[May , 2014]

China-Ghana South-South Cooperation on Renewable Energy Technology Transfer

Sector	Renewable Energy, South-South Cooperation
Location	Ghana, China
Executing Agency	United Nations Development Program
Implementing Partners	Ghana Energy Commission China Ministry of Science and Technology
Project Duration	4 Years
Project Budget	**2.720.000** USD

United Nations Development Programme

Country: China

Project Document

Project Title	China-Ghana South-South Cooperation on Renewable Energy Technology Transfer
UNDAF Outcome(s):	China's development experience is effectively shared with other countries
Expected CP Outcome(s): *(Those linked to the project and extracted from the CPAP/UNDAF Action Plan)*	Low carbon and other environment sustainable strategies and technologies are adapted widely to meet China's commitments and compliance with Multilateral Environment Agreements
Expected Output(s): *(Those that will result from the project and extracted from the CPAP)*	Policy and capacity barriers for the sustained and widespread adoption of low carbon and other environmentally sustainable strategies and technologies removed Capacity to implement local climate change action plans for mitigation and adaptation, and sustainable development built
Executing Entity in China:	Administration Center for China Agenda 21, Ministry of Science and Technology (MOST)
Executing Entity in Ghana:	Energy Commission (EC)
Implementing Agency in China:	Administration Center for China Agenda 21, Ministry of Science and Technology (MOST)
Implementing Entity in Ghana:	Energy Commission (EC)

Project Summary

As part of Denmark's focus on South-South Cooperation, to enable coherent cooperation between China and countries in Africa, in particular around the promotion of the UN's Sustainable Energy for All (SE4ALL) initiative, UNDP China has been funded to develop the project in collaboration with the Energy Commission in Ghana, the Ministry of Science and Technology in China and the UNDP Country Offices in Accra and Beijing. The project will facilitate exchange of expertise and technology between China and Ghana, thereby building on China's unique development experience.

The project addresses Ghana's need to increase universal energy access. The project aims to effect off-grid community-based electrification, increase the share of renewable energy and promote the productive uses of energy. – At the same time, the project supports broader socio-economic and environmental objectives, most notably poverty reduction through employment generation as well as action on climate change mitigation. The project will create an enabling environment - in Ghana for absorbing new technology and in China for providing it appropriately. The project also promotes the production of renewable energy technologies in Ghana with a strong focus on private sector development and inclusion. In China, the project will support the review and updating of South-South Cooperation policies and guidelines. Moreover, the project contributes to solid capacity building, enabling China to engage more systematically in South-South Cooperation. This is conducive to Ghana's national development goals and priorities for poverty reduction and provision of energy.

Programme Period: **2014 – 2018** Key Result Area (Strategic Plan): Project ID: 00091276 Atlas Award ID: 00082283 Start date: September 2014 End Date August 2018 Management Arrangements: NEX	Total resources required 2,720,000USD Total allocated resources: • Regular • Other: • Funding from Danish Government: 2,720,000USD (including 1,764,000 US$ for Ghana; 956,000 US$ for China)

Agreed by MoST:

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Agreed by UNDP China:

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1. EXECUTIVE SUMMARY

As part of Denmark's focus on South-South Cooperation, to enable coherent cooperation between China and countries in Africa, in particular around the promotion of the UN's Sustainable Energy for All (SE4ALL) initiative, UNDP China has been funded to develop two projects, one with Zambia and one with Ghana. Both aim to ensure a more holistic transfer of renewable energy technologies from China to Africa. The planned support will not transfer hardware per se, but focus on the institutional framework and capacity required to make the local absorption of renewable energy technologies effective.

The present project is collaboration between the Energy Commission in Ghana, the Ministry of Science and Technology in China and the UNDP Country Offices in Accra and Beijing. The project will facilitate exchange of expertise and technology between China and Ghana, thereby building on China's unique development experience.

The project addresses Ghana's need to increase universal energy access. The project aims to effect off-grid community-based electrification, increase the share of renewable energy and promote the productive uses of energy. – At the same time, the project supports broader socio-economic and environmental objectives, most notably poverty reduction through employment generation as well as action on climate change mitigation. The project will create an enabling environment - in Ghana for absorbing new technology and in China for providing it appropriately. The project also promotes the production of renewable energy technologies in Ghana with a strong focus on private sector development and inclusion. In China, the project will support the review and updating of South-South Cooperation policies and guidelines. Moreover, the project contributes to solid capacity building, enabling China to engage more systematically in South-South Cooperation. This is conducive to Ghana's national development goals and priorities for poverty reduction and provision of energy.

Ghana's Energy Commission and China's Ministry of Science and Technology will implement the project. UNDP China and Ghana will provide technical and administrative support for the project implementation. The project has duration of four years and a total budget of USD 2,720,000.

