

RA2 - Productive Uses of Energy: The Informal Food Sector in South Africa, Rwanda and Senegal

Scoping study report – 2015

Lead Organisation: University of Twente

Partner organisations: University of Cape Town; MARGE; ENDA
ENERGIE



Summary

This report represents the Scoping Phase (Phase 1) of RA2 – Productive uses of Energy, of the Gender and Energy Research Programme, which applies a gender perspective to explore: (i) the energy sources used by micro and small enterprises in the informal food sector; (ii) the changes that may be brought by use of modern energy services (MESs) both within the enterprise itself and at household level; and (iii) how energy changes in enterprises influence economic and social empowerment of both men and women.

Phase 1 of this research employed a mixed methods approach in Rwanda, Senegal and South Africa, involving: 1) a literature review covering energy, the informal food sector, gender, and relevant policies; 2) a questionnaire survey of enterprises in the informal food sector; and 3) in-depth interviews with enterprise owners or employees. The key findings of Phase 1 include:

- The literature review, which explored the energy and gender dimension of entrepreneurs in the informal food sector in the study sites and beyond, finding that despite the relatively high number of studies on the informal food sector and particularly on street there is hardly discussion on gendered energy use. In addition, survivalist versus growth-oriented approaches were identified as important concepts for exploring the informal food sector, entrepreneurship and empowerment.
- The questionnaire survey and in-depth interviews, which explored a range of questions regarding enterprises, their production, energy use, and empowerment, established that informal enterprises depend on a wide range energy sources, and are faced with accessibility, and affordability issues.
- The scoping research confirms that energy use at home does contribute to the enterprise in a number of ways – such as use of appliances that were originally intended for household use only.

The final section of the report sets out the proposal for Phase 2 of the research, and incorporates lessons learnt from the Scoping Phase. Phase 2 will consist of a larger-scale survey (450–600 enterprises), combined with in-depth interviews (from 60–90)¹. The data analysis framework, and to explore women's empowerment through energy access, will employ the empowerment framework with a focus on: economic, social, political and psychological dimensions of empowerment. To measure women's empowerment, Phase 2 will employ objective and subjective indicators both qualitative and quantitative, to capture both internal and external transformation.

¹ Based on feedback received from various reviewers, the research team has decided that data collected during the Scoping Phase should be analysed further before collecting more data. The Scoping Phase did not provide sufficient time for an intense data analysis process and this made it difficult to identify and explore all the data while identifying data gaps.

Colophon

Scoping Study Report: Research Area 2 - Productive Uses of Energy, ENERGIA GENDER AND ENERGY RESEARCH PROGRAMME; Building the evidence base for improving energy interventions' effectiveness by taking a gender approach

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Abbreviations

AfDB	African Development Bank
ANC	African National Congress
ANDS	Agency of Statistics and Demography (Senegal)
APAAS	Association Planet Assistance et Aide Sociale
CJMC	City of Johannesburg Metropolitan Company (South Africa)
CoCT	City of Cape Town
CJMC	City of Johannesburg Metropolitan Company
DFID	Department for International Development (UK)
ENDA	Environment Development Action, based in Senegal
ENSIS	National Survey of the Informal Food Sector (Senegal)
EU	European Union
FAO	Food and Agriculture Organization
GDP	Growth Development Product
IB&C	Inclusive Business and Consultancy Ltd. (Rwanda)
IFS	Informal Food Sector
ILO	International Labour Organisation
JFPM	Johannesburg Fresh Produce Market
KZN	KwaZulu-Natal (province of South Africa)
LGP	Liquefied Petroleum Gas
MARGE NL	Consultancy firm in The Netherlands focusing on Energy, Environment and Sustainable Development
MES	Modern Energy Service
MSE	Micro and Small Enterprise
MSME	Micro, Small and Medium Enterprise
OECD	Organisation for Economic Co-operation and Development
PAHs	Polycyclic aromatic hydrocarbons
PAFA	Projet d'Appui aux Filières Agricoles – Agricultural Commodity Chain Support Project (Senegal)
PI	Principal investigator
POPAS	Platform of Professional Food Organisations in Senegal
RDB	Rwanda Development Board (Rwanda)
REG	Rwanda Energy Group (Rwanda)
RETs	Renewable Energy Technologies
RQ	Research question
SA	South African
SE4ALL	Sustainable Energy for All – United Nations Programme
SEP	Senegal Emergent Plant (Senegal)
SME	Small Medium Enterprise
SNV	International Development Organisation, based in the Netherlands
SPD	Sustainable development project
TAG	Technical advisory group
TOC	Theory Of Change
UCT	University of Cape Town
UN	United Nations
UNAFRES	Union des Femmes Restauratrices du Sénégal – Association of Restorer Women of Senegal (Senegal)

Glossary of key concepts

- Economic empowerment: bringing economic change for both men and women. Where women's economic empowerment is concerned it focuses on promoting and advancing women's economic activities, building their capacity in a bid to promote equality between men and women.
- Empowerment: Our definition of empowerment is not restricted to economic terms but considers empowerment that leads to transformations in gender roles and relations. Empowerment for our study considers the different positive impacts (at the enterprise and household levels) that are catalysed by the use of (modern) energy sources in the informal enterprises. These may include decision-making, mobility, increased productivity, ability to take care of household needs, etc. Our analytical framework includes economic, social, political and psychological empowerment which are some of the processes which our study aims to ascertain as outcomes of the use of MESs.
- Growth-oriented enterprises: These are the opposite of survivalist enterprises. They are registered, have better financial security to start and maintain an enterprise and don't depend on the poor market.
- Informal food sector: The definition of what constitutes the 'informal sector' has been subject of discussion over time. Here we take the definition based on the OECD Handbook,² where the informal sector is defined as comprising of enterprises not formally registered, which keep no accounts and, where people are employed in an enterprise but are not formally registered as employed (OECD, 2002). There are two main categories of enterprises within the informal sector: own account and informal employers.
- Informal enterprises: These are enterprises operating in the informal sector
- Modern energy services: These can be derived using electricity, Liquefied Petroleum Gas (LPG), Renewable Energy Technologies (RETs), clean and improved cookstoves, etc. For our study, MESs refer to services that can be accessed and used for cleaner and more efficient production, increased productivity, better quality of products, and less drudgery.
- Political empowerment: For our study this refers to political decisions and policies that promote gender equality. It also refers to the equal participation in political activities that lead to empowerment of men and women.
- Psychological empowerment: This refers to the 'feelings' of empowerment brought by the ability to make one's own decisions as a result of economic, social and/or political empowerment.
- Social empowerment: In our study social empowerment refers to the improved social status of men and women that may be brought by use of MESs in their informal food enterprises. Social empowerment may also lead to a 'sense of autonomy and self-confidence, and acting individually and collectively to change social relationships',³ which is an important aspect in addressing gender relations.
- Survivalist enterprises: These are necessity-driven informal enterprises found mainly in poor areas, operating on the side of the road without financial security to sustain the business. (Berner, Gomez, & Knorringa, 2012) observe that these are mainly operated by women.

² OECD Handbook: Measuring the Non-Observed Economy. (2002). Paris: OECD.

³ <http://www.gsdr.org/topic-guides/voice-empowerment-and-accountability/supplements/social-and-economic-empowerment/>.

Gender and policy - Definitions from Kabeer (1992) cited in (March, Smyth, & Mukhopadhyay, 1999, p. 21) Gender-aware policies: This type of policy recognises that women are, like men, development actors; that the nature of women's involvement is determined by gender relations which make their involvement different, and often unequal; and that consequently women may have different needs, interests, and priorities which may sometimes conflict with those of men. Within this category, Kabeer further distinguishes between gender-blind, gender-neutral, gender-specific, and gender-redistributive policies.

- Gender-blind policies recognise no distinction between the sexes. They make assumptions, which leads to a bias in favour of existing gender relations. Therefore, gender-blind policies tend to exclude women.
- Gender-neutral policies use the knowledge of gender differences in a given society to overcome biases in development interventions, in order to ensure that interventions target and benefit both sexes effectively to meet their practical gender needs. Gender-neutral policies work within the existing gender division of resources and responsibilities.
- Gender-specific policies use the knowledge of gender differences in a given context to respond to the practical gender needs of women or men; they work within the existing gender division of resources and responsibilities.
- Gender-redistributive policies are intended to transform existing distributions of power and resources to create a more balanced relationship between women and men, touching on strategic gender interests. They may target both sexes, or women or men separately.

1. Introduction

This report is divided into various sections that cover work completed during the Scoping Phase and plans for Phase 2. We first present the background of our study, which is largely based on the Scoping Phase research proposal. The background section outlines the questions that we had proposed to answer during this phase. The report also outlines the methodology used for the scoping phase and mentions the different approaches used depending on a variety of issues.

In Section 3, the report presents a literature review which provides secondary evidence of the issues surrounding modern energy service (MES) access and use by micro and small enterprises in the informal food sector (IFS) internationally and later narrows down to focus on our study countries. We view this literature review as work in progress as the team is working on improving the most relevant sections and presenting these in a journal article or two. Section 4 presents preliminary data analysis, which starts the process of responding to the research questions. One of the best achievements for our research team was the data-collection process, which has allowed us some insight into this research area, therefore enabling us to prepare better for Phase 2. In Section 5, the report gives some idea on plans for Phase 2 of our research. This section is also work in progress and should be regarded as a proposal that will be influenced by the outcomes of further scoping phase data analysis, which now forms part of Phase 2.

2. Background and methodology for Scoping Phase

2.1. Background

Our research focuses on the productive uses of energy in the informal food preparation and processing sectors in enterprises broadly classified as micro and small. For purposes of our research study, we define micro and small enterprises as informal enterprises informally employing⁴ one to five people at any given time. These enterprises have little capital to cover their costs and most do not benefit from the micro-finance schemes because of their informal nature. In our research we focus on the food preparation (mainly cooking) and some processing micro and small enterprises in the urban areas⁵ of three countries – Rwanda, Senegal and South Africa. This choice of focus is due to strong gender and development arguments around the IFS in developing countries, which are currently of interest to policy makers. It is a sector where available data suggests that women are strongly involved in management and decision-making positions in own-run enterprises or those they are employed in. The choice for urban areas in these countries is influenced by the fact that locations within and surrounding the cities in developing countries, are likely to have better access to MESs compared to the peri-urban and rural areas. Urban areas in developing countries are also viewed as locations where people can seek income-generation activities.

The project applies a gender perspective to explore the energy sources used by micro and small enterprises in the food sector, changes that may be brought by use of MESs within the enterprise itself and in the household of the enterprise owner or employee (where these changes may be reflected). The project also assesses the extent (if any) to which these energy-use changes in enterprises influence the economic and social empowerment of both men and women. For our research we define empowerment as a process that leads to transformations in gender roles and relations (Clancy et al,

⁴ In most cases micro and small enterprises, employees tend to be relatives of the enterprise owner and may be paid in cash or in kind.

⁵ For our research, we define urban areas as locations within and surrounding the major cities in the research countries. These cities are also characterized by high formal and informal economic activities.

2002; Cabraal et al, 2005; Dejene, 2007). We also use both quantitative and qualitative methods to test a number of the assumptions and hypotheses derived from the theory of change (TOC) as well as looking at the causal chain of energy supply and use. The use of qualitative and quantitative methods of data gathering includes (but not limited to) surveys, interviews, focus group discussions, observations, and stakeholder analysis. By using the TOC framework we explore the different levels of assumptions that are based on the anticipated impacts of improved access and use of MESs. For Phase 2 of the project, our TOC analytical framework is slightly altered, following some of the research results of the Scoping Phase.

Our research questions are based on the projects’ aims to explore whether improved access to MESs will lead to overall improvement of women-owned enterprises and therefore lead to overall economic empowerment for women and men. Our vision also takes into consideration the importance of influencing policy at different governance levels, especially the local level of government to lean more towards the provision of these MESs in order to improve the informal food preparation and processing sector.

2.2. Scoping Phase methodology

Our research employed a mixed methods approach involving both qualitative and quantitative gender data collection and analysis. Detailed explanation of the methods applied in the study is outlined below.

Sampling

During the Scoping Phase we used stratified sampling to select our enterprises to ensure that we capture the both types of women and men-owned informal food enterprises. Our sample of respondents consists of an unequal number of male and female enterprise, which we believe is a true reflection of the IFS in South Africa, Senegal and Rwanda. The enterprises and respondents were selected through a multi-stage sampling approach where we clustered the sample by country, city and location. This was followed by a systematic sampling approach to conveniently select and sample a wide range of enterprises. Here the location refers to the cities (see Table 1) and their sub-locations. Within the sub-locations we selected different types of enterprises such as street vendors, home producers and enterprises in public transport places, etc. In the informal sector, selection on the basis of turnover is considered not possible since informal sector enterprises do not usually keep a set of accounts that would provide a means of identifying flows of income and capital (OECD, 2002).

Main cities / locations	South Africa	Senegal	Rwanda
	Cape Town	Dakar	Kigali
	Johannesburg	Kaolack	Kigali
	Durban	Saint-Louis	Nyamata

Table 1: Research study locations

In each country, over 60 micro and small enterprises were surveyed, including in-depth interviews. The enterprise selection was also meant to display the different levels of informality of these enterprises and to show how survivalist enterprises operate, which will enable us to contribute to the business development discourse.

Data collection

We collected data using both qualitative and quantitative approaches in order to allow for triangulation and data validation. The following methods were used to collect data from informal food vendors in South Africa, Rwanda and Senegal:

- semi-structured questionnaire (surveys);
- in-depth interviews;
- focus group discussions;
- key informants / stakeholders;
- document analysis (for literature review and to inform about stakeholders).

Semi-structured questionnaires

During this Scoping Phase, our research consisted of initial empirical gender-disaggregated data collection and analysis together with a detailed review of the literature. During this phase we mapped and identified enterprises in the IFS in South Africa, Rwanda and Senegal. Using a questionnaire with open- and close-ended questions, we interviewed over 60 enterprises in each country, and also interview five enterprises per country in-depth. Part of the methodology objective is to track the interviewed enterprises for the detailed monitoring during the entire research period. In the second phase of the project (year two onwards) we will increase these numbers to at least 250 (per country where possible) during the main data collection phase. More information on some of the planned Phase 2 data collection methods is outlined in Section 5.

During the Scoping Phase, the methodology was designed to answer five research questions which would provide us with data that would be our baseline for Phase 2. The broad research questions that we based our questionnaire on are captured in our proposal as follows:

Phase 1 (Year 1):

- i. Which energy forms are available for use by women in their enterprises?
- ii. How are energy supply chains organised? Are they gendered?
- iii. What are the characteristics of the energy forms?
- iv. Which appliances suitable for use in food preparation and processing in micro and small enterprises are available?
- v. How do policies and regulatory frameworks influence the productive uses of energy and the uptake of MESs in the food preparation and processing value chain?

In addition to these questions, we included questions that we had planned to ask in Phase 2 as per our research proposal. The reasoning behind this decision was that the information we get from these questions will inform our decision on how we include them in Phase 2 in order to receive valuable data. The questions asked are:

- vi. What are the impacts of access to MESs on enterprise development, output and/or quality of products and profitability for food preparation and processing on micro and small enterprises? Are there differences in outcomes for enterprises owned and operated by women and by men?
- vii. What contextual factors (income sources, culture, political leadership, policy and regulatory frameworks, institutional mechanisms and vulnerability) influence the uptake of MESs in the food preparation and processing value chain?

Scoping phase research questions	Data collection methods
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i. Which energy forms are available for use by women in their enterprises?	Survey
ii. How are energy supply chains organised? Are they gendered?	In-depth, focus groups, survey
iii. What are the characteristics of the energy forms?	Survey, in-depth, literature
iv. Which appliances suitable for use in food preparation and processing micro and small enterprises are available?	Survey, in-depth, literature
v. How do policies and regulatory frameworks influence the productive uses of energy and the uptake of MESs in the food preparation and processing value chain?	Document review, In-depth interviews, surveys
vi. What are the impacts of access to MESs on enterprise development, output and/or quality of products and profitability for food preparation and processing on micro and small enterprises? Are there differences in outcomes for enterprises owned and operated by women and by men?	In-depth interviews, surveys
vii. What contextual factors (income sources, culture, political leadership, policy and regulatory frameworks, institutional mechanisms and vulnerability) influence the uptake of MESs in the food preparation and processing value chain?	Document review, In-depth interviews, surveys

Table 2: Baseline research questions and methods

As a further breakdown of our base research questions, our data covers the following issues: (i) enterprise ownership; (ii) decision making; (iii) the amount of work (in time) that the enterprise requires – to measure drudgery; (iv) type of products produced; (v) type of energy sources used at the enterprise and at home; and (vi) regulations that govern the operation of enterprises; use (and aspirations to use) of MESs, both before and after (types of energy services). Where necessary, the research teams employed assistants for data collection, and consulted with key informants and gatekeepers for background information about specific areas and enterprises.

Questionnaire development process

One of the issues agreed upon by the consortium members was the development of a common questionnaire that would be used by all the partners in order to collect similar data, for ease of comparison. The questionnaire development process was initiated by the lead organization and the partners were invited to contribute their inputs. During this time we also received inputs from our pool of experts and project advisors on a number of issues key to improving our questionnaire. The questionnaire is designed to employ both qualitative and quantitative data collection approaches.

