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Energy Efficient Production and Utilization of Charcoal through Innovative Technologies and Private Sector Involvement in Sierra Leone



Final Consultancy Report

On

Capacity building for clean cooking stove entrepreneurs on the production, utilization, maintenance and benefits of energy-efficient furnaces/stoves.

CORD-SL

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Abbreviations and Acronyms

CILSS - du inter-states committee for Drought Control

CORD-SL- Counterparts in Rehabilitation and Development in Sierra Leone

CSO - Civil Society Organization

ECOWAS - Economic Community of West African State

GHG – Green House Gas

MDAs – Ministries Departments and Agencies

PM - Particulate Matter

PREDAS - Programme regional pour la promotion des energies domestic et alternatives au Sahel

WHO - World Health Organization

1. EXECUTIVE SUMMARY

Wood fuel remains the dominant source of energy in Sierra Leone. The production and trade in charcoal has been a massive rural growth industry over the past decade in Sierra Leone. However, it is being unsustainably harvested, leading to severe depletion of the country's forest cover. Charcoal is substantially more efficient than wood and burns with very limited smoke and less fire hazard (preferred by landlords) and it has higher calorific value and easier to transport than wood. As a result, many people consider charcoal a relatively modern fuel when burn on the modern stoves. Notwithstanding its popularity, the charcoal and cookstoves sub-sector remains informal, unregulated and fragmented, plagued by inefficient production system relying on non-renewable sources. Project Objectives

The trend and pattern of charcoal production and utilization requires an interventions that should avoid trying to fundamentally change how the fuelwood industry operates and focus on solutions that makes the trade and business more efficient, resilient and sustainable by incentivizing all value chain actors as inclusive business. Therefore, the project was designed on Energy Efficient Production and Utilization of Charcoal through Innovative Technologies and Private Sector Involvement in Sierra Leone. The objective of the project is to bring economic, social and environmental benefits through the production of certified charcoal from sustainably sourced feedstock and through the promotion of improved cookstoves to reduce fuel wood demand, improve health and reduce greenhouse gas emissions.

On behalf of the Ministry of Energy (MoE), UNDP sought a consultancy with Counterparts in Rehabilitation and Development in Sierra Leone (CORD-SL) for capacity building oriented towards clean cooking entrepreneurs on the production, utilization, maintenance and benefits of energy-efficient furnaces/stoves. CORD-SL was therefore engaged in contractual agreement to produce an inception report with detailed work plan including activities and timelines that the contractor plans to undertake in order to complete this assignment for review and approval by UNDP; Identify, select and train 100 participants from among the public, private and CSO stakeholders at the national and districts levels according to the protocol of UNDP and MoE; conduct awareness campaigns on the use, maintenance and benefits of energy-efficient kilns; and submit final report to UNDP and the Ministry of Energy.

An inception report was submitted that spelt out the format of the consultancy with definite time lines. One hundred cookstoves entrepreneurs drawn from across the four regions were trained on cookstove production, maintenance and utilization. Putting things into the bigger picture and practice, was what the 4th day of the workshop was all about. Moving from theory to practice enhanced understanding. Similarly, awareness raising campaigns on efficient cookstoves were carried out. This enhanced the capacity of cookstove entrepreneurs to think efficient energy.

One key lesson learnt was that knowledge on the fabrication and production of cookstoves alone without complementary knowledge and skills in marketing may not increase production and utilization of improved and efficient cookstoves. It is concluded that awareness-raising campaigns showed how behavioural change could prevail in daily situations and the use of biomass. Based on the conclusions, it is recommended that funding in the form of grant or loan should be identified and sourced for entrepreneurs involved in fabrication and production of efficient cookstoves/kiln stove.

2. INTRODUCTION

2.1 Background

It has been estimated by the World Health Organization (WHO) that about 3 billion people worldwide rely on solid fuels for cooking and heating and that a large proportion of the affected population live on the traditional biomass fuels, such as wood, charcoal and agricultural waste. Biomass (firewood, charcoal and crop residues) provides the bulk of the energy supplied in the household, commercial and service sectors of the economy in Sierra Leone. It provides almost all the energy used to meet basic needs of cooking and water heating in rural and urban households, institutions and commercial buildings and it is the main source of energy for rural industries. The biomass energy situation has transformed dramatically over the past decade with a significant increase in charcoal production nationally and in charcoal consumption in urban areas – most notably in Freetown. This has seen a massive rural growth industry of the production and trade in charcoal in Sierra Leone.

