

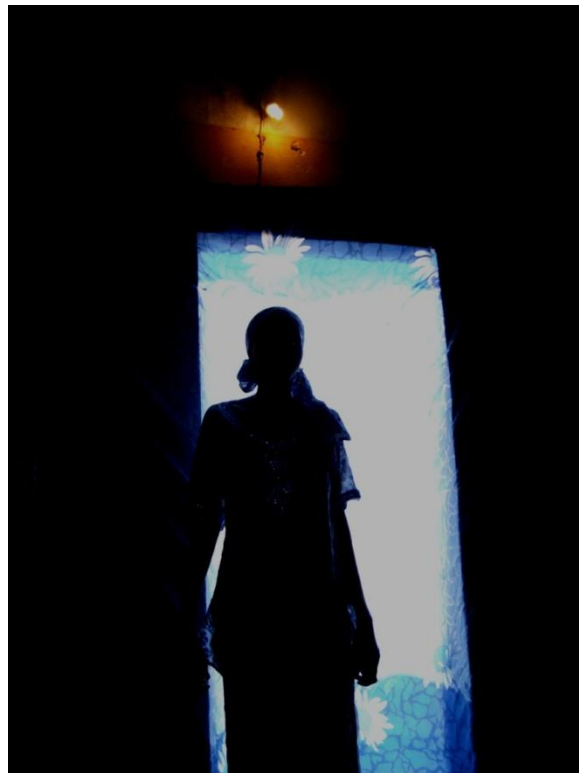


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Rural Electrification in Senegal

Access to Electricity and its Impacts on Women's Needs



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Abstract

Access to electricity impacts women and men differently. Current research often focuses on household units and the direct benefits of electricity whereas indirect benefits such as specific gender impacts are insufficiently researched. This study aimed to contribute to a better understanding of electricity's impacts on women's needs. By using Moser's (1989) definition of women's gender needs and by adding a third need as proposed by Clancy et al. (2003), this research analyzed the impacts of electricity on women's practical gender needs, productive gender needs and strategic gender needs. Overall findings indicated that access to electricity addressed above all women's practical gender needs. However, the different aspects of access to electricity could not be clearly identified as meeting either a practical, productive or a strategic gender need only. There was no clear division between women's gender needs and often, one facet of electricity addressed more than one need. Altogether, access to electricity proved to have a vast potential to meet women's gender needs and it is therefore essential to include women and their different gender needs in all steps of the process of rural electrification.

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Abbreviations

ASACASE	Association Sénégalaise pour l'Appui à la Création d'Activités Socio-Économiques
EnDev	Energising Development
GIZ	Gesellschaft für Internationale Zusammenarbeit
GPF	Groupement de Promotion Féminine
IEA	International Energy Agency
MDGs	Millennium Development Goals
PERACOD	Programme pour la Promotion de l'Électrification Rurale et l'Approvisionnement durable en Combustibles Domestiques
SEMIS	Services de l'Energie en Milieu Sahélien
SHS	Solar Home System
UK	United Kingdom
UN	United Nations

Chapter 1: Introduction

‘When Thomas Edison worked late into night on the electric light, he had to do it by gas lamp or candle. I am sure it made the work seem that much more urgent.’

George Carlin, American satirist and author (1937-2008)

1.1 Access to Electricity

Today, still 1.3 billion people are lacking access to electricity. While the number of people remaining without access to electricity has declined by 50 million between 2011 and 2012, around one fifth of the world’s population is still deprived of electricity. Ten countries account for two thirds of these 1.3 billion people: Four Asian and six Sub-Saharan African countries. In Sub-Saharan Africa, 590 million people are without access to electricity. While the average electrification rate in developing countries is 76 percent, vast differences can be detected among urban and rural areas, with electrification rates of 92 percent in urban areas and 64 percent in the latter (IEA 2012). This situation leads to poverty and lack of access to social services, impairs opportunities for women, and impedes environmental sustainability at the local, national and global level (UN 2005: 2).

The international community has acknowledged the fact that access to electricity is highly relevant in order to further the achievement of the Millennium Development Goals and to enable sustainable development. The year 2012 was proclaimed as the UN’s *Year of Sustainable Energy for All* and UN Secretary-General Ban Ki-moon has launched the *Sustainable Energy for All Initiative* which includes the goal of universal access to sustainable energy by 2030. At the Rio+20 Summit in Rio de Janeiro, the crucial role of energy within development processes was recognized and commitments were made in order to improve access to sustainable energy. However, until now there is no binding commitment towards universal sustainable energy access and it is estimated that without further action, still one billion people will lack access to electricity in 2030 (IEA 2012; UN 2005, 2010).

Senegal is one of the Sub-Saharan countries in which the IEA observed improvements in electricity access (IEA 2012). The electrification rate in 2010¹ accounted for 54 percent

¹ No other current data available

whereas in 2009 only 42 percent of the population had access to electricity, which constitutes an increase of eleven percent within one year (IEA 2011, 2012; World Bank 2013). However, the rural and urban electrification rates differ to a high degree. In 2008¹, only 18 percent of the rural population had access to electricity, while the electrification rate ranged around 75 percent in urban areas (Legros et al. 2009). This gives cause for concern as in 2011, still 57.4 percent of the Senegalese population of 12.8 million people lived in rural areas (World Bank 2013).

1.2 Problem Statement

The lack of electricity is experienced differently by men and women and entails different consequences. The same applies for access to electricity which impacts women and men in varying ways (Cecelski 2005; Clancy et al. 2003; Parikh 1995). In developing countries, wood, charcoal or animal and plant residues serve as main energy sources for cooking and heating while transport and agricultural food processing is realized through human energy. Women play a central role in this prevailing energy system as perpetual traditional divisions of labor within the household keep many women at home which is why they are more severely affected by inadequate energy services. Access to electricity does not only influence household burdens but also provides the opportunity to enhance income generating activities as well as to improve gender relations and increase the welfare of both women and men (Cecelski 2004, 2005; Clancy et al. 2003; ENERGIA/ DfID Collaborative Research Group on Gender and Energy 2006; UN 2005; UN DESA 2010).

However, in many societies women and men also have differing access to decision-making and resources within the household: ‘Women’s access to decision-making within the household and community is restricted, limiting their ability to influence processes and resource allocation on many issues including energy.’ (Clancy et al. 2003: 10). A study in South Africa showed that whenever energy devices such as batteries had to be purchased, men took over the decision-making part and women had no access to the equipment. Entertainment equipment such as televisions and radios were bought before or instead of purchasing equipment designed to facilitate domestic chores. Purchase decisions and ownership were clearly male domains (Makan 1995). While access to electricity could ‘/.../ make a crucial difference in their [women’s] ability to participate in development.’ (Cecelski 2005: 2),

women's roles and needs are rarely considered in electrification programs and scientific research, as the following part will outline.

1.3 Previous Research

At the beginning of the 1970s, rural electrification was perceived as an urgent need and the outcomes of its interventions were assumed to be a benefit for the households as a whole, to increase incomes and to improve family welfare. However, concerns were raised about the impacts of rural electrification on income and family welfare in the 1980s, linkages that had been established between rural electrification and poverty alleviation, education, health, income and employment had to be reviewed. Nevertheless, the 1990s marked the beginning of developing countries as major markets for solar home systems and rural electrification was more and more seen as a '.../ key element in a synergistic infrastructure package supporting economic and social development.' (Cecelski 2004: 22).

Most studies analyzing outcomes of rural electrification focus on household units whereas gender dimensions are rarely considered. It is widely assumed that women benefit from rural electrification as women spend more time at home, hence household electrification improves their working and living conditions. However, it is often left aside that power relations between men and women highly influence the benefits of rural electrification (Cecelski 2004). Haves (2012) states that there is a large amount of anecdotes outlining women's benefits from access to electricity but scientific research and impact evaluation studies are still rare. Many linkages between gender and energy are underresearched and there is a need for studies analyzing gender differentiated impacts in order to identify key elements for gender-sensitive energy approaches. The lack of research focusing on the impacts of electricity on women's lives is especially surprising considering the expressed commitments to support gender equality by the international donor community and the size of funds invested into electrification projects (Köhlin et al. 2011).

Current research often focuses on the direct benefits of electricity such as saved costs of kerosene, diesel, candles and batteries; however indirect outcomes like health effects, income generating activities, educational benefits and specific gender impacts are insufficiently researched. While there is a large range of literature outlining potential impacts of electrification on women, evidence to back up these claims is lacking (Köhlin et al. 2011; Panjwani 2005). Above all, there is a lack of evidence concerning the impacts of productive

use of energy and electric street lighting on women as well as electricity's impacts on their health and education (Cecelski 2004; Clancy et al. 2003; Haves 2012). Equally, women's access to resources and their role in decision-making processes are rarely considered and for a long time, women's interests in energy have been primarily treated as interests in cooking energy excluding other needs related to electricity (Clancy et al. 2003).

Clancy et al. (2003) therefore suggest further research in following areas such as: Women's energy needs with regards to traditional gender roles and empowerment; the productive use of electricity and its role in stimulating female entrepreneurship; the impacts of electric lighting in specific and electricity in general on men's and women's livelihoods; the analysis of the factors influencing equitable access to electricity for both men and women.