One of the significant suggestions from our advisor with expertise in entrepreneurship and business development was to use the concept of survival and growth-oriented entrepreneurs.⁶ Based on the study by Berner et al. (2012) the authors ‘typify the different rationalities of the two groups of entrepreneurs’ and argue that most interventions fail to address the needs of survival-oriented enterprises because they assume that all enterprises are growth-oriented. This is most common in the enterprises that are considered informal where policies and strategies are often developed to

⁶ See Table 3 for definitions of survival and growth-oriented entrepreneurs.

formalise such enterprises. Keeping this concept in mind while developing our questionnaire helped to include issues that would assist us in classifying whether the enterprises in our study were survivalist or growth-oriented. This would determine the way we approach data collection and analysis, especially with regards to issues pertaining production and profits. Berner et al. (2012) list the characteristics of survivalist and growth-oriented entrepreneurs.

Survivalist	Growth-oriented
Street economy, community of the poor, micro-enterprise, necessity-driven, informal, own account, proletariat, sub-subsistence	Small-scale family enterprise, intermediate sector, micro-enterprise, opportunity driven, petty bourgeoisie, micro-accumulation
Ease of entry, low capital requirements, skills and technology	Barriers to entry
Female majority	Male majority
Maximising security, smoothing consumption	Willingness to take risks
Part of diversification strategy, often run by idle labour, with interruptions, and/or part-time	Specialization
Embedded in networks of family and kin	Embedded in business networks
Obligation to share income generated	Ability to accumulate part of the income generated

Table 3: Characteristics of survival and growth-oriented enterprises

Source: Berner et al (2012)

A set of in-depth questions was also developed for some of the enterprises in order for us to understand more issues about their enterprises.

Links to the analytical framework

Our research questions also aim to prove the hypothesis made in our analytical framework, which relies on the use of TOC. To test the assumptions made about the impacts of MESs on the IFS, we framed our questions around the first level of assumptions as per our TOC analytical framework.

For activities under the Scoping Phase, question (vi) in Table 2 captures the assumed impacts of MESs the best. Based on this question, we developed a number of questions (see Annex 5 for the questionnaire and Annex 6 for the in-depth interview guide) to explore the different angles of impacts of MESs.

When we formulated our research proposal, we included several assumptions regarding the impacts of MESs on the IFS. The assumptions take the form of effects at different levels, depending on the type of impact made the energy service. For the Scoping Phase we concentrated on the first levels of effects and impacts that we thought would be brought by the MES in the informal enterprises we interviewed under our study during this phase. We wanted to find out if indeed MESs have these impacts on women- and men-owned enterprises, as well as finding the differences in impact. Part of the questionnaire therefore concentrated on questions about the impacts of energy services used by the enterprises. Where MESs are concerned, we would be able to prove or disprove the assumptions indicated in Table 4.

Assumptions about MESs	Assumptions about specific impacts on female- and male-owned enterprises
Cleaner and more efficient production / increased productivity	The enterprise ceases to use 'dirty sources'
Better quality products	Clean energy results in clean food products
Less drudgery	The enterprise is less dependent on traditional fuels
(Increased) sense of modernity	Modern energy use leads to improvements by the users

Table 4: Assumptions and impacts

As explained above, we have not exhausted the analysis of data collected during the Scoping Phase, which means that most of the questions formulated from these assumptions are not answered in this report. Phase 2 will therefore concentrate on strengthening Scoping Phase data analysis in order to answer these questions as well as identify the data gaps. With regard to the assumptions about MESs as stated in Table 4, through the initial data analysis we found that most may not apply to the enterprises we interviewed. In the case of efficient production and increased productivity, for some of the activities MESs did not necessarily add substantial value to the product sold by enhancing its taste or making it more attractive to purchase by the customers. Further analysis into these issues is underway and will be reported on as part of Phase 2. Part of the process of improving the Scoping Phase analysis in order to influence Phase 2 means using our current data to respond as much as possible to the assumptions in Table 4. Therefore, the proposal for Phase 2 will address ways to respond further to these questions and address the gaps identified during the process of analysing data from the Scoping Phase.

Causal chain: Fuel supply chain

Our data collection method of interviewing enterprises on site where they conduct their business allowed us to collect data that will inform our causal chain and enable us to map two types of chains: the fuel chains (potentially) supplying the selected type of IFS: woodfuel, LGP, kerosene, electricity, charcoal; and the supply chains of the IFS. At this stage we will answer research questions (i) to (iv). The answers here contribute to understanding the contextual factors.

In-depth interviews

The in-depth interviews were also conducted with informal food enterprises with similar circumstances as those interviewed with semi-structured questionnaires. The respondents for these interviews were selected in the similar way that was used to select respondents for the survey questionnaires with the purpose of having a flowing conversation about their enterprise activities. Up to five in-depth interviews were conducted in each country

Focus group discussions

The focus group discussions were held with groups of women who own informal food enterprises in Senegal. These discussions were held at the beginning of the project to assess some of the enterprise activities to determine whether they are suitable for our study.

Document analysis (secondary data)

In order to compile a detailed literature we collected information from secondary sources such as journals, international and national reports, policy documents, reports or case studies on programmes and project-related interventions and governing by-laws. Here we used a snow-ball method of 'data' collection where our starting point was a collection of key articles to perform key word searches and reference scans to find other relevant sources of literature. The team shared sources of local (country-specific) and international literature through a Dropbox folder for all members to access and exchange information.

Our literature review based on the secondary sources of information collected provides a synthesis of the existing knowledge of: (i) MESs in informal sector SMEs; (ii) gender in informal sector SMEs; (iii) informal sector micro and small enterprises; (iv) issues of empowerment in the informal sector as defined in our study; and (v) the gaps in the literature. We also explore the different country policies, laws and regulations as well as their impacts with regards to modern energy services in the IFS.

Contextual factors such as income source, dependency ratios, access to micro-finance, culture, policy mechanisms, political leadership, and vulnerability are analysed using a gender lens for each of the three countries in our study.

Key informants and stakeholders

As part of data collection, our research teams interacted with a number of key informants some of whom we see as doubling as stakeholders⁷ in our research. These key informants and stakeholders are in public and private organisations from a range of relevant sectors (gender and women, micro and small enterprises, energy, economic, food) at different levels (nation and local government), and will be interviewed to provide a more holistic understanding of IFS in particular and MSMEs in general. The information gathered from interaction with these actors is used to assess the gender awareness/approaches within sectors and organisations.

Limitation of methodology

Some of the limitations of our methodology for the Scoping Phase include the following:

- Not capturing the before and after the MES intervention: We asked a question that enabled us to capture the changes in use of different energy sources for the enterprise: 'Have you always used this energy source?' If the response was negative, follow-up questions were asked about the changes made and what influenced them. In Phase 2 this will be changed to focus more on comparing those with MESs with those without.

⁷ During this phase we defined stakeholders as individuals and organizations including government departments that we foresee making a contribution to our study through an exchange of information regarding the important elements of our study. During Phase 2, where relevant, we will strengthen the relationships with identified stakeholders.

- Not tracking the impacts of using MESs in the households of enterprise owners: This was mainly due to time restrictions on the research teams. Tracking the impacts at the household level requires observation of the enterprise owners' energy-use behaviour outside the enterprise-operating times. Our data for the scoping phase indicates that 51.3% of the female-owned enterprises use electricity in their households compared to 48.6% of male respondents. This is not a significant difference and it may indicate similar MES patterns for male- and female-owned enterprises. Only 4% of the respondents used LPG. In Phase 2, we will employ methodologies that enable us to interview and observe some home situations of entrepreneurs.
- The in-depth interviews yielded similar information to the surveys, as similar questions were asked. We had assumed that respondents would provide more in-depth information than was received from respondents approached with a structured questionnaire. Time limitations also played a role where the research team did not explore other methods of engaging the respondents besides spending time with them during their working hours. Part of the approach in Phase 2 will involve spending more time with a selected number of enterprises for interviews and observations.
- Cumbersome questionnaire development process: During the development phase of the questionnaire all our partners worked together to provide their input based on their knowledge of the research subject and the respective study countries. We also solicited advice from our project advisors and experts. With all the comments and suggestions, we reached a stage that made it difficult to include all the suggestions while trying to develop a concise questionnaire that would not be burdensome for the respondents. To ensure a smooth end to the process, the lead organisation visited the UCT partners to work together in collating all the contributions. This process took a week and included a continuous testing process of the developed instruments. For Phase 2, the survey and interview tools development will be more streamlined, by deciding with (and between) researchers and advisors the kind of data we would like to capture (e.g. economic input/output approaches, versus a more socio-economic approach).
- Some questions too rigid: Closely related to the previous point is the issue of rigidity of some of the questions. Some examples include questions about the number of items produced by the enterprise and the prices. Most of the entrepreneurs in our study did not keep records of such transactions and operated on a day-to-day basis which is influenced by a number of contextual factors. Not only was it very difficult to capture such data, there is a risk of some misrepresentation in a larger dataset.
- Multilingualism: The consortium works in diverse multi-cultural countries, which, although valuable for our research and especially for comparison purposes, posed several issues. For example, it presented a language challenge which we experienced with the translation of the questionnaire from English to the local languages such as IsiZulu, IsiXhosa, SeSotho and French. The questions had to be carefully rephrased to suit all research team's areas while at the same time not losing the core meaning and objectives of the study.

3. Literature review of the evidence and the latest developments on productive uses of energy

This literature review gives some background of the IFS beyond the present countries of research. It gives the lay of the ground and connects this to our research focus and the current state of IFS, energy use and its impacts on the gender dynamics specific to informal micro and small enterprises in the food sector. Another version of the literature review, intended for a journal article, will take a different form by focusing in-depth on the gender dynamics of the IFS and the use of MESs, identification of gaps in the existing literature, and to some extent touching on the influence of energy services on business development and how this separates the survivalists from growth oriented enterprises.

3.1. The informal sector and women

According to the ILO (2011), women outnumbered men as a percentage of informal workers (excluding agriculture) in over half of the 44 countries for which sex-disaggregated data was available. The African Union (2008) suggests that over 90% of new jobs in Sub Saharan Africa are generated in the informal economy. In the Southern African region, after agriculture, the informal economy is the most important source of employment, providing 72% of employment (Charmes, 2012) and varying depending on economic and cultural factors, as well as spatiality. However, participation in formal and informal sector has a distinctive gender characteristic: women are almost twice as likely to be in the informal sector than men. This indicates that the informal sector can and does play a critical role in economic empowerment of women. In a study of 11 cities – eight in Africa, two in Asia and one in Latin America – WIEGO (2012) found that in all the cities, women are more likely than men to be employed in the informal sector. A World Bank study reveals that the informal sector ‘is said to generate 97% of the job creation’ in Senegal and ‘represents 12%’ of the GDP.⁸

Gender differences do not just exist between the informal and formal sectors but also within each of these sectors. In the informal sector, men tend to be more involved in ‘technical’ trades such as selling mobile telephones and accessories, undertaking car and machine repairs, while women tend to engage in retail (e.g. selling garments) and services related to their gendered roles in the household domain. Women are therefore concentrated in domestic work, food processing and preparation, and health and education services. In Zimbabwe for example, an estimated 80% of women in non-agricultural enterprises were involved in brewing beer, while men were smiths, brick-makers, and builders, according to a study by Scott (1995).

In addition to subsector categorisation, informal enterprises are also differentiated by the growth and exit potential of their business. These categories include high-growth at one end of the spectrum and survivalist at the other end. From a gender division perspective, women tend to dominate the survivalist category, and as such their enterprises tend to be vulnerable to economic shocks and most likely vulnerable to restrictive regulations. In terms of motivation for starting a business, women – especially poor women – are more likely to report starting a business out of necessity (to address household poverty) than men (Clancy, 2006; Berner et al. 2012; Dejene 2007).

Such factors make the informal sector an interesting area for academic study as well as for developmental interventions, especially for those interested in women’s welfare and empowerment. A number of reasons have been suggested for women’s high levels of participation in the informal sector, including the fact that informal work accommodates women’s household chores and responsibilities (Maloney, 2004; Kabeer, 2008). Other authors have suggested that the informal sector has fewer barriers to entry, such as regulations on registration, capital requirements and need for certain skills (Vossenber, 2013).⁹ One informal sub-sector in which women dominate is the food

⁸ Rapport No. 40344SN A la Recherche de l'Emploi - Le Chemin vers la Prospérité Banque mondiale (Septembre 2007) page 11

⁹ Despite women dominating the informal sector, they still face more challenges than men in operating their businesses. These challenges are not just different in their degree or intensity but also in their scope. For example, women are more likely than men to be asked for

processing and preparation sector. Even in countries where women typically do not work outside the home for religious and/or cultural reasons, women tend to be involved in the IFS by either selling their products from home or being behind the 'male face' of the business, processing and cooking food at home, while male relatives and/or business partners sell it in the public sphere. This makes the IFS a particularly interesting subsector where women's economic empowerment is concerned.

This section reviews the studies available on the IFS in order to assess what areas of study have been addressed. It first addresses the question of what the informal food sector is and its importance as an area of study. It then identifies relevant studies, their focus and the resulting gaps in the literature. It then considers the importance of MESs for the IFS in terms of social, productive and strategic needs. Then, before reviewing the policy environment which affects the IFS in different countries, this section highlights the evidence for women's empowerment linked to MES in the IFS.

3.2. Types of enterprises in the informal food sector

The term 'informal sector' means different things in different context. This subsection presents an overview of the IFS, in which the literature covers two main types. The first category is of ready-meals or near-ready foods, which are often prepared in restaurants or catering services, and include street-vended food and neighbourhood or institutional markets. The second category is that of processed foods which might have to be processed further before consumption (e.g. grains and cereals, nuts and nut powders, pastes, condiments, dairy products, processed fish and meat etc), or are used as purchased. Within each of these categories, informal traders may sell these in a fixed or semi-fixed location while others are highly mobile (ambulatory), such as coffee- and tea-sellers in Dar es Salaam, Dakar and Accra, who cart their food and beverages from place to place.

Regardless of the type of IFS participation, a number of characteristics are common – although the extent to which participants of the IFS are located along the continuum of characteristics varies. A noticeable relevant commonality is the dominance women tend in street food vending, although their presence in informal food processing is less well documented (except for a few small donor-driven projects). A second common characteristic across countries and rural-urban spaces is that IFS participants are overwhelmingly illiterate or semiliterate women; this is especially true for street food vendors (Osei-Boateng & Amaratwum, 2011). For example, a 2003 census of street vendors in Harare, Zimbabwe showed that about 8 631 people were involved in the business of street food vending, of which 81% were women (Graffham, Zulu, & Chibanda, 2005). In Bahia, Brazil, of 247 food vendors interviewed by da Silva et al. (2014), 55.9% were female with low levels of education (49% had elementary education or lower). A comprehensive survey on the IFS was conducted from a sample of more than 3 700 respondents¹⁰ in a study commissioned by ENDA (2010) on street food in the region of Dakar. The data showed women as the majority (85.5%) of people active in the IFS. The study also found that most of the women entrepreneurs in the informal sector (41.3%) have no formal education, and according to the National Strategy for Equity and Gender Equality their income is much less than that of men active in the informal sector. A study of 334 street vendors in Accra showed the sector employs more than 60 000 men and women and 94% of food vendors are women with minimal or no education (NRI, 2015). Street food vending in Accra generates an annual turnover of over USD 100 million and an annual profit of USD 24 million (ibid). In Cotonou in the 1990s, street-vended food

bribes; but may also be asked for sexual 'favours', which is less likely to happen to men. Women's high participation in the informal sector is also indicative of the barriers they face in entering the formal sector.

¹⁰ Rapport provisoire de l'enquête de base sur l'alimentation de rue dans la région de Dakar. ENDA Graf Sahel, septembre 2010.

generated an estimated USD 20 million. This signifies that participating in the IFS is a key pathway for economic empowerment.

A third common characteristic is that the IFS offers necessary income-generating opportunities for the urban poor. Despite the fact that IFS participation tends to be survivalist in nature, this does not mean that they do not grow, nor that they are short-term strategies. J. Clancy (2006) states that ‘the urban poor are largely dependent on small scale-enterprises for generating income’ (2006:20). A snapshot study of women in IFS in Accra showed that women participated in street food vending as a long-term enterprise – between seven and 20 years, and that women did grow their businesses from feeding a few customers a day (sometimes as ambulatory food vendors or bench owners – which is micro level) to selling several meals a day and even catering for events (M. N. Matinga, Clancy, Doyle, & Annegarn, 2015). A study covering Bamako (Mali), Accra (Ghana) and Abidjan (Côte d’Ivoire) found that most food vendors in Bamako and Accra had been in the sector for more than 10 years, and about 7.5 years in Abidjan (FAO, 2012). In Lusaka, Zambia, a study conducted in 2003 found 5 355 food vendors who in turn employ another 16 000 people; with profits ranging from USD 0.20–31 per day in a country with high poverty levels, street vending is an important economic activity for the urban poor (Graffham et al., 2005). In Bahia, Brazil, the average street food vendor worked in this subsector for nine years and had an average working day of 8.3 hours (da Silva et al., 2014). In Imo State, Nigeria, Onyeneho and Hedberg (2013) found that all street food vendors in their sample were female and had an average of eight years working in street food vending. During the Scoping Phase of our research, data indicated that 40% of informal enterprises that were in existence for more than ten years in South Africa were owned by women. In Rwanda, 65% of the enterprises that were less than a year old were owned by men.