A recent study done in West Africa targeting the distribution of the population according to the primary fuel used for cooking showed that Sierra Leone uses about 99 percent of biomass fuel (charcoal and wood put together); the highest in the sub region (WHO, 2009, data base, 2009 Programme regional pour la promotion des energies domestic et alternatives au Sahel (PREDAS) du inter-states committee for Drought Control (CILSS). At this rate, the pressure on natural resources is exacerbated even further as communities produce more charcoal to meet their livelihood demands and urban charcoal consumer demand. The use of solid fuels (particularly wood and its conversion into charcoal) for cooking and heating causes emission of large amount of pollutants such as particulate matter (PM), carbon monoxide, hydrocarbon, formaldehyde and benzene that causes serious respiratory problems to mainly women and children who are mostly exposed to the dangerous gas. Worst case repercussion scenario from exposure to cooking smoke is death (mostly premature) and such deaths account for more than deaths caused by malaria and tuberculosis in the ECOWAS.

2.2 Project Goal and Objective

Hence, the Ministry of Energy (MoE) through UNDP secured fund from the Global Environment Facility (GEF) on Energy Efficient Production and Utilization of Charcoal through Innovative Technologies and Private Sector Involvement in Sierra Leone project. The goal of the project is to reduce GHG emissions in the domestic and industrial sectors of Sierra Leone through integrated and sustainable biomass resource production and utilization, and promotion of sustainable biomass energy technologies in Sierra Leone using output based and market based approaches. A key objective of the project is to bring economic, social and environmental benefits through the promotion of improved cook-stoves to reduce fuel wood demand, improve health and reduce greenhouse gas emissions. This GEF funded project is collaborating with ministries, communities and entrepreneurs to achieve its goal.

2.3 Consultancy Objective

On behalf of the Ministry of Energy (MoE), UNDP sought a consultancy of an energy and biomass technology institution/firm/enterprise for capacity building oriented towards clean cooking entrepreneurs on the production, utilization, maintenance and benefits of energy-efficient furnaces/stoves so that there will be a pool of individuals who could be tapped for the construction, operation or maintenance of new projects, in order to enable the growth of cookstove and kiln service market.

2.4. Scope of Consultancy

In response to the call for proposals from UNDP, CORD-SL proposed the capacity-building of entrepreneurs on the production and utilization of efficient cookstoves such as Biochar (Pyrolytic charcoal) and the Alphas Stove and/or ELSA Stove as alternative energy sources and for kiln cooking in households. The underlying focus was to train 100 entrepreneurs who will serve as a pool of entrepreneurs who could be tapped for construction, operations and maintenance of new projects thereby contributing to the global fight against climate change which partly occurs due to the excess emission of biomass fuel into the atmosphere through the use of solid fuel like charcoal and wood.

The consultancy was intended to cover the entire country and targeted 100 cookstove entrepreneurs who already had prior knowledge in metal work and showed the willingness to use talent to create wealth. The coverage also included vocational learning institutions which had the required tools for technological skills transfer. Work lasted for a period of five months.

- Prepare handouts and other preparatory activities.
- Identify and select 100 participants from among the public, private and CSO stakeholders at the national and districts levels according to the protocol of UNDP and MoE.
- Select the dates of the trainings, and booking of the venues
- Identify and invite resource persons and participants.
- Conduct cost effective and result-based trainings on efficient charcoal production, maintenance and utilization that are not limited to academic presentations and documentations but will include a dominant share of pragmatic hands-on, 'learning by doing' and peer to peer training.
- Conduct two awareness campaigns on the use, maintenance and benefits of energy-efficient kilns.
- Design drawings, construction procedures and manuals for the construction and operation of energy-efficient stoves
- In consultation with relevant parties, propose draft agreement between the Ministry of Energy and local fabricators on the production of the furnaces/ stoves and training on their design and operation features.
- Support the production, installation and dissemination of furnaces/stoves to end-users.
- Prepare handouts and other preparatory activities.
- Identify and select 100 participants from among the public, private and CSO stakeholders at the national and districts levels according to the protocol of UNDP and MoE.
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- Conduct two awareness campaigns on the use, maintenance and benefits of energy-efficient kilns.
- Design drawings, construction procedures and manuals for the construction and operation of energy-efficient stoves
- In consultation with relevant parties, propose draft agreement between the Ministry of Energy and local fabricators on the production of the furnaces/ stoves and training on their design and operation features.
- Support the production, installation and dissemination of furnaces/stoves to end-users.

