propelled development. However, the project's investments in electrical power infrastructure were often a *sine qua non* for the realization of certain other investments and activities or, at least, significantly enhanced their productivity and efficiency.

The directly attributable impacts concern public and household **lighting** and **business applications.** According to the 1999 baseline study, only 45% of the families bought kerosene for lighting and several interviewees used kerosene and/or candles for home lighting. Nevertheless, all the interviewees in the 1999 baseline deemed electricity to be the *best source for lighting* and 30% reportedly planned to request a connection, 30% were not sure, while the rest (40%) had no plans to do so. Those who preferred electricity wanted it for both lighting and radios.

Our recently collected data confirm that many have been able to achieve that dream: electricity. Whereas 42% reportedly used electricity before 1999, now 79% do so and 16% of the interviewees are now using electricity for their home business, up from just 6% in the prior period. Before 1999, 45% sometimes used candles, now 80% do. Concomitantly, the use of dry cell torches—a costly form of lighting—has fallen from 22% to 11%, the likely result of increased city and household lighting. A few people are also switching to electricity for cooking (8% before; 12% now). These are changes that are *directly attributable* to the increased availability and reliability of electricity made possible by the project.

Some of the other changes in energy consumption patterns that our survey identified probably have little if anything to do with the availability of electricity. For cooking, many people are switching to charcoal (70% before; 86% now) as also for water heating (58% before; 68% now) since fuel wood is becoming more difficult and costly to get and people have to walk farther to fetch it. According to the 1999 baseline study, families spent two hours per day looking for energy. Our data reveals that, before 1999, 39% spent less than an hour looking for fuel wood whereas now only 27% can get it that fast. The rest spend one, two or even more hours to fetch wood.

The 1999 baseline claimed that, from 1994 up to 1999, the consumption of electricity was determined by EDM's capacity to supply it and not by the price of the energy or household income. The study expected that the use of electricity for cooking would increase very slowly because of the uncertainty about people's ability to pay for electric stoves. According to that study, all households in the rural area of Gurué used fuel wood to cook and the majority of the families interviewed for the baseline said that fuel wood and electricity were alternatives for energy to cook.

As for dry cell batteries, the 1999 baseline study reported that these were mostly for radios. Of our interviewees, 51% used dry cell batteries for radios before 1999 and now 71% do. This increase probably reflects the general improvement in the income and living conditions of the population, including those who are still **not** hooked up to electricity and, hence, still need batteries for their radios.

A6.5 Outcome and Impact of Electrification

A6.5.1 Access

The 1999 baseline study mentioned that over 30% of their interviewees planned to request a connection for electricity and that 30% was not sure. At present, 81% of our sample was, in fact, connected to electricity. According to our respondents, the number of domestic subscriptions increased from 30% before 1999 to 79% now. Electricity is used mainly for lighting and entertainment.

Table 16. *Since when does your house have electricity?*

	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
Had electricity link*	30	79	30%	84%
Had no link	69	15	70%	16%
No response	1	6	n.a.	n.a.
Total	100	100	100%	100%

*inconsistency with information on electric light is noted. It is unlikely to have electricity but not use it for light. However, the magnitude of change is the same.

A6.5.1.1 Type of Subscription

Before 1999, everyone getting electricity reportedly paid a domestic tariff. In 2007, two were getting a farm tariff while all others paid a domestic tariff.

A6.5.1.2 Reconnection due to Non-Payment

For the period before 1999, no respondent (29 valid answers) reported having reconnected their electricity after it had been disconnected due to non-payment. At present, 6% of the respondents (64 valid answers) reportedly had reconnected their electricity after it cut for non-payment.

A6.5.2 Use of Electric Appliances

Besides the electrical appliances listed below, the interviewees said that they also had freezers and liquefiers (juicers).

A6.5.2.1 Lights/Bulbs

Besides the leap in those with an electricity connection, more people now have more light bulbs. Before 1999, 3% of those with electricity had only one light bulb at home; no one had two; 55% had between 3 to 7 bulbs; 23% had 8; and 10% had between 9 to 12. Now merely 2% of the respondents who have electricity have only one or two light bulbs at home; 67% have between 3 to 7 bulbs; 12% have 8; and 13% have between 9 to 14.

Table 17. *Number of light bulbs in home before 1999 and in 2007*

Number of light bulbs in home	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
1	1	1	3%	1%
2		1	0%	1%
3	1	8	3%	10%
4	4	9	13%	12%
5	5	8	16%	10%
6	4	20	13%	26%
7	3	11	10%	14%
8	7	9	23%	12%
9	2	2	6%	3%
10	2	4	6%	5%
11	1	1	3%	1%
12	1	1	3%	1%
13	0	1	0%	1%
14	0	1	0%	1%
No electricity link	66	16	n.a.	n.a.
No response	3	7	n.a.	n.a.
Total	100	100	100%	100%

A6.5.2.2 Other Appliances

Radio

Radio usage and ownership has increased greatly. Before 1999, over 5% of the respondents (82 valid answers) reportedly used electricity on a borrowed radio and 38% owned one. Now, over 3% of the respondents (89 valid answers) used a borrowed radio and 64% owned one.

Cassette/CD/DVD player

By contrast, the use of cassette, CD and DVD players has not increased. Before 1999, over 2% of the respondents (89 valid answers) used electricity with a borrowed cassette/CD/DVD player whereas 38% owned one. Now, 2% of the respondents (89 valid answers) used a borrowed player whereas 40% owned one.

Black-and-White TV

Before 1999, 4% of the respondents (81 valid answers) owned a black-and-white TV. Now, 17% (88 valid answers) do while 5% have a borrowed one.

Colour TV

Before 1999, only 1% of the respondents (81 valid answers) owned a colour TV. Now 53% do (88 valid answers) while 5% borrowed one.

Cellular Phone

Before 1999, no cell phone services were offered in Mozambique. Now, 55% of the respondents (89 valid answers) owned a cellular phone and 8% reportedly borrowed one when needed.

Water Heater

With access to electricity, many people have been acquiring water heaters. Before 1999, 2.5% borrowed and 2.5% owned water heaters. Now, 2% borrowed and 15% owned one (87 valid answers).

Refrigerator

Before 1999, 10% of the respondents (82 valid answers) 10% owned a refrigerator and 1% borrowed the use of one, typically from a neighbour. At present, 27% owned one and 3% borrow (88 valid answers).

Electric Kettle

Before 1999, only 1% of the respondents (82 valid answers) owned an electric kettle; now 7% own one and 2% borrow one (87 valid answers).

Electric Stove or Hot Plate

Before 1999, 5% of the respondents (82 valid answers) owned an electric stove or hot plate. Now, 7% own one and 1% borrow (87 valid answers).

Electric Stove (Range) or Microwave Oven

Before 1999, only 4% of the respondents (81 valid answers) owned an electric stove (range) or microwave oven. Now, 10% owned one and 1% borrow them (87 valid answers).

Electric Water Pump

Before 1999, 1% of the respondents (82 valid answers) owned an electric water pump. Currently, it is still only 1% who own one (87 valid answers).

Sewing Machine

Before 1999, only 1% of the respondents (82 valid answers) owned a sewing machine. Presently, it is still only 1% who own one (87 valid answers). In Gurué, however, sewing machines are manual, not electric.

Hair Dryer

Before 1999, 2% owned a hair dryer (82 valid answers); now 5% do.

Computer

Before 1999, no respondent (82 valid answers) had a computer. At present, 5% own one (86 valid answers).

Power Tools, Heaters, Mixers

Before 1999, no one owned any power tools, heaters, or mixers. After 1999, out of 90 valid answers, 2% a power tool and 2% owned a heater or mixer.

A6.5.2.3 Major Findings

The major energy need is for cooking. Before the project, 85% of the families use fuel wood for their cooking needs. Today, it is 79%, and of these, the share using it only sometimes has increased. A significant shift has been to towards charcoal: an increase of more than 20% against the reference year, and those that use it frequently have increased quite dramatically. Those that never use electricity for cooking have decreased somewhat, 12% use it for cooking, but only 2% do it very frequently, 3% sometimes and 7% sometimes. Gas and kerosene are use by 2% of the sample, unchanged against earlier. Only an insignificant number of households use fuel wood, charcoal, kerosene or gas for any other purpose than cooking.

Fuel wood is obtained by about half that use it by purchasing it, the other half collect it (32% buy, 16% buy or collect, 33% only collect). Collecting wood requires more time than before the project: two thirds of the respondents need two hours or more, while earlier, the percentage was 56%. Those needing less than half an hour today are 15%, and 20% in the earlier period. The responsibility of women for obtaining fuel wood has changed from 60% before, to 33% today. However, another response was that only 17% saw a change in who collected the wood (see next section).

The main use of electricity is for lighting. 79% of the respondents use it today, against 42% before the project. Those that always use it, have increased from 14% to 41%, a significant increase, indicating that supply reliability must have improved. 75% of those using electric light have between 4 and 8 light bulbs in their home. Six percent have fewer, the rest more. The use of kerosene for lighting has disappeared, while before the project, 16% always used it. Candles are used as backup, when there is no electricity: 86% use it sometimes or frequently, while only 6% use it very frequently.

Electricity also has replaced dry cell batteries to a significant extent: Before, more than 50% of the respondents used it, and this has fallen to 20% related to use in radio and cassette players, while the numbers are 22% and 11% (before/after) in the case of use in torch lights. Dry cell battery energy costs at least a factor 20 more than mains electricity. This results in a seemingly small but very important saving, as people have little money available. Other uses for electricity is for Television, (80% use it against 5% before), a surprising number of different appliances, and the home business. The number of respondents who use it in the latter has increased from 6% to 16%. Cell phones did not exist before, now almost two thirds of the respondents use one, often limited to receiving calls because of cost.

Television sets, overall are the second most important use of electricity in terms of household electricity consumption. It may in some households (>10 hrs use per day) exceed electricity consumption for lighting. In households that have a refrigerator (30% of respondents), this ranks third in terms of share in total consumption.

The field survey questionnaire also contained questions on energy quantities used. Data were collected for the quantities of fuel wood, charcoal, electricity, gas and kerosene. The result in the end, unfortunately, was an insignificant share of valid answers, inconsistencies in valid answers made it impossible to use data.

A6.5.3 Features of Supply

A6.5.3.1 Cost and Payment Modalities

Before 1999, 61% of the respondents (57 valid answers) said that they made payments to EDM while more than 37% were not connected to electricity. Currently, 92% (82 valid answers) pay EDM for their electricity while 7% pay indirectly through their landlord.

Before 1999, 59% of the respondents (54 valid answers) said that they paid monthly whereas now 98% (81 valid answers) do so while 1% pay via CREDELEC (pre-paid electricity).

As we had anticipated would happen, the data obtained about the amounts paid for electricity consumption were very few and manifestly unreliable. Hence, they are not presented here. From EDM data, it is clear that the tariff is MZN 1.0/kWh for the first 100 kWh per month. Higher consumption costs more, but given the consumption patterns it is safe to assume that the large majority of households are using less than 100 kWh/month

Whereas before 1999 no respondent (84 valid answers) reported to share the payment of their electricity bill with other users, now 3% (31 valid answers) shared the bill with another house and 6.5% with two other houses.

A6.5.3.2 Charges and Tariffs raised by EDM

In EDM distribution, the costs arising are for an initial connection fee, a fixed subscription cost per month, a guarantee deposit, and finally consumption charges per kWh. The social tariff category is exempt from connection charge, fixed charges and guarantee deposit, as shown in the table below.

Table 18: *EDM Tariffs and Charges*

#	EDM Tariffs	MZN/kWh 2006	MZN/kW 2006	fixed fee (MZN) 2006	Connection Fee (MZN) 1 Phase	Connection Fee (MZN) 3 Phase	guarantee deposit (MZN)
1	0-100 kWh (social)	1.00					
2	0-200 kWh	2.20	2.46	70.80	65.41	130.82	673
3	201-500 kWh	2.93	3.52	70.80	65.41	130.82	2198
4	above 500 kWh	3.08	3.85	70.80	65.41	130.82	4527
5	Large Industrial LT)	1.38	106	207.31		191.53	per kW 220 - 415 MZN
6	Medium tension (MT)	1.14	119	973.08		899.05	
7	High tension (HT)	1.02	131	973.08		899.05	

Most households in the survey sample belong to the above category 1 and 2, while businesses and medium enterprises belong to category 3 and 4, and the large companies to categories 5 to 7.