Street-vended food is often the only source of income for the vendors. In Bahia, only 29.1% had revenue from another source (da Silva et al., 2014).

Food vending is, however, not only beneficial to the entrepreneurs and their households in terms of income generation. Street food provides affordable nutrition, particularly for the urban poor (Chukuezi, 2010; Mosupye and von Holy, 1999; Muzaffar et al, 2009), and has a wide range of clients, including office workers, travellers, schoolchildren and households. Among buyers of street food in Bangkok, the second-most cited reason for purchasing street vended food (after proximity to home) was because it is cheap. In Bamako, street food provides 134.417 kcal per day per person (Ag Bendech, Tefft, Seki, & Nicolo, 2013). The FAO estimates that, globally, over 2.5 billion people eat street food every day. In Lusaka, food vendors sell about 81 million meals per annum (Graffham et al., 2005). Street vended food also appears to be a coping strategy for households for when prices of food and fuel increase. According to Cohen and Garrett (2010), when food and cooking fuel costs increase, so does street food consumption. Further, with limited access to convenience food such as precooked supermarket meals and takeaways or deliveries, street vended food is becoming an affordable ‘convenience’ food for the urban poor. A study in Bangkok showed that purchasing street vended food is also time-saving for consumers – a reason cited by 34% of respondents. Another 70% considered convenience and time saving to be an advantage of street food vending. Given that women are often in charge of food preparation in their homes and often suffer from higher levels of time poverty than men, street food vending and the IFS in general can be a pathway for reducing time poverty and increasing opportunities for empowerment of women that are not necessarily participants in the IFS. However, studies on impact of IFS on women in general are lacking.

While there is an increased interest in street-vended food, perhaps due its visibility, the interest in informal food processing is lacking. In fact, the literature shows that interest in informal food processing (other than food preparation and street-vended food) peaked in the 1980s along with a

peak in interest in appropriate technologies. Nevertheless, from the existing literature, characteristics of informal food processing do not appear to differ substantially from those in street food vending. Like street-vended food, it is dominated by poor, illiterate or semi-literate women (da Silva et al., 2014) with low levels of access to modern technologies, modern energy services, finances and with little social and legal protection. One possible distinction between street food vending and food processing is that much of the former occurs in public view in urban areas while much of the latter occurs in rural areas, out of view. However, this distinction can be misleading and each form of IFS exists in both locations; but studies to provide a clearer picture are lacking.

3.3. Studies on the informal food sector

Given the importance of the IFS, what then do we know about it? Among the studies that have documented the IFS, the majority address the urban IFS, focusing on street food vending. Studies in rural areas tend to focus on post-harvest or agro-food processing. Studies have addressed questions relating to participation patterns in informal food preparation health issues in street-vended food focusing on food contamination and food-borne diseases (Bryan et al, 1997; Graffham et al, 2005; Kubheka et al, 2001; Onyeneho and Hedberg, 2013; Mensah et al, 2015); rules and regulations affecting informal food businesses, especially in cities (Briscoe, 1999; Vorley, 2013; Lim, 2014); and the role of the IFS in food security, nutrition and the economy (Vorley, 2013; Periera et al, 2014). Despite the role that MESs can play in the issues addressed by these studies (e.g. temperature control for food safety, safe energy use for safety of the work place in regulation studies, etc.) few them address or discuss energy use, let alone the role of MESs. For example, several studies point of to the use of cold water for washing plates but do not discuss the energy issues that cause people to not heat water. Similarly, there are discussions of poor temperature controls but no discussions on energy for refrigeration or for heating food to correct temperatures.

The study by Onyeneho and Hedberg (2013), which focuses on food safety in restaurants in Imo State in Nigeria, is of particular interest for the insights on gender and access to MESs although this is not discussed explicitly. The study classifies restaurants in four categories, with Class A being major hotels, Class B school cafeterias, Class C regular/fast food restaurants, and Class D what are termed 'bukas' or 'bukaterias' in Nigeria and which consist of food kiosks, roadside food sellers and roaming food sellers or food hawkers (collectively regarded as street food vendors in our study). They find all bukaterias were operated by females with only primary school education, and that none of them had refrigerators, while all other categories had some refrigerators. Perhaps because this is not a gender study per se, there is no discussion on the implications of this structuring on women and their businesses or economic empowerment.

Several studies have focused on food preparation or processing and energy specifically (Tedd et al, 2001; Davies et al, 2008; Kimemia and Annegarn, 2012; Matinga, 2015; Cecelski and Matinga, 2014; George et al, 2014; Baron and Nicholson, 2015). Some studies do make passing mention of energy use or processing technology used in the IFS (Davies et al, 2008; Kimemia and Annegarn, 2013). The majority of the studies on food preparation simply state the type of energy used while many of those on food processing simply state specific technologies used for processing without mention of the energy source. Of interest in those that discuss energy used is the dominance of traditional firewood and charcoal, even where transitions to modern energy such as LPG and electricity are occurring (Tedd et al, 2003; Davies et al, 2008; Kimemia and Annegarn, 2012; George et al, 2014; Matinga, 2015). Almost all of these studies are either descriptively statistical or rapid assessment and qualitative in nature.

Studies that discuss food processing value chains are of interest in this review of the literature in so far as they touch on gender aspects. An important issue that emerges from food processing studies (and to a lesser extent, food preparation) is that even in the case of one food end-product, the value chain itself can be gendered, with men undertaking certain tasks and women others, towards the same end-product. Davies et al (2008) show that in cassava processing, grating, dewatering, milling operations are dominated by men while peeling, washing, drying and frying operations are dominated by women. In West African dairy processing, men are involved in livestock care but it is women that do the milking and dairy processing – but this is also governed by complex arrangements on the basis of ethnicity and religion – calling for a deeper analysis of gender in food processing beyond women and men. In Nigeria and Senegal for example, Fulani women process, market and make decisions over milk, including how much is consumed and sold, selling it directly themselves, as do women in Somalia (Dietz, Abdirizak, Adano, & Zaal, 2001). However, wealthy Fulani women and strict Muslim women often use intermediary women (Waters-Bayer, 1985 and Corniaux, 2003). In Ethiopia, churning milk into traditional butter (qibe or kibe) is considered women’s tasks and is often time-consuming and arduous, as is producing other fermented milk products. Processing of ergo (a sour milk product) shows the need for intersectional approach, as it is traditionally made by married women, not just women. However, most studies treat women as a homogenous group and hence only refer to women when ‘gender’ is discussed.

Another gap noted in the literature is that when energy for food processing is discussed, much of this is focused on cooking (thermal) energy. Energy for drying and mechanised power for transforming foods from one form to another is rarely discussed. In particular, while women (and men) expend much metabolic energy on transportation and processing tasks such as pounding, grinding, sieving, peeling, winnowing etc. mention is often only made of cooking fuels where it is made at all. Exceptions to these are studies on milk churning and cheese making. This gap is even in cases where a transition has been made from manual processing to mechanised processing. In much of the literature of such transition, mention is made of the new technologies but not of power enabling such technologies.

A very limited number of studies have focused on the issue of women’s empowerment, MESs and the IFS (Matinga, 2015). Again, all these studies are quick assessments and lack in-depth analysis of what happens to women and men’s informal food businesses when they have access to MESs. The following section briefly discusses the importance of modern energy and food processing.

3.4. Modern energy services and the informal food sector

This section discusses the role that MESs can play in the IFS and the ways in which it can contribute to the economic empowerment of women. We use a modified version of Kabeer’s (as cited in March et al. (1999, p. 21) social relations framework, focusing on three of the five critical elements: human development, social relations, and institutions.¹¹ In discussing human development, we unpack this into gender goals as advanced by Skutsch (2005), who divides gender goals in energy according to welfare, production and strategic needs¹² which we consider critical to human development from a gender perspective.

¹¹ N. Kabeer (1994) further includes gender policies as the fourth element, dividing them into gender-blind, gender-aware, gender-neutral, gender-specific, and gender-redistributive policies. Her fifth element is the analysis of planning needs divided into immediate, underlying, and/or structural factors. We consider these two elements to be part of institutions and will therefore consider our third element institutions, policies and structures.

¹² See Clancy et al (2005) for a more in-depth categorisation of these needs. Examples include reducing drudgery (welfare needs) processing energy (productive needs) and lighting for personal safety (strategic needs).

a) Welfare needs: Practicality, health and safety

Energy is critical to food processing as it allows transformation into edible forms (e.g. through grinding, dehusking, cooking), preservation through sun-drying, refrigeration and smoking for example, as well as sterilisation (e.g. pasteurisation) and can help avoid the development of toxins (for example to mechanised shelling of groundnuts to reduce aflatoxin incidences). Without appropriate and affordable forms of energy, food processing is arduous and increases chances of food waste and even food poisoning and can be a health risk. A study in Ghana, for example, showed sun-dried fish, much of which is undertaken in the informal sector, have high levels of coliform bacteria (Bomfeh, 2011). Without energy to prepare food, IFS would be impractical if not impossible. While traditional energy can and does fulfil most of the practical and some of the health and safety needs of the IFS, it is often inefficient, leading to high workloads. In addition, a number of applications are not possible with traditional energy forms, which in the IFS are typically biomass for thermal needs and metabolic (often women's) for manual processes such as grinding. Refrigeration and temperature control are not possible, leading to poor storage, high rates of spoilage and increased chances of food poisoning, which together can result in loss of customers and hence of incomes for the IFS participants.

Food-drying is one way in which foods are processed before sales and without access to MESs many food processors in need of drying (many of whom are women) resort to open-air drying. One study estimates that due to poor (slow) drying, an estimated 40% of food preserved in Africa has unacceptable levels of aflatoxins (Williams et al., 2004)¹³. While solar drying appears to have potential for reducing aflatoxins in dried foods, there is no evidence that it does so.

b) Productive needs: Lack of MESs, substandard quality and low incomes

For entrepreneurs, MESs offer an advantage over traditional forms because in most cases, it can be consistently controlled to suit the needs of the product (M.N. Matinga, 2015) access to modern forms of energy can result in product inconsistencies for entrepreneurs, which can result in loss of customers. Without consistent energy services, informal businesses such as restaurants and bakeries cannot compete on product quality with formal business. This can contribute to their charging low prices, and hence making low incomes.

Poor efficiencies and low productivity have become a characteristic of informal business and the IFS is no different. The literature often mentions that women tend to have lower access to (and control over) technology, so that their enterprises tend to have lower efficiencies and productivity. Improving access to MESs in food processing is one way in which efficiency and productivity can be improved, as has been shown by the Mali Multifunctional Platforms, resulting in improved incomes (Benjamin K. Sovacool et al., 2013).

c) Strategic needs for the informal food sector: limited business scope

Lack of MESs also limits market scope for informal food processors. Groundnuts, for example, are considered a 'woman's crop' in much of Africa, but many of these women produce it for household consumption. Although there is growing demand for groundnuts in Europe and elsewhere, the high levels of aflatoxins are a deterrent to building an export market. Aflatoxin can be reduced through

¹³ Aflatoxin is a toxin produced due to a specific kind of mould. It is linked to suppressed immune systems and liver cancer in humans and stunted growth in children.

better and more efficient shelling as well as drying processes. In many cases, this would require investing in improved technologies such as solar driers as well as automated (or mechanical) shellers. In Ghana, smoked fish production, an area in which women also have substantial levels of participation, has potential for regional and European export markets. However, inefficient smoking techniques (among other things) mean that the fish is often contaminated with microbiological contaminants (resulting in listeria and other health threats) but is also high in polycyclic aromatic hydrocarbon. An SNV study of the fish value chains showed that, as a result of the use of low-efficiency stoves, polycyclic aromatic hydrocarbon levels in smoked fish from the informal sector in the country are well above EU standards and can therefore not be exported to Europe and other developed countries despite an existing market.

Lack of MESs for processing and preparing foods can also limit markets even within the countries of origin or within a community. In Mali, a UNDP project supported by Sweden established 13 (pilot) units where women process foods for local and Bamako markets. Using solar- and gas-powered mills, freezers, driers, blenders and lamps, the women's groups process mangos, ginger, tamarind, grains etc., into syrups, juices, jams and biscuits, which they then sell (UN-WOMEN, 2015).

Poor processing techniques contribute to the high levels of imports (and preference for imported processed food) in Africa, even for foods that are locally grown. In Nigeria, tomato paste production was previously done on an informal basis by women, often poor rural and urban women.

3.5. Women's empowerment, gender and energy – what is the evidence?

There is not much literature on women's empowerment, the informal food sector and energy. The only exceptions to this are Tedd et al. (2001) and Matinga (2015), and to a lesser extent Cecelski and Matinga (2014), Nicholson and Baron (2015).

Street vendors themselves are aware of the need for energy for their enterprises. Street food vendors in Lusaka and Harare indicated their willingness to pay for running water and electricity (Graffham et al., 2005). In Accra, Ghana women food vendors reported the importance of LPG in their food enterprises, including portable cylinders for ambulatory operations and shifting to LPG to be more responsive to customer needs and in order to 'grow' their enterprises (Matinga, 2015).

Although not specifying women's empowerment, Polak (1996) discusses the role of traditional ovens – tabouna – for making chobbs, the traditional Tunisian bread. The majority of the makers of chobbs are women and with at least 500 000 tabouna ovens across the country, this is an important source of income for Tunisian women. Aspects of chobbs production are interesting in this study because, even though the majority of Tunisian households use LPG, chobbs is still baked using firewood including rosemary shrubs, representing traditional values and continuity.

Although incomes generated in the IFS are seen as a pathway to women's empowerment, it also allows women to gain agency. Because of the high levels of women in the IFS sector and because of challenges that they face, women often unite as cooperatives and/or associations to negotiate such challenges. For example, women's dairy cooperatives in Kenya, Senegal, Rwanda and elsewhere offer a platform for women to negotiate prices and contracts with buyers. Food vendors associations allow women to interact with and voice their needs to municipal authorities.

3.6. Policy environment affecting the informal food sector

Policies embody rules by which society live, and convey incentives and disincentives that govern economic, political and social interactions and actions. Policies can be formal (written rules and

regulations, constitutions etc.) or informal (codes of conduct, norms and ideologies). Within the informal sector, a number of formal and informal policies set out and provide the context in which a gendered IFS operates. This subsection discusses the formal policies in which the informal sector in general, and hence the IFS, operates. Focus is on policies related to the urban environment, as relevant for our study. Global literature shows that informality is contextual and defined differently from country to country. The same goes for the characteristics of IFS, including gender issues, policy and regulatory issues, and others. This subsection therefore starts with a general commentary on how policies (and institutions) have generally dealt with the informal sector. It then proceeds to look at a number of key policies affecting the informal sector and the IFS in particular, in each country relevant for our study.

The informal sector was not even recognised in labour statistics until the 1970s when economic anthropologist Keith Hart brought it to the attention of economists and policy makers after observing the high levels of what he termed the informal economy in Ghana (Hart, 1973). Recognising the informal economy as a valid and relevant sector in national policies planning and statistics has, however, been problematic. This can be attributed to colonial and post-colonial ambitions of modernisation of the developing world, which imagined cities and even villages organised along the more formal and 'organised' patterns of Western Europe. As such, government and local government have often exhibited reluctance to legitimise and plan for the informal sector, and especially the IFS, in urban areas.

The IFS has therefore traditionally been conceptualised in the minds of urban planners as dirty, dangerous, disorganised, backward, and undesirable.¹⁴ Skinner (2008) confirms this when she observes that in the 1980s and 1990s, the informal economy was vulnerable to exclusion policies, which sought to clear the modern city of unregulated and informal trading. However, as the informal sector persisted and with little improvements in formal employment figures, countries and the development community have come to accept the informal sector as a crucial part of the development puzzle. Subsequently, successful policies have emerged that promote the inclusion of the informal economy. In Tanzania for example, the Sustainable Development Project (SDP) in Dar es Salam included street traders in the urban design solutions by providing 24 types of steel shelves for street traders to display their goods. Durban's Warwick Junction is another example that aims to address some of the criticism of the informal economy in cities, in 2001 formulating an informal economic policy and integrating the informal economy, by addressing the infrastructure needs of street vendors, accommodating them by sector within the design and planning of urban infrastructure (Skinner, 2008).

The inclusionary policies of today aim to secure decent working conditions in the informal economy by improving linkages with the formal economy, access to finance, and supportive infrastructure, which aim to improve the productivity and profitability of the informal economy (Rogerson, 1997). The non-inclusionary policies argue that investing in the labour intensity of the formal economy (where decent working conditions are supposedly secured) must be prioritised to absorb the surplus labour which would otherwise feed the informal economy (Pollin, Burns, & Heintz, 2004). The latter approach is not 'exclusionary' per se because, while it neglects improving the informal economy itself, it does not dismantle what currently exists or neglect the issue of surplus labour and livelihoods. Non-inclusionary policies were new in the 1980s, following laissez-faire trends; adopting a more hands-off approach,

¹⁴ Much debate among economists discusses the costs of formalisation and the limited opportunities for generating growth or wealth in the informal economy and the limited labour protection or access to public services (Ishengoma & Kappel, 2006), while also recognising the benefits of the 'relative ease of entry, reliance on local resources, small manageable scale, and minimum capital investment' in the informal economy (Carr & Chen, 2002, p. 11).

they ‘included deregulation and benign neglect, the latter an “easy” but still significant shift given previous periods of harassment’ (Dierwechter, 2004, p. 963).

