United Nations Development Programme

Country: Nigeria

PROJECT DOCUMENT

Project Title: Sustainable Fuelwood Management in Nigeria

UNDAF Outcome: Outcome 4.3. By 2017, Nigeria's environmental vulnerability to negative effects of economic activities, urbanization and climate change is reduced, focusing on sustainable environment and natural resources management.

UNDP Strategic Plan Output: Output 1.5: Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy)

Expected CP Corporate Outcome(s):
Outcome 1. Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded
CP Output(s): Output 1.4. Scaled up action on climate change adaptation and mitigation across sectors which is funded and implemented

Expected CPAP Outcome 4. Peaceful, secure and sustainable development path where disaster, environmental, climate and conflict risks and threats are mitigated by policies, laws and plans that are participatory, gender responsive, funded monitored and enforced systematically at all levels

Expected CPAP Output(s):
Output 4.3.1. A comprehensive national framework for the sustainable management of Nigeria's natural resources, including water, air, oil, biodiversity, natural habitats and extractive industries.
Output 4.3.2. Environmental institutions at Federal, State and LGA levels are capable to implement policies and enforce laws for environmental management.

Implementing Partner: Federal Ministry of Environment

Responsible Partner: UNDP

Brief Project Description

Over half of Nigeria's estimated 170 million inhabitants live below the poverty line, with over 70% of the population still relying on biomass for fuelwood. Rapid deforestation is a major concern with over half of the country's primary forests cut down in the last 10 years, exacerbated by rapid population growth of 2.5%. The overall goal of this project is "Sustainable Fuelwood Management in Nigeria." The objective of the project is sustainable fuel wood production and consumption to secure the flow of multiple environmental benefits, including carbon storage and sequestration. This will be achieved through i) supply side management (the production and procurement of certified fuelwood from sustainably sourced feedstock from a) woodlands outside the protected forests in Cross River and Delta State in the South and b) from farmer managed woodlots in Kaduna State in the North and ii) demand side management through the promotion of improved stoves/kilns in the domestic sub-sector as inclusive business to reduce fuel wood demand, improve health and reduce greenhouse gas emissions. The project is well aligned with: i) the Vision 20:2020 and Transformation Agenda (2013-2018) to promote a low carbon, climate resilient, high growth, genders sensitive, inclusive and sustainable development path; and ii) the National Forestry Policy (2010) and REDD+ Readiness Program to promote the rehabilitation and conservation of forests, soil and water resources and other relevant national policy and legal frameworks.
Management of Project: Implemented using UNDP NIM modality

Programme Period: 2016-2021 Award ID: 00092573 Project ID: 00097204 PIMS # 5366 Start date: Feb 2017 End Date: Feb 2022 Management Arrangements: NIM PAC Meeting Date: Jan 31 2017	*Total resources required (total project funds)* **$20,810,000** • Regular (UNDP TRAC) $300,000 • GEF $4,410,000 Other (partner managed sources) • Government (In-kind) $1 900,000 • Government (Grant) $2,200,000 • Bank and MFI (Fortis MFI) $3,000,000 • UN-REDD+ $4,000,000 • SME $2,000,000 • DARE $1,000,000 • ICEED $2,000,000

Agreed by (Government): 03-02-17
Date/Month/Year

Agreed by (Implementing Partner): Prof. E.J. Bala. Director General, Energy Commission of Nigeria. 31-01-2017
Date/Month/Year

Agreed by (UNDP): 07/02/2017
Date/Month/Year

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Acronyms and abbreviations

AfDB	African Development Bank
ASCPF	African Sustainable Charcoal Policy Framework
CBO	Community-Based Organisation
CREDC	Community Research and Development Centre
CRS	Cross River State
DARE	Developmental Association for Renewable Energies
DFID	U.K. Department for International Development
DFO	District Forest Officer
EC	European Commission
ECN	Energy Commission of Nigeria
ECOWAS	Economic Community of West African States
ECOW-GEN	ECOWAS Initiative on Gender Mainstreaming in Energy Access
EREF	ECOWAS Renewable Energy Facility
EU	European Union
FAO	Food and Agriculture Organisation, United Nations
FD	Forestry Division
FMC	Forest Management Committee
GACC	Global Alliance for Clean Cookstoves
GEF	Global Environment Facility
GERES	Group for the Environment, Renewable Energy and Solidarity
GIZ	German International Development Cooperation
FGN	Government of Nigeria
IAP	Indoor air pollution
IBRD	International Bank for Reconstruction & Development (World Bank)
ICEED	International Center for Energy Environment and Development
ICS	Improved Cook Stove
LGA	Local Government Authority
LPG	Liquefied Petroleum Gas
MARD	Ministry of Agriculture and Rural Development
MDAs	Ministries, Departments and Agencies
FMoP	Federal Ministry of Power
FMOF	Federal Ministry of Finance
MFI	Micro Finance Institution
MHS	Ministry of Health and Sanitation
MLG	Ministry of Local Government
MSME	Micro Small and Medium Enterprises
MTI	Ministry of Trade and Industry
NCCS	National Clean Cookstove Service
NCEAP	Nigeria Clean Energy Access Program
NESP	National Energy Service Programme
NFCCN	National Forest Conservation Council of Nigeria
NGO	Non-Governmental Organisation
NTFP	Non Forest Timber Product
PRSP	Poverty Reduction Strategy Program
REAP	Renewable Energy for All Project
REDD+	Reduced Emissions from Deforestation and Forest Degradation (plus land use change)
RUWES	Rural Women Energy Service
SE4ALL	Sustainable Energy for All (also SEFA)
SFM	Sustainable Forest Management
SLM	Sustainable Land Management
SME	Small and Medium Enterprise
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WACCA	West African Clean Cooking Alliance

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1. DEVELOPMENT CHALLENGES

1.1 Rationale for Intervention

Over the last decade, Nigeria has experienced steady growth, averaging over 7 percent per annum. Nigeria has the potential to make further strides toward rapid, more inclusive growth, which would reduce poverty further and create more opportunities for shared prosperity. The challenge for Nigeria is to pursue economic development and realize the Vision 20:2020 and Transformation Agenda (2013-2018) without creating additional burdens on natural resources thereby preserving ecosystems that are critical to maintaining the quality of life and providing environmental services to society. Climate change will impact on sectors that are strategic for the growth of the economy, such as agriculture, livestock, and water resource management. Increasing temperature, coupled with changes in precipitation patterns and hydrological regimes, will only exacerbate existing vulnerabilities.

Nigeria has the third highest rate of deforestation in the world: 3.7% or 410,000 hectares of forests annually, with some areas in the South losing over 1,000 hectares/year (Figure 1). The country has lost over 50% of its forest resources between 1990 and 2010 when its forest area shrank from 17 million hectares down to 9 million hectares (FAO, 2010)[1]. With unabated, continuation of current trends there is great concern that Nigeria's scarce forests will be lost within a few decades.

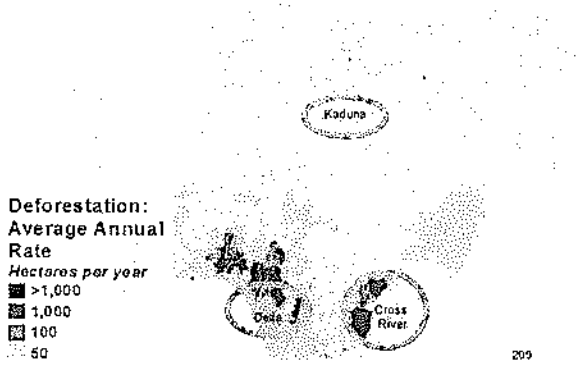


Figure 1: Map of Deforestation in Nigeria (Conservation International, 2014)[2]

Deforestation is the largest source of GHG emissions in Nigeria: it is responsible for 40% of national CO_2 emissions (SNC, 2014). According to the Second National Communication to the UNFCCC, baseline scenario emissions from deforestation will increase from 9.5 $MtCO_{2e}$/year in 1990 to 26.5 $MtCO_{2e}$/year in 2030 (based on a conservative deforestation rate of only 2.6%). The National Forest Conservation Council of Nigeria (NFCCN) estimates that a large portion of the forests in Nigeria will be cleared within a few decades if current rates of deforestation are not reduced. The lack of reforestation activity means clearing is not being offset by new plantings. With forests almost gone in the north of the country already, the loss of tree cover is also thought to be helping accelerate the spread of deserts and reducing farmland. A report by the NFCCN in 2008 estimated that 35% of arable land had been lost to desertification in the north over the last 50 years[3].

Unsustainable and constantly mounting consumption of fuelwood by Nigerian households, institutions (schools, prisons, hospitals, army camps) and cottage industries (e.g. fish smoking, cassava processing, and palm oil processing, bakeries) is one of the main causes of deforestation and land degradation. More than half of the 9.6 million hectares of rain forest belt in the south of Nigeria has been used to meet the demand for fuelwood in rural and urban areas. Fuelwood use has grown from 50 million m^3/year in 1990 to 70 million m^3/year and accounts for a significantly higher share of forest product use than, for example, commercial logging; the latter amounts to only 11 million m^3/year in

[1] *FAO 2010. Global Forest Resources Assessment. FAO Forestry Paper 163. FAO· Rome*

[2] *Source: Conservation International (2014) available on-line at http://www.conservation.org/how/science/Documents/DeforestationGuide_CommoditySourcing_Nigeria.pdf*

[3] *Nigerian"s Forest could go by 2020", Carbon Positive News Article, as reported in Atmosfair's POA Cookstoves.*

2010 and did not register any major changes in the last decades (FAO, 2010). This increase is largely due to population and economic growth, and also to the absence of affordable and more energy efficient alternatives, especially for the poorest consumers at the Bottom of Pyramid (BOP) market segment. This is further exacerbated by the rising prices and erratic supply of fossil fuels, forcing a massive shift from "modern" fuels like kerosene and LPG back to reliance on fuel wood, i.e. reverse substitution with wood fuel (FAO, 2010).

Apart from causing economic hardship for the poor, the use of inefficient stoves also causes serious health problems. The World Health Organization has estimated that for the mid-2000s, Nigeria's population's heavy reliance on inefficient cooking energy technologies has resulted in 95,000 deaths per year, mostly women and children from smoke inhalation related diseases making it the third cause of death after malaria and AIDS in Nigeria (WHO, 2008). Furthermore, the incomplete combustion of firewood in traditional inefficient stoves can cause black carbon emissions that contribute to global warming (IPPC, 2014).

The Second National Communication (SNC, 2014) estimates that about 4.5 million hectares of fuelwood plantations have to be established in order to tackle the primary cause of deforestation and help address the looming shortfall of fuel wood resources. However, this analysis does not take into account the significant, yet unrealized, potential to effectively reduce demand for non-renewable fuelwood through the promotion of more energy efficient cooking and thermal solutions, as well as through the use of alternative low-carbon energy sources, such as LPG, biogas, ethanol or solar energy.

Natural resources play a pivotal role in the lives of people in Nigeria with 75% of the population living in rural areas and over 70% employed by the agriculture and forestry sector. Increasing economic development and demographic pressure are changing agricultural and forestry systems in Nigeria and creating ever-increasing pressure on the natural resource base. The Government of Nigeria seeks to promote a paradigm shift towards low-emission and climate-resilient development pathways, to achieve economic efficiency in directly securing emission reductions at cost, and to support equity in the distribution of resources.

Internal migration to urban areas, poor enforcement of legislation and widespread poverty are some of the main contributing factors to fuel poverty and degraded natural resources. These trends are rapidly heading towards a state where over-extraction and insufficient re-planting of trees is threatening both people's ability to afford fuel wood for cooking and their ability to easily attain it in other ways. Coupled with this humanitarian issue, the deforestation and forest degradation that occur as a symptom of people's reliance on wood fuel (+70% of the population) is threatening the sustainability of the natural environment and its ability to perform ecological services in fragile areas.

1.2 Current Policy and Regulatory Framework to improve fuelwood supply side and demand side management measures

The Federal Government of Nigeria is well aware of the above mentioned issues, are setting policies to balance the demand of fuelwood with sustainable and renewable supply through sound Forestry and Fuelwood policy and Renewable Energy and Energy Efficiency Policy (revised in 2015).

Forest policies and programmes: Following a lengthy and participatory review, the National Forestry Policy was approved by the Federal Government in 2006. The Policy's overall objective is to achieve sustainable forest management, leading to sustainable increases in the economic, social and environmental benefits from forests and trees, for present and future generations, including the poor and vulnerable groups. Specific objectives include: i) Increase, maintain and enhance the country's forest estates through sound forest management practices; ii) Address the underlying causes of deforestation, forest degradation and desertification; iii) Promote and regulate private sector involvement in forestry development, and create a positive investment climate in the sector; iv) Support schemes that facilitate access to carbon markets; and v) Encourage forest dependent people, farmers and local communities to improve their livelihoods through new approaches to forestry.
Renewable Energy Master Plan, 2005 and 2015: The Renewable Energy Master Plan (REMP),

drafted by the Energy Commission of Nigeria and the United Nations Development Programme (UNDP) in 2005 and reviewed in 2015, expresses Nigeria's vision and sets out a road map for increasing the role of renewable energy in achieving sustainable development. The REMP does not specifically differentiate between on-grid and off-grid generation, however, it refers to integrating renewable energy into buildings, electricity grids and "other distribution systems". [ECN; 2013]. Simultaneously to the overall increase in power supply from renewable energy sources, the REMP targets higher electrification rates, from 42% in 2005 to 60% in 2015 and 75% by 2025. Below we shall return to the precise targets set for each subsector of renewable energy. However, in this context it is important to note that the REMP has still not been signed off by the government or formulated into a law governing the renewable energy development. Only once that has happened will investors have a clear path for drawing on the various financial incentives envisaged, such as pioneer status (tax exemption) and custom duty waivers.

Fuelwood Policy: Over 70% of Nigeria's population depends on fuelwood for cooking and other domestic uses. The consumption of fuelwood is worsened by the widespread use of inefficient cooking methods, the most common of which is still an open fire. This system has a very low thermal efficiency and the smoke is also hazardous to human health, especially to women and children who mostly do the cooking in homes. The rate of consumption of fuelwood far exceeds the replenishment rate to such an extent that desert encroachment, soil erosion and loss of soil fertility are now serious problems in the country. The largest sources of fuelwood at present are from open forests, communal woodlots and private farmlands. Supply from natural forest regeneration is continuously being diminished due to the additional activities such as the clearing of forests for development projects, agricultural and industrial activities. Since forests are essential for healthy environment, act as a check on wind and water erosion and desertification, and also serve as energy sources, it is essential that they are extracted in a balanced, sustainable and rational basis.

The fuelwood policy stipulates that: i) The nation shall promote the use of alternative energy sources to fuelwood; ii) The nation shall promote improved efficiency in the use of fuelwood; iii) The use of wood as a fuel shall be de-emphasized in the nation's energy mix; and iv) The nation shall intensify efforts to increase the percentage of land mass covered by forests in the country. There is also a need to restore degraded land and forests.

Objectives of the fuelwood policy: The objectives of the policy are: i) To conserve the forest resources of the nation; ii) To greatly reduce the percentage contribution of fuelwood consumption in the domestic, agricultural and industrial sectors of the economy; iii) To arrest the ecological problems of desert encroachment, soil erosion and deforestation; iv) To facilitate the use of alternative energy resources to fuelwood; and v) To reduce health hazards arising from fuelwood combustion.

Strategies for the fuelwood policy comprise:

i) Cultivating fast growing tree species needed to accelerate the regeneration of forests;
ii) Developing appropriate technologies for the utilization of alternative energy sources to fuelwood;
iii) Developing appropriate efficient wood stoves in the short term;
iv) Encouraging the establishment of private and community woodlots for supply of fuelwood in the short term;
v) Establishing micro-credit facilities for entrepreneurs, especially for women groups, for the establishment and operation of commercial fuelwood lots and the production of renewable energy devices and systems;
vi) Developing an appropriate pricing structure to encourage substitution from fuelwood to alternative fuel types;
vii) Ensuring the availability and effective distribution of alternative energy sources to fuelwood at all times;
viii) Establishing training programmes on the use, maintenance and fabrication of efficient woodstoves and other alternative technologies;
ix) Organizing systematic public enlightenment campaigns on the problems of desertification and soil erosion arising from deforestation;
x) Ensuring the existence of effective forestry laws to stop the willful felling of trees;
xi) Ensuring effective enforcement of the forestry laws;
xii) Increasing the area covered by forest reserves;
xiii) Setting up an effective system of forest regeneration; and

xiv) Disseminating the alternative technologies to fuelwood through extension programmes, pilot plants.

1.3 Situation analysis of the fuelwood and cooking energy value chain in Nigeria

In Nigeria, the demand for fuelwood is very high because more than 70% of rural households use fuelwood for their cooking, making it the most used form of cooking energy. The over-dependence on fuelwood in the country has been attributed to its availability and affordability compared to other sources of energy. Earlier research found that fuelwood consumption in the north and south western parts (the Ibadan area in Oyo state) of Nigeria far exceeds sustainable production, and the deficit is only made up from areas of surplus (pockets of localised vegetation in other parts of the country), which adds to the cost of the wood

Southern States: Commercial firewood production is mainly carried out by the majority of Southern State villages that are located near major highways and urban centres. Firewood is sold along most of the highways across the State, and is purchased either in small amounts for household consumption by passing private motorists, or in large amounts by returning empty trucks for commercial consumption or resale in big cities and towns. Communities in Cross River State visited during the focus group sessions rely on dry and dead wood collected from forests. The collected fuel wood serves as the primary source of energy used for cooking, preservation and processing agricultural produce such as garri, i.e. cassava flour.

Northern States: The majority of firewood in the North comes from the South as well as from along the lengths of the North-South highways. While mangrove wood comes almost exclusively by boat from Costal States, farm wood is transported to the North via the road network. Most vendors hire trucks for transportation and do not visit the provinces themselves.

Tree Species Utilized: Although there is a great deal of diversity in the number or tree species harvested, firewood is generally classified into three broad categories: farm wood, forest wood, and mangrove wood. Farm wood, by far the most common type of firewood produced, is harvested as a part of the farming cycle and generally all tree species on the farm are used (following farm clearance and burning) to make firewood bundles. Farm wood comes by road from the villages and is harvested as part of the farming cycle, while mangrove wood is harvested from swampy areas along Nigeria's coast, transported to Lagos by sea and sold at the various wharves. Mangrove wood tends to be most popular with fish traders to use for drying and with bakers throughout Lagos and Abuja, while farm wood is used mainly for domestic cooking. The mangrove firewood vendors have a local association at each of the wharves and generally operate in an amicable, though competitive manner. There is no association for the other firewood vendors in Nigeria.

Harvesting Methods: The vast majority of firewood is harvested as part of the farming cycle and acts as an important supplement to agrarian livelihoods in Nigeria. Farm wood is a by-product of farming and is harvested by women after their husbands have cleared the farm bush, allowed the sticks to dry and set the land on fire. After the farm is cleared, women then collect the burnt firewood, cut the wood into practical lengths and widths, and then bundle them into individual head loads.

GACC's (2011)[4] Nigeria Market Assessment Sector Mapping report summarized the cookstove scenarios in Nigeria:

A. Indoor air pollution (IAP): Solid fuel usage is estimated by WHO to cause ~95,000 deaths annually, representing 3.8% of the national disease burden. Indoor air pollution exists across the country and is caused by the use of fuelwood or charcoal in open fires; kerosene stoves are often poorly maintained and release toxic fumes. More than 74% of households rely on fuelwood or charcoal for cooking, of the remaining, 25% rely on kerosene. Clean fuel penetration is less than 1%. There are several efficient cookstove programs in the country but none has achieved the scale required to serve the entire country. Formed in April 2011, the Nigerian Alliance for Clean Cookstoves

[4] *http://cleancookstoves.org/resources/168.html*

aims to install 10 million stoves nationwide within 10 years through a coordinated effort across partner organizations.

With less than a 1% modern fuel penetration in Nigeria, wood and charcoal used in open fires are the main cause of IAP, resulting in significant health damage across the country. Intervention programs should aim to reduce open fire cooking with improved cookstoves and reduce reliance on wood as a fuel source by promoting modern fuel usage. While the government does not have any programs to reduce IAP, they are interested in providing awareness raising support. Awareness raising and education are critical components of a successful cookstove intervention.

B. End users: Cooking habits are generally uniform across the country, while urban households have adopted conveniences such as fast food (instant noodles), in rural households traditional methods still prevail. Social events are frequent and require large volume cooking. Even LPG households resort to fuelwood for such events. Many consumers already pay for stoves and fuel indicating that a willingness to pay does exist, except in rural poor households where wood is collected and used in open fires. End users are seeking convenience and an alternative to kerosene – there is frustration around supply and price instability of kerosene.

A cookstove market can be divided into two key segments - consumer and commercial. Consumers can be further segmented based on urban vs. rural location and on income. A cookstove solution should be tailored to the needs of each segment on variables such as size, fuel type, price and value proposition. The targeted rural population can be segmented into 1) subsistence farmers or temporary laborers who live below the poverty line; and 2) people engaged in agribusiness that are economically better off. The targeted urban population can be segmented into 1) households below the poverty line (<$1 per day); 2) food sellers and small business owners who make up to $10 per day, and 3) lower income professionals who make up to $50 per day.

C. Cookstove Industry: Nominally priced (USD 2-3) metal frame stoves are produced locally and used for wood or charcoal cooking; available kerosene stoves vary in quality and price (USD 10-20) and are mostly imported; imported efficient woodstoves (USD 33- 100) and LPG stoves (USD 100 minimum) are priced significantly higher. Kerosene when purchased at Government subsidized prices is the cheapest available fuel; however during supply shortages prices can rise up to three times the subsidized price. Wood or charcoal are more expensive than LPG; however they can be purchased in smaller quantities – important for households that cannot afford the high upfront cost of LPG. Both kerosene and LPG fuel supply chains are characterized by numerous impediments causing supply shortages and high costs. Methanol is a potential alternative fuel, but the solution and distribution networks require considerable additional development before it can be widely available to households. While there is no domestic large scale commercial stove production, there is increasing private sector participation in marketing and distribution of cookstoves.

Available Cookstove Usage and Cost: Basic open fire stoves are locally made and available at minimal cost, while other commercially available stoves are imported. LPG and improved stoves are priced significantly higher. The majority of the population uses basic wood or charcoal stoves, or three stone fires. Commercial operators-caterers and agri-business use open fires as they are perceived to be cheaper. Kerosene and LPG stoves are limited to urban and peri-urban areas, and towns. Efficient woodstoves are expensive, have not yet fully been developed, or reached critical volume to benefit from economies of scale. Basic wood and charcoal stoves are manufactured by local welders. Some kerosene stoves are locally made, although most are imported from China. High import duties and long lead times for custom clearance increases the cost for improved stoves. The high upfront cost of cookstoves is a major factor in the limited adoption of modern fuels and improved biomass cooking solutions. A cookstove intervention should aim to reduce this cost. In the long run purchased wood and charcoal cost more, however in the short run they can be purchased in smaller quantities requiring less financial outlay.

Fuel Usage: Households with access to trees collect wood, while many in urban areas and towns have to purchase wood. In arid Northern states, people now spend more time collecting wood and have to travel further and charcoal usage is heavier in these states. Due to supply and price fluctuations, kerosene is increasingly becoming inconvenient and costly leading some kerosene users to switch to LPG. LPG is perceived as being more expensive and a "rich man's fuel" due to its high upfront cost. Safety concerns regarding LPG exist but similar concerns regarding kerosene have not

impeded adoption. LPG penetration is limited to higher income groups in urban areas. A small number of homes supplement fuel with electric hot plates, however low power availability limits their usage. **The higher long-term cost of purchasing biomass and the inconvenience associated with kerosene lowers the barrier for clean fuels. A cookstove program should consider a base of the pyramid modern fuel solution.**

Methanol potential in Nigeria: There is unique potential to utilize flared natural gas to create a methanol cooking solution for Nigeria, simultaneously reducing pollution from both gas flaring and cooking. Natural gas which is currently flared and wasted can instead be converted into a clean burning methanol cooking fuel. In 2007, 150 households participated in a methanol cookstove pilot study conducted by Project Gaia. The stove and its methanol fuel were accepted by almost all the respondents that participated in the study. Statoil is investigating the potential to divert flared gas into methanol production, developing a business plan, and looking for a partner. Safety is an important concern as methanol is highly toxic. High upfront investment in plants (methanol, resin, biodiesel, etc) would be required. Considerable investment in the distribution network would be required as leveraging existing kerosene distribution will expose methanol to issues similar to kerosene. Although requiring a significant upfront investment and government support, methanol has the potential to supply clean fuel, grow local industry and generate employment.

Other Renewable Energy Sources e.g. biogas: There is an increased interest in developing the renewable energy and biofuels sector in Nigeria; the Government has launched several renewable energy programs. Current renewable energy programs are mainly related to biogas with pilots operated by the Government. Biogas solutions may not be suitable for national implementation, and therefore may remain as a community specific solution. Technical expertise and program implementation support is required to scale up existing biogas programs. The establishment of renewable energy villages could be used to promote sustainable renewable cooking fuels using agricultural byproducts. Previous projects showed that solar cookstoves are not viable due to low consumer acceptability.

1.4 Barriers and Gaps Analysis

Based on the above analysis of the energy situation and the current situation in industries, institutions and households that are consuming wood as fuel, the increasing trend of fuel consumption is obvious. In order to analyze the underlying causes of this problem, a stakeholders' consultation was conducted in Abuja on 10 June 2015 with 40 participants. All of the main stakeholders were consulted several times during the PPG process to ensure that their priorities and experiences within the context of Nigeria were captured and reflected in the design of the project. The participants generally agreed that the main problem faced by Nigeria regarding its fuel wood is the unsustainable production and utilization of biomass resources. Comments from the stove stock-taking workshop conducted by NACC and ICEED in Sept 2013 were also taken into account as detailed in Annex E.

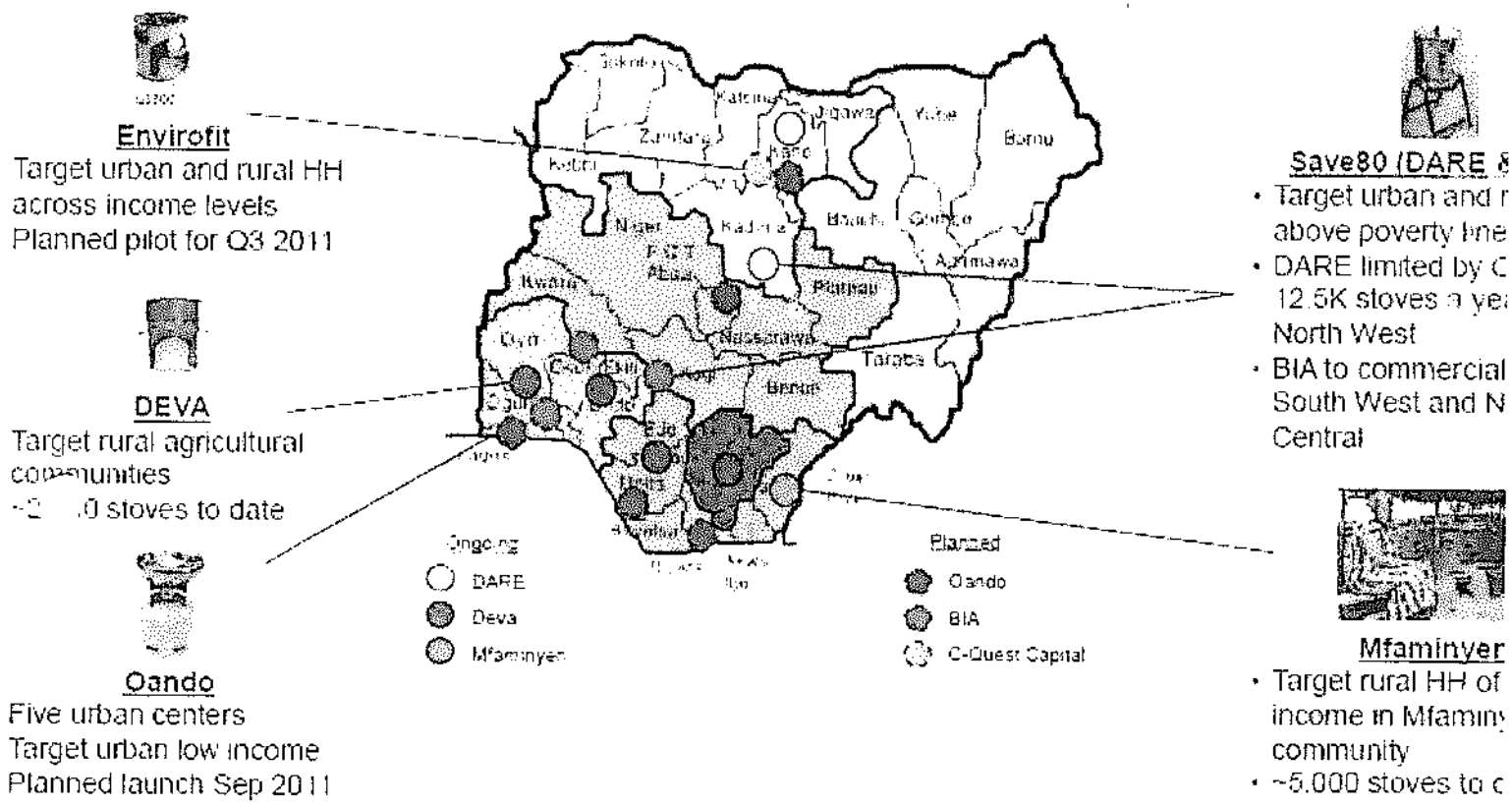
All in all, the Government of Nigeria, its development partners, public and private sector recognize the need to balance the supply and demand of fuelwood and the importance and benefits of sustainable fuel wood management both from the perspective of climate change mitigation, as well as the local socio-economic development standpoint; thus a number of important initiatives and programs have been implemented and are on-going to address deforestation and desertification and their multitude root causes. However, as far as fuelwood is concerned, the baseline projects still fall short of providing a comprehensive and holistic approach to sustainable fuel wood management in Nigeria thus leaving some of the main barriers to sustainable energy and underlying causes of deforestation in the South and land degradation in the North unaddressed. The sector is plagued by a lack of coordination and integration between policies and projects addressing sustainability of fuelwood production and consumption at all levels from local to national.

Despite obvious linkages and synergies, the two sides of fuelwood problem, demand and supply, are being addressed in isolation. As can be seen from the description of the baseline projects , there exist two types of projects and programs, which largely run in parallel with little overlap programmatically and geographically, namely those dealing with a) Sustainable forest management (supply side); and b) Clean energy access (demand side). However, the only long lasting solution to this problem is one

where a) the importance and benefits, including economic ones, of sustainable forest management and restoration of degraded land are fully realized by local community and b) affordable and sustainable alternatives are available to meet household energy needs. Piece-meal programs that only address one aspect of the demand-supply equation cannot be effective nor sustainable in addressing the root causes of the problem. □

A. Barriers to sustainable fuelwood consumption in Nigeria: □

Under-developed domestic supply chain: As illustrated in Figure 2 and in the findings of the stove stocktaking workshop outlined in Annex E, there are a number of domestic clean cook stove manufacturers in Nigeria, but local production capacities remain limited, often do not provide adequate quality of the products, and rely on expensive imports, which drive costs up. Consequently, do-it-yourself (DIY) stoves are the most popular solutions while penetration of efficient second generation cookstoves is less than 0.1% of the market. Pilot projects are very limited in scale or not affordable to average consumers (such as SAVE80 that can cost up to USD 100). Scale and a strong business case are needed to make local manufacturing viable and capable of delivering robust and affordable stove solutions for the base of the pyramid (BOP), e.g. developing clay stoves in the South where there are rich clay resources whilst developing metal stoves in the North where clay is scarce.



□

Figure 2: Existing Clean Cook Stove Producers in Nigeria (GACC, 2011)

Affordability and access to consumer and start up financing: In the absence of affordable stove solutions for the BOP, modern and efficient fuel stoves are priced significantly higher than available traditional solutions or kerosene stoves resulting in an extremely low penetration rate for improved stoves. Despite three registered Programmatic CDM Stove programs, carbon finance has proven its limited effectiveness in improving the affordability of the final product: even with a carbon subsidy, SAVE80 is 3 times more expensive than traditional stoves and under the current circumstances, the

prospects of attracting additional finance through carbon markets do not look promising. Hence, new financial sources and models are needed to address the affordability barrier, improve access to consumer financing and thus ensure wider replication and higher penetration rates of EE cook stoves.

Those few efficient stoves which are available on the market in Cross River, Delta and Kaduna (mainly imported from China and elsewhere) are priced several times higher than traditional stoves: while the cost of a traditional stove is about USD 2, cleaner and more efficient products, like StoveTec cost USD 20 and above. Many of the micro-finance institutions operating in the three pilot states are not marketing or offering financial products or services for the production or purchase of clean stove/kilns. Component 4 of the project will address the affordability barrier by facilitating access to consumer and start up finance and partnerships with MFIs.

Low awareness and penetration rate of alternative energy solutions among rural households in Cross River and Delta: Less than 0.1% of households in CRS and Delta State use improved cookstoves. This is an indication of extremely low awareness and market demand for efficient cook stoves and other sustainable energy alternatives for domestic fuelwood use. Apart from the financial/affordability barrier, the main barrier to a higher penetration rate of improved stoves is the prevailing perceptions and attitudes of rural households, especially women, towards new technologies. People are reluctant to change their traditional cooking practices, have few technical and business skills and lack understanding of how modern technologies work (even in its simplest design). Also, the recognition of the linkages between deforestation and its negative consequences on the one hand and domestic energy use on the other is often missing. Component 2 of the project will address this barrier through awareness and training activities, as well as targeted investment in pilot communities.

Limited manufacturing capacity and supply of efficient and affordable cook stoves in Cross River and Delta State: There is only one efficient cookstove program in CSR, the Ekwuk stove, designed and promoted by the Mfaminyen Conservation Society. However, its uptake remains limited. Even in the targeted communities only 4,500 products have been built. There is no information about the Ekwuk stove design available in other CSR areas, nor are there any other efforts or programs underway to promote more efficient cook stoves manufactured elsewhere. To facilitate wider replication of do-it-yourself stove design like Ekwuk or domestic manufacturing of efficient stoves, assistance has to be provided to local communities and enterprises to jump start the market, ensure quality and build a supply chain. But there is a need to conduct a detailed market segmentation study to ensure that the design of the proposed stove meets the needs of the household. Component 3 of the project will seek to address this barrier.

Lack of opportunity for private sector participation: The private sector is the main engine of job creation and the source of nearly nine out of ten jobs in the world. Accordingly, Nigeria's job creation strategy needs to be embedded within the broader strategy, as articulated in the Transformation Agenda, to promote private sector growth and entrepreneurship. However, the existing legal framework suffers from poor enforcement. In addition, there is ineffective coordination among ministries regulating the private sector and between the Government and the private sector; and many ministries have limited capacity to implement reforms. Despite those challenges, Nigeria has significant private sector potential, with investment opportunities in the agribusiness sector. If these opportunities are realized, they will provide substantial sources of job creation and diversified growth.

B. Barriers to sustainable fuelwood management and supply in Cross River, Delta and Kaduna State:

Weak institutional capacities for sustainable forest management, especially at community level: Management capacity of the state forestry department and local organizations, such as Forest Management Committees (FMCs) is rather low, with poor funding, low staff morale, limited technical training coupled with poor governance issues. Forest laws and policies are obsolete, and weakly enforced. Funding for forest management is limited and unsustainable. The land tenure laws fail to formally recognize community tenure (although in CRS 18 FMCs managed to receive formal recognition of the Government).

Much of CRS's forest (roughly 400,000 ha) is protected within Cross River National Park, in addition sizeable tracts of forests fall under Forest Reserves (270,000 ha) and Community Forests (160,000 ha). However, protection of forest boundaries from illegal encroachment and exploitation is limited by a shortage of funding, staff, skills and expertise. Even though the Government of Cross River and Delta recognized community ownership of the forests through the establishment of over 45 forest management committees (FMCs), their capacities remain extremely limited and only few operational plans are actually being implemented. As a result, virtually all forest reserves and community forests are at least partially degraded, and several have no remaining forest cover at all. For example, despite special protection status, the following reserves have already lost 100% of their forest cover: Ikom Fuel Wood Forest Reserve, Gabu Yala Forest Reserve, Yache Yala Forest Reserve and lower Eyong Forest Reserve. The Ekinta Forest Reserve is deforested to about 92%. Component 1 of the project will work with pilot communities (community owned forests that are contiguous with adjoining forest reserves) to strengthen their custodial, technical and business capacities for sustainable forest management and ensure sustainability of their operations in the long-term.

Weak institutions and insufficient policies at state and national level: Poor enforcement of forest and land laws, policies and regulations, as well as the absence of any policies and regulations which specifically address efficient energy use by households, promote more EE technologies, further exacerbate deforestation drivers in Cross River and Delta State and land degradation in Kaduna State. In this respect, the capacities and mandate of the CRS, Delta and Kaduna Forestry Committees are not sufficient, especially as far as monitoring deforestation and degradation and its drivers are concerned. Although sustainable fuelwood demand and supply are embodied in national policies, their implementation remains a great challenge at the state level hence the supply and demand value chain remains fragmented.

Low economic value of forests and forest products: There is a loss of revenues from forests due to poorly designed policies, illegal logging and rent capture (a World Bank analysis indicates that four states subsidised the forest industry to the tune of US$ 6.5 million in 2003 through a failure to adjust their fees to their real levels and a failure to capture revenues lost through illegal logging). This reduces revenues in the forest sector and therefore the overall capacity to implement and enforce policies, as well as incentives for more rational and sustainable forest use and management. Component 4 seeks to develop and introduce Payment for Ecosystem Services (PES) from forest conservation measures.

1.5 Project Baseline

There are also a number of plans, initiatives and projects that are under implementation to balance the supply and demand of fuelwood and to meet the fuelwood and stove targets that were set through the various established relevant plans, policies and programs. The proposed project builds on the on-going and planned initiatives that are in line with the Renewable Energy Master Plan for the promotion of energy efficiency and energy conservation measures in the end-use sectors and for the promotion of RE (Table 3). These current initiatives are expected to generate fuelwood savings and consequently bring about GHG emissions reduction, and will contribute to the realization of the targets set by, among others, the RE Master Plan.

i. Annual energy mix and consumption in the overall energy generation sector: As of 2010, the primary energy demand in Nigeria is at 483 PJ, of which biomass contributed 43.5%, petroleum contributed 45.3%, followed by 5.7% from large hydro, 4% from coal and with only 1.5% from new renewable energy (solar, wind). In the absence of the GEF project, this trend is likely to persist under the baseline scenario, dominated by biomass and fossil fuel (kerosene) usage.

ii. Household energy demand of Nigeria in 2010: The total demand of primary energy by different sectors of the economy is at 483 PJ About half of this total energy demand is from the household and commercial sector (46.7%), followed by 28.8% from transport, 24.5% from industry and the remaining from the agriculture sector. With increasing disposal income, energy consumption in the domestic, transport and commercial and industrial sectors will continue to increase.

iii. **Annual GHG emissions from fuelwood combustion in Nigeria in the year 2000:** the overall GHG emissions from LULUCF due to fuelwood combustion are 97,385 Mt CO_{2e}.