1.4 Purpose of the Study

While the study at hand cannot address all of the topics outlined above due to its limited scope, it nevertheless aims at contributing to a better understanding of electricity's impacts on women's needs and at addressing the demand of gender-sensitive energy research. In order to analyze the impacts of electricity on women's needs, women's needs have to be defined at first. In line with Moser's (1989) definition of women's needs and by adding a third need as proposed by Clancy et al. (2003), three different women's needs are identified: Practical gender needs, productive gender needs and strategic gender needs. This leads to the following main research question and its three sub questions:

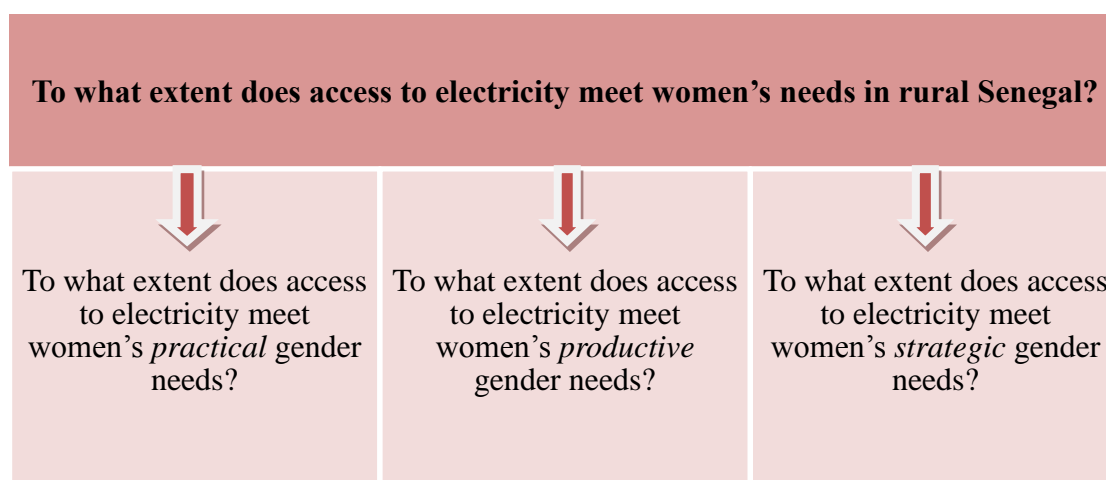


Figure 1: Research Questions

1.5 Women's Role in Senegalese Society

In general, the Senegalese society is characterized by a strong hierarchy with men as the main breadwinner and head of family establishing rules, making important decisions and controlling expenditures. Women on the other side are mainly considered to be mothers and housewives being in charge of the children and domestic housework. The sexual division of labor is widely practiced in rural but also urban areas, with agriculture and fisheries as traditional male fields of work. Often, women are expected to contribute to some extent to the household's income, for instance through small commerce. Their role is socially constructed around the man's one, the wife assists her husband in assuming his responsibilities as the head of the household and owns him respect, obedience and gratitude. This patriarchal system is based on the subordination of women and the domination of men. The differentiation and inequality between men's and women's roles structure men's and women's relations on all levels and aspects of social and community life. A woman's fecundity is highly valued and it is a woman's duty to give birth to children. These circumstances partly explain or rather justify for some the precocity of marriages and the prevalence of polygamy, particularly in rural areas. The assigned roles of men and women are reproduced by the Senegalese society through internalized stereotypes of the allegedly male and female characteristics. These stereotypes are often, unconsciously or deliberately, confounded with religious sources² and thus bring about moral and psychological impacts throughout different generations (Diop Diagne and Ministère de la Famille et de l'Entreprenariat Féminin 2009).

1.6 Women's Role in the Senegalese Energy Sector

The recognition of women's contribution to sustainable development in Senegal was acknowledged in the country's *2005 Provisional National Development Strategy*. Still, the integration of gender aspects into cross-sectoral policies and programs is only slowly progressing and the *2003 Energy Sector Policy Letter* lists access to energy as one of the main objectives without referring in particular to gender specifics or women's involvement (Diagne Gueye 2007). Although 'Women/gender and energy has emerged as one of the critical pathways for linking energy interventions to the Millennium Development Goals /.../ yet, despite many efforts, energy poverty is widespread, and gender inequality exists at every level

² Senegal's predominant religion is the Islam.

of the energy sector' (Cecelski 2004: i). Many energy programs and policies fail to address women's needs even though women represent one of the most vulnerable groups to poverty and account for 50.56 percent of the country's population. Especially in rural areas, '.../ women struggle under heavy workloads that cause gender-based social imbalances and effectively exclude them from many educational opportunities and decision-making processes.' (Diagne Gueye 2007: 59).

3.1 Outline of the Study

The prior section served as an introduction to the topic of research. In order to understand the possible impacts of access to electricity on women's needs, a short overview over the global energy situation was given, with particular focus on Senegal's electrification rate. The problem statement outlined the different possible impacts of electricity on men and women and lastly, an overview over women's role in the Senegalese energy sector as well as in Senegalese society in general was given.

This thesis is divided into eight parts. The following chapter outlines the theoretical approach of women's gender needs. Chapter 3 introduces the methodology. Chapter 4 is composed of the analysis. In Chapter 5, the findings are being discussed. Chapter 6 concludes the main findings.

Chapter 2: Theoretical Framework

Often, research about gender and poverty nexus addresses the three aspects of access to resources, decision-making, and control. Many gender analyses revolve around men's and women's different activities and their differences in access to and control over resources in order to understand the overall situation of women. While research needs frameworks allowing to analyze different situations, '.../ much of the literature on access and control fails to note the key role of energy, and it can be questioned whether the usual gender analytic tools are adequate to bring out the energy component in women's livelihoods' (Clancy et al.

2003: 4). Although gender analysis has been applied since many years in the water, health and agricultural sector, it is still rare in the energy sector. While women's energy consumption is often equated to cooking and the focus still mainly lies on fossil fuels rather than on biomass, vital women's needs such as basic, material needs as well as needs in terms of productive activities and emancipatory goals have been neglected (Clancy et al. 2003). In order to answer the research questions, this research therefore uses the theoretical framework of women's gender needs in order to analyze its findings:

Practical gender needs relate to those needs derived from women's experienced conditions in their '.../ engendered position within the sexual division of labor' (Moser 1989: 1803). Practical gender needs correspond to the fundamental need for human survival and can be translated into basic, material needs for day-to-day survival. Even though such basic needs are required by all members of the household, they are specifically identified as practical gender needs as the sexual division of labor gives women the primary responsibility for domestic chores, food provision, managing the family, and providing some income (Moser 1989). Practical gender needs do not include attempts to reach strategic goals such as emancipation or gender equality: Projects working towards meeting practical gender needs are concerned with improving the living and working conditions of women at home and are not designed to challenge existing gender roles and divisions of labor. Hence, such interventions preserve and might even reinforce the sexual division of labor (UNDP 2007).

Strategic gender needs are identified through '.../ the analysis of women's subordination to men' (Moser 1989: 1803) and are addressed to challenge existing gender roles and relationships between women and men in order to attain a more equal organization of society. By meeting strategic gender needs the relative positions of women and men are altered in order to promote empowerment and gender equity (Moser 1989). Strategic gender needs can include '.../ the abolition of the sexual division of labor; the alleviation of the burden of domestic labor and childcare; the removal of institutionalized forms of discrimination such as rights to own land or property, or access to credit; the establishment of political equality; freedom of choice over childbearing; and the adoption of adequate measures against male violence and control over women' (Molyneux 1985: 233).

Additionally, Clancy et al. (2003) add a third need, the *productive gender need*. While Moser (1989) includes the need for providing income into the practical gender needs, Clancy et al. (2003) identify productive gender needs as a separate need. This makes especially sense in terms of energy interventions as it is often assumed that the access to electricity increases the

possibility of income generating activities. Such activities could include work during evening hours, the provision of refrigeration for food production and sale as well as the acquisition of sewing machines, solar mills or other devices.

The theoretical approach of women's gender needs fits well within the Senegalese context. Traditional norms as outlined above expect Senegalese women to fulfill their daily chores and due to low household's incomes, women often have to seek an additional income. Thus, Senegalese women have practical and productive gender needs. It can now be analyzed to what extent electricity impacts the fulfillment of these practical and productive gender needs. Also, the theoretical framework enables the analysis of electricity's impacts on their strategic gender needs and allows the discussion if Senegalese women perceive their gender needs also to be strategic gender needs. With the help of the theoretical framework, the analysis aims to discuss how and which gender needs are met by access to electricity. However, one must be aware that the distinction between practical, productive and strategic gender needs is not clear-cut and can also depend on the context (UNDP 2007).

Chapter 3: Methodology

In the following section, the applied methodology is outlined. First, the method approach is explained, followed by an outline of the chosen data collection methods and the process of data transcription and analysis. Further, the characteristics of the sample are described. Then, the question about validity and reliability are discussed and limitations to the research are illustrated. Lastly, ethical considerations with regards to the research are discussed.

3.1 Research Design

A study's point of departure is crucial for conducting a study. Decisions about its epistemological and ontological standpoints are influencing the study's focus, its research questions, the data collection methods and results (Mikkelsen 2005).

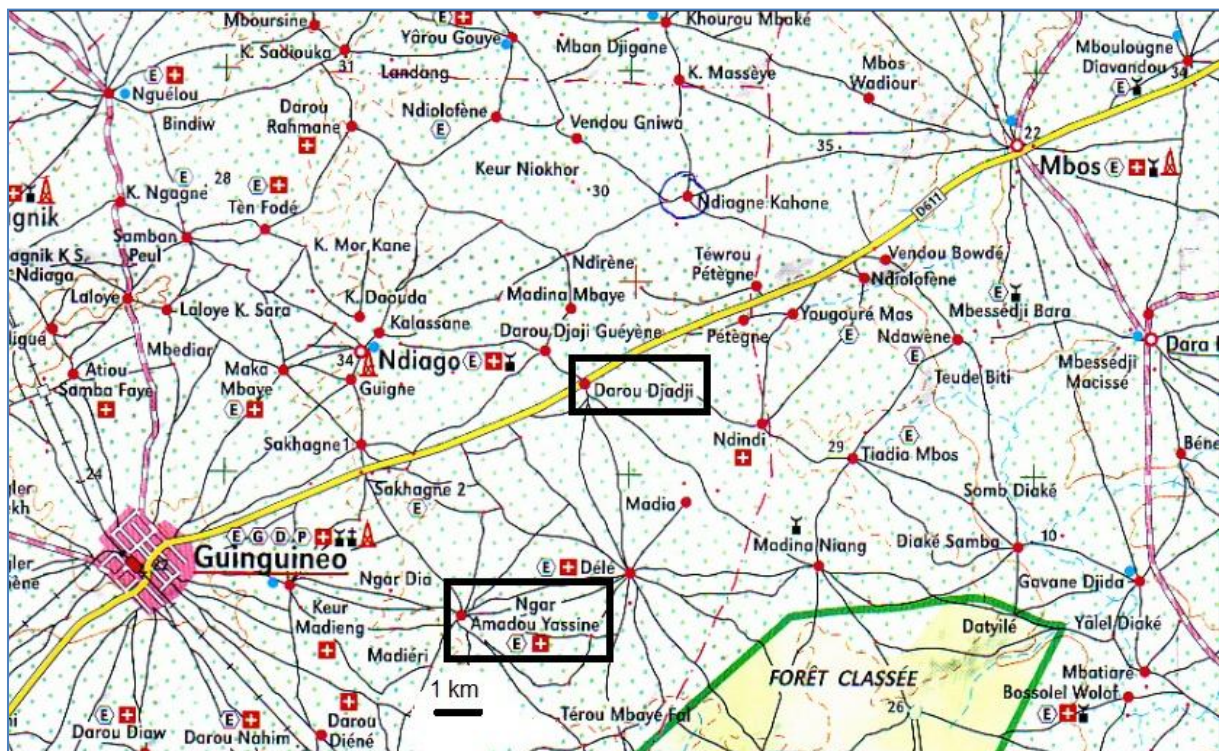
With regards to the ontological standpoint, the research at hand uses a constructivist approach. Reality is perceived as a ‘.../ constantly shifting emergent property of individual’s creation’ (Bryman 2008: 22). Hereby, reality is socially constructed and in constant change. This stands in contrast to the realistic approach which perceives reality as something fixed, pre-given and unchangeable. Through social interactions the meaning of social products which are used to explain the natural and social world is constructed (Bryman 2008). In compliance with the constructivist approach, this research presents one specific version of reality which cannot be regarded as definitive.