Given the mix of inclusionary and exclusionary policies with respect to the informal economy that are evident in developing countries, what are the key policies affecting the IFS in the three study countries and what operational context do they provide? The following sections provide an overview of the key policies affecting the informal economy and their impacts on the IFS. Where data is available, it also discusses specific local government policies.

(i) South Africa

In South Africa in 2012, an estimated 2.1 million people were employed or operating in the informal economy, of which about 57% were men and just over 41% were women. Informal economy participation is highest in Limpopo province (34% of total economic activity), and is more than 20% of non-agricultural employment in Mpumalanga, the Eastern Cape, the Free State and KwaZulu-Natal. However, the African National Congress (ANC) which has ruled South Africa since its transition to a non-racial democracy views the informal economy as a problem that must be addressed, calling it a ‘second economy’ that represents the legacy of inequality and marginalisation imposed by the former apartheid regime. This view has caused a tense relationship between authorities such as city officials and police and street vendors, including the IFS, which was prevalent during apartheid and persists in the post-apartheid era.

Cape Town – A case of give and take

At a local level, the City of Cape Town (CoCT) commissioned the development of an Informal Trading and Management Framework in 2003. The Framework distinguishes between three types of trading (Ukukhula, 2004, p. 9), survivalist, informal trading and formal trading. The policy and framework encourages traders to move their operations from ‘kerbside’ to ‘markets’ to ‘formal businesses’, and acknowledges that different sectors require different support, but this is not developed much further except to say that external support can have a creative role. There is no consideration of the level 1 traders acting as a safety net and no mention is made of protecting this role of the informal economy.

The CoCT Informal Trading By-law was promulgated in 2009, as a result of the policy and framework. It is comprehensive and ensures the protection of City property and business interests. Trading plans allow for formalisation of areas where informal economic activity is planned for or already exists. This policy enables traders to secure trading bays in high foot traffic zones or markets with high demand for space, by requesting trading plans from the City. The process of attaining a trading plan involves multi-stakeholder engagement, public meetings, etc. and could be seen as a deterrent to formalising areas. On the other hand, a trading plan that follows this process is helpful in areas where informal and formal trading is in conflict and requires resolution.

Section 12.3.1 of the bye-law is very vague and allows for subjective interpretation: ‘No person shall carry on business as an informal trader in a manner which creates a nuisance.’ The question is: a ‘nuisance’ to whom? If informal traders are a nuisance to formal businesses or customers of formal businesses, is the law then favouring the formal above the informal? One way in which informal traders are often considered a ‘nuisance’ is in their waste disposal practices, which often leave city environments littered, and alleys and backyards can become health hazards due to poor hygiene. Yet the bye-law does not provide the trader with the opportunity or means to apply to the City for waste removal services in the absence of a trading plan.

Herrick and Charman (2013) conclude that ‘the net result [of restrictive trading legislation in Cape Town] has been to criminalise a key livelihood, and worsen relations between police and shebeeners through ongoing raiding, confiscation and harassment’.

The informal sector is acknowledged, however, and even supported through a range of national and local government policies, regulations and bye-laws. Within the three provinces in this research, a number of local government policies affect the IFS: the 2001 eThekweni Informal Economy Policy and the KZN Green paper on the Informal Economy (Durban) for Durban, The City of Johannesburg's Informal Trading Policy of 2006 and the Johannesburg Fresh Produce Market for Johannesburg, and the Informal Trading Development for Cape Town. In Durban, (eThekweni municipality jurisdiction) the eThekweni municipal officials instigated a participatory process with the view of incorporating the needs of informal economy participants in new informal trading policies and bye-laws. However, traders felt that the process entailed a low form of participation largely limited to sharing information rather than decisions. The same is true for the city of Johannesburg.

(ii) Rwanda

The informal sector in Rwanda is said to contribute 46% of the total GDP (Malunda, 2012). According to the African Development Bank, in 2010/11 the share of women operating in the informal sector was equal to 18%, an increase of two percentage points from 2005/2006 (AfDB, 2014). The 2011 Census found that 30% of employees in the accommodation and food sector are women, which is above the average for informal sector (MINICOM., NISR., MIFOTRA., & PSF, 2011).

Rwanda's informal sector operates in a highly regulated environment and one in which the government intends to formalise it (Hillenkamp & Laville, 2014). While the informal sector in South Africa appears to operate in an environment of theories of socio-economic rights and visions of restitution, in Rwanda the informal sector, including the IFS, is governed by theories of modernisation. The modernisation theory underpinning development ambitions in Rwanda means the government has, with support from international partners, aimed for the formalisation of activities in all sectors. The agency in charge of these activities is the Rwanda Development Board (RDB), whose scope includes all aspects related to the development of the private sector. This involves working with and addressing the needs of companies of all sizes and both local and foreign investors. All businesses in the country are required to be registered at the Rwanda Development Board where between 2012 and 2015 the proportion of licensed business activities increased from 66% to 95% (Rwanda Development Board, 2015). In Gisozi sector (Gasabo, Kigali), as much as 95% of businesses that operate in its area of jurisdiction were licensed at local level in 2015, with the remaining 5% representing the informal sector, mostly selling unprocessed food in low quantities, repairing shoes and mobile phones for example (Sibomama, 2015). Nonetheless, the African Development Bank (AfDB) reported that an estimated 1.25 million Rwandan were employed in the informal sector in 2010/2011 – an increase of about 6 percentage points over 2005/2006. And while employment rose in both the formal and informal sectors, the increase was much faster in the informal sector, especially for men (AfDB, 2014). The 2011 Analytical Report of the Rwandan Establishment Census showed that as much as 99.8% of the accommodation and food service establishments were informal micro or small-sized (MINICOM. et al., 2011).

One impact of the formalisation of the informal sector, which could be augmented by cultural preferences, is that there is no street food-vending in the sense of open food stalls on the roadside in cities in Rwanda. Rather, urban food sellers operate in permanent buildings. While there are no studies of the impact of such configurations on women's empowerment, and particularly the participation of

women in the ‘informal’ food sector, the impact is likely to be negative since women are more constrained in accessing capital and in negotiating with authorities. However, it must also be pointed out that Rwanda is considered to have some of the strongest laws promoting gender equity. These include mandates for women’s representation in parliament as well as provision of collateral for women-owned businesses.

(iii) Senegal

The 2004-2005 OECD Report on Senegal’s economic perspectives points that the rate of underemployment ran around 72.5%, which explains why the population is so involved in the informal sector (OECD., 2014). A World Bank study reveals that the informal sector ‘is said to generate 97% of the job creation’ in Senegal and represents 12% of the GDP (World Bank, 2007). More recently the Emergence Plan ascribes more than half the GDP to the informal sector and indexes it as ‘a constraint on the structural change in the economy’, while acknowledging that it is ‘often the sole opportunity of economic inclusion’.

The development of the majority of African cities is accompanied by a profusion of informal jobs – generally known as ‘odd jobs’ – in all spheres of activity, including the food sector (World Bank, 2007). The Emergence Plan, as Senegal’s current strategic framework for social and economic development, highlights the informal sector which contributes 55% to the GDP and includes over 60% of non-agricultural jobs (ibid). Yet, as the National Survey on the Informal Sector (ENSIS, 2013) illustrates, the sector is affected by the precariousness of working conditions despite its economical relevance.¹⁵ Its development environment par excellence is the urban areas because of the extent of the lack of qualification and underemployment which make it a ‘refuge sector’ capable of ‘capturing any job creation initiative’ (République du Sénégal, 2012). The relationship between poverty, access to employment and the rapid growth of the informal sector is obvious. People find in it easier access to small enterprises and to credit (ANSD, 2006), as well as work, to an alternative way out of the crisis, according to the Survey on Poverty in Senegal (ibid).

In Senegal the definition of informal sector proposed by the National Agency for Statistics and Demography is ‘the whole set of production units without a statistical ID number or formal business

A focus on milk production in Senegal

Some interesting studies have been devoted to the milk sector in Senegal, and have highlighted the situation of the sector, the players, the circuits, and the different programmes implemented. Despite situational analyses that preceded the state projects or those developed as part of a partnership, the milk sector is still faced with major problems related to productivity, the market, preservation, the organization of circuits, but also to seasonality. Broutin and Rouyat (2004) stresses the difficulties encountered during the dry season and the rainy season by the players, but to deal here in detail with this sector, which plays a key role in the activities of the population of the region of Saint-Louis, would be over-ambitious.

Depending on the time of year, livestock breeding is sedentary or transhumant and contributes even remotely to income acquisition in spite of the present climate conditions. It is an important pillar of the local economy as it is practiced by practically the whole rural population, regardless of social group and ethnicity. Practices are still traditional, with poor exploitation of products and by-products. The livestock is composed of small ruminants reared in the concessions and small herds of cows that are pastured, and provides milk and meat, as well as some specific money needs.

In some areas of the region, women control the production of milk and by-products. They carry out their activities within the concessions and take charge of milking, pasteurization and selling, whereas men deal with the management of the herds. Thus women have some practical experience in milk processing and conditioning, which is why even in the dairies the staff is practically composed of women. Depending on milk collection and the context, women allocate appropriate shares of dairy products to gifts, exchange and selling, or else own-consumption and milk-cereal bartering. However, the increased monetisation of the milk circuit and the expansion of mini dairies reduce women’s decision-making power in the management of milk production.

¹⁵ ‘Lack of financial means to rent or buy premises, non-availability of adequate professional premises, will of the Informal Production Unit managers to minimize the costs in view of widening their profit margins’. National Survey on the Informal Sector, November 2013.

accounting'. The National Survey on the Informal Sector in Senegal asserts that 'it is organized as a sector consisting of micro-units with 2 to 9 workers per unit and in which self-employment is established as a principle' (ENSIS, 2013). In the World Bank report on Senegal, it is 'the enterprises without a NINEA (National Identification Number for Enterprises and Associations) or a tax ID number'. These enterprises contribute much to self-employment, thus representing, between 1995 and 2004, 98% of employment growth (World Bank, 2007).

While there are no formal regulations on women in the informal sector per se, the Senegalese constitution does guarantee equal rights for women and men. This is supported by the national gender equality and equity strategy (2005). However, longstanding patriarchal traditions and practices both historical and current mean that women remain disadvantaged. Low levels of education among women compared to men have contributed to women participating in the informal sector more than men, proportionally. It is estimated that 83% of economically active women in Senegal are engaged in the informal sector. They tend to be self-employed and to participate in home-based subsectors and their earnings are generally lower than those of men.

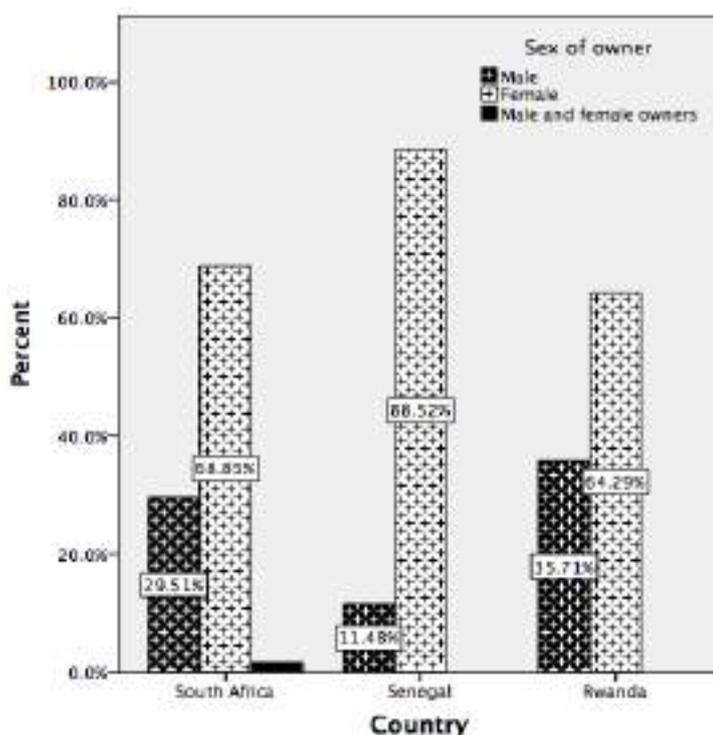
4. Evidence based on data analysis

During the Scoping Phase, the research teams conducted fieldwork in South Africa, Senegal and Rwanda. In this section we present some of the findings based on the data analysis carried out. As stated earlier in this report, our team is in the process of further analysing the Scoping Phase data. The analysis presented in this section focuses more on the comparative aspects of various findings. As part of Phase 2 the analysis will also compare multiple variables.

Enterprise ownership

As expected from the literature reviewed on informal enterprises in the food sector in developing countries, most of them are owned and operated by women. Of all the enterprises we interviewed 68.8% (n=62) are female-owned in South Africa, 88.5% (n=61) in Senegal, and 64.2% (n=56) in Rwanda.

Figure 1: Percentage of female and male owned enterprises per country



Age of enterprise: years of existence

Our data reveals that the number of years of existence varied for most of the enterprises interviewed. The age of enterprise is influenced by various factors such as the owners' reasons for having an enterprise, location, seasonality, security and trading regulations among other issues. One of our study objectives for the scoping phase was to investigate the introduction of MESs into the traditionally women-dominated IFS. Table 5 indicates that in South Africa and Senegal women own the older enterprises. An interesting trend is that in Rwanda there a high number of males and women enter the sector and most of the enterprises are less than a year in existence. In Phase 2 our project will investigate how the highly regulated enterprise environment in Rwanda contributes to the number of years that enterprises exist.

		< 1 year	Between 1 and 5 years	Between 5 and 10 years	More than 10 years
South Africa	Male-owned	22.2%	50.0%	11.1%	16.7%
	Female-owned	11.9%	23.8%	23.8%	40.5%
Rwanda	Male-owned	65.0%	25.0%	10.0%	0.0%
	Female-owned	50.0%	47.2%	2.8%	0.0%
Senegal	Male-owned	14%	28.5%	43%	14%
	Female-owned	7%	26%	22%	44%

Table 5: Age of enterprise

Further investigation of this issue during Phase 2 could reveal how the age of the enterprise contributes to its status. Could enterprises that have been operating for fewer years be considered survivalist-oriented, and could those operating for more years be considered growth-oriented? Another option to consider is to explore whether enterprises operating for more years fall between the gap between survivalist and growth-oriented enterprises and should therefore be referred to as ‘stability oriented’, since their main aim may be to keep their enterprises as stable as possible in order to operate them for many years.

Permits to operate

In Rwanda more respondents than in South Africa pay for permits to operate their enterprises. This speaks to the high regulation of business activities in Rwanda where operating without proper permits and registration is not allowed. Both male and female enterprise owners in Rwanda paid for their permits and only a small number from both sexes operated without such permits. In South Africa and Senegal, a majority of enterprises, regardless of whether they are male- or female-owned did not pay for their permits. Although there are laws and regulations governing informal food trading in South Africa and Senegal, the figures in Table 6 indicate that these regulations are not as strictly enforced as they are in Rwanda.

	Yes	No
Rwanda	76.8%	23.2%
Senegal	24.6%	75.4%
South Africa	24.2%	75.8%

Table 6: Permit payments

Rent

Similar to permit payments, in South Africa and Senegal there were more enterprises not paying rent for the premises they operated from, regardless of whether the enterprise was male- or female-owned. In Rwanda, similar to payment for the permits, enterprise owners paid rent. Here too, the data does not show much difference between the male and female enterprises. The high percentage of enterprise owners paying for rent in Rwanda can also be attributed to strict regulations of the SME sector in the attempt to formalise the informal sector.

	Yes	No
Rwanda	80.4%	19.6%
Senegal	39.3%	60.7%
South Africa	33.9%	66.1%

Table 7: Rental payments

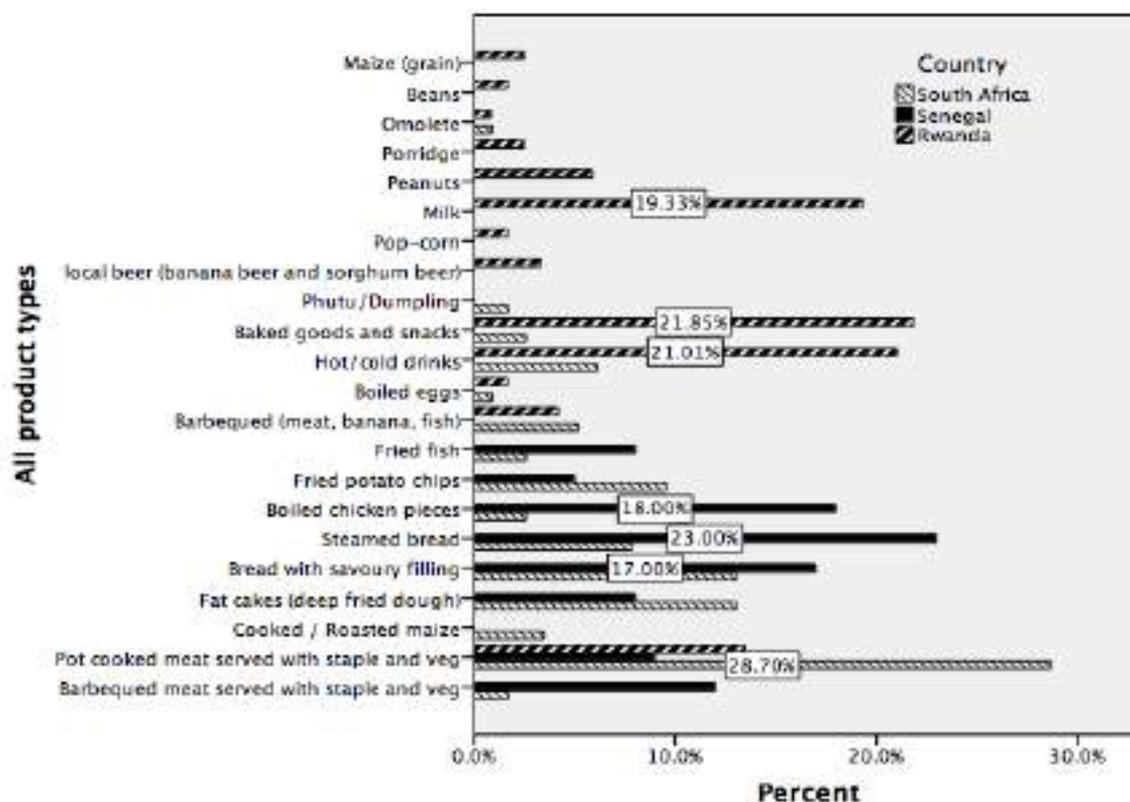
Although the data on type of location/structure does not reveal a significant relationship with type of food cooked or whether they pay for rent or a permit, it was observed that informal traders prefer to be located close to a local transport terminal – to the entrance of a train station, for example. Location determines access and visibility to clients, which in turn determines the type of structure available or permitted. It is suggested that a mapping exercise might be more useful in understanding the impact of location and type of structure upon micro and small enterprises in the IFS.