2. PROJECT RATIONALE

2.1 Ghana's national energy context

The Republic of Ghana, with a population of just over 24 million, is one of the best performing economies of West Africa. Ghana is classified as a low-middle income country with a per capita GDP (PPP) of $2,500. Situated on the coast, and bordering Cote d'Ivoire and Togo, the country has averaged economic growth 6.4% annually since 2000. The growth rate has accelerated in recent years, and now exceeds 7%. However, the country still suffers from high unemployment especially for youth, and poverty is still widespread with huge disparities between the northern and southern sectors of the country.

In order to sustain its current economic performance, Ghana's energy sector vision is to develop an "Energy Economy" to secure a reliable supply of high quality energy services for all sectors of the Ghanaian economy and also to become a major exporter of oil and power. The Government of Ghana (GoG) has defined key targets for the energy sector:

1) Universal access to electricity by 2016;
2) 5,000 MW of generation capacity by 2015;
3) Achieve 10% contribution of renewable energy (excluding large hydro) in electricity generation mix by 2020;
4) 50% of the population having access to liquid petroleum gas (LPG) by 2020.

In recent years, Ghana has performed well in terms of increasing the share of electricity generation going to households from less than 40% in 2000 to 60% in 2010, and currently more than 70% of households nationwide have access to electricity. However, this national average masks striking urban-rural disparity with only 40% of rural households having access to electricity, with significant impact on productive activities and local economic development. Extension of the grid to some of the remaining remote unelectrified (such as islands and isolated) communities is difficult due to geographical and financing constraints.

Ghana has an installed capacity of 2,578MW (as of 15 May 2013) mostly made up of hydro and thermal facilities. Electricity peak demand in 2013 is 2,016MW and is growing at 8% per annum. The existing power plants are unable to attain full generation capacity as a result of limitations of fuel supply, limitation of water inflows into the hydroelectric power facilities and challenges with maintenance of generation facilities.

In addition, 70% of the population in urban areas and 90% in rural areas depend on wood fuel for meeting their domestic energy requirements which has adverse impacts on health, particularly for women and children.

In order to address these issues, the Government has indicated

a) additional generation will come primary from Independent Power producers (IPPs),
b) that investing in renewable energy is critical in order to provide access to some of the remote communities and make it more sustainable in the medium-long term. This shall include investments in off-grid solutions for decentralized access.
c) move 50% of the households to use LPG as main cooking fuel and the remaining households to the use of improved and more efficient cook stoves which have reduced health impacts.

2.2 Renewable Energy potentials in Ghana

2.2.1 Regulatory Framework

In the past few years, the Government of Ghana has put in place a number of policies, strategies and legislative instruments to regulate the energy sector and promote the development of renewable energy sources. The ***Energy Policy*** (2010) provides direction to all energy programmes and includes the 10% target for the contribution of modern renewable energy to the country's energy sector by 2020. The ***Energy Sector Strategy & Development Plan*** (2012) articulates the vision of Ghana's energy sector: ensure universal access to energy services and export of energy by 2016. The development and subsequent use of decentralized electricity generation sources (including renewables) for remote off-grid communities are among the main programmes identified to achieve universal access to electricity.

In the area of renewable energy, the main legislative and policy instrument is the ***Renewable Energy Act 2011 (Act 832)***, which provides for the development, management, utilization, sustainability and adequate supply of renewable energy for generation of heat and power. The Act provides the fiscal incentives and a regulatory framework that encourages private sector investment in the energy sector. In this regard, key provisions in Act 832 are:

- Feed-in-tariff scheme offer guaranteed prices for electricity generated from renewable energy sources.
- Licensing regime for commercial renewable energy service providers among others to ensure transparency of operation in the renewable energy industry.
- Purchase obligation under which power distribution utilities and bulk electricity consumers would be obliged to purchase a certain percentage of their energy required from electricity generated from renewable energy sources.
- Off-grid electrification – promote mini-grid and stand-alone renewable energy systems for remote off-grid locations.

- Establishment of a Renewable Energy Authority to own, implement and manage renewable energy assets on behalf of the State (particularly for off grid electrification).
- Research & Development – Innovative renewable energy options including biofuels for transport and export (where necessary)
- Renewable energy fund to provide incentives for the promotion, development and utilization of renewable energy resources. In this connection, the Ministry of Energy has already established the Renewable Energy Business Fund, which aims to provide incentives to encourage private investors to participate in renewable energy projects on a Build, Own, Operate and Transfer (BOOT) basis. These incentives include: promoting research into generation and utilization of renewable energy; and capacity building for construction, operation and maintenance of renewable energy facilities.

2.2.2 Institutional Framework

Ghana has several institutions directly or indirectly linked to managing energy resources, addressing energy challenges, and implementing the Renewable Energy Act. As in most countries, the Ministry leads policymaking while commissions/agencies serve as regulatory and/or implementing bodies. The two main institutions in this project are:

- The ***Ministry of Energy and Petroleum (MOEP)***: responsible for policymaking and for providing policy guidance to the sector. Accordingly, the MOEP is responsible for formulating, monitoring and evaluating policies, programmes and projects with the energy sector. A Renewable Energy Directorate has been established inside the Ministry as part of the commitment to promote the renewable energy sector.