Concerning the epistemological standpoint of this research, an interpretative approach is applied. Individuals attribute meaning to their social reality, hence their actions are meaningful, they ‘.../ act on the basis of the meanings that they attribute to their acts’ (Bryman 2008: 16). Thus, ‘.../ social life is constructed by those who participate in it’ (Mikkelsen 2005: 135). As human behavior is considered to be under constant change, it cannot be explained in laboratories or experiments. In order to explain human actions, one must gain knowledge of people’s way of thinking and interpret their actions according to their point of view and within their setting (Bryman 2008; Creswell 2007). Thus in order to answer the research questions of this study, the Senegalese women’s own way of thinking and their actions are central to this research. Therefore, a qualitative approach was chosen as qualitative studies aim to see ‘.../ through the eyes of the people being studied’ (Bryman 2008: 385) and grant the researcher actual insights into people’s social reality (Chambers 2008).

The approach to theory is an inductive approach. While this research is not using grounded theory in order to construct a complete new theory, it is neither aiming to assess a current theory with a predetermined set of indicators or variables. While the definition of women’s needs guides the research and helps to address the central questions, the research does not intend to falsify or confirm the theoretical framework. Instead, the theoretical framework was adapted to the actual context and study, adding productive gender needs to Moser’s (1989) framework and the characteristics of the different gender needs were developed throughout the research. Although no completely new theory is created, this research has hence the nature of an inductive approach.

3.2 Data Collection, Transcription and Analysis

The fieldwork was conducted in Senegal, in the region of Kaolack, the so called *Bassin Arachidier*. The *Bassin Arachidier* is located in the mid-West of Senegal and is one of Senegal's largest agricultural areas. However, Kaolack's agricultural sector is crisis-shaken since more than ten years and poverty is widely spread. The *Bassin Arachidier* is a very rural area with the majority of its population being farmers. Subsistence agriculture is widely spread (Diouf 2008).



Map 1: Map of the Study Sites (Source: Centre de Cartographie Dakar)

The fieldwork was conducted in cooperation with the GIZ Program PERACOD (Programme pour la Promotion de l'Électrification Rurale et l'Approvisionnement durable en Combustibles Domestiques) which facilitated the access to the field and provided important expert information. Initially, the village of Ngar Amadou Yassine (800 inhabitants) was selected as study site. However due to its limited amount of households with access to electricity (Fourteen households) and as not all possible respondents were reachable due to time constraints on their side, it was decided to increase the sample size by adding a second study site: the village of Darou Djadji (250 inhabitants, nine electrified households). Both villages have been electrified by the Senegalese Energy Agency ASER and PERACOD in

2008. In Darou Djadji, individual solar home systems have been implemented and in Ngar Amadou Yassine, a mini grid has been installed. Both systems, the solar home systems (SHS) as well as the mini grid are operated by Senegalese companies. The individual solar home systems allow the installation of four lamps and one radio per household and the mini grid offers four different levels of electricity ranging from likewise four lamps and one radio to fourteen lamps and one fridge³.

As data collection methods, in-depth interviews, a focus group discussion and observations were chosen. Except for expert interviews, all interviews and the focus group discussion were held in Wolof and translated by an interpreter from Wolof to French and vice versa. In total, twenty interviews were conducted: Seventeen interviews with women from electrified households, one interview with the chairwomen of a women's group and two expert interviews. The amount of interviews was not higher as I felt that theoretical saturation was reached. More precisely, nine interviews with women from electrified households were conducted in Ngar Amadou Yassine and in Darou Djadji, eight interviews with women from electrified interviews were held. The amount of interviews in both villages varies as not all intended interviewees could be reached due to time constraints on both sides. Additionally, an interview with the chairwomen of Ngar Amadou Yassine's women's group owning a refrigerator was led. Further, two expert interviews were conducted: One interview with a sociologist concerning gender relations in Senegal and one interview with an expert on rural electrification from PERACOD. The interviews were semi-structured interviews. Since interviews are designed to learn about the individuals' perspectives, they constitute a suitable method to learn about the respondents' personal perceptions concerning electricity and their own needs (Mack et al. 2005). Semi-structured interviews were chosen for their flexibility enabling the interviewee to integrate own points and aspects the researcher was not aware of (Mikkelsen 2005).

A focus group discussion was held with sixteen women from the women's group of Darou Djadji who owns a solar mill. Additionally, two men participated. The implication of the men's participation will be outlined further when discussing the limitations of this research. The focus group intended to investigate how the women managed the solar mill, what kind of benefits they saw in rural electrification and how their own specific needs could be met. It wasn't possible to conduct a second focus group in Ngar Amadou Yassine since time constraints prevented women from participating in a focus group discussion. Several

³ A more detailed description of solar home systems and mini grids can be found in Appendix I

ceremonies were taking place during the field visits and made it impossible to assemble women.

Moreover, general observations were made and descriptive and reflective notes were taken about the housing situation, the state of the electrical devices, the location of the lamps and about the behavior of the interviewed women themselves. Observations were made during the interviews and the focus group discussion as well as after the interviews when women showed me the lamp in their room or other electronic devices. I chose the role of an observer as a participant (Bryman 2008). While my role was primarily the role of an interviewer, observations involving little participation complemented my findings. By doing so, I could gather data through observations complementing the interviews.

Before each interview and before the focus group discussion, participants were informed about the purpose of the research, their anonymity was guaranteed and spoken consent was obtained in order to record the interview. The recordings were transcribed while still in the field. This allowed for a constant reflection of the collected data and eventual changes during the data collection process (Creswell 2009). With the help of an excel sheet, the data was then assembled and clustered according to similar topics. Thereby recurrent answers could be detected and coded into different categories. For the analysis and discussion of the data, the findings were then translated from French into English. Direct quotations from respondents that are used in this study were translated from Wolof into French and then into English and thus cannot reproduce the exact same wording of the respondents. However, much attention has been paid in order to guarantee a correct translation. Direct quotations in the study were selected according to their significance in underlining the findings. The names of the respondents were changed in order to guarantee their anonymity.

3.3 Sample Characteristics

The selection of the sample was based on purposive sampling and convenience sampling. A purposive sampling is a method primarily used in qualitative research and aims to reach those people that are most relevant to the research topic since they will most likely help to answer the research question (Bryman 2008). On the other hand, ‘a convenience sample is one that is simply available to the researcher by virtue of its accessibility’ (Bryman 2008: 100). Interviewees were selected according to the following criteria: Being a married woman between the ages of twenty and sixty years and living in a household with access to

electricity. The age range was chosen in order to include variety in the sample and to find out if gender needs differ according to the respondents' age. However, no major differences in the respondents' answer behavior due to different age could be detected. Younger girls were excluded from the sample as their role, responsibilities and gender needs within the household differ from the ones of women above the age of twenty. Further, it was aimed to enhance the variety of the resulting sample by including households with different electricity levels⁴. The focus lies on married women as it makes it easier to analyze women's gender roles when a comparison to their husband's gender role can be drawn, therefore unmarried women were excluded. Moreover, in rural areas it is uncommon for Senegalese women to be still unmarried at the age of twenty. Thus, by focusing on married women, it was hoped to conduct the research closer to Senegalese reality.

Due to specific circumstances on-site, in two cases a woman of the chosen age range was not reachable, hence, through convenience sampling, another married female member of the household was chosen. In two other cases, the interviewees were widows. Nevertheless, due to their significant answers, it was decided to include their data in the research. In order to identify electrified households and respondents fulfilling the given criteria, snowball sampling was used. For the focus group discussion, purposive sampling was used according to the criterion of being a member in the women's group owning a solar mill in Darou Djadji.

3.4 Validity and Reliability

In order to enhance the internal validity of this research and ensure the accuracy of the data, various strategies have been employed that are suggested by Creswell (2009). For instance, different data sources have been used and constant self-reflection was applied in order to outline how the discussion of the findings was influenced by my background and culture. Also, a prolonged stay in Senegal enabled a deeper insight into traditional norms and gender relations which contributed to a better understanding of the findings. Moreover, the findings of the research were presented to and discussed with staff from PERACOD. This debriefing by experts of rural electrification and energy interventions increased the validity of the findings.

⁴ The different electricity levels are explained in detail in Appendix I

The nature of qualitative research is not to generalize findings but to generate 'particular description[s] and themes developed *in context* of a specific site' (Creswell 2009: 193). It is particularity and not external validity that qualitative research addresses (Greene and Caracelli 1997). The study at hand uses a qualitative research design and therefore does not aim to generalize findings.

External reliability is difficult to assure as in order to replicate a qualitative research, constant changing social settings and circumstances had to be freezed. However, by recording all interviews a transparent documentation of the data is granted, thus contributing to internal reliability (Bryman 2008).

3.5 Limitations

A major limitation to the research was the language barrier, as the majority of the rural population does not speak French but Wolof, a language I do not speak, and the distance to the villages. However, I was supported by the local PERACOD office which gave me access to an interpreter and a driver. Both the interpreter and driver facilitated the introduction to gatekeepers and made it possible that people in the villages were open to talk to in the first place. Nevertheless, it must be acknowledged that by using an interpreter, information gets lost during the interpreting process and that the possibility of analyzing the speaking behavior of the interviewees, such as speaking pauses, is nearly impossible.