Products prepared and sold

The most popular food sold by the South African informal entrepreneurs in our study includes pot-cooked meat served with vegetables and staple (rice or maize-porridge). Pot-cooked meat ranges from traditional meals such as cow's head or tripe to stew. Other popular items prepared by the respondents are deep fried sour dough, bread with savoury fillings, steamed bread and deep-fried potato chips, followed by barbequed meat and hot and cold drinks.

Pot-cooked meat served with vegetables and staple was also popular in Rwanda, as well as baked goods and snacks. In this case, the 'snacks' category is vast and includes baked and deep-fried goods (chapati, sambusa, etc), candies, fruit, pastries, etc. This is to stress that most of the processed food sold is not meant for full meals. Other popular items prepared by the respondents are hot and cold drinks and milk.

Figure 2: Response percentages of all product types in South Africa, Senegal and Rwanda



The most popular foodstuffs prepared and sold the most by the informal enterprises in Senegal were boiled chicken pieces, steamed bread, fried fish and barbequed meat. Other popular products similar to those sold in South Africa were bread with savoury filling and deep-fried dough.

The analysis of food sold in these three countries shows that there are no big differences in the items sold. The meals and snacks are similar in preparation and cater for tastes and preferences of local customers.

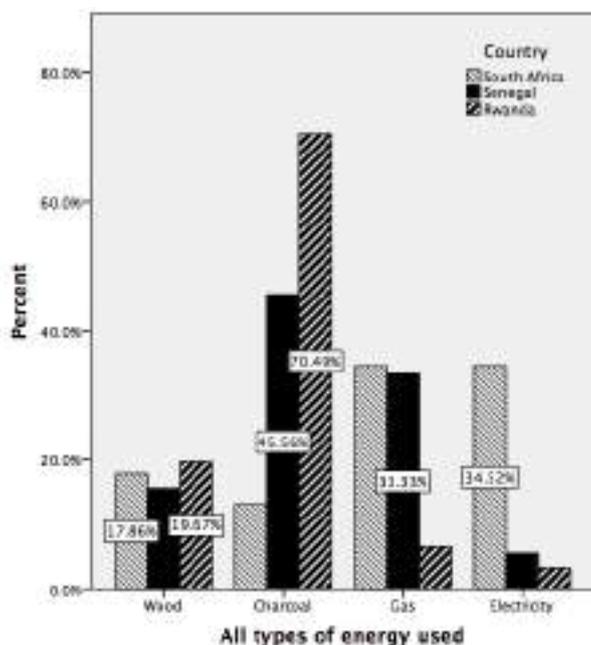
Energy use

In Rwanda, 70.5% of respondents use charcoal for different types of trading activities compared to 45.5% in Senegal. Only 19.6% of respondents in Rwanda use wood, while LPG and electricity are far less common sources of energy for preparing food in this sector. The cost of electricity in Rwanda is among the highest in Eastern Africa, which limits its use to basic needs, such as lighting. Grid electricity is not reliable, with strong voltage fluctuations and frequent black-outs. Charcoal and wood are much more affordable and accessible alternatives for the majority of low-income households and informal enterprises in the food sector.

There is a higher use of LPG in South Africa (34.5%) and Senegal (33%) compared to Rwanda, while South African enterprises use electricity the most (34.5%) in combination with other sources of energy. Use of electricity in South Africa is influenced by a number of contextual issues such as location of enterprises and proximity to the electricity access points where they can connect to an electricity

supply formally (where they pay the municipality) or informally (where they pay a non-official electricity supplier).

Figure 3: Percentage of energy type used per country



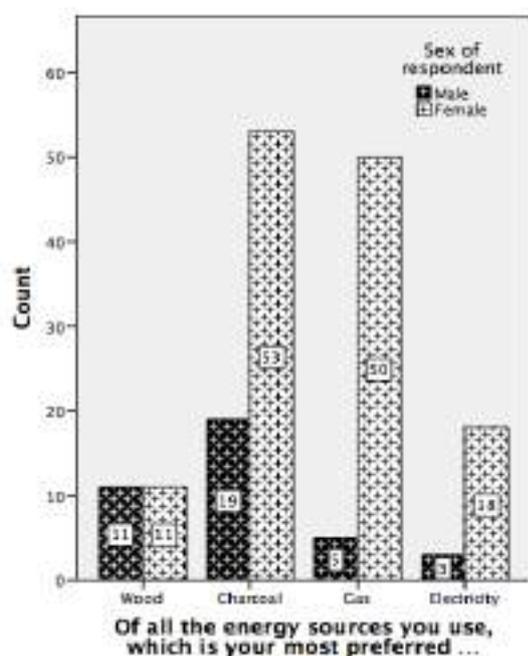
Percentages refer to all respondents (multiple responses per respondent) per country.

There is no statistical evidence of a significant relationship between gender of the respondent and type of energy used (Chi-Square = 6.471, df = 7, $p > 0.05$). Evidence collected through in-depth interviews and observations shows that other contextual factors influence the use of energy. An example is the case of enterprises that operate from structures built by the local government authorities as part of formalising the informal sector. These types of locations come with restrictions on the types of energy sources that can be used, including bans on open fires and paraffin/kerosene. This restricts enterprises that depend on these types of energy sources for production of their goods. These enterprises are often left with no choice but to leave the structures provided by the local authorities and operate in open public places with temporary shelter.

Energy sources (and appliances) respondents prefer to use

In the three countries, energy-use preferences differed, largely based on the availability and affordability of energy sources. Other factors, such as efficiency of the energy source, safety, ease of use, and the contribution to the quality of the product, also played a role in establishing preference. As the majority of the respondents were female, the data also reflects this. The majority of female respondents across all three countries preferred to use charcoal, gas and electricity, depending on what was available and affordable in that country. The male-dominated enterprises preferred to use charcoal and wood – a choice which is influenced by a variety of factors, including the types of products they prepare and sell.

Figure 4: Percentage of male and female owners and their preference for energy sources



Energy supply

To map the energy supply chains we asked respondents about where they obtained their different energy sources. A majority of energy suppliers are males supplying wood and charcoal to the enterprises; others were categorised as shops or utilities, for supplying charcoal and gas. Purchasing charcoal and gas from shops and utilities is more common in South Africa than in Senegal and Rwanda. Charcoal in South Africa is an expensive fuel source and therefore less desirable.

	Male	Female	Shop/Utility/ Other	Total
Wood	24	5	9	38
Charcoal	44	22	16	82
Gas	10	3	29	42
Electricity	2	0	10	12
Paraffin/kerosene	0	0	3	3
Total	80	30	67	177

Table 8: Energy suppliers

Most enterprises that use charcoal either collect it from the supplier themselves or have it delivered by the supplier with no delivery cost (51%).

	Collect - own transport	Collect - hired transport	Collect - public transport	Delivered at cost	Delivered at no cost	Total
Wood	8	3	0	8	16	35
Charcoal	19	3	5	12	42	81
Gas	6	2	5	6	20	39
Electricity	3	0	2	0	3	8
Paraffin/kerosene	0	0	0	2	0	2
Total	36	8	12	28	81	165

Table 9: Transportation of energy sources

Although gas is relatively more expensive than electricity and wood for various end-uses, enterprises continue to use it for cooking, especially if they are located in local government-supplied structures where use of traditional energy sources is restricted. The City of Johannesburg Metropolitan Company (CJMC), which manages the Bree Street Taxi Rank, a public transport hub in the city that provides space in the form of kiosk-style structures to 450 informal enterprises. Depending on the size, affordability and the needs for space use, some of these kiosks are used for food preparation and the food is sold to public transport users. As part of service provision for the enterprises renting space from CJMC, piped gas in each kiosk was made available at a local government-subsidised rate, which made it more affordable. This ensured access to a clean and affordable cooking energy source for the enterprises and made it possible for the CJMC to regulate the types of energy sources they used.

Advantages / disadvantages of using energy sources

The top three advantages and disadvantages of the most common energy sources, as given by the respondents, are shown below. Most of the people that favoured wood did so because it was cheaper. Some respondents said it cooks better and saves electricity; people that have access to electricity often use it as an alternative. Among the main wood users, 25% of the responses indicated that wood was dirty, another 25% indicated that it was difficult to use.

Those using charcoal favoured it because it was easily accessible and cooks better and it is cheaper (compared to other energy sources). In Rwanda and Senegal it is common for charcoal vendors to sell directly to enterprises without any delivery costs

Energy source	Top three advantages	% of responses	Top three disadvantages	% of responses
Wood	Cheaper / affordable	47%	Difficult to use	25%
	Cooks better	22%	Dirty	25%
	Saves electricity	14%	None	22%
Charcoal	Easily accessible	25%	None	38%
	Cooks better	22%	Runs out quickly	21%
	Cheaper / affordable	22%	Expensive	17%
Gas	Cooks better	24%	Expensive	52%
	Easy to use	24%	Potentially dangerous	22%
	Cheaper / affordable	16%	None	13%
Electricity	Cleaner	27%	Expensive	50%
	Cooks better	20%	Difficult to use	17%
	Easy to use	20%	Load-shedding	8%

Table 10: Advantages and disadvantages of various energy sources

Based on these responses, it is clear that each energy source has relative advantages and disadvantages. Whether the energy source was considered expensive or cheaper/affordable, it is clear that affordability is one of the top three priorities. Of the top three disadvantages and advantages, unique attributes for each energy source are highlighted in the table above.

Appliance	Female-owned		Male-owned	
	On-site	Off-site	On-site	Off-site
BBQ stand/appliance	11	0	8	0
Wood stove	5	5	5	2
Gas stove	24	0	5	0
Electricity stove	6	0	3	0
Paraffin/kerosene stove	2	1	0	0
Electrical appliances	10	3	3	1
Charcoal stove	28	4	13	1
Pop-corn machine	23	2	4	0
Total	109	15	41	4

Table 11: Main appliances used on and off site

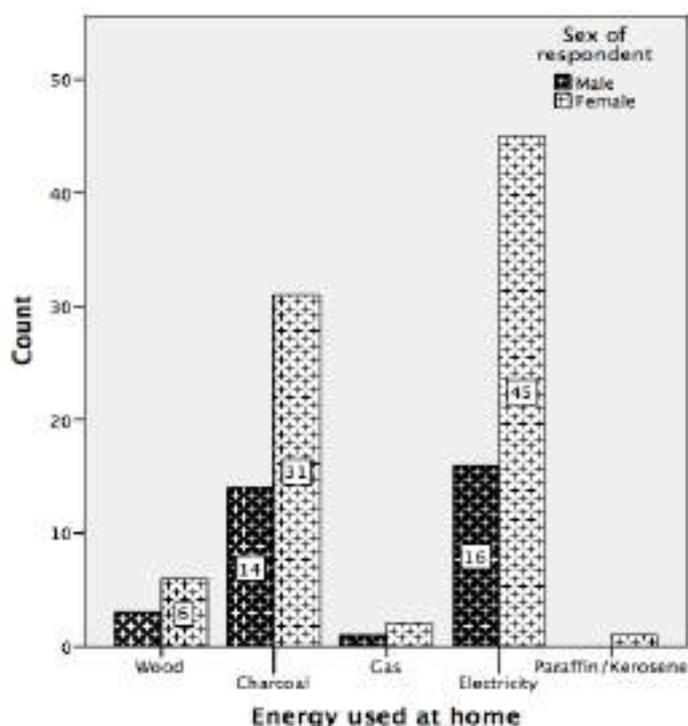
Investigating whether energy appliances are used on- or off-site by the enterprises in the IFS is important, as it indicates the types of energy sources these enterprises have access to and are using. One of the challenges faced by the informal enterprises is being located in a public area without access to energy services such as electricity. Table 11 shows two significant findings: (i) that 64% of the 169 enterprises interviewed prepare the food that they sell on-site; and (ii) the same 64% (109 enterprises) are owned by women, a fact that confirms that this sector is dominated by women in our research countries. 'Off-site' in the majority of the cases in our sample means away from the enterprise site, usually at home, whereafter the food is brought on-site for selling. This scoping study therefore confirms that energy use at home does contribute to the enterprise, hence the intention to investigate the enterprise-household dynamics in-depth during Phase 2 of research.

	Wood	Charcoal	Gas	Electricity	Kerosene	Total
South Africa	14	8	25	12	3	62
Senegal	12	29	19	1	0	61
Rwanda	10	42	2	2	0	56
Total	36	79	46	15	3	179

Table 12: Energy source used per country

A majority of enterprises used their appliances on-site, with most gas users (54%) in South Africa, followed by Senegal (41%). More than half (53%) of the charcoal-users were in Rwanda, with 37% in Senegal. This indicates the high use and accessibility of charcoal in these two countries compared to South Africa it is considered expensive by businesses in the IFS.

Figure 5: Response percentage of energy used at home among male and female respondents



The figure above shows that both male and female respondents use predominantly electricity (33.5%) or charcoal (25%) at home. Electricity is predominantly used in South Africa, understandably, given easier access than in Senegal and Rwanda where the spread of electrification rates is less and electricity supply is often unstable and unreliable. Only 5% of the total sample used wood at home. The split between males and females follows the approximate 35:65 split between male and female owners in the sample population. There is no statistical evidence of a significant relationship between gender of the respondents and energy used at home (Chi-Square = 1.171; df = 5, p > 0.05).

During Phase 2 of this project, as stated earlier and on the following sections, we aim to establish how energy access and use at home contributes to the informal food enterprises.

Employment of assistants

Table 13 shows that in our study sample there are more male (63%) than female assistants (37%). Rwanda and Senegal IFSs interviewed employ more male assistants than South African enterprises.

	Male	Female
South Africa	11%	25%
Rwanda	20%	7%
Senegal	32%	5%
Total	63%	37%

Table 13: Sex of paid assistant

During Phase 2, these differences in the sex of employees will be explored, to identify the influencers. We will also investigate whether the types of energy used by the enterprises have an influence on who is employed. While conducting interviews, the research team observed that in some enterprises most male employees were physical labourers, moving bulky and heavy loads especially during set-up and

pack-up times at the beginning and at the end of the day. Since most enterprises in the IFS are owned by women, the assumption is that they preferred to use male assistants for physically demanding activities such as pushing heavy loads, setting up the temporary structures and moving materials to and from storage facilities. Phase 2 of this project will shed more light on this issue.

4.1. Additional evidence and developments

During the Scoping Phase, the research teams identified stakeholders to interact with them at different levels, such as meetings, workshops and conferences. A brief concept note about the project was sent to potential stakeholders. The research teams acknowledge that stakeholder engagement is a continuous process where project information is shared with identified individuals and organisations.

In **South Africa** contact has been made with relevant researchers at the University of Cape Town who are involved in gender studies, empowerment, and informal trading. The research team also used the different networks to establish contact with local stakeholders in Nyanga and Langa townships where fieldwork for the scoping phase took place. The South African team was invited to the Women and Environment Dialogue organised by the government's Department of Environmental Affairs. Two of our researchers attended the event on behalf of the project. The event was organised in honour of the SA Women's month (August), when extra attention is paid to issues affecting women while celebrating their achievements in different fields. The core issues are around women's empowerment, which is one of the main issues of our research. There were many well-profiled and well-established equality- and leadership-oriented people, including those who focus on women in these programmes and many inspiring people who, at a small scale, have improved peoples' livelihoods and in the process have empowered people. There was also a large group of invitees that consisted of government-based stakeholders including policy-makers (among them the Department of Energy, municipal leaders, and deputy ministers), practitioners, women's empowerment advocates, and many female entrepreneurs in the green economy sector. The University of Cape Town team hosted a table at the World Café session on the second day, devoted to promoting and discussing the project, to create awareness and interest from the stakeholders but also to explore how this fits with on-going activities in the sector. The project was well received and a key part of the dialogue that seems crucial for future activities is to keep working closely with the communities to go beyond data extraction and to stimulate empowerment by sharing knowledge.