3. METHODOLOGY

The consultancy was conducted in four stages, namely:

3.1 Presentation of Inception Report: A detailed work plan including activities and timelines that the consultancy would undertake in order to complete this assignment was presented to UNDP for review and approval. This entailed desk review of project documents and relevant literature. This took the form of an inception workshop.

3.2 Training of cookstove entrepreneurs: Preparation for the training started with the production of training modules or handouts for target communities within three weeks of contract signature. Afterwards, a comprehensive participants list from among the public, private and CSO stakeholders at the national and provincial levels was put together for the trainings on efficient charcoal production, maintenance and utilization. The selection of participants was done a consultative meetings with relevant stakeholders like Ministry of Energy and other line MDAs. This generated relevant information was used to triangulate with other information to produce a consolidated and organized data on existing entrepreneurs in the business of cookstoves entrepreneurship. This was followed by a country tour in collaboration with the UNDP and other local stakeholders. During such time, some typical questions including whether CSO/Private/Public? Core Competency and purpose of existence? Individual knowledge and experience and where operations are taking place were posed during the consultative meetings with stakeholders. These questions were meant to provide the required information for the continuation of the process. The consultant planned and submitted of design drawings, construction procedures and manuals for the construction and operation of energy-efficient stoves to be used during the training.

Training Method/Approach took two phases: The first phase was in the form of classroom teaching. This session covered theoretical knowledge sharing with the participants based on tailored templates and tutorial manuals that were used by the facilitators and trainers. The second phase of the training had participants put into work clusters and allowed to fabricate energy saving stoves and to demonstrate a new method of producing smoke free charcoal. Each cluster comprised of different specialized persons each of whom completed a separate type of work (cutting, bending, welding, filling and spraying) with the aid of templates and other jigs that were provided and tutored on by the facilitator. These processing stages applied to both Alphus and ELSA stoves. The training module used by the consultant comprised of two components – Theoretical teaching and Practical hands on training. These were supported by training manuals which were distributed and used by the participants throughout the sessions. During the training sessions, participants contributed to the development of a proposed agreement between the Ministry and local fabricators for the production of the furnaces/ stoves. The training reports were submitted to UNDP for review.

3.3 Awareness campaigns: As an action point of the trainings and in compliance with the Terms of Reference (TOR) on awareness campaigns on the use, maintenance and benefits of energy-efficient kilns. The conduct of a countrywide awareness raising on the use of kiln stove instead of wood fuel took the form of drama, demonstrations and songs. Series of local tools were used for this exercise in order to make it locally owned and to ensure community commitment to the objective of the consultancy. Photographs were collected and presented to UNDP and the Ministry of energy through the respective reports.

3.4 Final Report: In addition to the inception report, training report and awareness raising report, CORD-SL presented the draft of the final consultancy report to UNDP which was reviewed.

Reviewed comments were then incorporated into the Final Consultancy Report including lessons learnt, recommendations and annexes of attendance lists.

4 COMPREHENSIVE CONSULTANCY DELIVERABLES

4.1 Inception Report: Consultancy work started with an inception report. The report provided an insight of work scope and possible challenges that the consultant could have probably faced. The report also provided the work approach, tools and work calendar that the consultant had to use to effectively carry out the work. It even suggested training modules. This provided the project with an overview of how the consultancy would look like: the scope, the timing and duration.

4.2 Cost effective and result-based trainings: Between the month of May and September 2017 CORD-SL conducted training exercises for one hundred (100) participants at the four regions of Sierra Leone. Participants were drawn from various districts in all four regions and the exercise targeted students as well as metal work and engineering practitioners.

The objective of the training exercises was to empower participant entrepreneurs with hands on training and skills that will enable them add value to their metalwork skills and at the same time make them innovative in using a niche in gaining livelihood in communities. These trainings accounted for the accomplishment of a consultancy service that was provided.