A6.5.3.3 Power Failures

For the period before 1999, 61% of the respondents with electricity reportedly had not experienced power failures or said they were rare whereas 25% said that they occurred often. By 2007, 51% reported that power outages were rare or never occurred and only 1% claimed they occurred often (Table 19). Now, however, more electricity users report power fluctuations.

Table 19. *Frequency of power outages*

	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
Never	15	17	38%	21%
Rarely	9	28	23%	35%
Sometimes	6	34	15%	43%
Often	10	1	25%	1%
No response	2	2	n.a.	n.a.
Not applicable*	58	18	n.a.	n.a.
Total	100	100	100%	100%
Respondents	40	80		

* We only counted the responses by people that received electricity in the period.

A6.5.3.4 Power Fluctuations

Fluctuations are reportedly up a bit. For the period before 1999, 49%% of electricity users that responded had experienced power fluctuations. Now, 38% complained of power fluctuations and their frequency seems to be less than before (Table 21 and Table 21).

Table 20. *Are there power fluctuations?*

	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
No	19	30	49%	38%
Yes	20	50	51%	63%
No response	3	2	n.a.	n.a.
Not applicable	58	18	n.a.	n.a.
Total	100	100	100%	100%

Table 21. *How often do the fluctuations occur?*

	Number	% of respondents

	Before 1999	2007	Before 1999	2007
Never	19	36	59%	51%
Rarely	2	28	6%	40%
Often	11	6	34%	9%
No response	10	12	n.a.	n.a.
Not applicable	58	18	n.a.	n.a.
Total	100	100	100%	100%

A6.5.3.5 Damage due to Power Fluctuations

For the period before 1999, 10% of the respondents (71 valid answers) reported having suffered damages due to power fluctuations before 1999 whereas, now, 28% (86 valid answers) report such damages.

For the pre-1999 period, 74% of the electricity had never incurred such losses; 5% (62 valid answers) claimed they were rare; and 19%, often. For the post-1999, 52% (77 valid answers) said such damages never happen; 38% said they are rare; but 8% claimed they were frequent.

Table 22. *Has your electrical equipment been damaged due to the fluctuations?*

	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
No	34	57	87%	71%
Yes	5	23	13%	29%
No response	3	2	n.a.	n.a.
Not applicable	58	18	n.a.	n.a.
Total	100	100	100%	100%

A6.5.3.6 Major Findings

Most customers pay their electricity bill to EDM (92%), some pay through their landlord, and allegedly, five households are connected to another house, and the bill is shared. This saves costs for an additional meters, but is, strictly speaking, illegal.

EDM applies a differentiated tariff, depending on a number of factors: consumer category, such as domestic, commercial, agricultural or industrial, the level of consumption, and the level of load, as well as the voltage level of supply. It is seen that the social tariff is heavily subsidized: Consumers with a monthly 100 kWh or less, pay less than half of the next domestic category. The domestic tariff is progressive, and ranges from MZN 1 per kWh to about MZN 3 per kWh. All categories, except social tariff, also pay a connection charge, recurring fixed charges, and have to make a deposit.

It is seen from this that larger domestic consumers subsidize smaller consumers: Small consumers pay from one third to half of what the larger domestic consumers pay.

The quality of supply, according to respondent's perception, has decreased: Before, 61% had not experienced power failures, while now, only 51% stated to not have experienced it. Voltage fluctuations are experienced less often, only 9% against the previous 34%. On the other hand, 29% claim to have suffered damage to equipment due to fluctuations, while it was only 13% previously. There may be a contradiction in this, but it is also possible, that a single abnormal incident has caused damage in many homes.

The statements on power failures and fluctuations are not considered reliable. It is possible that the questions have been misunderstood, or the responses were not very clear and misinterpreted by the remunerators.

A6.5.4 Social Impacts

A6.5.4.1 Security

For additional security, homes with electricity are clearly using their lights more at night in comparison to the period before the project. Before 1999, 46% of the respondents with electricity never left their lights on throughout the night whereas 46%, always did. For 40%, security is the main reason and for another 9%, both security and the comfort of light. By 2007, 31% (87 valid answers) whereas 74%, always (Table 23). In both periods, security was the predominant motive (Table 24).

Table 23. *Does your household leave some lights on throughout the night?*

	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
Never	19	25	46%	31%
Sometimes	4	10	10%	12%
Always	18	46	44%	57%
No response	1	1	n.a.	n.a.
Not applicable	58	18	n.a.	n.a.
Total	100	100	100%	100%

Table 24. *Why do you leave your lights on all night?*

	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
Simply for light	0	1	0%	2%
Security	17	39	81%	74%
For security and light	4	13	19%	25%
No response	2	4	n.a.	n.a.
Not applicable	77	43	n.a.	n.a.
Total	100	100	100%	100%

A6.5.4.2 Working at Night

As for working at night because of having electricity, 14% of the respondents say they work less now whereas 60% claim to work more now. Asked "who is working **more**" now, 50% said the wife; and 20% indicated no change. Concerning, only the boys seemed to get little benefit.

Table 25. *Is there more or less work due to having electricity?*

	Number		% of respondents	
	Before 1999	2007	Before 1999	2007
No change	20	20	63%	27%
Yes, more work	8	44	25%	59%
Yes, less work	4	10	13%	14%
No response	10	8	n.a	n.a

Not applicable	58	18	n.a	n.a
Total	42	82	100%	100%

Table 26. *Who works more?*

	Number			% of respondents	
	Before 1999	**2007**		**Before 1999**	**2007**
No change	14	9		74%	20%
Wife	4	23		21%	50%
Husband	0	3		0%	7%
Girls	0	4		0%	9%
Both, boys & girls	0	2		0%	4%
All	0	2		0%	4%
Other, specify	1	3		5%	7%
No response	23	35		n.a.	n.a.
Not applicable	58	19		n.a.	n.a.
Total	100	100		100%	100%
Total respondents	19	46			

Table 27. *Who works less now that you have electricity?*

	Number			% of respondents	
	Before 1999	**2007**		**Before 1999***	**2007**
No change	1	3		n.a.	9%
Wife	1	6		n.a.	18%
Husband	0	6		n.a.	18%
Boys	0	1		n.a.	3%
Both, boys & girls	2	7		n.a.	21%
All	0	6		n.a.	18%
Other, specify	0	5		n.a.	15%
No response	26	47		n.a.	n.a.
Not applicable	70	19		n.a.	n.a.
Total	100	100			100%
Total respondents	4	34			

Note: For the early period, there are too few respondents to be significant.

As for those that were *working less*, the main explanation was that in the evenings they are tired; the mother works during the day; and most of the work is done during the day. The reasons seems unrelated to the availability of electricity. *Working more* seems, however, to be clearly related to the availability of electricity. People claimed they worked now because, with light, that has become possible. For example, the wife can prepare dinner and women can now continue working during the evenings doing additional work like sewing, since, during the day, they are too busy with other activities. In one household, we were told that the husband had a carpentry and sometimes now works in the evenings. Overall, it seems that, for the people in our survey, electricity has intensified work in the home and on the job.

For those who work in the evenings, they argued that:

- their memory is fresh then and there is more time available;
- the night is calm and fresh;
- there are many activities during the day so some are transferred to the evenings;

- electricity enables them to work at night; and
- Light bulbs give nearly the same clarity as daylight.

A6.5.4.3 Entertainment

With 67 valid answers, most people with a television have it on between two to four hours per day though 10% connect it for ten hours every day. Over 27% of the respondents, With 75 valid answers, 27% have the radio on for one hour/day while 12% do so for two hours.

A6.5.5 Effects of Electricity on the Education Sector

The education network in Gurué district has 133 schools (511 classrooms). Of those, 114 are primary schools for first grade (EP1); 13 are complete primary schools (EPC), 3 are for the primary teaching of second grade (EP2), 2 are secondary schools, and 1 is a private technical school. The district is one of three in the province that has a pre-university school, and it admits students from other districts. The city of Gurué also has one boarding school that receives boys and girls from the other districts.

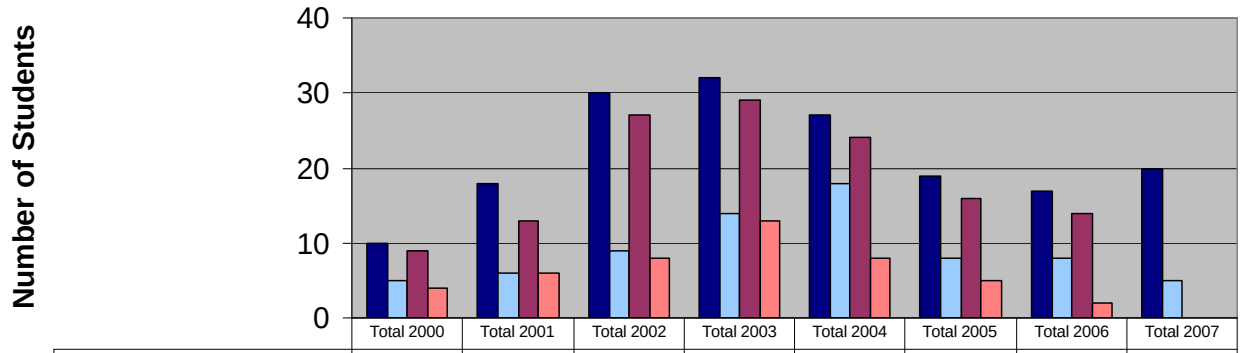
Between 1999 and 2001, 35 school infrastructures (2 boarding schools, 81 classrooms, 9 houses for teachers) were built or refurbished. Moreover, the Governor of Gurué expects to improve the education sector because, currently, the district cannot accept all children for lack of teachers and classrooms. The sector has 803 teachers (639 in primary schools and 64 in secondary and pre-university schools).

For adults' literacy, there are 17 units with 142 centres and 9.272 learners (AEA).

For the Centro Polivalente Leão Dehon electricity is essential. It runs a technical school with three courses: general electricity, auto mechanics, and locksmith mechanics. Each course runs during the day and lasts three years, which is equivalent to standards 8, 9 and 10 in the normal education system. In 2000, it had 27 students, rising to 88 in 2003 but falling to 25 in 2007 (Figure **9**).
The district has over 36.998 pupils (44.5% girls). Its extraordinarily high teacher/pupil ratio (1 : 112) as well as the low level of training of the teachers (46% are untrained) limits the sector's development. Access to school is mainly constrained by cultural issues, especially for girls between 10 and 12 years old right after the initiation rites since many are forced to marry. Another constraint is the long distance children have to walk to school.

According to the District Director for Education and Culture, electrification helps the school to function fully by adding evening classes to improve workers' access to education. On interviewee, a teacher, confirmed that the evening courses have helped to increase of the number of people—including women—who go to school. Several other interviewees report that access to the evening courses is better now that street lights have improved security, especially when they are returning from school. That is more complicated and unsafe in the neighbourhoods without electricity.

Figure 9. *Registered and approved students from general electricity courses at Centro Polivalente Leão Dehon, 1999-2007*



	Total 2000	Total 2001	Total 2002	Total 2003	Total 2004	Total 2005	Total 2006	Total 2007
GENERAL ELECTRICITY Registered W	10	18	30	32	27	19	17	20
GENERAL ELECTRICITY Registered M	5	6	9	14	18	8	8	5
GENERAL ELECTRICITY Approved M	9	13	27	29	24	16	14	0
GENERAL ELECTRICITY Approved W	4	6	8	13	8	5	2	0

Years

A6.5.5.1 Electrification of Schools

Before the high intensity power lines brought electricity to Gurué, the schools used generators but, lacking sufficient funds for fuel, suffered interruptions in their activities. Nevertheless, after the electrification project, merely four schools in Gurué became electrified. Those that are in the city are due the fact there was no work for its electrification. For the others, the transformer points (PT) do not have sufficient capacity to provide electricity to locations, e.g., Aeródromo, Mangone (8 km from the city).

Table 28. *Electrified schools in Gurué, by year*

School	Year
Montes Namuli	1972
Escola Secundária	1972
Moneia	2000
Muela	2000
Projecto	2003
25 de Junho	2004

Source: Data prepared for the present study by the DDEC and adapted by Alícia Calane, May, 2007.

A6.5.5.2 Informatics

Though a project exists to put computers in the schools that depends a lot on how each director manages their school. Some computers, a copy machine, and audio-visual materials were obtained for the pre-university school to improve the work and reduce costs. Though 10 computers were given to the school, after six months only five are still functioning. When the computers were good, all the students got computer lessons twice a week albeit with no connection to the Internet.

With their newly acquired computer skills, people are now using computers to keep information mainly at District Direction of Education of Gurué and in the pre-university school. In other districts (such as Gilé), where there is only a generator that works irregularly and, then, two hours per day, the results are not the same because the time spent on the

computer is very limited. Thus, they cannot develop skills and are still typing out their reports.