Table 3: Baseline Activities by partners	Co-finance Budget (USD)
Component 1: Sustainable Fuel Wood Supply. **a. UN REDD+ Readiness Programme and Community based REDD+ Country Plan for Nigeria:** The UN-REDD Readiness Program for Nigeria seeks to create the REDD+ mechanism using Cross River State (CRS) as a demonstration model and is structured in four outcomes, two at the Federal level and two focusing on Cross River State, as follows: i) Improved institutional and technical capacity at the national level (Federal); ii) Framework for REDD+ expansion across Nigeria prepared (Federal); ii) Institutional and technical capacity for REDD+ in CRS strengthened and iv) REDD+ readiness demonstrated in CRS. Some REDD+ sensitization activities have already been carried out in Delta State. The Community based REDD+ Country Plan for Nigeria will support Outputs 5.4, 5.5 and 5.6 of the former Component 5 presented at the PIF stage. ***This GEF-funded project will support Outcome 4 to train and develop certified stove producers to produce clean stoves for sale as an inclusive business among the pilot communities as well as to develop a community managed multifunctional platform in Cross River and Delta State.*** **b. EU's Energizing Access to Sustainable Energy in Katsina State (2014 to 2018):** This is a four year intervention funded by the European Union to improve the fuel wood balance in Katsina state. The programme is aimed at sustainably improving the fuel-wood balance and resilience of livelihoods of rural households in 7 Local Government Authorities in Katsina state by increasing wood supply through farmer managed natural regeneration whilst reducing fuel wood demand through dissemination and use of fire wood efficient stoves. With counterpart contributions from Oxfam Novib and the International Center for Energy, Environment and Development (ICEED) as Co-applicant, the programme has a duration spanning 4 years, from the 10th of September 2014 to the 9th of September 2018 and will be implemented by both organizations, working with local partners, target beneficiaries and communities. ***This GEF funded project will partner with the EU project to transfer the farmer managed natural regeneration best practices from Katsina to farmers in Kaduna state.***	USD 4 million (as grant from 2013-2017)
Component 2: Sustainable Fuel Wood Consumption. **National Clean Cooking Scheme (NCCS), Federal Ministry of Environment:** There is also an array of Government and donor-supported activities promoting a transition towards more efficient and alternative solutions for household energy needs (i.e. fuel wood demand side), such as the National Clean Cooking Scheme of the Federal Ministry of Environment and its Rural Women Energy security Initiative aimed specifically at addressing the needs of rural women for sustainable and healthy cooking solutions. Under NCCS, the Federal Government supports retrofitting of kitchens in public schools, hospitals and hotels across the country with improved cook stoves and LPG. The National Clean Cooking Scheme is an umbrella longer term initiative which aims at coordinating all clean cooking energy in the country towards achieving the Government's goal of 20 million households with improved cooking energy technologies by 2020. This initiative will support Output 5.1 of the former Component 5 to phase out traditional cookstoves. **Community Research and Development Center (CREDC):** Several local NGOs and community-based organizations, such as the Community Research and Development Center (CREDC) under the Sustainable Forest Management Project, are also engaged in awareness raising and capacity building on the local level, sharing knowledge about efficient cooking technologies and the importance of forest protection. In CRS, the Federal Government initiated a pilot biogas project in order to diminish pressure on forest resources	Federal Ministry of Environment: USD 2.2 million (grant from 2015 to 2019) FMOE: USD 1.9 million (in-kind from 2015 to 2019)

from domestic energy use, but no evidence exists yet regarding its implementation. **The Nigerian Energy Support Programme (NESP):** NESP funded by the European Union and the German Government and implemented by GIZ, in close coordination with its Federal and selected state (Cross River, Niger, Ogun, Plateau and Sokoto) partners, aims inter alia at increasing the number of rural dwellers with access to improved energy services and products. NESP will support a 15-month programme that facilitates access to at least two improved agro processing technologies for up to fifteen groups and/or cooperatives of rural agro-processor groups/cooperatives in up to three of the five NESP selected states (e.g. up to 5 groups/cooperatives per State) and on up to three agro-products – rice, cassava and/or palm oil. Given their key role in the clean cooking energy sector, the intervention will pay special attention to women. Initially proposed primary equipment promoted by NESP activities will include: institutional improved biomass or LPG stoves and improved biomass or LPG roasters. Additional equipment that may be supported include: Manual liquid or oil presses and Solar dryers and solar dehydrators. This initiative will support Outputs 5.1 and 5.2 of the former Component 5. ***This GEF-funded project will support all the above initiatives to train and develop certified stove producers to raise awareness and produce stoves for sale to the pilot communities as an inclusive business.***	
Component 3: Domestic Industry for Clean Cooking Solutions. Several fuel efficient solutions (commonly region or segment focused) are already in or entering the market, with competition emerging in several states, but their penetration and market share remain extremely limited: less than 0.1% of all Nigerian households use improved stoves (See Figure C3 in Annex C). **a. ICEED:** To support domestic industry, ICEED in partnership with the Energy Commission of Nigeria supports the establishment of the National Clean Cookstoves Development and Testing Laboratory at the University of Nigeria (Nsukka, Enugu State); this partnership helps develop technical standards for stoves, provides testing and certification services related to stove technical quality, indoor air pollution, and energy efficiency, as well as supports local MSMEs in improving the quality of their products. These initiatives support Outputs 5.1, 5.2 and 5.3 as proposed under the former Component 5. Given the limited GEF resources and to avoid duplications, national stakeholders recommended that there is no need for this SFM project to support Component 5. **b. Nigerian Developmental Association for Renewable Energies (DARE):** DARE and the German non-governmental organisation Lernen-Helfen-Leben e.V. (LHL e.V.) are jointly implementing a CDM project entitled "Efficient Fuel Wood Stoves for Nigeria" whereby the revenues from the CER sales are used to subsidize the sales of highly efficient cook stoves SAVE80 in the Northern regions of Nigeria[5]. The project is expected to support distribution of up to 13,000 SAVE80 systems and thus prevent the emission of 300,000 tCO_{2e} until 2019. Nevertheless, the project is an important part of the baseline activity because it proves the viability of the business and financial model for efficient cook stoves in Nigeria (provided that the carbon benefits of such a project are monetized). Other PoA developers are C-Quest Capital. This initiative will support Output 5.1 to phase out traditional cookstove as proposed under the former Component 5. **c. SME Fund (SME):** The SME Fund seeks to provide low cost, clean and safe cooking energy for households at the bottom of the economic pyramid through their 2G proprietary Cellulose ethanol bio process. The organisation has successfully launched one of the largest and fastest growing clean cooking and lighting programmes in Africa. This was accomplished through a vertically integrated business model that dramatically reduces costs in both manufacturing and distribution, by creatively using social marketing, thereby economically empowering independent distributors. The SME Fund has reached over 230,000 households with their ethanol stove and has sold over 2 million litres of gel. With the growing demand, the SME Fund is looking to have 1 micro distillery and 2 gel plants at	ICEED: USD 2 million (as grant from 2015 to 2019) DARE: USD 1 million (as grant from 2015 to 2019) SME: USD 2 million (as grant from 2015 to 2019)

[5] *https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/7R1B09HSJV3FKIZYCA4D6XQOETP5GN/view*

the community level to meet the demands of communities and raise awareness of their ethanol stove. **d. Mfaminyen Conservation Society:** In CRS specifically, the Mfaminyen Conservation Society supported the indigenous design of an improved cookstove (Ekwuk) and its dissemination across the states: over 4,500 products were sold. The CRS Government committed 100,000 USD to further scale up its production. These efforts, nowever, fall short of the potential and need of the region. ***The GEF-funded project will support all the above initiatives to scale up clean fuelwood and ethanol stoves among the pilot communities.***	
Component 4: Financing for Clean Cooking Solutions. **a. Fortis MFI (FMFB):** Nigeria has a relatively large and well-developed micro-finance sector with a cumulative loan portfolio of over USD 350 mln. Some MFIs have recently started offering structured loan products to households for energy access solutions, such as improved cook stoves, LPGs, solar PV systems, etc. However, the demand is low and so is the volume of transactions in the market segment. In CRS, there are 14 registered MFIs, but no visible involvement in financing improved energy access. ***The GEF-funded project will support and train MFI staff to design, develop, test and improve value chain financing products and services to scale up sustainable fuelwood and clean stoves among the pilot communities.***	Fortis MFI: USD 3 million (as grant from 2015 to 2019
Total	**USD 16,400,000**

1.5 Institutional and Stakeholder Analysis

During the project identification and preparation stages, stakeholders consisting of relevant agencies, non-government organizations (NGOs) and private sector groups who could contribute to the successful implementation of the project have been identified. To generate buy-in and strong project ownership, a participatory workshop and individual face-to-face consultations were conducted to assess their needs, identify problems and suggest solutions, clearly define their role/involvement during project implementation and ascertain their commitment to the objectives of the project. As these stakeholders are also beneficiaries of the project outcomes, their participation and commitment are ensured, which adds assurance to the success of the project. A description of the public, private and CSO stakeholder groups and their involvement in the project as well as the benefits they can expect to receive are presented in Annex B. Also a detailed description of the ECN and FMOE, which will play a key role during project implementation, is also presented in that annex.

The Project Board, which is the highest level of supervision during the project implementation, will be comprised of representatives from the funding/co-funding agencies, senior representatives of relevant Government agencies and other entities, as appropriate. This will ensure an integrated approach to dealing with the challenges and opportunities that takes into account the interests of all stakeholders, including cross-cutting concerns/activities that incorporate and support gender equality and marginal group participation. The Project Management Unit (see section 4) will be in direct regular communication with all stakeholders while actively participating in relevant events and organizing workshops and training seminars.

2. STRATEGY

2.1 Policy Conformity

2.1.1 National and Regional Alignment

Alignment with National Aspirations: Nigeria Vision 20: 2020 and Transformation Agenda (2013-2018): The Federal Government of Nigeria (FGN) has put forward an ambitious vision for the country's economic development by 2020: **Nigeria Vision 20: 2020** (FGN 2010). It is not only a road map for economic growth, but is also intended to be the foundation of future long-term sustainable development by giving equal value to these additional three pillars:

- **Institutional:** to promote responsible leadership, transparency, accountability, rule of law, and security of lives and property;
- **Social:** to improve the nation's prospects for achieving the Sustainable Development Goals (SDGs) and creating employment in a sustainable manner; and
- **Environmental:** to halt environmental degradation and promote renewable energy and climate change mitigation and adaptation.

The project is in line with the GEF-5 Climate change mitigation strategy to remove the barriers to access to affordable alternative energy by introducing the necessary legal, institutional and regulatory frameworks for scaling up of bioenergy solutions. It is designed to remove the technical barriers by providing the Government agencies, manufacturers and importers with technical assistance and a certified independent testing facility to measure the energy consumption of end-use appliances. It also addresses the informational barriers with a component to carry out outreach programs designed to sensitize the Nigerian populace on bioenergy and energy efficiency concepts and its potential for socio-economic development.

Regional Alignment and Harmonisation: The fifteen member states of the Economic Community of West African States (ECOWAS) have expressed the need to mainstream renewable energy and energy efficiency into their national policies. In this regard, the ECOWAS Renewable Energy Policy (EREP) and the ECOWAS Energy Efficiency Policy (EEEP) were adopted by the ECOWAS Council of Ministers and the Authority of Heads of State and Government in 2013. The vision of the EREP and the EEEP is to secure an increasing and comprehensive share of the Member States' energy supplies and services from timely, reliable, sufficient, efficient, cost-effective uses of renewable energy sources enabling universal access to electricity by 2030 and a more sustainable, efficient and safe provision of domestic energy services for cooking. The EREP and EEEP recognize woodfuels (firewood and charcoal), which are used for domestic cooking purposes and commercial applications, as one of the renewable energy options that are not utilized efficiently but have the potential for development in the ECOWAS region. In the region, woodfuels represent the bulk of final energy consumption, reaching up to 70-85 % in some countries. Within these policy frameworks and specifically under the programme for Supporting Energy Efficiency Activities in West Africa, a clean cooking initiative was launched in October 2012. The West African Clean Cooking Alliance (WACCA) aims to ensure that the entire population in the region has access to clean, safe, efficient and affordable cooking fuels and devices by 2030. WACCA will explore both the supply and demand side of the cooking chain and introduce efficiency where necessary to improve the fuel supply and demand characteristics for better access and improved living conditions. This GEF-funded project will partner with WACCA to mainstream the demand side management of biomass and to develop regional harmonization on standards and labels for improved cookstoves and charcoal kilns.

2.1.2 Country Ownership and Eligibility

The Federal Government of Nigeria signed the UNFCCC convention on June 13th 1992 and ratified it in August 1994. Nigeria ratified the Kyoto Protocol on the 10th of December 2004. The current project was designed after extensive consultation with key public and private sector stakeholders, thus there are extensive inputs from the key relevant agencies of government such as the NCCS, Federal Ministry of Environment, Forestry Commissions, ECN, SON, NACC, NGOs (ICEED, CREDC, DARE, SME Fund) and financial institution (e.g. Fortis MFI). The project fits into the government's Vision

20:2020 to replace 50% of firewood consumption for cooking by scaling up and replicating alternative clean bioenergy and reducing reliance on unsustainable firewood by promoting bioenergy standards and best practices. This SFM project is also well aligned with the measures highlighted in the INDC submitted by the Government of Nigeria to UNFCCC on 28 November 2015 to promote energy efficiency by 2% per year (30% by 2030) and promote climate smart agriculture and reforestation. No activity in this SFM project will directly or indirectly support fossil-based fuel uses.

2.2 Project Alternative

The GEF-funded alternative will address the above barriers to balance the demand with supply through sustainable fuel wood management in Nigeria, with a specific geographic focus on Cross River, Delta and Kaduna States. Its objective is the sustainable fuel wood production and consumption to secure the flow of multiple environmental benefits, including carbon storage and sequestration, and ensure that basic human development needs are met without compromising ecosystem ability to provide global environmental services.

The project is designed to comprehensively address one of the major causes of deforestation in Cross River and Delta State and land degradation and desertification in Kaduna State, specifically the unsustainable use of non-renewable fuel wood in rural and peri-urban areas. To protect and secure forest and fragile land resources to meet local needs, the project will i) in partnership with the UN-REDD programme, support national and state-level efforts in CRS and Delta through sustainable forest management and ii) Great Green Wall program to restore degraded land in Kaduna through sustainable land management to develop agroforestry woodlots. At the same time, it will work with national and international partners, value chain actors, technology providers, private sector, financial organizations, and local communities to identify and promote a set of alternative clean energy solutions to reduce their demand for fuelwood.

The geographic focus of the proposed project in Cross River, Delta and Kaduna states are for the following reasons: a) The State Governments of CRS, Delta and Kaduna are at the forefront of the climate change, forest and land conservation agenda in Nigeria, e.g. CRS has formulated its low-carbon vision for the State: *"Within 10 years, Cross River State will have 1 million hectares of forest land managed for climate change friendly activities that will include carbon, non-timber forest products, sustainable tree crops and ecotourism. The aim is to create a new low carbon economy for the state based on the sustainable management of its forests."*; b) UN-REDD+ selected CRS as a pilot to demonstrate its REDD+ readiness model; c) UN-REDD+ has targeted Delta State as the next state to replicate the success in Cross River and the chosen communities have already been sensitized on the REDD+ programme and its benefits. d) Unlike the frontline desertification state, the Great Green Wall program has also targeted Kaduna as a buffer state to prevent future desertification. All of these programmes provide a sound baseline to superimpose additional GEF support for sustainable fuelwood management and clean energy access. These interventions fall outside the direct focus of UN-REDD and Great Green Wall, but are important areas of intervention because the lack of clean energy access puts additional pressure on high conservation value forest and fragile land resources in Cross River, Delta and Kaduna State. The UN-REDD, Great Green Wall and GEF partnership in the three states can therefore offer a timely and truly comprehensive, innovative and integrated landscape system approach to addressing the root causes of deforestation, land degradation and desertification.

The project will promote the supply and demand of affordable and sustainable energy alternatives among rural communities with a special focus on women and the most vulnerable groups, by building an inclusive value chain, improving the technology base and access to financing, as well as by strengthening community forest and land management best practices with a robust institutional framework. Furthermore, the project will help to develop and propose for adoption relevant state-level and national-level policies and programs to support wider replication and scaling-up of successful integrated forest, land and energy management practices and clean technologies for securing access to clean food, clean energy and water across Nigeria. Figure 6 shows how with GEF support, the proposed project will remove the barriers that hinder the widespread utilization of improved cookstoves and efficient fuelwood technologies, thereby contributing to energy savings, reduced demand for non-renewable fuel wood and GHG emission reductions.

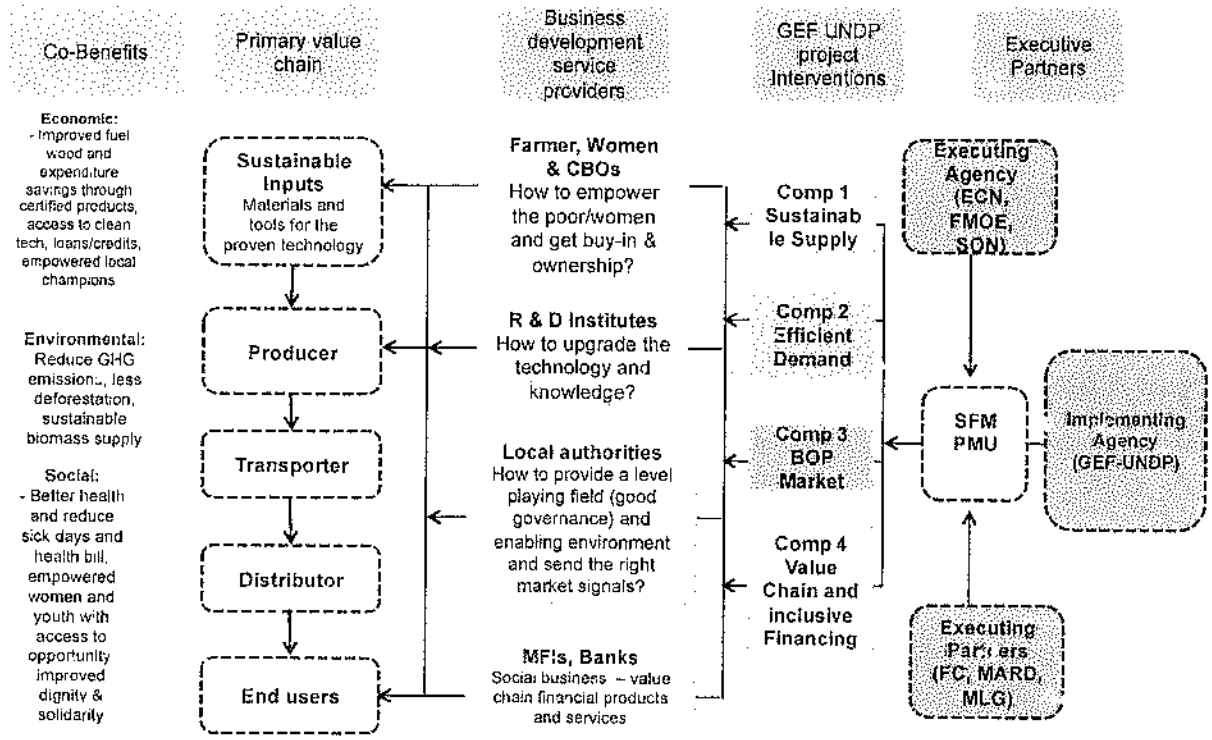


Figure 6: Rationale for intervention: Overcoming the technical, regulatory and financial barriers for the scaling up of renewable fuelwood and clean stoves as inclusive value chain business development in Nigeria

Local production of affordable and high quality stoves: In the North, clay insulated stoves are not very popular nor common due to the lack of good quality clay. Transporting clay from the South to the North would be prohibitively expensive. Hence open fires and stoves made from scrap metals are common. Given that many households in the BOP will not be able to afford the expensive imported stoves (e.g. Save 80 cost USD100), DARE has started working with experts from Germany to test and assemble a metal stove for less than USD 10. A prototype is currently being tested that is showing great promise and can be as efficient as the Save 80 stove with 40% thermal efficiency in the water boiling test. There is great potential to support this initiative to develop a viable local business to assemble affordable metal stoves by trained unemployed youth and women. In the South with high clay deposits, Toyola Energy is making clay stove liners with metal parts imported from China for local assembly.

2.3 Design Principles and Strategic Considerations

The project is designed to balance the supply and demand for fuelwood through a **Bottom-up approach** of leveraging private sector resources to provide inclusive financial incentives (start-up loans, matching rebate schemes) and market mechanisms to secure the supply and stimulate demand for energy efficient stoves/kilns and certified fuelwood.

In light of the barriers mentioned above and baseline initiatives, this project proposes a series of integrated interventions **mostly focused on value chains Steps 1, 2 and 5 of the fuelwood value chain (improved supply and efficient utilization) – see Figure 7**. Forest management (Stage 1) is covered under the UN-REDD+ programme in Cross River and Delta State has been sensitized on REDD+ activities. The project's focus on supporting sustainable fuelwood production seeks to protect whatever forests are still left in Nigeria whilst seeking to restore degraded land for the production of renewable fuelwood to balance demand with supply in the pilot areas (Stage 2). Where the use of non-renewable fuelwood is a primary driver of deforestation, the introduction of improved stoves/kilns is the most powerful tool in both reducing emissions and increasing forest cover (Stage 5).

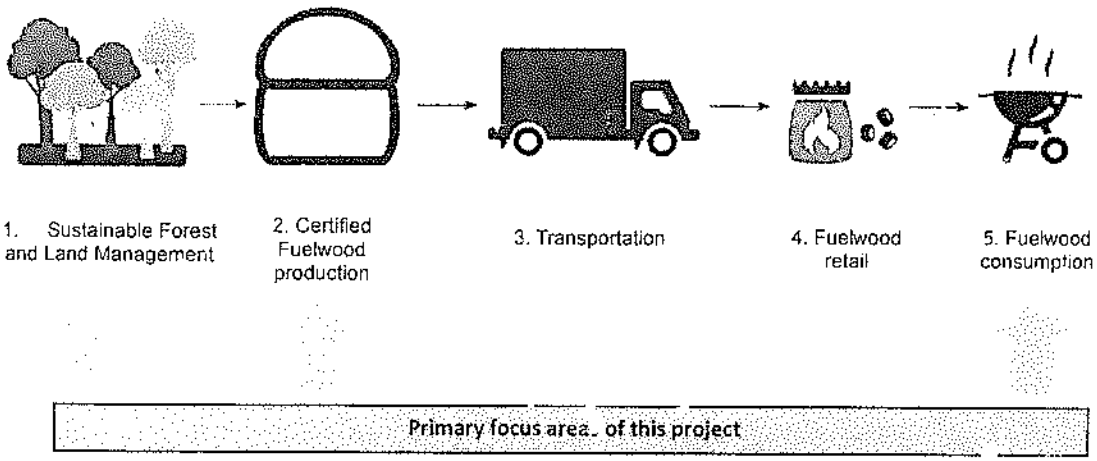


Figure 7 – Fuelwood Value Chain – Interventions by Stage

To ensure effective coordination and integration, the inter-linkages between the different components and interventions/phases of the fuelwood value chain (whether funded by GEF or other stakeholders) must be considered in a holistic manner and seen in their entirely to understand why it is essential to approach the problem via a comprehensive value chain approach to maximize mitigation and resilience benefits. Numerous studies have confirmed that the optimization of emission reduction benefits can only come from holistically addressing all parts of the fuelwood value chain in an integrated manner. In this way the project is following established best practices and is integrated with and complementing a series of interventions across the full fuelwood value chain.

The project and its associated baseline co-finance together seeks to transform the Nigerian fuelwood value chain from the scenario described in the left side of Figure 8 (unmanaged and informal) to the scenario described on the right side (managed, sustainable and formalized).

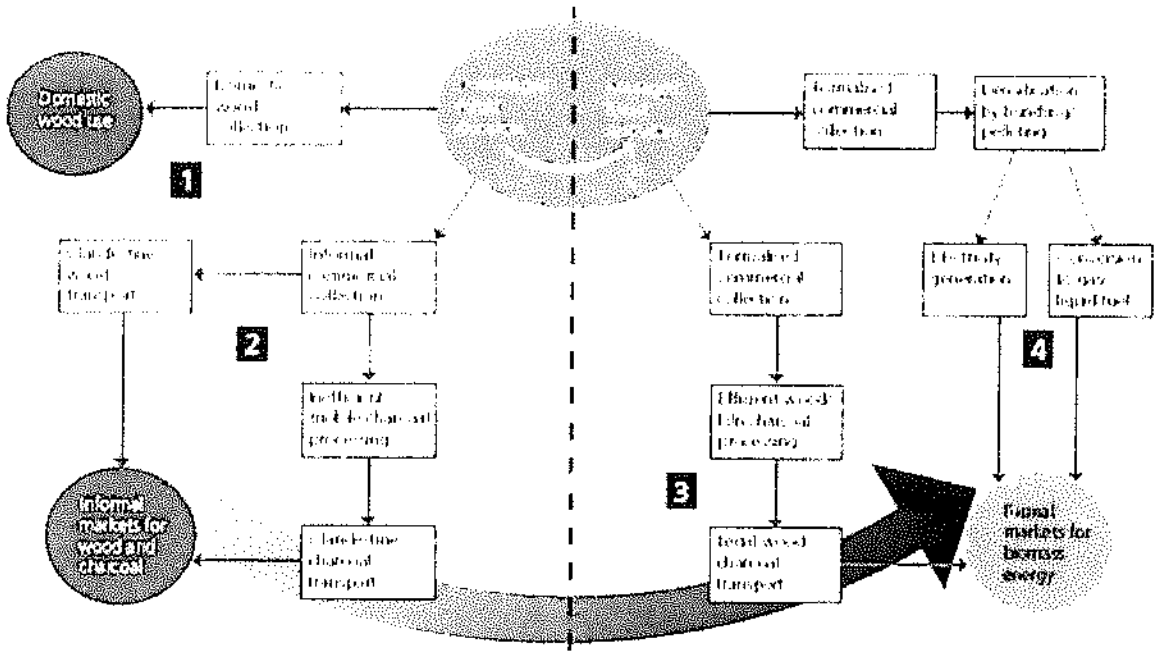


Figure 8 – Woody Biomass Energy Production showing desirable transition stages
Source: (2011) *Bundles of energy: The case for renewable biomass energy*, IIED

The goal of the Project is the reduction of GHG emissions in the domestic, institutional and industrial sectors of Nigeria through integrated and sustainable fuelwood production and utilization, and promotion of sustainable biomass energy technologies in Nigeria using output based and market based approaches.

Based on the above strategic considerations, the Project will focus on four major components as follows:

- **Component 1.** Sustainable fuel wood supply
- **Component 2.** Fuelwood Demand Management
- **Component 3.** Domestic Industry for Clean Cook Stoves and Other Clean Energy Alternatives
- **Component 4.** Financial models for sustainable fuelwood management.

Each of the above components will have specific activities that are designed to produce outputs leading to the following outcomes, respectively:

- **Outcome 1:** Models for sustainable fuelwood production demonstrated in:
  a. At least 10 communities in Cross River and Delta State leading to:
     - 50,000 ha of forestlands under improved multifunctional forest management;
     - Forest Management Committees (FMCs) created/strengthened in SFM
  b. At least 10 communities in Kaduna State leading to:
     - 3,003 ha of degraded land restored with Sustainable Land Management measures like woodlots;
     - SLM Management Committee created/strengthened in SLM

- **Outcome 2:** Improved awareness and acceptance of alternative (renewable and more efficient) energy technologies for domestic, institutional and industrial sub-sectors in Cross River, Delta and Kaduna States. Increased penetration of improved/alternative energy technologies for domestic needs in targeted communities by at least 20% (BAU: 0.1%); Avoided emissions of 40,000 t CO_2 eq/year from combustion of un-sustainable biomass in inefficient cook stoves/kilns (replaced by more efficient or other alternatives)

- **Outcome 3:** Improved efficiency, quality and affordability of domestically manufactured cooking/heating appliances for domestic, institutional and industrial sub-sectors. Strengthened domestic supply chain for EE/RE cooking and heating appliances

- **Outcome 4:** Consumer financing model for EE cook stove/kiln successfully operates. Sales of efficient cook stoves/kilns increased by at least 20% in Cross River, Delta and Kaduna State. Investment in sustainable forest management in Cross River and Delta State increased.

2.4 Project Objective, Outcomes, Outputs and Activities

The SFM Project has the following Project Objective:

Project Objective: Sustainable fuelwood management in Nigeria secures multiple environmental and socio-economic benefits, including reduced GHG emission from reduced wood fuel consumption, enhanced carbon storage and sequestration, as well as improved rural livelihoods and opportunities for local development.

The Project has been designed to implement four components that are expected to generate outcomes that, when achieved, will realize the Project Objective. The Project seeks to overcome the technical, financial, marketing and investment barriers to balance the supply and demand of fuelwood by scaling up of supply of certified sustainable fuelwood and reduce consumption through access to certified clean stoves/kilns.

Each project component will comprise of activities that specifically address a particular category of barriers.

Component 1: Sustainable Fuelwood Supply (GEF funding: USD 1,322,358: Co-funding: USD 3,400,000).

Output 1.1: Assessment of the availability of biomass (deadwood, crop residues and livestock wastes) and prospects of the rural subsistence supply and business opportunity of fuel wood conducted

Under this output, a study will be carried out to collect baseline data on the supply and demand of fuelwood from protected forest, woodland and farmstead at the selected pilot sites. The study will determine the elasticity of the fuelwood supply and demand (prices of cooking energy) scenario which are determined by availability of cooking fuel (pruning, twigs greater than 2 cm and offcuts from standing trees, fallen or standing dead trees), method and labour required to collect and transport the fuelwood and if traded their prices. The data will highlight how flexible the supply and demand chain is, and how quickly end users switch between sources (forest, woodlot, garden, farm yards, crop residues)[6]. The data will reveal the key drivers for deforestation either from fuelwood demand for cottage industrial and processing needs or household cooking needs. Commercial drivers for deforestation will also be established. The potential for biomass energy from crop residues and livestock waste as direct cooking and thermal fuel or processed fuel (briquettes, pelleting) will also be assessed.

The data gathered from seasonal samplings of deadwood volume, sizes and usability will inform decisions on how the deadwood are being utilized: documentation on the pattern of community foraging and fuelwood collection best practices and by-laws on regulated collections; support viable business in excess of the community's requirement. The study will provide useful information on the need to replant as well as the trading patterns and movement of the fuelwood. The data will also be used to develop knowledge products to raise awareness on the critical need to balance supply and demand of fuelwood under Output 1.6 in order to prevent deforestation and land degradation.

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[6] *In Kenya, trees outside forest supply half of fuelwood demand. In West Java, ⅔ came from farmyard and gardens and 2/3 from branches and twigs. In semi arid regions where the regrowth is slower and there is high population density, fuelwood could be a driver for deforestation often exacerbated by high institutional processing and industrial demand.*

Activities are:

- Conduct a baseline survey to assess the technical and physical availability of biomass (deadwood, plant and livestock wastes) and the elasticity of the supply
- Assess current biomass utilization (deadwood, plant and livestock wastes) at the community level and opportunity for trading and business

Output 1.2: 3,003 ha farmer managed woodlots established under agroforestry and FMNR system for certified sustainable fuelwood supply in pilot communities

To address the chronic shortages and imbalance of the fuelwood sector in semi-arid zones, this output seeks to demonstrate the sustainable supply of renewable fuelwood from degraded land using SLM best practices such as agroforestry woodlots and farmer managed natural regeneration. With the support of an Agroforestry expert, this output seeks to promote SLM best practices using agroforestry to interplant selected leguminous multi-purpose trees (timber and fruit trees) with short term crops and farmer managed natural regeneration to provide fuelwood. 3,003 ha will be planted on private land of between 2 to 3 ha from 1,300 landowners that have been identified by DARE and Samura College of Agriculture, Ahmadu Bello University in Kaduna. The project will partner with DARE, Kaduna Forestry Commission and Samaru College of Agriculture to implement and coordinate the operations.

Activities are:

- In partnership with DARE, Forestry Commission and SCA, develop knowledge products on Sustainable Forest Management (SFM) and Sustainable Land Management (SLM) best practices;
- Organize participatory and gender sensitive technical and business training for value chain actors (inputs suppliers, farmers), public stakeholders (extensionists, R&D) and 20 male and female business agents on nursery and agroforestry woodlot establishment and maintenance;
- Selection, establishment and maintenance of 20 nurseries on farmers' land to produce 1.8 million seedlings or clonal cuttings (18,000 seedlings/cuttings per year per nursery over 5 years);
- Distribution and planting of seedlings/cuttings and maintenance of the trees in 3,003 ha woodlot; and
- Establish the supply chain, marketing and trading of certified fuelwood and farm produce

Output 1.3: Sustainable community-run forest management systems established over an area of 50,000 ha

The implementation plan for SFM in Cross River and Delta State is described in great detail in Annex C. Table C2 shows the pilot community and hectarage and the number of households to be trained in SFM best practices. Based on the knowledge products developed under Activity 1.2.1, 1,111 households, foresters and SFM Management Committee will be trained by an SFM expert on how to manage their forest sustainably and how and when to collect deadwood, fuelwood from coppicing, pruning and offcuts of greater than 2cm.

In collaboration with the REDD+ project team in CRS and Delta State and based on Output 1.1, the methodology and procedures (frequency, species, size, volume, recording) for the sustainable extraction of fuelwood from the protected 36,000 ha forest lands in CRS and 14,000 ha in Delta state will be designed, developed, field tested and improved by the SFM Expert. The monitoring of the supply and demand of the fuelwood in each community will be carried out.

Activities are:

- Organize participatory and gender sensitive technical and business training for value chain actors, public stakeholders (extensionists, R&D staff) and 30 business agents on SFM best practices;
- Design and develop methodology and procedures for the extraction of fuelwood from protected 50,000 ha of forest land in Cross River (36,000 ha) and Delta State (14,000 ha),
- Establish the supply chain and marketing and trading of certified fuelwood and non-timber forest products (e.g. spices and medicinal plants)

Output 1.4: Community Energy Enterprises (CEE) with multifunctional platform (carbonization units, e.g. efficient charcoal kiln; agro-forestry processing units, marketing and IT center) established

In addition to securing access to renewable fuelwood from protected forests and woodlots on an individual household basis for subsistence use, there is also a need to demonstrate the feasibility of adding value and converting the collectively harvested fuelwood from protected forests and community woodlots into charcoal or to power and operate the agro-processing multifunctional platform. The primary objective is to test a model for collective sustainable fuelwood production, whereby fuelwood producers for charcoal production or agro-processor groups or cooperatives will have access to, and manage, forest land in Cross River and Delta and woodlot in Kaduna.

In partnership with the SFM and SLM Management Committee, the CEE with multifunctional platform (MFP) will manage the forest and woodland to produce wood on a sustainable basis for improved, efficient and certified fuelwood production on a commercial basis. The models will demonstrate whether providing fuelwood or charcoal producing groups or agro-processing cooperatives with access to forests and woodlot, with obligations to manage and harvest trees on a sustainable basis, can work and be profitable. Currently, local authorities, chiefs, landholders and the Forestry Commission must approve production of fuelwood on lands they control, and receive some form of payment for harvesting wood and producing fuelwood on and from that land. A CEE will be established in each pilot site in Cross River, Delta and Kaduna State.

There are several different types of capacity building and training that will be necessary for these CEEs including:

1. **Business Skills** – How to work as a Joint Venture Enterprise (NCCS, ECN, Ministry of Trade, Industry and Investment);
2. **Technical Skills in the Area of Forestry** and Woodlot Management, Sustainable Harvesting, Tree Species Selection, Operations of Nurseries, Replanting (REDD+, FD, forestry NGOs/CBOs such as CREDC, DARE, SME Fund, ICEED, etc.)
3. **Technical Skills (for charcoal) in Improved Charcoal Production**, Including Wood Harvesting and Cutting, Drying, Retort Kiln Design, Construction and Operations – Efficiency Improvements to Maximize Output with Least Input. (ECN, FD)
4. **Technical Skills for Commercial Fuelwood in Wood Harvesting**, Collection, Bundling (FD, NGOs);
5. **Operational and Management Skills** – How to Set up a Successful Business and Manage a Variety of People from Different Backgrounds (Business Agent, SME, CREDC, ICEED, DARE, Social Business);
6. **Commercial Skills including Accountancy, Bookkeeping and Commercial Operations** (Business Agent, MFI, Social Business);
7. **Marketing of Production including any Branding** (Business Agent, MFI, NGOs)

Activities are:

- Develop the Community Energy Enterprises (CEE) with multifunctional platform value chain
- Define the roles and responsibilities of the CEE
- Work with local leaders to select members for CEE
- Provide Training and Capacity Building to the Community Energy Enterprises with multifunctional platform

Output 1.5: SFM and SLM Management Committee established and capacity enhanced in community-based forest and landscape management and business best practices

To generate strong buy-in and project ownership, men, women and youth from the local community will be selected to sit on the SFM and SLM MC to plan, coordinate, implement, oversee and monitor the project implementation. It is critical that the SFM and SLM MC are fully capacitated in order to ensure the sustainability of the project results beyond the GEF project.

Activities are:

- In partnership with community leaders and elders, identify and select male and female members of the local SFM and SLM Management Committee
- Through a participatory approach, define the roles and responsibilities of the SFM and SLM MC members
- Develop knowledge products and conduct technical and business training for male and female business agents and SFM and SLM MC members

Output 1.6: Awareness raising campaign on sustainable fuel wood production and other benefits of SFM and SLM conducted

Awareness raising campaign will be planned and implemented to sensitize stakeholders on the cause of fuel wood deficiency and impact of deforestation and benefits of their collective actions to generate strong buy-in and enthusiasm and ownership. Stakeholder engagement is integral to the development of an effective strategy for SFM and SLM implementation in Nigeria. This output aims at ensuring that all stakeholder groups at all levels have a better understanding of the SFM and SLM programme, better definition of expected roles and responsibilities, etc. Stakeholder engagement emphasizes increased awareness raising, integration of SFM and SLM initiatives with safeguard measures and broad involvement in implementation to help ensure effective communication and informed decision-making.

Critical to the process of engagement is the active involvement and support of local level institutions and stakeholders such as traditional authorities, chiefs land owners, land users, community and faith based-institutions and community members. This is because they live closest to forest resources and thus have a critical role to play in conservation in the light of their rich knowledge and experience in natural resource management as well as the fact that forest resources often serve as the primary, if not the only, source of their livelihoods. Additionally, benefit sharing, which is one of the key issues for SFM and SLM, requires very extensive consultation and participation of national stakeholders at all levels in the planning, decision-making and implementation of these arrangements. There is therefore the need to engage all stakeholders significantly affected by, involved in implementation of, or otherwise interested in SFM and SLM.

Activities are:

- Based on needs assessment, develop easy to use knowledge products (training manual, leaflets, brochures, podcasts, videos) for raising awareness on the benefits and best practices on SFM and SLM
- Organize workshops, roadshows, annual Cooking Energy Summit, TV and radio to raise awareness and to educate, sensitize and engage public, private and CSO and faith-based stakeholders on the causes and impacts of fuel wood deficiency and deforestation and the benefits of SFM and SLM in targeted 3 States and nationwide

Component 2: Fuel wood Demand Management (GEF funding: USD 640,000: Co-funding: USD 3,880,000).

Output 2.1: Feasible EE and alternative energy solutions identified.

A Cookstove Business Development expert will be hired to develop a business plan to map out the EE and alternative technology and how they could be improved, produced, distributed and scaled up as inclusive business according to affordability and market segmentation. The plan will identify who are the value chain actors to serve the BOP market and how they could be incentivized to supply, produce, distribute and retail the improved cookstoves.

Activities are:

- Conduct a detailed market segmentation study to identify needs, gaps, opportunities and challenges for the promotion and distribution of suitable clean stoves/kilns for households at the bottom of the pyramid
- Develop criteria to select and recommend feasible EE and alternative energy solutions for demonstration in the domestic sector at the pilot community

Output 2.2: Energy efficient cook stove/kiln distribution program designed, validated and its implementation monitored

Based on findings from Output 2.1 and according to the implementation and distribution plan proposed in Annex C, the final cook stove distribution programme will be validated and the implementation will be monitored by the project team. The distribution and scaling up plan will develop a pipeline of prioritized areas to be covered based on market segmentation: needs, materials, suppliers, producers, resources, priority area, readiness for adoption and affordability. The project will pilot the implementation of SFM activities in Cross River, Delta and Kaduna State within its implementation period. These SFM activities are expected to have a longer lifespan, and their scope is expected to grow over time. As an example, the project will support the implementation of a robust MRV framework and the operation of a performance based payment system with clear exit strategy. It is expected that these SFM activities will continue their operation with additional public/private SFM programs supported by FMOE, ECN and NACC.

Activities are:

- Validate and finalize the implementation and distribution plan on how the selected technology will be produced, distributed, scaled up and monitored to meet domestic cooking needs in the pilot communities

Output 2.3: Participatory technical and business training provided for end users on clean energy technologies for domestic (women) sector.

This output seeks to strengthen the **knowledge** (understanding and accepting new information) and **skills** base (having the ability and empowerment to do something new or in an improved way) of the end users. This will empower end users to make wise and well-informed decisions in the purchase of improved cookstoves. They will be able to spot sub-standard cookstoves and demand high quality stoves and after sale services and thus contribute to quality improvement.

Activities are:

- Develop easy to use knowledge products (leaflets, brochures, manuals, factsheets) to support end users (e.g. women, trade associations) to create demand for aspirational EE stoves/kilns for the domestic sub sectors.
- Organize participatory training workshop to educate, sensitize and empower the end users to create demand through cook stove demonstration, site visits and word of mouth to reduce supply risks.

Output 2.4: Marketing and awareness raising campaign for clean stoves/kilns conducted

Based on review of lessons learned, needs and gaps of current outreach programmes and campaigns and the baseline study conducted under Activity 2.1.1, knowledge products (leaflets, manual, brochures, factsheet, podcast, social media, DVD, CD) from Output 2.3 will be used to raise awareness on the benefits of clean cook stoves and kilns for the domestic, institutional and industrial sub-sectors.

To have real desired impact with great absorption and penetration rates and genuine long-term uptake, creative marketing and public awareness on stoves/kilns and fuel efficiency will need to be sustained for at least three years (text messaging, billboards, radio, TV drama, Nollywood). People can remember radio and TV commercials and easy-to-remember jingles. This will help to push the tipping point of stove sales.

Activities are:

- Develop easy-to-remember marketing and awareness raising knowledge products (advertising flyers, banners, factsheet, slogans and jingles for radio and TV) tailored for meeting local needs.
- Organize marketing and awareness campaign through various local and national educational (school, radio, TV) and advertising media, e.g. billboards, shops, malls, radio, TV drama and documentary and film industry (e g. Nollywood).

Output 2.5: Energy efficient cook stove distribution program implemented for 20,000 improved cook stoves for the BOP market

As BOP families spend a higher proportion of their hard earned income (up to 50%) on cooking fuel, this output seeks to design, field test and improve affordable and high quality stoves and fuel for these vulnerable families. The objective is to specify clean stove technology propositions for the BOP market segment with potential for scaled up development and to recommend the best possible model for scaled up replication. By the end of the project, the Nigerian government should be able to know where the opportunity lies and whether the technology investments in clean stove cottage industry are viable.

The details of the distribution plan are presented in Annex C covering: improving the supply chain, implementation structure and access to finance. This output will build upon the progress made by existing actors in the country to develop a viable market system for the production and distribution of energy efficient cook stoves and kilns, and will scale this up nationally reaching households in all 6 geo-political zones of the country.

The primary focus will be up-scaling of cookstoves that have been selected under Output 2.1 (e.g. the clay stove promoted by Toyola Energy in Lagos and other stoves that they are currently developing, Envirofit Stove, Clay Ecostove, Ben 2-3 Metal stove). The production and distribution model consists of selected enterprises that are producing different components and producing stoves. These businesses will retail the stoves from their premises in the pilot community and also sell the stoves wholesale to small shops and kiosks in the community and to a network of businesses they have established in rural areas of the country.

In addition, these businesses act as a lead firm in supporting other micro-enterprise producers in the pilot communities, providing training and selling production inputs and manufacturing equipment. To-date, informal trainings are taking place but these will be formalized and upgraded with certificates.

Under this output, it is anticipated that more than 50 micro-enterprise stove producers will be trained, certified and established in the pilot communities and in district towns around the country. Training where participants will be at least 50% youth or women will be provided by the lead firms in the community, and the small cost of initial tools and parts for production will be subsidized (Startup Programme), will be provided on credit by the lead firms, or will be enabled by access to a microfinance loan (e.g. Fortis) to be developed under Output 4.1. The matching rebate scheme developed under Output 4.1 will also be tested, monitored and evaluated and upgraded during project implementation.