5.2.1 Participant List - A total of 100 cookstoves (90 males and 10 females) entrepreneurs were trained in a series of trainings. Twenty-five participants each were trained from the Western Area and in the Southern, Northern and Eastern provinces. A comprehensive participants' lists from among the public and private sectors were produced prior to the respective regional workshops which positively influenced the workshop attendance. Participants provided contacts to aid follow up. The majority of cook stove entrepreneurs or fabricators were men which is indicative of the poor representation of women (10%) and very low participation of women in the training. Provision was also made for the participation of people with disabilities



Fig 1: Participation of people with disability

5.2.2 Training modules or handouts. The trainings were conducted through theoretical lectures from the training modules and handout presented in the Inception workshop. These modules and manuals helped participants to understand key concepts, parts of the stove and names of tools. Inclusion of design drawings, construction provided

insight into what the practical session would provide and the procedures in the manuals for the construction and operation of various cookstoves prepared them for the practical sessions of Day 4.



Fig 2: Participants in theoretical learning sessions

5.2.3 Practical Sessions: In the practical sessions, presentation in the form of experimental display of main different charcoals stove or cookstoves presently in use countrywide was employed. These included the wonder stove (KCJ), Alpheus charcoal stoves and ELSA stove. At the end of the training sessions (theoretical and practical) participants enhanced their knowledge on the basics of material cutting analysis, the uses of cutting and bending tools; preparation of various templates based on drawing; production of heat insulating materials for the various stove types; and using various templates to produce stove patters and development of production jigs for mass production.



Fig 3: Cluster of participants in practical training sessions



Fig 4: Participants showcasing finished products

5.2.4 Experience sharing: Participants were randomly chosen to explain their experiences in the industry and knowledge gathered from the training. Some participants were randomly selected participants were allowed to demonstrate their practical knowledge. The experience sharing on cookstove fabrication and production communicated challenges posed by the industry and resolutions adopted to overcome some of these challenges.



Fig 5: Certification ceremony

5.3 **Proposed Memorandum of Association (MOA)**: Based on the experiences shared, the consultant developed a proposed MOA between beneficiaries and the Ministry of Energy. The essence of the MOA is to establish a special working relationship between the two parties and to sustain the project idea particularly in regards to logistical support from the Government of Sierra Leone to promote entrepreneurship development in the cookstove industry within the country. At the end participants were given certificates.

5.4 **Awareness-raising campaigns.**

Awareness raising campaign used all accessible activities, which encouraged literate and illiterates to acquire new skills in cookstove fabrication, production and utilization. Even those activities such as dance or cooking, are recommended. Additionally, the campaign encouraged peer-to-peer learning that provided learners with the motivation to involve in the industry and thereby taking advantage of the livelihood opportunity. Also, spectators who were learners themselves became more aware of the obstacles faced by women using the traditional three-fire-stone hearth and the demand it puts on the forest. This could influence them to adjust the livelihood in a more effective way.

In addition, the campaign advised stakeholders to identify ways to minimise fuelwood use. This will be useful in provision of a clear and comprehensive guidance for effective natural resource management. Moreover awareness-raising campaigns showed how behavioural change could prevail in daily situations and use the biomass. Observers were encouraged to share their experiences which was useful for the new learners to understand better what they can expect from the awareness-raising campaign process. The use of role plays helped to make a consultancy pertinent and aspirational for the participant.

5.5 **Final consultancy report**

With the input and the professional experience, it was time to produce the consultancy report as a means of communication on the consultancy. It is intended that the ideas expressed in this reports will

be used as a basis for action or to make a decision of some sort. The report summarises the main deliverables of the consultancy, making sure that the conclusions and recommendations drawn are supported by the findings.

5. SUMMARIES AND RECOMMENDATIONS

Haven gone through the training exercises a special debriefing session was organized for the participants in each location in order to assess the training outcomes. These are expressed in the following sub-headings:

3.5. Challenges

The training was not accomplished devoid of difficulties and challenges. Below were a couple of challenges the project team faced in both the field and in-office works.

- Some of the participants were illiterates and so found it difficult to understand especially at the theoretical training sessions. This was mitigated by code switching which the consultant used to bring the illiterate participants to speed.
- Participants expressed financial difficulties that they might face in getting the input materials for the production of the stoves
- Generally, participants expressed that the theoretical aspect of the training was difficult to grasp as some participants lacked basic education

5.2. Lessons learnt

- Work in the industry is considered by participants as too difficult for women
- practical fabrication of cookstove alone without marketing may not increase production

5.3. Conclusion

- Certificates were distributed among participants with CORD-SL and UNDP logos.
- The clusters were necessary and helpful for individuals and group understanding as participants showed appreciations for support received from their cluster members.
- Participants demonstrated eagerness to replicate fabrication for their individual livelihood but were said to be constrained by capital.
- The consultant awaits feedback from the field coordinator and partner facilitators as well as beneficiary participants.