As reinforced by the DDEC previously, the schools with electricity may have computers, which facilitate school planning as happens in those that are already have electricity. If all schools had computers, DDEC would receive information from them more quickly.

According to Centro Polivalente Leão Dehon, the centre organized seven computer courses this year and interest is growing. Nevertheless, few opportunities exist within the area to apply such skills once they are acquired.

A6.5.5.3 Electricity supply reliability

The pre-university school has experienced persistent problems with the supply of electricity, which require professional analysis. Electrical fluctuations have destroyed some equipment, including one computer whose processor burned up. Some UPS's have stopped working but the school is not sure it this is due to the fluctuations. According to DDEC, there are other neighbourhoods that had some problems created by a contractor, but this is now being solved.

Black-outs happen only when there are problems with the main line or when it is for maintenance, which usually happens on Sunday. However, EDM usually warns ahead of time.

A6.5.6 Impact of Electrification on Education

A6.5.6.1 Study Habits in the Community

Asked how the availability of electricity has affected the children's study habits in their neighbourhood, the answers were:

- The community is very busy, so during the evenings they take the chance to go to school;
- It is now possible to go to night classes;
- With the electricity, people can now go to school, something that did not happen before;
- With the electricity, people can now assist their children in the studies;
- Now the streets have lights and that reduces the circulation of thieves, and that encourages more people to study in the evenings without being afraid;
- Now, with the electricity, there are many women that are going to school;
- It helps the readings, as well as access to internet and studies during the evenings;
- It is good, it is possible to go to school and produce results just like if it had been studying during the day; and
- I can go to school, return to do the homework, and then chat with people at home.

Though there is electricity some of the neighbourhood schools still lack electricity for various reasons. People dislike that they have to walk far in the evening to go to a school with electricity when one exists in their neighbourhood. The reasons suggested by some is the lack of payment of the electricity bills, and then the line is cut and the lack of teachers due to small budget for their salaries.

A6.5.6.2 Children Studying

From the 48 valid answers, 60% of the respondents said that, with the arrival of electricity, the children did not change their study habits, the others (40%) reported changes. Asked if their studies have improved, 84% said that they had improved a lot and 16% said no. Seemingly, this partly contradicts the answers reported in the previous sentence where 60% reported no changes. Improvements have occurred but, perhaps, less than reported in this

second response.

Of the respondents, 79% said that the children's studies did not worsen after getting electricity; 21% said they did. The reasons suggested for a good impact are:

- Children can now prepare the next day classes.
- The light helps the children to produce more.
- It is possible to provide additional assistance to the children while they are studying.
- Children can watch TV and can get lots of information about the world.
- Children can study without much effort to see.

Those that said that it got worse argued that:

- The children only want to see the soap operas.
- The children become too distracted and do not want to study, do not have time to study, and only want to go out and see movies.
- Some prefer that their children study during the day.
- The children's studies worsened because of being distracted watching TV.

A6.5.7 Health Sector Overview

A6.5.7.1 Sanitary Units and Staff

The health sector in Gurué comprises a network with 13 sanitary units and 183 beds. One unit is the Gurué Rural Hospital in Gurué city, which has 142 beds. The other sanitary units are health centres type III (they all include maternities and permanent vaccination posts) – 2 in the city and the remaining in the UP2 neighbourhood, the villages of Muagiua, Invinha, Lioma, Ruace, Serra, Tetete, Mepagiua, Up10 e Macuarro. The health network also include 20 village health posts.

The health staff of the district comprises 140 professionals, including 4 medical doctors, 27 medium-level technicians, 45 basic-level technicians, 20 elementary technicians, 2 drivers, e 42 servants. On average, there is one health technician for every 9.405 people. According to data provided by the chief nurse, Gurué Rural Hospital had 99 employees in 2006. According to the Distrital Director of Health, it now has 111 employees.

A6.5.7.2 Coverage

Gurué District has 11.286 habitants per sanitary unit. According to the District Government's Development Plan, each sanitary unit receives over 8.000 people per year, and the distance that people need to walk to reach a sanitary unit is of 10 km to 15 km.

The Rural Hospital of Gurué serves all Gurué city, as well as all localities that transfer their patients to the hospital for paediatric, emergencies, and maternity care. Over 20% of those that come due to an emergency stay in the hospital. For surgeries, the hospital also receives patients from other districts such as Ile and Namarrói.

As a Rural Hospital, the services provided, apart from the urgent surgeries, are basic. There are no sub-specialties. When necessary, the patients are sent to Quelimane. The hospital works 24 hours a day and has appointments for consultations up to 15.30 p.m., the government's normal working hours.

According to information received from the chief nurse, the Rural Hospital of Gurué received an average of 1.622 emergency patients in 2006 and 50% were children, 26% women. From

those that stayed in the hospital, 43% are for paediatric reasons, 26% for surgery and 31% requiring general medicine.

A6.5.7.3 Vaccination

According to the District Governor, the coverage of the vaccination program rose by 50% between 1995 and 2006. Besides the fixed posts that have fridges for the vaccines, the technical team also visits villages during the vaccination campaigns.

A6.5.7.4 Most Frequent Diseases

The most frequent diseases in the district are diarrhoea, tuberculosis, parasitoids, malaria, and malnutrition. Children are mostly affected by malaria and parasitoids. Malaria is one main killers in the district.

The Rural Hospital has registered as the most frequent diseases, malaria, respiratory diseases, and HIV/AIDS. Burns are rare because, according to the DDS, the population knows well not to play with fire. Reportedly, epileptics are the most susceptible to burns.

Specialized services and counselling exist for the youth. In 2003, voluntary testing was started as well as a day hospital to support HIV/AIDS infected people to take antiretroviral medicine. The district also has a District Nucleus for the Combat against HIV/AIDS (Núcleo Distrital de Combate ao HIV/SIDA).

A6.5.7.5 Impact of Electrification on the Health Sector

Due to emergencies, laboratory testing, surgeries, and vaccines storage, electricity has helped the hospital, which can now provide more consistent services. The hospital has acquired new modern equipment that has also improved services.

Concerning eye diseases, the DDS said that it was difficult to measure the impact of the electricity here because he had no references to compare. For eyes problems, some people are sent to the hospital by the community agents though many come by themselves. Till two months ago, the hospital had an ophthalmologist who attended 80 people per month. Now there is no one to do this.

Besides electricity, the hospital buys fuel wood from the Centro Polivalente Leão Dehon mainly for use in the kitchen.

The expenses for both electricity and fuel wood are increasing though the bulk of the expenditure is for electricity.

Table 29. *Gurué Rural Hospital monthly energy expenditures, 2004-2006*

Monthly Energy Expenditures (Mtn)			
Energy	**2004**	**2005**	**2006**
Electricity	23.000 to 25.000	28.000 to 30.000	30.000 to 33.000
Fuel wood	5.000 to 7.500	7.500 to 10.000	10.000 to 15.000

The community's perception

Asked how electricity had affected or affects the community's health, some people replied according to their family's experience while a few referred to the community as a whole. Some of the opinions are accurate, others have a dubious scientific basis, for example:

- Some people said that the electricity does not affect their health .

- Electricity has nothing to do with health unless one spends too much time watching TV, which can affect their eyes.
- Electricity has nothing to do with health though, in previous years, they drank warm water and now can drink cold water, which is supposedly good for health.
- The family has less time to rest.
- Children study early in the morning and sometimes they stay awake until 22h watching TV and have difficulties in waking up in the morning and that is not positive.
- Others said that the electricity affected their families' health in a very positive way since the children can be medicated at any time during the night without needing candles or kerosene for light.
- Electricity brings happiness and units the family since there is more time to chat, listen to the radio, and watch TV
- Electricity protects health because is avoids smoke pollution.
- The lack of electricity makes the family have less chest problems and sore eyes due to smoke.
- The health is better because the hospital has light to facilitate operations and the treatment to the patients.
- Now, health is not affected because they no longer use anymore candles and other fuels for lighting
- At dinner time, it is possible to see what they are eating.

A6.5.7.6 Major Findings on social effects

Security

The number of people that used to leave the lights on during the night has increased considerably. It gives people a feeling of security.

Night Activities

People that are connected to electricity like it for the convenience and the extra hours it gives them to interact with their friends and family. Some have also started to work at night to earn income. Women have more work to do as they are now able to do the housework that they were unable to do during the day because they were in their production fields or business outside their homes. So, with electricity, evening activities increase in both entertainment and work and may well reduce the time for resting.

Education

Undoubtedly, electricity increases opportunities for people to study during the evenings. With electricity, technical courses—including computer classes—were introduced in the city and have attracted significant demand. However, as many interviewees said, though electricity brings more opportunities for longer hours of light, one cannot measure its pedagogical impact in isolation. Many other factors are at play.

Health

Electricity has brought the good results and increased trust for the health sector. Modern machines were brought to the district, surgeries are now possible, and medicines, including vaccines, can be stored in fridges, which is very important for the national vaccination campaigns. With increased lighting at night, people also feel more confident to go at any time to the hospital to get treatment.

A6.6 Enterprises Development

A6.6.1 Situation of the Firms in 1999 in Relation to Electricity

The 1999 baseline study referred that the main source of energy consumed in Gurué was the thermal production from the five operational tea factories with a capacity of approximately 1.8 MW and approximately 0.6 MW more from EDM and various private entities, followed by hydro power of 1.1 MW. Local power generation with diesel engines used an estimated 330.400 litres for 1999. The generators were not in continuous operation because of high costs. For the production of electricity approximately 72.000 litres were consumed by the tea factories, 192.000 litres by EDM and 62.400 litres and by the Leon Dehon Centre. The remaining 4.000 litres were consumed by boarding houses, NGOs, the grain mill and small companies.

In Gurué a litre of diesel used to cost about 5.350 MTM. (old currency, equivalent to MZN 5.35). In addition, the consumption of wood fuel by the factories for tea drying and for Emochá's steam turbine is estimated at 30,466 m3 for 1999, making this the third most important source of energy in that time. Approximately 60% of this fuel was obtained by the factories from their own plantations, the rest being acquired or cut from the forest with licenses emitted by the District Directorate of Agriculture for the purpose. The distances to the locations where wood fuel is cut vary from 8 to 40 km. The cost of wood fuel is approximately 8.500 MZN/m3 and transport costs vary between 2.000 MZN to 3.000 MZN per m^3. The small and medium sized companies consumed 2.500 m^3 of wood and about 36.000 kg of charcoal per year in the production of foodstuffs and alcoholic beverages.[6]

The 1999 baseline was concerned about the environmental situation because the rate of reforestation was lower than the level of cutting. According to the study, it was previewed that the future consumption of power in Gurué would reach 7.5 GWh between 2003 and 2005 when investors, confronting the reality of having available good quality power for sufficient time would carry out investments which in that time they wouldn't even mention. Many of the likely capital investors are not even in Gurué at present.[7]

According to the 1999 baseline study, all the tea companies with the exception of Gulamo's (Chazeira de Moçambique) hydro power plant that has had water for year round operation and also provision of 80 kW of electricity to the EDM network, suffered great difficulties from the irregular supply of energy because of lack of water and funds to operate their generators for longer periods. According to the same study, the lack of network supplies of electricity to the tea industry retarded investment in the sector and only in that time, with the knowledge of future connection larger investments seem to start to have been planned.

In general terms, all sectors identified power supply as the main problem, like communications, roads. In addition to this, the commercial sector supplied by the EDM network also complained of the weak buying power of Gurué workers, both seasonal workers with intermittent salaries and of those with low salaries. Some commercial sector representatives also noted the strong impediment to the development of Gurué being difficult access to credit. In 1999 the principal operating costs of the tea companies were salaries, followed by energy.

[6] Baseline 1999: 9-10
[7] Baseline 1999: 11-12

A6.6.2 Economic Sector Overview

A6.6.2.1 Industries

The industrial network Gurué is composed by 11 areas of activities that integrates the tea industry, mineral bottling, mills, oil pressing and others as presented in the following table:

Table 30- Gurué district industries network, 2004-2005

Type of Activity	2004			2005		
	Operational	Closed	Total	Operational	Closed	Total
Tea processing industry	5	1	6	4	2	6
Mineral water bottling	1	0	1	1	0	1
Boer bean processing	1	0	1	0	1	1
Mills	32	1	33	47	1	48
Furniture production	1	3	4	2	2	4
Bread-making	1	1	2	2	1	3
Oil pressing	24	0	24	2	22	24
Mechanic locksmith	1	0	1	1	0	1
Mechanic workshops	3	0	3	3	0	3
Shoe shop	1	0	1	1	0	1
Tea packing	1	0	1	1	0	1
TOTAL	**71**	**6**	**77**	**64**	**29**	**93**

Source: Direcção Distrital da Indústria, Comércio e Turismo in Governo do Distrito de Gurué (2006: 25)

The following table summarizes the official information about the industries production. For each of the listed firms, with the exception of the Centro Polivalente Leão Dehon (CPLD), there is an individual data collected during the field work. This can be seen later in the present document.