Activities are:

- Prepare design drawings, construction procedures and manuals for the construction and operation of energy-efficient cookstoves
- Agreement with local fabricators on the production of the furnaces/stoves and training on their design and operational features
- Production, installation and dissemination of furnaces/stoves to end-users
- Conduct of training and awareness campaign on the use, maintenance and benefits of energy-efficient furnaces/stoves
- Regular monitoring and evaluation of installed furnaces/stoves
- Improvement in the design based on results of the monitoring and evaluation activities
- Promotion and replication of re-designed furnaces/stoves to remaining households and community-based institutions

Output 2.6: Other alternative energy solutions tested and piloted at household and/or community level (i.e. biogas, LPG, ethanol and solar-based solutions)

Based on recommendations from Output 2.1 and in order to provide alternatives to fuel wood, other forms of cooking energy such as biogas, LPG, ethanol and solar-based cooking will also be demonstrated. The final choice of the alternative technology will be decided by the community during project implementation. This output seeks to build on the success of the manufacturers of household cookstoves under Output 2.5, to green the cottage industry and institutional cooking value chain by generating market driven supply of industrial and institutional cookstoves/furnaces/kilns to create

cleaner, safer, and more hygienic working conditions whilst creating green jobs. In the public sector there is also much need for institutional stoves in schools, hostels, prisons and hospitals. Production of these stoves is likely to be centralized, with businesses constructing/installing the stove on the premises of the consumer. The stoves will be constructed from local materials using rocket-design for large pots or energy efficient ovens. This output will work closely with RUWES, Fortis and NACC in developing mentoring and business incubator programs in greening the value chain.

After the private sector participants are mapped out and their potential roles ascertained, the project team along with RUWES and NACC and government team will formulate a framework for partnership between ECN and the entrepreneurs that is workable, effective and provides benefits and incentives to all parties concerned (see details in Annex C). This will entail detailed discussions with all parties concerned and the possibility to use tested models and innovative output-based schemes as appropriate. Support mechanisms in the form of capacity development and/or financing incentives to micro-entrepreneurs will be agreed as part of the public-private partnerships that will be created. Such mechanisms will be made in synergy with other activities in this Project.

The implementation of the public-private partnerships formulated in Output 2 will be the basis for the implementation and dissemination of alternative stove/furnaces/kilns in the relevant industries targeted in this Project, namely the fish smoking, gari making, bakeries and ceramic making sectors. The aim is for private enterprises to take up roles in the project cycle that are best done by the private sector and eventually doing it through normal market mechanisms without any government intervention or support.

Activities are:

- Testing and improving alternative energy solutions (e.g. biogas, ethanol, solar based)
- Identification of local producers/fabricators, raw material suppliers and micro-entrepreneurs and their specific areas of involvement
- Investigation and formulation of appropriate procurement procedures, matching rebate and market delivery mechanisms
- Implementation of public-private partnerships for the production & delivery of alternative energy efficient stoves/furnaces/kilns

Component 3: Domestic Industry for Clean Cook Stoves and Other Clean Energy Alternatives (GEF funding: USD 818,149: Co-funding: USD 5,440,000).

Output 3.1: Business plan for clean cook stove manufacturing zone prepared to scale-up production and reduce costs

In consultation with the private sector and value chain actors, the Bioenergy Expert will review the needs, gaps, opportunities and challenges in the identification and selection of manufacturing zones for clean cook stoves/kilns with access to power, labour, supplies and materials (e.g. clay). The need and feasibility for a dedicated zone will be explored. The expert will make recommendations for expanding technology markets and scaling up industry wide improvements. Based on the analyses, the investment opportunities (within an industry and across industries) that have the highest probability of yielding returns will be recommended. The recommendations will also take into account qualitative considerations such as constraints and opportunities, availability of technology, technological complexity, payback periods, initial investment requirements, regulatory and legal framework, risks, political will, and managerial capacity of firms. In offering these recommendations, the Bioenergy Expert will assess the current state of knowledge, experience and practice to expand the selected technology markets. The Stove Expert will also highlight among the whole set of possible technologies, those which present higher potential to be supplied locally versus those which should be imported from abroad. All of these recommendations should include appropriate justification and reference to both the primary source of evidence from Nigeria and the secondary data from best practice. In particular, these recommendations should be "implementation ready", so that concrete action steps can be taken by relevant government agencies and value chain actors.

Activities are:

- Review needs and gaps in the manufacturing of cook stoves by the private sector

- Develop a business plan (secure local inputs supply chain, bulk purchase, reduce production costs, access to finance, capacity development, marketing) for the local manufacturing of clean cook stoves/kilns

Output 3.2: Unit cost of improved cook stove reduced down to at least $10

The Bioenergy Expert will partner with women's groups and the local producers association to improve the productivity and develop disruptive innovation of affordable stoves for the BOP market based on the following strategies: **i. Reduce materials cost:** Reduce transport and logistics costs by using local resources e.g. using clay as liners for the producers in the South (e.g. Ewkuk stove, Toyola Stove,) and using metals or recycled metals (e.g. from end of life refrigerators/metal roof) for the producers in the North (e.g. Ben Stove); **ii. Reduce supply risk** through bulk orders and long term contracts; **iii. Reduce production costs:** Improve productivity through division of labour – specialized parts and assembly; improved technical skills; and use of right tools; and **iv. Create and incentivize local innovation:** Partner with the University, ECN and the Centre of excellence to improve local clay-based and metal-based stove; Partner with national, regional (ECREEE) and international stove development and testing centres.

In partnership with DFID's M&E clean cook stove project, NCCS and NACC, an annual market survey will be conducted as part of the M&E programme to track price movement in the clean stove market. The market intelligence data will be used to continue to improve the price and quality of the stove/kiln.

Activities are:

- Participatory technology development in the production of affordable and high quality stoves/kilns
- Market survey to track cook stove prices

Output 3.3: Participatory and peer-to-peer training for local SMEs, distributors and community centers provided

This output will develop a range of capacity development interventions to complement the direct investments in enterprises under Outcomes 2 and 3. Capacity building opportunities will be tailored to enterprises at different stages of development and will range from webinars and online materials available to all NACC partners, to the Business Program that helps local entrepreneurs with basic business planning and financial management skills, to the Capacity Building Facility (CBF) that provides capacity building services when coupled with committed growth financing.

The opportunity to link the training course with GACC's Global Social Benefit Institute (GSBI) will be explored. GSBI's high quality accelerator curriculum is condensed into 3 days of support in a classroom setting where entrepreneurs work together and collaborate on a plan for growing their enterprises in a sustainable manner. Entrepreneurs are expected to leave the workshop with the tools to apply for future funding and training programs. While the training workshop is targeted to earlier stage social enterprises, participants receive value from the training whether they are still in the planning stage or have been in business for many years

This output will utilize the GACC's Capacity Building Facility to:

- Partner with MFIs and social impact investors to increase investment in the clean cooking sector by providing access to capacity building services such as strategic planning, financial management, etc. to strengthen their underlying investment;
- Finance the cost of capacity building to leverage grant and investment capital;
- Work with NACC and NCCS partners to prioritize the sector capacity building needs of clean cookstove and fuel companies, including the incorporation of gender considerations into capacity building delivery;
- Encourage the development and use of local service providers to help create jobs and strengthen indigenous markets for the clean cooking sector.

Activities are:

- Develop knowledge products for technical, business and marketing training of value chain actors (suppliers, producers, distributors, retailers)

- Conduct technical and business training for SMEs, distributors and community centers
- Organise and conduct annual study tours to successfully operated stove production sites

Output 3.4: Adequately capable local entrepreneurs producing certified improved cook stoves

The production and distribution of 20,000 clean stoves are covered under Output 2.5. To ensure that the production is viable and sustained beyond the GEF project, the technical and business skills of the local entrepreneurs will continually be improved and upgraded through a detailed national scaling up plan and in partnership with NACC, the Center of Excellence and local banks and MFIs (See Figure D4 in Annex D).

Activities are:

- Adequately trained and capable local entrepreneurs producing certified improved cook stoves using local materials and employing local youth and women

Component 4: Financial models for sustainable fuelwood management (GEF Funding: USD 725,962; Co-funding: USD 3,230,000).

Output 4.1: Financial model designed and tested in partnership with MFIs and technology providers

Many BOP households in Nigeria are not able to afford the expensive imported clean stove and spend a high proportion of their hard earned income on dirty fuelwood. This output aims to broaden access to clean stoves/kilns for BOP households in rural Nigeria by allowing trained and certified value chain actors to access competitive finance to produce high quality and certified clean cookstoves.

Activities are:

- Review lessons learned and key success factors for the design of value chain and gender sensitive financial products and services (e.g. matching rebate scheme)
- Test, improve and upgrade financial products and services for the supply and demand of clean stove/kiln

Output 4.2: Training provided to MFIs on clean energy financing

Based on technical and business knowledge products developed under Output 3.4 and lessons learned from Output 4.1, knowledge products on financial loans and services to train staff from local banks and MFIs will be developed in the form of leaflets, factsheet, manual, brochures and DVD. These products will assist financial staff and investors alike in making informed decisions and understanding the financial and business risks for optimizing the return on investment.

Based on the results of activity 4.1.1, training materials will be developed by the Climate Finance expert for meeting the needs of the MFI staff and value chain actors. The PMU will organize an annual training workshop and identify the participants.

This activity will support producers and MFIs to explore the opportunity to access other regional and international climate funds to scale up and replicate future stove/kiln and fuelwood programmes e.g. Green Climate Fund resources as a future pipeline of bankable projects or GACC funds such as: the Pilot Innovation Fund, the Women's Empowerment Fund, the Catalytic Small Grants program, the Spark Fund, the Working Capital Fund and the Capacity Building Facility.

Activities are:

- Develop knowledge products for financial training
- Organized training for MFIs and value chain actors
- Access to other climate funding resources

Output 4.3: Community funds (CF) and incentive schemes set-up and capitalized, including via compensatory mechanisms for forest conservation and land restoration

To ensure that the design of the project properly addresses the complexity of protected areas, ecosystem services, and sustainable financing issues of forest conservation in CRS and Delta State

and degraded land in Kaduna State, a Climate Finance Expert will be hired to design, test and improve the community fund and scheme to incentivize value chain actors and custodians to protect their fragile resources such as forests, land, biodiversity and water. According to the REDD+ team, no forest fund or incentive scheme has been designed yet as Nigeria is still in the readiness phase. The strategy for REDD+ implementation will be finalized by December 2016, which will put forward conditions and commitments to be met to trigger PES and other REDD+ benefits. This output will support the Community based REDD+ Country Plan programme (CBR). In CRS, the Government, largely through its CRS Forest Commission, has initiated several initiatives to conserve their forests and biodiversity. These include the certification of 19 Forest Management Committees (FMC) as local community institutions to interface effectively with other stakeholders in forest governance processes in the state. Through establishing FMCs, the State gives formal recognition to community forest management and builds on the tradition of forest communities' stewardship and conservation of forests. In CRS, the policies relevant to climate change and Payment for Ecosystem Services are the new law on Management and Sustainable Use of the Forest Resources of Cross River State[7], which enables the award of concessions for PES. These include concessions for carbon, biodiversity offsets, eco-tourism and watershed protection.

This SFM project will support CBR to develop the PES programme through following activities:

- Develop forestry law for parliamentary approval to define ecosystem services that will be purchased under the PES scheme (e.g. carbon sequestration)
- Develop a fund raising mechanism for PES, e.g. the National Forestry Financing Fund (NFFF) could be set up to issue and sell Ecosystem Service Certificates (CSA), e.g. each representing 1 ha of protected forest within the PES scheme
- Develop a modality to protect the forest with estimated pricing (USD/ha) over a certain period
- Develop mechanisms to engage with stakeholders to ensure participation and ownership, e.g. NFFF Board and REDD+ Executive Committee
- Develop land tenure arrangements and carbon rights system, e.g. availability of land titles
- Develop a strong forest governance framework for ensuing a high rate of compliance with national restrictions on forest use and PES rules and operations (e.g. availability of forest management plan).
- Establish a baseline reference for PES based on forest mapping, cover and inventory
- Develop a robust MRV system to monitor forest and land use and amount of carbon sequestered.

2.5 Cost Effectiveness

From the fuelwood supply side, the direct GHG emissions avoided from 50,000 ha of protected forest and 3,003 ha of woodlots are 5,198,739 and 168,468 tCO_{2e} respectively (Table 20) based on FAO's EX-ACT model (see Annex J). On the fuelwood demand side, the GHG savings from the dissemination of 20,000 clean stoves are 595,165 tCO_{2e} to give an overall abatement cost of USD 0.74 of GEF resources/tonne of CO_2 emissions avoided (Table 20). The project's cost effectiveness will be tracked using the Tracking Tool for Climate Change Mitigation Projects developed by GEF and the detailed GHG calculations and parameters used are shown in Annex D, I and J.

Table 20: Post-Project direct GHG emission avoided and saved from protected forest, woodlot and clean stove

Description	SFM (50,000 ha protected forest, 20 years)	CCM 5 & LD-2 (3,003 ha woodlot, 20 years,	CCM 2 & 3 (20,000 clean stoves)	Total	Abatement cost (USD/tCO2e)
Quantity of fuelwood saved (tonnes)		176,436	554,933	731,369	
GHG emissions mitigated (tCO2e)	5,198,740	168,460	595,165	5,962,365	
Abatement cost for CCM 2 and 3					2.71

[7] http://www.undp.org/content/dam/nigeria/docs/gef-sgp/Community%20based%20REDD+%20Country%20Plan%20for%20Nigeria.pdf

Abatement cost for CCM5, SFM and LD-2					0.52
Total GEF Funding (USD)	1,100,000	1,698,910	1,611,090	4,410,000	0.74

The project has been designed in a way to minimize duplication of efforts between other development partners and to maximize potential collaboration, thus enhancing its cost-effectiveness. In addition to the carbon benefits outlined above, the project is expected to generate multiple environmental and socio-economic benefits, including sustainable forest management, sustainable land management and improved rural livelihoods and opportunities for local development. Finally, the strong emphasis on community ownership and engagement will contribute to the project's cost-effectiveness through on-the-ground, community-level interventions.

2.6 Sustainability

Sustainability: The sustainability of this project, in particular its support to EE market transformation for efficient cook stoves, will be ensured via close collaboration and involvement of all value chain market actors: local communities (demand), manufacturers (supply), and financial intermediaries (MFIs). It is the aspiration of the project to create a business model whereby the market will continue growing without further grant support. This is based on the following assumptions:

- Demand for improved cook stoves will sustain due to implementation of the SFM regime in pilot communities;
- Supply of affordable cook stoves will be provided by local manufacturers; and
- Financing will be made available at affordable terms by partner MFIs.

Scaling-up: There is a huge potential for scaling up SFM and efficient cook stove solutions in Cross River, Delta and Kaduna State, let alone Nigeria and adjacent countries (see Figure 9): with 0.1% penetration rate for efficient cookstoves and 50 million people predominantly relying on biomass for cooking, the three states have great market potential for increased cook stove sales and scaling-up of the project-supported model for sustainable fuel-wood management.

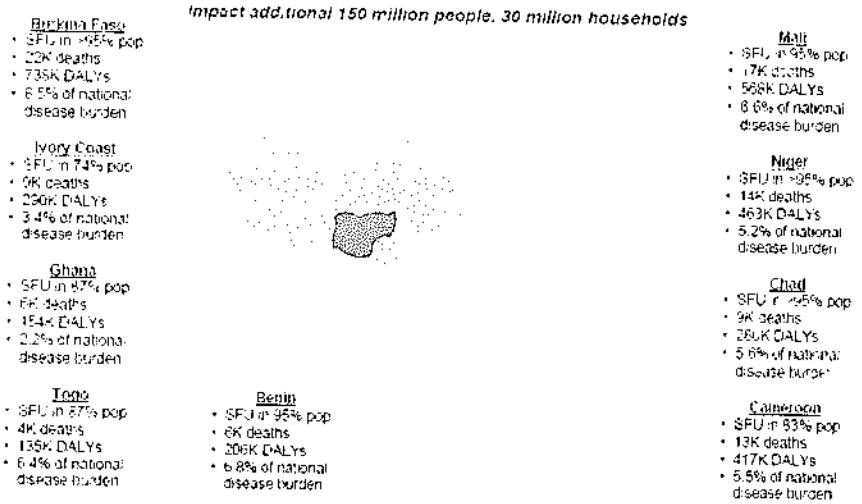


Figure 9: Potential for scaling-up sustainable fuelwood management program (GACC, 2011)

The implementation of the Sustainable Fuelwood Management (SFM) project will involve key public, private and CSO stakeholders from the forestry, agriculture and energy sectors and include assessment parameters that are directly linked to national priorities and ongoing or planned programs. The SFM program will be structured, to the extent possible, within existing institutional frameworks rather than resorting to the creation of new committees. GHG abatement measures will

be linked to the government's ongoing procedures and programs, strengthening the mitigation aspects of these programs instead of developing new ones.

With regards to SFM program implementation, the sustainability of the SFM activities will be a key parameter both at the design and piloting phase. A factor that strongly favors sustainability is that MRV is the key aspect to the success of any SFM. Therefore, the establishment of strong MRV systems, linked to performance based payments when appropriate, will be a key element for SFM program implementation. Furthermore, the project will prioritize the implementation of SFM programs that are linked to ongoing or planned government programs, strengthening their GHG emission reduction potential and their capacity to perform MRV. By aligning SFM programs with national priorities, the project will mainstream its actions within a broader development context, which strongly favors sustainability.

Scaling-up can happen in different ways, through mainstreaming into government planning and budgeting to affect the entire population, taking ongoing successful pilots to a larger scale or by transferring knowledge from one part of the country to another, or from one country to another.

2.7 Replicability

The challenge is to ensure that the formalization of the fuelwood and stove/kiln supply and demand chains developed at the community levels could be replicated to other states. This will be achieved through the development of a cookstove improvement system where the needs of the end users are assessed and their feedback used to improve and refine the system. A capacity development program will be put in place to ensure that the technical capacities and business skills of value chain actors are kept up to date. The required annual budget will be secured to support institutional and technical capacity and that there are adequate resources for training and manpower supply.

The project is designed to establish a sustainable financial and institutional framework for Sustainable Fuelwood Management in Nigeria. This is intended to trigger the process of implementing SFM activities in the country and to foster the replication of such activities in Nigeria. The project can expect replication at the following three levels:

i. Pilot SFM program implementation: The project will pilot the implementation of SFM activities in Cross River, Delta and Kaduna State within its implementation period. These SFM activities are expected to have a longer lifespan, and their scope is expected to grow over time. As an example, the project will support the implementation of a robust MRV framework and the operation of a performance based payment system with a clear exit strategy. It is expected that these SFM activities will continue their operation with additional public/private SFM programs supported by FMOE, ECN and NACC.

ii. Additional SFM program implementation: The project invests heavily in identifying and designing SFM programs for the forestry, agriculture and energy sectors, which will receive direct support by the project. However, there will be a number of SFM programs that can be supported at design level and ready for implementation. Such SFM activities are expected to be implemented with national and international assistance as appropriate. A key indicator of the project's replication success, included in the results framework, is an assessment of how many SFM activities designed by the project are in the implementation phase by the end of the project lifetime.

iii. Definition of new SFM programs: As described in the sustainability section above, the project aims to develop a SFM planning framework that allows for the development of new SFM activities in the forestry, agriculture and energy sectors. The voluntary targets established by the Government of Nigeria for the forestry, agriculture and energy sectors are ambitious and require significant changes within the sectors to be achieved. As such, the establishment of a well-defined institutional setup to prioritize actions and design SFM programs is essential to strengthen the country's efforts to achieve its targets. Likewise, the project's support for the establishment of MRV mechanisms will be replicable across SFM programs and will allow for quality reporting of the country's mitigation efforts. Finally, the project will contribute, along with the other ongoing SFM design and development efforts (described in the context and baseline sections of this document), to the establishment of a common cross-sectoral SFM design and implementation framework, including the establishment of procedures, protocols, and institutional arrangements. This collective effort will ultimately result in the mainstreaming of SFM

programs in Nigeria's national development process, which is the decisive factor for the project replication and for steering Nigeria towards a low carbon, climate resilient and gender sensitive development path.

2.8 Global Environmental Benefits

The activities of the Project consisting of the sustainable supply of certified fuelwood from 50,000 ha of protected forests in Cross River and Delta State and 3,003 ha of agroforestry woodlots in Kaduna State and the dissemination of 20,000 cookstoves will result in the reduction of GHG emissions amounting to approximately 5,962,365 tCO_2e throughout the life of the installations (see Table 20 above). Refer to Annexes D, I and J for a detailed assessment of energy savings and related GHG emissions reduction from each technology.

2.9 Cross Cutting Issues

2.8.1 Gender Equity Issues in Energy Access and Use

Women's participation, representation and access to resources and benefits will be a key focus of this project that aims to provide access to improved household energy through sustainable fuelwood and clean stoves/kilns. The project will contribute towards social, economic governance transformations to empower women through specific activities that: promote participatory and consultative planning for decision-making; improve women's capabilities through their involvement and their technical capabilities in setting up and maintaining multi-functional platforms, as consumers and producers in pilots and as role models; and, advance their influence in decision-making as well as control over natural resources.

Fuel wood use for domestic purposes is synonymous with women in Nigeria. Although women may share the task of collecting fuel wood with men, they are entirely responsible for cooking in the households. The project will therefore reduce the time that women spend on wood collection and will contribute to improving the health of women who spend a significant amount of time in the kitchen. Women will also regularly maintain the stoves/kilns to keep them in a condition that will ease their operation. Thus, the SFM project includes women as an important target group in its activities conducted at the community level.

In addition, women entrepreneurs are constrained by family and traditional obligations and usually lack access to credit, technology and have limited business skills. Development efforts to date have not sufficiently addressed the multi-dimensional constraints to women's active participation in the economy in the country. There is no cohesive approach to gender mainstreaming in the economy within the government, NGO, or donor sectors. Thus, the business development training carried out by the project will have a specific focus on developing businesses run by women.

2.8.2 Socio-economic benefits (including Poverty and MDG)

The SFM project is expected to provide socio-economic benefits to communities using renewable fuelwood and clean stoves/kilns. Local government officials will acquire coordination capacity in working with the private sector.

Clean stoves/kilns: The project is expected to contribute to poverty reduction through savings on women's time and better health of people by reducing indoor pollution. Consequently, villagers will have fewer days of sickness thereby enhancing their productivity. The production and distribution of clean stoves/kilns will also create employment at the village level. Villagers like skilled masons, including women, will be targeted as trainees for production of clean stoves/kilns.

Under the project, stoves/kilns will be produced out of locally available materials (clay in the south and metal in the north) but the design would require a certain level of skills. The project will train community women and local masons in producing stoves/kilns so these people could then

disseminate the stoves/kilns in the local community. There is therefore potential for employment of these trained stove/kiln technicians supplementing their income through payment for stove/kiln building activities. The project will introduce clean stoves/kilns at an affordable cost (targeted at less than USD 10). The stove/kiln producers will be offered a start-up loan or matching rebate and producers will have to mobilize the remaining start-up costs. Institutional and industrial owners will be supported with a matching rebate. The project will link poor households in the first stage of the roll-out of the stove/kiln (when rebate rates are higher) with micro-finance institutions (e.g. Fortis MFI) that are currently being initiated through the FGN's support.

The SFM Project is expected to provide alternative local employment and sustainable livelihoods that will avoid encroachment into protected forests and help restore degraded fragile lands. The promotion of micro-nurseries and tree management and business skills being promoted with the REDD+ and agroforestry project team will allow the custodians and farmers to practice sustainable forest and land management vital for providing environmental services. The improved stoves and kilns are more efficient and will use less fuel wood so that the pressure on the fragile forest will be less severe. The household, commercial and industrial sectors will have the opportunity to reduce their fuelwood bills from a renewable source and gain access to a financing facility for the production and purchase of clean technology.

3. SFM Project Results Framework

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: By 2018, targeted Government institutions, the private sector, and local communities manage natural resources in a more equitable and sustainable way.
Country Programme Outcome Indicators: Detailed regulatory bioenergy framework supporting dissemination of bioenergy technologies Number of households in remote community using energy efficient appliances with increased income generation opportunities **Compliance with GEF focal areas:** **CCM Objective 2:** "Promote market transformation for energy efficiency in industry and the building sector: components 3, 4, and 5 of the project will support market transformation towards more energy efficient household appliances, e.g. cook stoves, by strengthening their supply chain and domestic manufacturing capacities (Component 3), by facilitating access to consumer finance for energy efficient appliances (Component 4). **CCM Objective 3:** "Promote investment in renewable energy technology" by supporting sustainable utilization of biomass resources by local communities (Component 2). **CCM Objective 5:** "Conserve and enhance carbon stocks through sustainable management of land use, land-use change, and forestry" by improving forest conservation and sustainable forest management at local level (Component 2). **LD Objective 2:** "Generate sustainable flows of forest ecosystem services in drylands, including sustaining livelihoods of forest dependent people". The project will remove barriers to sustainable forest management by promoting the enabling policy environment, access to technologies (such as improved cookstoves), combined with large-scale applications of SFM technologies and practices on the ground. **SFM/REDD Objective 1**: "Reduce pressures on forest resources and generate sustainable flows of forest ecosystem services" by reducing pressures on forest from unsustainable fuel wood consumption.

Project Components	Expected Outcomes	Indicators	Baseline	Targets	Means of Verification	Assumptions and Risks
Project Objective: **Sustainable fuelwood management in Nigeria secures multiple environmental and socio-economic benefits, including reduced GHG emission from wood fuel consumption, enhanced carbon storage and sequestration, as well as improved rural livelihoods and opportunities for local development**	Sustainable fuelwood management in Nigeria demonstrated through i) the supply of certified fuelwood from protected forests and farmer managed woodlots and ii) efficient utilization of certified fuelwood through improved cooksktove as inclusive business	Hecterage of forest protected and t of CO2 sequestered by EOP.	- REDD+ programme being implemented	- 50,000 ha forest protected under REDD+ programme by EOP - 5,198,739 tCO2e sequestered over the lifetime of the project	- Progress report - REDD+ monitoring and progress report - Number of custodians and farmers trained and certified in SFM - CCM Tracking tool	- Strong buy-in from forest custodians and farmers and forest staff - Availability of fuelwood - Good management of forest and resources
		Hecterage of woodlot established, t of fuelwood supplied and tCO2 avoided by EOP	- No formal woodlot system established in Kaduna State	- By EOP, 3,003 ha woodlot farms established - 176,436 t of renewable fuelwood supplied by EOP and 705,744 t fuelwood supplied over lifetime - 168,468 tCO2e avoided over lifetime	- Progress report - Nursery and woodlot development report - Number of farmers trained and certified - CCM Tracking tool	- Strong buy-in from public, private and CSO partners and farmers - Availability of high quality inputs, seeds and land - Good management of nurseries, seedlings and plants
		- Volume of tCO2 saved by EOP	- No formal or fragmented stove supply chain	- 595,165 tCO2e saved by EOP	- Household surveys; SFM project M&E Reports - CCM Tracking tool	Government continues to have the political will to support policies and actions that would promote clean and efficient cookstoves
Component 1. Sustainable fuel wood supply	Outcome 1: Models for sustainable fuelwood production demonstrated in: a. At least 10 communities each in Cross River and Delta State leading to:	Quantity of renewable fuelwood supplied by EOP	- No formal woodlot system established in Kaduna State	- By EOP, 3,003 ha woodlot farms established - 20 nurseries established by year 3 - 9,000,000 seedlings raised, sold and planted EOP - 176,436 t of renewable fuelwood supplied by EOP and 705,744 t	- Progress report - Nursery and woodlot development report - Number of farmers trained and certified - CCM Tracking Toola	- Strong buy-in from farmers - Availability of high quality inputs, seeds and land -Good management of nurseries, seedlings and plants

	50,000 ha of forestlands under improved multifunctional forest management; 20 business agents trained in SFM; SFM and SLM Management Committees created/strengthened. b. 3,003 ha of degraded land restored with Sustainable Land Management measures like agroforestry woodlots and Farmer Managed Natural Regeneration (FMNR); SLM Management Committee created/strengthened in SLM			fuelwood supplied over lifetime - 168,468 t CO2e avoided over lifetime		
		□ .				
		5 No. of partners involved in the project towards reaching the project goal, by EOP.	- REDD+ programme being implemented	- 50,000 ha forest protected under REDD+ programme by EOP - 5,198,739 tCO2e sequestered over the lifetime of the project	- Progress report - REDD+ monitoring and progress report - Number of custodians and farmers trained and certified in SFM - CCM Tracking tool	- Strong buy-in from forest custodians and farmers and forest staff - Availability of fuelwood - Good management of forest and resources
		- Number of viable multifunctional platforms (MFPs) established in each of Cross River, Delta and Kaduna State by EOP	- No Multifunctional platforms exist	- By the end of year 5, 3 multifunctional platforms established each in Cross River, Delta and Kaduna State	- Multifunctional Management and progress report - Report from SFM/SLM MC - Account of MFP	- Good business plan for MFP developed - Good management of MFP - Viability of the MFP

Component 2. Fuelwood Demand Management	Outcome 2: Improved awareness and acceptance of alternative (renewable and more efficient) energy technologies for cooking and heating among local communities in Cross River, Delta and Kaduna State. Increased penetration of improved/alternative energy technologies for domestic needs in targeted communities by at least 20% (BAU: 0.1%); Avoided emissions of 50,000 t CO2e/year from combustion of un-sustainable biomass in inefficient cook stoves (replaced by more efficient or other alternatives)	- Report on Market Segmentation in Nigeria developed by Year 3	- Preliminary GACC market assessment report	- By year 3, 1 detailed report on Market Segmentation in Nigeria developed	- Market Segmentation report	- Availability of baseline data - Coverage of study is representative
		- Number of women sensitized and trained by EOP	- No formal training	- 300 women trained and certified as social entrepreneurs by EOP (100 in each state)	- Number of Technical and business certificates issued - Progress report	- Training provided are relevant and beneficial
		- Number of domestic cookstoves produced and distributed for BOP by EOP - tCO2e saved by EOP and lifetime	- No formal stove supply chain	- 20,000 stoves produced and distributed for BOP by EOP - 595,165 tCO2e saved by EOP	- CCM Tracking tool - Progress report	- Distribution target not being met - Poor quality stove

Component 3. Domestic Industry for Clean Cook Stoves and Other Clean Energy Alternatives	Outcome 3: Improved efficiency, quality and affordability of domestically manufactured cooking/heating appliances for BOP. Strengthened domestic supply chain for EE/RE cooking and heating appliances	- Number of low cost stoves designed and tested for each state by EOP	- No specific stove for BOP market	- 1 low cost clean stove each designed and tested for BOP market in Cross River, Delta and Kaduna State by EOP	- Lab testing progress report - Number of clean stoves tested and certified at testing labs	- No suitable stove design or availability of local materials or skilled technicians - High production costs
		- Number of low cost stoves produced and sold by EOP	- No formal local production for BOP market	- 20,000 low cost stoves produced and sold in Cross River, Delta and Kaduna State for BOP market by EOP	- Production record according to business plan - Input and production costs	- No suitable stove design or availability of local materials or skill technicians - High production costs
Component 4. Financial models for sustainable fuelwood management.	Outcome 4 Consumer financing model for clean cook stove/kiln successfully operated. Sales of efficient cook stoves increased by at least 20% in Cross River, Delta and Kaduna State. Investment in sustainable	- Number of financial products designed and tested and scaled up by EOP - Volume of loans disbursed by EOP - Number of households reached with clean stoves	- No financial products targeted for stove products	- At least 2 financial products (matching rebate, start up loan) designed and tested and scaled up by EOP - USD 500,000 disbursed by EOP - Sensitized on clean stoves by EOP	- Financial products and services brochures - Loan portfolio and account report	- High transaction costs - Low uptake of products and services - High default rates
		- Number of bank/MFI staff trained by EOP	- No formal certified training	- 20 bank/MFI staff each trained in Cross River, Delta and Kaduna State by EOP	- Training report - Number of trainings organised and certificates issued	- Knowledge products that are not suitable - Lack of basic financial skills

	forest management in Cross River and Delta State and woodlot in Kaduna State increased.					

3.1 Total Budget and Financial Planning

Award ID:	00092573
Project ID	00097204
Business Unit:	NGA10
Project Title:	Sustainable Fuelwood Management in Nigeria
PIMS no.	5366
Implementing Partner	Energy Commission of Nigeria

Outcomes	Source of Funds	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount (USD) Year 1	Amount (USD) Year 2	Amount (USD) Year 3	Amount (USD) Year 4	Amount (USD) Year 5	Amount (USD) Total	Notes
Outcome 1: Models for sustainable fuelwood production demonstrated in: a. At least 10 communities in Cross River and Delta State leading to: 50,000 ha of forestlands under improved multifunctional forest management; SFM Management Committees created/strengthened in SFM. b. 3,003 ha of degraded land restored with Sustainable Land Management measures like agroforestry	62000	GEF	71200	International Consultants	30,000	20,000	10,000	10,000	10,000	80,000	1
	62000	GEF	71300	Local consultants	30,000	20,000	20,000	20,000	20,000	110,000	2
	62000	GEF	72100	Contractual Services-Companies	50,000	50,000	50,000	50,000	50,000	250,000	3
	62000	GEF	72600	Grant	80,000	80,000	80,000	80,000	80,000	400,000	4
	62000	GEF	71600	Travel	10,000	10,000	10,000	10,000	10,000	50,000	5
	62000	GEF	74200	Audio Visual & Print Prod Costs	6,000	5,000	5,000	5,000	2,929	23,929	6
	62000	GEF	72200	Equipment and Furniture	50,000	50,000	30,000	50,000	50,000	230,000	7

woodlots, SLM Management Committee created/strengthened in SLM	62000	GEF	75700	Training, workshops and Conferences	20,000	20,000	20,000	20,000	23,429	103,429	8
	62000	GEF	74100	Professional service (legal)	15,000	15,000	15,000	15,000	15,000	75,000	9
				Total Outcome 1	291,000	270,000	240,000	260,000	261,358	1,322,358	
Outcome 2: Improved awareness and acceptance of alternative (renewable and more efficient) energy technologies for cooking and heating among local communities in Cross River, Delta and Kaduna State. Increased penetration of improved/alternative energy technologies for domestic needs in targeted communities by at least 20% (BAU: 0.1%); Avoided emissions of 40,237 t CO2e/year from combustion of unsustainable biomass in inefficient cook stoves/kilns (replaced by more efficient or other alternatives)	62000	GEF	71200	International Consultants	30,000	20,000	10,000	10,000	10,000	80,000	10
	62000	GEF	71300	Local consultants	20,000	20,000	20,000	20,000	20,000	100,000	11
	62000	GEF	72100	Contractual Services-Companies	50,000	50,000	50,000	50,000	60,000	260,000	12
	62000	GEF	72600	Grants	70,000	70,000	80,000	80,000	80,000	380,000	13
	62000	GEF	71600	Travel	10,000	10,000	10,000	10,000	10,000	50,000	14
	62000	GEF	74200	Audio Visual & Print Prod Costs	10,000	10,000	10,000	10,000	10,000	50,000	15
	62000	GEF	72200	Equipment and Furniture	50,000	50,000	50,000	50,000	60,000	260,000	16
	62000	GEF	75700	Training, workshop, meetings	30,000	20,000	20,000	15,000	10,000	95,000	17
	62000	GEF	74100	Professional service (legal)	15,000	15,000	15,000	15,000	15,000	75,000	18
				Total Outcome 2	285,000	265,000	265,000	260,000	275,000	1,350,000	
Outcome 3: Improved efficiency, quality and affordability of	62000	GEF	71200	International Consultants	30,000	20,000	20,000	20,000	20,000	110,000	19
	62000	GEF	71300	Local consultants	30,000	30,000	30,000	20,000	20,000	130,000	20

domestically manufactured cooking/heating appliances for BOP. Strengthened domestic supply chain for EE/RE cooking and heating appliances	62000	GEF	72100	Contractual Services-Companies	50,000	50,000	50,000	50,000	50,000	250,000	21
	62000	GEF	71600	Travel	15,000	15,000	15,000	15,000	15,000	75,000	22
	62000	GEF	74200	Audio Visual & Print Prod Costs	10,000	10,000	10,000	10,000	8,149	48,149	23
	62000	GEF	72400	Communic & Audio Visual Equip	8,000	8,000	8,000	8,000	8,000	40,000	24
	62000	GEF	75700	Training, workshops and Conferences	10,000	10,000	10,000	10,000	20,000	60,000	25
	62000	GEF	72200	Equipment and Furniture	20,000	20,000	20,000	20,000	20,000	100,000	26
	62000	GEF	74500	Miscellaneous	1,000	1,000	1,000	1,000	1,000	5,000	27
				Total Outcome 3	174,000	164,000	164,000	154,000	162,149	818,149	
Outcome 4 Consumer financing model for clean cook stove/kiln successfully operated. Sales of efficient cook stoves increased by at least 20% in Cross River, Delta and Kaduna State. Investment in sustainable forest management in Cross River and Delta State and woodlot in Kaduna State increased.	62000	GEF	71200	International Consultants	20,000	20,000	20,000	20,000	20,000	100,000	28
	62000	GEF	71300	Local consultants	10,000	10,000	10,000	10,000	10,000	50,000	29
	62000	GEF	72100	Contractual Services-Companies	40,000	40,000	40,000	40,000	40,000	200,000	30
	62000	GEF	71600	Travel	5,000	5,000	5,000	5,000	5,000	25,000	31
	62000	GEF	74200	Audio Visual & Print Prod Costs	5,000	5,000	5,000	5,000	3,000	23,000	32
	62000	GEF	72400	Communic & Audio Visual Equip	5,000	5,000	5,000	5,000	7,000	27,000	33
	62000	GEF	75700	Training, workshops and Conferences	10,000	10,000	10,000	10,000	10,962	50,962	34
	62000	GEF	72600	Grant	50,000	50,000	50,000	50,000	50,000	250,000	35
				Total Outcome 4	145,000	145,000	145,000	145,000	145,962	725,962	
Project Management	62000	GEF	71200	International consultants	0	0	30,000	0	30,000	60,000	36
	62000	GEF	74100	Professional Services (Audit)	3,000	3,000	3,000	3,000	3,000	15,000	37
	62000	GEF	71400	Contractual Services - Individuals	14,000	14,000	14,000	14,000	14,000	70,000	38

	62000	GEF	71600	Travel	3,000	3,000	3,000	3,000	1,531	13,531	39
	62000	GEF	72200	Equipment and Furniture	2,000	2,000	2,000	2,000	2,000	10,000	40
	62000	GEF	74598	Direct Project Cost	5,000	5,000	5,000	5,000	5,000	25,000	41
				Total Project Management	27,000	27,000	57,000	27,000	55,531	193,531	
				TOTAL Project	922,000	871,000	871,000	846,000	900,000	4,410,000	

Budget Notes

1 International Agroforestry Expert will be contracted to support development of a strategy for enhancing carbon storage potential of forests for integrating into land use planning and decision making at different levels including development of a carbon flow monitoring protocol and system.

2 Local Agroforestry expert will be contracted to provide specific technical support to FMOE and ECN and project partners including focus State, LGA, communities and international consultants to mainstream SFM and SLM in development plans and activities, improving land and forest management and enhancing carbon storage potential of local forests. Specifically, expert will be utilised to facilitate establishment of nursery, community woodlots, training of value chain actors and wood lot managers on new fuelwood regulations, development of knowledge transfer tools and resources, development of land use and forest management plans, support private woodlot and plantation establishment; development of benefit sharing mechanism, framework for payment of ecosystem services, development of data collection system and develop tools and pilot systems for capacity building and communication.

3 Contractual Services will be utilised on a competitive basis to provide technical support to tree nursery management as an entrepreneurial activity to produce over 9 million seedlings, supply of over 9 million tree seedlings to private tree growers and fuelwood producer associations.

4 Grants will include support to selected Community Based farmer groups to plant 3,003 ha of woody energy crops, these will follow UNDP micro grant policies and procedures and grants cannot exceed 300,000 per recipient

5 Travel funds will be required for travel for consultants, contractors and project staff to reach landscape sites whether for research, project management or stakeholder meetings as well as to national level meetings. Stakeholders will be required to attend national and / or landscape level meetings and seminars as appropriate to the particular output and activity; Farmer to farmer learning study tours and exchanges.

6 Printing and Publications funds will be required to ensure adequate stakeholder awareness of SFM and SLM, collaborative forest management approaches, public-private sector partnership guidelines, land use planning guidelines and tools.

7 Machinery and Equipment will be purchased as investments to assist in mapping of boundaries defining land use zones, setting up pilots for monitoring specific indicators of forest health, monitoring of baseline carbonisation technologies, lab equipment for field level testing and monitoring of carbonisation.

8 Training funds will be utilised to ensure preparation and awareness activities are carried out to achieve the key outputs as defined on the log frame including: peer to peer training of fuelwood producers / woodlot managers on new fuelwood regulations and SFM and SLM best practices, training a total of 1,300 households (potential private trees owners) in the three pilot states through awareness creation, demonstrations, training and establishment of support structures for the provision of seedlings for enrichment planting and inputs; training of district Land Use Planning staff in the use of techniques that support community planning, implementation processes and land degradation assessment tools.

9 Legal experts will be hired for formulation and ratification of memoranda of understanding and related articles in formulation of various community and district level collaborative forest management mechanisms in order to ensure the agreements reside in law.

10 International Consultants will be contracted to support development of a demand side strategy for enhancing clean cookstove promotion, production and manufacturing for integrating into demand side planning and decision making at different levels including development of a clean stove monitoring protocol and system.

11 Local Consultants will be contracted to provide specific technical support to FMOE/RUWES, ECN and SON and project partners including focus states, LGAs, communities and international consultants to mainstream clean cookstove solutions in development plans and activities, improving production and manufacturing management and enhancing business resilience of local social entrepreneurs. Specifically, experts will be utilised to facilitate establishment of clean stove/kilns production zones, community-based multi-functional platform, peer to peer training of clean stove/kilns value chain actors on new fuelwood regulations, development of knowledge transfer tools and resources, development of production and phase-out plans, support private sector actors; development of rebate matching and benefit sharing mechanism, framework for payment of ecosystem services, development of data collection system and develop tools and pilot systems for capacity building and communication

12 Contractual Services will be utilised on a competitive basis to undertake production of stove/kiln and viability to target group (18,000 ICS, 1,000 institutional and 1,000 industrial stoves/kilns.