In August, the UCT team attended a symposium in Khayelitsha township on educational development in Cape Town's townships and local empowerment. At this event, several key local players from the municipalities and development sector were present. Contact was established and the project was introduced. In September, a member of the UCT team visited UN Women in Copenhagen, who showed interest in the project process and outcomes and will be contacted in the future for dissemination.

In **Senegal**, the team paid several visits to the target project areas to learn more about the enterprise activities. The stakeholders that have been engaged include formal food organisations and grain-processing plants to learn about the development and operation process. ENDA Energie has signed an agreement with the Platform of Professional Food Organisations in Senegal (POPAS), a network organisation for female food processors and caterers. The purpose of the agreement signed through the programme is to establish and sustain relationships between POPAS and ENDA based on access to energy and ownership of the technology. Other organisations that ENDA has been in close contact with include the Women's Association of Registered Food sector Professionals, Women's Professional Association for the Exploitation of Local Products, and National Union of Women Caterers, amongst others.

Additional stakeholder engagement activities include discussions with politicians, municipal and magisterial district actors to better understand the relationship with the IFS and the issues affecting women in this sector. This allowed going beyond the documentation and understanding these areas from the perspective of institutional actors. There is also constant collaboration with consultants on specific topics to deepen knowledge on the sectors of food preparation, cereal and milk processing.

ENDA is also engaging with the Agricultural Market Development Program, which contributes to integrating local products into diets of local communities. The Agricultural Commodity Chain Support Project, based in Kaolack, initiated the broadcast of a number television programmes on the preparation of meals and dishes based on local cereals, to promote consumption of local products. ENDA visited the Institute of Food Technology and the Research Centre on Renewable Energy in Dakar, to keep informed about the potential of training food operators and technological innovations favourable to food processing and preparation.

In **Rwanda**, the International Business Centre (IBC), a local partner, which is sub-contracted by MARGE to conduct local field research as set out in the original research proposal, signed an agreement with Rwanda Energy Group (REG), a government entity entrusted with energy development and utility service delivery. The agreement is an indication of REG support for the research study, which, IBC noted, means greater ease in obtaining approval from the local research ethics committee to carry out the research. REG is not only the country's electricity supplier, but also the implementing agency for energy studies on behalf of the government in Rwanda. REG was interested in the results, particularly in newly developed urban areas and the productive use of energy.

4.2. Reflection and lessons learnt from Scoping Phase and process

A number of factors have influenced the team in achieving our research objectives.

The major positive factors include:

- Open and engaged research participants who were willing to share information about their businesses.
- Interest from stakeholders who have helped us achieve our objectives by sharing their information.
- Advice from the team of experts has been available and useful in improving our conceptualisation of the research questions.
- Undertaking fieldwork in the first year put a lot of pressure on the team but allowed us to test the waters and get a better sense of direction moving forward.
- There has been adequate support from ENERGIA.
- An introduction to the survivalist and growth-oriented enterprises concepts has helped in getting conceptual clarity on informal enterprises.
- Based on the Scoping Phase data, we realised that multiple-energy access and use sustains the enterprise rather than using a single energy source.

The negative factors include the following:

- The area of research is interesting and the multidisciplinary team that has been put together enriches it, but there is also a risk of pulling the research into different research interests due to the diverse nature of the team.

- Related to this, the advice from different advisors and experts, while individually good, adds to a range of (research-focused) choices – all of which are interesting and relevant but do overwhelm the team.
- The rigour and dissemination required by the research standards and TORs requires high levels of commitment of resources compared to the available resources. Many team members have had to work beyond their allocated time in order to meet the requirements of the research. This and their on-going commitments in their regular organisations has led to delays in delivery.
- There has been untimely delivery of outputs by partners to the lead organisation, which has negative consequences in the running of the project.
- The highly regulated informal sector in Rwanda presents challenges in the respondent selection process. However, the uniqueness of Rwanda also provides valuable insights and might enlighten policy-makers on the effects of formalisation on gender and the IFS.
- Limited data collection and analysis time due to 'openness' of the survey led to a time-consuming process of data-cleaning and post-coding. Had the resources been commensurate with the amount of data and the processing required, this would not have been a problem.
- The geographical diversity of the teams meant infrequent opportunities to meet and have focussed work sessions. This is worsened by the fact that many have other obligations, often requiring travel. Furthermore, most of the team is in developing countries with problematic access to electricity (some suffering up to 24 hours of power outages) and internet. This problem would have been reduced had the team had a face-to-face meeting at the beginning or in the middle of the year of the Scoping Phase.

5. Proposal for Phase 2

5.1. Problem statement

Modern energy services and for entrepreneurs in the informal food sector

Phase 2 of this project will explore from a gender perspective the changes that may be brought within micro and small food preparation and processing enterprises as a result of the use of and access to MESs. As there is no guarantee of receiving accurate data on the before and after, the data collection process will rather focus on comparing enterprises with MESs to those without. The project will also track how access to and use of MESs for enterprise purposes impacts on the households (through changing role-patterns, responsibilities and decision-making balance) of the enterprise owners and how this affect women's empowerment. MESs can be defined as desired and useful products, processes or services that result from the use of the likes of electricity, LPG, biogas and kerosene.

Our research focuses in particular on the productive uses of energy in the informal food preparation and processing sectors in enterprises broadly classified as micro and small enterprises in Rwanda, Senegal and South Africa, and including cooking, heating and cooling, mechanical power, lighting, and mobility associated with their enterprises. Existing studies have identified that MESs can contribute to reducing poverty, stimulating development and raising income in several ways, as outlined below.

1. Cooking, heating and cooling. The majority of households in the developing world rely on traditional stoves for their cooking and heating needs, ranging from three-stone open fires to improved cook stoves to substantial brick and mortar models (World Bank, 2011a). Small

enterprises are also significant users of such cooking methods, which can cause significant health, environmental problems, in addition to being considered highly inefficient (Crewe, Sundar, & Young, 2010). Heating and cooling are also significant users of energy for households. Again, traditional, solid fuels such as wood are often used for heating, adding to the issues outlined above. The ability to cool products, for example, is an important benefit that MESs could bring to enterprises; it could contribute to reduced food waste and improved quality of products, as well as allowing, for example, buying in bulk and refrigerating the leftovers for the next day.

2. **Mechanical power.** The introduction of mechanical power through MESs increases the efficiency and effectiveness of productive activities. Bates, Hunt, Khennas, and Sastrawinata (2009) and de Gouvello and Laurent (2008), for example, have demonstrated that mechanical services have great potential to reduce time spent on fuelwood-gathering, improve air quality, and raise household and community incomes. Mechanical power also contributes to the more informal aspect of incomes by reducing much of the daily drudgery that pervades the lives of the poor (Cabraal, Barnes, & Agarwal, 2005). Some researchers suggest that if the poor had access to MESs, time could be spent on income-generating, educational or other activities, but how this works in reality is not well understood, in particular in informal enterprises. Phase 2 of our research will explore such issues.
3. **Lighting:** without lighting, livelihood activities cannot be continued beyond daylight hours, thus reducing the total number of productive hours available. In addition, (street) lighting could provide safety for entrepreneurs, extending their work-hours, and increasing a sense of safety. The safety aspect in the use of energy services is also an important gender issue. Gender and energy studies (Cabraal et al., 2005) have documented that street lighting increases the feeling of safety, especially for women.
4. **Mobility.** A key energy service that is often ignored in discussions of MESs and their contribution to alleviating poverty is mobility. Although it is difficult to cite precise numbers, a significant proportion of the world population has transportation choices that are constrained by lack of infrastructure, fuel scarcity, distances or time involved with travel, expense, or a combination of the above (Woodcock, 2007). Many of the poor, for example, do not have access to or cannot afford public transport or private motorised vehicles, and rely significantly on non-motorised transport, including walking, handcarts, etc. (Kaltheier, 2002). Regardless of the mode of transport involved, low mobility stifles the attainment of better living standards, reduces the ability to earn income, strains economic resources, and reduces access to other services such as education, markets and health services. Many poor communities depend on shared or hired motorised transport for mobility, which disproportionately strains their budgets (Kaltheier, 2002). With regard to the enterprises in this study, mobility costs reflect the cost of getting to the enterprise, but also the cost of moving energy, e.g. transportation of gas canisters, wood, etc.

An additional factor in which mobility has affected development from a gender perspective is migration. For example, in the South African study sites, the questionnaire survey from the scoping phase found that many enterprise owners were migrants either from neighbouring African countries or from rural to urban areas within South Africa. Whereas in the past it was largely men that would migrate to urban areas for work, nowadays also many women seek job opportunities in urban areas. Failing to find a job, people fall into to the informal sector, engaging in survivalist enterprises as part of their livelihood strategy (Berner et al., 2012). Crucially, many in the IFS are able to setup these enterprises because there are energy services available for doing this, although these may not be MESs per se.

A complicating factor is the realisation among researchers that energy transitions to MESs are neither linear nor predetermined. Although commonly applied in the energy and poverty literature, the concepts of energy ladders and energy equity are imperfect (B.K. Sovacool, 2012), and have been criticised for not fully capturing the intricacies of how households or enterprises consume energy (Van der Kroon, Brouwer, & van Beukering, 2013). For example, the model assumes that people will always seek to move up the energy ladder, away from traditional fuels. Yet, studies find that in many cases, even if MESs are available, households and enterprises remain users of traditional fuels for various reasons (Hiemstra-van der Horst & Hovorka, 2008), including cost, availability, habit/tradition (B.K. Sovacool et al., 2012) and social expectations (Barnes, Peskin, & Fitzgerald, 2003). Such findings and discussions led to the concept of ‘energy stacking’, in which multiple-fuel sources are simultaneously used for a variety of purposes and motivations, or users moving back and forth between fuel types to suit their financial and non-financial needs. One of the key findings in Phase 1 of this study confirmed the existence of the energy-stacking behaviour, and found that multiple sources of energy were used as part of the energy mix of an enterprise for a variety of reasons, including ease of use (electricity), customer preferences (in relation to flavour and wood), affordability (wood and gas); and availability and regulation (electricity). Therefore, in Phase 2, we assume energy-stacking and the co-existence of multiple energy uses in individual enterprises.

Women’s entrepreneurial activities and the informal food sector

Our research will provide insight into the above processes by taking a gender approach, and we will investigate contextual factors and impacts of access to MESs on productive uses as well as on enterprise owners and workers. We will focus on micro and small enterprises in the IFS¹⁶ in urban areas. The IFS is heterogeneous, with enterprises ranging in activities from cooking meals to home-based enterprises, to processing food products such as tea, coffee, spices, fruits and nuts, dairy and fish. An important factor affecting their energy use is the enterprise location, whether within the household, in public places like bus stations and sidewalks, other open spaces, or more formalised trading areas (see the findings of the Scoping Phase discussed above). Access to these spaces is gendered (M. A. Chen, 2005). The enterprises also differ in their labour structure and consist of own-account workers, and enterprises with an owner and one or more workers (who may or may not receive payment for their labour and who may be employed on a continuous, temporary or intermittent basis).

There is a revival of interest in the informal sector as a driver of the economy. Urbanisation is also bringing behavioural changes, with low-income urban workers eating at roadside restaurants, which are part of the informal food sector.

There are strong gender and development arguments linked to the choice of enterprises in the Informal Food Sector (IFS), which are currently of interest to policy makers. Women’s entrepreneurial activities are often located in the informal sector, and frequently run from home, since it enables them to combine productive tasks with reproductive tasks, such as childcare. The IFS is a sector where available data suggests that women are strongly involved in management/decision making positions, own enterprises, and/or are employed. Despite its importance to women’s livelihoods, there is little evidence about the gender and energy aspects of the sector. We will contribute to building an evidence base through both quantitative and qualitative research.

¹⁶ The definition of what constitutes the ‘informal sector’ has been subject of discussion over time. Here we take the definition based on the *OECD Handbook: Measuring the Non-Observed Economy*. (2002). Paris: OECD. The informal sector comprises of enterprises not formally registered, which keep no accounts and, where people are employed in an enterprise, they are not formally registered as employed. There are two main categories of enterprises within the informal sector: *own account* and *informal employers*.

The informal food sector (IFS) depends mainly on traditional and thermal energy as inputs for production and processing. IFS enterprises tend to be heat-intensive (food processing), labour intensive, and/or lighting intensive (e.g. home based cottage industries with work in evenings) and are often dangerous to women's health. For example, selling prepared food is a common activity and is seldom found at a fixed location or structure, although electric street lighting can extend the hours of trading, yet few use electricity for its core functions. As a consequence of the above, the energy forms most used by women, and therefore their businesses are often not catered for by the supplied / available energy services. The conclusion of a recent literature study carried out by ENERGIA is that there is a clear gap in knowledge about the role of MESs in informal sector enterprises (J. Clancy, Winther, Matinga, & Oparaocha, 2011).

IFS enterprises are significant users of fuelwood which they often buy, and energy costs have been estimated to form between 20% and 25% of total inputs (J. Clancy et al., 2002). There are few in-depth evaluations of energy for *productive uses*, including in the IFS where the use of, for example, cookstoves can be assumed to be common. Although electricity is not the most effective and not the cheapest energy form for providing, for example, thermal energy (the main energy form used in the IFS), there is no doubt that the adoption of MESs, and electricity in particular, can bring benefits to IFS enterprises. In Senegal, electricity has been identified as the determining factor for the effective mainstreaming of gender and the development of productive activities, particularly in rural areas²³. In addition, there is evidence of a positive correlation between electrification and an increase in the number of micro and small enterprises in rural areas in South Africa (Prasad & Dieden, 2007). However, due to the informality of the sector, and a lack of knowledge on energy behaviour in this sector, women and their business activities are often neglected. The conclusion of the recent literature study carried out by ENERGIA is that there is a clear gap in knowledge about the role of MESs in informal sector enterprises (J. Clancy et al., 2011).

Many aspects of the adoption of MES in the IFS are under-researched, and in particular, little is known about the factors that motivate adoption of MES or the transition to MES from a gender perspective. For example, are women less likely to adopt MESs in their enterprises than men? Understanding uptake behaviour is considered complex, at the household level; studies thus far found cash and credit constraints to be the most significant factors affecting uptake (Bensch & Peters, 2013). However, the role of socio-psychological drivers, such as discount rates, risk aversion and peer pressure, as well as contextual factors such as local institutions and the quality of the supply chain, have received less attention (Lewis & Pattanayak, 2012).

In addition, despite promising findings of the correlation between electrification and enterprise development, there is very little empirical, quantitative, independently generated evidence to test the hypothesis that MES access improves incomes, in particular whether access to MESs and the derived outcomes are gendered – that is, they are experienced differently by women and men. Although evidence can be found in the literature that demonstrates correlation between energy and transformations in women's and men's lives, causality is more difficult to prove (Cecelski, 2005). In addition, multiple factors are involved. For example, it has long been recognised that the availability of electricity alone is not sufficient to stimulate enterprise development or start-up (Kooijman-van Dijk, 2009). Our proposal explores these links from the perspective of the IFS in Africa and whether access to MES in businesses stimulates empowerment. In addition, a gender analysis of the fuel and food supply chain adds to the body of knowledge about productive uses of energy where impact analysis tends to focus on electricity.

From a gender perspective, the informal sector offers women benefits such as flexibility to take care of other household obligations. Nevertheless, evidence shows that the gender-wage gap increases as

informal businesses formalise (M. A. Chen, 2005), and it becomes a key question as to whether or not access to MESs has a beneficial impact on women's income. Women's capabilities to participate in markets are considered to be a key factor in women's empowerment (WDR, 2012), which in turn is seen as an integral and necessary dimension of efforts to reduce poverty and enhance economic growth (World Bank, 2005, p. 28). However, seeing empowerment as merely confined to economic matters is restrictive in its definition of what constitutes it, and certainly does not directly address much wider issues of gender power relations.¹⁷ Indeed, it cannot be assumed that increases in income will necessarily translate into increased control over that income or increased well-being or changes in other aspects of gender inequality (Chant, 2003).

To avoid a narrow view of empowerment as merely economic, we will take into account three key considerations in our study when exploring it. Firstly, the empowerment process is not directly observable; it can only be approximated using proxies or indicators. Secondly, gender empowerment is a multi-dimensional process, crossing social, economic, political and psychological dimensions, and the causal pathways through which resources are translated into agency can also be varied, e.g. material, perceptual, relational and cognitive (M. Chen & Mahmud, 1995). Gender inequality exists across different dimensions (social, economic, political, and psychological) and in various domains of women's lives. Thirdly, context is crucial, as the particular empowerment pathways vary from context to context, and even within one context empowerment may be experienced differently by different genders, class, and various social categories of women and men (Simeen Mahmud, Shah, & Becker, 2012). Empowerment pathways and their indicators may be context-specific or universal. Supporting these findings is Skutsch, who has hypothesised that energy access alone is not sufficient (that is energy is enabling rather than causative), and other contextual factors such as legal and policy frameworks are needed to support such a change (Skutsch, 2005). A recent review found the evidence to be mixed (J. Clancy et al., 2011). Our research provides an opportunity to test this hypothesis, and move beyond a narrow view of empowerment through women's entrepreneurial activities, and provide new insights by mapping impacts on women's empowerment back to the household, in particular whether or not it transforms gender relations.