Table 31. Gurué district industrial production, 2004-2005

Company	Product	2004	2005
		Produced	Produced
SDZ. Sarl	Packed tea	1 169 365 Kg	1 014 153 Kg
Chazeiras de Moç.	Packed tea	932 947 Kg	724 199 Kg
Chá Magoma	Packed tea	1 066 404 Kg	806 463 Kg
Sagar Zambézia	Processed boer beans	1 513 022 Ton	----------
Centro P. Leão Dehon	Furniture	2 326 pieces	3 602 pieces
CPLD	Flour	394 261 Kg	417 383 Kg

Source: Direcção Distrital da Indústria, Comércio e Turismo in Governo do Distrito de Gurué (2006: 25)

A6.6.2.2 Trade

In terms of trade, the following two tables provide an overview of local trade.

Table 32 - Commercial network, 2004-2005

Type of Activity	2004			2005		
	Operational	Closed	Total	Operational	Closed	Total
Warehouses	4	0	4	6	0	6
Shops	21	43	64	28	43	71
Rural trade B	0	0	0	41	0	41
Rural trade C	0	0	0	78	0	78
Rural trade D	0	0	0	73	0	73
Trade fairs	8	0	8	9	0	9
Rural markets	14	0	14	15	0	15
Bancas fixas	63	0	63	63	0	63
TOTAL	**110**	**43**	**153**	**313**	**43**	**313**

Source: Direcção Distrital da Indústria, Comércio e Turismo in Governo do Distrito de Gurué (2006: 26)

Table 33. *Agricultural trade, 2004-2005 (tons)*

Product	2004		2005	
	Planned (ton)	Produced (ton)	Planned (ton)	Produced (ton)
Maize	13,000	29,316	15,000	23,760
Rice	300	398	300	2,317
Mapira	500	126	300	433
Cassava	12,000	7,661	7,000	4,217
Beans	14,500	28,529	16,000	17,325
Amendoim	300	309	100	66
Total	**40,600,**	**66,339**	**38,000**	**48,118**

Source: Direcção Distrital da Indústria, Comércio e Turismo in Governo do Distrito de Gurué (2006)

A6.6.2.3 Tourism

Although the district is considered a good tourist destination, the lack of infrastructures and the lack of investment in the sector does not contribute to its development.

Table 34 - *Hotel industry network and similar, 2003-2005*

Type of Activity	2003			2004			2005		
	Operational	Closed	Total	Operational	Closed	Total	Operational	Closed	Total
Board houses	2	0	2	2	0	2	2	0	2
Residencials	0	0	0	0	0	0	1	0	1
Restaurants and bars	11	4	15	4	7	11	7	6	13
TOTAL	**13**	**4**	**17**	**6**	**7**	**13**	**10**	**6**	**16**

Source: Direcção Distrital da Indústria, Comércio e Turismo in Governo do Distrito de Gurué, 2006

A6.6.2.4 Financial Services

After Banco Austral closed, the Banco Internacional de Moçambique (BIM) became the only bank in the district. The Banco Austral was a development bank belonging to the government and was later privatized. Now, BIM is the only bank offering services that also include credits and saving accounts. The team approached the bank manager to understand about the changes and about the type of clients BIM has, but the manager had first to ask for permission at the headquarters and no information was obtained. Some of the bank's clients opined that, with a continuous electricity supply, the bank is able to operate and this constitutes a reason for them to invest in Gurué, as travelling to Mocuba to make the deposits was not safe.

Another financial institution is AMODER (Associação Moçambicana para o Desenvolvimento Rural), which has been operating in the district since 2001. AMODER concedes credit to trade, small industries, agriculture, livestock and fisheries.

A6.6.2.5 Company Summaries

Taking into consideration human and economic potential and the type of activity, the 1999 study classified firms as: GROUP I : Big companies, GROUP II: Medium-sized companies, GROUP III: Small companies.

GROUP I. Big Companies

Among the big companies identified in 1999, there existed Emochá with 14 production units, all in the process of privatization. Now, only some of these units are operating. Of these, we visited the following companies, including some that are only now restarting:

- *Sociedade de Desenvolvimento da Zambézia, SDZ:* In 1999, this company was in the process of development and importation of machinery to start working.
- *Chazeira de Moçambique:* Started in 1998, Chazeira de Moçambique, a tea company, is part of Gulamo's Group that owns 2,350 hectares within the municipality though, now, it is only using 1.350ha.
- *Chá Magoma (Chazeira Magoma):* According to the 1999 study, Chá Magoma, a tea producer and exporter, arose from the privatization of three production units (UPs) from Emochá E.E. and has been operating since 1996.8 Located outside Gurué municipality, the company owns 6,000 hectares though, at present, it only uses 1,717 hectares. It has a greenhouse to dry the tea, by fuel wood.
- *Chá Zambézia:* A subsidiary of Chá Magoma, Chá Zambézia owns 5,500 hectares of land in the municipality. Of these, 5,000 hectares are being worked, 306 hectares is for circulation, and 194 hectares are idle.
- *Agro-Industries Lda.:* Agro Industries Lda. is an agro-industry that transforms boer and other beans. It is in a suburb in Gurué Municipality. The company started working in Gurué in 2003. Before then, the factory belonged to the SCI-SDZ group, which sold the majority share to Export Marketing.
- *Centro Politécnico Leão Dehon:* The Centro Politécnico Leão Dehon is a religious community that integrates two priests, four Portuguese volunteers and two Italian volunteers. Located in the Bairro Artes e Ofícios, a suburb, it belongs the priests of the "Coração de Jesus" of Italian origin. They work in two areas: education and industry. The education is technical and focuses on general electricity, auto mechanics, and locksmith mechanic. Industrial training includes carpentry, workshop of a locksmith, milling industry, auto mechanics, and office services.

Some operational characteristics – Tea companies

From the collected data during the field work, SDZ reportedly has over 1,930 employees, 88% of whom are casual workers, a percentage that varies with the amount of work. The participation of women is low because, at early ages, start to care for newly formed families. Usually those that come to work in the fields are over 30 to 35 years old. Another explanation given by other companies is that women usually work on their own fields and do not have time to work for the tea plantations.

In 2003, Chazeira de Moçambique had 1,535 employees and, in 2003, 1,587 in 2006, a 3% increase. For 2006, over 83% were seasonal workers, over 13% were casual and only 5% were permanent. In relation to 2003, the number of permanent workers fell by 15% and casual workers, by 35%, while

[8] The information collected during our fieldwork in the Abril 2007 reports it started in 2006.

seasonal workers increased by 10%. According to Chazeira de Moçambique, seasonal workers are easier to manage because they are paid by the day.

In 2006, Chá Magoma had 2.320 workers: 9% permanent, 91% casual. Half were seasonal workers.

When interviewed in 2007, Chá Zambézia had over 1,100 workers: 27%, permanent; 46%, casual; and 27% seasonal. Twenty percent of the tea plantation workers are women.

Most of the workers are illiterate and either casual or seasonal employees. The number of skilled workers, engineers, is almost nil. Some workers may have a high school education but they are usually found in the factories and the offices.

The majority of the workers are from Gurué though some hail from Namarrói, Quelimane, and Nampula.

The salaries vary between 1,277 MZN to 19,312 MZN for permanent workers, the ones that work in the office or as field controllers. The seasonal and casual workers receive 35.32 MZN (after taxes) x 26 days/month.

Electricity Usage. Before 1996, some tea companies produced energy with turbines, diesel generators or fuel wood. At least two of the interviewed companies, two companies have been receiving medium-tension electricity from EDM since 1999. At least for one, energy usage has been growing sharply in recent years by 69%. It also has its own generation capacity to produce 500KVA, of which it uses 400KVA.

The companies firmly believe that the use of electricity makes them more secure and enables them to install modern technologies in the factories, e.g., to substitute fuel wood in the greenhouse. However, some companies expect their production costs to increase some 60% by 2008 while production will double. Newly recommissioned plantations cannot talk much about the effects of the installation of electricity on their production though it is clearly essential.

Investments in the Infrastructure for the Supply of Electricity. The availability of electricity in Gurué made possible new investments in upgraded electrical systems of the companies that would allow them to invest in new machinery. Investments among different companies varied between USD 20.000 to over a million USD in loans, to buy the machinery, the transformer, tractors, cars, trailers, and one truck from abroad. According to interviewees, such investments would not have been done without the availability of electricity.

Main Constraints Faced by the Firms:

- Lack of means to transport their products to Mombassa though the roads were improved in 2006. High transport costs make the products more expensive and less competitive.
- For the exporters, value added tax payments are also a constraint. According to them, they cannot, in practice, recovery these from the Treasury though, legally, they should be able to do so.
- One interviewee complains that “EDM needs to be more serious”. Though he accepts that maintenance of the PTs is his firm’s responsibility, EDM should at least guarantee the availability of engineers to do the job correctly. Others complain that electricity is too expensive, and that in comparison to MOZAL (Mozambique’s largest industrial power consumer near Maputo), this was not fair.
- Lack of parts is a constraint and forces the companies to go for repairs outside of Gurué.
- Scarcity of labour is a big constraint. Purportedly, too many people prefer to work in the city.

Installed Equipment: In terms of installed equipment, because of electricity, the number of machines increased as well as their technological sophistication. At the moment of the interviews, 12 machines were being renovated in a particular firm to reduce their consumption of electricity in another, a new greenhouse was being installed to use only electricity.

Other Sources of Energy. Some companies use other sources of energy such as turbines, thermal generators and fuel wood, others not. Fuel wood is used to dry the tea in the greenhouses. Some firms use 5,000 m^3 of fuel wood in each season. Some firms obtain the fuel wood from their own land. In

relation to the turbines, one of the firms referred that between 1998 and 2003 the turbine used to produce over 400 KVA but now only 170 KVA, presumably a sign of greater dependence on EDM.

Production. All the interviewed companies referred that, due to weather conditions, the best period for production is between December and May.

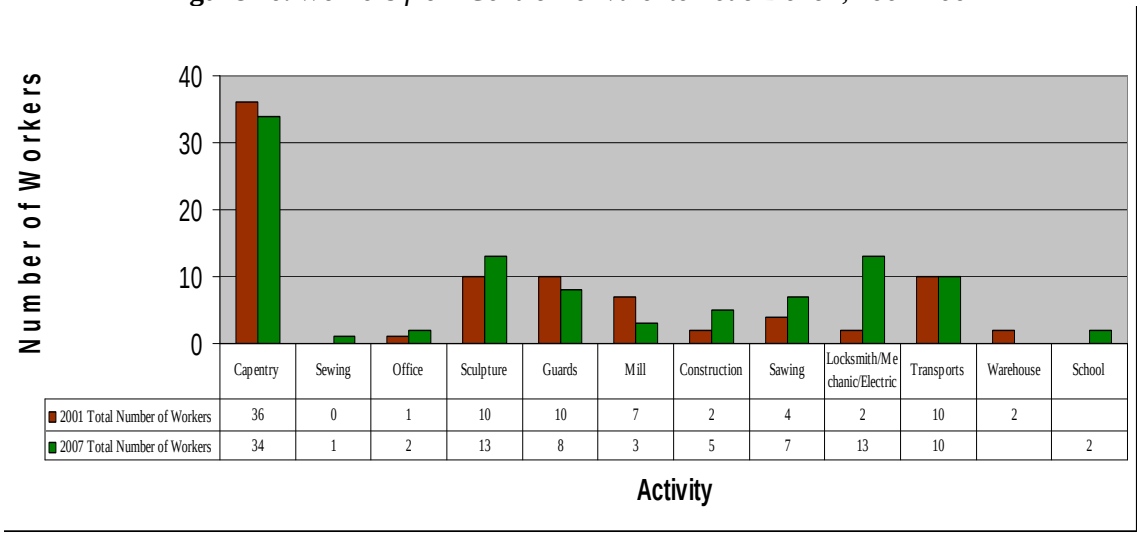
According to the manager of a large firm, since 2001 to now, production has increased more than 40% and many jobs have been created. Another firm reported the highest production of green leaf in May 2005/06. two firm produce, on average, 100,000 kg/month. One of them expects to increase that to 200,000 kg/month. More than 70% of the production happens between December and April.