13 Matching rebate: This will involve support for value chain financing schemes for stove/kilns producers. Specifically these will be informed of financing packages developed through in depth consultations with targeted MFIs.

14 Travel funds will be required for travel for consultants, contractors and project staff to reach project sites whether for research, project management or stakeholder meetings as well as to national level meetings. Stakeholders will be required to attend national and / or production level meetings and seminars as appropriate to the particular output and activity; peer to peer training and learning study tours and exchanges.

15 Printing and Publications funds will be required to ensure adequate stakeholder awareness of benefits of demand side management, collaborative producers networking and management approaches, public-private sector partnership guidelines, production planning guidelines and tools.

16 Machinery and equipment will be purchased as investments to assist the set-up of efficient stove/kilns production value chain including, transportation technologies, vehicles, and branding, testing, packaging and storage materials.

17 Trainings will be utilised to ensure preparation and awareness activities are carried out to achieve the key outputs as defined on the log frame including: peer to peer technical and business training of stove/kilns value chain actors (suppliers, producers, distributors, retailers and end users) on new stove/kilns regulations (Standard and Label) and supply side best practices, training a total of producers in the three pilot states through awareness creation, demonstrations, training and establishment of support structures for the provision of seedlings for enrichment planting and inputs; training of district Land Use Planning staff in the use of techniques that support community planning, implementation processes and land degradation assessment tools.

18 Legal Specialists will be engaged for ratification of memoranda of understanding and related articles in formulation of various stoves/kilns producer organisations, stove/kiln producers, distributors and retailers; MFIs and Banks with respect to financing mechanisms for access to technology and clean development funds.

19 National Stove Expert will be hired to design and test the low cost stove for BOP market

20 International Stove Expert will be hired to design and test the low cost stove for BOP market

21 Local company contracted to design and test the low cost stove for BOP market

22 The travel costs cover the visits of local consultants to selected parts of the country as part of their TOR as well as their DSA

23 Printing and reproduction of legal and technical documentation

24 Purchase of audio visual equipment for workshop/training

25 Organise workshops and training for public, private and CSO stakeholders

26 Office equipment and furniture

27 Miscellaneous

28 International Climate Finance Expert will be hired to design, test and improve the financial products and services

29 National Climate Finance Expert will be hired to design, test and improve the financial products and services

30 Local companies will be hired to develop and test the value chain financial products and services and payment for environmental services (PES)

31 The travel costs cover the visits of local consultants to selected parts of the country as part of their TOR as well as their DSA

32 Printing and reproduction of legal and technical documentation

33 Purchase of audio visual equipment for workshop/training

34 Organise workshops and training for public, private and CSO stakeholders

35 Sum set aside as start-up loan and matching rebate to disburse the value chain financial products and services and payment for environmental services (PES), these will follow UNDP micro grant policies and procedures and grants cannot exceed 300,000 per recipient

36 International consultants will be hired for midterm review ($30,000) and terminal evaluation ($30,000)

37 An accountancy firm will be hired at $3,000 per year for annual audits

38 $75,000 has been allocated to support the work of the Project Management Unit to be backed up by a full time administrator/accountant, and where management related

39 This sum is budgeted for non-project specific activities travel by members of the PMU to allow for effective project coordination between the PMU, the different district offices and numerable field sites within them

40 $10,000 has been budgeted for computer purchases, upgrades and services

41 UNDP cross charges for procurement services (including consultants)

3.2 Outcome wise summary details of GEF grant and Co-funding budget:

Project Outcomes	Sub-components (Output)	GEF ($)	UNDP (grant) ($)	Federal Ministry of Environment (grant)	REDD+ (Grant)	Cross River Forestry Commission (in-kind)	Fortis MFI	SME Fund	DARE	ICEED Ltd	Co-funding total	Grand Total
Outcome 1: Models for sustainable fuelwood production demonstrated in: a. At least 10 communities in Cross River and Delta State leading to: 50,000 ha of forestlands under improved multifunctional forest management; SFM Management Committees created/strengthened in SFM b. 3,003 ha of degraded land restored with Sustainable Land Management measures like agroforestry woodlots; SLM Management Committee created/strengthened in SLM	Output 1.1: Assessment of the availability of dead wood and prospects of the rural subsistence supply of fuel wood conducted	80,000		0	400,000	200,000	0			0	600,000	680,000
	Output 1.2: Community and private woodlots established for sustainable fuelwood supply in Kaduna State	400,000			500,000	100,000	0			0	600,000	1,000,000
	Output 1.3: Sustainable community-run forest management systems established over an area of 50,000 ha in Cross River and Delta State	400,000			500,000	200,000					700,000	1,100,000

	Output 1.4: Community-based micro-enterprises and multifunctional platform (carbonization units e.g. efficient charcoal, gasifier; agro-forestry processing units IT center; welding workshop) established	210,000			200,000			500,000			700,000	910,000
	Output 1.5: SFM and SLM Management Committee established and capacity enhanced in community-based forest and landscape management and business best practices	90,000			300,000	150,000					450,000	540,000
	Output 1.6: Awareness raising campaign on production and demand of sustainable fuel wood and other co-benefits of	83,929			200,000	150,000	0			0	350,000	433,929

	SFM and SLM conducted											
	Sub-Total	1,263,929	0	0	2,100,000	800,000	0	500,000	0	0	3,400,000	4,663,929
Outcome 2: Improved awareness and acceptance of alternative (renewable and more efficient) energy technologies for cooking and heating among local communities in Cross River, Delta and Kaduna State. Increased penetration of improved/alternative energy technologies for domestic needs in targeted communities by at least 20% (BAU: 0.1%); Avoided emissions of 40,237 t CO2e/year from combustion of un-sustainable biomass in inefficient cook stoves/kilns (replaced by more efficient or other alternatives)	Output 2.1: Feasible energy efficient and alternative energy solutions identified for selected communities through a market segmentation study	150,000		100,000	100,000						200,000	350,000
	Output 2.2: Energy efficient cook stove/kiln distribution and monitoring program designed	160,000		100,000	100,000						200,000	360,000
	Output 2.3: Participatory and gender sensitive training provided for end users on clean energy technologies for domestic (women), institutional	170,000		200,000	200,000						400,000	570,000

	(schools, prisons) and cottage industry (gari, bakeries, fish drying, smoking) sub-sector											
	Output 2.4: Marketing and awareness raising campaign conducted	200,000		100,000	150,000						250,000	450,000
	Output 2.5: Energy efficient cook stove/kiln distribution program implemented for 20,000 improved cook stoves for the domestic	450,000	200,000	700,000	80,000		0		400,000		1,380,000	1,830,000
	Output 2.6: Other alternative energy solutions tested and piloted at household and/or community level (i.e. biogas, LPG, ethanol and solar-based solutions)	192,358	100,000	200,000	150,000			1,000,000		0	1,450,000	1,642,358
		1,322,358	300,000	1,400,000	780,000	0	0	1,000,000	400,000	0	3,880,000	5,202,358

Outcome 3: Improved efficiency, quality and affordability of domestically manufactured cooking/heating appliances for BOP. Strengthened domestic supply chain for EE/RE cooking and heating appliances	Output 3.1: Business plan for clean cook stove manufacturing zone prepared to scale-up production and reduce costs	300,000		200,000	350,000	250,000	0			0	800,000	1,100,000
	Output 3.2: Unit cost of improved cook stove reduced down to at least USD 10	174,000		100,000	240,000	100,000	0			0	440,000	614,000
	Output 3.3: Participatory and gender senstivie training to local SME, distributors and community centers provided	100,000		0	150,000	100,000	0			0	250,000	350,000
	Output 3.4: Adequately capable local entrepreneurs producing certified improved cook stoves	300,000		0	150,000	200,000	1,000,000		600,000	2,000,000	3,950,000	4,250,000
	Sub-Total	874,000	0	300,000	890,000	650,000	1,000,000	0	600,000	2,000,000	5,440,000	6,314,000
Outcome 4 Consumer financing model for clean cook stove/kiln successfully	Output 4.1: Financial model designed and tested in	350,000	0	0	80,000	0	0	400,000		0	480,000	830,000

operated. Sales of efficient cook stoves increased by at least 20% in Cross River, Delta and Kaduna State. Investment in sustainable forest management in Cross River and Delta State and woodlot in Kaduna State increased.	partnership with MFIs and technology providers											
	Output 4.2: Participatory and gender sensitive training provided to MFIs on clean energy financing	206,182	0	300,000	100,000	0	0	100,000		0	500,000	706,182
	Output 4.3: Community fund and incentives set-up and capitalized, including via compensatory mechanisms for forest conservation and land restoration	200,000	0	200,000	50,000	0	2,000,000			0	2,250,000	2,450,000
	Sub-Total	756,182	0	500,000	230,000	0	2,000,000	500,000	0	0	3,230,000	3,986,182
5. Project Management	Project Management, Consultants *	193,531	0	0	0	450,000	0	0	0	0	450,000	643,531
Project Total	Grand Total	4,410,000	300,000	2,200,000	4,000,000	1,900,000	3,000,000	2,000,000	1,000,000	2,000,000	16,400,000	20,810,000

Project co-financing:

Sources of Co-funding	Name of Co-funder	Type of Co-funding	Amount ($)
National Government	Federal Ministry of Environment	Grant	2,200,000
Multilateral organization	UNDP	Grant	300,000
Multilateral organization	UN-REDD+	Grant	4,000,000
Private Sector	Members of Nigeria Association of Clean Cookstoves (NACC) • SME - $2,000,000 • DARE - $1,000,000 • ICEED - $2,000,000	Investment	5,000,000
Private Sector	MFIs (e.g. Fortis MFI)	Loans	3,000,000
Regional Government	Cross River State	In-kind	1,900,000
Total Co-funding			**16,400,000**

3.3 Project Implementation Schedule

Activities	Responsibility	Schedule																				Partners involved
		Year 1				Year 2				Year 3				Year 4				Year 5				
		Q1	Q 2	Q3	Q4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	
Output 1.1: Assessment of the availability of dead wood and prospects of the rural subsistence supply of fuel wood conducted																						
Activity 1.1.1: A baseline survey will be conducted to assess the technical and physical availability of deadwood and the elasticity of the supply.	Proj Team (PT), ECN, FC, Agro Consultant (AgCon)		X	X																		FAO, REDD+
Activity 1.1.2: Utilization of deadwood for local subsistence consumption and opportunity for trading and business	PT, ECN, FC		X	X																		FAO, REDD+
Output 1.2: 3,003 ha community woodlots established for the sustainable fuelwood supply in Kaduna State																						
Activity 1.2.1: Organize participatory and gender sensitive technical and business training for value chain actors (inputs suppliers, farmers), public stakeholders (extensionists, R and D) and 50 business agents on nursery and agroforestry and FMNR woodlot establishment and maintenance	PT, ECN, FC, AgCon		X	X																		EU's Katsina project, FAO, CBO, Univ
Activity 1.2.2 Identification of roles of community-based organizations and agreement on modalities for their participation	PT, ECN, BA, FC			X	X																	EU's Katsina project, FAO, CBO, Univ
Activity 1.2.3: Establishment and maintenance of 38 nurseries on farmers land to produce 1.8 million seedlings (18,000 seedlings per year per nursery over 5 years)	PT, ECN, BA, FC			X	X																	EU's Katsina project, FAO, CBO, Univ
Activity 1.2.4: Distribution, planting of seedlings and maintenance of the trees (timber species, fruit trees, spices with good fuelwood property interplanted with annual food crops) on 3,003 ha as agroforestry (live fence, alley cropping) and FMNR system (coppicing and pruning)	PT, ECN, BA, FC				X	X	X	X	X													EU's Katsina project, FAO, CBO, Univ
Activity 1.2.5: Establish the supply chain, marketing and trading of certified fuelwood and farm produces	PT, ECN, BA, FC					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	EU's Katsina project, FAO, CBO, Univ
Output 1.3: Sustainable community-run forest management systems established over an area of 50,000 ha																						
Activity 1.3.1: Organize participatory and gender sensitive technical and business training for value chain actors (inputs suppliers, farmers), public stakeholders (extensionists, R and D) and 100 business agents on SFM best practices	PT, ECN, FC, REDD+, BA, SFM Expert		X	X																		PMU, FAO, REDD+, CBO
Activity 1.3.2: Design and develop methodology and procedures for the extraction of fuelwood from protected 50,000 ha of forest land in Cross River (36,000 ha) and Delta State (14,000 ha)	PT, ECN, FC, BA, REDD+		X	X	X																	PMU, FAO, REDD+, CBO

Activity 1.3.3: Establish the supply chain and marketing and trading of certified fuelwood and non-timber forest products (e.g. spices and medicinal plants)	PT, ECN, FC, BA, REDD+				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, REDD+, CBO
Output 1.4: Community-based micro-enterprises (carbonization units e.g. efficient charcoal kiln, gasifier; agro-forestry processing units; IT center; welding workshop) established																							
Activity 1.4.1: Selection of sites, appropriate energy sources (biomass, hybrid with solar or hydro system) and technology for powering and establishment of the community managed multi-functional platform (RE power generation, IT center, agro-processing facility, business center, welding workshop, farm shop, phones charging center)	PT, ECN, FC, BA, FMOE			X	X																		GIZ, FAO, PMU, CBO, SLM-SFM MC, RE Institute
Activity 1.4.2: Design and develop the business plan for the operation and management of the multi-functional platform	PT, ECN, FC, BA, FMOE			X	X																		GIZ, FAO, PMU, CBO, SLM-SFM MC, RE Institute
Activity 1.4.3: Establishment, operation and management of the multi-functional platform by the SFM and SLM MC and selected CBO	PT, ECN, FC, BA, FMOE					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		GIZ, FAO, PMU, CBO, SLM-SFM MC, RE Institute
Output 1.5: SFM and SLM Management Committee and business agents established and capacity enhanced in community-based forest and landscape management and business best practices																							
Activity 1.5.1: In partnership with community leaders and elders, identify and select male and female as business agents and members of the local SFM and SLM Management Committee to plan coordinate and implement the project	PT, REDD+, FC, FMOE, ECN		X	X																			PMU, ECN, REDD+, CBO
Activity 1.5.2: Through participatory approach, define the roles, responsibility, remunerations and incentives for business agents and SFM and SLM Committee members	PT, REDD+, FC, FMOE, ECN		X	X																			PMU, ECN, REDD+, CBO
Activity 1.5.3: Develop knowledge products and conduct technical and business training for male and female business agents and SFM and SLM Committee members	PT, REDD+, FC, FMOE, ECN			X	X					X	X				X	X				X	X		PMU, ECN, REDD+, CBO
Output 1.6: Awareness raising campaign on production of sustainable fuel wood and other co-benefits of SFM and SLM conducted																							
Activity 1.6.1: Based on needs assessment, develop easy to use and remember knowledge products (training manual, leaflets, brochures, DVD, CD) for raising awareness on the benefits and best practices on SFM and SLM	PT, FC, ECN, BA, SFM/SLM MC		X	X																			PMU, ECN, FAO, FC, CBO, RE Institute
Activity 1.6.2: Organize workshops, roadshows, Annual Cooking Energy Summit, TV and radio to raise awareness and to educate, sensitize and engage public, private and CSO and faith-based stakeholders on the causes and impact of fuel wood deficiency and deforestation and the benefits of SFM and SLM in targeted 3 States and nationwide	PT, FC, ECN, BA, SFM/SLM MC			X	X					X	X				X	X				X	X		PMU, ECN, FAO, FC, CBO, RE Institute
Output 2.1: Feasible energy efficient and alternative energy solutions identified for selected communities																							

Activity 2.1.1: As a follow up to the GACC initial market assessment, conduct a detail market segmentation study to identify needs, gaps, opportunities and challenges for the promotion and distribution of suitable clean stove/kilns for selected communities with different income status (affluent, urban rich, urban poor, rural rich and rural poor)	PT, ECN, Biomass Expert		X	X	X																		PMU, ECN, BA, NACC, TCCFS
Activity 2.1.2: Develop criteria to select and recommend feasible EE and alternative energy solutions for demonstration in the domestic, institutional and industrial sub-sector at the pilot community	PT, ECN, FC			X	X	X																	PMU, ECN, BA, NACC, TCCFS
Output 2.2: Energy efficient cook stove/kiln distribution and monitoring program designed																								
Activity 2.2.1: Based on recommendations from Output 2.1, develop implementation and distribution plan in how the selected technology will be produced, distributed, scaled up and monitored for meeting domestic, institutional and industrial cooking and thermal needs in the pilot community (as detailed in Annex B)	PT, ECN		X	X																			PMU, ECN
Output 2.3: Participatory and gender sensitive training provided for end users on clean energy technologies for domestic (women), institutional (schools, prisons) and cottage industry (gari, bakeries, fish drying, smoking) sub-sector																								
Activity 2.3.1: Develop easy to use knowledge products (leaflets, brochures, manuals, factsheets) to support end users (e.g. women, trade associations) to create demand for aspirational EE stoves/kilns for the domestic, institutional and industrial sub sectors.	PT, ECN, BA, Stove Expert		X	X	X																		PMU, NACC
Activity 2.3.2: Organize and conduct participatory training workshop to educate, sensitize and empower the end users to create demand through cook stove demonstration, site visits and word of mouth	PT, ECN, BA				X	X				X	X					X	X			X	X		PMU, NACC
Output 2.4: Marketing and awareness raising campaign conducted																								
Activity 2.4.1: Based on review of lessons learned and needs and gaps of current outreach programmes and campaigns and the baseline study conducted under Activity 2.1.1, develop easy to use marketing and awareness raising knowledge products (advertising flyers, banners, factsheet, slogans, billboards, and jingles for radio and TV) tailored for meeting local needs	PT, Stove Expert, BA		X	X	X																		PT, ECN, NACC, CBO, Private sector
Activity 2.4.2: Organize and conduct marketing and awareness campaign through various local and national educational (school, radio, TV) and advertising media e.g. billboards, shops, malls, radio, TV drama and documentary and film industry	PT, BA			X	X			X	X			X	X			X	X			X	X		PT, ECN, NACC, CBO, Private sector
Output 2.5: Energy efficient cook stove/kiln distribution program implemented for 20,000 improved cook stoves/kilns for the domestic (18,000 units), institutional (1,000 units) and industrial (1,000 units) sub-sector																								
Activity 2.5.1: Preparation of design drawings, construction procedures and manuals for the construction and operation of energy-efficient stoves/kilns	PT, Stove Expert		X	X	X																		PMU, NACC,CBO, TCCFS, Private Sector, Banks

Activity 2.5.2: Agreement with local fabricators on the production of the furnaces/stoves and training on their design and operation features	PT, BA			X	X	X																		PMU, NACC,CBO, TCCFS, Private Sector, Banks
Activity 2.5.3: Production, installation and dissemination of furnaces/stoves to end-users	PT, FMOE, , CBOs, Private sector				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, NACC,CBO, TCCFS, Private Sector, Banks
Activity 2.5.4: Conduct of training and awareness campaign on the use, maintenance and benefits of energy-efficient furnaces/stoves	PT, ECN, CBOs, Private sector, Community				X	X				X	X				X	X			X	X				PMU, NACC,CBO, TCCFS, Private Sector, Banks
Activity 2.5.5: Regular monitoring and evaluation of installed furnaces/stoves	PT,, CBOs, Private sector, Community					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, NACC,CBO, TCCFS, Private Sector, Banks
Activity 2.5.6: Improvement in the design based on results of the monitoring and evaluation activities	DOE, CCDC, CBOs, Private sector, Community						X	X					X	X					X	X				PMU, NACC,CBO, TCCFS, Private Sector, Banks
Activity 2.5.7: Promotion and replication of re-designed furnaces/stoves to remaining households and community-based institutions	PT, CBOs, Private sector, Community						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, NACC,CBO, TCCFS, Private Sector, Banks
Output 2.6: Other alternative energy solutions tested and piloted at household and/or community level (i.e. biogas, LPG, ethanol and solar-based solutions)																								
Activity 2.6.1: Based on recommendations from Activity 2.1.1, test and pilot alternative energy solutions (e.g. biogas, LPG, ethanol, solar based) in selected households in the pilot community	PT, Biomass Expert			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, ECN, TCCFS, Univ
Activity 2.6.2: Develop knowledge products from these pilots for the sharing of knowledge and lessons learned.	PT, ECN							X	X									X	X					PMU, ECN, Univ
Output 3.1: Business plan for clean cook stove manufacturing zone prepared to scale-up production and reduce costs																								
Activity 3.1.1: Review need and gaps in the manufacturing of cook stove/kiln by the private sector	PT, Stove Expert, BA		X	X	X																			PMU, CBO, NACC
Activity 3.1.2: Develop business plan (secure local inputs supply chain, bulk purchase, reduce production cost, access to finance, capacity development, marketing) for the local manufacturing of clean cook stove	PT, Stove Expert, BA			X	X	X																		PMU, CBO, NACC
Output 3.2: Unit cost of improved cook stove reduced down to at least USD 10																								
Activity 3.2.1: Participatory technology development to reduce clean and low cost stove cost to USD 10 through reduce inputs and production cost	PT, Stove Expert			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, CBO, NACC

Activity 3.2.2: Market survey to track cook stove prices	PT, Stove Expert				X	X						X	X					X	X			PMU, CBO, NACC
Output 3.3: Participatory, gender sensitive and peer to peer training to local SME, distributors and community centers provided																							
Activity 3.3.1: Develop knowledge products for technical, business and marketing training for value chain actors (suppliers, producers, distributors, retailers)	PT, Stove Expert, BA		X	X	X																	PMU, CBO, Private Sector
Activity 3.3.2: Organize and conduct peer to peer technical and business training for SME, distributors and community centers	PT, Stove Expert, BA			X	X				X	X				X	X				X	X		PMU, CBO, Private Sector
Activity 3.3.3: Organise and conduct study tours to successfully operated stove production sites	PT, Stove Expert, BA				X					X					X					X		PMU, CBO, Private Sector
Output 3.4: Adequately capable local entrepreneurs producing certified improved cook stoves																							
Activity 3.4.1: Adequately trained and capable local entrepreneurs producing certified and high quality clean and low cost cook stoves using local materials	PT, Producers, BA		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, NACC, CBO, Private Sector
Output 4.1: Financial model designed and tested in partnership with MFIs and technology providers																							
Activity 4.1.1: Review lessons learned and identify key success factors for the design of competitive value chain financial products and services	PT, Climate Finance Expert		X	X	X																	PMU, FMOF, Banks, MFIs, Private Sector
Activity 4.1.2: In partnership with Ministry of Finance, local banks and MFIs, test, improve and upgrade financial products and services for the supply and demand of clean stove/kiln	PT			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, FMOF, Banks, MFIs, Private Sector
Output 4.2: Participatory and gender sensitive training provided to MFIs on clean energy financing																							
Activity 4.2.1: Identify training needs and develop knowledge products for meeting financial training needs	PT, Climate Finance Expert		X	X																			PMU, FMOF, Banks, MFIs, Private Sector
Activity 4.2.2: Organized and conduct participatory training for public and local bank and MFIs staff	PT, Climate Finance Expert			X	X					X	X				X	X			X	X			PMU, FMOF, Banks, MFIs, Private Sector
Output 4.3: Community fund and incentives set-up and capitalized, including via compensatory mechanisms for forest conservation and land restoration																							
Activity 4.3.1: Review lessons learned in the development of Payment for Environmental Services (PES) for monetizing of environmental services into monetary assets through business opportunity	PT, Climate Finance Expert		X	X	X																		PMU, FMOF, Banks, MFIs, Private Sector
Activity 4.3.2: In partnership with REDD+ and EU Katsina's project, designed, established and implement PES and community forest fund as revolving fund for the supply and demand of fuelwood and clean stove/kiln in pilot community	PT, Climate Finance Expert			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, FMOF, Banks, MFIs, Private Sector
Project Management	Project coordination and management	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Project coordinator, PMU

	Mobilisation and hiring of personnel	X	X									X										UNDP CO ECN
	Inception workshop	X																				Project coordinator, PMU
	Progress report		X		X		X		X		X		X		X		X		X		X	Project coordinator, PMU
	Annual reports (APR/PIR)				X				X				X				X				X	Project coordinator, PMU
	Mid term Review												X									International consultant
	Terminal Evaluation																			X		International consultant

4. MANAGEMENT ARRANGEMENTS

This SFM project will provide the Government with a good opportunity to strengthen the institutional, technical and organization capabilities of its agencies in the effort to balance the demand for fuelwood with renewable supply for the domestic, institutional and industrial sector. A prime beneficiary will be the MARD, SON, Forestry Commissions (FC), MLG and R&D and learning institutes, who will act as key partners, under the tutelage of the FMOE, FC and ECN. The FMOE, FC and ECN are the best entities for driving this project forward and for establishing a technical and business competency center in the area of supply of renewable fuelwood and promotion of energy efficient stoves.

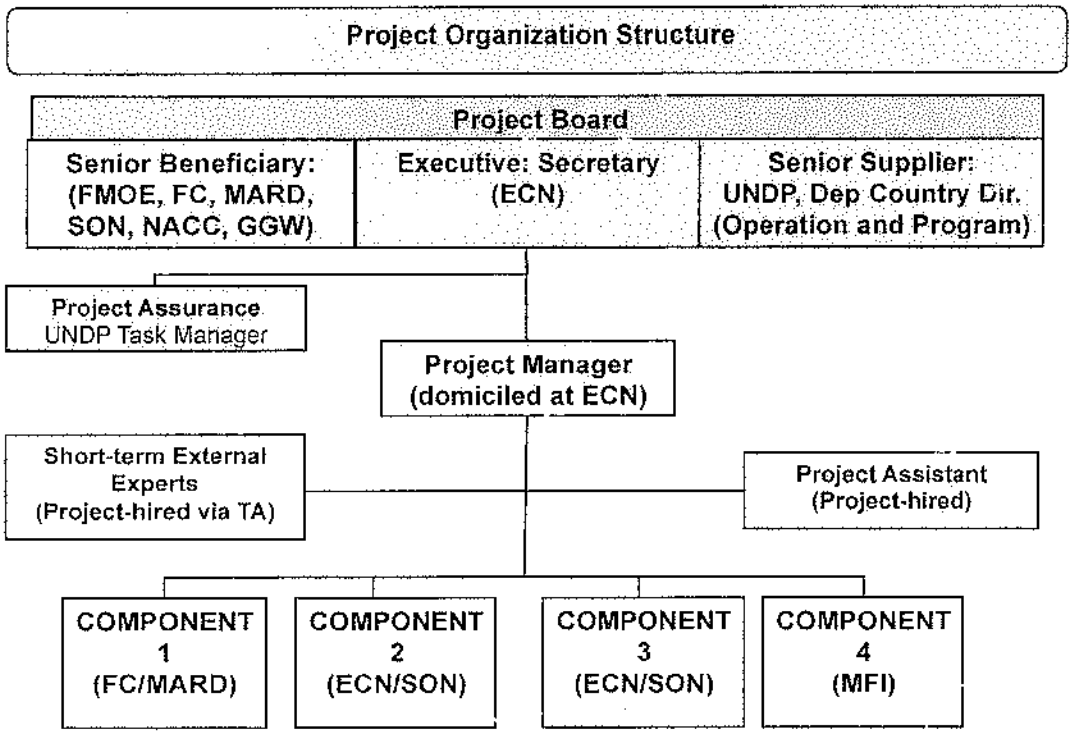


Figure 10: Project Organizational structure

The project will be implemented over a period of five years, starting in the year 2016. The project will be nationally executed under UNDP's National Implementation Modality (NIM) according to the Standard Basic Assistance Agreement between UNDP and the Government of Nigeria, and the Country Program Action Plan (CPAP). The lead Implementing Partner for this Project will be the Energy Commission of Nigeria, which has the governmental mandate to coordinate the formulation and implementation of energy efficiency and forest and land restoration policies and related programs and strategies respectively.

Project Board: The **Project Board** *(Steering Committee)* will be established at the inception of the project. The composition of this is presented above in Figure 10. The Board will meet at least biennially and it will be convened and supported logistically by the Project Management Unit to be domiciled at ECN. The Board may meet more frequently, if required. This will be chaired by the Permanent Secretary of FMOE, and will provide overall guidance for the project throughout its implementation. Specifically the Board will be responsible for: (i) achieving co-ordination among the various government agencies; (ii) guiding the program implementation process to ensure alignment with national and local statutory planning processes and SFM activities, policies, plans and strategies; (iii) ensuring that activities are fully integrated between the other relevant developmental initiatives; (iv) overseeing the work being carried out by the different agencies, monitoring progress and approving plans and reports; (v) overseeing the financial management and production of financial reports; (vi) monitor the effectiveness of project implementation; and (vii) providing guidance to district and local committees as needed.

The proceedings of all Project Board meetings will be recorded and shared amongst all the members and also with the SFM/SLM Management Committees at the community level. The Board will undertake annual project reviews (or as otherwise deemed necessary by the Project Board) – including the review of annual Project Implementation Review (PIR) sheets that the project has to submit to UNDP and the GEF. In case a consensus cannot be reached, final decision shall rest with the UNDP Resident Representative, in consultation with ECN. The extent to which the UNDP Program Officer will be delegated quality assurance responsibilities will be determined during the first Project Board meeting and will be indicated in writing.

The ECN will serve as the Executive and will have ultimate responsibility for the project, supported by the Senior Beneficiary and Senior Supplier. As part of the responsibilities of the Project Board, the Executive will ensure that the project is focused, throughout the project cycle, on achieving the results noted in the project's Strategic Results Framework in the most innovative, cost effective, catalytic and replicable manner. The Board will provide strategic guidance to the project and will ensure that risks are being tracked and mitigated as effectively as possible. The Senior Executive will be responsible for approving and signing the Annual Work Plan (AWP) for the following year on behalf of the Implementing Partner as well as approving and signing the Combined Delivery Report (CDR) at the end of the year. The Senior Executive will be responsible for delegating authority in writing to a Responsible Officer within the Ministry for signature of the Funding Authorization and Certificate of Expenditures (FACE) form as well as any other project related documentation.

Project Management Committee (PMC): The Project Management Committee (PMC) will be setup under the Project Board, which will meet at least once a month to guide the Project Management Unit (PMU) to make key management, functional and operational decisions. Its specific responsibility includes:

- Approve the appointment and responsibilities of the Project Manager and delegate its project assurance responsibilities
- Based on the approved Annual Work Plan, approve quarterly execution plans and also approve any essential deviations from original plans
- Provide technical and operational guidance to the project
- Ensure the quality assurance of project processes and deliverables
- Ensure the required resources for the successful implementation of the project
- Monitor and evaluate the progress of project activities
- Use the evaluations for performance improvement, accountability and learning
- Arbitrate on any conflicts within the project or negotiate solutions to problems if any with external bodies

The composition of the Project Management Committee will be as follows;

- **Chairman** – DG of ECN (National Project Director – NPD)
- **Members** (Representing) - UNDP, FMOE, SON, FC (CRS/Delta/Kaduna), NACC, CREDC, ICEED, Fortis MFI
- **Convener & Secretary** – Asst. Director General, ECN (Project Manager – PM) supported by National and International Technical Advisor

Depending on the need, PMC could invite relevant private sector project beneficiaries as well as sector specialists for consultations at its regular meetings.

Project Management Unit (PMU): The Project Management Unit will be physically established and hosted within ECN. ECN will play the key role in project execution.

Project Staff

The TORs for each post are explained in detail in Annex D.

Project Manager (PM): The Project Manager (PM) will be responsible for overseeing the overall project implementation and ensuring that the project objective and outcomes (results specified in the

project document) are achieved in a timely and cost effective manner to the required standard of quality. The PM will report to the Project Management Committee on project progress and plan, and seek its guidance to resolve emerging issues.

Full-time Project Assistant and Finance Officer: Project Assistant and Finance Officer will provide secretarial and financial assistance to the project staff and assist the NPC on administrative and financial matters.

Representatives of SFM and SLM Management Committees: Representatives from SFM/SLM MCs need to be identified and engaged on need basis for the successful coordination and implementation of project activities at community level.

Part time International Technical Advisor (ITA): A part-time ITA will be engaged to provide overall technical guidance, advice and back supporting to NPC and project team in the planning and implementation and monitoring of the project.

Short-term External Experts: Both international and local short-term experts (STEs) may be engaged to provide technical assistance to support the different activities and aspects of the Project implementation. The selection and hiring of STEs will be done through competitive offers and in accordance with UNDP and the FGN requirements.

5. MONITORING FRAMEWORK AND EVALUATION

The following sections outline the principal components of the Monitoring and Evaluation Plan and indicative cost estimates related to M&E activities. The project's Monitoring and Evaluation Plan will be presented and finalized at the Project's Inception Report following a collective fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities.

Project start:

A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and program advisors as well as other stakeholders. The Inception Workshop is crucial to building the necessary strong local ownership for the project results and to plan the first year annual work plan.

The Inception Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and Addis Ababa Regional Hub staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
b) Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

A detailed Inception Workshop report is a key reference document and must be prepared within one month of the Inception Workshop and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly review:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP-GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes. or capitalization of value chain actors are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty justifies classification as critical).
- Based on the information recorded in ATLAS, a Project Progress Report (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues. lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annual Review:

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (1 July to 30 June). The APR/PIR combines both UNDP and GEF reporting requirements.

  The APR/PIR includes, but is not limited to, reporting on the following:
  - Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
  - Project outputs delivered per project outcome (annual).
  - Lesson learned/good practice.
  - AWP and other expenditure reports
  - Risk and adaptive management
  - ATLAS Project Progress Report (PPR)
  - Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits:

UNDP CO and the UNDP Regional Service Centre in Africa (RSC) will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RSC and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of project cycle:

The project will undergo an independent Mid-Term Review at the mid-point of project implementation (late 2018). The Mid-Term Review will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term review will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term review will be prepared by the UNDP C.O based on guidance from the RSC and UNDP-GEF. The management response and the review report will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Project:

An independent Terminal Evaluation (TE) will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The TE will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term review, if any such correction took place). The TE will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the RSC and UNDP-GEF. The TE should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation

Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the TE.

Learning and knowledge sharing:
Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.
The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.
Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Communications and visibility requirements:

Full compliance will be undertaken with UNDP's Branding Guidelines. These can be accessed at http://intra.undp.org/coa/branding.shtml, and specific guidelines on UNDP logo use can be accessed at: http://intra.undp.org/branding/useOfLogo.html. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects should be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at http://intra.undp.org/coa/branding.shtml.

Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"). The GEF Guidelines can be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf . Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

5.1 M & E Work Plan and Budget

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Project Manager ▪ UNDP CO, UNDP GEF	Indicative cost: 10,000	Within first two months of project start up
Measurement of Means of Verification of project results.	▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	Indicative cost: 20,000	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager ▪ Project team	Indicative cost: 5,000 (to be determined as part of the Annual Work Plan's preparation)	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually
Periodic status/ progress reports	▪ Project manager and team	None	Quarterly
Mid-term Review	▪ Project manager and team ▪ UNDP CO ▪ UNDP RSC ▪ External Consultants (i.e. evaluation team)	Indicative cost: USD 30,000	At the mid-point of project implementation
Final Evaluation	▪ Project manager and team, ▪ UNDP CO ▪ UNDP RSC ▪ External Consultants (i.e.	Indicative cost: 30,000	At least three months before the end of project implementation

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
	evaluation team)		
Project Terminal Report	▪ Project manager and team ▪ UNDP CO ▪ local consultant	0	At least three months before the end of the project
Audit	▪ UNDP CO ▪ Project manager and team	Indicative cost per year: 3,000	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RSC (as appropriate) ▪ The Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US$ 107,000 (+/- 5% of total budget)	

Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be provided by the project team and the UNDP Country Office (UNDP-CO) with support from UNDP/GEF. The Logical Framework Matrix in Section 4 provides *performance* and *impact* indicators for project implementation along with their corresponding *means of verification*. These will form the basis on which the project's Monitoring and Evaluation system will be built.

5.2 General

(i) UNDP support services

ECN has entered into an agreement with UNDP for direct project support services in the form of procurement of goods and services during the project implementation process (see Annex H). In such a case, appropriate cost recovery will be charged as per UNDP rules and regulations. The support services will be outlined in the form of Letter of Agreement signed between ECN and UNDP. The table below indicates the cost of UNDP direct project services (DPS) anticipated over the project implementation period of five years.

ESTIMATE OF DIRECT PROJECT SERVICES (DPS) (US$)						
Year	**2016**	**2017**	**2018**	**2019**	**2020**	**Total (US$)**
ISS (support for recruitments, procurement, selection & awarding of sub-contracts, approvals, etc.)	5,000	5,000	5,000	5,000	5,000	25,000
Total (US$)	5,000	5,000	5,000	5,000	5,000	25,000

(ii) Prior obligations and prerequisites

No prior obligations or prerequisites have been identified.

(iii) Audit Clause

Audit will be conducted according to UNDP Financial Regulations and Rules and applicable Audit policies..

(iv) Agreement on the intellectual property rights and use of logo on the project's deliverables

In order to accord proper acknowledgement to GEF for providing funding, a GEF logo will appear on all relevant GEF-supported project publications, including among others, project hardware, if any, purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgement to GEF. The UNDP logo should be prominent – and separated from the GEF logo. Alongside GEF and UNDP logo, the ECN logo may also feature as the Implementing Partner of the project.

(v)

6. LEGAL CONTEXT

This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the Standard Basic Assistance Agreement (SBAA) and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

- Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP/GEF hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

The UNDP Resident Representative in Nigeria is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP Regional Coordination Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:

- Revision of, or addition to, any of the annexes to the Project Document;
- Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
- Inclusion of additional annexes and attachments only as set out here in this Project Document

Standard text has been inserted in the template. It should be noted that although there is no specific statement on the responsibility for the safety and security of the executing agency in the SBAA and the supplemental provisions, the second paragraph of the inserted text should read in line with the statement as specified in SBAA and the supplemental provision, i.e. "the Parties may agree that an Executing Agency shall assume primary responsibility for execution of a project."

7. ANNEXES

ANNEX A: Baseline scenarios and selection criteria in Cross River, Delta and Kaduna State

Cross River State: Cross River State (CRS), in southeast Nigeria, has a population of almost 3 million people and covers an area of 2,307,400 ha. More than 50% of what is left in Nigeria as Tropical High Forest is found in CRS. Lowland rainforests occupy more than a third of the State land (829,412 ha), the mangrove forests (fresh water and salt water) jointly account for 5 % of the state land area (105,339 ha), and Montane forest covers less than 1% of the CRS land area (11,376 ha). The forests of the cross-border region between Cameroon and Nigeria are especially rich, with a high degree of endemism. In addition to being home to the Cross River gorilla, the region straddling the Nigeria-Cameroon border is a biodiversity hotspot of global significance. An estimated 120 endemic plant species and many rare tropical hardwoods (e.g., mahogany, ironwood, and ebony) also grow in these forests. Though the region has been somewhat neglected by international conservation efforts, it is recognized as a landscape of High Conservation Priority by USAID's Central African Regional Program for the Environment (CARPE) and is included in two of the World Wildlife Fund's Critically Endangered Terrestrial Ecosystems[8]. □

Between 1978 and 1995, the area occupied by natural forests in CRS decreased from 52.7% to 44.8%. Further assessments carried out between 1991 to 2001 and 2000 to 2008, indicated additional and intensified losses: the total forest cover of CRS in 2000 was 7,409 km2, and accounted for 34.8% of the state land area. By 2008, the total forest cover declined to 6,102 km2 leading to a further decline in coverage of the state to 28.68%. 1,307 km2 of forest was lost between 2000 and 2008 resulting in a 17.64% decline in forest cover for the period. Forest cover data between 2000 and 2008 showed an annual loss of 163.42 km2 at a rate of 2.2% yearly. □

"A Preliminary Assessment of the Context for REDD in Nigeria", a joint study commissioned by the Federal Ministry of Environment, the Cross River State's Forestry Commission and UNDP identified the following key drivers of deforestation in CRS: (i) Agricultural expansion; and (ii) Unsustainable wood extraction for timber and fuel wood. □

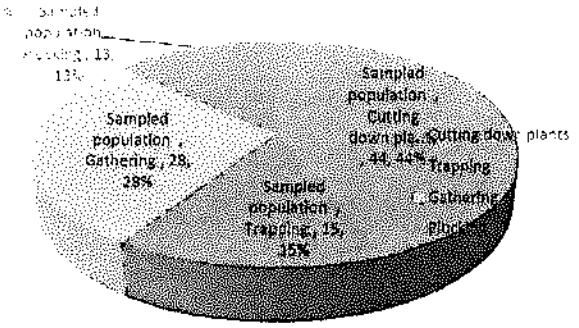
Agricultural expansion is the primary driver of deforestation in CRS in light of state's demographic and economic profile: agriculture is the largest economy sector in the state and often the only source of income and productive activities for local population. Recognizing the negative impact of agriculture on forests, a number of baseline projects in CSR sought to address this problem, such as USAID Sustainable Practices in Agriculture for Critical Environments (SPACE) project and the World Bank Community Based Poverty Reduction Project. Also, Outcome 3 of the UN-REDD project for CSR directly supports activities to promote alternatives to deforestation and sustainable livelihood opportunities for local farmers and rural population.