Moreover, my affiliation to PERACOD might have influenced the answer behavior. Although this factor cannot be ruled out, it did not seem to affect women's ability to criticize or point out negative aspects concerning the electricity provision. Also, while PERACOD provides the equipment for the installation of the solar panels or the mini grid, it is the local energy operator who charges the households and is responsible for maintenance and repair. It seemed that PERACOD is playing a less central role and is perceived more as an intermediary between the operator and the village residents. Above all, the nature of this research as a scientific research for university purposes was underlined before each interview.

While Scheyvens and Leslie (2000) acknowledge the need to consult women, they illustrate various practical difficulties when interviewing women. During the research at hand, some practical difficulties were experienced as well. Gaining access to women was difficult, not because of their lack of willingness to be interviewed, but because of their limited free time:

Women were busy doing household chores, supervising children or preparing to cook. Hence, the time frame for interviews was adapted to their daily routines with interviews taking place from 10 am to 2 pm at latest, as in Senegalese society lunch is served at around 3 pm. It could be observed that during the last interviews of the day, women were more in a hurry since they needed to start preparing the meal soon. Also, interviews were sometimes interrupted for a short time due to some instant task the women had to conduct or children crying.

Scheyvens and Leslie (2000) further note that their research showed that women are less likely to attend community meetings and if they do, will rather sit quietly in the back without expressing their opinions. Since women are less often subject to research, asking to interview women might provoke surprised or even suspicious reactions on the part of men (Scheyvens and Leslie 2000). In order to prevent such reactions, village chiefs were consulted first, informing them about the purposes of the research and interviewing them about the village's infrastructure and population. Nevertheless, the outlined behavior could be observed during a focus group discussion when the village chief and a second man took it for granted to participate even though it was announced as a focus group discussion with women only. The focus group discussion was intended to investigate how women manage the solar mill, what kind of benefits they see in rural electrification and how their own specific needs can be met. However, the presence of two men led to a situation in which sixteen women sat quietly in the back letting the village chief speak, with the scarce participation of three women, all of them wives of the village chief. To some extent this limitation turned into an opportunity, as instead of having a lively discussion with the women, observations concerning the hierarchical structures of the village, both between men and women and among the women themselves could be made. Moreover, the behavior of women in the presence of men could be analyzed. These observations will be discussed in detail in the analysis in chapter 4.

3.6 Ethical Considerations

As Scheyvens and Leslie (2000) stress, the sensitivity of ethical issues is intensified when conducting research involving women as key informants. I am aware of this issue, nevertheless I decided to primarily interview women as my research focuses on impacts on women's life. It is therefore crucial that a sensitive approach is applied and that an environment is created in which women are willing to open up. In order to create a comfortable interview setting, I decided to hold the interviews within a private setting such as

the women's room or a calm corner in the yard. It was paid attention to the fact that no other person was present during the interview except for the respondent, the translator and I. However the conduction of interviews raised a lot of attention and it could not be always avoided that curious household members were present during some parts of the interviews. This might have influenced the women's answering behavior.

In recent years, interviewing in qualitative research has been criticized for being a moral inquiry (Kvale 2007). Creswell (2009) suggests that researcher pay attention to the sensitivity of the interview questions and whether the interview is stressful or uncomfortable for the respondent. During the interviews it was noticed that when women were not willing to explain further or lacked knowledge, they gave answers such as 'It is the tradition' and 'This is how it is in Senegal'. When receiving such answers, I decided not to investigate further as it was obvious such assertions were used as means to end the questioning. The respondents seemed to be uncomfortable with the question and a continuation of the questioning did not seem appropriate.

Moreover, the question of reciprocity has to be raised. Development studies are often associated with respondents' expectations of later interventions. While in theory, both the researcher and the participants should benefit, it is often unclear how participants can benefit from the research. Rarely, informants gain access to the research report and the sharing of the findings is often hindered by language barriers. Remuneration in terms of money is rejected as a bad practice in social research. However, especially qualitative research asks its participants for a lot of time and some researchers show appreciation by giving gifts in other form than money (Creswell 2009; Mikkelsen 2005). In my case, interviews lasted around forty minutes, which for women is a large amount of time during which no household chores can be performed. Nevertheless they showed a lot of patience while answering my questions. Thus, at the end of each interview, I gave the interviewee a bag of sugar and tea, two valuable items in Senegalese society, in order to express gratitude. This practice was approved by the local staff of PERACOD that is more accustomed to traditions on site than I was. As I will also translate my findings into French, I aim to make this study more accessible in Senegal. My hope is that this research can contribute to rural electrification interventions that recognize women's different needs.

I also need to be aware of the fact that by interpreting the data, my own perceptions will influence the outcome. When interpreting other societies and cultures, researchers start from their own experience thus interpreting from the standpoint of their own culture, norms and

values (Mikkelsen 2005). My own understanding about women and men, their gender roles and needs might be very different from the respondents' views. The analysis has to make clear from which point of view the data is analyzed.

Chapter 4: Findings and Analysis

The following chapter contains the analysis of the study. It is divided into seven parts. It starts with the analysis of electricity as a labor reducing tool and then discusses the question of electricity prolonging women's workday. Further, electric lighting and its impacts on daily chores as well as perceptions of darkness are analyzed. The fourth part outlines electricity's role in entrepreneurial activities and the fifth part focuses on information and entertainment devices. Moreover, the linkages between the use of cell phones and electricity are explained. Lastly, the role of electric street lighting is discussed. If not stated otherwise, sources of this chapter constitute of the information gained during data collection in the field.

4.1 Electricity as a Labor Reducing Tool

Electricity is highly valued as a labor reducing tool by the interviewed women. In Senegal, women carry the largest burden of domestic work (Diagne Gueye 2007). The respondents' practical gender needs relate in particular to cooking, grinding cereal (millet, groundnuts, corn, and bissap), agricultural activities such as sowing seeds and harvesting, gathering firewood, drawing water from a well and other domestic work like cleaning, washing, supervising children as well as cattle. It is estimated that Senegalese women in rural areas spend between thirteen to sixteen hours per day with domestic work (Diagne Gueye 2007).

The hardest and most time-consuming part of women's daily work is to pound the harvested crops. Electric grinding machines such as solar mills could reduce a very large part of the women's workload. In Darou Djadji, a solar mill went into operation in January 2013 allowing women to grind millet mechanically on site. Before the introduction of the mill, women either had to pound the crops manually or had to take the crops by foot or horse cart to

the mill in another village five kilometers away. Still, the women criticize the mill's low capacities (less than 25 kilogram can be grinded per day) and point out the need for solar mills that can process not only millet but also corn and groundnuts, as latter are cultivated in large quantities and processed into oil⁵.

Before gaining access to electricity, kerosene lamps, candles and torches were used as lighting devices. The respondents were responsible for buying candles, kerosene or batteries, a burden that they are now relieved off:

‘It was very tiresome to go buy candles every day. Now, I don’t have to make that walk [to the local shop] every day.’ Ndèye (27)

A study found out that in rural Africa, 87 percent of women's commutes are performed afoot and 65 percent of the household's transport is effected by women (Malmberg Calvo 1994). In the study at hand, women in Ngar Amadou Yassine had to reach Guinguénéo, a town approximately five kilometers away in order to buy kerosene, a task that has become unnecessary with the access to electricity:

‘To buy kerosene, you had to make the long way until Guinguénéo because you cannot buy it here in the village. You could also ask someone going to Guinguénéo to buy it for you. But then he would forget about it and you had no kerosene and the house was obscure.’ Kiné (60)

Policy papers often assume that time saved through access to electricity and the decrease of the workload is not only contributing to women's practical gender needs but also to women's productive and strategic gender needs. They argue that time saving through the access to electricity enables women to engage in income generating activities, to take part in decision-making processes within the household and the community or to engage in educational activities such as evening classes or reading (Diagne Gueye 2007; UN 2005, 2010; UN Millenium Project 2005; UNDP 2004). While the traditional division of labor certainly fosters gender-based social imbalances and women's time and human energy invested in domestic work plays a critical part in this (Diagne Gueye 2007), further aspects have to be considered as well. In the case of the women in Ngar Amadou Yassine and Darou Djadji, their highest priority is the uptake of income generating activities. While the respondents acknowledge that electricity has the potential to reduce their workload, a broader concern is the lacking funds in order to start a small business. As employment opportunities in a village with less than 800

⁵ Groundnut oil is often being sold, providing an income generating activity for women. I will draw on that in part 4.4 when discussing the impacts of electricity on productive gender needs.

respectively 250 inhabitants are rare, women's possibilities to generate income mainly consist of the creation of their own business which requires initial investments. The linkage between access to electricity and productive gender needs will be outlined in more detail in part 4.4. But it is important to note at this point already that while electricity does contribute to the reduction of workload and thus to the saving of time, the fulfillment of productive gender needs is hindered by financial barriers.

Regarding strategic gender needs, the respondents do not consider the saved time as a mean in order to address strategic gender needs. First of all, women in the study do not use the saved time in order to engage in educational activities. The reasons for this are the very high illiteracy rate among the respondents which prevents them from reading in the first place and the lack of infrastructure. Although primary schools exist in both villages, evening classes for adults are not offered. Diagne Gueye (2007) adds that the high work load attributed to female household members in Senegal entails also that daughters or other female household members in school age attend school irregularly if at all. In all visited households, the domestic chores are shared between the co-wives, daughters, daughters-in-law or sisters-in-law and only half of the respondents' daughters in school age are going or have been going to school. However, the linkage between electricity and school attendance goes beyond this study and requires further research.

Secondly, the respondents do not regard the saved time as a possibility to take part in decision-making processes neither did it increase their participation in village activities or groups. Groups in which women participate already existed before gaining access to electricity and decisions within the household and the community are still taken by men. Women's decision-making power is restricted to what Senegalese society considers *female* domains such as cooking and managing the household; decisions about the children's education or concerning larger expenses are mainly taken by men. However questions concerning women's actual decision-making power might have evoked answers that depict women's role in decision-making as smaller than it is in reality. This might be due to the fact that respondents feared to be represented as what society considers a misbehaved woman:

'A good woman obeys her husband. If he tells her to do something, she does it. If he tells her to refrain from doing something, she refrains from it. Not obeying your husband means you are a poor wife and mother. A married woman always asks her husband's permission, this is how it is.' Amada (32)

Although experts confirmed my assumption that women have more decision-making power than they admit, they also validated the collected data asserting that at the end of every discussion, it is the man that makes the final decision by giving or not giving his approval. Patriarchal norms such as the traditional roles of men and women as well as their assigned decision-making power proved to be very prevalent in the context of the study.