5.2. Research objectives for Phase 2

The research objectives identified for Phase 2 of this research are as follows:

- To conduct further analysis of data collected during the Scoping Phase in order to provide different forms of evidence-based responses to our initially proposed questions. This process will also assist the team in identifying the data gaps before embarking on additional fieldwork.
- To collect additional qualitative and quantitative data in order to strengthen the information and knowledge gathered during the Scoping Phase.
- To explore the contextual factors and regulatory frameworks that influence the use of MESs by men and women in informal food sector and processing enterprises.
- To use a gender lens in exploring the motivations behind the adoption of MESs in the energy mix of IFS entrepreneurs and assess the impacts on the enterprise of MES access and use.
- To explore the specific contextual factors (income sources, policy and regulatory frameworks, politics, institutional mechanisms) that influences the uptake of MESs by enterprises in the IFS.
- To investigate the underlying gender, energy and empowerment issues that influence specific business development behaviour differences between the survival and growth- oriented enterprises in our sample.

¹⁷ There has also been a impreciseness in the definition of empowerment which makes it difficult to theorize and to apply in the context of development practice (Tsikata & Darkwah, 2014).

- To assess the relationship between the adoption of MES and empowerment.
- To influence policy making and implementation processes in both the energy and informal trade sectors by producing gender considerate results and action plans that will be easily adoptable by policy authorities at national and international levels.

5.3. Main research questions and sub-questions for Phase 2

Phase 2 (Years 2-4)

- What are the impacts of access and use of MESs on enterprise development for enterprises owned and operated by women and by men? What are the effects of this access and use on output and/or quality of products and profitability for food preparation and processing on micro and small enterprises?
- From a gender perspective, what motivates the adoption of MESs in the energy mix of IFS entrepreneurs, and how does access and use of MESs affect a) enterprise development; b) output; and c) profitability of food preparation and processing of micro and small enterprises?
- Which contextual factors (income sources, culture, political leadership, policy and regulatory frameworks, institutional mechanisms and vulnerability) influence the uptake of MESs by micro and small enterprises in the food preparation and processing value chain?
- What is the relationship between the adoption of MES in women's productive activities, enterprise development and their empowerment, and what types of empowerment can be distinguished?

5.4. Methodology for Phase 2

The methodology for Phase 2 of the project builds on the key findings and observations from Phase 1 (Scoping Phase), and has been adapted from the original in light of these findings. Although the quantitative and qualitative methods contribute to answering all Phase 2 research questions, some questions are more suited to qualitative or quantitative approaches than others.

5.4.1 Quantitative data collection: Micro-analysis using data from Primary Survey (2016-2018)

Before engaging in further data collection, the first part of Phase 2 in the year 2016 will be used to analyse the data collected during the Scoping Phase at a more in-depth level.

The survey in Phase 1 provided a broad insight into the micro and small enterprises (e.g. time use, business details, and trading activities), their use of energy services, the gendered nature of the energy supply chain, and the underlying reasons for operating an enterprise. The questionnaire survey that will be designed and implemented in Phase 2 will build upon these findings to collect relevant data to study the implications of introduction of MESs in micro and small enterprises, enterprise development, and empowerment of women due to introduction of MESs. This will largely contribute to answering particular research questions, seeking a range of answers with regard to the adoption of MESs in enterprises and enterprise development and the contextual factors affecting their uptake. The nature of these questions is as such that it allows for large-scale, structured data gathering.

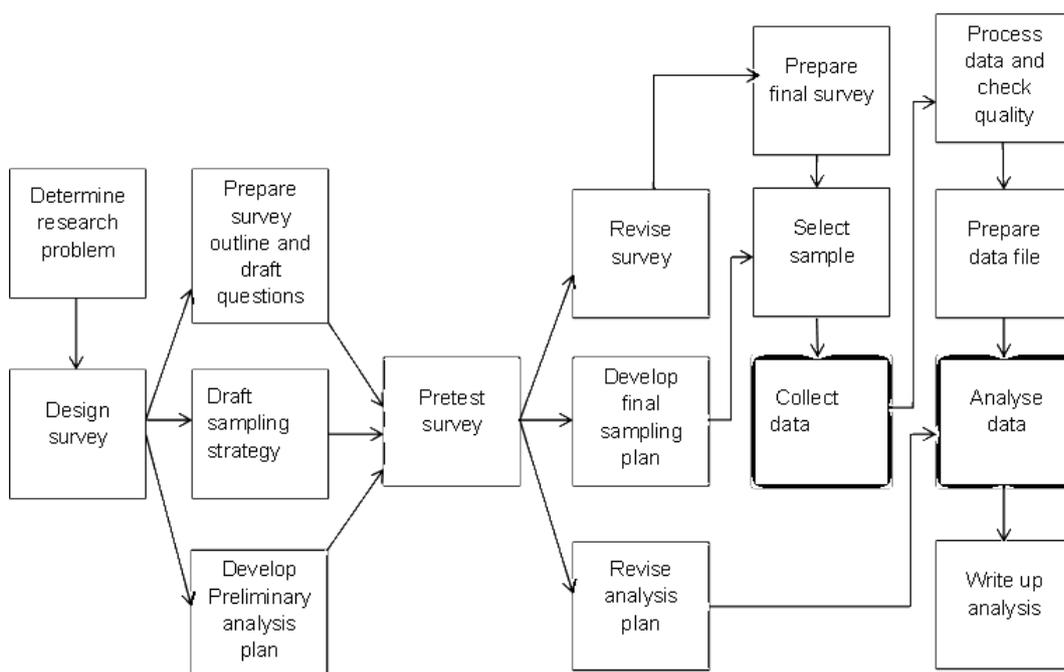
Survey design

A questionnaire survey will be distributed in the case study areas to gather data from micro and small enterprises in the informal food sector on the implications of introducing MESs in micro and small enterprises, gender roles in fuel choices, empowerment of women due to the introduction of MESs and the identification of tipping points for entry of men. Questionnaire surveys, a research method to

collect a body of quantifiable data in a systematic way (Robson, 1993) will allow for the identification of patterns of association between the different variables.

The questionnaires will be derived from the questionnaire tested in Phase 1. The survey will be shortened significantly and be more targeted, to reflect the research questions for Phase 2 posed above. The schematics below show the design of the survey for Phase 2. Our survey approach for Phase 2 will be slightly different from the survey used in Phase 1 mainly because of the findings generated from this phase. As a result of the difference in research questions between Phase 1 and Phase 2, we will follow the survey design procedure from the beginning, incorporating the most useful aspects of the survey conducted in Phase 1.

Figure 6: Data collection, processing and analysis plan



A sample size of 150 IFS enterprises has been chosen per country, resulting in 450 surveyed enterprises across the sites.¹⁸ This sample size enables representation of the diversity of enterprises in the IFS, gender aspects; and comparison between case study sites. More broadly, this number allows for sufficient detail to: (i) provide insight in to the causal effects of MESs compare to traditional forms of energy; and (ii) overcome the lack of sex-disaggregated data, hence allowing for generalisations to inform policy.

The survey will consist of both open and closed questions to give respondents and opportunity to explain some of their answers. However, where possible, structured, closed questions will be used to increase the comparability of the data, as suggested by Alreck and Settle (1995) . To facilitate the comparative analysis of the data, largely identical surveys will be distributed in the three study sites, which will be conducted with a translator in case the respondent prefers to communicate in a language other than English.

¹⁸ The research team would like to extend the study to include Nigeria, a country with a strong presence of the Informal Food Sector where there is a clear correlation between urbanisation and eating out. The inclusion of Nigeria will depend on team's proposal success in securing the cooperation funds set aside for projects under the ENERGIA Gender and Energy research programme.

The survey, once developed and refined, will be pre-tested by each collaborator, allowing for issues to be addressed before data collection.

The following sampling strategy will be applied:

1. Cluster sampling is a technique often used in areas where populations are geographically separated or widely dispersed (Alreck & Settle, 1995). Due to the dispersed locations of the IFS enterprises, several sub-locations will be selected within each case study country. In each country, two to three cities or main urban centres will be selected as the primary sites of data collection, and within those sites, specific neighbourhoods (depending on IFS enterprise activities) will be targeted.
2. Once clusters are selected, we will employ stratified sampling in each cluster to ensure both male and female respondents in each study site. As part of our efforts to avoid bias in our sample, we will stratify the sample based a scan of the area in which general mapping will take place of the types of businesses in the area. For example, in Cape Town, we will employ the enterprise/area maps developed by Engineers Without Borders (at the University of Cape Town) and by an associated Masters research project on gender, enterprise and energy. These and similar efforts in the other sites will guide representativeness of our sample.

Data analysis

After collection, the questionnaire surveys will be processed, checked for quality, and a realistic data-capturing template will be prepared. Based on the survey questions, each variable will be defined and coded, and three different data files will be created to facilitate analysis: (i) an Excel file, containing the responses to all questions, including open and closed questions; (ii) an SPSS file containing only the variables for the closed questions; and (iii) an NVivo file containing only the responses to the open questions.

5.4.2 Qualitative data collection

To gain a more profound insight into the ways in which MESs in enterprises affects gender empowerment, Phase 2 will have a significant qualitative data collection component. During Phase 1, it became clear that some of the survey questions could not reach enough depth of enquiry, and so it was decided to make the qualitative data feature more prominent in Phase 2.

From the quantitative survey sample, we will select up between 20–30 entrepreneurs per country for in-depth investigation of their energy use, background to their enterprise, and empowerment, and to trace their energy use back to their household level. These enterprises will be selected from the total survey sample.

Qualitative data collection will include semi-structured interviews paired with observations, and focus groups. The data collected through these methods will allow for in-depth investigation of the impacts of access to MESs on enterprise developments and the gender differences in this process; insight into the motivations of adopting MESs in the enterprises and whether these are gender-specific; whether the availability of MESs attracts or attracted men to enter the IFS; and in-depth insight into issues of empowerment. In addition, the interviews and focus groups will explore the contextual factors that influence the uptake of MESs in the food preparation and processing value chain.

We are currently developing a detailed interview guide for this part of the data collection that will be translated into the languages of our respondents. Below is a brief outline of the relevant research question and how we expect the data collected in the interviews will cover this.

1. From a gender perspective, what motivates the adoption of MESs in the energy mix of IFS entrepreneurs, and how does access and use of MESs affect a) enterprise development; b) output; and c) profitability of food preparation and processing of micro and small enterprises?

Although this question will be largely answered by the questionnaire survey, we will also discuss these matters in the in-depth interviews and focus groups. The interview guide will be developed in such a way that the motivations for adoption of MESs in enterprises will be explored in relation to the factors above. The findings from the survey will provide input in the interview guide, so this can be tailored to contextual factors but also probe further inquiry in the issue at hand.

2. Which contextual factors (income sources, culture, political leadership, policy and regulatory frameworks, institutional mechanisms and vulnerability) influence the uptake of MESs by micro and small enterprises in the food preparation and processing value chain?

We will answer this question through a combination of interviews, surveys, observation and desktop study. Whereas the literature review has identified relevant policies and regulations, we will explore these more in-depth in the interviews and focus groups, and to an extent in the questionnaire survey. The interview guide and focus group schedule will include a section on contextual factors, in which interviewees (both enterprises and other stakeholders such as municipal government, civil society organisations) will be asked to describe the contextual factors that influence the uptake of MES in businesses in the local context. We expect a range of issues to emerge during this discussion, which will be influenced largely by the local social/economic/environment/political contexts. We will explore the emerging themes from these interviews firstly in national context, followed by an exploration of these issues across the study sites and against the existing MES and micro and small enterprises literatures.

3. What is the relationship between the adoption of MES in women's productive activities, enterprise development and their empowerment, and what types of empowerment can be distinguished?

This question will be answered through a combination of focus groups, in which such issues will be discussed in a small group setting and meta-analysis of the survey and interview data. For example, as part of the focus group procedure, it is possible that we will select a small group of women that have adopted MES in their enterprises and will discuss whether women have become more empowered since they have adopted MES, and in what ways they became empowered. In line with this approach, we will then conduct focus groups with traditional energy users, and explore in a similar setting how they expect access to MES might affect their enterprise, development and empowerment. If we are able to clearly distinguish between growth-oriented enterprises and survivalist enterprises, we might also use this to identify focus group participants and address these same issues. Such decisions will be made in the first quarter of 2016, before the commencement of the data collection for Phase 2.

We will then use the collected data and examine the data against the current literature on empowerment.

5.4.3 Qualitative data analysis

The qualitative techniques employed in this phase are in keeping with participatory approaches, a key component in gender research. They further allow for in-depth exploration and provide rich data, which can offer explanations for phenomena observed in the questionnaire survey. Software package NVivo will be used to facilitate analysis of the qualitative data (based on thematic analysis) and to search through the data.

Where possible, interviews and focus groups discussions will be recorded, transcribed and coded to categorise data into separate units. This process will follow a thematic coding approach based on pre-defined themes. This is the most appropriate in Phase 2 as our research design and approach has been informed by both the literature review and questionnaire survey of Phase 1. Thematic analysis will be applied to identify recurring issues in the data, as suggested by Creswell (2003), with determination of each theme (and related sets of sub-themes) based on the population of the codes. To explore patterns, themes and categories within the data, both inductive and deductive analysis will be used. Whereas the first allows for the nuances of the themes to be explored in-depth, the latter will contribute to the development of theoretical propositions. We will then examine these themes against the existing literature.

As part of our data analysis framework, and to explore women's empowerment through energy access, we will employ the empowerment frameworks provided by Simeen Mahmud et al. (2012), M. Chen and Mahmud (1995) and S. Mahmud and Tasneem (2014) which focus on economic, social, political and psychological dimensions of empowerment. Because for many women in developing countries paid work has, in addition to being a pathway out of poverty, a transformative potential including internal transformation (changes in women's personal and political consciousness and agency as citizens) and external transformation (changes in women's social position). To capture both types of transformation in measuring women's empowerment we need both objective and subjective indicators, as well as appropriate qualitative indicators to capture these processes of change that are not easily observable.

As a result of the above considerations, the survey will include questions regarding women's strategic areas of decision-making within the family, women's mobility in relation to different locations in the public domain, their participation in community life, attitudes and perceptions of changes in relationships, aspirations regarding their own future and the future of their children; sense of control over their own lives; control over income use; and spare-time activities (e.g. watching TV).

Key indicators will be based in several dimensions:

1. agency with regard to income;
2. mobility in the public domain;
3. participation in public life (e.g. knowledge about labour laws; participation in committees; whether others seek their advice, schooling);
4. attitudes and perceptions (self-esteem; attitudes regarding sharing domestic tasks by partners; hopes for the future; sense of control over own lives);
5. appreciation/value of work as seen by others;

6. spare-time activities (including watching TV, use of mobile phone applications such as What’s App and Facebook) (S. Mahmud & Tasneem, 2014).

We will relate these to the use of MESs and whether access to these has affected any of these dimensions. For some indicators to be measured, MESs are a given: for example, MESs are needed to watch TV or use a mobile phone, whereas others are possibly affected by access to MES, such as domestic tasks, schooling and appreciation of work by others. Also, to explore our hypothesis of the tipping point of MESs in informal catering businesses and when they become more attractive to men, we will link MESs to indicators of empowerment. We will use mixed indicators, which will combine pre-determined objective measures of empowerment (based on our analysis) with subjective measures of empowerment offered by research participants. This approach allows for: the giving of voice to people in different contexts, avoids a Western (research) bias, and allows for nuancing of language.

In addition to the empowerment framework we will employ logics of survival and growth-oriented entrepreneurship theorisations, to reconstruct the logics of their strategies (Berner et al., 2012). This approach was adopted as part of Phase 2 because in Phase 1 a significant number of entrepreneurs appeared to be in the survival entrepreneurship category,¹⁹ and a few in the growth-oriented category,²⁰ and distinctions could be made between ‘necessity-driven’ entrepreneurship versus ‘opportunity-driven’ entrepreneurs (Reynolds, Bygrave, Autio, & Hay, 2002). Yet, many seemed to be somewhere in between. We feel that increased insight into whether enterprises are survivalist or growth-oriented, also in relation to their use of MESs, would provide important insights that help us to answer all the research questions. Table 14 shows some of the key characteristics that we will be focusing on in the questionnaire surveys and in-depth interviews.

Survivalist	Growth oriented
Street economy, community of the poor, micro-enterprise, necessity-driven, informal, own account, proletariat, sub-subsistence.	Small-scale family enterprise, intermediate sector, micro-enterprise, opportunity driven, petty bourgeoisies, micro-accumulation.
Ease of entry, low capital requirements, skills and technology.	Barriers to entry.
Female majority.	Male majority.
Maximising security, smoothing consumption.	Willingness to take risks.
Part of diversification strategy, often run by idle labour, with interruptions, and/or part-time.	Specialisation.
Embedded in networks of family and kin.	Embedded in business networks.
Obligation to share income generated.	Ability to accumulate part of the income generated.

Table 14: Differences between survivalist and growth oriented enterprises

Source: Berner et al (2012)

Data will be gathered by the researchers (both senior and junior) from all the organisations that form part of the consortium. The University of Twente will provide capacity building in quantitative and qualitative gender data gathering and analysis.

¹⁹ This category is characterized by activities undertaken by people unable to secure regular wage employment or access to an economic sector of their choice. The incomes generated from these businesses usually fall short of even a minimum standard, with little capital investment, virtually no skills training and only constrained opportunities for expansion into a viable business. Overall, and a desperate attempt to survive are the prime defining features of these enterprises.