As far as commercial logging is concerned, the importance of this driver in CRS is expected to have declined considerably due to the moratorium on logging put in place by Governor Liyel Imoke's administration in 2008, as well as implementation of other measures to deal with illegal logging and other commercial activities in the forestry sector resulting in unsustainable wood extraction, such as the establishment of the anti-deforestation task force, banning of the Cross River Agro Forestry Company from logging, cancellation of all logging concessions in the State issued before the moratorium, etc. □

In contrast, fuel wood consumption, while recognized as the second largest source of forest extraction in CSR (see Figure 10), have not yet received comparable attention from the Government and development agencies. Apart from few small NGO-driven initiatives to promote efficient cookstoves, there are no systemic efforts in place by the CRS Government and development partners to address unsustainable fuelwood consumption practices. □

[8] *Federal Ministry of Environment of Nigeria, Cross River State Forestry Commission, UNDP. 2011. A Preliminary Assessment of the Context for REDD in Nigeria.*

***Figure 10: Prevailing methods of forest resource extraction in Ilkom Local Governance Area, CSR* (Judith, O. Kinuabeye, J. Eja, E. 2011).**



Delta state (DS): The state has a total land area of approximately 18,000 km of which 6,000 km is mangrove swamp situated along a coastline stretching over 160 km. The total population of the state is 4,098,391. Endowed with 40 per cent of Nigeria's total oil and gas resources, or some 10 to 16 billion barrels of oil and some 160 x 1012 cubic feet of natural gas, DS is awash in oil and gas wealth and possibly the richest oil and gas jurisdiction in sub-Saharan Africa. Despite this enormous wealth in energy resources, the vast majority of the population is not only extremely poor economically, but energy poor as well. An estimated 98 per cent of households lack access to quality cooking and lighting fuels (Obueh, 2006)[9]. CEHEEN estimates that a typical rural woman in DS spends six hours gathering fuelwood (Obueh, 2006).

The primary threats to protected forests and biodiversity are: pollution from the oil and gas sector; habitat degradation and land-use change; land clearings for agriculture and unsustainable harvest of trees. Agriculture is largely subsistence, shifting cultivation using slash-and-burn to prepare the land from site to site. Oil and gas exploration, facility construction and sand dredging damage and fragment ecosystems and habitats across the Delta. The over-harvest of timber (for fuel wood and construction), Non-timber forest products (NTFP) (for fuel, medicine and food) results in habitat fragmentation, degradation (erosion, flooding) and destruction, and in exotic species invasions (e.g. Nipah palm from Asia in mangrove areas). The Delta town of Sapele was home until recently to the largest timber and plywood factory in West Africa. It is now unable to operate due to an inadequate supply of logs.

In a study that assessed a site for forest tree and shrub species which produce economically valued products, it was reported that over exploitation of the forest species were clearly evident (Agbogidi, 2011)[10]. The outcome of a 2008 pilot study for the methanol-fueled Clean Cook stove in 150 homes in Delta State has shown that the stove and its methanol fuel were accepted by almost all the respondents that participated in the study based on the following attributes: quality of both stove and fuel; performance and efficiency of both stove and fuel; safety of both stove and fuel; fuel economy of fuel and stove as well as the way methanol fuel was distributed to them.

The eleven Government Forest Reserves in the State cover a total area of 88,109 ha. Forest plantation in the State grew from 3,701 ha in 1999 to 4,205 ha in 2012, in addition to the free forest area that occupy a total area of 350,505 ha in the following order – freshwater swamp forest (317,686 ha) > lowland rainforest (23,974 ha) > riparian forest (7,972 ha) > woodland (873 ha)

Between 1978 and 1998, the area occupied by natural forest in the State decreased from 530,700 ha (approximately 31.3% of the State) to 389, 800 ha (23%) and then to 309,700 ha between 1998 and 2008. The vegetation of the State has been significantly altered from the original mosaic by three

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[9] *Obueh, J. 2006. "Methanol Stoves for Indoor Air Pollution Reduction in Delta State, Nigeria – Addressing the needs of People for Clean Energy" Boiling Point Technical Journal. No. 52, 2006. Pp 27 – 29.*

[10] *Agbogidi, O. M. 2011. A survey of the economically valued forest plant species at the proposed site for airport in Asaba, Delta State, Nigeria. Agriculture and Biology Journal of North America. PP 1-7.*

major drivers - agricultural expansion, lumbering and urbanization, as a new State in quest of infrastructural development.

In the study conducted by Beak and Geomatics International on the Forest Resources of the State in the year 2000, approximately 60% of the 89% local people in the State rely majorly on fuel wood as source of energy and means of livelihood. The Delta State Government through an established multi-disciplinary climate change unit embarked on sensitization in communities and schools; built capacities to mitigate its effects by training and engaging forest dependent communities to fabricate Eco-stoves from locally available materials as alternative to the 100 percent-fuel wood tripod stand for fish drying, cassava (garri) processing and domestic cooking. The Eco-stoves functionally reduced the emission profiles of CO2 by abating 5 tons of CO2 per 500 units daily; 1,825 tons of CO2 per 500 units annually; and a total of 2,400 tons of CO2 per community annually. Thus, saving 25,000 kg fuel wood in the forest as stand as well as habitat for biodiversity conservation, and represent an innovative initiative for the management and conservation of forest estate in the pilot communities in Delta State.

Kaduna State: Kaduna State (KDS) in North-West Nigeria with a population of about 6,066, 652 and a population density of 132 inhabitants per sq mile. It lies within latitude 8^0 45^1 and 11^0 30^1N and longitude 6^0 10^1 and 9^0. The State is estimated to cover a land mass area of about 48,473.2 square kilometres. KDS belongs to the guinea savanna vegetation belt. The annual rain fall shows marked decreases from 1,524mm in the south to 635mm in the north while the mean annual temperature ranges between 19°C–32°C. The Forests and its vegetation are diverse because it is a combination of plantation and natural forests. The main indigenous forest species are *Pakia biglobolsa* (Dorawa), *Ceiba petandra* (Silk Cotton), and *Andasonia digitata* (Kuka) while the exotic forest species include *Azadiracta indica* (Neem), *Tectona grandis* (Teak), *Eucalyptus* spp., *Gmelina* spp., and *Pinus caribea* (pine). Kamuku National Park (KNP) is located in Birnin Gwari, Kaduna State. The Park, originally gazetted as Birnin Gwari Native Authority Forest Reserve in 1936 was upgraded to the status of a National Park in May 1999. Major threats to conservation activities are hunting and illegal cattle-grazing. Kamuku National Park is placed in World Conservation Union (IUCN) Management Category II i.e. Protected Area managed mainly for ecosystem protection and recreation.

A recent assessment of the Gidan Waya forest reserve in KDS (Dogo, 2014)[11] indicates extreme degradation – Open landscape with scattered trees shrubs and a variety of grasses. Continuous slash-and-burn method of land clearing for cultivation in the dry season and the use of herbicides in the rainy season, fuel wood harvest, animal grazing and cultivation on steep slopes has continued to deplete soil, water and vegetation resources without any visible restoration process put in place. Also, a study of the Nimbia forest reserve (Musa *et al.*, 2014)[12] examines the use of GIS and remote sensing in mapping land cover in Nimbia forest reserve between 1986 and 2010 show that the forest is retreating due to several anthropogenic activities of man such as illegal felling of wood and uncoordinated farming activities.

The major drivers of deforestation in Kaduna state include: indiscriminate land clearing for farming, illegal felling and fuel wood extraction. Qualitative indications of the consumption of Non Renewable Biomass in KDS are: The fact that wood exports have been banned in Nigeria since 1976, in order to allow priority supply of the national internal market; Price increases for fossil fuels have led to a massive return of households to fuel wood; and Important road transport of fuel wood from southern supply zones to KDS and other northern fuel wood deficit areas.

Massive deforestation and cutting of trees for fuel wood in the northern States is threatening the livelihood of millions of people. Experience from programmes funded under the 5th and 6th EDF in the North has shown that planting of trees for shelter belts and wind breaks cannot compensate the loss of the natural tree cover as a result of the rapid population growth. A recent study undertaken in Katsina showed that the quantity of sustainable fuel wood production is overcut 4-5 times. There is an urgent need for more trees to cater for the fuel wood demand of the existing and future population.

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[11] *Dogo, B. A. 2014. Restoration of Degraded Gidan Waya Forest Reserve. Academic Journal of Interdisciplinary Studies, MCSER Publishing, Rome-Italy. Vol 3 No 7.*

[12] *Musa, I. T., Yakubu; M. T., Ya'U, H. M.; Zakari, S. I. and Vivan, E. 2014. Analysis of Forest Cover Changes in Nimbia Forest Reserve, Kaduna State, Nigeria using Geographic Information System and Remote Sensing Techniques. Journal of Environment and Earth Science. Vol.4, No.21, 2014.*

Desertification and tree planting programme in the Northern States: The threat of the advancing desert necessitated the promotion of tree planting programme in Nigeria, which is an annual exercise, where trees are planted at a particular time of the year (mostly peak of rainy season). This exercise is more visible in the Northern states of Nigeria that are the worst hit by desert encroachment. The aim of the exercise is to sensitize the public on the importance of trees in our environment and also to discourage indiscriminate felling of trees due to its attendant consequences. Trees beautify our cities, promote healthy climatic conditions, improve quality of environment, and check desertification, landslide and erosion. Trees also encourage ecotourism, games, resorts and are also home to varieties of medicinal plants and wildlife. They also contribute to the process of carbon sequestration and act as carbon sink, which is important for reduction of greenhouse gases and global warming.

The campaign was traditionally a three tier event with the federal government flagging it off, then the states and the local government councils follow suit. Areas that are most threatened by the surging desert are selected to launch the campaign, which indicates government readiness to roll back this very threatening monster. However, it is an incontestable fact that desertification is one of the fundamental environmental problems that is responsible for the current trend in global warming, drought, decrease in crop yield, forced migration and loss of biodiversity among others. Despite these enormous challenges this campaign has been neglected. Where it is carried out it has been made ceremonial at the expense of tax payers' money.

It is imperative to state that much as we want to address the problems enumerated above, government at all tiers should wake up to their responsibilities to tame the advancing desert. The following suggestions might prove useful:

i) The right tree species that will adapt and thrive well in the environment should be selected. The timing of tree planting campaign is important. Appropriate planting timing should be ensured;
ii) Effective maintenance of the trees must be ensured after planting. As this is the major reason that makes the programme of tree planting exercise fail after the launching;
iii) The current trend all over the world is community participation in developmental projects; respective communities where the project is sited should be involved from design to implementation of the planting project;
iv) Communal forest nurseries should be encouraged and assisted by the government and CBOs.
v) Government at all levels must muster the political will to enforce forest legislations to guard against indiscriminate felling of trees.
vi) The promotion of the use of alternative sources of energy and other simple energy saving techniques should be encouraged and made affordable.
vii) Our research Institutes should conduct researches to improve the genetic potentials of our indigenous tree species, which are more readily acceptable to our farmers.
viii) Government, NGO's and other relevant agencies should re-double their efforts in sensitizing the public on the economic, social and environmental need to plant and maintain trees for sustainable development.

Lessons learned: The experience to date shows that change is brought about slowly. that it took a long time to establish trust between the opposing groups of stakeholders and that local expectations are very high and need to be carefully managed. Visibility and communication strategies need to be designed with care. Additionally, the low technical and managerial capacity of private companies, especially small and medium sized enterprises (SMEs), needs to be taken into account, as they are crucial partners in implementing the type of renewable energy projects planned under the proposed programme. The experience of previous EU-funded Governance Programmes indicates that the logistics and time required for working simultaneously in several States, spread around the country, should not be underestimated.

Rationale for the choice of the project sites: This project will partner with selected communities in Cross River, Delta and Kaduna States to cover both land use from most naturally wooded outside protected areas in the South to degraded land in the buffer state of the semi-arid zone in the North. Fuelwood production is a popular economic activity in these states. The communities in the pilot states were selected based on the following criteria: (i) Current fuelwood production rates and

deforestation rates; (ii) available wood fuel resources; (iii) secure land tenure; (iv) access to markets; (v) degree of stakeholder engagement and interest and (vi) potential co-financing resources from public, private and CSO stakeholders for operations and maintenance. In addition, other considerations include overlaps with REDD+ programme, MARD Agricultural Transformation Agenda and Green Great Wall program; capacity of district stakeholders and local communities to manage the chosen technologies and technical/agronomic considerations.

ANNEX B: Project Risks and Assumptions

The project design took into consideration the success factors that would make the realization of the Project goal and achievement of project objective within controllable and manageable limits. These are described as internal factors and should be within the control and authority of the Project Team. However, there are factors beyond the control of the Project and therefore the success of the project in attaining its goal and targets relies on the assumptions that certain desired situations or conditions will exist or happen. However, these assumptions if worded in the negative sense are considered as the risks of the project implementation.

The Project Results Matrix (Section 3) shows a detailed overview of the project's assumptions for successful project implementation. To address these risks, the project has to establish effective means to monitor and to the extent possible mitigate these risks. Mitigation measures include a strong emphasis on hands-on and adaptive project management and participation of each stakeholder, mobilizing private sector participation and a continuous dialogue between the project's donors, implementing partner, and government agencies. The different risks that were identified during the SFM project formulation and the recommended mitigation measures and risk rating are the following:

Table B.1: Project Risks and Mitigation Measures

Type	Level	Risk	Mitigation strategies
Policy and Legislative Risk	Moderate	In Nigeria, legislative processes are usually very cumbersome and it may take several months or years to complete the legislative cycle. The proposed project could experience the following risks: • Legislative delays that may go beyond the project life span. • Inability of members and low buy-in of the Nigerian Parliament to fully understand the importance of energy efficiency and thus may not show much interest in the issues. • Slow/delayed adoption of the new law and policy by the Nigerian Government. • The mandates of ECN and SON and other relevant agencies are not revised in a timely manner.	The current project will put in place activities to adequately sensitize and inform policy makers and legislators at the outset of the project to enable them to understand the urgency and importance of the project. The Project Board will be formed to provide a regular platform for dialogue and to enlighten the lawmakers, industry and consumers on the cost-benefit of the project and opportunity costs of inaction.
Institutional Risk	Low	The success of this project will largely depend on adequately increasing the technical capacity of the relevant institutions, such as the ECN, SON, R and D, Forestry Division etc. The following are therefore potential risks: • lack of project ownership • the willingness of the staff of these institutions to adopt new knowledge and practice • insufficient training of laboratories staff, manufacturers, importers and retailers in the implementation of the labeling program • lack of adequate training of key stakeholders of the project • inadequate training on procedures	A bottom-up, participatory training approach will be used to generate greater ownership. To mitigate this risk, adequate provision will be made to train staff of these institutions to imbibe the new technology. Training and enhancement of the capacity of relevant agencies and stakeholders is a key component of the current project.

		for energy consumption measuring, calculation of energy efficiency index and enforcement procedures.	
Economic and political Risk	Medium	• The Nigerian economy is highly dependent on oil export. Any drop in the price of oil in the international market may have significant impacts on the volume of economic activities in Nigeria. The current and future price of fossil fuel could influence the uptake and buy in of bioenergy options. A drop in international and regional oil prices would diminish the attractiveness of bioenergy measures and therefore could likely threaten the willingness of the stakeholders to engage in the proposed bioenergy reform & strategy. • Political upheaval and instability could affect economic development and the uptake of bioenergy technology	This project seeks to improve/reduce fuelwood use and make it more sustainable by also ensuring renewable biomass supply. This is not considered a significant risk. The 2015 Presidential and Parliamentary elections in Nigeria were remarkably peaceful, and further significant outbreaks of violence are considered unlikely.
Technical Risk	Medium	The clean stoves/kilns and woodlot systems being promoted may not meet the needs of the end users, leading to poor adoption. The production system may be costly and not efficient.	This will be addressed through: - Participatory Technology Development where the end users will work with R&D institute to test, upgrade and improve and reduce the cost of the clean stoves/kilns - Participatory Knowledge Development where lessons learned will be developed as knowledge products to be used for the training and awareness campaign
Financial Risk	High	To promote bioenergy in Nigeria will require a significant investment on the part of the Government, the private sector and other development partners. The lack of competitive value chain financial products and services and the limited understanding of potential risks and return on investment could act as a deterrent for investment in this sector.	The project will put in place a strategic public-private partnership, complementing adequate structures, mechanisms, policy and legislation that will encourage investment in the sector. Competitive financial products and services will be developed and promoted to stimulate the nascent improved cookstove industry.
Marketing/Distribution Risk	Medium	Insufficient numbers of households purchase alternative energy technologies to conduct useful analysis The anomalies in the Nigeria marketing/distribution system such as the proliferation of traditional and substandard products, monopoly of distribution etc. may pose a potential danger to the success of the project. This makes the current business environment not conducive to the development of bioenergy.	Prior to implementing the program, conducted an extensive viability study, and in the course of the program all indications show that very large numbers of households will choose to purchase energy technologies. This will be addressed by the current project by putting in place the right policy and legislation and setting up a stringent mechanism for

			enforcement.
Information Risk	Medium	Though may be considered as medium risk but it may impact on the project: • Households may be reluctant to switch to new cookstoves due to unfamiliarity or behavioral/cultural barriers. • There is low level of awareness on the potentials of bioenergy solutions to bring about economic development and environmental sustainability. • There is also lack of thorough communication with key policy makers. • Moreover, there is lack of an accurate reporting of existing legal and regulatory framework. • Not many Nigerians have information on the existence and availability of bioenergy appliances. • Illiteracy and general low capacity among households in target areas poses challenges in terms of data collection and impact measurement.	This will be addressed by creating knowledge products and awareness using all type of media (TV, radio, newspaper, Nollywood drama) and using NGOs already working on bioenergy projects. The implementation of a bioenergy policy will be included as a component of procurement policy to help the country adapt to the adoption of bioenergy. Using local CBO which has extensive experience in working with base of pyramid households in Nigeria and in many other countries around the world. CBO will design the research tools to take into account beneficiary capacities, and minimize the risk of beneficiary incomprehension and bias.
Rights-based risk (protecting indigenous people and land tenure rights)	Medium	Though may be considered as medium risk but it may impact on the project: • Unclear land ownership and customary rights may cause disputes and grievances that will affect access to the land for nursery and woodlots development	This will be addressed by: - selecting lands that have clear land title and customary rights that are approved by the local authority and community leaders - implementing a transparent and fair system for resolving conflicts and grievances based on local structure

ANNEX C: Stakeholder Groups and Their Participation

A description of the public, private and CSO stakeholder groups and their involvement in the Project as well as the benefits they can expect to receive:

Energy Commission of Nigeria (ECN): Established in 1988, the Energy Commission of Nigeria (ECN) is the government office in charge of energy sector planning and policy implementation. The commission also promotes the use of renewables and alternative energies within the electric generation mix in Nigeria. The ECN fulfils the role of strategic overall planning, coordination and effective direction of Nigeria's national energy strategies within Nigeria and with ECOWAS member states. Energy research, development and training related activities are carried out in the six technical departments and the six energy research centres. Two of the centres, located at Nsukka and Sokoto, are responsible for new and renewable energy research. The centre in Lagos caters to energy efficiency and conservation, while the centre in Benin specialises in energy and environment. The two centres in Ilorin and Bauchi are responsible for hydropower research and research in the area of petroleum respectively. ECN was instrumental in launching the Renewable Energy Master Plan (2102). A significant contribution by ECN was the first National Energy Policy 2003) launched in 2005. This policy is currently under revision (2013).

Federal Ministry of Environment (FMOE): FMOE was established in 1999 by the Federal Government of Nigeria with the statutory responsibility of protecting the natural environment against pollution and degradation and conservation of natural resources for sustainable development in Nigeria. FMENV is formally charged with environmental responsibilities and also with coordinating all climate change matters under its Special Unit Climate Change. The unit also represents the Ministry at international climate negotiations. The Special Unit on Renewable Energy acts as the voice of the ministry regarding renewable energy and energy efficiency issues. The objective of the unit is to develop and implement strategies that will achieve clean, reliable energy supply mechanisms in order to develop the sector based on international best practices and in order to showcase viability for private sector participation. Thus, the unit's activities revolve around three core issues: (i) secure, safe, and reasonably priced energy supplies and services; (ii) economic growth and development; and (iii) environmental protection. The focus on renewable energy and energy efficiency is mainly on displacement and reduction in use of conventional fossil fuels of biomass for household and small scale agricultural applications. The FMENV is also the regulator for the Environmental and Social Impact Assessment (ESIA). The ESIA is mandatory for all development projects as per the Nigerian EIA Act No. 86 of 1992.

Forestry Commission, Cross River State: The Cross River State forestry Commission (CRSFC) is the main government agency in the state responsible for the management of its forests. The Commission has a mandate to focus on the conservation, protection and sustainable utilization of forest and wildlife resources in the state, and be home to one of the world's greenest and biologically most diverse and richest places. The law empowers the Forestry Commission to regulate the activities of Ministries, Parastatals, Local Governments, Departments, Organizations, statutory bodies, as they relate to forest and forest resources and wildlife conservation issues in the State. The law also enables the Commission to establish links with relevant national and international regulatory policy making and funding bodies for the benefit of bio-diversity conservation and sustainable forestry in the State. The forest commission by all global standards articulates the following initiatives and programmes:

Reforestation and regeneration of degraded forest areas; Re-survey, demarcation, re-beaconing (where appropriate) of all Forest Reserve boundaries. Establishment of complete asset (timber, in the first instance) tracking system from stump to site to retail end; Protection and management of mangroves and wetlands, monitoring and protection; Ecotourism and sustainable forest exploitation; Research into key plants and animals in the state; Creation of carbon reserve mechanisms for marketing; Climate change adaptation mechanisms for vulnerable rural poor; Research into medicinal, aromatic and pesticide plants; Conservation and environmental education awareness; Institutional capacity building and strengthening; Alternative livelihood sources and rural forest resource governance; and Regulation of forest sector operators.

Federal Ministry of Agriculture and Rural Development: The Federal Ministry of Agriculture and Rural Development (FMARD) was established in 1966 by the Federal Government of Nigeria with the statutory responsibility to regulate agricultural research, agriculture and natural and natural resources, forestry and veterinary research throughout Nigeria. The ministry has the responsibility of optimizing agriculture and integrating rural development for the transformation of the Nigerian economy, with a view to attaining food security and positioning Nigeria as a net food exporter for socio-economic development. The mandate of the ministry is to be a significant net provider of food to the global community, through the promotion of Agricultural Development and Management of National Resources in a value-chain approach to achieve sustainable food security, enhance farm income and reduce poverty. The ministry is responsible for various parastatals. The agencies/parastatals under the ministry include: The Nigerian Agricultural cooperative and Rural Development Bank (NACRDB); Nigerian Agricultural Insurance Corporation (NAIC); Agricultural and Rural Management Training Institute (ARMTI); National Centre for Agricultural Mechanization (NCAM); Thirteen Federal Colleges of Agriculture; Fifteen Agricultural Research Institutes including three notable research institutions that deal with tree crops: The Cocoa Research Institute of Nigeria (CRCN); The Rubber Research Institute of Nigeria (RRIN); and Nigerian Institute for Oil Palm Research (NIFOR).

Federal Ministry of Power (FMOP): The FMOP is responsible for ensuring a robust power sector that fully supports the socio-economic needs of the nation. The main goal of the ministry is directed at initiating, formulating, coordinating and implementing broad policies and programmes on the development of electricity generation from all sources of energy. FMOP is also charged with the responsibility of developing and deploying electricity-related renewable energy policies in Nigeria. The FMOP is headed by the Honourable Minister as Chief Executive of the ministry. The Honourable Minister of State is in charge of the operational activities of the Ministry, while the Permanent Secretary is the accounting officer. The latter two offices are supported by seven departments and five units. They are responsible for the coordination of all forms of electricity generated from both renewable energy and other non-renewable energy sources. In order to facilitate diversification of the nation's energy mix, the ministry is encouraging renewable energy sources for power generation, especially in rural areas of the country. The ministry synchronises the Inter-Ministerial Committee on Renewable Energy and Energy Efficiency (ICREEE), has commissioned some solar power pilot projects in Ogun and Cross River states, and is building a pilot wind farm in Katsina. The FMOP coordinates renewable energy and energy efficiency matters through the Electrical Inspectorate Services (EIS) department. [11]

Nigerian National Petroleum Corporation (NNPC): NNPC has sole responsibility for upstream and down- stream developments in the oil industry, and is also responsible for regulating and supervising the sector on behalf of the Nigerian Government. NNPC was established on April 1, 1977 as a merger of the Nigerian National Oil Corporation and the Federal Ministry of Mines and Steel. In 1988, the corporation was commercialised into 11 strategic business units, covering the entire spectrum of oil industry operations: exploration and production, gas development, refining, distribution, petrochemicals, engineering, and commercial investments NNPC by law manages the relation between the Nigerian federal government and a number of foreign multinational corporations. Through collaboration with these companies, the Nigerian government conducts petroleum exploration and production. In its current version REMP insufficiently refers to the NNPC activities. NNPC is also exploring the use of biofuels (mainly ethanol and biodiesel) for mixing in conventional fuel to produce "green gasoline". Otherwise its involvement in renewable energy and energy efficiency is limited to internal consumption.

Standards Organisation of Nigeria (SON): The Standard Organisation of Nigeria (SON) is a federal government establishment instituted by Act. No.56 of 1971 with the responsibility of ensuring that all products (imported and manufactured in Nigeria) keep to stipulated standards. The breakdown of SON functions include to: ensure compliance with standards designated and approved by the Council; undertake investigations as necessary into the quality of facilities, materials and products in Nigeria, and establish a quality assurance system including certification of factories, products and laboratories; provide reference standards for calibration and verification of metering and metering equipment; compile an inventory of products requiring standardisation; prepare Nigeria Industrial Standards; foster interest in the recommendation and maintenance of acceptable standards by industry and the

general public; develop methods for testing of materials, supplies and equipment; register and regulate standard marks and specification.

The SON has developed and/or adopted some standards on renewable energy and energy efficiency recently. Among these standards are a code of practice for the deployment of outdoor solar lighting, design qualification and type approval of PV modules, safety standards for use of PV power converters, etc. In order to encourage quality and competition that will enable exporters, importers and the consumers at large have free access to desired quality and/or professional services SON's services include the certification of products (SON Conformity Assessment Programme for Exports, SONCAP). SONCAP is a pre-shipment verification of conformity to standards process used to verify that products to be imported into Nigeria are in conformity with the applicable Nigerian Industrial Standard (NIS) or approved equivalents, and technical regulations before shipment. Under the SONCAP regime, imports are required to undergo verification and testing at country of supply and a SONCAP certificate is issued demonstrating that the products meet the applicable standards. [55] The SON has defined three routes that may be applied as appropriate conformity assessment procedures for product(s) subject to SONCAP, according to type, risk and effect on the health and safety, and environmental protection. They cover: unregistered/unlicensed products (conformity verification); registered products (registration and conformity inspection); licensed products (product certification systems).

Federal Ministry of Local Government (FMLG): FMLG is concerned with matters affecting local government and local government administration as well as issues relating to chieftaincy matters. Some responsibilities include but are not limited to: Monitor the activities and performance of all Local Governments in the State in order to ensure compliance with the local government laws and other regulations made under the law; Monitor public utilities under the local government, coordination of the statutory allocation to local government councils (inclusive of loans and grants) and coordination of the affairs of all local government councils and submission of periodic reports thereon to the Governor of the State; Relations with Local Government Councils, Local Government Service Commission, Office of the State Auditor-General for Local Governments and Federal Ministry of State and Local Government Affairs; Coordination of Development Plan for local government councils; Market registration and Valuation Matters; Train elected functionaries and political office holders at local government level in collaboration with the Local Government Service Commission.

Samaru College of Agriculture, Ahmadu Bello University, Kaduna: Samaru College of Agriculture, was established in 1922. It is an arm of Ahmadu Bello University that is mandated on training middle level manpower in Agriculture which leads to the award of National Diploma and Higher National Diploma after two and four years respectively. The University has various departments, sections, units that take care of such projects and such include Parks and Gardens, Botanical garden Unit. There is also a Savannah Forestry Research Station which is part of Forestry Research Institute of Nigeria amongst others. At the College, Horticulture Section is the unit involved in such things and over the years the section operates a nursery where various plants are being propagated. In the last couple of years, the College had specifically established 1hectare of Guava and 1 hectare of Moringa and few square metres of mango and citrus to reclaim marginal lands. Our interest in guava was in the fact that the favourable climate within the state favours its growth, financial returns from the sales of its fruits and branches removed during prunning serves as fuelwood. The College also produce seedlings of various plants for the Ministries of Agriculture (States and Federal). The other units of the University had also established hectares of Khaya and other species to reclaim marginal lands but all within the University campus. The College has been involved in selling seedlings of various plants to the public but has not been involved in establishing woodlot for commercial purposes.

Global Alliance for Clean Cookstoves (GACC): Global Alliance for Clean Cookstoves is actively supporting Nigeria in various stove activities. For example, GACC is supporting ICEED to establish the Nigerian Clean Cookstoves Design and Testing Centre at Afikpo, Ebonyi State. The centre will provide stove producers and users, and other relevant stakeholders the opportunity to confidently compare stove performance and safety. In addition, it will provide a common set of terminology for wood stoves for easier understanding and communication; give stove producers, marketers and users assurance of product quality.

National Clean Cooking Scheme (NCCS), Federal Ministry of Environment: There is also an array of Government and donor-supported activities promoting transition towards more efficient and alternative solutions for households energy needs (i.e. the fuel wood demand side), such as the National Clean Cooking Scheme of the Federal Ministry of Environment and its Rural Women Energy Security (RUWES) Initiative aimed specifically at addressing the needs of rural women for sustainable and healthy cooking solutions. Under NCCS, the Federal Government supports retrofitting of kitchens in public schools, hospitals and hotels across the country with improved cook stoves and LPG. Similarly, USAID is supporting improvement in efficiency in the use of fuel wood by Nigerian schools and public institutions by providing energy efficient cook-stove through its "Safe Cooking Energy Programme" in the Niger State.

Community Research and Development Center (CREDC): Several local NGOs and community-based organizations, such as Community Research and Development Center (CREDC) under the Sustainable Forest Management Project, are also engaged in the awareness raising and capacity building work on the local level spreading the word and knowledge about efficient cooking technologies and the importance of forest protection. In CRS, the Federal Government initiated a pilot biogas project in order to diminish pressure on forest resources from domestic energy use, but no evidence exists yet regarding its implementation.

ICEED: To support domestic industry, ICEED in partnership with Energy Commission Nigeria supports the establishment of the National Clean Cookstoves Development and Testing Laboratory at the University of Nigeria (Nsukka, Enugu State); this partnership helps develop technical standards for stoves, provides testing and certification services related to stove technical quality, indoor air pollution, and energy efficiency, as well as support local SMES in improving the quality of their products.

Nigerian Developmental Association for Renewable Energies (DARE): DARE and the German Non-Governmental Organisation Lernen-Helfen-Leben e.V. (LHL e.V.) are jointly implementing CDM project entitled "Efficient Fuel Wood Stoves for Nigeria" whereby the revenues from the CER sales are to use to subsidize the sales of highly efficient cook stoves SAVE80 in the Northern regions of Nigeria[13]. The project is expected to support distribution of up to 13,000 SAVE80 systems and thus prevent the emission of 300,000 tCO2e until 2019. By the time of its last monitoring report (mid 2012), the project was behind delivery schedule and has only claimed 17,000 tCO2 in GHG emission reductions since its start in 2008. Nevertheless, the project is an important part of baseline activity because it proves viability of business and financial model for efficient cook stoves in Nigeria (provided carbon benefits of such project are monetized). Other PoA developers are C-Quest Capital.

SME Fund (SME): SME seeks to provide low cost, clean and safe cooking energy for households at bottom of the economic pyramid through their 2G proprietary Cellulose ethanol bio process. The organisation has successfully launched one of the largest and fastest growing clean cooking and lighting programmes in Africa. This was accomplished through a vertically integrated business model that dramatically reduces costs in both manufacturing and distribution, by creatively using social marketing, thereby economically empowering independent distributors. SME has reached out to over 230,000 households with their ethanol stove and has sold over 2 million litres of gel. With the growing demand, SME is looking to have 1 micro distilleries and 2 gel plant at the community level to meet the demands of communities and raise awareness of their ethanol stove.

Mfaminyen Conservation Society: In CRS specifically, Mfaminyen Conservation Society supported indigenous design of improved cookstove (Ekwuk) and its dissemination across the states: over 4,500 products were sold. The CRS Government committed 100,000 US$ to further scaling-up its production. These efforts, however, fall short of the potential and need of the region.

Technical Committee for Stove and Fuel Standard (TCCFS): This SFM project will support TCCFS to partner with NACC members and SON and ECN to build on the initiative to develop Standard and Label for clean stoves for the domestic, institutional and industrial sector. A viable fee system for cost recovery will be explored.

[13] *https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/7R1B09HSJV3FKIZYCA4D6XQOETP5GN/view*

GACC is supporting ICEED to establish the Nigerian Clean Cookstoves Design and Testing Centre at Afikpo, Ebonyi State. The centre will provide stove producers and users, and other relevant stakeholders the opportunity to confidently compare stove performance and safety. In addition, it will provide a common set of terminology for wood stoves for easier understanding and communication; give stove producers, marketers and users assurance of product quality.

National Centre for Energy Research and Development, University of Nigeria, Nsukka: The centre is owned by Energy Commission of Nigeria and since 1980 been operating in the field of R&D, training and dissemination of renewable and non renewable energy sources. Over the years, the centre has developed a number of efficient biomass stoves. According to the centre, one of its best stoves called the nozzle type cookstove has a wood use efficiency of 69%. In addition, the stove has a thermal efficiency of about 40% and significantly reduces emissions. The centre is hampered by funds to embark on further R&D and widespread dissemination.

Fortis MFI (FMFB): Its objectives are: Provide small loans (microcredit for members especially women) for enterprise promotion and income generation; Drive savings as a major thrive to secure loans and reduce the target audience vulnerability to economic stress; Ensure a sustained system for managing and recovering microcredit; Improve the economically active poor 's participation and contribution to formal financial systems and improve access to business opportunities; Ensure a sustained system for managing and recovering microcredit; Improve the economically active poor 's participation and contribution to formal financial systems and improve access to business opportunities; Promote economic development through none collaterized lending and the informal sector's participation in formal financial system; and Encourage economic activity and self-employment of the active young. FMFB shall also undertake to ensure the following: Members have improved access to micro-loans, micro-credit and other support services that encourages the growth and development of their businesses; Linkages are established and maintained to financial and none financial services to help increase productivity and income levels; Members business practices are improved with weekly center meetings and pre-disbursement trainings to ensure effective utilization of loans and no default on repayment; Productivity and job creating potentials of the informal sector are improved with linkage promotion and direct access to other programmes on credit discipline, health promotion, financial literacy etc to improve on their general livelihood and standard of living; Best practices in microfinance are adopted to ensure that the Fortis Micro-model is upheld and replicated.

Solar Sister, Inc. Solar Sister is a social enterprise using an innovative gender inclusive business model to empower African women as engines of a clean energy revolution. They used Pilot funds to add cookstoves to their current product basket in Nigeria, offering customers a unique range of modern lighting, phone charging, and improved cooking choices.
Enhancing Consumer Demand Through Increased Market Engagement

C-Quest Capital LLC: C-Quest Capital (CQC) is a private equity and carbon finance firm providing clean and efficient household energy technologies and sustainable sources of household fuels. Through TLC Green, a Joint Venture between CQC and the Malawian NGO Total Land Care, CQC proposes to test a new business model to couple the marketing and sale of sustainable firewood with improved cookstoves.

Toyola Energy Limited: Toyola Energy Limited manufactures and sells energy efficient cook stoves in urban and rural Ghana. The stoves use standard charcoal but are 40% more efficient than the traditional stoves used in the region. To date, Toyola has provided this cleaner energy product to 35,000 households through the sales of over 100,000 cookstoves. Toyola has offset over 140,000 tons of carbon dioxide emissions and employed over 300 employees. Toyola will use their catalytic small grant to hire additional managers and increase production efficiencies.
Catalytic Small Grant: African Clean Energy

Envirofit: Envirofit International is a social enterprise that was established in 2003 to develop well-engineered technology solutions to improve the human condition on a global scale, with a primary emphasis on applications in the developing world. Envirofit's enterprise-based model is based on the design and sale of high quality, affordable, consumer driven products that yield health, environmental and economic benefits. Envirofit uses a market-based solution to develop local communities and create a large-scale sustainable impact. They envision a world in which everyone can enjoy durable, affordable, aspirational, well-engineered technology products that offer economic payback incentives,

while improving health and the environment. Envirofit partners with Tower Enterprise to manufacture stoves in Nigeria supported with distribution networks.

Food and Agriculture Organization (FAO): FAO has developed the Bioenergy and Food Security (BEFS) Approach for Nigeria that seeks to assist policy-makers in assessing the interplay between natural resource availability, bioenergy production potential, rural development and food security, and in strengthening their capacity to manage the trade-offs associated with bioenergy development.

Aprovecho Research Center (ARC) is a non-profit corporation established in 1976 and it is dedicated to researching, developing and disseminating appropriate technological solutions for meeting the basic human needs of refugees and impoverished people and communities in the developing world. This GEF funded project will explore the feasibility to partner with ARC to set up stove testing labs in Nigeria in collaboration with regional ECREEE in Cape Verde.

Consumers: The consumers especially women will be important beneficiaries of the bioenergy program as they will be able to reduce the share that energy represents in household budgets. However, given the relative lack of knowledge of many buyers in Nigeria, an information and outreach campaign will be needed to explain the value of considering the total cost of ownership before making an appliance purchase.

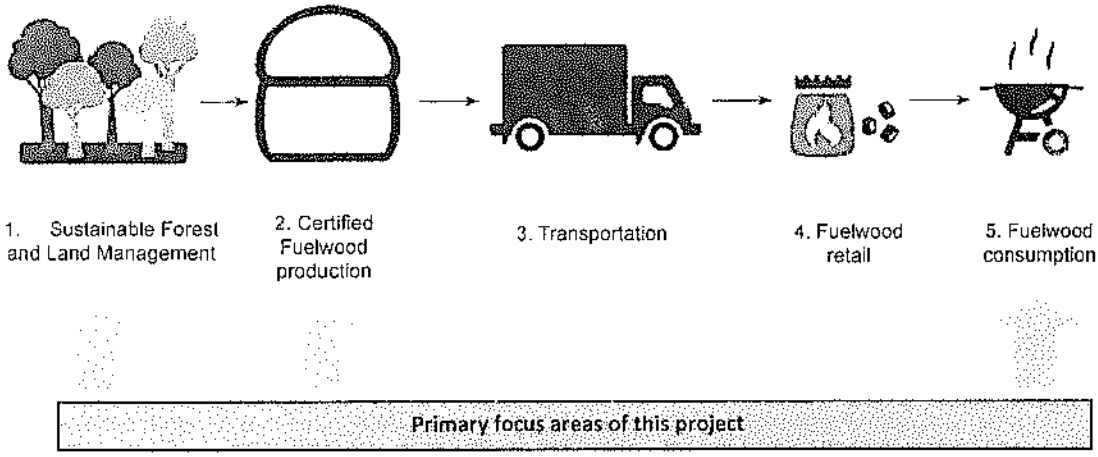
Nigerian Association of Clean Cookstove (NACC - Shell, UNDP, GIZ, EU, ICEED, etc): The Nigerian Alliance for Clean Cookstoves was established in April 2011 with the aim to introduce 10 million fuel efficient stoves to Nigeria by 2021 through: i. Policy – Work with the Federal Government to develop policies which foster the development of a clean cookstove market. Ii. Quality Certification – Partner with research centers, private sector and standard issuance organizations to ensure that only high quality stoves are certified for the Nigerian market; iii. Financing – Structure financing options to ensure affordability and access to Nigerian households; and iv. Advocacy – Create mass awareness of clean cookstoves; encourage knowledge sharing with international cookstove programs. Established only recently so no significant progress as yet. Implications: The Nigerian Alliance for Clean Cookstoves can play the central coordinative body role in order to provide support and ensure effective implementation of cookstove programs.

Technical Committee for Stove and Fuel Standard (TCCFS): The Technical Committee for Stove and Fuel Standard (TCCFS) has a mandate for developing standards and specifications for cooking stoves. The committee's objective is to define and verify clean stoves and fuels and encourage innovation to find better cooking solutions. The committee represents a significant step in efforts to scale up clean cookstoves and fuels as it provides guidance for rating cookstoves on four performance indicators: fuel use; total emissions; indoor emissions and safety. The committee provides guidance on standards to evaluate performance and help consumers, investors, donors and policy makers navigate the market. By using standards and testing to set ambitious and achievable goals to strengthen national policies and drive innovation that will lead to improved technologies and fuels. Standards can give stove makers affirmation of product quality, let users know they are making a worthwhile investment, and drive industry innovation. The committee output is expected to reduce the risks of cookstoves to health and safety, and facilitate the large-scale adoption of clean cooking solutions.

ANNEX D: Assessments and proposed implementation modalities of the proposed project

As already mentioned above, this project proposes a series of integrated interventions **mostly focused on Steps 1, 2 and 5 of the fuelwood value chain (improved fuelwood supplies and efficient utilization)**. The main beneficiaries in Stage 1 and 2 are forest custodians, landowners, male and female farmers and youth on the supply side whilst the beneficiaries in Stage 5 are stove/kiln prodcuers and end-users (domestic, industrial and institutional) on the demand side. Such segmentation would allow different business models and financial schemes to be developed to optimize the benefits. The following section elaborates on how these business models and financial mechanisms will be implemented for overcoming the financial, cultural, social and information/knowledge barriers.

Fuelwood Value Chain – Interventions by Stage



1. Stage 1 and 2 - Implementation Mechanism for the Development of Inclusive Sustainable and Certified Fuelwood Supplies and Business

A. Sustainable fuelwood supplies and inclusive business from Sustainably Managed Forest

The project will align closely its activities, both on the local and policy level, with the UN-REDD Readiness Program: to the extent the time-line of both projects will overlap (UN-REDD is until 2016), the efforts are made to identify and design pilot interventions jointly and the UNDP-GEF interventions are designed to ensure maximum complementarity and synergy and build on the work initiated by UN-REDD, especially in the promotion of clean stove/kiln, implementation of incentive mechanisms and SFM measures in Cross River and Delta State (Figure D1).

Natural forests can be managed to provide wood for fuelwood production. In addition to the collection of deadwood, trees would also be selectively harvested in a manner that allows coppicing and sprouting. The coppices and sprouts can then be managed to provide sustainable wood stocks for fuelwood production. Where the forests are degraded, some enrichment planting will be practiced.