5.4. Recommendations

It is recommended by the team that the following be addressed if the project on kiln cookstove fabrication is to thrive and achieve its objectives:

- Where need be the consultant to make further visitation for further debriefing.
- Funding should be identified and sourced for kiln stove fabricating entrepreneurs in the form of grant or loan.
- A robust monitoring exercise to be conducted in the form of post training assessment. This will validate the training outcomes

- Government of Sierra Leone and Development Partners should consider a robust policy for technical-vocational training which will serve as host to new technologies like the Elsa and Alphas Stove fabrication.
- Follow-up training of cookstove entrepreneurs is required in marketing for the upscaling on cookstove production and utilization.
- Awareness-raising activities such as dance or cooking are recommended.

6 Annexes

Annex 1: Training Module

Day 1

- ✓ Principles of operation of the stoves
- ✓ Test for charcoal fuel consumption and overall efficiency
- ✓ Advantages and disadvantages in the uses of the various stoves

Day 2 & 3

Analysis on the fabrication of the Alphas charcoal stove and ELSA stove.

- ✓ Basics on material cutting analysis
- ✓ The uses of cutting and bending tools

Group work

- ✓ The preparation of various templates based on drawing
- ✓ Production of heat insulating materials for the Alphas stove
- ✓ Alphas charcoal stove production using various templates to produce stove patters
- ✓ Development of production jigs for mass production of Alphas stove
- ✓ Final practical fabrication of the Alphas stove for marketing

Day 4

Group work

- ✓ Production of ELSA stove
- ✓ Experience sharing on Elsa stove production
- ✓ Presentation on charcoal production utilizing the Alphas system

Annex 2: List of Participants

Eastern Region

No	NAME	ORGANIZATION	TOWN/DISTRICT
1	Kebbie Emmanuel Aiah	Eastern Poly-Tech	Kono
2	Kamara Ibrahim	Eastern Poly-Tech	Kono
3	Moripe Matilda Kumba	Eastern Poly-Tech	Kono
4	Sesay Isata	Eastern Poly-Tech	Kono
5	Musa Finda	Eastern Poly-Tech	Kono
6	Amara Denise Wai	Eastern Poly-Tech	Kono
7	Massaquoi Maruf M.	Eastern Poly-Tech	Kono
8	Mustapha T. Koroma	Eastern Poly-Tech	Kenema
9	James Bangura	Eastern Poly-Tech	Kenema
10	Hassan Kamara	Eastern Poly-Tech	Kenema
11	Moses Samai	Eastern Poly-Tech	Kenema
12	Dauda Tarawalie	Eastern Poly-Tech	Kenema
13	Ira Dasama	Eastern Poly-Tech	Kenema
14	Sahr Manga	Eastern Poly-Tech	Kenema
15	Ansumana Gebbbeh	Eastern Poly-Tech	Kenema
16	Sao Francis Momoh	Eastern Poly-Tech	Kenema
17	Henry Saidu	Eastern Poly-Tech	Kenema
18	Edison D. Lahai	Eastern Poly-Tech	Kailahun
19	Momoh Komaway	Eastern Poly-Tech	Kailahun
20	Musa Sheku	Eastern Poly-Tech	Kailahun
21	Elizabeth Wai Swaray	Eastern Poly-Tech	Kailahun
22	Susan Jusu	Eastern Poly-Tech	Kailahun
23	Asanatu A. Sesay	Eastern Poly-Tech	Kailahun
24	Morie N. Sellu	Eastern Poly-Tech	Kailahun
25	Mohamed Juana	Eastern Poly-Tech	Kailahun