²⁰ This category, although often consisting of very small businesses, have only a limited capital base and their operators possess only rudimentary business skills. Nonetheless, many of these enterprises have the potential to develop and flourish into larger formal small business enterprises (Rogerson 1997).

The theory of change

The project’s vision is covered by the theory of change (levels assumptions) where we state assumptions about ‘improved access to modern energy services’ and how this will lead to overall improvement of women owned enterprises and therefore lead to empowerment for women and men. Our vision also takes into consideration the importance of influencing policy on the ground to facilitate the provision of these modern energy services in order to improve the IFS (and crop processing sectors). Whereas Phase 1 of the study explored the energy and entrepreneurial backgrounds of the study, Phase 2 of the study will engage more deeply with the empowerment aspects of the study. In our study, we define empowerment broadly as leading to transformations in gender roles and relations, and having increased life options and choices, gaining greater control over one’s life, and generally attaining the capability to live the life one wishes to live (Simeen Mahmud et al., 2012) and (S. Mahmud & Tasneem, 2014). The above definition implies that empowerment is a dynamic process of change, whereby ‘those who have been denied the ability to make choices acquire such an ability’ (Naila Kabeer, 1999).

We will use both quantitative and qualitative methods to test a number of the assumptions and hypotheses derived from the theory of change as well as looking at the causal chain of energy supply and use. We will use the extensive networks of the research partners (which covers academia, policy and practice) to share our findings and influence policy and practice through publications, modern media and workshops.

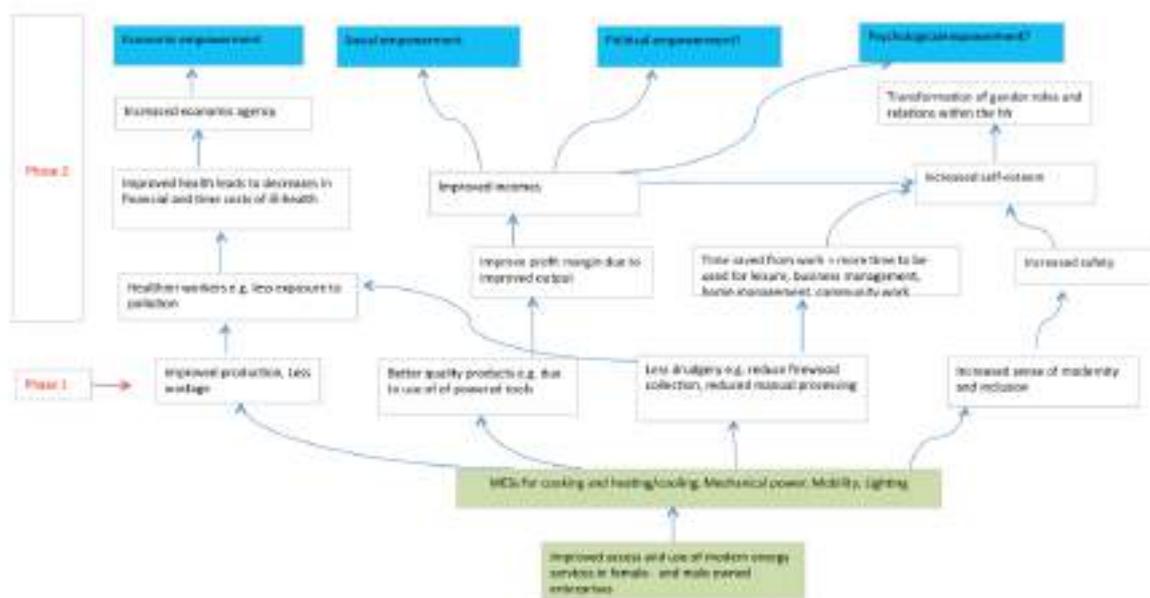


Figure 7: Analytical framework based on the theory of change framework

Phase 2 deliverables

- Each research team will organise three seminars or events involving a panel of research experts and policy makers discussing the latest research findings that have been facilitated by relevant Southern policymaking institutions, with workshop reports and follow-up. These contribute to capacity building of policy makers understanding about links between gender

and energy.

- Case studies (best cases, exemplary and contrasting ones related to key research questions) and other material for use in a best-practice dataset and for external communication.
- Country studies with sections on the regional context focussing on energy and gender.
- A minimum of two articles based on robust evidence on the linkages between gender, energy and poverty to be published in peer-reviewed journals (submission by September 2016, and May 2018).
- Four articles or research papers disseminated to stakeholder audiences from policy and practice, for example published in conference proceedings, journals and magazines presenting policy orientated research outputs that specifically address knowledge gaps in linkages between gender, energy and poverty.
- Dissemination products and active dissemination through partners' own dissemination media (newsletters, websites, blogs etc.) and inputs to ENERGIA and ETC dissemination products.
- Attendance at two SE4ALL meetings supporting or representing ENERGIA.

5.5. Influencing policy at multiple levels

SE4ALL

One of the main aims of the SE4ALL initiative by the United Nations is to promote sustainable energy development. In order to realise this goal, several initiatives to mobilise key actors around the world are in action. Our project aims to connect and contribute to this important initiative in the following ways:

- Contribute relevant information about the impacts of access and use of MESSs on IFS enterprises owned by men and women in the urban areas of developing countries. This will contribute directly to the SE4ALL initiative aimed at expanding capacity building of practitioners working to alleviate energy poverty in developing countries.
- Closely follow activities by the SE4ALL Africa Hub in order to participate and contribute to the local think tanks to share information based on our research.

National and local levels

- Our research will inform policy at different levels and sectors. The energy sector will be targeted to ensure that relevant energy services are accessible to the men- and women-owned enterprises in the IFS. At the local level (municipalities and other local authorities), information generated by the study on the impacts of regulations and by-laws will influence the implementation of such regulations in the future.

5.6. Revisions of timeline, workplan, budget, project team and any other key revisions

5.6.1. Background to proposed timeline for Phase 2

A major change to the project team has been brought about by the loss of a senior team member from the University of Cape Town. Nevertheless, changes in the timeline, workplan, budget and project team have been kept to a minimum. The research team aims to conclude the project within the

proposed Phase 2 period, in line with the initial proposal submitted to ENERGIA at the beginning of the Scoping Phase. For an overview of the planned Phase 2 activities, see Appendix 3.

5.6.2. Background to Annual Workplan 2016

The Annual Workplan for 2016 is part of the document submitted for Phase 2 planning. In 2016 we will use the data collected during the Scoping Phase as a baseline to inform the type of research issues that we need to pay close attention to. The activities for 2016 research year include questionnaire survey design and testing. The same will be done for the in-depth interviews and focus groups. We will also attend and host stakeholder engagement processes in the form of meetings, workshops, and where possible, partnerships with those that will assist with the dissemination of our research. During 2016 we will produce research update reports and submit journal papers for publishing based on the work done during the Scoping Phase.

5.6.3. Background to the budget for Phase 2

There are slight changes to the budget, which include reallocation of activities, particularly for the University of Cape Town partner. Minor changes may occur where consortium partners may decide to allocate more or less hours per staff member on the project. These changes will not at any time constitute 10% of the total budget at any time. In the event that budget changes affect 10% of the allocated budget, The lead organisation will inform ENERGIA.

5.6.4. Project team for Phase 2

The research team composition is multi-disciplinary, with an even North-South spread, including both women and men from academic and practice. This will enable a holistic analysis with added value for both academic and non-academic audiences. Within the team, participation from researchers at doctoral and post-doctoral levels will ensure academically and scientifically sound results. Whereas the Southern partners dominate the research activities, the Northern partners will provide additional steering and capacity building, whilst embedding themselves in the data collection and analysis of the case study countries. For example, although the lead applicant is based in a Northern institution, the key researcher and project coordinator is from a Southern country and has significant research experience in Sub-Saharan Africa, and is well-versed with the energy and gender research in developing countries. The team research assistants, including interns, will be supervised by members of the project team.

The research team has secured backing of expertise that act as project advisors. These advisors have diverse skills which include gender and energy in developing countries, research methods, business development and entrepreneurship, in-depth knowledge of working in developing countries, policy analysis and policy.

Name	Institution	Role in the project
Professor Hans Bressers	University of Twente	Overall management responsibility of the project to ensure academic rigour, adherence to ethical standards and to provide (where necessary) capacity building of the team particularly in the field of policy impact evaluation.

Dr Nthabiseng Mohlakoana	University of Twente	of	<p>Day to day research coordination while working closely with Prof. Bressers and other team leaders and coordinators. For Phase 2, she will also be responsible for overall monitoring of fieldwork in South Africa, Senegal and Rwanda while working closely with the local consortium research teams to ensure research consistency.</p> <p>Scoping studies: Contributing to the synthesis of the literature and the analysis of the IFS and other food processing micro and small enterprises.</p> <p>Macro-analysis using secondary sources of data: Prioritising sectors for collecting secondary sources of data, analysis and synthesis of the data, developing reports and co-authoring papers with other consortium members.</p> <p>Micro-analysis using data from primary survey: Contribute to designing questionnaires and sampling methodology; contributing to data analysis, synthesis, inferences, and implications; co-authoring papers.</p>
Dr Margaret Matinga	University of Twente and University of Cape Town	of	<p>During Phase 2 of the research project, Dr Matinga will be part of the team as a consultant and advisor. Dr Matinga will support the coordinating team in reviewing and critically analysing questionnaires, produced data, reports, literature reviews and co-authoring papers with other consortium members. She will also provide guidance to the team in the field work preparatory phases where she will advise on approaches to ethnographic observation and in refining the theoretical framework to be used for Phase 2.</p>
Dr Jiska de Groot	University of Cape Town	of	<p>Dr de Groot will be the key contact person for the ENERGIA research. Her role includes the coordination of fieldwork activities for the Cape Town and Durban sites, design and implementation of research activities; and coordination of stakeholder engagement among academic and non-academic audiences. She will be supported by Dr Batidzirai. He will be further backed up by Ms Martin (Research Projects Manager). Both have extensive networks and project experience of their own; should specific functions in the project need to be fulfilled by them, please specify clearly. In close collaboration with Prof. Bressers and Dr Mohlakoana, Dr de Groot will contribute contents-wise to the scientific embedding and homogeneity of the research activities in the three partner countries.</p>
Dr Bothwell Batidzirai	University of Cape Town	of	<p>Team leader for Phase 2. Dr Bothwell Batidzirai provides management and research support to Dr de Groot with day-to-day decision-making concerning the project. With respect to the dissemination of the project outputs, Dr de Groot and Dr Batidzirai will support each other in representing the consortium and its work through their networks in the energy and development sector, and highlight the importance of the project with policy makers. Similar to other members of the research consortium, the University of Cape Town will also receive support on business development expertise from the advisory team which includes Professor Knorrnga.</p>
Ms Brenda Martin	University of Cape Town	of	<p>Ms Martin will provide the University of Cape Town team with network support by recommending networks within the energy sector within and outside of SA, and assisting the team at consortium level with constantly updating its communication strategy.</p>
Ms Abigail Knox	University of Cape Town	of	<p>Ms Knox will be employed in Phase 2 to design and implement research activities in the Durban case study. She has experience in researching the informal energy market in the informal food sector and is currently undertaking a PhD at the University of Cape Town. Her work will directly contribute to this project. She will be in charge of coordinating fieldwork, sample selection and linking the research to local stakeholders and policy makers, and will be involved in writing project reports and other outputs. In addition, Ms Knox will contribute to academic paper writing and dissemination of the project to academic and non-academic audiences.</p>

Mr Robert van der Plas	MARGE	Mr van der Plas is the team leader at MARGE. He will coordinate the activities undertaken by MARGE in Rwanda and will ensure that all relevant information and deliverables are provided to the University of Twente. Overall, Mr van der Plas will also assist in ensuring that all the consortium teams are working towards a common goal.
Ms Marina Brutinel	MARGE	Ms Brutinel has experience ranging from the provision of high level policy advice in the field of sustainable development strategies. Her skills include both assessment and development projects that economic analysis. For this project she will be responsible for the research and supervision of the research assistant at MARGE.
Mr Andrea Ranzanici	MARGE	Mr. Ranzanici has experience in sustainability assessment and technical assistance of energy projects in Rwanda, Madagascar and Indonesia. He will support the MARGE/IB&C teams for Rwanda as research assistant.
Ms Yacine Diagne Gueye	ENDA	Ms Diagne will be in charge of research project coordination, management and supervision of junior staff at ENDA. Her responsibilities will include ensuring that that all relevant information and deliverables are provided to the University of Twente. Ms Diagne will use her ENDA network to disseminate research findings to policy makers and their role as ENERGIA focal point to ENERGIA members. To this project she will bring lessons learned from her participation in the World Bank PROGEDE project into the research as well as sharing with WB our findings.
Mr Abdou Ndour	ENDA	Field research, design of data collection tools, collection of secondary data. Literature review and primary data investigation, market analysis and analysis of needs of micro and SMEs.
Mr Abdou Thiam	ENDA	Mr Thiam has a considerable experience working with local organizations, SMEs, local decision-makers and rural populations in energy issues, and in organising energy training and workshop and networking. He will contribute this experience to the project.

Project advisors

Dr Margaret Skutsch	University of Twente and University of Cape Town	Dr Skutsch brings her extensive skills in designing and conducting social science research to building the team's capacity to conduct research using a gender approach. As a founder member of ENERGIA she has considerable knowledge of gender issues in the energy sector and has designed gender tools for use in conducting research in the energy sector. During the Scoping Phase she supported the team in designing the methodology and defining the scope of the primary and secondary qualitative data collection and gave advice on analysis. For Phase 2 of the project, Dr Skutsch will have more days on the project and will continue to advise the team on methodological issues and analysis. She will ensure that the written output is of academic rigour and quality. She will also use her climate change network to disseminate the findings of the research.
Dr Thomas Hoppe	University of Twente	Dr Hoppe brings his skills in designing, conducting and analysing quantitative research in the energy sector. During the Scoping Phase, he played an active role in advising the team about the questionnaire structure in order to cover all the proposed issues. Dr Hoppe will continue to offer his methodology expertise to the research team

		throughout Phase2. As the Energy Stream coordinator for CSTM's Masters in Environmental and Energy Management he is involved in supervising research in the energy sector of students from the South (including household energy). His role will be to build the capacity of the team to design and conduct quantitative research.
Dr Emile Dophide	University of Twente	Dr Dopheide brings skills in capacity building for designing, conducting and analysing quantitative research for micro-level economic analysis. During the scoping phase he provided much needed support and advice where piloting of the questionnaire was concerned. He will continue to be part of the project especially in advising the team on how best to use the data collected for Phase 2. He has considerable experience in training Southern researchers in this type of research.
Prof. Peter Knorringa	Erasmus University Rotterdam - ISS	Prof. Knorringa is an expert in entrepreneurship and business development. He has ample experience on small and medium scale enterprises in developing countries including South Africa. During the scoping phase he has assisted the research team in shaping the project focus and categorising the enterprises as survival or growth oriented which makes the research more relevant. His role is to offer advice on sample selection and analysis of data collected from different types of IFS enterprises. Pro. Knorringa will also contribute and exchange knowledge based on his current project titled 'Frugal innovation and technology networks with Africa', which also focuses on how modern energy services can improve the lives of the poor.

5.6.5. Risks and mitigation strategy

Risk	Mitigation strategy
Project management	
Key persons' reduced participation in the project	Project proponents are permanent staff of the respective institutes. However, in the event of a research team member not being available in the long term, the consortium is sufficiently large that there will be another staff member able to take over either permanently or at least in the short term until a suitable replacement (full-time employee or consultant services) can be appointed.
Loss of data due to IT failure	Maintenance of back-up database that is regularly updated and following a data protection protocol.
Conflicts given the cultural differences inherent in working among international partners	Chances of conflicts arising due to this will be minimal because of involvement of partners with professional background and with prior international collaborative experience. Well laid out plan of action and partner responsibilities can further minimise this.
Research quality	
Risk of incoherence between countries	Regular consultation between country team leaders and the University of Twente. Dialogue about joint methodologies to ensure that any local variation is still compatible with the central tenets of the methods while allowing for generalisation where possible. We will use the scoping phase of testing the surveys in the three partner countries, analyse the results and compare the findings and where necessary make necessary changes in the questions to ensure relevance, clarity and transferability of findings while maintain local nuances.

Lack of interest by policy makers and other stakeholders	Continuous involvement from the start of the project in designing the research creates ownership.
An ambitious survey plan	We recognise that collecting data in three countries is ambitious. We consider that including personnel in the participating institutions who have extensive experience with surveys and survey design will ensure that we are realistic. If need be at the end of Phase 1 we can reassess what the options for detailed collection are.
Lack of interest by research subjects	Respondents will not be forced into participation but will be made aware that their input will potentially assist creating better policies that will benefit their enterprises. We believe that adopting a more ethnographic approach of observation a level of trust will be built with respondents which will encourage a greater preparedness to share information. It is the experience of one of our team when conducting her PhD research that women find the experience of being asked about such a different topic of energy rather than HIV/AIDS as making them more than willing to talk about their views on the subject.
Attrition (research subjects disappear)	Given the nature of the sector entrepreneurs for a variety of reasons may cease to trade or have moved to another location. By employing a large sample size we aim to ensure that the quantitative results are not compromised.

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