To conclude, it can be stated that time saving cannot be defined as either a practical, productive or strategic gender need only as there is no clear division between the three gender needs and the definition of every practical, productive or strategic gender need also depends on the surrounding circumstances (UNDP 2007). While electricity reduces women's workloads and contributes to the saving of time, it depends on the women and the context if this saving of time is translated into a practical, productive or strategic benefit. This study could identify four influencing factors: The available infrastructure, the financial background, traditional norms and women's motives. In the case of the interviewed women, time saving through access to electricity is not used as a productive or strategic benefit; instead the focus lies on the reduced workload and the improved working conditions at home. Electricity therefore can be regarded as meeting practical gender needs.

4.2 Light's Dark Side – Prolonging Women's Workday?

While the previous paragraph discussed the decrease of one part of women's workload as an improvement of the working situation, the reversed has to be analyzed as well: Electric lighting may extend women's workday and thus increasing women's overall workload (Cecelski 2004; Clancy et al. 2003; UNDP 2004; Wamukonya and Davis 1999). The following section will explore whether access to electricity extends women's working day and thus whether electricity in fact intensifies women's practical gender needs instead of addressing them.

Findings from this study show that for most women, access to electricity does not increase their workload. The majority of the women indicate that after dark, they rest. Some women use electric lighting in order to process groundnuts in the evening and only few women use electric lighting for housework and washing laundry in the evening hours. Addressing productive gender needs through electric lighting is rarely practiced. Mariama's case remains an exception:

‘I started sewing bed sheets in the evening hours since we had electricity installed. By selling them, I earn some money. But as I do not have a sewing machine and would not even know how to use one, I sew manually, so it takes a long time.’
Mariama (47)

However, a previous study investigating impacts of rural electrification in different villages including Ngar Amadou Yassine shows different findings: Many women were observed to use electric lighting in the evening hours in order to process groundnuts and bissap. Additionally, it was stated that various women use electric lighting in order to braid other women’s hair until late at night (SEMIS 2013).

These different findings were discussed in a meeting with the head researcher of the study conducted by *Services de l’Energie en Milieu Sahélien* (SEMIS), and the following can be concluded: The date of the conduction of the two different studies is of major importance. The study of SEMIS was conducted in November 2012. In Senegal, November is the month after the harvest; hence there is a large amount of groundnuts and bissap to process. As this is a work usually performed by women and children it explains the large numbers of women processing the harvest until late at night. However, in January and February, most of the harvest has been processed and less work needs to be done. This explains the different results of the study at hand which was conducted in January and February. However, the question whether it is the access to electricity, thus the electric lighting in the courtyard, that contributes to this additional workload or whether electric lighting simply facilitates a task that needs to be conducted in the time after harvest anyway has to be discussed further and could be subject to additional in-depths studies. In this specific case, evidence points to the argument that electric lighting simply facilitates and accelerates a task that otherwise would be conducted under poorer working conditions. Thus, electric lighting is addressing a practical gender need. To some degree, it might also address a productive gender need by accelerating the processing of the harvest which then can be sold. However, in the study at hand the majority of the smallholders engage in subsistence farming with none or only little agricultural yield being sold.

The month after harvest is also the time of ceremonies. Ceremonies occupy an important part in Senegalese society and most ceremonies are held after harvest, when smallholders have cultivated the harvest and earned some money that can be spent. Appearance plays an important role during ceremonies and it is from outmost importance that especially women buy new dresses and invest in hair and make-up. This explains the findings about women braiding hair at night in November while in late January and February, different results were

obtained. Although ceremonies were still held in the villages in January and February, the high season of ceremonies was over. At this point the question about electricity's negative impacts should be raised. With no doubt, it prolongs women's working day but on the other hand gives them the opportunity to earn money, as braiding is paid. Further, Senegalese society puts a lot of pressure on women to be well-dressed and nice-looking, especially at ceremonies. Women often feel the need to spend a large amount of time in their appearance but at the same time lack the time to do so due to their daily workloads. Offering this service after dark facilitates their life by giving them the opportunity to accomplish their chores during the day and getting their hair braided after dark. From this point of view, electric lighting gives women the chance to fulfill society's expectations. I therefore conclude that electric lighting in this context meets both a productive gender need, by providing a source of income, and a practical gender need, by providing access to hairdressers and thus improving the women's living situation.

4.3 Electric Lighting, Daily Chores and Perceptions of Darkness

While some aspects of electric lighting and its implication on women's life have been discussed in the previous section, this section outlines impacts of electric lighting on women's daily chores and discusses different perceptions of darkness. The findings show that except for two, all interviewed women had a lamp installed in her room. It could be observed that the women with a lamp installed in their own room were the wives of the head of household. Women who were daughters-in-law or sisters-in-law of the head of the household had less chances of having a lamp installed in their room. It is the firmly established hierarchy within the Senegalese household that ensures that the head of household and his wives have access to electric lighting in their rooms as it is the head of the household who decides on the location of the electric lighting. More than half of the households had also a lamp installed in the courtyard as the courtyard is a center of household activities, for both work and social life.

Respondents argue that electric lighting improves their living conditions to a large degree. While candles provide little electric lighting and kerosene and batteries are expensive, a single solar panel provides enough power to illuminate four light bulbs and a mini grid offers the possibility to install up to fourteen light bulbs. This allows households to illuminate several rooms or even the whole house instead of only one part of a room. Additionally, another advantage has been mentioned by the respondents: Households are less affected by supply

shortages and the lamps can be turned on whenever needed. When children do their homework, when dinner is eaten in the courtyard and even at night, electric lighting can be left on so that babies do not cry in the darkness and household members find their way from their rooms to the toilet and back. Light is interpreted as a source of security, scaring of thieves and providing comfort during thunderstorms. In Awa's case, access to electricity has also improved her working conditions as a midwife in the village's health center:

'Before, we used a gas lamp if there were deliveries at night but now with the electricity and the installed lamp, we have so much more light which makes work easier.' Awa (60)

The women's statements show that here electric lighting is addressing basic gender needs by improving women's living conditions as well as working conditions, like in Awa's case. Other working conditions that could be improved through access to electricity revolve around cooking. In Senegalese society cooking takes a large amount of time. Traditionally, the food is cooked on an open fire, an energy source that loses a lot of heat and efficiency in the process. Energy interventions such as the dissemination of improved cooking stoves⁶ aim to address the issue of cooking on an open fire but electricity as such has not yet been able to improve the respondents' cooking situation. Electric stoves are too expensive and are often regarded as a long term option while improved cooking stoves are easier available, near term options (Ahuja and Tatsutani 2008; UNDP 2000). However, electricity has the potential of improving women's working situation by providing electric lighting in the kitchen and thus addressing a further practical gender need.

As the sun sets around seven pm and dinner is traditionally eaten late at night, the interviewed women cook with a torch and try to prevent long cooking hours after dark. In fact, many women prepare most of the meal already during the day which facilitates and speeds up the cooking process after dark. Still, the interviewees do acknowledge the difficulties to cook with a torch as it makes cooking more inconvenient, tedious and lengthy, provokes back and neck troubles from clamping the torch between neck and shoulder as well as eye problems. Access to electricity could solve this issue and improve the working conditions of women and thus address a practical gender need.

Nevertheless, none of the visited households has electric lighting installed in the kitchen and the given reasons all underline the assertion that the amount of lamps is limited and that

⁶ Improved cooking stoves aren't electric stoves but stoves made out of metal sheets or clay burning fuels (charcoal or wood) more efficiently (GIZ 2011).

women prioritize having a lamp in their room rather than in the kitchen. The preference of having electric lighting in the room could be seen as the satisfaction of a strategic gender need, enabling women to read and thus nurture their education and knowledge (UNDP 2004). However, as mentioned before, the majority of the interviewed women are illiterate. It is not them, who study at night, but their children:

‘It is hard to cook with a torch, yes. But the children study at night and it is just easier to take a torch with you into the kitchen than to study with a torch’, says Mbissine (49), mother of six children.

For Mbissine and for other women, fostering their children’s education ranks above having a lamp in the kitchen; in this case they prioritize less on the satisfaction of their own practical gender need.

A further observation that was made concerns the perception of darkness. Interestingly, women do not find the kitchen to be dark during the day however in my perception, the lack of electric lighting is not only a problem after dark but also a daytime problem. Most kitchens are constructed as a straw hut with an open entrance but without any windows. This leads to obscurity in the kitchen even at daytime. These differences between my own and the women’s perceptions of darkness might derive from the different circumstances we are used to. As a researcher from a European country where one is used to having electric lighting almost anywhere at any time, I perceive darkness where these women do not. Being accustomed to not having access to electricity, the interviewed women are used to the lack of or the provision of only small sources of electric lighting. Additionally, while in most Western cultures cooking takes place in the kitchen, Senegalese women do not necessarily prepare the food inside the kitchen. Many respondents simply relocate the work such as food preparation to the courtyard where there is daylight and where they can sit together and chat:

‘I do not have to spend so much time in the kitchen in the evening, as I already prepare the couscous after lunch and only have to add hot water before dinner time.’ Fatou (27)

Cultural differences might lead to misconceptions and as a researcher from a different culture one has to step away from the absolute assumption that kitchens need electric lighting. The findings lead to the conclusion that while a lamp in the kitchen is definitely a women’s request, it is not top priority. While there is a practical gender need for electric lighting in the kitchen, for the respondents of this study, other needs come first.

4.4 Electricity's Impacts on Entrepreneurial Activities

Various policy papers expect electricity to trigger and promote income generating activities such as the selling of cooled beverages out of a refrigerator, sewing clothes with an electronic sewing machine or conducting a solar mil. (UN 2005, 2010). However, some evidence from rural areas in Sub-Saharan Africa shows that households use electricity for rather consumptive purposes such as electric lighting and entertainment devices than for productive use (Acker and Kammen 1996; Bensch et al. 2011; Harsdorff and Peters 2010; Neelson and Peters 2011; Peters et al. 2011; Wamukonya and Davis 2001). In the study at hand, the respondents cited refrigerators or deep freezers as income generating activities made possible through the access of electricity. However there was only one individual household in the two visited villages that owns a deep freezer and no individual household owns a refrigerator. The reason for this is the fact that larger purchases such as the bargain of a refrigerator, deep freezer, sewing machine or solar mill exceed most households' income.