Market: The tea is sold at auction in Mombassa and then it goes to Europe and Gulf countries. Other markets are India and South Africa, and, nationally, Nampula, Beira and Maputo. The biggest buyers are in Mombassa, Kenya. The company processing beans exports to the region and internationally. The interviewees mentioned that, abroad, there are many problems with the exports of Mozambican goods because the product is associated with HIV/AIDS and inadequate cleaning. Nonetheless, the Mozambican product is sold to other countries who use their own trademark.

Non-Tea Companies

The Centro Polivalente Leão Dehon increased the number of its workers by 14% between 2001 and 2007, and now has 98 employees.

Figure 10. *Workers from Centro Polivalente Leão Dehon, 2001-2007*



	Capentry	Sewing	Office	Sculpture	Guards	Mill	Construction	Sawing	Locksmith/Mechanic/Electric	Transports	Warehouse	School
2001 Total Number of Workers	36	0	1	10	10	7	2	4	2	10	2	
2007 Total Number of Workers	34	1	2	13	8	3	5	7	13	10		2

In Agro-Industries Lda., most work is manual, so, when activity is low in one section, workers switch to another work. In 2003, they only worked one shift or, at most, two. Now they work three and this has increased output by 68%. The permanent staff remains the same while casual workers increased 82%.

Table 35. *Agro-Industries' workers, 2003-2007*

	2003		2007	
	Total staff	**Women**	**Total staff**	**Women**
Total staff	60	1	185	-
Permanent staff	32	1	32	-
Casual *(daily wage)*	28	-	153	-

Most workers are from Gurué, though some hail from Mocuba, Ile, Namarrói, Quelimane and Lichinga. Most salaries vary between 1,443 MZN to 1,855 MZN. Some companies pay daily wages of 35 MZN/day.

According to Agro-Industries, unless they have some training, women are not hired because the work is to load goods and very much manual. The machines have some risk especially because some must be open. If women work and do something wrong they be injured. Allegedly, women could not stand the work because of the heat, which can also give them health problems.

In terms of workers' health and safety, they used to have masks but this year they got none. The company has ordered the full gear but is still waiting for it to come from India.

Use of Electricity: The Centre Politécnico Leão Deahon has had electricity since 1995 though initially from a generator. Only in 1998 did they get electricity from EDM, with a transformer installed in their property. A part from the use of the connection to the centre and other distributions made from the PT managed by EDM, the Centre does not supply electricity to anyone else.

Investments in Infrastructure for the Supply of Electricity: Our interviewees were unanimous that an uninterrupted supply of electricity was vital for their investments and activities. Without it, the Agro-Industries would not have bought the factory.

With the availability of electricity, they changed the electrical installation and added machinery. In some cases, the use of electricity is continuous and, even 400 volt lamps are working four years now without interruption without, blowing out.

Electricity permitted the companies to buy more machinery, especially computerized machines that need stable electricity. In fact, to guarantee its stability, they plan to install a system ensure the safety of the machines, the development of industrial activities, illumination for the laboratories to simulate the electric installations, run trials with motors, mechanical mechanisms, physic and chemistry laboratories as well as to keep the library open all day until 17.30h.

Main Constraints Faced by the Firm:

- the theft of raw material and electric material required for factories' maintenance;
- the unavailability of electric materials and inputs required by industries;
- lack of access roads and transport for goods and passengers; and
- the communication system, which is so bad that, for documents, it is better to send a messenger despite the costs for transportation and accommodation.

Equipment Installed: Only one firm specified its installed capacity, namely, a 115 KVA transformer.

Other Sources of Energy. In addition to electricity from EDM, Centro Polivalente Leão Dehon has a 250 kWh generator that is to be used for the freezers and fridges when there are programmed cuts of electricity. The fuel used to come from Cuamba, Quelimane and Nampula. Now it comes from Nacala. The centre has a 13,000 litre tank, but now coordinates with the local supplier. The centre only supplies fuel to other people during emergencies. Workers have to buy fuel from the local supplier.

Centro Polivalente Leão Dehon also uses fuel wood to cook but the other firm uses for its industrial production. The fuel wood comes from the leftovers from the carpentry. Some is also sold to the hospital and the boarding schools at 600 MZN/m^3.

The second firm is thinking about the possibility of using nutshells to reduce the use of firewood, which is bought from the plantations being opened or rehabilitated. That supply is about to end since 80% of those plantations are already rehabilitated. As a result, they will have difficulties obtaining firewood.

A reason mentioned for the use of fuel wood was that EDM charges for the installed capacity even if it is not used. With firewood that does not happen. When there is no production, the firewood is stored. With EDM you pay a flat rate. One firms referred that this was keenly noted when the factory stopped working for a period of time. Though electricity seems cheaper than wood, since the factory sometimes closes for two to three months, the overall result is adverse.

Production: Unquestionably the production capacity has increased since the arrival of electricity. The centre is now working with six saw mills with engines of 10 kW each, saws for cutting trunks, a carpentry, and the school. The installed capacity is more or less 180 KVA. Monthly production varies depending on the type of contracts but has increased from 1996 and the firm is growing. A greenhouse was bought to dry the wood and the centre is waiting for a new one to arrive. The production material, wood, is purchased legally in Namarrói, 80 km away.

Agro-Industries' work has increased. Now it has two shifts and, between 2003 and 2007, monthly production increased over 60% from over 6 ton/month to over 15 ton/month. It takes 15 days to transform the raw material though that also depends on how long the factory is working. Then, from August 2006 to March 2007, it worked only two shifts. After March 2007, the factory started working in three shifts.

Till recently, the machinery capacity was not being properly used. There was an imbalance between sections. The process requires that the beans be dry but, compared to the other machinery, there was a shortage of drying equipment.

The bean processing includes cleaners, selector, rolls, spirals, and lifts. Usually such factories exist in places with little rain. In normal temperatures, the beans are dried outside in piles two inches high. But, since Gurué has continuous rains, the result this way is inferior.

An electricity cut lasting more than 30 minutes can damage one full day's production. However, since no large electrical fluctuations occur, the machinery rarely breaks down.

Raw material comes from Zambézia Province and part of Nampula. The company has warehouses all over the country. They buy and send beans to the factory as needed; the rest is exported as non-processed beans.

Market: The main market is the local Mozambican market though, after processing, Agro-Industries exports to Singapore, UK, USA, India, South Africa, and Tanzania. Locally, consumption is low and the national distribution system is poor. Around Gurué, the maximum local consumption in 2003 was 200 kg to 300 kg per month. This market requires small, one and two-kg packs.

Monthly Expenses of the Firm: For one company, the monthly expenses from the centre are first salaries and then fuel, social security, and insurance. The other company mentioned that its salaries are four to five times higher than the electricity bill, followed by firewood, transportation, and electricity.

Electricity Supply: Some firms congratulated EDM because of the lack of power outages and fluctuations though one company complained about the frequency of electricity cuts. But even this interviewee mentioned that, in the past, cuts were more frequent. For example, in 2003, energy would cut out about 10 times per month but now it does so only when the weather is bad due to the rain, wind, or theft of the cables. Other cuts happen for maintenance, which occurs on Sundays, and, for these, warnings and schedules are published. Even so, however, the company suffers because the raw material brought in on Saturday should be processed immediately.

Nonetheless the own water turbines are preferred because they provide low-cost electricity. They depend, however, on the availability of water. Due to the age of the system and to the lack of rains, the system has not been functioning very much.

One large firm has all its 14 factories working on their own electricity. According to them, it is almost for free by using turbines and thermal. By contrast, the electricity from EDM is very expensive, especially because the value-added tax charged is not refunded. Actually, this firm uses diesel only for transportation. According to SDZ, they could build a small irrigation scheme with a power station but need capital.

Companies reportedly never had a problem with equipment being destroyed due inadequacies in EDM's services. EDM gives more attention to the UPs because, in 2003, a phase fell in one line. However, others insist that, though its services have improved a lot, EDM should always be available to provide assistance to the industrial sector.

Additional sources of energy are diesel generators in various sizes. Some have small generators, others have 850 KVA. These generators are used to supply the workshops and the company's houses and

when the grid electricity cuts out. However, not all this capacity is used due to the availability of electricity from EDM. One firm clearly preferred to employ workers for the supply of energy. In 2003, it had six working with the generator and 14 with the turbine. Now it has eight and ten, respectively.

One company complained of fluctuations and another said that there are none.. The first claimed that lots of lamps blow though, till now, its machinery has not been affected because they have a new electrical system and have installed a system to protect the machines. The energy cuts are programmed and warned with a calendar. This is considered very good because it is for the maintenance of the lines. Other cuts are not frequent and are due to storms, rain, and the theft of cables, plus unknown reasons. Having a generator helps a lot, but those who do not have one suffer losses. Depending on the problem, the cuts usually last just 10 to15 minutes unless it is a programmed cut. That can take a day. Sometimes cuts happen three or four times a day but, in a year (between November l), this might occur 10 times.

Electricity and other Expenses: One firm reported that, with electricity, it had reduced its production costs by more than 40%. The generator had been very expensive because of the fuel and the maintenance costs. With a constant supply of electricity, the factories also save time. By contrast, the turbines depend too much of the supply of water from the river and, sometimes, that is not sufficient. The respondent could not say exactly what the expenses were, but referred that probably over 40% were with maintenance. On the other side, another interviewee referred that, at present, EDM's tariffs are increasing.

According to all interviewees, salaries constitute between 60% to 80% of their expenses, followed by electricity, fuels, and lubricants.

Group II: Medium-size Companies

Only one company interviewed fell in this category.

Handling Ldt. has six permanent workers and, since the warehouse started in 2004, 10 to 12 casual workers depending on the goods that arrive to be unloaded. All the workers are men. Their education levels vary from 3rd to 5th grade for the guards; 5th degree to 8th grade for porters, 9th grade for warehouse chief, and the manager has a high school education. The salaries vary from 1,800 MZN to 3,010 MZN.

Use of Electricity. The company has a general installation. The monthly consumption in kWh was not legible because the invoice was from a fax copy

Investments related Infrastructure for the Supply of Electricity. Handling Ltd. would not have set up in Gurué without electricity because sometimes it has to work at night. Nor would it have come if Gurué had no bank, which, of course, needed centrally supplied electricity because generating it with a diesel generator is too costly. Also, without a bank, Handling Ltd. Would have had to go to Mocuba to deposit money.

Main Constraints Faced by the Firm. Sometimes they suffer losses when the product is damaged, but this is not due to electricity.

Other Sources of Energy. No other sources of energy except electricity are used.

Business: Since Handling Ltd. was set up in Gurué, the business has been growing. It slacken in the winter time because many people are working on their farms. When potatoes start to come out in June and July, the business restarts again. The drinks it sells come from Nampula, Quelimane and Maputo.

Monthly Expenses of the Firm. For the rent for the store and the manager's house, the phone bill, and electricity for the two places, Handling Ltd. pays every month to Artes e Ofícios (Centro Polivalente Leão Dehon) for social security, syndicate, porters, and salaries.

GROUP III: Small Companies

The following companies are classified as small:

- *Livraria e Papelaria Coane:* Operating since 2003, Livraria e Papelaria Coane is a tiny private Mozambican shop that sells office materials in the city centre.

- *Farmácia Gurué: Farmácia Gurué* is a small state-owned firm.
- *Oficinas Texas: Oficina Texas* is a private Mozambican family firm that provides auto mechanic services though previously the family had a mill. Located surrounding of Gurué city, they had their works started in 1996.
- *Informal Mechanic and Locksmith:* João Baptista Alfredo is a mechanic locksmith who, for the last two years, has been working in the market. He used to work in Beira (Province of Sofala) in an industrial workshop and then in Emochá until 1995. Before starting to work in the market, he did small jobs at home. Now people come to weld bicycle and cars parts. He has a helper but does not pay a salary because business is slow. They just divide the net proceeds.

One company had increased the number of its workers since the business started. At first it only had two permanent employees, but now five. This firm does not employ causal employees. In another firm, its three workers (all men) are the same since the beginning. The owner said that no woman has even asked for a job. Only one of the workers is from Gurué, the others are from Maputo. The monthly salaries in both companies vary between 1,200 MZN to 3,000 MZN.