- The ***Energy Commission (EC):*** manages the Ghana's utilization of energy resources as well as advises on energy policy. It also serves as the licensing authority (electricity and gas utilities); it formulates regulations for electricity and gas, promotes energy efficiency and renewable energy, and acts as the official energy advisor to the government.

2.2.3 Gaps and challenges for renewable energy in Ghana

Despite the generally favorable regulatory and institutional environment, there are specific challenges hindering Ghana's progress towards achieving universal access to energy, ensuring a more developed and widespread use of energy for local economic development, and in this specific case, pushing forward the renewable energy sector:

At the *upstream level*, there are still gaps in the overall regulatory framework:

1) The Government is yet to develop a Renewable Energy Master Plan to design specific actions to put the Renewable Energy Act into implementation.
2) The established Renewable Energy Fund is yet to be resourced and detailed strategies to mobilize the necessary funding are yet to be defined.
3) The Renewable Energy Authority, necessary to form partnerships with private operators for PPP implementations, is yet to be established.

This situation, together with serious challenges related to the financial solvency of the power sector (the generation, transmission and distribution utilities), is hampering the involvement of the private sector in the renewable energy sector, despite the high level of interest shown both by national and foreign investors.

At the *downstream level*, there are several gaps, including:

1) Poor business development capacity of key project implementers/managers, service providers and beneficiaries of renewable energy projects
2) Limited business-oriented models and robust results-based planning, monitoring and evaluation indicators and targets for renewable energy projects to ensure their long-term impact and sustainability.
3) Inadequate use and leverage of technical and research institutions.
4) Inefficiency in the operation and maintenance of machinery and equipment, and in the adoption of technological improvements and upgrades.
5) Cultural constraints – e.g. many rural communities still regard renewable energy an inferior forms of energy.
6) Difficulty for investors to identify matured bankable projects with proper documentation and scale potential.

A key challenge, affecting in particular small and medium size private investors, is the inability to obtain credit or loans to finance their investments in the sector. This is partly due to the fact that the financial sector does not have strong risk mitigating instruments such as partial risk guarantees and renewable energy payment agreements to provide the needed assurance. An important factor in engaging the two sectors is the need to equip the private sector and especially the financial sector with knowledge of the renewable energy industry. This would be crucial in developing and offering the long-term financial products required by the sector.

2.2.4 Ghana's commitment to the Sustainable Energy for All Initiative

An important step towards tackling these issues lays in Ghana's participation in the UN Secretary General's ***Sustainable Energy for All (SE4ALL) Initiative***, which aims to achieve three goals by 2030 globally:

1. Energy Access: ensure universal access to modern energy services;
2. Energy Efficiency: double the global rate of improvement in energy efficiency; and
3. Renewable Energy: double the share of renewable energy in the global energy mix.

In the case of Ghana, the Government decided to focus on increasing universal energy access by off-grid community-based electrification, improving access to modern fuels for cooking (improved cook stoves and LPG), and promoting the productive uses of energy. In this connection, the Energy Commission (national focal point for SE4ALL), with technical and financial support from UNDP, developed the ***SE4ALL Action Plan***, which was officially launched at the United Nations Conference on Sustainable Development (Rio+20) in Rio de Janeiro in June 2012. The Action Plan identifies key bottlenecks/barriers and proposes critical actions and commitments to address prioritized needs in the energy sector towards the attainment of the objectives outlined above.

The prominent role of renewable energy is clearly demonstrated in some of the projects that the Government has prioritized for the implementation of the SE4ALL Action Plan:

- **Off-grid electricity:** 2 million solar lanterns; solar for ICT in 5,000 remote schools; solar for 1,000 remote/riverbank health facilities; 50,000 solar home systems; mini-grid renewable energy electrification for 20 communities

- **Productive uses of electricity:**

  1) Promotion of renewable energy resources for irrigation to increase agricultural productivity.
  2) Agro-processing, including solar dryers, palm-processing plants and multifunctional platforms for grinding and milling.
  3) Cold storage for fish at landing sites.
  4) Introduction of aquaculture ventures.
  5) Salt production – support medium scale enterprises.
  6) Biogas – introduce institutional biogas systems for schools, hospitals, and prisons; Improved biomass systems for thermal energy and power generation for small-scale industrial applications (brick, tile & ceramic etc).

A key element of the SE4ALL approach, reflected in the Ghana Action Plan, is the recognition of the need for partnership building and concerted action by government, civil

society, research community and the private sector, in order to address the gaps, challenges and barriers of the energy sector. Coordination between different actors is needed to assemble all the necessary elements of success. Without a stable policy environment with commercial opportunities, companies will not invest in R&D or deployment; without action by private companies or civil society organizations, national policy programmes will not achieve the desired scale and impact. According to the SE4ALL Framework of Action (2012), *"donor governments, public development partners and multilateral institutions can mobilize resources, provide technical assistance and policy guidance, engage in knowledge and capacity building, share best implementation practices, and make direct financial investments*".