Capacity Development for Sustainable Fuelwood Production from Natural Forests: Coppicing is a well-known method of woodland management which takes advantage of the fact that many trees make new growth (sprouts) from the stump or roots if cut down. In subsequent growth years, many new shoots will emerge, and, after a number of years the coppiced tree is ready to be harvested, and the cycle begins again. This will allow the coppiced woodland to be harvested in demarcated sections on a rotation. In this way, a crop is available each year for fuelwood production. In addition, a forest maintained this way, will allow a rich variety of habitats, which is beneficial for biodiversity. Coppicing maintains trees at a juvenile stage, and a regularly coppiced tree will never die of old age.

There is an urgent need to map out tree species with good sprouting capability for fuelwood production in the target area. Some trees take a relatively long time to grow to maturity. However the

size of wood that is optimum for fuelwood production should be less than 12 centimeters in diameter. After three to five years, most of these sprouts will have attained the required diameter and therefore ready as fuelwood. This will ensure that every three to five years, the demarcated section will be ready for harvesting. Some indigenous non-invasive species can grow rapidly. The tree can be attractive, with decoratively colored new leaves and colorful fruit which are attractive to birds and monkeys which may be important seed dispersers.

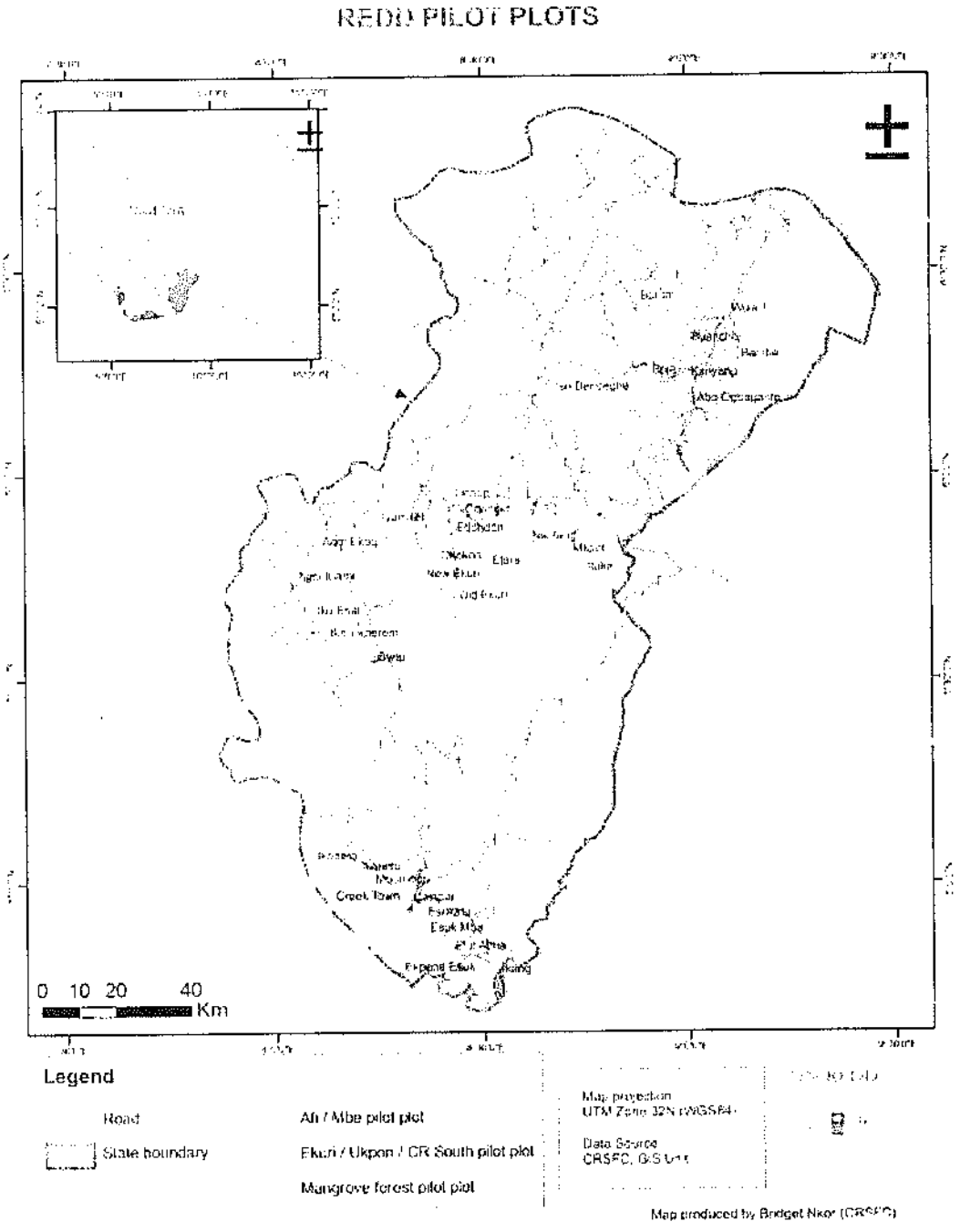


Figure D1: REDD+ pilot sites in Cross River State

Capacity development for tree planting: The project will build capacity for a total of 1,111 households (potential private trees owners) in Cross River and Delta State through awareness creation, demonstrations, training and establishment of support structures for the provision of seedlings for enrichment planting and inputs. Table D1 below indicates the cumulative distribution of households for

capacity building per year and the total accumulation of forest land in hectares to be sustainably managed for fuelwood production per year.

Table D1: Sustainably Managed Forests for annual fuelwod production in hectares (cumulative) in the pilot community in Cross River and Delta State

Community	Total community	No. of household	Year 1	Year 2	Year 3	Year 4	Year 5
Cross River State							
1. Old Ekuri	1,718	20	150	365	595	790	900
2. New Ekuri	1,448	16	100	226	376	536	710
3. Iko Esai	5,109	44	456	1,001	1,421	1,621	2,000
4. Owai	2,305	42	345	735	1,145	1,523	1,890
5. Etara	1,070	51	367	759	1,194	1,761	2,310
6. Eyeyeng	924	44	378	792	1,181	1,539	2,000
7. Edondon	4,826	51	379	802	1,214	1,738	2,275
8. Okokori	1,797	25	180	414	672	887	1,115
9. Agoi Ibami	10,079	21	147	374	592	805	950
10. Agoi Ekpo	8,570	19	121	332	533	732	850
Sub Total Ekuri/Iko	**37,846**	**333**	**2,623**	**5,800**	**8,923**	**11,932**	**15,000**
11. Urua Iwang	496	13	98	221	347	497	577
12. Esuk Mba	2,236	11	78	205	315	436	500
13. Esiere-Ibom	5,879	4	20	65	118	160	200
14. Creek Town	6,429	13	118	252	376	521	600
15. Efut Esighi	1,721	7	45	108	154	202	300
16. Edik Okon Idem	342	9	67	191	302	380	423
17. Akwa Esuk Eyamba	842	13	90	200	327	453	600
18. Esuk Idebe	1,240	8	45	100	164	255	345
19. Akim Akim	452	10	80	164	259	357	455
20. Ekpene Eki	2,083	-	-	-	-	-	-
Sub Total Mangrove	**21,700**	**89**	**641**	**1,506**	**2,362**	**3,261**	**4,000**
21. Buanchor	2,941	66	520	1,150	1,773	2,494	2,956
22. Boje-Ebok	1,332	44	350	762	1,218	1,696	2,000
23. Abo Mkpang	1,235	34	260	540	850	1,218	1,545
24. Kanyang1&2	2,265	44	360	750	1,179	1,627	2,000
25. Olom	3,123	12	94	171	311	475	555
26. Enyi	1,687	44	320	689	1,099	1,549	2,000
27. Esikwe	1,361	20	160	340	550	745	900
28. Bamba	1,697	43	345	713	1,132	1,521	1,945
29. Abo Obisu	886	23	180	393	623	818	1,044
30. Njua Kaku	2,849	46	378	734	1,146	1,669	2,055
Sub Total Afi/Mbe	**19,376**	**378**	**2,957**	**6,242**	**9,881**	**13,812**	**17,000**
State Total	**78,922**	**800**	**6,221**	**13,548**	**21,166**	**29,005**	**36,000**
No. of beneficiaries	394,610	4,000					

(5/HH)							
Delta State							
1. Umuwai	1,800	53	389	845	1,315	1,871	2,387
2. Ohorun-Uweye	650	19	150	328	541	753	864
3. Umuedem	1,300	38	313	658	1,114	1,459	1,724
4. Umuneze	800	24	178	368	591	810	1,061
5. Umuidekun	1,000	29	234	490	802	1,024	1,326
6. Ezede	906	27	189	407	696	941	1,201
7. Uheri	820	24	180	398	632	848	1,087
8. Umuotei	1,080	32	217	486	844	1,222	1,432
9. Uweye	720	21	1-5	323	590	808	955
10. Umukayan	1,480	44	314	737	1,264	1,700	1,963
State Total	**10,556**	**311**	**2,309**	**5,040**	**8,389**	**11,436**	**14,000**
No. of beneficiaries	**52,780**						
GRAND TOTAL	**89,478**	**1,111**	**8,530**	**18,588**	**29,555**	**40,441**	**50,000**
No. of beneficiaries (5/HH)	447,390	5,556					

B. Sustainable fuelwood supplies and inclusive business from Sustainable Land Management

EU-GIZ "Energising Access to Sustainable Energy" will support sustainable forest management and fuel wood production practices in Katsina state (Northern Nigeria) and promotion of relevant policies at the state and national level. Collaboration will be sought regarding national-level policy work on clean energy access.

During PPG, the fuelwood baseline survey demonstrated that using planted tree biomass for fuelwood production process is a sustainable option. However, this may be an expensive option in some areas where there is a relative abundance of biomass compared to clear felling and selective cutting in which cases the biomass is available at (close to) zero opportunity costs. In areas of scarce wood biomass in the semi-arid and drier Northern states, availability of land to produce trees for fuelwood production vis-à-vis food security is often an issue of concern by environmentalists. Fortunately the target areas in Kaduna State do not have food security issues. During project implementation and scale up of project in areas with food security issues, there are opportunities that could be exploited which are outlined below:

Tree Regeneration and Improved Fallowing for Wood Fuel Production: Improved fallow, which is the deliberate planting of trees or shrubs in rotation with crops have great potential for improving soil fertility. This is recommended in the target area. By providing nitrogen to crops, tree fallows can help farmers increase their incomes and food security. They may also help in the reduction of soil degradation and curb deforestation. Forage, shrubs, trees and grasses are very important for agriculture and livestock, particularly the trees have high foliage productivity, and high leaf protein content. The woody biomass from these shrubs and trees provide a very high potential charcoal production and thus can sustainably improve incomes of subsisting communities.

Use of Marginal and Fragile Lands: In the target district as is practice in many countries in the region producing charcoal, the traditional land utilization practice will involve establishing woodlots on non-arable land, since this does not lead to any reduction of land set aside for crops and pastures. In specific instances where non-arable land is unavailable, the growth of trees may be restricted to the borders of fields, water-bodies or roadsides. This can tremendously increase available wood for charcoal production in a community.

Promotion of Agroforestry and Agro-Silvo Practices: The other option that is sustainable with proper management is the selective cutting of trees in the agro-silvo production system or Farmer Managed Natural Regeneration that is being implemented in Katsina State under the EU-GIZ project. This means that certain trees that provide good quality fuelwood are selected and cut for fuelwood

production. Preference and suitability of trees used for fuelwood production may vary with size, availability and accessibility of the tree species. Lessons learned in the EU-GIZ project will be transferred to the project in Kaduna through study tour and site visits.

Establishment of Tree Plantations for Sustainable Fuelwood Production: Provision of incentives for woodlot establishment for fuelwood production and investment in the improved fuelwood or charcoal production technologies, is critical for a sustainable production of fuelwood in a liberalized economy and the project proposes the following to be pursued;

i Through participatory approach, identification of tree species by land owners to be planted that are suitable for fire wood production and training of land owners in planting of tree species appropriate for fuelwood. Tree species that are suitable for the dry Northern climate with good fire wood and timber properties and high value fruits are: Guava; Cashew (Anacardium Occidentale); Neem (Azadiracta Indica); Mahogany (Khaya Spp.); Mango (Magnifera Indica); Flame of the Forest (Delonix regia); Isoberlina doka and Vitelleria paradosa (Shea butter).

ii Investment in the training of fuelwood producers in modern and efficient fuelwood and value addition production technologies and processes (e.g. efficient retort charcoal kiln that reduce the rate of tree harvesting through increasing the amount of charcoal obtained by as much as threefold[14]).

iii Training producers in fuelwood handling and packaging, and group marketing.

iv In partnership with MFI (e.g. Fortis MFI), provide of credit to those who need it to cushion the effects of change of land use from food/crop production to tree planting for fuelwood, fruit and vegetable production.

Assumptions and Basis for Tree Planting Plans: The plans have been determined based on the following assumptions:

i. That there is available suitable land for farmer managed and community based woodlot establishment for selected tree species. According to the feedbacks from CBO partner (DARE) and Samaru College of Agriculture in Kaduna State, over 3,003 ha of private land are suitable and available for sustainable fuelwood production if supported. However this land has competing uses for agriculture production and commercial purposes. Yet tree plantations are a new farming ventures where the harvest takes time but could be profitable if the right approach and incentives are available;

ii. That the FMOE, Forestry Commission and Land and Survey Department in Kaduna State have set aside 6,000 ha of forest reserves for woodlot development: i) Libere Forest Reserve, Kaura LGA, Kaduna State; ii) Fatika Forest Reserve, Giwa LGA, Kaduna State. and iii) Kurmin Kogi Forest Reserve, Ikara LGA, Kaduna State. During PPG, it was agreed that 200 ha of forest reserve in Kurmin Kogi FR will be developed to demonstrate community-based woodlot in partnership with RUWES women.

iii. That the land owners will appreciate that there are more benefits for investing in woodlots for fuelwood production compared to some conventional land use practices.

iv. That government will come up with standards for the fuelwood value chain and put mechanisms in place to regulate and monitor fuelwood production and marketing; and

v. That the industry will provide market incentives for investment in efficient fuelwood production technologies like efficient kilns and retorts charcoal kilns as well as management, accounting and marketing best practices.

vi. Flexible financing mechanisms will be put in place for tree production for fuelwood and fruit production.

The proposed technical plans are premised on the PPG baseline study findings which showed that more than 1,300 tree growers can be included in the project by having their capacities developed for tree growing and approximately 3,003 hectares of land will be planted and well managed for sustainable fuelwood production.

[14] Improved charcoal production technologies give much higher yields of charcoal of excellent quality in addition to by-products of commercial value. This makes the practice very profitable and the actors will have the necessary motivation for investing in woodlots for charcoal production.

The Implementation Plan for Tree Production: Table D2 below gives the average cumulative acreage of the three indicative species to be promoted per household and the targeted households in the pilot communities. The species selected give good quality fire wood, are indigenous, termite and fire resistant and with good management fast growing. They are easy to establish and could easily be planted by direct sowing with good seed or through seedlings supplied by dedicated and certified nurseries. The species are ecologically friendly with the climatic environment of the target area. Using conservative figures, both Guava and Mango record 19.5 metric tons after the same period with the same subsequent annual growth rate. Given the limited land holdings in the target areas, if 1,300 land owners who can progressively commit on average up to 2.27 ha of their land by the fourth year, to plant the recommended tree species; a total acreage of 3,003 ha of tree plantation will be achieved in five years. The species sprout very well that will lead to sustainable production of the wood resource.

Table D2: Average Land Size Committed to Tree Production

Proposed average Acreage for the different Tree Species planted per household in hectares	Year 1	Year 2	Year 3	Year 4
Guava	0.57	0.57	0.91	1.25
Khaya Spp	0.45	0.45	0.57	0.61
Mango indica	0.23	0.45	0.45	0.45
Average Household Acreage	1.25	1.48	1.93	2.27
Total Area of Tree Species planted in the target Area in hectares	Year 1	Year 2	Year 3	Year 4
Guava	741	741	1,183	1,625
Khaya Spp	585	585	741	793
Mango indica	299	585	585	585
TOTAL AREA PLANTED IN HECTARES	1,625	1,911	2,509	3,003
Number of households	1,300			

The above plantation arrangements for the corresponding tree species in the target area has taken into account several factors including among others: the ecological suitability of the locations, human settlements, household land sizes, economics of land utilization, stage of forestry development in the community and the density of fuelwood vendors and more important the available land that can be converted from crop cultivation to tree planting.

The establishment of the above plantations shall involve investment and operation costs including land preparations, nursery set up, planting, costs of seeds, weeding and pruning within the initial years of the plantations establishment. Accordingly, the following cumulative wood tonnage (Table D3) is anticipated after 5 years given that the duration for establishment will be five years and harvesting will start after four years. The growth patterns are based on planted acreage per year with estimated tree coverage of 3,000 trees per hectare.

Table D3: Projected Wood Growths and Production in Metric Tonnes

Tree Specie	Average Growth Rate (t/yr)	Year 0	Year 1	Year 2	Year 3	Year 4	Cumulative Biomass Production
Guava	19.5	0	14,449.50	14,449.50	23,068.50	31,687.50	83,655.00
Khaya Spp	22.5	0	11,407.50	11,407.50	14,449.50	15,463.50	52,728.00
Mango	19.5	0	5,830.50	11,407.50	11,407.50	11,407.50	40,053.00

indica							
TOTAL BIOMASS PRODUCTION IN TONNES			31,687.50	37,264.50	48,925.50	58,558.50	176,436.00

GHG mitigation: The above wood stock has three benefits namely; public benefits (ecological impact and tax revenue) and private benefits (sales revenue of both wood and charcoal). The FAO's Ex-Ante Carbon balance model (EX-ACT)[15] has been used to calculate the GHG benefits from protecting 50,000 ha of forest and from establishing 3,003 ha of woodlots that would result in the annual sequestration of 259,937 tCO_2 and 8,423 tCO_2 respectively to give a total of 268,360 tCO_2 per year or 5,367,200 tCO_2 over a 20 year period. The results of the EX-ACT carbon balance analysis are summarized in Annex J.

C. Development of the Community Energy Enterprise (CEE) with Multi-Functional Platform (MFP)

With this intervention, SFM seeks to develop a community energy enterprise in Cross River, Delta and Kaduna with multifunctional platform value chain: to reduce post-harvest loss, improve product quality, reduce fuel consumption (and thus production costs), improve the health of those working on the processing and reduce environmental impact of these activities (Figure D2).

In addition to securing access to renewable fuelwood from protected forest and woodlot on an individual household basis for subsistence use, there is also a need to demonstrate the feasibility to add value and convert the collectively harvested fuelwood from protected forest and community woodlot into charcoal or to power and operate agro-processing multifunctional platform. The primary objective is to test a model for collective sustainable fuelwood production, whereby fuelwood producers for charcoal production or agro-processor groups or cooperatives will have access to, and management of, forest land in Cross River and Delta and woodlot in Kaduna.

The Community Energy Enterprises (CEE) with Multifunctional Platform (MFP) (Figure 2) will manage the forest and woodland to produce wood on a sustainable basis for improved, efficient and certified fuelwood production on a commercial basis. The models will be to demonstrate whether providing fuelwood or charcoal producing groups or agro-processing cooperatives with access to forests and woodlot, with obligations to manage and harvest trees on a sustainable basis can work and be profitable. Currently local authorities, chiefs, landholders and the Forestry Commission must approve production of fuelwood on lands they control, and receive some form of payment for harvesting wood and producing fuelwood on and from that land.

The pilots are intended to provide each stakeholder with a more transparent, commercial and partnership role to align the interests of all parties to ensure commercially viable production of certified fuelwood on a sustainable basis. Two pilot sustainable forestry Community Energy Enterprises with multi-functional platform (Figure D2) will be set up in Cross River and Delta and 1 woodlot energy enterprises in Kaduna State. They will be set up for a minimum of 20 years, to enable at least two, if not three full tree rotations and harvest. These enterprises will be set up as public-private partnerships between local district councils, local chiefs (on tribal land), well-organized and successful SFM and SLM Management Committee, local landholders (on the land that will be used for the pilots), and local business people. These enterprises will be set up as commercial joint ventures in which each participant group will have shares in the enterprise, with certain agreed rights and responsibilities (e.g., overall management, forest management and fuelwood production, technical assistance and training, etc.). Each partner will receive a share of the proceeds, as a shareholder and for any services they might provide (e.g., rent on the land, payment for accounting services, fees, taxes, etc.).

[15] http://www.fao.org/tc/exact/carbon-balance-tool-ex-act/en/

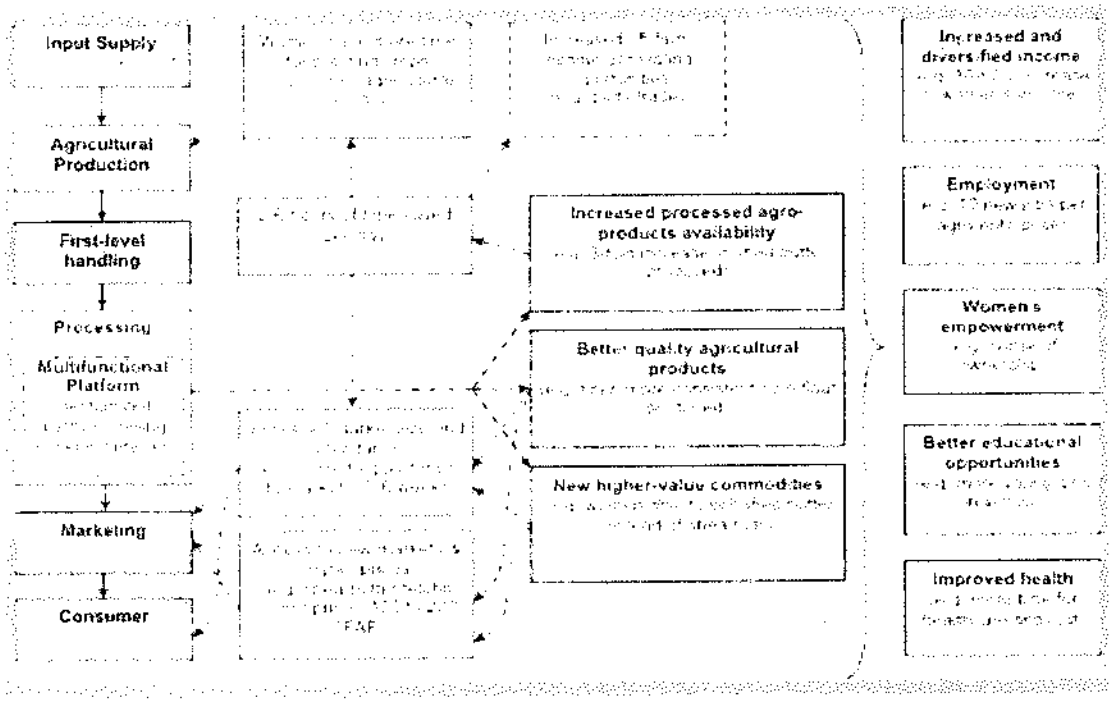


Figure D2: Multifunctional platform value chain development (UNDP, 2013).

Table D5: Characteristics of the Forest Carbon Projects in East Africa with data on SFM and SLM projects in Nigeria included.

Country	UGANDA	ETHIOPIA	KENYA	KENYA	NIGERIA	NIGERIA
Project	Trees for Global Benefits Project (TFGB)	Humbo Assisted Natural Regeneration Project (HANRP)	The International Small Group and Tree Planting Program (TIST)	East Aberdare/Mount Kenya Forest Rehabilitation Project (EAMK-FRP)	REDD+ in CRS and Delta	Kaduna Agroforestry woodlot
Predominant A/R method	Indigenous on-farm (some exotic)	Indigenous regeneration	Exotic on-farm (some indigenous)	Indigenous in Forest Reserves	Indigenous in Forest Reserves	Indigenous on-farm (some exotic)
Biodiversity/ Habitat	Small fragmented farm plots	Large contiguous plot	Small fragmented farm plots	9 medium-size plots	Large contiguous plot	Small fragmented farm plots
Total Area (ha)	2,750	2,728	14,000	720 (10 - 200 ha)	50,000	3,003
Farmers	2,100	5,100	53,000	1,500	5,000	1,300
Land Tenure	Customary, individual	Government/formal community usufruct	Formal, individual mostly titled	Government, community usufruct	Government, community usufruct	Formal, individual mostly titled
Carbon rights	Individual farmers	Cooperatives	CAAC	GBM	SFM MC	SLM MC and Individual farmers
Community institutions	CBOs	Cooperatives	Informal groups	CBOs/Community Forest Associations	CBOs/SFM Management Committee	CBOs/SLM Management Committee
Sponsor	USAID, UK	World Vision; World Bank	CAAC/(USAID non- carbon aspects)	World Bank	GEF funded	GEF funded

Box D1: Lessons from Forest Carbon Projects for the development of Community Funds and Incentives

The Forest Carbon Projects study[1] has identified several key success factors from the four East African pilots that are relevant for the design of the community funds and incentives for SFM and SLM solutions in Nigeria (Table C5). The key success factors identified are: **TFGB:** ECOTRUST as the proponent, carbon credit aggregator and market interface is a wholly Ugandan institution and therefore locally accountable to project participants and laws; Plan Vivo is well-suited to working with local organizations and smallholders because of its acceptance of project-specific standards and ex-ante payments; and Requires (when applicable) that both spouses sign the carbon agreements thereby enhancing household transparency and equity; **HANRP:** Potential for natural regeneration of indigenous vegetation in eastern Africa, which has significant cost and biodiversity benefits compared with tree planting; Well-organized farmers can play a leading role in forest rehabilitation and management on state land without intrusive supervision and regulation (something that many governments are skeptical of); and Agreement to prioritize use of carbon revenues for community well-being rather than individual payments (and spreading some direct benefits to non-members, too);**TIST:** Effective mobilization and motivation of large numbers of farmers in a short time (achieving a scale 10 to 25 times that of the other projects) and indicating that a long prior engagement with communities is not always essential; Largely "paper-free" project management through uploading monitoring information directly from the field, and operating this system with locally trained farmer-participant staff; and A donor-private sector model where the former finances "non-carbon" social and biodiversity benefits and a private company finances forest carbon (and other compliance) aspects; **EAMK-FRP:** As with TFGB, GBM is an **indigenous organization** that is building capacity for forest carbon management in Kenya and is currently experimenting with other carbon standards; **High-quality vegetation/carbon baseline** that yields scientific research quality ecological and forest stand data and an appropriate design for biodiversity conservation among the tree-planting projects; and **Commitment to A/R in Forest Reserves**, and consequent **engagement with government** and the need to address **co-management, responsibilities, cost and benefit-sharing issues.**

Measurement, reporting and verification: Challenges include: **Conservative carbon sequestration estimates** favor buyers over farmer-producers, especially with low-incentive carbon prices. As more applicable and accurate data become available, farmers will obtain fairer payments for their environmental services; Compliance methods require technical expertise, consistency and quality control for monitoring, and proponents use technically trained staff to make routine tree measurements. Three of the projects use headquarters staff for this purpose, but TIST has trained local farmers as quantifiers in its purpose-built process; and Although HANRP and TIST are verified by CCBA at Gold level, both projects have limited biodiversity and community impact monitoring in place. Long lead time is another factor. Projects typically took at least five years to validation, though Plan Vivo's ex-ante payments allow revenues to flow earlier in the process. Project proponents who considered or used CDM compliance now favor and use VCS or Plan Vivo in new projects.

Financial aspects: Several financial challenges distinguish forest carbon projects from other development projects addressing land use: Investment costs including compliance are high (often upward of $1 million for CDM and VCS) and typically require international consultant expertise from few approved carbon (or CCBA) auditing firms. Compliance costs continue throughout the project; Some standards are more rigorous and therefore expected to accrue higher carbon prices; Operating costs are kept relatively low, as all projects lean heavily on volunteer labor and the promise of future gain from carbon revenue, timber and other co-benefits; **At current carbon prices, carbon revenues seem insufficient incentive for tree-planting. Co-benefits alone seem to provide sufficient rewards to compensate costs for many, but carbon revenue is a behavioral incentive to each tree-grower;** and Understanding details of carbon contracts signed by farmers/groups is typically low despite concerted awareness efforts by project proponents.

Afforestation/reforestation and biodiversity conservation: The relationship between biodiversity conservation and tree planting or regeneration is not straightforward. Several factors significantly affect how the study projects are likely to impact biodiversity: On-farm planting of exotic trees is unlikely to have more than marginal value in enhancing biodiversity; Most farmers prefer certain exotic species because of rapid growth for timber or carbon credits. TFGB insists on indigenous species primarily with a few less harmful exotics. TIST encourages indigenous species, but leaves the choice to farmers who tend to prefer exotics; Where feasible, **natural regeneration** is the most effective A/R method on larger contiguous areas that also enhances biodiversity and restores ecosystem functions; The extent to which small plots of trees on scattered farms enhances biodiversity through forming corridors or "stepping stones" is unclear and depends on many factors. There are few data relating density and dispersion of such plots to enhanced conservation for a range of species; and Many farmers see little benefit in biodiversity per se, and see disadvantages resulting from human and wildlife conflict.

Community engagement: All projects have effectively engaged thousands of farmers to either plant trees on their own land or to plant/regenerate forest on public or communal land. Institutional arrangements at community level vary, but all projects recognize that intense engagement is essential to develop sufficient understanding of the esoteric nature of climate change related to growing trees and forest carbon markets. Three of the projects feel that their long prior engagement with the same communities on other activities was crucial in building trust, though TIST is able to recruit large numbers of farmers in areas where they have not operated previously. Challenges and conclusions regarding community engagement include: **Managing expectations is critical** regarding carbon revenues and attribution of some carbon benefits (improved rainfall in particular) directly to trees grown; Most farmers planting on private land have not **engaged their children** in assuring continued responsibility for trees inherited for these contracts spanning decades; and All projects encourage gender equity. Except for HANRP, where female participation is increasing but low, there is close to 50 percent women in membership and leadership roles.

Scaling up and sustainability: TFGB and TIST continue to expand within their current areas and in new areas. World Vision and GBM have initiated new carbon projects in other areas, though not as part of HANRP or EAMK-FRP. Moving from a few thousand hectares (ha) to tens or hundreds of thousands as a project starting point is not straightforward. Some costs will benefit from economies of scale, such as design and compliance auditing (assuming project areas are somewhat uniform). For community projects, economies of scale are less likely because of the extensive and intensive engagement needed, and optimum size of community groups from administrative, logistical and social perspectives. The new and complex nature of forest carbon projects requires intense and continued building of awareness, technical capacity and social capital. **Sustainability of A/R related to carbon credits is uncertain** beyond the initial crediting period, especially for on-farm projects. **Timber is more valuable than carbon at current prices**, so much will depend on whether farmers replant a decade or more from now. The balance of monetary and non-monetary incentives influencing farmers' land-use decisions at that time is unknowable. Forest regeneration on communal and public lands seems likely to remain intact provided the **regulatory regimes remain in place and are respected and enforced**, and especially if local inhabitants recognize the value of environmental and economic co-benefits accrued and incentivized as value chain actors.

Relevance for National REDD+: In each country the study projects are well known to, and recognized as important by, the REDD focal points. These pioneer projects provide diverse lessons for A/R, many of which are also applicable to avoided deforestation. Among potential areas of interest described in this report are: Baseline and monitoring requirements (forest, environmental, social); Leakage and permanence issues; Benefit-sharing arrangements; Risk mitigation; Stakeholder engagement; Natural regeneration versus planting for A/R; Smallholder contribution to carbon sequestration; Community management of forest carbon and capacity for MRV; and Awareness, extension and co-benefit facilitation.

Cookstove within REDD: The international mechanisms known as REDD+ offers a new source of finance for cleaner cookstoves and improved woodfuel supply. Under existing REDD+ programs a significant amount of effort is already underway to support sustainable woodfuel supply chains: over half of the countries engaged in the Forest Carbon Partnership Facility Readiness Fund have identified cookstoves, sustainable woodlots, or fuel switching technologies as a primary intervention in their national REDD+ strategies; four of the eight pilot countries under the Forest Investment Program specifically integrate reduced woodfuel use in their proposed investment plans; and six of the eleven countries accepted into the FCPF Carbon Fund pipeline refer to improved woodfuel use in their program design documents.

While cookstoves and sustainable woodlots are being considered within national REDD+ programs, the finance being channeled towards these investments is still far below the scale required. We recommend three areas that could be addressed to improve linkages between REDD+ and cookstoves. Firstly, greater alignment and coordination is needed between cookstove and REDD+ agendas. To date the majority of REDD+ programs addressing woodfuel use are not being implemented in high priority countries. Coordination would help both to align cookstove and REDD+ priorities and to improve communication and knowledge sharing between sectors. Secondly, alignment is needed in accounting methodologies between REDD+ and woodfuel consumption; these methodologies have progressed along separate paths, making it difficult to align REDD+ financing with emissions reductions from cookstove projects. And finally, we recommend an analysis of impacts of current cookstove programs on REDD+ and the development of improved monitoring systems for the clean cooking sector.

Box D2: Land Administration in Kaduna State: The Kaduna State Ministry of Lands, Survey and Country Planning (MLSCP) have overall responsibility for land tenure, land administration and development planning and control, through its departments of Land Administration and Town and Country Planning. The following is a summary of procedures observed in the preparation of layout plans: A layout can be initiated either by the Ministry of Lands and Survey or Kaduna State Urban Planning and Development Agency (KASUPDA); KASUPDA, on the receipt of a draft plan, proceeds to make comments on the plan as it considers desirable; The final plan is then prepared by KASUPDA with a brief to the Honourable Commissioner recommending the approval of such plan; The layouts and briefs are presented to the Land Use and Allocation Committee. After deliberations the committee may recommend for amendments that are considered necessary or where it is satisfied with the proposals, recommends it for approval by the Executive Governor and after approval, the Land Use and Allocation Committee is duly informed by the Ministry's agencies. The Survey Department is also informed and copies are forwarded to them for action. The process of titling in Kaduna State is very cumbersome resulting into long processing time of sometimes ? years despite the self-timed frame of between 30 – 90 days. The cost of processing is also quite high. Challenges include: Inability to adopt and adapt the Nigerian Urban and Regional Planning Law of1992; Non-Existence of Regional and Master Plans for Major Centres; Non-Computerization of Town Planning Activities/Services; Lack of updated base maps and cumbersome nature of existing development approval process and number and quality of both technical and administrative staff. It is recommended that a simplification of land titling procedures that will reduce time and cost to encourage applicants should be applied.

2. Stage 5 - Implementation Mechanism – Developing Inclusive Certified Cook stove/kiln Business

The improved cook stoves for domestic sector is slightly more developed and has a more organized market than for the institutional and industrial sector. But given the huge Nigerian market, there is great opportunity for scaling up in all three sectors through the creation of demand for these aspirational appliances to reduce supply risk through commercially sustainable models. This will include peer to peer and participatory training to upgrade technical and business skills, institutional capacity development, knowledge and advocacy and where applicable, financial support to promote the public-private partnership. The models will be continually improved during the Project implementation. Based on discussions with potential private sector participants initially identified, the models that could work for promoting market mechanisms are graphically shown in Figures D3 for

industrial and domestic stoves using matching rebate scheme. The major elements of these models are described in the sections that follow.

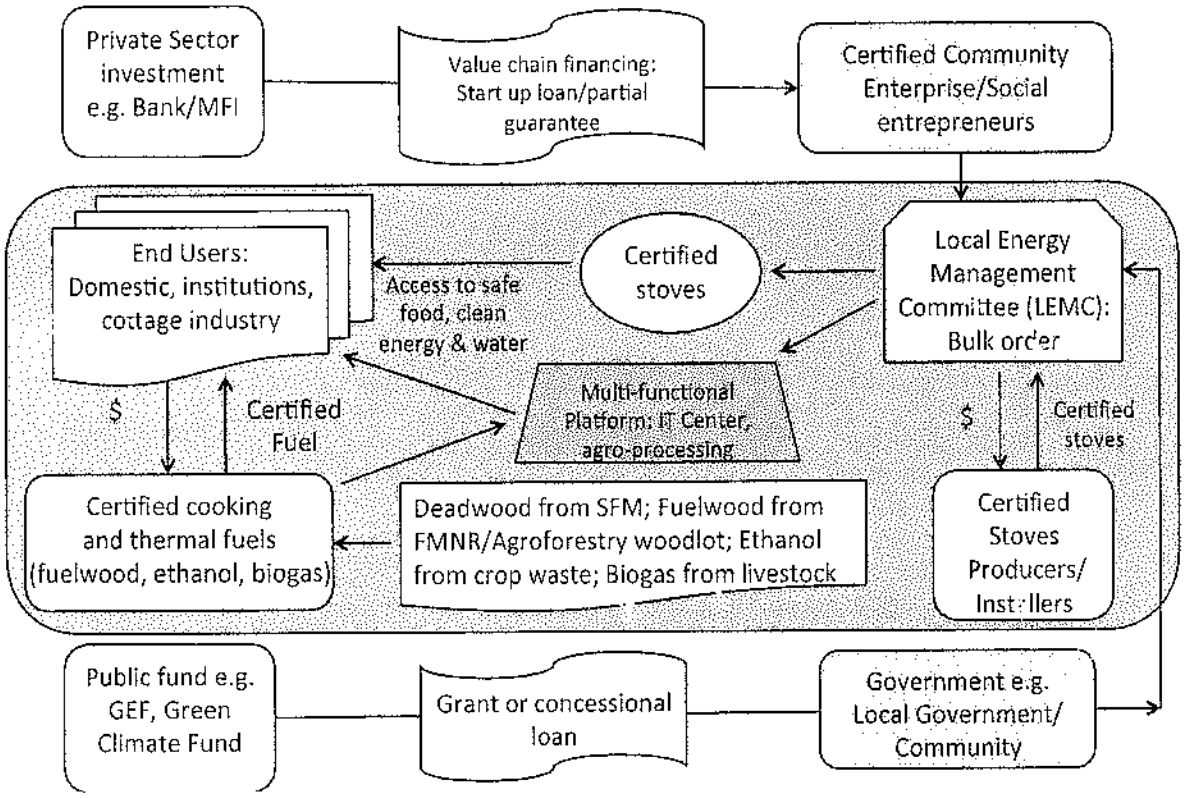


Figure D3: Market based approach and value chain financing for the scaling up of stoves and kilns

A. Targets and prioritization

The target of disseminating 20,000 domestic stoves/kilns within the period of the project implementation will be achieved in five phases in Cross River, Delta and Kaduna State (Table D6). The first phase, will start at the later part of Year 1 and will prioritize communities that have strong presence of Community-based (CBO) and Faith-based Organizations (FBO) that have indicated strong interest to participate in the Project. This will increase the likelihood of success by building on the strong presence and networks of existing institutions that have on-going relationships with the villagers in the areas. Phases 2, 3, 4 and 5 will be initiated by replicating the experience and success gained in Phase 1. In all 66 stove/kiln producers will be trained, equipped and certified to cover for the household, institutional and industrial sectors in all three states with access to finance (Table D6).

Table D6: Scaling up programme of efficient stoves and kilns in Cross River, Delta and Kaduna State

State	Number of Households	Year 1	Year 2	Year 3	Year 4	Year 5	Total	No. of Certified Stove/Kiln Producers
i. Domestic cookstove								
Cross River State	641,992	200	750	1,350	2,000	2,530	6,830	10
Delta State	1,280,747	133	700	1,305	1,999	2,400	6,537	10
Kaduna State	994,518	100	533	1,000	2,000	3,000	6,633	10
Total		433	1,983	3,655	5,999	7,930	20,000	30

B. Efficient Biomass Stove Models and Production in Nigeria

Overall, the stove/kiln sector in Nigeria is still undeveloped, with only a handful of stove producers currently operating on a market basis and producing stoves for sale:

- Jiko stove by Toyola Energy, Lagos State
- Eco-Stove by Asaba, Delta State
- Ekwuk stove at Mysemem, Calabar, Cross River State
- Save80 stove assembled by DARE, Kaduna State and distributed under the NCCS
- Envirofit stoves assembled by Tower and distributed by ICEED in Lagos State

During PPG, a brief technical assessment into cooking stoves and manufacturers in Nigeria has been conducted as well as using information from the stock taking workshop conducted by ICEED in 2013 (See Annex F). The purpose of the stove assessment and ICEED report was to provide a brief survey of existing stoves and the capacity of current stove producers in target areas, and to assess the viability of local stove manufacture in Nigeria. However, a more detail technology assessment and market segmentation study will be carried out during project implementation (Output 2.1) with the objectives to: (i) assess the quality and suitability of current fuel-efficient stove designs; (ii) assess the production capacity of existing stove producers and constraints to improve/expand production especially for the BOP market; (iii) assess the viability of local stove production in target areas where there are no existing stove producers; (iv) undertake an initial assessment of the viability of biomass collection and availability of input materials (e.g. clay, metal); (v) provide recommendations for stove design and stove production/importing approaches and production/manufacturing zones.

Quintas Renewable Energy Solutions: Quintas has been producing updraft, down draft and cross draft gasifier stoves in Akure in Southwest Nigeria using local materials. According to the Director, Dr. Omotayo, its stoves have been able to achieve between 60 – 70% energy efficiency with minimal smoke. But there is a need to validate these claims according to international protocol. Challenges faced by the company is in convincing people to adopt the technology as there is a need to reduce the cost of the gasifier stoves in order to compete with kerosene stoves. The company is also working on gasifier to generate electricity for agro processing.

Save 80 Woodstove: Save 80 woodstove is the first second-generation woodstove to make a mark in Nigeria. The stove saves 80% of wood in comparison to three-stone stoves. It comes with a Wonder Box which is a heat retention box. The pre-boiled pot from the Save 80 stove can be transferred into this box for continued cooking thus further reducing wood use. The stove is disseminated by development Association for Renewable Energy (DARE) an organization based in Kaduna. The stove was designed and perfected by African students in Germany and the Director of DARE, Yahaya Ahmed was among them. Overtime, So far it has been able to disseminate about 16,000 stoves mostly in the northern parts of Nigeria and has registered it as a Clean Development Mechanism (CDM) project, the first efficient biomass stove CDM project. The earnings from CDM is what it uses to subsidize the cost of the stove. DARE has been trying to find local substitutes for the Save 80 parts but none of the materials found has the thermal qualities required. The organization imports the stove materials and fabricate in its facility in Kaduna. On ways of disseminating the stoves, DARE carries out public awareness campaigns through cooking demonstrations, community meetings, etc. It currently employs 139 youths who have been trained and are involved in stove fabrication and sales.