In order to generate income by using electricity in a productive manner, the respondents of the study used their already existing networks and their affiliation to women's groups. In rural Senegal, mutual assistance and solidarity is traditionally very strong. The importance of social relations in the Senegalese culture induces women to gather and assist each other in times of need and financial troubles, making available a network of solidarity exceeding family relations (Piroux 2000). Women's groups often orientate themselves towards income generating activities in order to meet productive gender needs (Sow 1990). According to Sarr (1998) women gain financial autonomy through group internal money lending systems such as *tontine*⁷ allowing them to meet productive gender needs and take up income generating activities.

Since one year, the women's group in Ngar Amadou Yassine owns a refrigerator with a freezer compartment allowing them to sell self-made juice and ice-cream, cooled water, soft drinks, and congealed water. The women produce and sell the products on a rotating basis and the common revenue is kept by the treasurer. The amount of revenue varies as Marie (59), the group's chairwoman explains:

‘Sometimes we earn 3,000 FCFA per day, sometimes we only earn 500 FCFA per day. During ceremonies we do not have any difficulties to sell our ice cream,

⁷ *Tontine* is a money lending system in which all participants contribute an equal amount of money each month and lottery decides who will obtain the cumulated amount of money. This process is repeated each month until every member received money (Sarr 1998).

water and soft drinks. We sell a lot and can earn up to 5000 FCFA during one day. But when there are no ceremonies, we sell less.'

Since the monthly profit averages 23,000 FCFA (see Table 1) there has not been yet any disbursement to the individual members as according to the chairwomen, profit is still too little to be paid out to the fifty members. Instead, the money is saved for the future purchase of a second refrigerator.

Table 1: Monthly revenue, costs and profits of the women's group in Ngar Amadou Yassine

Monthly Revenue	Monthly Costs	Monthly Profit
50,000 FCFA (76 €)	18,000 FCFA Primary Materials 5,000 FCFA Electricity 4,000 FCFA Rent to the owner of the village shop, where the refrigerator is placed <hr/> 27,000 FCFA (41€)	23,000 FCFA (35€)

Source: SEMIS (2013)

If profit would be paid out at this stage, each woman would earn enough money per month for approximately one kilogram of rice. Considering that the average size of the respondents' households consists of seventeen persons, the income provided through the refrigerator does only meet the women's productive gender needs partly. Nevertheless, compared to the group's previous income generating activities such as selling self-made soap, the group increased its income due to access to electricity; although it is unclear to which amount. Illiteracy, lack of bookkeeping and the unwritten law not to talk about money made questions about revenue very challenging. Often, business figures cannot be provided at all or only the daily amount of revenue is known. Research conducted by SEMIS (2013) shows similar results and according to Sarr (1998), illiteracy and the lack of business skills can hinder women in the pursuit of income generating activities to a high degree. In the study at hand, the majority of the interviewed women is illiterate. It can therefore be concluded that while electricity provides the possibility to meet women's productive gender needs, factors such as illiteracy, high investment costs and the lack of business skills impair the satisfaction of productive gender needs.

In Darou Djadji, a group of twenty-eight women owns the solar mill⁸ mentioned above. It was acquired three years ago but is only in operation since January 2013 as a technical defect prevented its utilization initially. Women of Darou Djadji as well as surrounding villages use the solar mill to grind millet. The price for grinding one kilogram amounts to 25 FCFA (4 Eurocent) and even though there is a high demand for grinding millet, it would be more favorable for business if the mill could also grind corn and groundnuts. For one thing, this would draw on more customers. For another, grinding groundnuts would allow the women to produce groundnut oil which can be sold providing an additional source of income. Millet however is mainly used for personal use.

At the time of the field visits, almost no income has been made yet. Similar to the case of the women's group in Ngar Amadou Yassine, electricity certainly has the potential to address productive gender needs but factors such as technical details and high running costs (installment payments to the bank, electricity bills, and salary for the mill's operator) influence the fulfillment of productive gender needs. Apart from these productive gender needs, electricity in the form of the refrigerator and solar mill also addresses practical genders needs by improving women's working and living conditions. The fact that the solar mill contributes to improved working conditions was already outlined in part 4.1, but the refrigerator addresses basic gender needs too. Many respondents emphasized that having access to cold beverages and ice cubes has improved their quality of life to some degree.

Moreover, in this study, business opportunities for women also address strategic gender needs. Gender equality, as the majority of the respondents argues, signifies that both husband and wife contribute to the household's income. Contrary to Western concepts of gender equality where amongst others the sexual division of labor at home is addressed, all women in the study reject the idea of a husband assuming household chores: 'The kitchen is for women.' explains Binetou (32). Having an own income may also increase women's decision-making power:

'It is my husband who decides whether or not to bring our children to the hospital if one of them is sick. I would like to take that decision too, but I cannot as I do not earn any money myself. If I have an income, it will be me who takes the children to the hospital.' Maguette (27)

⁸ The solar mill was acquired with the help of the German development cooperation which provided the solar system and the Senegalese NGO ASACASE, which facilitated the access to micro credit in order to finance the solar mill as well as the participation of two women in a seminar about business management. The solar mill itself is a prototype.

Earning an income is a major concern for the women, firstly in order to improve their living situation, secondly in order to fully fulfill their role as a woman and to become, in their eyes, equal to their husbands. A woman who is not providing or is not trying to provide an additional income to the household is often considered lazy:

‘Why did we [women] come together and found a group? Well, if I am a woman who only sits at home, it is no use. A woman has to work like a man. Both of them have to work. So we work like men.’ Marie (59) chairwoman of the women’s group in Ngar Amadou Yassine

Ensuing from this point of view, small scale businesses opportunities such as owning a refrigerator or operating a solar mill enhance the status of the women within the household and the community thus meeting a strategic gender need. Even though the interviewed women did not yet earn any individual income, already the pursuit of an income generating activity influences their role within the household and makes them feel more valuable. This argument is also underlined by Haves (2012) who explains that earning money can also foster increased gender equality through women’s higher bargaining power and the challenge of sexual divisions of labor. Besides, taking up entrepreneurial activities may raise women’s self-esteem: The respondents argue that they feel more valuable within the household. Moreover, owning a fridge or operating a solar mill helps to acquire reputation within the community. In this regard, electricity meets a further strategic gender need. However, the case of the women’s group in Darou Djadji shows that Senegalese women face various social constraints related to their gender when it comes to female entrepreneurship, an aspect also stressed by Sarr (1998). While the mill is owned by the women’s group, it is operated and managed by the son of the village chief who had been operating a mill before. The village chief explains:

‘The women do not know how to operate the mill. They do not know how this machine works /.../ Of course we could teach them how to operate it but they [the women] do not have the time to operate and manage a mill.’

Unfortunately, it was not possible to discuss this aspect in detail as the village chief was present during the focus group discussion and further discussion would have put the women in an uncomfortable position. Still, observations during the fieldwork in general and the focus group discussion in specific concerning prevalent hierarchies and women’s behavior towards men could assess a high degree of respect and recognition if not appreciation of male authority. It can therefore be assumed that the women’s group in Darou Djadji accepts and might even agree with the village chief’s choice to install his son as the mill’s operator. Also, potential opposition would probably not be declared in public and thus remains hidden from

this research. Thus it is open for discussion whether the solar mill actually addresses a strategic gender need by increasing women's self esteem or – on the contrary – whether women's self esteem has been decreased by pointing out women's marginalization in decision-making. Senegalese sociologist Fatou Sow (2004) describes this as the contradiction between women's central role in social terms in family and community and her marginalization in decision-making.

4.5 Access to Information and Entertainment Devices

Access to radio and television is generally valued for leisure and entertainment purposes but can also contribute to a high degree to broaden horizons as well as to increase awareness and knowledge in remote rural areas. While there are acknowledged negative effects of especially television, radio and television often represent the only information devices in rural areas where illiteracy rates are high and access to internet or newspapers is rare. Therefore the educational and entertaining role of television and radio should not be underestimated (Barnes and Sen 2003). Access to information devices also reduces women's dependence on men for information. Additionally, access to a source of information can induce more informed and aware women and might stimulate the wish for more knowledge and education among others. Especially television may entail women being more aware of their rights and may change their opinion about their own role in society due to different roles of women presented in television (Haves 2012). Access to such information and entertainment devices can thus meet strategic gender needs.

The majority of the women in this study have access to a radio and one third has access to a television but it is not necessarily them who use the television or radio the most. Since women don't have much leisure time, it is rather male household members or the household as a whole who profits the most from a television. Often, it is a man who owns the television and has it in his room. Still, women do profit from the access to a television at night when they have finished with their chores.

Regarding the access to a radio, it is the women who profit – if not the most than – at least as much as the other household members. This is due to the fact that in contrast to televisions, radios are possessed by men as well as by women. Hence, in this connection gender differences could not be observed. As a radio can naturally be listened to not only by one but by several persons, it is not only the owner but the whole household who profits. And since

women's work centers around the house, it provides them with the possibility to listen to the newscast or music while doing their chores.

In this study, both radio and television are used for entertainment purposes and information retrieval: Televisions are used to watch movies, TV shows or religious broadcasts but mostly to watch the newscast. Similar patterns were detected with regards to the radio, where listening to the newscast ranks highly above listening to music. While this can be interpreted as a sign for more informed and well-versed women, one must be aware that interviewees might tend to responses that depict them in a positive way. Interviewees might also give replies that they think the researcher wants to hear. Both of these answer behaviors can influence the validity of the data (Mikkelsen 2005). In order to prevent such falsifications, a question about the women's awareness of the current crisis in Mali was asked, which had just come to worldwide attention due to France's intervention. Although the events in Mali are not necessarily a national Senegalese issue, the discussion of a Senegalese military intervention and the general situation in Mali were omnipresent in the news. Therefore, the awareness of the crisis in Mali was used as an indicator as to what extent radio and television were used as a source of information. Interestingly, a smaller number of women than the number of those who stated to use radio and television for information retrieval was aware of the current situation in Mali. However around one third of all interviewed women knew about it, still constituting a significant number. All women being aware of the Malian crisis had gained this information through the radio, not the television. This can either be due to the fact that in women's daily life and working routine, radio is more accessible than television, as outlined above. It might also be based on the fact that as a tool for gathering information, radio was mentioned more often than television, thus television is rather used as an entertainment device and whereas radio is used more as an information device.