The project will ensure that the selection of the projects and sites benefitting from the RETs transfer is in line with the priorities set by the Government of Ghana in the SE4ALL Action Plan, in particular with regard to productive uses of energy and off-grid solutions for decentralized energy access.

Renewable energy resources and technologies

Ghana is well endowed with renewable energy resources particularly biomass, solar, wind energy and hydro resources. The development and use of renewable energy resources have the potential to support Ghana's energy security. Using renewable energy can also mitigate the negative climate change impact of energy production and use, as well as solve urban and peri-urban sanitation problems through biomass and waste-to-energy technologies. Hydropower is still the most important renewable energy source accounting for about 55% of electricity generation capacity in Ghana. Additional hydropower plant with 400MW generation capacity has been completed and commissioned, however none of the small and medium hydro power resources (below 100MW) has been developed. The key objective of the Energy Policy is therefore to increase the proportion of renewable energy, particularly solar, wind, mini-hydro and biomass in the national energy supply mix.

The Government of Ghana seeks to achieve universal access to electricity by 2016, and the sustainable utilization of biomass resources (e.g. waste), which has been captured in the SE4ALL Action Plan:

1) The use of modern forms of energy to support the agricultural sector with the aim of ensuring food security.
2) The deployment of efficient cookstoves to households with the aim of reducing woodfuel consumption and therefore alleviating the problems associated with its use.

The project will therefore focus on the following renewable energy resources and technologies in line with the Government of Ghana's priority areas:

Biomass (improved cook stoves)

Wood fuels account for over 70% of total primary energy supply and about 60% of the final energy demand. Moreover, the majority of households (about 80%) in Ghana depend on wood fuels for cooking and water heating in addition to commercial, industrial and institutional use. The demand for wood puts Ghana's forests under tremendous pressure and has severe consequences for the ecosystem as a whole. Deforestation rates (3% per annum) in Ghana are amongst the highest in Africa, with current levels of wood fuel consumption far exceeding forest growth. The charcoal production process contributes heavily to this deforestation and is responsible for high emissions of greenhouse gases such as carbon dioxide and methane. It is estimated that over 100,000 cook stoves are disseminated annually in Ghana. These have generally been found to be efficient. However, their emissions raise serious health concerns due to indoor air pollution. There are also concerns over the level and type of technology used to manufacture the cook stoves and the eventual quality of the product. UNDP Ghana is currently supporting the Energy Commission and the Ghana Standards Authority to develop standards for improved cook stoves and to establish a testing, certification and expertise center for cook stoves

The improved cook stoves such Ahibensu, Gyapa and others have been promoted in the country but its adoption by the population have had some challenges. These include:

1) Small number of entrepreneurs.
2) Low economies of scale of the improved cook stoves.
3) Limited public awareness of the biomass technology and its benefits.
4) Unsustainable production techniques
5) Difficulties in obtaining secure tenure for large tracts of land for commercial development of biomass.

Biogas (for cooking and power generation)

Ghana has a large potential for biogas production, deriving both from agro-fuels and from waste-fuels. Agriculture is a major industry in Ghana, and consequently, large amounts of by-products/residues that can be used for energy production are generated. For example, it has been estimated that there is 553,000 tonnes of maize cob and stalk produced with a potential energy of 17.65 - 18.77 MJ/kg and 19 tonnes of paddy rice husks with a potential energy of 16.14 MJ/kg. For animal waste, the estimated energy for cattle dung in 1996 was 203,651 GJ/day, sheep 39,474 GJ/day, goats 51,667 GJ/day, pigs 17,365 GJ/day and poultry 3,968 GJ/day. Municipal waste is generated in large quantities. For example, Kumasi and its suburbs generate up to 1,600 tonnes daily while Accra and its environs generate up to 2,500 tonnes. In general, municipal waste generation in the metropolitan centers varies

from 600-800 tonnes per day. Additionally, Accra generates over 800m3 of liquid waste per month. This could be a good feedstock for biogas production for cooking and electricity generation. A number of biogas plants have been installed in institutional and commercial premises but its widespread dissemination also faces challenges.

Key challenges and gaps in this sector include:

1) Small number of entrepreneurs.
2) Lack of support and training for technicians, artisans and entrepreneurs engaged in the development of biogas plants.
3) High start-up costs and currently no subsidies to support biogas technology development; unsuitable design of biogas plants.
4) Limited public awareness of the biomass technology and its benefits.
5) Little value placed on waste resources.
6) Unsustainable production techniques; difficulties in obtaining secure tenure for large tracts of land for commercial development of biomass.

Mini-hydro (for agriculture activity and small households)

There are 22 exploitable mini-hydro sites (below 1MW capacity) in the country with a combined potential generation capacity of between 5.6MW and 24.5MW. These sites are mainly waterfalls to take advantage of their high heads in run-of-the-river schemes. In most of these areas, tourism has become an important source of livelihood; therefore disrupting the attractive waterfalls for the purpose of power generation could become a source of conflict for the majority of communities that rely on the tourist and religious activities. The possibility of combining power generation with the existing tourism industries is therefore found to be necessary. This notwithstanding, the river downstream of some of these potential sites have good heads and embankments such that power can be conveniently harnessed through the construction of weirs to improve plant operation.