Toyola Stoves: Toyola started in 2006 in Ghana as a social entrepreneurial business with a mission of providing clean cookstoves to low income households in a financially sustainable and scalable way. Its main product is efficient charcoal stoves. The company has since expanded its operations in Togo, Benin and Nigeria and sells over 100,000 stoves annually in these four countries. The Nigerian facility was opened a year ago. Its stove is 100% locally produced using ceramics and scrap metal. To ensure affordability, the company offers credits to its customers and retailers. It has trained over 200 local artisans and engaged over 300 community level micro-entrepreneurs. In addition to this, the company engages in direct sales Access to finance was a major challenge when it started so it applied and got support from a number of international organizations including UNEP and E+Carbon. The company has reported a number of gains and impacts including: i) over 250,000 stoves sold and over 300,000 tonnes of CO2e saved; and ii) an average of $99.84 savings per stove per annum for families. Toyola has garnered a number of awards including Africa Energy Award in 2010 and Ashden International Gold Award in 2011. According to the company director, Suraj Wahab, it plans to expand its business to other African countries in the near future in addition to the manufacture of briquettes and high yield charcoal. Its overall goal is to disseminate additional 3 million stoves by 2020.

Fast Fire Stove: This stove is being marketed in Nigeria by SOSAI Renewable Energy Company. The stoves are imported as knocked down parts and assembled in their facility in Kaduna. However, according to its Director, Habiba Ali, the company plans to start local production of the stoves in the near future. The company disseminates its stoves in partnership with C-Quest Capital and Ecozoom and was recently registered as a CDM project. The project plans to disseminate 2 million stoves in the next 5 years with the pilot which is ongoing in Kaduna. The pilot plans to disseminate 40,000 stoves. The company's market strategies include visits to communities, cooking demonstrations and creation of supply chain through distributors. The company has come to understand that consumers want stoves that is clean and safe, saves time, energy efficient, modern design, and most importantly reliable and cost effective. The company has an ongoing partnership with Solar Sisters to distribute stoves in Nigeria through the establishment of a supply chain from top to bottom. The company believes the market for efficient biomass stoves in Nigeria is very large and government support is needed to reach this market.

Mfamiyang Conservation Society (MCS): This NGO was founded by Linus Ita in Cross River State. It engages in the production and distribution of efficient clay woodstoves. Though it has not perfected its stove design, current stoves according to Linus post significant percentage reduction in firewood use when compared to three-stone stoves. The organization also engages in efficient charcoal stoves production and distribution. Its charcoal stove also doubles as dryers for grains and fish. The organization is currently working in 10 wards in one of the local government areas and has local stove champions in each of the wards. These champions train entrepreneurs, ensure stove quality and monitor data generated. The organization hopes to expand its area of operation in the near future. However, funding is one of its major constraints.

Jigawa State Alternative Energy: This is a state owned organization that was set up to help find alternatives to conventional energy sources. This was as a result of the environmental challenges being faced by the state especially deforestation and desert encroachment. The Agency produces and distributes stoves at no cost to consumers. So far about 70,000 stoves have been produced and disseminated. The Director of the Agency, Hassan H. Hassan disclosed that its stoves are constructed using the same principles as the vacuum flask. Though not good in terms of sustainability, the Director said the idea behind free distribution of stoves is the significantly reduce the rate of deforestation and desertification. The Agency spends about N30 million on this scheme annually and is currently exploring options for making it a sustainable business venture.

Envirofit Stoves: Envirofit International started operations in 2003 with the aim of developing clean technology solutions to improve the human condition on a global scale, with a primary emphasis on applications in the developing world. Overtime, the company has produced a number of efficient wood and charcoal stoves that have posted impressive results in terms of emissions reduction and wood use, according to the CEO Ron Bills. The company works with leading research institutions on materials science to develop its stove parts especially stove combustion chambers. To expand its operations in Nigeria, the company has entered into partnership with Tower Aluminium (cooking wares producers) to distribute its stoves in the country. It is also planning to set up a manufacturing facility in Lagos to serve the West African market. The CEO revealed that if 100,000 stoves are disseminated, it can change 500,000 lives, protect 156,000,000 trees, save families $334,400,000, create 400,000 jobs and eliminate 1,287,000 tons of carbon emissions.

Wonderbag: Though not an efficient biomass stove, Wonderbag is a heat retention bag that aids cooking. Its principle of operation is quite simple: bring the food to boil and transfer into the bag to continue the cooking. This method saves cooking fuel and drastically reduces emissions. According to Tobi Adewoye, the company plans to distribute 5 million bags. It has entered into a partnership with Unilever. The bag saves about $350 annually if a household spends about N100 daily on cooking fuel so amortization is in about three to four months and with the bag lasting up to 5 years, the gains are quite significant.

Lessons learned in the efficient and effective dissemination of efficient biomass stoves are: The need for attitudinal and behavioural change for all value chain actors through awareness that the continual use of traditional stove/kiln has high economic, social, health and environmental cost (demand outstripping supply by 3 to 4 times in hotspot areas); Availability of competitive, user friendly, durable and reliable stoves that meet the needs of the end users; Access to competitive value chain

financing al products and services; Government and NGOs support in raising awareness on the benefits of clean stoves/kilns; Using CBOs and Women and Youth groups to create demand to reduce supply risks through efficient and formalized supply chain; Need for stove producers and marketers to register their products with the Standards Organization of Nigeria to ensure national standardization and quality assurance; Need for localized production and demonstrations; Need for technical and business skills development among value chain actors to improve stove/kiln design, productivity and disruptive innovation to lower stove/kiln prices; and Need the buy in from all public, private and CSO stakeholders.

Implications for BOP market: This project will investigate the opportunities for wider marketing and dissemination of built it yourself solutions, such as the Ekwuk clay stove in Cross River and Eco-Stove in Delta, which is the only available and affordable alternative. Operating cost of Ekwuk stove is at least 3 times less than the traditional one and therefore its use is fully sustainable from financial view point. It also does not cost more than traditional one to build. The key is to overcome the initial inertia and skepticism of local communities towards new technologies.

The project will conduct market and technical study to identify other suitable commercial alternatives from those already available on Nigerian market (but not yet in CRS) and will work with their manufacturers to help set up local assembly lines, distribution network, maintenance and after sale care and services (Output 2.1). At business planning stage, the impact of this measures on unit costs will be investigated with a view of designing such scheme that can ensure substantial reduction in unit price and operating costs (i.e. the target is to achieve unit price of at least 10$ per unit as opposed to current 30$ per unit, while have operating costs reduced by at least 5 times to lower fuel demand)

C. Assessment of in-country production potential for cookstoves

The preliminary assessment included many meetings with local manufacturers including artisanal clay stove producers, metal workshops and cement casting factories. Overall, the manufacturing capacity for stoves in Nigeria is huge. The "Jiko" stove adopted from Kenya by Toyola Energy has great potential for upscaling as they are light and robust for easy transport but the method of manufacturing needs to be refined and made more efficient. Further analysis and prototype development will be carried out during project implementation and the production potential for these stoves is considered high.

Considering the designs of the different stoves (i.e., cooking, institutional and industrial stoves), to be introduced and promoted in this Project, different types of fabricators/technicians are required. The cook stoves and institutional stoves will use mainly mud/clay as material with some metal components for cook stoves and minimal quantity of steel bars for cook stoves. The construction and installation of these stoves require skills normally possessed by an ordinary technician/mason. The cookstove technology landscape survey has done some preliminary identification of these skills in village levels in Nigeria. During the implementation of the Project, individual technicians will be identified in the targeted villages. The Project will conduct capacity building activities to train the technicians on the construction and installation of the stoves. Those who pass the training and agree to the modalities of the promotion and dissemination of these stoves will be accredited by the Project and will be registered as part of the pool of technicians in their respective villages. These certified producers will have access to start up loan as working capital for purchase of supplies as well as marketing and sale support (Figure D4).

The design of the cookstove to be promoted in the Project consists largely of metal parts to be procured and fabricated locally into a cooking stove. Some informal training are already taking place. Some of the fabricators who were interviewed indicated their willingness to fabricate the stoves using the improved design During the Project implementation, detailed negotiations on the modalities for the bulk production and dissemination of the heating stoves will be agreed with the interested fabricators/entrepreneurs.

D. Role of community- (CBO) and faith-based o ganizations (FBO) and women in reducing demand and supply risks through a robust marketing and sale strategy

One major challenge in the promotion and dissemination of the energy efficient stoves/kilns as inclusive business is how to create a demand for the adoption of aspirational stoves/kilns by the

potential end users to replace the existing traditional stoves currently being used in their households, institutions and cottage industry. There is a need to understand what are the potential cultural barriers (e.g. traditional use of smoke in rural life) that could hinder their uptake, but rural populations have indicated willingness to switchover from their traditional to more modern stoves if the modern stoves meet certain criteria. Market drivers that were mentioned were savings in fuel wood and improved health.

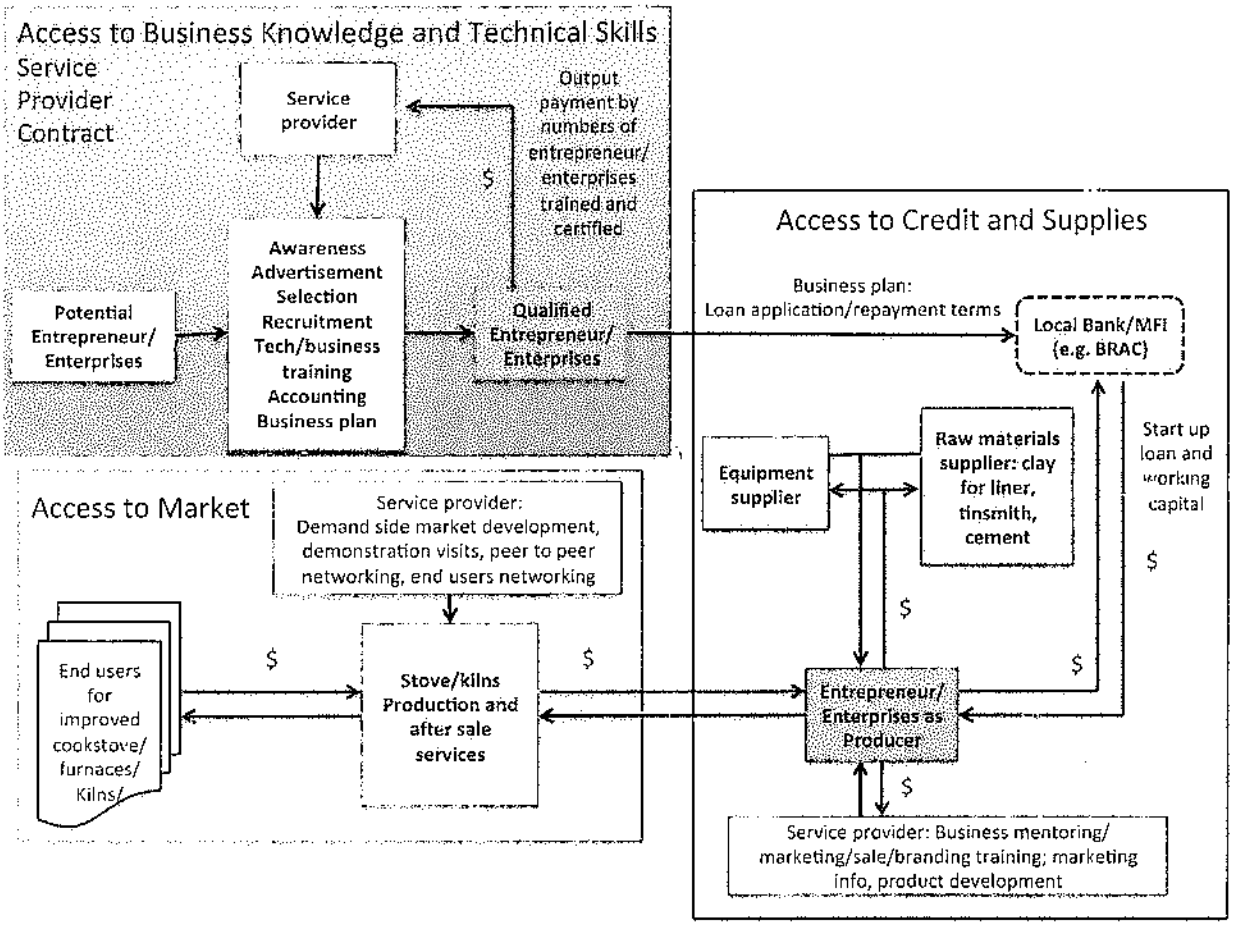


Figure D4: Business model for the up-scaling of improved cookstove in Nigeria

However, it is envisaged that in order to convince end users to replace their old stoves with the new design, a comprehensive marketing and sale strategy will be developed to raise awareness on the economic, health, social and environmental benefits of these stoves through:

1) High visibility mass media messaging: i) Point of sale marketing (branded pushcarts and displays in shops); ii) TV drama (Nollywood) and radio adverts; iii) Posters / Billboards.

2) Person-to-person / word-of-mouth messaging: i) Door-to-door sales using branded pushcarts; ii) Awareness-raising and education outreach by government and civil society (Women and Mothers Union); iii) Roadshow and Demonstration events (rural and urban)

The high visibility mass messaging is crucial for raising the profile of cookstoves, and making them highly recognizable around the country. The more personal messaging (person-to-person) is crucial for generating awareness and triggering purchasing decisions.

A system should also be set up for end users to have a standard mechanism to place orders, make payments, a system of registering complaints and making contribution in upgrading and improving the design of the stove or requirement for after-sales service, while being assured that the stove are constructed, certified and labeled to international standard (Figure D5).

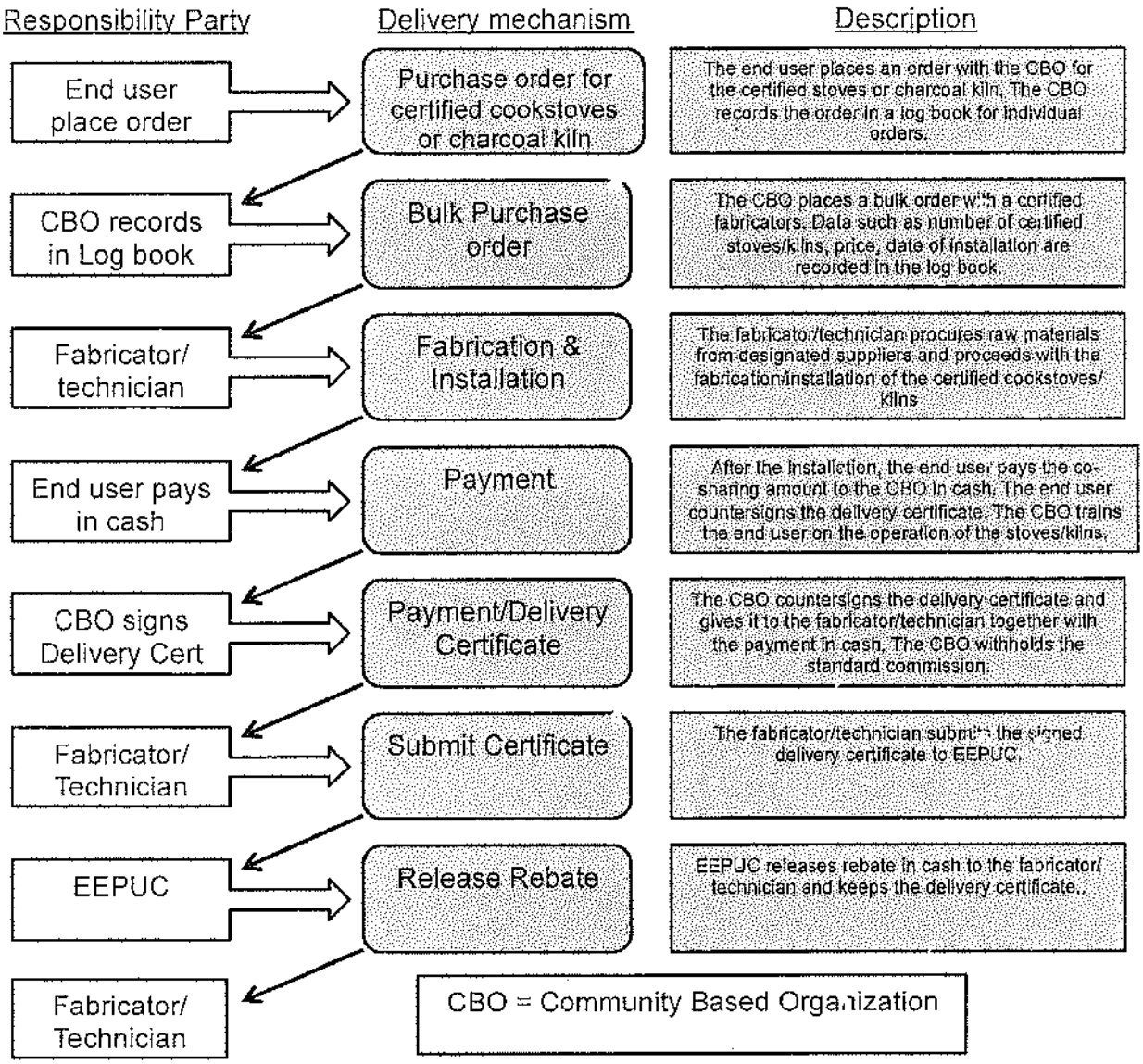


Figure D5: Matching Rebate Delivery Scheme for Certified Institutional Stoves/Kilns

For these aspects, the Project will work with community- and faith-based organizations and grassroots and women institutions that are already actively present and have complimentary climate mitigation and adaptation activities in the rural areas (Table D7). Likewise the Centre of Excellence will be set up to champion the good causes of clean technology. In this document, CBOs and FBOs refer to both the registered and non-registered non-profit organizations. During the project preparation stage, CBOs / FBOs already existing such as youth groups and women's groups have been identified to fit into this category and have given indications that they would be willing and interested to provide this role within the Project.

Special focus will be placed to ensure that women and youth are empowered to participate in the project design and implementation; create energy policy and strategy that are gender sensitive, provide peer to peer technical and business training for women, access to market and business opportunity.

Working as the local coordinator in the village level, the CBOs / FBOs will perform the following roles (Figure D5):

- Conduct awareness campaign among the villagers on the benefits and importance of the promoted stoves that have been certified by testing center

- Market the promoted stoves for maximum uptake from the village
- Conduct training of household members on proper operation and use of the stoves
- Receive individual orders of stoves from households
- Place bulk order of certified stoves with the fabricator for thermal heating stoves or the technician(s) for the cookstoves
- Only certified institutional stoves/kilns with label could be produced by certified installer are eligible for matching rebate scheme (Figure D5)

Table D7: Overall institutional & stakeholder mapping for SFM/REDD+ programs in Nigeria

Institutions & stakeholders	Primary function	Roles in SFM and REDD+
Federal Ministry of Environment	Conservation and Management of Nigeria's Environmental resources in sustainable manner	Lead agency for Nigeria's climate Change Policy and implementation, including REDD+
-- Department of Climate Change (formerly Special Climate Change Unit)	Designated National Authority for Climate Programme in Nigeria	Provide legal, financial & institutional platforms for mainstreaming REDD+ into overall National Climate Change Policy
-- National Advisory Council REDD+ -- Federal Department of Forestry	Lead Agency for planning policy and regulations for the Conservation, protection and sustainable management of Nigeria's forest Resources	Provide policies guidelines for sustainable forest mgt. (SFM) in Nigeria's including REDD+ / Houses the national REDD+ Secretariat
National Planning Commission	Responsible for overall National Development Policies in Nigeria	Integrate REDD+ into national development programmes, including Budget processes
Fed. Ministry of Agric. & Rural Dev.	Agriculture and rural dev policy formulation and projects implementation	Integration of REDD+ into National Agriculture and Rural Development policies and programmes (Agriculture is a major deforestation driver in Nigeria)
Nigeria Air Space Research and Development Agency (NASRDA)	Provision of maps and data on Nigeria's Natural Resources and land use and monitor change therein	Provision of vegetation and land use change maps & data (for the purposes of MRV, Carbon / Biodiversity mapping)
Federal Ministry of Women Affairs	Mainstreaming gender equality and women affairs into national and international development.	Ensuring active participation of women in REDD+ programmes and promotion of equitable distribution of REDD+ benefits to women who have particular linkages with the forest.
Research Institutes (Samaru Agriculture College, ABU, FRIN etc)	Teaching and research in National resources in sustainable Forest Dev. in Nigeria	Studies and research on social, economic and technical aspects of REDD+
NGO /CSO/CBO/FBO stakeholders	Advocacy, studies, awareness creation and capacity building in partnership with institutions and programmes on Climate Change and sustainable environment management in Nigeria	Studies, awareness creation, capacity building and liaison between REDD+ implementing agencies and other stakeholders
A national REDD+ forum	To serve as platform for cross fertilization of ideas on planning and implementation of REDD+	Facilitate regular update and exchange of feedbacks between REDD+ implementing Agencies and Stakeholders
Media	Dissemination of information on CC & other matters to the general public	Dissemination of information on the potentials and benefits of REDD+ on the forest communities, stakeholders &

		general public.
Forest related Private Sector	Management of private forests; timber production; agro-forestry based ecosystem restoration.	Investment and Best practices for forest conservation and enhancement of Carbon stocks; Carbon projects.
Federal Ministry of Energy	Policies & regulations on energy, incl. renewable energy	Enhancement of access to alternative & clean energy for forest communities to reduce pressure on fuel wood
Federal Ministry of Finance	Financial policies and regulations, including international financial Mechanisms	Advise on carbon finance and REDD+ financial mechanism
National Park Service	Protection, management and biodiversity conservation in National Parks/Protected Areas	Joint implementation of REDD+ project activities, including biodiversity co - benefits and other ecosystem services.
UN Donor Agencies (e.g. UNDP,FAO, UNEP)	Technical & financial assistance/collaboration on national and international development programmes, including CC	Fund project and provide technical assistance. Already involved in REDD+ planning & implementation in Nigeria.
Private sector – Value chain actors (ICEED, CREDC< DARE, SME Fund, Quintanas)	Provide business development services	Produce, distribute, retail and market clean stove/kilns
Local Bank and MFI (e.g. EcoBank, BOI. Fortis MFI)	Provide financial products and services	Offer competitive and affordable value chain financing with competitive interest rate and repayment scheme

The above roles and responsibilities, which cannot be effectively performed by the SFM Project Team in Abuja, are pivotal for the successful promotion and dissemination of the stoves. Hence, for the duration of the Project, the full operating costs of the CBOs / FBOs to perform the abovementioned activities will be borne by the Project. However, it is envisaged that at the end of the Project, CBOs / FBOs will cover their operational costs by charging a standard minimal fee as a percentage of the price of the stoves/kilns. This transition to market mechanism where the CBOs / FBOs are rewarded as a function of the volume of the sales of the product (as an output based approach) will continue to provide incentives for them to aim for success. The fee to CBOs / FBOs will be embedded into the overall price of the stove/kiln. Although this could slightly increase the cost of the stove, the participation of the CBOs will:

- help to create local demand so that supply, producer and delivery risks could be minimized to generate market confidence
- reduce inefficiencies in the transaction between the end user and the fabricator/technician
- free up some time of the fabricator/technician for the production of more stoves instead of doing the marketing of their product and training the end users
- put the task of the awareness campaign and marketing to an entity that has a local presence and has the motivation to deliver the required volume of stoves (e.g. Women group)
- transform the stoves into a aspirational goods that has a standard quality, label, price and services

Such benefits could translate into savings of time and money for those involved in the installation and dissemination of the stoves that would be of more value than the additional fee to the CBO / FBOs.

Social Business Development

The FGN under the NCCS and RUWES and UNDP Nigeria are collaborating to explore innovative ways to mobilize the private sector to contribute proactively to development – this will be done by setting up social businesses and through partnership agreements, providing them with much needed business development services (Figure D3). Social business networks of relevant stakeholders will also be setup for horizontal/vertical linkages and mutual support. The objective of this project is to promote high impact social enterprises that will contribute to private sector development as well as attainment of MDGs. As a result of this Project, social enterprises will contribute to the reduction of poverty in rural areas and generate rural employment and income. Investing in products and services,

through both microenterprises and cooperatives that meet the needs of local communities will build local market demand, which will, in turn, drive local production, and with the multiplier effect will impact not only income levels but also the overall well-being of communities.

Business Mentoring and incubation

This GEF funded project will partner with NACC and RUWES under Federal Ministry of Environment to improve the business knowledge and technical skills of budding social entrepreneurs. The Project will compile training modules like Costing, Record Keeping, Stock Control, Buying and Financial Planning and Marketing adapted to the needs of alternative energy businesses. For example, in partnership with Toyola Energy or ICEED, DARE, CREDC, Solar Sisters, businesses will be identified for upgrading and expansion of these identified businesses to become rural and peri-urban distribution networks that will supply alternative energy technology and provide regular servicing and maintenance of the products. While Toyola Energy, CREDC and ICEED focuses on the technical aspect of the products, the RUWES's Business Development Services could focus on business management and customer service. It is expected that these businesses will demonstrate the profitability of offering such technology in rural and peri-urban markets, and encourage City-based suppliers to replicate this model and extend their sales network to other energy poor areas.

E. End User Financial Schemes: Matching Rebate Scheme for the Purchase of Domestic Stoves for BOP

The current prices that the households are paying for their traditional stoves/kilns are shown in Table D8 below. In comparison, the estimated prices of improved stoves are substantially higher. This is so because the improved stoves/kilns promoted in this Project will require improved quality and better materials. It must also be noted that because of the above features of the improved cookstoves promoted in this Project, the costs of manufacturing them are higher than the prices of traditional cookstoves. Hence, the Baseline Survey and investigations conducted during the PPG stage revealed that it is necessary to provide some form of rebate for the BOP end users to cover for the incremental cost of purchasing the new cookstove.

Table D8: Indicative cost of stoves/kilns and rationale for their funding schemes	Domestic cookstove
Current cost of traditional stove/Kiln (average), USD	7
Total cost of new improved stove/Kiln (estimated), USD	15
Cost of current stove/Kiln as a percentage of total cost of new stove	47%
Funding schemes	Matching Rebate Scheme for SMEs to produce/manufacture improved stoves
Rationale	Relatively well established technology with established peri-urban market ready for scaling up and use of revenue for repayment

From the preliminary GACC (2011) market study, the respondents indicated that they desire to experience from improved stoves attributes such as durability, less smoke emissions, better heat and duality of use (cooking) and less fuel wood use. The end-users are willing to pay for this difference because of the benefits that they will receive for using the new stoves, such as cleaner indoor air, reduction of health hazards and reduction of fuel costs due to decreased wood fuel consumption.

Using the principle of matching rebates, the fiscal support that will be provided to the stove/kiln producers and institutions (schools, prisons, hospitals) will be reduced as the volume of the uptake of

the stoves/kilns increases. This gives incentives for the potential producers and institutions to make an early decision and "try" the new system. The early batches of stove/kiln producers and institutions are needed to create a demonstration effect and all other potential producers and institutions to observe the benefits of the promoted technologies. As the benefits are experienced by the early users and seen by the neighbors and other potential users, the true value of the system are no longer perceived but becomes known and hopefully appreciated. This will help to reach a critical mass and a strong "gravitational pull" will play an important role in the development of the marketplace i.e. as the market grows, critical mass and gravitational effect will attract more buyers and more suppliers. **The process of making the rebate payable once the quality has been checked, certified and approved, works as a powerful mechanism to ensure quality control.** Matching rebate will be disbursed to qualified stove/kiln producers and institutions against an agreed work plan and SMART results to be achieved over a period of up to 5 years.

It is proposed that a rebate of 60% of the full cost of the stove/kiln and institutional cookstoves will be given to stove/kiln producers and institutions who belong to the first 60% of the targeted number of stoves/kilns to be disseminated. This rebate will be reduced to 50% for producers and institutions who belong to the next 50% of the target group, and finally, to 20% for users who belong to the last 20% of the target group. An indicative sliding matching rebate scheme is presented in Table D9.

At the end of the Project, it is expected that the energy efficient stoves/kilns and institutional stoves will be sufficiently demonstrated to allow market mechanism to prevail without or with minimal matching rebate. It is also hoped that at the end of the Project the procedures for the construction of stoves/kilns and institutional stoves will be more streamlined, and combined with better economy of scale, the price of improved stoves/kilns would be reduced, making it more affordable for new end users and institutions to purchase even without the benefit of rebates.

Table D9: Matching rebate scheme for institutional stoves and charcoal retort kilns

Year	1	2	3	4	5
Percentage uptake of targeted volume in each Phase of roll-out	>0-60%	>50-50%	>40-60%	>60-80%	>80-100%
Matching rebate as a percentage of the cost of the stove	60%	50%	40%	30%	20%
Amount of matching rebate for domestic stoves, USD	9.0	8	6.0	4.5	3.0

In order to have equity and ownership among the users of stoves/kilns and to have a fair treatment for all communities in the different phases of the roll-out of these stoves/kilns, the principle of introducing higher rebate at the beginning and phasing it out as the uptake increases will be applied similarly in each of the five phases of the stoves/kilns dissemination. Using the distribution plan in Table D10 as the basis for calculating the rebates at each year of the project implementation, the resulting amount of rebates according to year for charcoal retort kilns and institutional stoves is shown in Table D11

Table D10: Target distribution of domestic stove/kiln according to phases of implementation

Description	Domestic Cook Stoves
Phase 1 Community	***1,083***
Year 1 (60%)	433
Year 2 (50%)	650
Year 3 (40%)	-
Year 4 (30%)	
Year 5 (20%)	
Phase 2 Community	***2,666***
Year 1 (60%)	-
Year 2 (50%)	1,333
Year 3 (40%)	1333

Year 4 (30%)	
Year 5 (20%)	
Phase 3 Community	***3,870***
Year 1 (60%)	-
Year 2 (50%)	-
Year 3 (40%)	2,322
Year 4 (30%)	1,548
Year 5 (20%)	
Phase 4 Community	***5,564***
Year 1 (60%)	-
Year 2 (50%)	-
Year 3 (40%)	-
Year 4 (30%)	4,451
Year 5 (20%)	1,113
Phase 5 Districts	***6,817***
Year 1 (60%)	-
Year 2 (50%)	-
Year 3 (40%)	-
Year 4 (30%)	-
Year 5 (20%)	6,817
Total	**20,000**

Table D11: Amount of matching rebate according to year for domestic stoves	
Description	**Domestic Cook Stoves**
Year 1	
No. of stoves/kilns	433
Full cost of stoves/kilns	6,498
Amount of matching rebate	3,899
Amount of cost-share	2,599
Year 2	
No. of stoves/kilns	1,983
Full cost of stoves/kilns	29,742
Amount of matching rebate	14,871
Amount of cost-share	14,871
Year 3	
No. of stoves/kilns	3,655

Full cost of stoves/kilns	54,825
Amount of matching rebate	21,930
Amount of cost-share	32,895
Year 4	
No. of stoves/kilns	5,999
Full cost of stoves/kilns	89,988
Amount of matching rebate	26,996
Amount of cost-share	62,992
Year 5	
No. of stoves/kilns	7,930
Full cost of stoves/kilns	118,947
Amount of matching rebate	23,789
Amount of cost-share	95,158
Total number of stoves/kilns	***20,000***
Total cost of stoves/kilns	***300,000***
Total matching rebate	***91,486***
Total cost-share	***208,514***

ii. Indicative modalities and procedures for distribution of stoves

During the early part of the Project implementation, the activities related to the promotion of output based and market mechanisms will focus on the identification of fabricators/technicians and the CBOs in the different targeted villages and districts. Although the principles of the modalities have been discussed with some potential CBOs, the detailed modalities and procedures will be agreed with these entities during the Project implementation. These modalities and procedures will include aspects such as:

- Procedures for procurement of raw materials
- Pricing of stoves
- Payment mechanisms
- Amount and mechanics of rebate
- Roles and responsibilities of different parties
- Quality control and assurance
- Content of the training programme

An indicative procedure for the distribution of stove/retort kilns and improved cookstoves and description of the different steps for the delivery mechanism is graphically presented earlier in Figure D2.

iii. Exit Strategy

The Project will start to prepare a sustainable follow-up plan as soon as deemed feasible (Year 3 onwards) that will detail how to exit the matching rebate scheme after the end of the project-life – by attracting public and private financing and leverage climate finance (e.g. Green Climate Fund, NAMA) in order to continue and scale-up the project in Nigeria.

F. GHG Emission Mitigation from the Use of Clean Stoves and Kilns

The activities of the Project consisting of the dissemination of 20,000 efficient stoves will result in the reduction of GHG emissions amounting to approximately 167,033 tCO2e at the end of appliance life (Table D14).

As explained earlier, the Project will introduce efficient stoves in three categories, namely: domestic cookstoves, institutional stoves and industrial stoves/kilns. These stoves will replace traditional less efficient stoves currently being used by many households, institutions and cottage industry in Nigeria. Due to the much higher efficiency of the new stoves, less fuelwood will be used up for the same cooking and thermal needs derived by the end-users of the stoves. This will lead to GHG savings and the use of non-renewable fuelwood would be reduced.

The GHG annual emission mitigation from stoves/kilns can be calculated as follows:

GHG emission mitigation = amount of fuel wood saved annually by the efficient stove x the emission factor of fuel wood x the number of stoves introduced

In order to provide a conservative estimate on the different parameters and assumptions leading to the calculation of the GHG emission, the UNFCCC approved methodology (AMS-II.G./Ver.02) was used. The details of the calculations for each type of stove are given in Annex I. The main parameters used in the calculations and the sources of information are shown in Table D13 below.

Table D13: Assumptions used in GHG emission mitigation calculation

Parameters	Value	Source of Information	Remarks
Efficiency of old stoves			
Cook stoves	10%	GACC	All these estimated parameters will be verified during project implementation
Efficiency of new stoves			
Cook stoves	40%	GACC	
Quantity of fuel wood consumed per stove per day	Cookstove = 11 (8-15) kg	GACC	
Emission factors			
Fuel wood	122 tCO2/TJ	IPCC default value	
Kerosene	71.5 tCO2/TJ	IPCC default value	Use kerosene for conservatism
Net calorific value of biomass	0.015 TJ/tonne	IPCC default value	

i. Life-time Direct GHG Emissions Avoided

The 20,000 stoves/kilns will be disseminated in different phases and at different years. Lifetime direct emissions avoided attributable to the investments made during the projects supervised implementation period, totaled over the respective lifetime of the investments is presented in Table D14, D15 and D16. The summary of the expected annual and cumulative fuel wood savings and GHG mitigation as a result of using the efficient stoves is shown in Table D14. Table D15 shows the fuel wood savings and GHG mitigation according to the different types of stoves for the first five years. The life of the stoves supported in this Project is expected to be about five years, with the industrial stoves, which is made of metal and cement, lasting slightly more than that. Thus, giving an average of

five years from the end of Year 2, the stoves that are supported by the Project by utilizing the institutional and financing scheme set up within the Project, and disseminated through its roll-out mechanism, are expected to mitigate GHG emissions until the end of Year 8. Table D16 presents details of the summary in Table D14 - total lifetime direct GHG emissions avoided.

Description Table D14: SUMMARY: Lifetime Direct GHG Emissions Avoided	Stoves (Year 9)	Energy generated by wood used (TJ)	Total emissions saved over technology lifespan (tCO2e)
Quantity of non-renewable fuel wood substituted (tonnes)	155,742	7,879	
GHG emissions mitigated (tCO2e)	167,033		581,651

Table D15: First 5 year Post-Project direct GHG emission mitigation of stoves					
Year	1	2	3	4	5
Cook stoves					
No. of installed stoves	433	1,983	3,655	5,999	7,930
Fuel wood saved annually (tonnes)	1,304	5,971	11,006	18,064	23,879
GHG emissions mitigated annually (tCO2e)	1,398	6,404	11,804	19,374	25,610
Total					
No. of installed stoves	***433***	***1,983***	***3,655***	***5,999***	***7,930***
Fuel wood saved annually (tonnes)	***1,304***	***5,971***	***11,006***	***18,064***	***23,879***
Cumulative fuel wood saved (tonnes)	***1,304***	***7,275***	***18,281***	***36,346***	***60,225***
GHG emissions mitigated annually (tCO2e)	***1,398***	***6,404***	***11,804***	***19,374***	***25,610***
Cumulative tCO2e mitigated	***1,398***	***7,803***	***19,607***	***38,981***	***64,591***

Table D16: Total lifetime direct GHG emission mitigation of stoves									
Year	1	2	3	4	5	6	7	8	9
Cook stoves									
No. of installed stoves	433	1,983	3,655	5,999	7,930	7,930	7,930	7,930	7,930
Fuel wood saved annually (tonnes)	1,304	5,971	11,006	18,064	23,879	23,879	23,879	23,879	23,879
GHG emissions mitigated annually (tCO2e)	1,398	6,404	11,804	19,374	25,610	25,610	25,610	25,610	25,610

Total									
No. of installed stoves	*433*	*1,983*	*3,655*	*5,999*	*7,930*	*7,930*	*7,930*	*7,930*	*7,930*
Fuel wood saved annually (tonnes)	*1,304*	*5,971*	*11,006*	*18,064*	*23,879*	*23,879*	*23,879*	*23,879*	*23,879*
Cumulative fuel wood saved (tonnes)	*1,304*	*7,275*	*18,281*	*36,346*	*60,225*	*84,104*	*107,983*	*131,863*	*155,742*
GHG emissions mitigated annually (tCO2e)	*1,398*	*6,404*	*11,804*	*19,374*	*25,610*	*25,610*	*25,610*	*25,610*	*25,610*
Cumulative tCO2e mitigated	*1,398*	*7,803*	*19,607*	*38,981*	*64,591*	*90,202*	*115,812*	*141,423*	*167,033*

ii. Project indirect (Project replication) GHG emission mitigation

The design of the Project emphasizes on sustainability of its activities, including the dissemination of more stoves through market mechanisms and where, in special circumstances, continuation of rebate from the FGN. Market growth rate is estimated at about 15% increase annually in the number of operating stoves. The GHG emission mitigation given this situation up to Year 14 (ten years after the end or the Project), referred to as the project indirect GHG emission mitigation, is given in Table D17. Data from year 6 to 9 are not shown.

Years 15-18 reflect the remaining lifetime of stoves installed during the influence period. It is assumed that as the improved energy efficient stoves reach the end of their lifetime (5 years), they will be automatically replaced by the consumer/ household. However, for the sake of keeping the post-project indirect impact calculations limited to the 10-year influence period, Years 15 – 18 shows the details for retiring of the remaining stoves installed from Years 11 – 14.

Some indirect CO2 emission reductions can also be realized during the project period from similar applications that may have been influenced by the interventions that the project will be doing but are not in any way related to the project. To be conservative, these are not accounted for in the estimation of the indirect CO2 emission reductions, which in this case is mainly considered as those realized during the influence period after the completion of the GEF project.

Thus, the total indirect GHG emissions avoided is estimated to be 2,106,449 tCO2e. This is based on the following assumptions:

1. The 20,000 stoves distributed by the GEF Project will automatically be replaced as they retire at the end of their individual shelf-life. This will happen due to the various manufacturing, distribution, after-sales services, financing and information mechanisms that the GEF Project will install to ensure the sustainability of the project.
2. The indirect impact is estimated based on a 15% annual growth of customers (purchasing improved stoves) after the end of the project, from Year 5. So, it will be an annual 15% growth, starting from a base figure of 20,000. However, the CO2 emissions attributed to the baseline 20,000 stoves are NOT included in the estimation of the indirect impact. Only the annual growth of 15% of new customers is accounted for the in the calculation of indirect impact (influence). Hence, the indirect impact does NOT include the direct impact.

For the sake of keeping the influence period limited to the 10-year duration, the calculations for Year 15 – 18, do not assume automatic replacement.

Table D17: Project indirect GHG emission mitigation of stoves (Years 1 to 4 and 6 to 9 are not shown). Estimated at stove/kiln annual growth rate of 15%.

Year	5	10	11	12	13	14	15	16	17	18
Cook stoves										
No. of installed stoves	7,930	15,950	18,343	21,094	24,258	27,897	32,081	13,739	10 987	7,823
Fuel wood saved annually (tonnes)	23,879	48,030	55,234	63,519	73,047	84,004	96,605	41,371	33,086	23,558
GHG emissions	25,610	51,512	59,239	68,124	78,343	90,094	103,609	44,370	35,484	25,266

mitigated annually (tCO2e)										
Total Stove/kiln										
No. of installed stoves	*7,930*	*15,950*	*18,343*	*21,094*	*24,258*	*27,897*	*32,081*	*13,739*	*10,987*	*7,823*
Fuel wood saved annually (tonnes)	*23,879*	*48,030*	*55,234*	*63,519*	*73,047*	*84,004*	*96,605*	*41,371*	*33,086*	*23,558*
Cumulative fuel wood saved (tonnes)	*23,879*	*71,909*	*127,143*	*190,662*	*263,709*	*347,713*	*444,318*	*485,689*	*518,774*	*542,332*
GHG emissions mitgated annually (tCO2e)	*25,610*	*51,512*	*59,239*	*68,124*	*78,343*	*90,094*	*103,609*	*44,370*	*35,484*	*25,266*
Cumulative tCO2e mitigated	*25,610*	*77,122*	*136,361*	*204,485*	*282,828*	*372,922*	*476,531*	*520,901*	*556,385*	*581,651*

ANNEX E: Terms of Reference of Key Project Personnel

1. Project Board

The Project Board (PB) will be established to provide high level guidance and oversight to the Project. The PB will be responsible for making management decisions on a consensus basis for the Project when guidance is required by the Project Manager, including approval of project revisions. Project assurance reviews will be made by the PB at designated decision points during the running of a project, or as necessary when raised by the Project Manager.