Southern Region

No	NAME	ORGANIZATION	TOWN/DISTRICT
1	Saidu Kallon	Disable Rights Movement (DRIN)	Pujehun
2	Munda Boizy	Disable Rights Movement (DRIN)	Bonthe
3	Haddah Sheriff	Disable Rights Movement (DRIN)	Bo
4	Daniel A. Momoh	Disable Rights Movement (DRIN)	Moyamba
5	Joe Bundu	Disable Rights Movement (DRIN)	Moyamba
6	Raymond Bendu	Rotifunk Black Smith Center	Moyamba
7	Yusufu Kamara	Rotifunk Black Smith Center	Moyamba
8	Saidu Kamara	Rotifunk Black Smith Center	Moyamba
9	Kolleh Bendu	Rotifunk Black Smith Center	Moyamba
10	Karimu Gbla	Rotifunk Black Smith Center	Moyamba
11	Alfred Muana	Growth Center – Bo	Bo
12	Gibril Bangura	Growth Center – Bo	Bo
13	Kamanda John	Growth Center – Bo	Moyamba
14	Rhahim Kargburie	Growth Center – Bo	Bo
15	Jacob Peter	Growth Center – Bo	Bo
16	Mary Coker	Growth Center – Bo	Bo
17	Musa Kargbo	Growth Center – Bo	Bo
18	Samuka juana	Growth Center – Bo	Bo
19	Ismail Muana	Growth Center – Bo	Bo
20	Mustapha Kamara	Growth Center – Bo	Bonthe
21	Abubakarr Sillah	Growth Center – Bo	Bo
22	Mohamed F. Kamara	Growth Center – Bo	Bo
23	Mustapha Fofana	Growth Center – Bo	Bo
24	Jibrilla Bangura	Growth Center – Bo	Bo
25	Joseph Josiah	Growth Center – Bo	Moyamba


Northern Region

No	NAME	ORGANIZATION	TOWN/DISTRICT
1	Joseph D. Fomba	SLOIC	Makeni
2	Sheku Kanneh	SLOIC	Makeni
3	Joseph F. Lebbie	SLOIC	Makeni
4	Alieu Tarawalie	SLOIC	Makeni
5	Alieu Musa	SLOIC	Makeni
6	Francis M. Turay	SLOIC	Makeni
7	Sorie Bangura	SLOIC	Makeni
8	Daniel Koroma	SLOIC	Makeni
9	Gibrilla Tarawalie	SLOIC	Makeni
10	Daniel Kamara	SLOIC	Makeni
11	Solomon Tarawalie	SLOIC	Makeni
12	Ibrahim G. Kalokoh	SLOIC	Makeni
13	Amadu Koroma	SLOIC	Makeni
14	Joseph Sesay	Growth Center	Binkolo
15	Marco Conteh	Growth Center	Binkolo
16	Sanpha Sesay	Growth Center	Binkolo
17	Edmond J. Kamara	Growth Center	Binkolo
18	Andrew J. Kanu	Growth Center	Binkolo
19	Isheka Kalokoh	Growth Center	Binkolo
20	Ibrahim Kalokoh	Growth Center	Binkolo
21	Mohamed Conteh	Growth Center	Binkolo
22	Joseph S. Kabia	Growth Center	Binkolo
23	Kamanda Koroma	Growth Center	Yoni
24	James K. Kamara	Growth Center	Yoni
25	Henry Komeh	Growth Center	Yoni

Western Region

No	NAME	ORGANIZATION	TOWN/DISTRICT
1	Mustapha Koroma	Government Trade Center	Freetown
2	Joseph Mansaray	Government Trade Center	Freetown
3	Mohamed Conteh	Government Trade Center	Freetown
4	Mohamed Kamara	Government Trade Center	Freetown
5	Abubakar Thoronka	Government Trade Center	Freetown
6	Bockarie Koroma	Government Trade Center	Freetown
7	Brima Musa	Government Trade Center	Freetown
8	Hassan Kanu	Government Trade Center	Freetown
9	Mohamed Bangura	Government Trade Center	Freetown
10	Alhassan Turay	Government Trade Center	Freetown
11	Mohamed Jalloh	Government Trade Center	Freetown
12	Musa Kormeh	Government Trade Center	Freetown
13	Mohamed Kanu	Government Trade Center	Freetown
14	Abu Buya Bangura	Government Trade Center	Freetown
15	Thomas Lamgba	Government Trade Center	Freetown
16	Mustapha Makieu	Government Trade Center	Freetown
17	Obai Kamara	Government Trade Center	Freetown
18	Santigie Mansaray	Government Trade Center	Freetown
19	Alhaji Conteh	Government Trade Center	Freetown
20	Ibrahim Mansaray	Government Trade Center	Freetown
21	Abu Mansaray	Community Blacksmithing	Godrich
22	Foday Gamanga	Community Blacksmithing	Godrich
23	Samura Kamara	Community Blacksmithing	Godrich
24	Alpha Wurie	Community Blacksmithing	Waterloo
25	Gbessay Kanu	Community Blacksmithing	Waterloo