Use of Electricity. Previously, electricity was provided by one of the factories and the EDM generator. Lately, the electricity was defective and there have been a series of difficulties. The electrification project greatly improved supply of electricity and, according to the interviewee, the number of consumers increased a lot. The industries use electricity from EDM, which had a great impact locally. The firm is connected to the electricity since 2001 for its own use only and reportedly spends about 2,445 MZN/month. The second firm had a contract as a domestic installation, with a monthly consumption of 82 kWh.

Investments related in Infrastructure for the Supply of Electricity: No investment has been made in the electrical installation in either firm, but one company did invest in equipment for the supply of its services. Without electricity this would not have happened..

Supply of Electricity: Our interviewees stated that spontaneous, unannounced cuts and fluctuations in the electricity supply usually lasted less than 30 minutes and rarely more than an hour. The fluctuations damaged the mill engine and six other machines at the first company blew some lamps at the second company.

The interviewees argued that, for development, Gurué needs the electricity network to be extended to the neighbourhoods. Many are still without electricity, which encourages robberies and vandalism in the streets.

Other Sources of Energy: All the small firms use electricity and no other energy source.

Energy Bills and Expenses: The interviewees often complained about how expensive electricity. Not unexpectedly, no one had ever complained directly to EDM.

Monthly Expenses of the Firm: Monthly expenses mainly comprise costs for material inputs, salaries, and electricity.

An Informal-Sector Mechanic: João Baptista Alfredo is a mechanic and locksmith, who for the last two years, has been working in the market. Till 1995, he worked in Beira (Sofala Province) in an industrial workshop and then in Emochá. Before starting to work in the market, he used to do small jobs at home and went to weld at a friend's house. Now he and a helper weld cars parts and people's bicycles in his small shop. The helper does not receive a salary. Instead they divide the money according to the net receipts.

To use the space in the market, he pays both the municipality and EDM. He gets electricity from a nearby house and, in turn, pays its monthly electricity bill (more or less 500 to 600Mtn) and has never suffered a cut for non-payment.

If he did not have a reliable supply of electricity, he would have to work on his farm or merely do manual iron works. With electricity, he can do many other small jobs and, as a consequence, bought a welding machine, his only major investment.

A6.7.4 Major Findings on Industry

The tea industry of major importance for Gurué, and it has been revived after reliable electricity became available. It is the major driver for economic growth in the area, but some other firms in the agro-industrial sector are also important. Overall, in the six firms interviewed, more than 7.200 persons are employed, although most of these are on daily wage employment (about 90%). Only few women work in industry, but in some tea companies the share of female leaf collectors is 20%.

For all the firms, electricity is of major importance. Some would not have opened without grid supply, others need grid supply because their own generating equipment is getting old, unreliable and expensive. One company still uses its own small hydropower plant, incurring low cost, while one other company can supply its entire energy needs from own sources: turbines, diesel generators and steam engines. All firms today use significantly more electricity than before, on average plus 50%, in one case almost 70%. Industrial production has shown considerable growth over recent years, and various companies have invested amounts from USD 20.000 to one million.

It appears that the reliability of supply is improving, seen by reduced use of stand-by generators. Some of the industrialists praise this reliability and are very satisfied about the situation, while others complain that there are still power cuts, and that electricity is too expensive. However, comparing tariffs of EDM with today's cost of diesel generation indicates a saving of about two thirds on electricity.

Other sources of energy are fuel wood (for drying tea leafs), and diesel for transport and stand-by generators.

Only one firm falls in the category of medium sized firm. It is basically a warehousing and logistics company without its own transport fleet. Its only energy source is electricity for the warehouses, office and living quarters.

The small enterprises group comprises small and informal businesses, employing only a few people. They use electricity for lighting and office as well as workshop equipment.

The structure of operating cost of the industries in the order from highest to lowest share is invariably: salaries, electricity, other items (this excludes the cost of input materials).

A6.7 Development of Gurué

During the interviews, people agreed that the economy and quality of life of the local people had improved since 1996. However, public investment still needs to improve. Here we present the results of interviews held with key people from the EDM, TDM, and the local police concerning what has been done and their main constraints.

A6.7.1 Public Investment

Electrification, communication, roads, and security are some of the public investments that affect development in Gurué. According to the 1999 baseline study, EDM had no locally generated funds to rehabilitate the distribution network, install meters, expand the network, and obtain vehicles and infrastructure to provide clients better services. Both large and small private companies and government offices complained of the same problems with EDM's supply of electricity, namely, insufficient power, bad quality, and the irregularity of supply all of which lower their efficiency, effectiveness and the quality of their products or services.

At present, EDM has a plan for the distribution of electricity. The number of clients is one of the criteria for the electrification and the profile of the electric scheme. For 2007, 800 additional individual connections will be made. On the basis of that goal, EDM starts to target new clients and areas and collects data about needs and costs. EDM also has a strategy to supply electricity to social institutions. For the Molocue side, there is an administrative post of Mepuagiua. It has requested a connection. but in terms of number of clients it justifies, there is a school and a health centre, but they don't have the profile.

For a client to receive electricity, there are procedures and a tariff table. Reportedly, to get a connection now takes about three days. Ile and Namarrói have consumers' commissions that explain the functioning of EDM procedures. Each month, the problems are collected and solved. The objective is inform people about EDM's policy.

Due of the number of requests, EDM Gurué has two transformers, which are overloaded because they feed several neighbourhoods simultaneously. EDM is thinking about installing another transformer to safeguard the nearby neighbourhoods.

Harvest time is when most connections occur though, soon after the harvest, many clients cancel their services.

The electrification of Macuarro, 40 km from Gurué, in direction to Ile is planned for 2007. That will be easy because a medium tension line exists along the way. In Magige, on the way to Lioma, there is a school and a mill.

A6.7.1.1 Impact of the Availability of Electricity

Electricity has lowered costs for many companies and allows some to work 24 hours/day. This brings local development including new investment, for example, in the tea mills.

- The quality of the electricity that is supplied has improved a lot and the breakdowns due to power fluctuations have reportedly decreased considerably. In Gurué, before cuts, people are warned by the radio in advance. Illegal connections are very rare but, when they do occur, it is usually with the connivance of EDM's workers. Cuts still occur, however, when thieves sabotage the lines to steal cables for their aluminium and spikes for steel. The aluminium goes to make pans and spoons, the spikes to make animal traps.

A6.7.1.2 Problems

Lack of Payment by Clients. As for bill collections, the seasonal small farmers are the most problematic. EDM used to have problems with governmental institutions but not now with the new administrator. Health institutions still have late payments. Schools and boarding schools receive at least three warning letters with the knowledge of the district/administration and only after that is electricity cut.

Measures Taken to Resolve Unpaid Bills. To recover the payments, EDM enters into negotiations with the clients and, only as a last measure cuts the electricity, except for the hospital.

Main Problems Faced by EDM Gurué. When cables and spikes are stolen, the investment is repeated instead of being applied for other investments. EDM calls the police but, reportedly, there is never a positive result. Last year, EDM provided transportation for the police for the markets far from Gurué. They found some material but it was difficult to prove that it derived from materials stolen from EDM.

When hiring, EDM now has a policy to give preference to women if they have the skills required in the tender. Within EDM, women usually work in the administrations. Female electricians and other technicians are rare. The branches get a lot of pressure to achieve gender equity though that is difficult. Though, toward this end, Artes e Ofícios (Centro Polivalente) cooperates, still the number of women is very low.

A6.7.1.3 Improved Communication

TDM got digitalized equipment in 2000.

Types of Services Provided. Initially EDM provided fixed telephone services and later started to provide Internet and online banking services. Since 2000, all these services started working. The company will also start soon to provide wireless fixed telephone connections and ADSL broadband connections. TDM expects to offer these services as soon as its fibre optical connections is operational. The main reasons for the introduction of new services were to improve communications because the lines suffer a lot of noise and frequent breaks.

Before, the electricity was not supplied 24/24 hours. It was usually turned off at 22:00 hours. Before 1999, EDM used a generator, which was very expensive. The coming of electricity facilitated the introduction of new equipment and services such as the "Blá Blá Fixo".

Number of Clients and Their Location. In 1999, the communication system was by radio and TDM had no individual clients. All came the office to use the radio and paid for the immediately for the services.

In 2000, EDM started with 96 clients, both individuals and institutions. They don't have the information divided for this period and also the archives are not in the office, so they are not available. By 2007, it has 208 clients: individuals, institutions, and government officials.

Types of clients

Type of Client	2000		2007	
	Number of clients	Total number of lines	Number of clients	Total number of lines
Professional	?		29 firms	53
Official	?		6 gov. institutions	14
Private booths	3	3	3	3
TDM booths – Card	4	4		0
TDM booths – normal	1	1		2
Residential	?		136	136
TOTAL	**8**		**174**	**138**

Source: Interview with Benjamim Manuel Molde, TDM Gurué Supervisor, Gurué, 24-25 of April 2007

Supply of Electricity. Our interviewee confirmed that regularly there are fluctuations and cuts in the supply of electricity. The cuts are, however, programmed and announced previously.

TDM has rectification equipment to feed the transmission and communication equipment to prevent it from being damaged. The other equipment that is not connected to the rectification comprises the plugs that are protected through the disjuncture and the PCs that have UPS. The fluctuations blew out two rectifiers

They had to request two more. TDM paid for them without bothering to ask EDM to do so. The fluctuations also blew out a GPS.

Other Sources of Energy. TDM has two generators (60 kVA each) and 12 alkaline batteries. The fuel is bought in Petromoc in Quelimane. They have a subterranean 5.000 litre tank.

Expenses

Before, when TDM used mainly the generator, it used 5,000 litres/month but since EDM started working in December 2000, they have only ordered 3,000 litres till now.

A6.7.2 Improved Security

Officers in some police posts were interviewed. The findings:

Electricity and Security: Many neighbourhoods do not have electricity and that makes it very difficult to control crime there. With electricity and lighting it is much easier to control and reduce robbery and qualified theft. On the other hand, electricity increases violence in bars and places of entertainment.

The lack of electricity in some neighbourhoods is linked to the low economic power of the residents. Social contracts—the Quelimane experience—could facilitate the access to electricity more people.

Electricity is very important and very needed because the cases that are being registered, a part from the corporal offences and homicides, if the electricity expanded the criminality indices would reduce because the people develop and the people can be more aware. It is dangerous for the policeman himself the lack of electricity and also limits lots of works that could be done.

A6.8 Overall Conclusion

There have been a number of factors that have spurred growth in Gurué, but the provision of reliable electricity has been at the core. Electricity has made it possible to achieve improvements in industry, lower costs, increase production and employment at a significant magnitude, while poor households have not directly benefited, because only relatively few households are connected, and the poor largely excluded. However, a number of indirect benefits are apparent, from which the whole population in the area, including the poor, can take advantage.

Employment has increased, mostly for unskilled workers, there has been a boom in acquiring skills in electrical trades, trade and commerce are growing, services previously unavailable such as banking and telecommunication are now available, and in the public sector, health, education and security have seen positive changes. In combination with improved transport, all this enhances further economic growth, and will require more electricity. There is no doubt therefore, that the investment in the transmission line and local distribution will pay off..

An area that has only marginally been touched by electrification is the environment. Fuel wood and charcoal are still the major energy sources at the household level, and thermal processes in the industries still use fuel wood. This continues to put pressure on the forest resources, and this concern needs to be addressed otherwise.

The arrival of a steady, 24-hour supply of electricity to Gurué stimulated numerous investments in both small and big, commercial and industrial activities and, in some cases, the investments were synergetic, thus enabling and encouraging others to invest. For example, BIM set up a branch in Gurué and, with electricity, offers new services, which, in turn, reduced the costs and risks of conducting business with large cash balances and eliminated the need to travel to Mocuba to make deposits. With electricity available around the clock, some tea companies have intensified their operations by adding shifts (and employees) or purchasing sophisticated electronic machinery (e.g., electronically controlled drying equipment) to increase output, improve quality, and fetch higher prices. For others, having electricity from EDM enabled them to slash costs by switching from high-cost diesel-powered generators though those who are able to use water turbines to generate electricity save money by using them. Yet another factory is abandoning fuel wood in preference for electricity to run its new greenhouse. These investments are also facilitated because power outages seem to have decreased according to reports by the industrialists while EDM has become fairly reliable in announcing its scheduled cuts for line maintenance.

Small and medium-sized businesses have also benefited from the availability. With it, they have been able to acquire some electrical machinery to increase the range of the services and goods they offer and, in some cases, also increasing their business hours to meet customers' needs.

The police, citizens and business people, all report that electricity has improved both public and private security wherever public lighting is installed. Improved security has also encouraged more people, particularly women, to attend night school, which can also now offer more reliable services due to the reduction in power outages and the extension of geographic coverage of the electricity supply. For the same reasons, hospital services have improved in such areas.