Key challenges and gaps in this sector include:

1) Adequate data to help develop mini-hydro technology not easily assessable, unavailable and outdated.
2) Concessional financing not available to private developers.
3) Ghana has many run-off rivers that can be used for mini-hydro. However, the big run-off rivers have varying speeds (seasonally dependent), small rivers run-offs can dry up.

Solar and wind (pumps for irrigation)

Ghana is endowed with enormous solar energy resource spread across the entire country. Over 11,500 solar systems have been installed in more than 120 communities throughout the country for off-grid application. The government through the Volta River Authority

(VRA), the main power producer in the country, has just added to the national grid a 2MW solar power to complement the power deficit in the country. Using locally produced materials in development of small off-grid solar PV systems presents an opportunity to generate employment but this needs technology transfer along with a package of capacity building support. Ghana has about 2,000MW of raw potential for wind energy. It is currently reliably projected that over 300MW installed capacity of wind farm could be established at the coastal part to generate over 500GWh to supplement the nation's energy supply. The Government has indicated (see SE4ALL Action Plan) that solar and wind pumps could substantively contribute to the further development of the irrigation system in the country.

Key challenges and gaps in this sector include: high initial investment costs; lack of clarity on custom tariffs; lack of favorable finance packages for consumers and solar energy entrepreneurs; lack of well trained personnel at all levels; lack of certification of installers and service providers; lack of long term planning and markets for solar energy technologies; limited access to finance and high interest rates.

2.3 China's renewable energy experience: Relevance for Ghana

In the last 60 years China has experienced unprecedented economic growth. The country has undergone a deep structural transformation, creating significant levels of employment and translating GDP growth into tangible improvements in living conditions of its people.

Diversification of energy resources, especially transitioning to renewables, is a critical aspect of China's continued development. As concerns over environmental degradation increases, balancing growth with the achievement of environmental objectives has become a priority, and investments in renewable energies have grown with an average of 80% per annum since 2004.

In 1992, when Agenda 21 took its initial steps into China, the government was just starting to promote renewable energy. Since then, there has been a steep progression in policies, laws, regulations and investments linked to the national agenda of sustainable development, which have supported the establishment and subsequent growth of the renewable energy market.

Through the expansion of provincial electricity grids, local hydroelectricity facilities and the promotion of other renewable energy alternatives, China has achieved high rates of electrification reaching 99,8% of its population in 2012. With China's tenth Five-Year Plan (2001-2005), renewable energy policies fully embraced the entire country's development agenda. This was symbolized by the launch of the Western Development Strategy, which

specifically targeted integration, as well as the exploitation of renewable energy resources into wider national development and rural development plans. An important part of this is the Household Electrification Program, which aimed at providing energy access to the rest of the 8.5 million people living in remote areas without electricity in Western China by 2020.

Overall, the generation of electricity from renewable energies has increased from nearly 0% of the total energy produced in 1993 to 0.3 % in 2013. Considering the sheer scale of China, this nominally small increase has made China a global leader in several sectors of green technology production:

- China's small hydropower capacity is roughly equal to all small hydro capacity in the rest of the world combined. Hydro energy accounts for 17.4% of China's energy mix in 2012.
- In 2010 China's Solar Photovoltaic (PV) companies held 50% of the global market and nine of the fifteen top solar PV panel manufactures worldwide is located in China.
- China's installed solar water heating capacity alone accounts for 80% of global installations and China is the world's leading manufacturer of solar water heaters.

2.3.1 China's creation of an enabling environment for renewable energy

The National Climate Change Programme set targets for reducing energy intensity by 20% during 2005-2010 and increasing the use of alternative energy to 10% of primary energy use by 2010.[1] China's Renewable Energy Law passed in 2005 and revised in 2007 set targets for increasing the share of renewable energy sources from 5% in 2005 to 15% in 2020. The Renewable Energy Law requires grid operators to purchase renewable electricity, adopts feed-in tariff for biomass and wind electricity, and provides tax incentives as well as subsidies for renewable energy sources.[2] China also uses its value added tax (VAT) to promote renewable energy. Due in part to these policies, China achieved its renewable energy targets (installing a 200 GW Renewable Energy Standard) in 2009, and exceeded those targets during the 11th FYP.[3]

2.3.2 China's institutional framework

[1] National Development and Reform Commission (2007).China's National Climate Change Programme.
[2] See for instance Martinot, Eric (2010). Renewable Power for China: Past, present and future. Frontiers of Energy and Power Engineering in China, Vol. 4, No. 3, 2010, pp. 287-294.
[3] Bellvrait, Elie (2011). Climate Policies in China, India and Brazil: current issues and future challenges. IDDRI Working Paper No 16, 12 July 2011

- **The Ministry of Science and Technology** is responsible for all science and technology national planning and regulation, including renewable energy technologies. It also holds responsibility for the implementation of China's sustainability commitments under Agenda 21and will host the PMU supported by the project.