Annex 4 – Terms of Reference

UNITED NATIONS DEVELOPMENT PROGRAMME	 <small>Empowered lives. Resilient nations.</small>
Terms of Reference	

I. Position Information

Post Title:	Biomass technology institution/firm/enterprises to build the capacity of clean cooking entrepreneurs for the fabrication and distribution of energy efficient cookstoves and charcoal production.
Location:	Freetown, Sierra Leone Application
Type of Contract:	Professional Service
Application Deadline:	25 February, 2017; 13:00 hrs
Duration of Initial Contract:	120 working days between 15th March and 30th November 2017

II. Background

Biomass (firewood, charcoal and crop residues) provides the bulk of the energy supplied in the household, commercial and service sectors of the economy in Sierra Leone. It provides almost all the energy used to meet basic needs of cooking and water heating in rural and most urban households, institutions and commercial buildings and it is the main source of energy for rural industries. The biomass energy situation has transformed dramatically over the past decade with a significant increase in charcoal production nationally and in charcoal consumption in urban areas – most notably in Freetown. This has seen a massive rural growth industry of the production and trade in charcoal in Sierra Leone.

At this rate, the pressure on natural resources will be exacerbated even further as communities produce more charcoal to meet their livelihood demands and urban charcoal consumer demand. Interventions should be focused on making the trade and business more efficient, resilient and sustainable by promoting the production and utilization of efficient cook-stoves/kilns to reduce the demand for charcoal.

The Ministry of Energy (MoE) through UNDP secured fund from the Global Environment Facility (GEF) on Energy Efficient Production and Utilization of Charcoal through Innovative Technologies and Private Sector Involvement in Sierra Leone project. The goal of the project is to reduce GHG emissions in the domestic and industrial sectors of Sierra Leone through integrated and sustainable biomass resource production and utilization, and promotion of sustainable biomass energy technologies in Sierra Leone using output based and market based approaches. A key objective of the project is to bring economic, social and environmental benefits through the promotion of improved cook-stoves to reduce fuel wood demand, improve health and reduce greenhouse gas emissions. This GEF funded project is partnering with ministries, communities and entrepreneurs to achieve its goal.

On behalf of MoE, UNDP is seeking a consultancy of an energy and biomass technology institution/firm/enterprise for capacity building oriented towards clean cooking entrepreneurs on the production, utilization, maintenance and benefits of energy-efficient furnaces/stoves.

III. Duties & Responsibilities

Under the supervision of the UNDP Energy and Environment Programme lead, and in close collaboration with the Directorate of Energy in the Ministry of Energy, the contractor will be expected to develop technical skills and capabilities of members of communities, government agencies and institutions so that there will be a pool of individuals who could be tapped for the construction, operation or maintenance of new projects, in order to enable the growth of cookstove and kiln service market. The contractor carries on preparation work and organization of training on the installation, operation and maintenance of energy-efficient furnaces/stoves/kilns. The contractor therefore performs but not limited to the following key functions:

- Prepare handouts and other preparatory activities.
- Identify and select 100 participants from among the public, private and CSO stakeholders at the national and districts levels according to the protocol of UNDP and MoE.
- Select the dates of the trainings, and booking of the venues
- Identify and invite resource persons and participants.
- Conduct cost effective and result-based trainings on efficient charcoal production, maintenance and utilization that are not limited to academic presentations and documentations but will include a dominant share of pragmatic hands-on, 'learning by doing' and peer to peer training.
- Conduct two awareness campaigns on the use, maintenance and benefits of energy-efficient kilns.
- Design drawings, construction procedures and manuals for the construction and operation of energy-efficient stoves
- In consultation with relevant parties, propose draft agreement between the Ministry of Energy and local fabricators on the production of the furnaces/ stoves and training on their design and operation features.
- Support the production, installation and dissemination of furnaces/stoves to end-users.