Electricity has also brought big changes in household consumption patterns: a big jump in its use for lighting and some increase in its use to run electrical appliances like radios, televisions, fridges, and cell phones. At least in Gurué, however, people cook with fuel wood or charcoal and few are switching to electrical stoves.

Questionário sobre o Impacto da Electrificação em Gurué

Pesquisa encomenda pela NORAD
e efectuada pela Scanteam e EconPolicy Research Group
Abril - Maio de 2007

Bom dia (boa tarde), chamo-me_____. Sou o entrevistador que está a fazer a pesquisa para a avaliação do impacto de um projecto de electrificação rural financiado pela cooperação norueguesa. A informação que nos der será confidencial. Sendo assim, peço-lhe que me responda as perguntas que tenho, incluindo informações sobre a sua família para podermos mais tarde ter a oportunidade de voltar para verificar as mudanças que possam acontecer nas vossas vidas.

Atenção: Responder as perguntas para antes de 1999 e agora

	Antes	Agora	
Q1			**Data** _____
Q2			**Número da entrevista**
Q3			**Hora de início**
Q4			**Hora do fim**
Q5			**Nome do entrevistador:** _____
Q6			**Nome do supervisor:** _____
Q7			**Nome do entrevistado:** _____
Q8			**Endereço do entrevistado:** _____
Q9			**Número de identificação da família:**
Q10			**Distrito /VDC**
Q11			**Bairro**
Q12			**Relação do entrevistado com o chefe da família:** *[1] Chefe da família; [2] Esposa/Esposo; [3] Outro*
Q13			**Género do entrevistado: [1] Masculino; [2] Feminino**
Q14			**Número *total* de membros na família, *incluindo crianças***
Q15			Femininas (qualquer idade)
Q16			Masculinas (qualquer idade)
Q17			**Quantas mulheres com *16 ou mais* anos de idade?**
Q18			**Quantos homens com *16 ou mais* anos de idade?**

Q19			**Número total de crianças com 15 ou menos anos de idade**
Q20			*Crianças entre os 5 e 15 anos de idade*
Q21			*Menos de 5 anos de idade*
Q22			**Nível de Riqueza (preencher após classificação/avaliação)**
			[1] Rico [2] Médio [3] Pobre [4] Muito pobre
Q23			**Tem algum conhecimento sobre o projecto de electrificação?** *[0] Nada; [1] Algum; [2] Muito*

Estatuto Social (HU) CASA & outra PROPRIEDADE

	Antes	Agora			
HU1			**Quem é o dono desta casa?**	*[1] Marido*	*[2] Esposa*
				[3] Dos dois	*[4] Outro, especificar*
				[5] É arrendada (alugada)	
HU2			**Número de quartos**	*(não contar com cozinhas e casas de banhos)*	
HU3			**Desde quando vive aqui?**	*Colocar o ano, ou 1 se sempre viveu na casa*	
HU4			**Se se mudou para aqui após 1999/após o projecto, qual foi a razão?**		
			[1] acesso a electricidade	*[2] acesso a outros benefícios do projecto de electrificação*	
			[3] reassentado pelo projecto de electrificação	*[4] Outro, especificar*	

Observações:

			Escolha uma resposta para as seguintes perguntas		
HU5			**Tipo de construção - paredes**		
			[1] Construção em blocos	*[2] Pau a pique maticado*	
			[3] Estacas de madeira ou zinco	*[4] Outro, especificar:*	
HU6			**Tipo de construção - cobertura**	*[1] Telha*	*[4] Palha*
				[2] Zinco	*[5] Outro, especificar*
				[3] Caniço	
HU7			**Houve alguma mudança qualitativa na casa (material ou tamanho) desde 1999/projecto: [1] Sim; [2] Não**		
			Especificar a razão:		

HU8			**Propriedade de outros bens?**			
HU8.1			*Bicicleta*	*[0] Não*	*[1] Sim*	
HU8.2			*Mota*	*[0] Não*	*[1] Sim*	
HU8.3			*Tractor de duas rodas*	*[0] Não*	*[1] Sim*	
HU8.4			*Tractor grande de 3 ou 4 rodas*	*[0] Não*	*[1] Sim*	
HU8.5			*Carro particular*	*[0] Não*	*[1] Sim*	
HU8.6			*Tanque de água*	*[0] Não*	*[1] Sim*	
	Antes	**Agora**				
HU9			**Quais são as suas fontes de água para a família?**			
HU9.1			*Chuva/rio/lago*	*[0] Não*	*[1] Sim*	
HU9.2			*Furo*	*[0] Não*	*[1] Sim*	
HU9.3			*Canalizada*	*[0] Não*	*[1] Sim*	
HU9.4			*Fontanário público*	*[0] Não*	*[1] Sim*	
HU9.5			*Outro, especificar:*	*[0] Não*	*[1] Sim*	
HU10			**Utiliza bomba de água?**	*[0] Não*	*[1] Sim*	
HU10.1			**Qual é a fonte de energia?** *[1] Gasolina ou petróleo;*	*[2] Eléctrica*	*[3]Manual*	*[4] Outra*
HU11			**Por dia, quanto tempo demora para trazer água para toda a família?**			
			[1] Menos do que 5mn	*[3] Mais do que meia hora, mas menos do que 1 hora*		
			[2] Mais do que 5 mas menos do que 30 min.	*[4] Mais do que 1 hora*		
HU12			**Quem carta água para a família?**			
			[1] Esposa	*[4] Marido*		
			[2] Meninas	*[5] Rapazes e raparigas juntos*		
			[3] Rapazes	*[6] Outro, especificar*		
HU13			**Houve alguma mudança desde 1999/projecto?**	*[0] Não*	*[1] Sim*	
			Porquê? *Especificar:*			
HU14			**Tipo de casas de banho**	*[1] Casa de banho*	*[2] Latrina*	*[3] Não tem*
HU15			**Houve algum outro impacto do projecto nas vossas condições de vida?** *[1] Sim; [2] Não*			

(AG) AGRICULTURA

	Antes	Agora				
AG1			**As pessoas que vivem nesta casa trabalham na machamba?**	*[0] Não*	*[1] Sim*	
AG2			**Qual é a sua relação com o/a dono/a da terra em que você faz a machamba?**			
			[1] Dono/a	*[4] Usa a terra de graça*	*[-1] Não respondeu*	
			[2] Arrenda	*[5] Outro, especificar:*	*[-9] Não é aplicável*	
			[3] Emprestada de grátis			
AG3			**Qual é a área total que faz machamba?** *(em hectares, m² ou outra unidade, especificar)*			
AG3.1			Irrigada?	*Que unidade?*		h, m² ou outra
AG3.2			Não irrigada?	*Que unidade?*		h, m² ou outra
AG3.3			Se aumentada ou reduzida após 1999, porquê? Especificar:			
AG4			**Como é que é feita a irrigação?**	*[1] Derivada do rio ou bombada do furo*	*[2] Gravidade*	
				[3] Do excedente de água para beber	*[4] Outro*	
AG5			**Se utilizam bomba, qual é a fonte de energia?**			
AG5.1			Energia manual (manivela)	*[0] Não*	*[1] Sim*	
AG5.2			Animal	*[0] Não*	*[1] Sim*	
AG5.3			Electricidade	*[0] Não*	*[1] Sim*	
AG5.4			Diesel/gasolina	*[0] Não*	*[1] Sim*	
AG6			**Quantas bombas usa?**	*(introduzir o número)*		

(SE) SOCIOECONOMIC

	Antes	Agora				
SE1			**Alguém na nesta casa tem um negócio?**	*[0] Não*	*[1] Sim*	
SE2			**Onde? Em casa ou noutro sítio?**	*[2] casa*	*[3] fora*	
SE3			**A quem pertença o negócio?**	*[1] O marido; [2] A esposa; [3] Outra pessoa que vive na casa*		
SE4			**Se sim, que tipo de negócio?**	*[5] Barraca de comida/restaurante*	*[9] Carpintaria*	
			[1] Cabeleireiro/barbeiro	*[6] Barraca de mercadoria*	*[10] Mecânica*	
			[2] Costureira/alfaiate	*[8] Banca*	*[11] Outro, especificar:*	
			[3] Reparações/loja de serviços	*[7] Vídeo/aluguer de filmes*		
			[4] Latoaria e metalomecanica (e.g., fogoes, grades, baldes)			
SE5			**Utiliza-se electricidade neste negócio?**	*[0] Não, [1] Para iluminação, [2] Para outros usos, [3] Para ambos*		
SE6			**Tipo de negócio?**	*[1] Barraca de comida/bebidas; [2] Barraca de mercadoria [3] Banca?*		
SE7			**O acesso a electricidade foi um factor crucial para decidir iniciar o seu negócio?**	*[0] Não;*	*[1] Sim*	
SE8			**Quando é que iniciou o negócio?**	*(introduzir a data: mm/aaaa)*		
SE9			**Quantas pessoas trabalham no seu negócio?**	*(introduzir números)*		
SE10			**Quantos recebem salário?**			
SE11			**Todas as fontes de rendimento da família?**			
SE11.1			*Machamba de subsistência: Produção suficiente para quantos meses? (Introduzir número de meses)*			
SE11.2			*Rendimento de agricultura e pecuária*	*[0] Não*	*[1] Sim*	
SE11.3			*Subsídio do governo/pensão*	*[0] Não*	*[1] Sim*	
SE11.4			*Remessas de familiares que trabalham fora (noutras províncias/distritos)*	*[0] Não*	*[1] Sim*	
SE11.5			*Rendimento do negócio*	*[0] Não*	*[1] Sim*	
SE11.6			*Rendimento da família - membro com emprego permanente*	*[0] Não*	*[1] Sim*	
SE11.7			*Rendimento da família - emprego casual*	*[0] Não*	*[1] Sim*	
SE11.8			*Outra fonte de rendimento, especificar :_____*	*[0] Não*	*[1] Sim*	
SE11A			**Da lista acima, qual é (foi) a fonte de rendimento mais importante?** (qualquer de 1 a 8)			
SE11B			**Da lista acima, qual é (foi) a segunda fonte de rendimento mais importante?** (qualquer de 1 a 8)			
SE12			**O que é que aconteceu depois do projecto/1999?**			
SE12.1			Afectou/não afectou o negócio	*[-2] o negócio fechou;*	*[-1] o negócio diminuiu;*	
				[0] Não houve mudança;	*[1]o negócio aumentou;*	*[2]o negócio aumentou muito;*
SE12.2			Porquê? Explique:			
SE12.3			Algum membro da família encontrou um emprego permanente	*[0] Não*	*[1] Sim*	

SE12.4			Algum membro da família encontrou um emprego temporário	*[0] Não*	*[1] Sim*
SE12.5			Foi no projecto de electrificação ou numa empresa que trabalhava no projecto?	*[0] Não*	*[1] Sim*
SE12.6			Que trabalho? *Especifique:*		
SE12.7			Quem da família?		

(EGY) ENERGIAY: CONSUMO DE COMBUSTÍVEL

Por favor, indique quais dos combustíveis a sua família já utilizou/ utiliza para qualquer actividade . Custo por mês ou semana na moeda local

EGY **Num mês, quanto é que *gasta* ou *usa* em energia/combustíveis?**

Introduza a quantidade utilizada antes e agora (se sabem) e, depois, na coluna **MM** *se o inquirido opina que agora utiliza: Muito mais agora [2]; Mais agora [1]; Igual como antes [0]; Menos agora [-1]; Muito menos agora [-2]*

	Antes	Agora	MM	
EGY1	kg	kg		Lenha
EGY2	kg	kg		Carvão
EGY4	lt	lt		Petróleo
EGY5	MTn	MTn		Energia solar (apenas custo de manutenção)
EGY6				Pilhas (número compradas)
EGY7				Outras pilhas/baterias (para recarregar) (número)
EGY8				Velas (número)
EGY9	KWh	KWh		Electricidade (KWh)
EGY10	tangues	tangues		Gás LPG (tangues)
EGY11				Outro (*circule:* número, litros, kg)
EGY12		MTn		Quanto gasta mensalmente para energia?
EGY13		%		Qual é a % do rendimento total gasto em energia?

EGY14 Pode explicar porque é que gastou mais/menos (relativo/absoluto) do que antes do projecto?