The Project Board will play a critical role in project monitoring and evaluation by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It will ensure that required resources are committed and will arbitrate on any conflicts within the Project or will negotiate a solution to any problems with external bodies. In addition, it will approve the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual Workplan, the Project Board can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans.

In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP Project Manager.

Potential members of the Project Board will be reviewed and recommended for approval during the UNDP Project Appraisal Committee (PAC) meeting. Representatives of other stakeholders may be included in the Board as appropriate.

The Project Board (PB) shall be comprised of the following:

- The Director General of ECN, who shall be the Chairman of the PB
- A representative from FC, SON
- A representative from MARD
- A representative from UNDP
- A representative from NACC and NCCS
- The Project Director (who shall act as the PB Secretary)
- The Project Manager (who shall be a non-voting member of the PB)
- Representative(s) from private sector - MFI
- Representative(s) from co-financing donors

The PB will convene at least four times in a year (at the inception phase, at the mid-term phase and at the end of the project period) and on a need basis when required and called upon by the chairman.

The PB will have the following functions:

- Oversee and advise on the execution of the Project
- Monitor and supervise implementation of the Project
- Endorse the work plan
- Approve adaptations to the Project components during the Project execution, if any Evaluate the performance and impacts of the Project
- Approve Progress, Midterm and Terminal Reports of the Project

2. National Project Coordinator

Under the direct supervision of the UNDP CO Head of Environment & Energy Unit, and in close cooperation with the Programme Officer, the National Project Coordinator is responsible for the day-to-day management and implementation of the UNDP-GEF project, including all project administrative matters. All work of the NPC will be carried out in line with the Country Programme Action Plan and in full compliance with the UNDP Rules and Regulations. The management and coordination process will be pursued through undertaking appropriate actions in programme formulation, implementation and evaluation. Strong emphasis will be made on ensuring cohesion with other UNDP programmes.

Job content

i. Manage the project implementation in accordance with objectives, schedule and planned budget;
ii. Manage all project activity, staff, consultants and etc., for timely implementation of requirements on Monitoring and Evaluation;
iii. Coordinate awareness creation on all project activities;
iv. Coordinate the project activities with relevant activity and initiative of the Government;
v. Ensure cooperation between the participating institutions of the project;
vi. Ensure timely preparation of annual project reports, working plans and other relevant project documents.

Qualifications

At least 10 years work experience in project management. Previous work in international project management is an advantage

- University education in Engineering, Energy, Physics, Business Management or relevant field. A post-graduate degree (MSc, MPhil, PhD etc) is an advantage
- Strong interpersonal and communication skills
- Ability to take decisions
- Strong computer skills (Microsoft Office)

3. Full time Assistant Project Managers

Assistant Project Managers will assist respective NPC for the implementation 4 components of the UNDP-GEF project. All work of the Assistant Project Managers will be carried out in line with the Country Program Action Plan and in full compliance with the UNDP Rules and Regulations.

Job content

vii. Assist the NPC to:
   a. manage the implementation of project component in accordance with objectives, schedule and planned budget;
   b. manage respective project component activities, staff, consultants and etc., for timely implementation of requirements on Monitoring and Evaluation;
   c. coordinate awareness creation on project component activities;
   d. coordinate the project component activities with relevant activity and initiative of the Government; and
   e. ensure timely preparation of annual project reports, working plans and other relevant project documents for the project component.

Qualifications

At least 3 years work experience in respective project component.

- University education in Engineering, Energy, Physics, Business Management or relevant field. A post-graduate degree (MSc, MPhil etc.) is an advantage
- Strong interpersonal and communication skills
- Ability to take decisions
- Strong computer skills (Microsoft Office)

4. Administrative and Finance Assistant

The Administrative and Finance Assistant will work under the direct supervision of the Project Manager and provide assistance to the project implementation in the mobilization of inputs, the organization of training activities and financial management and reporting.

Job content

(i) Prepare all payment requests, financial record-keeping and preparation of financial reports required in line with NEX financial rules and procedures
(ii) Assist in the recruitment and procurement processes, checking the conformity with UNDP and the Government rules and procedures
(iii) Assist in the organization of in-country training activities, ensuring logistical arrangements
(iv) Prepare internal and external travel arrangements for project personnel

(v) Maintain equipment ledgers and other data base for the project
(vi) Take record of projects meetings and draft correspondence as required
(vii) Maintain project filing
(viii) Other duties which may be required

Qualifications

At least five years administrative experience,

- University degree in Business Administration (Finance or Accounting)
- Good organizational skills
- Good computer skills, including spread-sheets and database

5. International consultant – International Technical Advisor – Project Management

Job content

i. To serve as part-time ITA to provide overall technical guidance, advice and back-supporting to Project Coordinator and project team
ii. Assist the Project Coordinator and project team to prepare a detailed Annual Work Plan of all project activities in line with the programming and approved budget, and start and conclude them accordingly;
iii. Advise the Project Coordinator and project team on the project strategy and implementation methodology;
iv. Assist in the recruitment, supervision and management of local staff;
v. Participate in the recruitment of local consultants and international experts;
vi. Conduct mission to project sites on a quarterly basis.

Qualification

At least 5 years work experience in project management. Previous work in international project management is an advantage

- University education in engineering, energy, physics, business management or relevant field. A post-graduate degree (MSc, MPhil, PhD etc) is an advantage
- Strong interpersonal and communication skills
- Ability to take decisions
- Strong computer skills (Microsoft Office, Internet, e-mail)

6. International Consultant for Mid Term Review

The International Consultant will be recruited to conduct the Mid-Term Review of the Project. S/he will report to the Project Manager and act as the team leader for the following specific tasks:

- Provide guidance to the National Consultant in conducting the Mid-Term Review.
- Assess the progress towards achievement of the project objectives as outlined in the approved Project Document.
- Look into the linkages between this project and other relevant projects/agencies and assess their effectiveness.
- Assess the structure and performance of the project management team and support provided by GEF-UNDP.
- Identify lessons learned from the implementation of the project's activities.
- Provide guidance and specific recommendations on how the project team and UNDP can improve performance (both substantive and management) during the remaining duration of the current project.
- Provide guidance and specific recommendations for future support in the area of climate change mitigation and renewable energy for both the FGN and UNDP to consider.
- Produce the Mid-Term Review Report.
- Present the findings to relevant stakeholders.

Qualifications:

- Familiarity with climate change challenges in developing countries; previous experiences related to renewable energy and particularly biomass energy would be an advantage.
- 10 years of relevant field-based experience in monitoring and evaluation of projects.
- Familiarity with a participatory approach in project monitoring and evaluation.

- Familiarity with Nigeria or similar countries.
- Excellent writing and analytical skills.

7. National Consultant for Mid Term Review

The National Consultant will be recruited to conduct the Mid-Term Review of the Project. S/he will report to the Project Manager and support the International Consultant for the following specific tasks:

- Liaise with local stakeholders to ensure that cultural perspectives and local circumstances are taken into account and incorporated into recommendations.
- Assess the progress towards achievement of the project objectives as outlined in the approved Project Document.
- Look into the linkages between this project and other relevant projects/agencies and assess their effectiveness.
- Assess the structure and performance of the project management team and support provided by GEF-UNDP.
- Identify lessons learned from the implementation of the project's activities.
- Provide input on how the project team and UNDP can improve performance (both substantive and management) during the remaining duration of the current project.
- Provide inputs on specific recommendations for future support in the area of climate change mitigation and renewable energy for both the FGN and UNDP to consider.
- Provide inputs to the International Consultant in preparing the Mid-Term Review Report.
- Present the findings to relevant stakeholders.

Qualifications:

- Understanding of climate change mitigation and renewable energy in Nigeria.
- At least 5 years of work experience in the development sector in Nigeria.
- Excellent communication skills in English (oral and written).

8. International Consultant for Final Evaluation

The International Consultant will be recruited to conduct the Final Evaluation of the Project. S/he will report to the Project Manager and act as the team leader for the following specific tasks:

- Provide guidance to the National Consultant in conducting the Final Evaluation.
- Assess the progress towards achievement of the project objectives as outlined in the approved Project Document.
- Look into the linkages between this project and other relevant projects/agencies and assess their effectiveness.
- Assess the structure and performance of the project management team and support provided by GEF-UNDP and to what extent recommendations from the Mid-Term Review were implemented.
- Identify lessons learned from the implementation of the Project's activities in the following areas:
  - Relevance – the extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time
  - Effectiveness – the extent to which the project objective has been achieved or how likely it is to be achieved
  - Efficiency – the extent to which results have been delivered with the least costly resources possible
  - Results – the positive and negative, and foreseen and unforeseen, changes to and effects produced by a development intervention. In GEF terms, results include direct project outputs, short-to medium term outcomes, and longer-term impact including replication effects and other, local effects
  - Sustainability – the likely ability of an intervention to continue to deliver benefits for an extended period of time after completion. Projects need to be environmentally as well as financially and socially sustainable.

- Provide guidance and specific recommendations for future support in the area of climate change mitigation and renewable energy for both the FGN and UNDP to consider.
- Produce the Final Evaluation Report.
- Present the findings to relevant stakeholders.

Qualifications:

- Familiarity with climate change challenges in developing countries; previous experiences related to renewable energy and particularly biomass energy would be an advantage.
- 10 years of relevant field-based experience in monitoring and evaluation of projects.
- Familiarity with a participatory approach in project monitoring and evaluation.
- Familiarity with Nigeria or similar countries.
- Excellent writing and analytical skills.

9. National Consultant for Final Review

The National Consultant will be recruited to conduct the Final Evaluation of the Project. S/he will report to the Project Manager and support the International Consultant for the following specific tasks:

- Liaise with local stakeholders to ensure that cultural perspectives and local circumstances are taken into account and incorporated into recommendations.
- Assess the progress towards achievement of the project objectives as outlined in the approved Project Document.
- Look into the linkages between this project and other relevant projects/agencies and assess their effectiveness.
- Assess the structure and performance of the project management team and support provided by GEF-UNDP and to what extent recommendations from the Mid-Term Review were implemented.
- Identify lessons learned from the implementation of the project's activities in the following areas:
  - Relevance – the extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time
  - Effectiveness – the extent to which the project objective has been achieved or how likely it is to be achieved
  - Efficiency – the extent to which results have been delivered with the least costly resources possible
  - Results – the positive and negative, and foreseen and unforeseen, changes to and effects produced by a development intervention. In GEF terms, results include direct project outputs, short-to medium term outcomes, and longer-term impact including replication effects and other, local effects
  - Sustainability – the likely ability of an intervention to continue to deliver benefits for an extended period of time after completion. Projects need to be environmentally as well as financially and socially sustainable.
- Provide inputs on specific recommendations for future support in the area of climate change mitigation and renewable energy for both the FGN and UNDP to consider.
- Provide inputs to the International Consultant in preparing the Final Evaluation Report.
- Present the findings to relevant stakeholders.

Qualifications:

- Understanding of climate change mitigation and renewable energy in Nigeria.
- At least 5 years of work experience in the development sector in Nigeria.
- Excellent communication skills in English (oral and written).

ANNEX F: Report on Workshop on Cookstoves Design, Production and Testing in Nigeria (ICEED, 9 April 2013):

The event started with a press conference hosted by International Centre for Energy, Environment and Development (ICEED), Energy Commission of Nigeria (ECN), and the representative of Shell Nigeria. Key messages delivered in the conference include: i) enhancing efficiency in biomass energy use will address health, poverty and environment challenges and create a market of over 300 billion Naira in new cooking stoves; and ii) the conclusion of a collaborative plan by ICEED, ECN, Standards Organization of Nigeria and the Nigerian Alliance for Clean Cookstoves to set national standards for biomass cooking stoves.

A. Update on the progress made in the designing of high efficiency wood stoves in Nigeria[16]

National Centre for Energy Research and Development, University of Nigeria, Nsukka: The centre is owned by Energy Commission of Nigeria and since 1980 been operating in the field of R&D, training and dissemination of renewable and non-renewable energy sources. Over the years, the centre has developed a number of efficient biomass stoves. According to the centre, one of its best stoves called the nozzle type cookstove has a wood use efficiency of 69%. In addition, the stove has a thermal efficiency of about 40% and significantly reduces emissions. The centre is hampered by funds to embark on further R&D and widespread dissemination.

Akanu Ibiam Federal Polytechnic Unwana, Afikpo, Ebonyi State: The Mechanical and Ceramics Departments of this institution has over the years made efforts to develop efficient woodstoves using ceramics as the insulating material. Their stove is essentially on the principles of rocket stove technology. The institution is currently facing challenges with getting the right mix for their insulating material and hope to get this right in the near future.

Sokoto Energy Research Centre, Usman Dan Fodio University, Sokoto: This is one of research centres owned by ECN. Professor Danshehu said the centre has been designing efficient biomass stoves in the last two decade. However, due to paucity of funds, it has not been able to expand its R&D efforts.

Imo State University, Owerri: Professor Okereke has been engaged in the field of materials science in terms of designing combustion chambers for wood based stoves and ovens. Though he or his institution has not embarked on actual production and commercialization of woodstoves, he has produced a good number of literature and design specifications to aid further research, development and production.

Implications:

- The research centres noted that one of the major challenges in designing efficient biomass stoves is in the area of material science. They have not been able to source locally the right mix of metal alloys to design metal-based combustion chambers as there is no iron and steel industries in the country.

- Another major challenge is lack of funds. The funding from ECN for the research centres has overtime been inadequate to finance further R&D commercial stove production and distribution. The centres would like to explore avenues for sustainable funding.

- Some private sector biomass stove producers complaint of the lack of working partnership between the government-owned research centres and private sector actors. There is no transfer of technology not support from R and D centres.

- Some stove producers suggested that the focus should be on ceramic base and not metal-

[16] *ICEED, 2013. Report on workshop on cookstoves design, production and testing in Nigeria. 9 April 2013.*

based combustion chambers e.g. Suraj Waheb of Toyola Energy has started manufacturing ceramic liners in Ogu state to compliment the metal parts imported from China.

- Engr. Ajieh of National Centre for Energy and Environment (one of the centres owned by ECN revealed that the centre has been involved in the design of efficient biomass stoves with some success. He noted that one of the main challenges in stove designing is the principles to follow be it combustion, pyrolysis or gasification. He urged stove producers to design their stoves based on these internationally recognized principles. He also urged producers to set reasons for going into efficient biomass stove production: lower emission, reduced biomass consumption, etc. He further urged producers to take into consideration the gap between the rim of their stove and the pot to minimize heat loss.

Summary of comments/observations/questions

i. There is need to deal with key design principles and issues especially those that are best suited to specific areas to enhance delivery of stoves with higher efficiency and value.

ii. There is need to explore local resources that can be able to meet international standards for stove production.

iii. There is need to form and strengthen linkages between research centres and stove producers.

B. National Efficient Wood Stove Standards & Testing Capabilities

Centre for Energy and Global Health, Colorado State University, USA: This presentation was made by Dr. Morgan Defoort on overview of current progress on biomass cookstoves standards and testing. He highlighted the conditions for measuring cookstove performance which include fuel (its species, moisture content, geometry. etc), fuel rate and amount of air being drawn into the stove. He noted that laboratory stove performance is measured by emissions (what leaves the stove) and concentrations (what's present in the room) Additionally field tests measure exposure (what people breathe). He noted some of the achievements of Colorado State University on stove testing to include: highly involved in current ISO protocol and standards development; 1,000 hours of official WBT/EPTP tests, 1,440 tests conducted; and over 300 unique designs tested. Dr. Defoort stated that for stoves to pass the ISO international Working Agreement (IWA) tests, the following basic equipment are needed: Emissions Analyser – Testo 335; Aerosol and Particulate Matter – HazDust EPAM 5000; and Exhaust Handling – hood, gaseous conditioning sample, lines and blower.

The benefits of global standards for biomass stoves are: Provide policy makers, donors, stove programmes and other stakeholders with a credible basis for comparing stove performance and safety; Help all stakeholders have a common set of terminology for communicating and understanding stove performance; Give stove makers affirmation of stove quality; Let stove users know that they are making a worthwhile investment; and Drive innovation in the industry.

The process that has led to the adoption of the ISO IWA are: Bonn World Health Organization Air Quality Standards meeting in 2005; Annual ETHOS meetings; Partnership for Clean Indoor Air (PCIA) forums of 2007, 2009 and 2011; Numerous international conferences; Alliance Standards and Testing Working Group; and finally the breakthrough at the PCIA forum in Lima in 2011 called the Lima Consensus – utilizing tiers of performance.

The IWA as an ISO document produced through workshop meetings and stated that 91 participants from 23 countries unanimously approved the consensus. Possible next steps to establishing international standards on biomass stoves to include an interim work on ISO standards which will involve the addition of other testing protocols.

National Centre for Energy Research and Development (NCERD): Dr. Anyanwu revealed that the environmental management of the centre which is in charge of developing and testing efficient biomass stoves started about 5 years ago. The centre is deficient in terms of personnel both for stove

design and construction as well as testing. In terms of stoves testing equipments, the centre has the following: a flame photometer for testing wood characteristics; a functional bomb calorimeter; and a functional fuel gas analyzer that outputs the noxious gases, SOx, CO and CO2. However, there are no equipment for analyzing particulate matter emission, polyaromatic hydrocarbons, and other critical testing and measuring equipment. Dr. Anyanwu said to make progress the centre needs to procure the required equipment as well as capacity building for its personnel.

Sokoto Energy Research Centre (SERC): Just like NCERD, SERC has a unit that is in charge of efficient biomass development and testing. However, unlike NCERD, this unit has been unable to make progress overtime mainly due to paucity of funds. Professor Danshehu said the centre has been trying to obtain comparative results for efficient biomass stoves with some success. He said the centre is willing to partner with both national and international experts to expand its scope.

National Centre for Energy and Environment: This centre is located in University of Benin and owned by ECN. Engr. Mike Ajieh, mentioned that the centre has the same king of equipment as NCERD. In addition, it has an industrial furnace that has the capacity to run ultimate (particulate emissions, chemical content, etc) and proximate analysis of biomass, and a bomb calorimeter. The centres testing lab is still under development and is yet to commence fulfilment of its mandates. Students of the university make use of the equipment the centre has for their research. The centre is also deficient in terms of personnel and would welcome ideas on how to upgrade its capacity.

Akanu Ibiam Federal Polytechnic Unwana: The Polytechnic has a number of equipment in its Ceramics and Mechanical Departments for stove design and construction. In terms of testing, the polytechnic is lacking equipment and personnel.

Implications for Nigeria: i) Research centres should build their capacity in terms of equipment and personnel. Emphasis may not need to focus on local environmental conditions, but tests should be adapted to local conditions in due course. Fundamental tests such as quality assurance, durability, efficiency should be the main focus, and other tests such as type and composition of fuelwood will follow later; and ii) Develop national standards but should all biomass stoves whether locally manufactured or imported be subjected to local testing as SONCAP can accept testing certificates performed by third party accredited labs overseas.

C. Action Plan for Enhancing National Capacity in Design, Production and Testing

Standards Organization of Nigeria (SON): Engr. Enebi Onucheyo representing the Director General, said SON was established in 1971 and is responsible for i) elaboration of standards for products and services; and ii) ensuring compliance with the Federal Government policies on standards, metrology and quality assurance. The Standards are documents established by consensus approved by a recognized body (for example Nigerian Alliance for Clean Cookstoves) that provides for common and repeated use; rules, guidelines or characteristic for activities or their results aimed at the achievement of the optimum degree of order in a given context. Such standards ensure that products are robust, safe and can perform to customer satisfaction. He noted that there was an international standard on solid fuel burning appliances (ISO/DIS 13336). Even though this has been discontinued there is need for national standards for biomass stoves. He said SON has not recognized any biomass stove testing facility in Nigeria.

SON has invited stakeholders to: participate in the standardization of woodstove; establish a test centre for quality assurance of this all important product; commit to producing according to standards; train and retrain professionals in the sector; and form an association of professionals to check quality in the sector.

Finally he said SON is ever willing to work as a team with stakeholders to develop and enforce standards for biomass stoves and get existing stoves standardized. He further urged producers and marketers to register their products with SON to ensure national conformity.

International Centre for Energy, Environment and Development (ICEED): ICEED led the initiative that culminated in the Nigerian Alliance for Clean Cookstoves. This Alliance launched in 2012 is a

public private that seeks to introduce 10 million clean cookstoves to Nigerian homes and institutions by 2020. As part of activities towards attaining this goal, the ICEED and the Nigerian Alliance got some support from the Global Alliance for Clean Cookstoves to set up a clean cookstoves development and testing centre in Nigeria. Ewah Eleri, Executive Director of ICEED and Coordinator of the Nigerian Alliance listed the goals of the centre which include: Develop technical standards for stoves manufactured or imported into Nigeria; Provide testing and certification services related to stove technical quality, indoor air pollution, and energy efficiency; Assist stove developers in improving stove design and construction methods; Conduct research and development in collaboration with Nigerian and international research institutes and laboratories; Serve as a national demonstration center for clean cooking technologies; and Carry out public awareness campaigns.

He listed the proposed activities to achieving these goals to include: planning meetings (this workshop is one of them); development of testing capacity which is essentially the acquisition of stove testing equipment; development of training capacity which is essentially a training session in Senegal for 2 or 3 scientists from the centre; carry out pilot stove testing projects which is in line with Dr. Dairo suggestion; development of a business plan to ensure that the centre is self sustaining; and public awareness campaigns to communicate the centre activities.

Nigerian Alliance for Clean Cookstoves (NACC). NACC was launched in 2012 and is a public private that seeks to introduce 10 million clean cookstoves to Nigerian homes and institutions by 2020. As part of activities towards attaining this goal, NACC got some support from the Global Alliance for Clean Cookstoves to set up a clean cookstoves development and testing centre in Nigeria. NACC is coordinated by ICEED has the following goals: Develop technical standards for stoves manufactured or imported into Nigeria; Provide testing and certification services related to stove technical quality, indoor air pollution, and energy efficiency; Assist stove developers in improving stove design and construction methods; Conduct research and development in collaboration with Nigerian and international research institutes and laboratories; Serve as a national demonstration center for clean cooking technologies; and Carry out public awareness campaigns.

Activities proposed to achieving these goals are: planning and organizing stakeholder meetings; development of testing capacity which is essentially the acquisition of stove testing equipment; development of training capacity which is essentially a training session in Senegal for 2 or 3 scientists from the centre; carry out pilot stove testing projects; development of a business plan to ensure that the centre is self sustaining; and public awareness campaigns to communicate the centre activities.

Comments and suggestions

i. Yahaya Ahmed of DARE said most of the efficient biomass stoves in the country has been tested and certified by international stove testing centres. Therefore subjecting such stoves to local tests will be a repetition. In addition, he said there is need for efficient biomass producers and marketers to tap into the carbon market through the Clean Development Mechanism as a way of raising funds or GCF as potential pipeline of bankable projects.

ii. SON said organizations that have had their stoves tested and certified can bring their test results so they can form part of the national standards, but this will not interfere with the activities of the proposed testing centre.

iii. Ewah suggested the setting up a national working group consisting of Nigerian scientists and engineers to take stock of what exists internationally and liaise with relevant international institutions to work out the steps for establishing national standards – National Tech Comm for Cookstove and Fuel Standard.

Agreements

i. Stakeholders agreed to take into cognizance international best practices when developing national standards for efficient biomass stoves.

ii. Stakeholders present agreed to set up a committee to provide a memo on ways of setting the national standards.

iii. Stakeholders present will form the nucleus for the development of a 12 to 24 months business and work plans for the proposed Nigerian testing centre.

iv. Stakeholders agreed to explore ways of procuring equipments and capacity building for personnel for the research centres.

ANNEX G: List of Organizations Consulted During the Preparatory Phase

The following organizations were consulted during the project preparatory phase:

Public Sector
Federal Ministry of Environment
Energy Commission of Nigeria
Forestry Commission
Standards Organization of Nigeria
Ministry of Power
Ministry of Finance
Ministry of Local Government and Rural Development
Ministry of Agriculture and Rural Development
Ministry of Education, Science and Technology

Private Sector
Fortis MFI
ICEED Ltd
Envirofit
Toyola Energy
SME Fund
Fish smoking producers
Bakeries
Garri Producers
Palm oil producers

Bilateral/Multilateral
UNDP
EU
GIZ
WFP
FAO
GERES
ECREEE

NGOs
ICEED
CREDC
DARE

GEF UNDP Sustainable Fuelwood Management in Nigeria Validation Workshop

List of Participants

S/N	NAME	ORGANIZATION/ADDRESS	EMAIL	LOCATION
1	Odigha Odigha	REDD		Cross River
2	Felicia Adun (Perm Sec.)	Delta State	feladun@yahoo.com	Delta State
3	Yahaya Ahmed	DARE	yahaya@gmx.de	Kaduna
4	Dr. Aliyu Said	Samaru College of Agric, ABU, Zaria		Zaria
5	Nwaomy Olujie	Standard Organization of Nigeria	nwaomyolujie@yahoo.com	Lagos
6	Tom Aneni	SEDI	tomaneni1@yahoo.comhoo.com	Benin
7	Adewale	Fortis MFI	aaderounmu@fortismfb.com	Abuja
8	Ewah Eleri	ICEED		Abuja
9	Dr. Dairo	Quintas	tayo.dairo@quintasenergies.com	Ondo
10	Carlos	Giz		Abuja
11	Femi Oye	SME Fund	f.oye@smefunds.com	Lagos
12	Suraj Wahab	Toyola Energy	toyolaenergy@yahoo.com	Lagos
13	Austine Osakwe			Benin
14	Kola Lawal	LIFES	lkolawole32@yahoo.com	Lagos
15	Godfrey Ogbemudia	CREDC	godfrey@credentre.org	Benin
16	Linus Ita	Mfamimyen Conservation Society		Calabar
17	Dr. Uyi Ojo	Environmental Right Action		Benin
18	Prof. Abiola Kehinde	National Centre for Energy Efficiency and Conservation	Aj.kehinde@gmail.com	Lagos
19	Mrs Bahijjahtu Abubakar	Renewable Energy Programme FME		Abuja
20	Biodun Olaore	ENVIRONFIT		Lagos
21	Omon Dania	University of Benin	zaname_dania@yahoo.com	Benin
22	Nkechi Isaac	Leadership		Abuja
23	Engr. Kenneth Achugbu	Rural Electrication Agency		Abuja
24	Yomi Ladapo	Federal Ministry of Environment (FME)	ladapoj@yahoo.com	Abuja
25	Dr. Bukar Hassan		Bukar_hassanyimird@yahoo.com	Abuja
26	Engr. Shamm T. Kolo	Consumer Protection Council	shammtk@gmail.com	Abuja
27	Kusimot David Olutope	Federal Ministry of Environment	kusimot@gmail.com	Abuja
28	Apiriola V. Tosin	Women & Youth Development Initiative	woyodev@yahoo.com	Kwara
29	Peter Tarfar	Climate Change Dept. FME		Abuja
30	Oduware Ojirinde	ASCON		Lagos
31	Cosmos Anyanwu	University of Nigeria Nnsukka		Nnsukka
32	Angela Okoye	Organization for the Sustenance of the Nigerian Environment	sustaindnig_envt@yahoo.com	Kwara

ANNEX H: Letter of Agreement on Direct Project Cost

STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE GOVERNMENT FOR THE PROVISION OF SUPPORT SERVICES

HOW TO USE THIS LETTER OF AGREEMENT

- This agreement is used to provide appropriate legal coverage when the UNDP country office provides support services under national execution.
- This agreement must be signed by a governmental body or official authorised to confer full legal coverage on UNDP. (This is usually the Minister of Foreign Affairs, the Prime Minister /or Head of State.) The UNDP country office must verify that the government signatory has been properly authorised to confer immunities and privileges.
- A copy of the signed standard letter will be attached to each PSD and project document requiring such support services. When doing this, the UNDP country office completes the attachment to the standard letter on the nature and scope of the services and the responsibilities of the parties involved for that specific PSD/project document.
- The UNDP country office prepares the letter of agreement and consults with the regional bureau in case either of the parties wishes to modify the standard text. After signature by the authority authorised to confer immunities and privileges to UNDP, the government keeps one original and the UNDP country office the other original. A copy of the agreement should be provided to UNDP headquarters (BOM/OLPS) and the regional bureau.

Dear [name of government official],

1. Reference is made to consultations between officials of the Government of [the name of programme country] (hereinafter referred to as "the Government") and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects. UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant programme support document or project document, as described below.

2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Government-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.

3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the programme/project:

(a) Identification and/or recruitment of project and programme personnel;

(b) Identification and facilitation of training activities;

(a) Procurement of goods and services;

4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the programme support document or project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a programme or project, the annex to the programme support document or project document is

revised with the mutual agreement of the UNDP resident representative and the designated institution.

5. The relevant provisions of the [Insert title and date of the UNDP standard basic assistance agreement with the Government] (the "SBAA"), including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.

6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA.

7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the programme support document or project document.

8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

10. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

Yours sincerely,

_____

Signed on behalf of UNDP

[Name]

[Title: Resident Representative]

_____

For the Government

[Name/title]

[Date]

Attachment to the

STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE GOVERNMENT FOR THE PROVISION OF SUPPORT SERVICES

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between Federal Ministry of Environment and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed project "**Sustainable Fuelwood Management In Nigeria**" (Project Number: XXX Output Number: YYY).

2. In accordance with the provisions of the letter of agreement signed on (date) and the attached project document, the UNDP country office shall provide support services for the Project as described below.

Support services (insert description)	Schedule for the provision of the support services	Cost to UNDP of providing such support services (where appropriate)	Amount and method of reimbursement of UNDP (where appropriate)
Services related to human resources (including but not limited to): 1. Identification, selection and recruitment of project personnel (including advertising, short-listing and recruiting): o Project Associate 2. HR & Benefits Administration & Management: o issuance of a contract; o closing the contract 3. Personnel management services: Payroll & Banking Administration & Management	April 2016 – June 2016 Ongoing throughout project implementation when applicable Ongoing throughout project implementation when applicable	As per the pro-forma costs: o 10 days over 60 months of GS5 HR Assistant: **2,000 USD** o 4 days over 60 months of NOB HR Manager: **2,000 USD**	UNDP will directly charge the project
Services related to procurement (including but not limited to): Procurement of goods Procurement of services o Consultant recruitment o Advertising o Short-listing & selection o Contract	Throughout project implementation when applicable	As per the pro-forma costs: o 30 days over 60 months of GS5 Procurement Associate: **6,000 USD** o 8 days over 60 months of NOB	UNDP will directly charge the project

issuance		Procurement Manager: 3,400 USD	
Services related to finance (including but not limited to): o Payments o Fund Transfers	Ongoing throughout implementation when applicable	As per the pro-forma costs: o 20 days over 60 months of GS6 Finance Associate: **4,600 USD** o 6 days over 60 months of NOB Finance Manager: **2,400 USD**	UNDP will directly charge the project
Services related administration (including but not limited to): o Travel authorization o Ticket requests (booking, purchasing, etc.) o F10 settlements o Asset management	Ongoing throughout implementation wher. applicable	As per the pro-forma costs: o 15 days over 60 months of GS5 Administration Assistant: **3,000 USD** o 2 days over 60 months of GS7 Administration Manager: **600 USD**	UNDP will directly charge the project
Services related to ICT (including but not limited to): o Email box maintenance o ICT and office equipment installation and maintenance o Internet channel use o Mobile telephony contracting and use	Ongoing throughout implementation when applicable	As per the pro-forma costs: o 4 days over 60 months of GS5 IT Assistant: **700 USD** o 1 day over 60 months of GS7 IT Manager: **300 USD**	UNDP will directly charge the project
Total		**25,000 USD**	

TABLE 1: ESTIMATE OF DIRECT PROJECT SERVICES (DPS) (US$)						
Year	2016	2017	2018	2019	2020	Total (US$)
ISS (support for recruitments, procurement, selection & awarding of sub-contracts, approvals, etc.)	5,000	5,000	5,000	5,000	5,000	25,000
Total (US$)	5,000	5,000	5,000	5,000	5,000	25,000

ANNEX I: GHG emissions calculations for the switch to improved stoves/kilns using UNFCCC Methodology AMS II G version 3 - Energy Efficiency Measures in Thermal Applications of Non Renewable Biomass

This category comprises efficiency improvements in thermal applications of non-renewable biomass. Examples of applicable technologies and measures include the introduction of high efficiency[17] biomass fired cook stoves[18] or ovens or dryers and/or energy efficiency improvements in existing biomass fired cook stoves or ovens or dryers.

1. Emission reductions are calculated as:

$$ER_y = B_{y,savings} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\ fossilfuel} \times N_{y,i} \qquad \text{Equation (1)}$$

Where:

ER_y = Emission reductions during year *y* in t CO_2e

$B_{y,savings}$ = Quantity of woody biomass that is saved in tonnes per device

$f_{NRB,y}$ = Fraction of woody biomass saved by the project activity in year *y* that can be established as non-renewable biomass using survey methods or government data or default country specific fraction of non-renewable woody biomass (fNRB) values available on the CDM website[19]

$NCV_{biomass}$ = Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne, wet basis)

[17] The efficiency of the project systems as certified by a national standards body or an appropriate certifying agent recognized by that body. Alternatively, manufacturers' specifications may be used

[18] Single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%.

[19] Default values endorsed by designated national authorities and approved by the Board are available at <http://cdm.unfccc.int/DNA/fNRB/index.html>.

$EF_{projected\_fossilfuel}$ = Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 t CO_2/TJ[20]

$N_{y,i}$ = Number of project devices of type *i* operating in year *y*

2. $B_{y,savings}$ is estimated using the following methods:

Where:

B_{old} = Quantity of woody biomass used in the absence of the project activity in tonnes per device

$B_{y,new,survey}$ = Annual quantity of woody biomass used during the project activity in tonnes per device, determined through a survey

η_{old} =
1. Efficiency of the device being replaced (fraction); measured using representative sampling methods or based on referenced literature values use weighted average values if more than one type of device is being replaced;
2. A default value of 0.10 may be optionally used if the replaced device is a three stone fire, or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney; for other types of devices, a default value of 0.2 may be optionally used

$\eta_{new,y}$ = Efficiency of the device being deployed as part of the project activity (fraction), as determined annually[12] using the water boiling test (WBT) protocol carried out in accordance with national standards (if available) or international standards or guidelines.[21] Use weighted average values if more than one type of system is being introduced by the project activity

[20] This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. It is assumed that the mix of present and future fuels used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression over solid fuel in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50% weight is assigned to coal as the alternative solid fossil fuel (96 t CO_2/TJ) and a 25% weight is assigned to both liquid and gaseous fuels (71.5 t CO_2/TJ for kerosene and 63.0 t CO_2/TJ for liquefied petroleum gas (LPG).

[21] In all cases the testing protocol shall be the same for both the device being replaced and the device being deployed.

1. Domestic cookstove at 15% annual growth rate

fNRB	90	%		Non renewable biomass
NCV	0.015	TJ/tonne		
EF	71.5	tCO2/TJ		
Cold	10	%		Cookstove efficiency
Cnew	40	%		Cookstove efficiency
A	18,000	unit		Total project units
AFC	11	kg/day		Daily biomass usage
Leakage	0	%		
1-(Cold/Cnew)	0.75	1900		

	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	unit	400	1,850	3,350	5,400	7,000	8,050	9,258	10,646	12,243	14,080	16,191	18,620	21,413	24,625	28,319	12,127	9,699	6,906
AFC	kg/day/unit	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
By	ton/yr	1,606	7,428	13,450	21,681	28,105	32,321	37,169	42,744	49,156	56,529	65,009	74,760	85,974	98,870	113,700	48,692	38,941	27,727
By, saving	ton/yr	1,205	5,571	10,086	16,261	21,079	24,241	27,877	32,058	36,867	42,397	48,756	56,070	64,480	74,152	85,275	36,539	29,205	20,795
fNRB	fraction	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Leakage	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ERy	tCO2e	1,292	5,975	10,819	17,440	22,607	25,998	29,898	34,382	39,540	45,471	52,291	60,135	69,155	79,528	91,456	39,166	31,323	22,303
	TCO2e/unit	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Cum Bsaved	1,205	6,775	16,863	33,124	54,203	78,443	106,320	138,378	175,245	217,642	266,398	322,468	386,948	461,101	546,376	497,620	526,825	547,620
	Cum ER	1,292	7,267	18,086	35,525	58,132	84,130	114,028	148,410	187,950	233,421	285,712	345,847	415,002	494,531	585,988	533,697	565,020	587,322

2. Institutional stove for schools and hospitals

fNRB	90	%		Fraction of Non renewable biomass
NCV	0.015	TJ/tonne		
EF	71.5	tCO2/TJ		
Cold	8	%		Cookstove efficiency
Cnew	45	%		Cookstove efficiency
A	1,000	unit		Total project units
AFC	50	kg/day		Daily biomass usage
Leakage	0	%		
1-(Cold/Cnew)	0.822			

	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	unit	16	64	148	312	460	529	608	700	805	925	1,064	1,224	1,407	1,618	1,861	797	637	454
AFC	kg/day/unit	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
By	ton/yr	292	1,168	2,701	5,694	8,395	9,654	11,102	12,768	14,683	16,885	19,418	22,331	25,680	29,533	33,962	14,544	11,632	8,282
By, saving	ton/yr	219	876	2,026	4,271	6,296	7,241	8,327	9,576	11,012	12,664	14,564	16,748	19,260	22,149	25,472	10,908	8,724	6,211
fNRB	fraction	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Leakage	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ERy	tCO2e	235	940	2,173	4,580	6,753	7,766	8,930	10,270	11,811	13,582	15,619	17,962	20,657	23,755	27,319	11,699	9,356	6,662
	TCO2e/unit	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
	Cum Bsaved	219	1,095	3,121	7,391	13,688	20,928	29,255	38,831	49,843	62,507	77,071	93,819	113,079	135,229	160,700	146,137	154,860	161,072
	Cum ER	235	1,174	3,347	7,927	14,680	22,445	31,376	41,646	53,457	67,039	82,658	100,621	121,277	145,033	172,351	156,732	166,088	172,750

3. Industrial stove for cottage industry - gari, fish smoking, palm oil processing, bakery

fNRB	90	%	Non-renewable biomass	
NCV	0.015	TJ/tonne		
EF	71.5	tCO2/TJ		
Cold	10	%	Cookstove efficiency	
Cnew	50	%	Cookstove efficiency	
A	950	unit	Total project units	
AFC	400	kg/day	Daily biomass usage	
Leakage	0	%		
1-(Cold/Cnew)	0.800			

	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	unit	16	64	148	272	460	518	585	684	787	905	1,041	1,197	1,377	1,583	1,821	780	623	444
AFC	kg/day/unit	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
By	ton/yr	2,336	9,344	21,608	39,712	65,700	75,555	36,888	99,921	114,910	132,146	151,968	174,763	200,978	231,124	265,793	113,825	91,030	64,815
By. saving	ton/yr	1,752	7,008	16,206	29,784	49,275	56,666	65,164	74,941	86,182	99,110	113,976	131,072	150,733	173,343	199,345	85,369	68,272	48,612
fNRB	fraction	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Leakage	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ERy	tCO2e	1,879	7,516	17,381	31,943	52,847	60,775	69,891	80,374	92,430	106,295	122,239	140,575	161,662	185,911	213,797	91,558	73,222	52,136
	TCO2e/unit	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4
	Cum Bsaved	1,752	8,760	24,966	54,750	104,025	160,691	225,857	300,799	386,981	486,090	600,067	731,139	881,872	1,055,216	1,254,561	1,140,585	1,208,857	1,257,468
	Cum ER	1,879	9,395	26,776	58,719	111,567	172,341	242,232	322,606	415,037	521,332	643,571	784,147	945,808	1,131,719	1,345,516	1,223 277	1,296,499	1,348,635

ANNEX J: GHG emissions calculations from protecting 50,000 ha forest and establishing 3,003 ha woodlots in Nigeria

The FAO's Ex-Ante Carbon balance model (EX-ACT)[22] has been used to calculate the GHG benefits from protecting 50,000 ha of forest and from establishing 3,003 ha of woodlots that would result in the annual sequestration of 259,937 tCO_2 and 8,423 tCO_2 respectively to give a total of 268,360 tCO_2 per year or 5,367,200 tCO_2 over a 20 year period. The results are presented below.

Project Name	*Sustainable Fuelwood Management in Nigeria*
Continent	Africa
Climate	Tropical
Moisture regime	Dry
Dominant Regional Soil Type	HAC Soils

Duration of the Project (Years)	Implementation phase	5
	Capitalisation phase	0
	Duration of accounting	5

Project Name	*Sustainable Fuelwood Management in Nigeria*	Climate	*Tropical (Dry)*	Duration of the Project (Years)	5
Continent	*Africa*	Dominant Regional Soil Type	*HAC Soils*	Total area (ha)	53003

[22] http://www.fao.org/tc/exact/carbon-balance-tool-ex-act/en/

Components of the project	Gross fluxes		Balance	Share per GHG of the Balance					Result per year		
	Without	With		CO_2			N_2O	CH_4	Without	With	Balance
	All GHG in tCO2eq Positive = source / negative = sink			Biomass	Soil	Other					
Land use changes											
Deforestation	0	0	0	0	0		0	0	0	0	0
Afforestation	0	0	0	0	0		0	0	0	0	0
Other LUC	0	1,299,685	1,299,685	-742,142	-557,543		0	0	0	-259,937	-259,937
Agriculture											
Annual	0	0	0	0	0		0	0	0	0	0
Perennial	0	-42,117	-42,117	-39,640	-2,477		0	0	0	-8,423	-8,423
Rice	0	0	0	0	0		0	0	0	0	0
Grassland & Livestocks											
Grassland	0	0	0	0	0		0	0	0	0	0
Livestocks	0	0	0				0	0	0	0	0
Degradation & Management	0	0	0	0	0		0	0	0	0	0
Inputs & Investments	0	0	0			0	0		0	0	0
Total	0	1,341,802	**1,341,802**	-781,782	-560,020	0	0	0	0	268,360	-268,360
Per hectare	0	-25	-25	-14.7	-10.6	0.0	0.0	0.0			
Per hectare per year	0.0	-5.1	-5.1	-2.9	-2.1	0.0	0.0	0.0	0.0	-5.1	-5.1