IV. Deliverables & Timelines

Based on the scope of work outlined above, the contractor will be expected to deliver the following outputs:

- Detailed work plan including activities and timelines that the contractor plans to undertake in order to complete this assignment for review and approval by UNDP with copy to the Director of Energy within 5 working days upon contract signature.
- Comprehensive participants list from among the public, private and CSO stakeholders at the national and provincial levels approved by MoE by third weeks in March and May, 2017.
- Training modules or handouts for target communities within three weeks of contract signature.
- First cost effective and result-based trainings on efficient charcoal production, maintenance and utilization training reports in April and second training report in June 2017 to be reviewed by UNDP and the Ministry of Energy.
- Submission of design drawings, construction procedures and manuals for the construction and operation of energy-efficient stoves by April.
- Two reports on awareness campaigns on the use, maintenance and benefits of energy-efficient kilns in April and second in July.
- Submission of proposed agreement between MoE and local fabricators for the production of the furnaces/ stoves in in first week May.
- Draft consultancy reports to UNDP and the Ministry of Energy by 15 November 2017 to be reviewed by UNDP and the Ministry of Energy.
- Final report presented to UNDP and the Ministry of Energy by 30 November 2017 to be approved by UNDP and the Ministry of Energy including the following Annexes:
 - Overview of report
 - Recommendations.
 - Attendance lists

V. Payment Modalities

Payment to the contractor will be made in three instalments upon satisfactory completion of the following deliverables:

- 1st instalment: 20% upon approval of the detailed work plan by UNDP.
- 2nd Instalment: 50% upon review and approval of all tasked due by April 2017.
- 3rd Instalment: 30% upon review and approval of the final report, including annexes.

VI. Qualifications

This assignment requires the services of a firm/consortium/enterprise that can demonstrate adequate analytical capacity and that can provide a team with expertise in clean energy and technologies relevant to efficient cookstove production and utilization. The team should include (but is not restricted to) the following (note that the Team Leader could fulfil a dual role as one of the technical experts):

Team Leader

- Advanced University Degree in an area relevant to this assignment.
- At least seven years of relevant working experience, at a senior level.
- Experience in facilitating stakeholder engagement processes, including training workshop.
- Excellent communication skills, and fluency in spoken and written English.
- Experience working for an international organization would be an advantage.
- Excellent knowledge of the Sierra Leone context

Sustainable Energy Expert

- Advanced University Degree in Environmental Studies/ Renewable Energy or other professional area relevant to this assignment.
- Demonstrated expertise in areas relevant to renewable energy, including biomass conversion and rural charcoal production, as well as issues related to marketability.
- Excellent analytical and research skills.

VII. How to Apply

1. Qualified firms registered in Sierra Leone are hereby requested to apply. The application must contain the following:

- a. Brief letter of application.
- b. Personal CV of each team member, indicating relevant academic background and professional experience.
- c. Brief description (max. 2 pages) of the proposed methodology on how to complete the assignment.
- d. Financial proposal that indicates the all-inclusive fixed total contract price supported by a breakdown of costs (including professional fee, local transport, and specified other costs if applicable).

Note:

- The information in the breakdown of the offered lump sum amount provided by the offeror will be used as the basis for determining best value for money, and as reference for any amendments of the contract.
- The agreed contract amount will remain fixed regardless of any factors causing an increase in the cost of any of the components in the breakdown that are not directly attributable to UNDP.
- Approved local travel related to this assignment will be arranged and paid by UNDP Sierra Leone.

Please note that applications will only be considered if they include ALL of the items listed above. Also note that the UNDP job portal website only allows for one document to be uploaded, so please combine all of the abovementioned items into one single Word or PDF document before uploading.

VIII. Evaluation Criteria

Offers received will be evaluated using a Combined Scoring method, where the qualifications and proposed methodology will be weighted 70%, and combined with the price offer, which will be weighted 30%. Only consultants obtaining a minimum of 49 points in the Technical Evaluation will be considered for the Financial Evaluation. Criteria to be used for rating the qualifications and methodology:

Technical evaluation criteria (total 70 points):

1. Professional qualifications and experience with respect to the TOR: 25 points.
2. Methodology of approach (max 2 page) in accomplishing the consultancy including though not limited to (a) stakeholder engagement strategy, (b) timeline: 45 points.

Financial evaluation (total 30 points):

All technically qualified proposals will be scored out 30 based on the formula provided below. The maximum points (30) will be assigned to the lowest financial proposal. All other proposals receive points according to the following formula: $p = y (\mu/z)$ where: p = points for the financial proposal being evaluated; y = maximum number of points for the financial proposal; μ = price of the lowest priced proposal; z = price of the proposal being evaluated.

Approval

Name: _____ Designation: _____ Signature: _____ Date: _____

Annex 4 – **Draft MoA**