In order to investigate the different purposes and utilization of information and entertainment devices in more detail, further research is needed. It also goes beyond the scope of this study to analyze to which extent women's perceptions of traditional gender roles are changed by the media and which additional factors besides information devices play a role. Nevertheless, the data allows for the conclusion that radio and television address to a certain degree strategic gender needs: Women having access to radio or television expressed rather untraditional views about women's role within the household and the Senegalese society. Respondents explained that both husband and wife need to contribute to the household's income. Except for work on the fields, which women argued was too hard for women, women felt that they

can assume the same tasks as men in the professional sphere. In order to do so, various women also acknowledged that women had to receive the same education as men. These findings are line with results from other studies focusing on the impacts of television and radio on women's attitudes and perception such as Barkat et al. (2002), Chong and Ferrara (2009), Jensen and Oster (2009) and Matly (2003). Still, the role of other influencing factors besides information devices needs to be further analyzed. The limited scope of this study does not allow a comparison between women with and without access to information and entertainment devices. However, it cannot be disputed that television and radio provide respondents the possibility to obtain news beyond their village and community and establish links to the outside world.

4.6 Facilitated Use of Cell Phones

Apart from information and entertainment devices, electricity can provide women with an improved access to communication devices such as cell phones. As cell phones need to be charged, access to electricity is essential. All respondents of this study have access to a cell phone, but only half of them possess their own one. The other half uses a cell phone from another household member if necessary. The majority of the women had their own cell phone already before gaining access to electricity. Even though electricity was not a trigger to buy a cell phone, it crucially improved the usage of it: Whereas without electricity, the owners of cell phones had to reach the approximately five or eleven kilometers⁹ distant town Guinguénéo, a town with access to electricity, or send it with someone else in order to charge the cell phone, now charging can be done at home. With regards to women's workload and the therefore limited time, this is a particular relief. Through the access to electricity, the women's living situation was improved and thus a practical gender need is met.

The interviewed women use cell phones for communication purposes but not for mobile banking such as cash payments which is common in Senegal (Ondiege 2010). It is sometimes assumed that cell phones can meet productive gender needs by providing phone services or cell phone charging stations (UNDP 2004). In the study at hand, phone services or the charging of cell phones is not considered as a possible income generating activity: Aïssatou (30) laughs and explains:

⁹ Around five kilometers from Ngar Amadou Yassine to Guinguénéo. Around eleven kilometers from Darou Djadji to Guinguénéo.

‘When neighbors who do not have electricity at their home bring their cell phones to my house in order to charge them, I do not ask for money, I do it for free. Here in Senegal we are nice to each other.’

To sum up, for Aïssatou and the other women, electricity facilitates the charging of cell phones and thereby facilitates the communication and contact to relatives or friends living elsewhere. Electricity thus meets a practical gender need. Moreover through the facilitated use of cell phones, electricity addresses strategic gender needs by increasing the possibility to gain access to information via cell phones.

4.7 Greater Mobility through Electric Street Lighting?

Women’s mobility in Senegal is in general more restricted than men’s and in very traditional communities, women leaving their house for reasons other than daily chores are viewed poorly (Sarr 1998). At daytime, the interviewed women leave their house mostly for chores such as drawing water from the well, working on the fields, collecting firewood in the forest and going to the market. Additionally, respondents cited non-daily activities such as visiting neighbors and family, reunions and ceremonies. Concerning women’s nighttime activities, some studies identify electric street lighting as an important factor influencing women’s behavior at night by providing more security and thus increasing their mobility (Barkat et al. 2002; Cecelski 2004; Köhlin et al. 2011). Through greater mobility, existing gender roles in rural Senegal can be challenged and strategic gender meets could be met.

The study at hand was able to draw a comparison between women’s nighttime activities with electric street lighting in the villages and without electric street lighting in the villages as at the time of the field visits, the electric street lighting in both villages was not working anymore since two months. However, no considerable behavioral changes could be determined. Almost all women leaving the house at night when there still was electric street lighting also went outside after dark when the electric street lighting was not working anymore.

Nighttime activities include drawing water from the well, going to the local store and participating in ceremonies. Some women stated to conduct such activities at nighttime only when considered necessary, otherwise they try to avoid leaving the house after dark. Other women completely reject the idea of leaving the house after dark:

‘A woman should not leave the house after dark. It is not proper. She has to finish her tasks during the day in order to prevent going out at night.’ Aïssatou (32).

Around one third of the women in this study stated that electric street lighting contributes to their feeling of security. According to them, with electric street lighting there were fewer robberies, children could play outside after dark and one could see the people passing by. A study conducted by Bensch et al. (2012) in the Southern part of Senegal investigated how access to electricity affects security attitudes and nighttime activities in rural areas. However, Bensch’s et al. (2012) findings show that there is no clear indication that electric street lighting reduces the probability of being robbed. Bensch et al. (2012) endorse the assertion that nighttime activities among women do not differ with or without public electric lighting. As the study at hand equally cannot identify greater mobility of women due to electric street lighting, it can be concluded that strategic gender needs are not met through electric street lighting. Still, electric street lighting increases women’s perceived and subjective feeling of security which is nevertheless important and can be interpreted as meeting practical gender needs. While women still behave according to their traditionally defined gender roles which in this case means not to leave the house, electric street lighting still provides a better living environment thus meeting a practical gender need.

Chapter 5: Conclusion

While the importance of access to electricity is recognized by the international community, 1.3 billion people still lack access to electricity (IEA 2012; UN 2005, 2010). In Senegal, there is an ample need for electrification in rural areas as well as for an enhanced integration of gender aspects in energy policies and programs (Diagne Gueye 2007; World Bank 2013). The integration of gender aspects within rural electrification programs and policies is crucial in order to meet the energy needs of both women and men as access to electricity impacts them differently (Cecelski 2005; Clancy et al. 2003; Parikh 1995). The question of electricity’s impacts on women’s needs is critical and neglected in both policy and program approaches as well as in current research (Cecelski 2004). There is a need for scientific research focusing on women’s benefits from access to electricity and on the linkages between electricity and gender (Haves 2012; Köhlin et al. 2011). The study at hand therefore explored the question of

electricity's impacts on women's practical, productive and strategic gender needs in order to contribute to a better understanding of the linkages between electricity and women's needs. In the following, the research's findings will be summarized and structured according to their practical, productive or strategic use.

Findings show that electricity meets practical gender needs through the access to electric grinding machines which reduce women's manual labor and improve their working conditions. Access to electricity further addresses a practical gender need by providing electric lighting that facilitates the processing of groundnuts and bissap at night, a work conducted by women especially during harvest. With regards to such nighttime activities, the question of electric lighting prolonging women's working day has been analyzed. Concerning the processing of the harvest, it can be concluded that this is a task that women have to conduct with or without access to electric lighting. By providing better lighting and thus accelerating the process, electric lighting improves women's working conditions at night. Further, electricity improves women's living conditions by providing the possibility of having one's hair braided at night. As Senegalese society expects women to look impeccable especially during ceremonies, women spend a large amount of time on their looks. Electric lighting provides the possibility of getting one's hair braided at night, which is a great relief for women who usually have very little time during the day. In this regard, electric lighting addresses a further practical gender need.

Moreover, electric lighting addresses practical gender needs by providing more light than kerosene lamps, candles or torches and by representing a source of security and comfort. Thus it improves living conditions at home. In one case, electric lighting facilitates a woman's work in the village health center and consequently addresses a practical gender need. However, the interviewed women give the practical gender need for electric lighting in the kitchen less priority than the need for electric lighting in the other rooms. Aiming to enhance the education of their children, women prefer installing electric lighting in the rooms instead of the kitchen. Additionally, the women are accustomed to dark kitchens and simply relocate major parts of the food preparation outside in order to spend less time in the dark. While the women affirm that there is a practical gender need for electric lighting in the kitchen, other needs are of higher importance to the respondents.

In the study, practical gender needs are also met through the provision of cold beverages, ice cream and ice cubes. Without access to electricity, cooled drinks or cooled food was not

available in the village. Considering the high temperatures in Senegal, the access to a refrigerator improves women's living conditions considerably. Besides, electricity facilitates the use of cell phones, namely the charging of cell phone batteries. Without access to electricity women were forced to walk, take the horse cart or send their cell phone to another town with access to electricity, approximately five kilometers away from Ngar Amadou Yassine and around eleven kilometers away from Darou Djadji. Regarding women's daily workload and limited time, electricity thus addresses a practical gender need.

While different studies underline street lighting's influence in increasing women's mobility (Barkat et al. 2002; Cecelski 2004; Köhlin et al. 2011), findings from the study at hand could not determine considerable changes in women's nighttime behavior. While respondents attribute a higher feeling of security to street lighting, Bensch et al. (2012) could not find any clear indications for an increased security situation in Senegalese villages with street lighting. It is therefore concluded that electricity is contributing to a subjective feeling of security and a better living environment and hence addresses a practical gender need.

Further, electricity has the potential to meet productive gender needs by enabling circumstances that allow the uptake of entrepreneurial activities. In the study at hand, income generating activities such as the operation of a solar mill and the sales of cold beverages and ice cream out of a refrigerator are analyzed. The two women's groups in this study were able to commence such income generating activities; however the fulfillment of the women's productive gender needs is affected by high illiteracy rates, high investment costs, the lack of business skills and technical knowledge as well as high running costs.

In a few exceptions, electricity addresses productive gender needs by providing electric lighting that allows the conduction of income generating activities in the evening such as sewing bed sheets or the processing of cereal. However, the majority of the interviewees indicate that only little or even none of the agricultural yields is sold. During the time of ceremonies, electric lighting allows women to conduct income generating activities such as hair braiding. While this does prolong women's workday, it also provides them with an opportunity to earn money. Since women highly value possibilities to contribute to the household's income, it can be concluded that in this case, electric lighting is rather appreciated for meeting productive gender needs than disapproved for prolonging the working day.