(APP) UTILIDADES E ENERGIA/COMBUSTÍVEL USADA

	Antes	Agora		
APP1			**Energia/combustível para cozinhar, incluindo ferver água** *(introduzir o código de acordo com o uso abaixo)*	
APP1.1			Lenha	*[0] Nunca (0% a 1%)*
APP1.2			Carvão	*[1] As vezes (2% a 30%)*
APP1.3			Electricidade	*[2] Frequentemente (31% a 69%)*
APP1.4			Gás	*[3] Verificar frequentemente (70% a 98%)*
APP1.5			Petróleo	*[4] Sempre (99% a 100%)*
APP1.6			Outro, especificar	
APP2			**Energia/combustível para aquecer água para banho e lavar** *(introduzir o código de acordo com o uso abaixo)*	
APP2.1			Lenha	*[0] Nunca (0% a 1%)*
APP2.2			Carvão	*[1] As vezes (2% a 30%)*
APP2.3			Electricidade	*[2] Frequentemente (31% a 69%)*
APP2.4			Gás	*[3] Verificar frequentemente (70% a 98%)*
APP2.5			Petróleo	*[4] Sempre (99% a 100%)*
APP2.6			Outro, especificar	*[-9] Não aplicável*

APP3			**Energia/combustível para iluminação** *(introduzir o código de acordo com o uso abaixo)*	
APP3.1			Lenha	*[0] Nunca (0% a 1%)*
APP3.2			Carvão	*[1] As vezes (2% a 30%)*
APP3.3			Electricidade	*[2] Frequentemente (31% a 69%)*
APP3.4			Velas	*[3] Verificar frequentemente (70% a 98%)*
APP3.5			Gás	*[4] Sempre (99% a 100%)*
APP3.6			Petróleo	*[-9] Não aplicável*
APP3.7			Outro, especificar	
APP4			**Energia/combustível para o negócio de casa** *(introduzir o código de acordo com o uso abaixo)*	
APP4.1			Lenha	*[0] Nunca (0% a 1%)*
APP4.2			Carvão	*[1] As vezes (2% a 30%)*
APP4.3			Electricidade	*[2] Frequentemente (31% a 69%)*
APP4.4			Velas	*[3] Verificar frequentemente (70% a 98%)*
APP4.5			Gás	*[4] Sempre (99% a 100%)*
APP4.6			Petróleo	*[-9] Não aplicável*
APP4.7			Outro, especificar	
APP5			**Energia/combustível para outros usos importantes, especificar (e.g., por exemplo, aquecer a sala/quarto, refrigeração)** *(introduzir o código de acordo com o uso abaixo)*	
APP5.1			Lenha:	*[0] Nunca (0% a 1%)*
APP5.2			Carvão:	*[1] As vezes (2% a 30%)*
APP5.3			Electricidade:	*[2] Frequentemente (31% a 69%)*
APP5.4			Velas (alem de emergências):	*[3] Verificar frequentemente (70% a 98%)*
APP5.5			Gás:	*[4] Sempre (99% a 100%)*
APP5.6			Petróleo:	*[-9] Não aplicável*
APP5.7			Outro, especificar:	

(FW) LENHA

	Antes	Agora			
Se a família/casa não usar lenha, introduza [-9] em todos os quadrados em todos os quadrados em todos os quadrados					
FW1			**Como é que obtém lenha?**		
			[1] Apanha/dado apenas	*[3] Compra e apanha*	*[-1] Sem resposta*
			[2] Só compra	*[4] Outro, especificar*	*[-9] Não*
FW2			**Se apanha, quanto tempo demora para apanhar lenha, por dia?**		
			[1] Menos do que 30 min	*[2] Mais do que 30mn, mas menos do que 1 hora*	
			[3] Mais do que 1 hora, mas menos do que 2	*[4] Mais do que 2 horas*	
FW3			**Quem apanha?**		
			[1] Esposa	*[4] Marido*	
			[2] Meninas	*[5] Meninas e rapazes*	
			[3] Rapazes	*[6] Outro, especificar*	
FW4			**Se mudou desde o projecto, porquê?**	*[0] Não*	*[1] Sim*
			Explique:		

(SOL) ENERGIA SOLAR

	Antes	Agora			
Se a família/casa não usa energia solar, introduza [-9] em todos os quadrados em todos os quadrados					
SOL1			Está satisfeito?	*[0] Não*	*[1] Sim*
SOL1.1			Quando comprou? *(Especifique o ano)*		
SOL1.2			Quanto pagou? (em MTn)		
SOL1.3			Está satisfeito?	*[0] Não*	*[1] Sim*

(DRY) PILHAS

	Antes	Agora			
Se a família/casa não usa pilhas, introduza [-9] em todos os quadrados em todos os quadrados					
DRY1			**Utiliza pilhas para quê?**		
DRY1.1			Rádio/gravador	*[0] Não*	*[1] Sim*
DRY1.2			Lanterna	*[-1] Sem resposta*	*[-9] Não aplicável*
DRY1.3			Outro, especificar		

(BAT) OUTRAS BATERIAS - DE CARRO

	Antes	Agora				
Se a família/casa não usar bateria de carro, introduza [-9] em todos os quadrados em todos os quadrados						
BAT1			**Utiliza bateria de carro para quê?**			
BAT1.1			Rádio/gravador	*[0] Não*	*[1] Sim*	*[-1] Sem resposta*
BAT1.2			Iluminação/luzes de emergência			
BAT1.3			Televisão			
BAT1.4			Outro, especificar			

(CAN) VELAS

	Antes	Agora			
Se a família/casa não usa velas, introduzir [-9]					
CAN1			**Usa velas para iluminação regularmente?**	*[0] Não*	*[1] Sim*
CAN2			**As velas são usadas exclusivamente para iluminação de emergência?**	*[0] Não*	*[1] Sim*

(ELE) ELECTRICITY

	Antes	Agora			
Se a casa não é electrificada, introduza [-9] em todos os quadrados em todos os quadrados					
ELE1			**Desde quando é que a sua casa tem electricidade?** *(Introduzir ano)*		
ELE1.1			**Tipo de contrato?**	*[1] Tarifa social; [2] tarifa doméstica; [3] agrícola; [4] geral*	
			Entrevistador: Pedir pela factura e verificar.		
ELE1.2			Quanto é que pagou pela conexão?	*MTn ou [0] se foi de graça*	
ELE1.3			Quem pagou pela instalação eléctrica no interior da casa?	*[0] Próprio/a; [1] Utilidade; [2] Outro*	
ELE1.3			Teve de reconectar depois de lhe terem cortado o fornecimento de energia por falta de pagamento?		
ELE1.4			Se sim, quanto é que pagou? *(MTn)*		
ELE1.5			Deram-lhe algum recibo oficial pelo valor pago?	*[0] Não*	*[1] Sim*
ELE2			**Como é que utiliza a electricidade?**		
ELE2.1			**Para luzes/lâmpadas**	(introduzir o número de lâmpadas)	
ELE2.2			**Para outros usos?**		
ELE2.3			Rádio	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.4			Gravador/CD/DVD	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.5			Televisão preto e branco	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.6			TV colorida	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.7			Telefone celular	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.8			Ferro eléctrico	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.9			Ventoinha eléctrica	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.10			Aquecedor de água	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.11			Geleira	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.12			Chaleira eléctrica	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.13			Fogão eléctrico	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.14			Forno eléctrico/range/microonda	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.15			Bomba de água eléctrica	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*
ELE2.16			Máquina de costura	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*

ELE2.17			Secador de cabelo	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*	
ELE2.18			Computador	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*	
	Antes	**Agora**				
ELE2.19			Ferramenta eléctrica (por exemplo, broca eléctrica)	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*	
ELE2.20			Aquecedor de sala/quarto	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*	
ELE2.21			Misturadora eléctrica	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*	
ELE2.22			Outro, especificar:	*[0] Não [1] Emprestado*	*[2] Comprado/próprio*	
ELE3			**A quem é que paga as contas de electricidade?**			
			[0] Ninguém (não tem medidor ou é uma ligação ilegal)		*[1] EDM*	
			[2] Senhorio (a pessoa a quem arrenda a casa)	*[3] Vizinho*	*[4] Outro, especificar:*	
ELE3A			**Quem nesta casa paga a conta de electricidade?**	*[1] Esposa*	*[2] Marido*	*[3] Outro*
ELE4			**De quanto em quanto tempo paga?**	*[1] Mensalmente*	*[2] pré-pago (CREDELEC)*	
				[3] Outro, especificar:		
ELE5			**Quanto pagou no mês passado? (MTn)** *(Introduzir o montante. Ver detalhes na conta de electricidade)*			
ELE6			**Quantas casas dividem a conta de electricidade?** *(Introduzir número)*			
ELE7			**Se dividido com um vizinho/a, quanto é que ele/a paga por mês?** *(Introduzir número)*			
ELE8			**Como é que calcularam o valor?**			
			[1] Número de lâmpagas/utensílios eléctricos	*[3] Não sabe*		
			[2] O medidor para os utensílios eléctricos é separado			
ELE9			**Existem cortes de energia?** *[0] Nunca*	*[1] Raramente*	*[2] Algumas vezes (entre 4 e 12 vezes*	*[3] Muitas vezes*
ELE10			**Flutuações de energia? (o brilho das luzes varia)**	*[0] Não*	*[1] Sim*	
ELE10.1			O seu equipamento eléctrico já se danificou por causa das flutuações?	*[0] Não*	*[1] Sim*	
ELE10.2			Qual é a frequência?	*[0] Nunca*	*[1] Raramente*	*[2] Frequentemente*
ELE11			**Carrega baterias/pilhas para outras pessoas?**	*[0] Não [1] Sim, pago*	*[2] Sim, de graça*	
ELE12			**O seu empresta de seus dispositivos eléctricos com alguém?**	*[0] Não [1] Sim, pago*	*[2] Sim, de graça*	

(ACT) ACTIVIDADES E PRÁTICAS DOMÉSTICAS RELACIONADAS COM ELECTRICIDADE

	Antes	Agora	
ACT1			**Na sua casa demora algumas horas acesas durante toda a noite?** *[0] Nunca* *[1] As vezes* *[2] Sempre*
ACT1.1			Porque? *[1] Simplesmente para* *[2] Segurança* *[3] Para segurança e para*
ACT2			**Há alguma diferença nas actividades domésticas após escurecer o dia pelo facto de ter electricidade?**
			[0] Não há mudança *[1] Sim, mais trabalho* *[2] Sim, menos trabalho*
ACT2.1			Se há mudança, quem está a trabalhar mais? *[1] Esposa* *[4] Marido*
ACT2.2			Se há mudança, quem está a trabalhar menos? *[2] Meninas* *[5] Meninas e rapazes*
			[3] Rapazes *[6] Todos,* *[7] Outro, especificar*
ACT2.3			Por favor, explique:_____
ACT2.4			Porque é que fazem trabalhos depois de escurecer o dia? *(Explique.)*
ACT3			**Em média, quantas horas por dia a televisão fica ligada?**
ACT4			**Em média, quantas horas por dia o rádio fica ligado?**
ACT5			**Em media, quantas horas** *(pessoas x horas)* **por dia se gastam em casa para as seguintes actividades depois de escurecer?**
ACT5.1a			Crianças a estudar *(pessoas x horas por dia)*
ACT5.1b			Mulheres a estudar/ler *(pessoas x horas por dia)*
ACT5.1c			Homens a estudar/ler *(pessoas x horas por dia)*
ACT5.2a			Actividade produtiva das crianças para poupar ou ganhar dinheiro *(pessoas x horas por dia)*
ACT5.2b			Actividade produtiva das mulheres para poupar ou ganhar dinheiro *(pessoas x horas por dia)*
ACT5.2c			Actividade produtiva dos homens para poupar ou ganhar dinheiro *(pessoas x horas por dia)*
ACT5.3			Outro trabalho *(pessoas x horas por dia)*
ACT5.4			Ler, conversar, mostrar/explicar qualquer coisa *(pessoas x horas por dia)*
ACT5.5			Outro, especificar *(pessoas x horas por dia)*

(ED) EDUCAÇÃO

	Antes	Agora	
Coloque respostas afirmativas ou negativas			
ED1			**Como é que a electricidade afecta os estudos das crianças nesta casa?**
ED1.1			Não há mudanças *[0] Não* *[1] Sim*
ED1.2			Melhorou bastante *[0] Não* *[1] Sim*
ED1.3			Piorou devido a distracção *[0] Não* *[1] Sim*
			Explique:
ED2			Na sua opinião, como é que a electricidade afecta os hábitos de estudo da comunidade/bairro como um todo? *Explique:*

(HEA) SAÚDE

	Antes	Agora	
HEA1			**Como é que a electricidade afecta a saúde desta família?**
HEA2			**Na sua opinião, como é que a electricidade afecta a saúde da comunidade como um todo?**