- **The National Development and Reform Commission (NDRC)** and the **National Energy Commission (NEC)** are the most dominant Chinese state institutions in the field of energy. The two coordinate policy strategies to be implemented by the **National Energy Administration (NEA)**.

- The **State Electricity Regulatory Commission (SERC)** and its subsidiary body the **China Electricity Council** are responsible for regulating the power industry. China is planning recently to restructure the National Energy Administration (NEA) in order to streamline the administrative and regulatory systems of the energy sector. The **new NEA** will assume the functions of the State Electricity Regulatory Commission (SERC), which will be dissolved. The main responsibilities of the consolidated administration will include drafting and implementing energy development strategies, plans and policies, advising on energy system reform and regulating the sector.

- The **State-Owned Assets Supervision and Administration Commission** (SASAC) is in charge of overseeing and approving all policy decisions involving State Owned Enterprises, several of which are involved in the energy sector and production of renewable energy technologies

2.3.3 Rural electrification in China

Originally, the Chinese government considered the extension of the grid as the backbone of its plan to take electricity to rural areas. This perception has substantially changed over the years. Extending the grid might not be economically competitive when compared to off-grid renewable energies. Since the 1990s, a number of projects have been launched based on solar and wind power to provide cost-effective alternatives to grid extension to rural areas. These projects have been the focus of Chinese rural electrification initiatives in recent years. As a result, China is currently one of the world leaders in both the production and installation of renewable energy technologies in rural areas.

Recent rural electrification initiatives based on renewable energies include:

- The Brightness Program (1996-2010) - represented the first initiative driven by the

Chinese government to use off-grid renewable energy from solar and wind to provide electricity to 23 million people in rural areas by 2010.

- The Township Electrification Program (2001-2003) - one of the largest renewable energy-based rural electrification programs in the world. With a total investment of USD 700 million supplied by both the central and local governments, this program electrified over 1,000 townships in less than 20 months.

- The China Renewable Energy Development Project (CREDP) (2001-2007) - funded by the World Bank and Global Environment Facility, the project aimed to reduce the cost of solar photovoltaic (PV) systems, improve PV product quality, develop the potential rural PV market and improve after-sale services for PV systems in remote rural areas.

As noted above, China has achieved an electrification rate of 99,8% in rural areas in 2012 and set a goal of a full rural electrification before 2020. In China's 12th FYP, the Chinese government pledges to put more effort into developing renewable energy sources in rural areas. The government has therefore launched various green energy demonstration projects in accordance with local needs. By 2015, a total of 200 green-energy counties and 1,000 villages using solar energy will be set up as examples. China rebuilds old hydropower stations in rural areas to increase their capacity and efficiency. It accelerates the electrification of rural areas using hydropower, and builds more small-sized hydropower stations in order to replace the use of wood as fuel in some rural areas. In addition, the Chinese government promotes the use of solar water heaters around the country. Significant parts of this experience will be directly transferable to the set-up of demonstration sites and training centers in Ghana.

2.3.4 Renewable energy resources and technologies

The 12th FYP highlighted the renewable power industries as one of China's new strategic industries. This has significant implications as strategic industries enjoy strong financial and political support. Among the renewable industries, wind, hydro, solar PV and biofuels represent different stages of development in renewable energy production in China.

This section focuses on the renewable energy technologies that are the focus of this project and the policies, programs and standards promulgated and implemented by the government to advance these technologies.

Hydropower

China is the world's leading hydropower producer and has seen significant growth of hydropower capacity. China's capacity is estimated to increase by16.5% annually towards 2020. The growth has been secured through government investments of more than 30 billion RMB each year in recent years, adoption of a series of regulations, development of rural electrification planning methods and implementation of several flagship programs. Small-scale hydropower promotion projects directly relevant for the Ghanaian context include 'Sending Electricity to Villages', 'Replacing Firewood by Electricity' and '400 Rural Electrification Counties'. China has set a target for total rural hydropower capacity of 75,000 MW by 2020. China is already sharing these experiences with significant success in 10 African countries through its Light Up Africa Initiative.

Solar

Solar technology is expanding in China, and with significant investments in solar cell and module production China now accounts for more than 90% of world output in the sector. The installed capacity of photovoltaic systems has reached 18GWp in 2013now the largest PV market outside Europe. One of China's key policies for promoting the adoption of solar technology in is its Golden Sun Program. The Golden Sun Program is a national program that provided upfront subsidies for qualified demonstrative PV projects from 2009 to 2011. The program was designed to subsidize the total cost of both on-grid and off-grid applications. Incentives for off-grid applications were particularly strong, offering 70% of project costs in upfront subsidies for these systems in rural areas. Grid companies are required to buy all surplus electricity output from solar power projects that generate primarily for the developers' own needs, at similar rates to on-grid tariffs set for coal-fired power generators.

With the use of solar photovoltaic systems, solar-powered irrigation technologies have also been gradually developed, and for solar thermal conversion, as at the end of 2007, China solar water heater production reached 23 million square meters, with total holdings amounting to 108 million square meters, 55% of global capacity. And at the end of 2012, China solar water heater production reached 64 million square meters, with total holdings amounting to 258 million square meters.