Findings also show that electricity meets strategic gender needs to some extent by providing access to information and entertainment devices, in this case television and radio. While the limited scope of this study does not allow for a deeper analysis of the linkages between information and entertainment devices and women's attitudes, the findings point to a positive influence of television and radio with regards to traditional gender roles. Women with access to radio and television claim equal access to education and to the professional sphere for both women and men. Not only information and entertainment devices, but also communication devices such as cell phones enable access to information, thus addressing a strategic gender need too.

It was found out that income generating activities do not only have the potential to meet productive gender needs but also address strategic gender needs. Findings show that women providing or trying to provide an additional income to the household feel more valuable within the household and consider themselves more equal to their husband. Further, their decision-making power and their self-esteem may rise. However, women also face various constraints regarding their role as entrepreneurs. In the case of the women's group in Darou Djadji, women own but do not manage and operate the solar mill themselves. In this case, it is doubtful if their self-esteem was increased since apart from owning the mill, their participation and decision-making power is rather limited.

As the overall findings indicate, the different aspects of access to electricity cannot be clearly identified as meeting either a practical gender need, a productive gender need or a strategic gender need. Often, one facet of electricity addresses more than one gender need. Besides, findings indicate that electricity addresses above all practical gender needs. This can be attributed to the fact that women's most urgent concerns revolve around those needs. A further reason is the fact that the satisfaction of productive and strategic gender needs also depends on external factors such as business skills, investment costs, technical knowledge, illiteracy rates and the prevalence of strong traditional gender roles. A special meaning can also be attributed to electric lighting as it addresses various gender needs. This is due to its high availability (all visited households possess at least four lamps) and due to the fact that other electronic equipment such as refrigerators, solar mills, televisions or radios require larger purchases. Altogether, access to electricity has a vast potential to meet women's gender needs and it is therefore essential to understand women's different gender needs in order to realize a successful implementation of rural electrification.

I want to conclude with a quote from natural resource economist Michel Matly underlining the importance of women's needs and their role within rural electrification:

‘That understanding women's desires is useful in setting up appropriate electrification strategies and programmes is a view that nobody will oppose, either by conviction or by courtesy. However, the message to get across /.../ is that building up electrification programmes that give access to both energy and to appliances, and that involve women in all steps and at all levels of the process of electrification are two indispensable factors in creating success /---/ The key factor is to involve more women, not as a general equitable measure, but of necessity.’
(Matly 2005: 68-70)

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Appendix

Appendix I: Details of Solar Home Systems and Mini Grids

The following information was retrieved during a discussion with a representative of the electricity operator of Ngar Amadou Yassine and during the interview with an expert on rural electrification from PERACOD.

In Ngar Amadou Yassine, a mini grid has been installed. A mini grid is a set of solar panels and an energy storage system which are interconnected to a distribution network supplying electricity to customers. The GIZ's mini grids in Senegal are PV-diesel hybrid mini-grids which means that power is generated through the use of photovoltaic (PV) modules and a supplementary diesel generator. The PV modules generate electricity when the sun is shining, and the electricity can either directly power appliances or be stored in the battery bank. When there is no sunshine, e.g. at night or during cloudy days, the stored energy is used. In order to assure power at any time, a diesel generator is added to the system, making it reliable. The mini grids installed in Senegal by the GIZ offer four different power levels, of which three of them were present in Ngar Amadou Yassine: Level (1) can power four light bulbs, a radio, a phone charger and a black and white television. Level (2) can power seven light bulbs, a radio, a phone charger, a color television and a ventilator. Level (3) was not existent in Ngar Amadou Yassine and level (4) can power fourteen light bulbs, a radio, a phone charger, a color television, a ventilator and a refrigerator or a freezer. The subscriber pays 20,000 FCFA for the installation (around 30.50 Euro) and a monthly fee of 3,600 FCFA (around 5.50 Euro) for level (1), 6,200 FCFA (around 6.50 Euro) for level (2) and 16,800 FCFA (around 25.60 Euro) for level (4).

In Darou Djadji, individual solar home systems have been implemented. A solar home system is a solar panel that is installed on the subscriber's house and has enough power for four light bulbs, a radio, a phone charger and a black and white television. The subscriber pays 20,000 FCFA for the installation (around 30.50 Euro) and a monthly fee of 3,600 FCFA (around 5.50 Euro) to the operator since the subscriber does not own the solar panel.

Appendix II: Interview Guide for Respondents from Electrified Households

The following interview guide provides an overview of the topics covered during the interviews. Questions were adapted to each situation. Some questions were changed from open-ended questions into closed questions so that the respondents could understand the questions more easily. In such cases, follow-up questions were asked, such as How and Why questions.

Personal Details

- 1) Age
- 2) Marital Status
- 3) Education
- 4) Children
- 5) Role and responsibilities in the household

Electricity

- 6) Electricity level of the household
- 7) Did electricity change your living and working situation?
 - a. How?
- 8) What are the advantages of having electricity?
- 9) What are the disadvantages?
- 10) How do you use the light during evening hours?
- 11) Has the access to electricity enabled you to pursue income generating activities?
 - a. How?
- 12) Do you have access to a radio, TV or cell phone?
 - a. How often do you use them?
 - b. To what purposes?
- 13) Who uses a TV/ radio the most?
- 14) Do you have more time now that you have electricity?
 - a. Why?
 - b. How do you use it?
- 15) According to you, who benefits the most from access to electricity?
 - a. Why?

Participation and Mobility

- 16) Do you participate in village meetings, evening classes or women's group meetings?
 - a. Why?
 - b. What is your role?
 - c. Can you describe the group's activities?
 - d. How often do you meet?
- 17) Did you participate before having electricity in the village/ at home?
 - a. Why?
- 18) For what purposes do you leave the house?
- 19) What did change when the street lighting was still working?

Gender Roles within the Household

- 20) Who contributes to your household's income?
- 21) Who controls/ manages it?
- 22) Can you describe a typical day of yours?
 - a. How was it before having access to electricity?
- 23) If you could change one thing in your life, what would you change?
- 24) Who takes the decisions about...
 - a. taking the children to the hospital if sick
 - b. buying food
 - c. larger purchases
 - d. education of the children
- 25) Do your/ Does your daughter(s) go to school?
- 26) What are the characteristics of a good husband and a good wife?
- 27) What means gender equality for you?
- 28) Do you think that life is easier for men or for women?
 - a. Why

Appendix III: Interview Guide Expert Interview 1

The following interview guide was used during the interview with an expert on rural electrification of PERACOD.

- 1) How are the villages for rural electrification programs identified?
- 2) Could you explain the different electricity levels to me?
- 3) Are there many women's groups conducting income-generating activities through electricity?
- 4) How are they approached?
- 5) How much did the refrigerator in Ngar Amadou Yassine and the solar mill in Darou Djadji cost?
- 6) How did the women's groups finance them?
- 7) Is there a large demand for such income-generating activities?
- 8) How are the households wishing electricity identified?
- 9) Do you assemble the inhabitants of villages for information purposes? Do women participate?
- 10) Why are lamps usually installed above the door?
- 11) What do you think are the reasons for the lack of lamps in the kitchens?
- 12) Usually, to whom do you talk to in the households wishing to be electrified?

Appendix IV: Interview Guide Expert Interview 2

The following interview guide was used during the interview with an expert on gender equality in Senegal. The expert is a known Senegalese sociologist focusing on gender research.

- 1) How is gender equality defined in Senegal?
 - a. Are there differences with regards to men/women and rural/urban areas?
- 2) How is gender equality presented in the media?
- 3) Why do so many women reject the idea of gender equality with regards to domestic chores?
- 4) How did former president Wade's law on gender equality influence the understanding of gender equality within society?
- 5) This law focuses on the political sphere. Are there further strategies or initiatives on gender equality focusing on other spheres?
- 6) Are there any differences regarding the engagement towards gender equality between former president Wade and current president Sall?
- 7) Would you say that the Islamic religion influences the pursuit of gender equality?
 - a. If so, how?
- 8) What role do the Senegalese traditions play in the pursuit of gender equality?
- 9) A working women in Senegal – is she appreciated by Senegalese society?
- 10) How would you describe the role of women within Senegalese society?
 - a. Are there differences between rural and urban areas?
- 11) How would you describe the gender relations between men and women in Senegal?
 - a. Are there differences between rural and urban areas?
- 12) How much decision-making power do women have within the household?
- 13) Have there been recent changes with regards to women's traditional role and responsibilities?

Appendix V: Main Characteristics of Respondents from Electrified Households

The following table outlines the main characteristics of the respondents from the visited electrified households. In order to guarantee full anonymity, the changed names used for the quotations within the study are not used in this table. With a limited amount of electrified households in the villages and the here mentioned characteristics, it would be possible to identify the real identities of the quoted woman.

	Age	Marital status	Number of Children	Electricity level of the household	Member of a women's group
Respondent 1	27	Married Only one wife	4	Level 1	Yes
Respondent 2	15	Married Only one wife	0	Level 1	No
Respondent 3	50	Married 1 st out of 2 wives	9	Level 1	Yes
Respondent 4	30	Married Only one wife	1	Level 2	Yes
Respondent 5	27	Married 1 st out of 2 wives	0	Level 2	Yes
Respondent 6	35	Widow 4 th out of 4 wives	4	Level 2	Yes
Respondent 7	27	Married Only one wife	3	Level 4	Yes
Respondent 8	32	Married 1 st out of 2 wives (2 nd wife died)	6	Level 4	Yes
Respondent 9	50	Widow 2 nd out of 4 wives	5	Level 4	Yes
Respondent 10	40	Married 2 nd out of 2 wives	5	SHS (=Level 1)	Yes
Respondent 11	25	Married Only one wife	4	SHS (=Level 1)	No
Respondent 12	56	Married 1 st out of 2 wives	6	SHS (=Level 1)	No
Respondent 13	30	Married 2 nd out of 2 wives	4	SHS (=Level 1)	No
Respondent 14	17	Married Only one wife	1	SHS (=Level 1)	Yes
Respondent 15	40	Married 4 th of 4 wives	6	SHS (=Level 1)	Yes
Respondent 16	60	Married Only one wife	8	SHS (=Level 1)	Yes
Respondent 17	60	Married 1 st out of 4 wives	5	SHS (=Level 1)	Yes