China has also deployed various solar technologies in developing countries, including solar PV, solar water pumps, solar thermal and solar cook stoves. Chinese technologies include both on-grid and off-grid capability. Chinese off-grid solar PV solutions for rural household-use are designed to maintain the normal power supply for at least 3 consecutive cloudy days and rural electrification has been a core focus of China's solar power investments. Household-use systems and photovoltaic pumps have been widely used in Tibet, Guangxi and Inner Mongolia of China and in Nigeria, South Africa and Pakistan.

Clean cook stoves

In China, approximately 80% of households rely on solid fuels like wood or dung to meet their energy needs. According to World Health Organization estimates, this exposure accounts for more than 540,000 premature deaths in China each year, and causes significant chronic and acute illnesses. By developing Clean Cook stoves, China is taking an important step towards reducing the health, gender, economic and environmental risks associated with inefficient and polluting cook stoves both in China and in developing markets around the world.

Significant efforts and funds have been invested to improve household biomass stoves and a ministry standard has been developed to evaluate and guarantee quality biomass stoves according to 'C4 features': The Clean, Convenient, Cost-effective, and fuel Conserving (C4) biomass stoves promotion has resulted in more sustainable use of biomass fuel, more healthy kitchen environments, reductions in eye- and respiratory diseases and reduced emissions. China's domestic cook stove industry is one of the world's largest with over 100 manufacturers.

Biogas

China's experience with biogas development ranges from small household biogas plants for cooking and lamps, to medium/large size projects for power and heating generation. China's biogas technologies are comparatively well advanced with several manufacturers of household biogas digester units that meet China's National Rural Household-Use Biogas Digester Standard. Household biogas plants contribute to environmental- and energy conservation; they integrate waste management and produce free fuel for cooking, contribute to healthier kitchen environments, and farmers cut fewer trees for fuel, saving 1.78 t/a wood (0.314 hm2 forest) on average, significantly contributing to global climate change mitigation. The combined benefits of household biogas digesters have supported poverty reduction in rural areas in China for the last fifty years.

2.4 China's South-South Cooperation

While China has extensive experience in cooperating with African countries and supports a wide range of development processes, strategic South-South Cooperation is still a relatively new phenomenon with significant gaps in situational and cultural knowledge and global good practice. Several Chinese institutions and companies are engaged in ad-hoc partnerships, often in the framework of provision of technologies, infrastructure or other bilateral cooperation, but this does not always take place in a coordinated and strategic manner in support of national development goals in the receiving country. The lack of a central coordination body in China makes collection of good practice and sharing of lessons learned for new partnerships difficult.

There has also been a tendency to emphasize hard-ware over software, sometimes with a resulting lack in local capacities to appropriately deploy and manage technology transfers resulting in waste of resources that could have better supported national development processes. Compounding this, with the rapid expansion of Chinese involvement in Africa and elsewhere, Chinese stakeholders are not always adequately aware of local regulations, customs and cultural norms. At times, this has inhibited effective project implementation with deployment of inappropriate technologies.

Finally, large parts of the Chinese experience in the field of renewable energy is not readily available to external partners but is dispersed at regional levels without a central repository to facilitate exchange of experience. As China becomes more involved in a number of development contexts, addressing these challenges will contribute to maximizing the mutual benefits of South-South Cooperation and leverage the significant potentials of China's contribution to international development efforts, including for pushing forward the adoption and roll out of renewable energy technologies in Ghana.

3. STRATEGY

In the past few years, Ghana has made considerable progress in extending access to modern forms of energy to the majority of the population, including through the development of renewable energy sources. The creation of a clear regulatory framework for the sector is ongoing and investments from both the public and private sectors have been on the increase. Nevertheless, several challenges and gaps both at the institutional/regulatory and technological/capacity levels are hindering Ghana's progress towards achieving universal access to energy, ensuring a more developed and widespread use of energy for local economic development, and pushing forward the renewable energy sector. On the contrary, China is currently one of the leading nations in the area of renewable energy. There has been a steep progression in policies, laws, regulations and investments linked to the national agenda of sustainable development, which have supported the establishment and subsequent growth of the renewable energy market. China is in fact exhibiting global leadership in several sectors of green technology production.

In the context of the SE4ALL Initiative, which has Ghana as one of its "first mover" countries, South-South cooperation between China and Ghana is one of the most strategic opportunities to address in an innovative manner the challenges affecting the further development of the renewable energy sector in Ghana and overall the access to electricity by its entire population.

This project aims therefore to facilitate the development and transfer of renewable energy technologies from China to Ghana along with the support required to make the technologies effective, including training and capacity building, transfer of know-how and best practices. The project will operate both at the upstream level (supporting the creation of an enabling environment for technology transfer) and downstream level (actual transfer and demonstration of technologies with potential up scaling by the private sector). To do so, the project will help formulate innovative South-South cooperation approaches to enhance sustainable green investment and business in Ghana. To facilitate this process, the project will also address key outstanding capacity gaps for China to engage in strategic South-South Cooperation through the facilitation of stakeholder coordination, training of key stakeholders engaged in South-South Cooperation and support to production of surveys, reviews and reports to bring out key parts of China's development experience in the renewable energy field to inform and inspire Ghana's policy process,

The project will be used as a launching pad for nurturing and building the capacity of knowledge networks in China and Ghana and exchanges between the two to ensure a country-driven technology transfer; local renewable energy industry capacity, and private sector development. It is also envisaged that the renewable energy technology transfer cooperation between China and Ghana will allow the GoG to launch a swift follow up to the SE4ALL Action Plan process by immediately addressing the priority needs that require realistic and pragmatic technology transfer.

In order to maximize benefits and impact, the project will seek to establish synergies with two other initiatives in China and Ghana addressing similar issues. In the case of Ghana, for example, the project will create linkages and collaboration with DANIDA-funded Ghana Climate Innovation Center (GCIC), which aims at offering a full suite of financing and capacity building services to technologists, entrepreneurs and new ventures that address challenges to starting and scaling their innovative climate or clean technology businesses.

In China, CNREC, China National Renewable Energy Centre, which is partly established by Denmark, is a central stakeholder to the project. CNREC, is the national institution affiliated to Energy Reduction Initiative for assisting China's energy authorities in renewable energy (RE) policy research, and industrial management and coordination. CNREC does research in RE development strategy, planning, policy and regulation

CNREC is combining the function of a national think tank with the function of a knowledge hub for cooperation between China and the international community on renewable energy Including cooperating with international institutions as IRENA and IEA. CNREC is currently preparing for an international training centre on renewable energy for development countries as part of the cooperation with IRENA.

Concretely, CNREC will be:

1. Contributing significantly to the review of the Chinese renewable Energy experience and policy components
2. A central member of the Chinese stakeholders alliance for China-Ghana/Zambia Renewable Energy Technology Transfer, RETT, as CNREC's establishment is a joint effort between China and Denmark increase the capacity of the Chinese authorities to manage the rapid development for renewable energy in China – functions central to this project as well.

The project will be implemented in a four-year period and has the following **Development Objective**: "Enhanced capacity for South-South development cooperation between China and countries in Africa within renewable energy transfer has been developed and tested"

The specific **Project Objective** is**:** *To contribute to climate change mitigation and reduce poverty by increasing access to renewable energy solutions through enhanced investment and production of Renewable Energy Technologies (RET) in Ghana, within the framework of South-South Cooperation between Ghana and China.*

This objective will be achieved through the implementation of the following four
Outcomes:

1. Ghana has an enabling environment in place for the transfer, production and regulation of the use of Renewable Energy Technologies in Ghana
2. Access to and use of relevant Renewable Energy Technologies (RETs) increased in Ghana
3. China's has strengthened capacity for South-South Cooperation in relation to RET transfer
4. Project management and coordination structures established

3.1 Outcomes/ Outputs/Activity Results

3.1.1 Outcome 1: Ghana has an enabling environment in place for the transfer, production and regulation of the use of Renewable Energy Technologies

This outcome will focus on strengthening the regulatory and institutional framework governing the renewable energy sector, in order to promote and facilitate investments, technological cooperation and private sector participation in developing RETs. On the one hand, this project will leverage the Chinese experience and expertise in formulating

policies, laws and strategies to promote investments in RETs, in order to improve and consolidate the Ghanaian RE regulatory framework. In particular, the project will put emphasis on the development of the Ghana Renewable Energy Master Plan, which will play a strategic role in effectively implementing the provisions included in the Renewable Energy Act. On the other hand, the project will seek to identify and remove the regulatory, technical, social and other barriers in Ghana, which are currently hindering effective and widespread absorption of RETs.

It is therefore expected that this outcome will lay the foundations and create the necessary enabling environment for the transfer and demonstration of selected RETs in Ghana, setting up an RET transfer model that Ghana can subsequently adjust and replicate with other countries willing to contribute to technological innovation in the renewable energy sector. It is also expected that the activities carried out under this outcome will have a trickle-down effect in terms of strengthening the conditions required by the private sector (both national and foreign) to invest in RETs.

Outcome 1 has two components:

Output 1.1: Strategy and policies for enhanced use, regulation and promotion of RET in Ghana in place

In order to identify which Chinese best practices and lessons learnt could be useful in the Ghanaian context, the project will review the past and current Chinese and Ghanaian RE policies and strategies. Specifically, experts from China and Ghana will be engaged to conduct studies and consultations with key stakeholders on China and Ghana RE policies This will be fundamental in order to ascertain the capacity needs and gaps in the Ghanaian regulatory framework, and appropriately utilize the Chinese experience and demonstrate how China created access to renewable energy and became a key producer of RETs. The outcome of these studies will be instrumental in drafting the Ghana Renewable Energy Master Plan (REMP), which is expected to include: a) an integrated RE planning framework, b) roles and responsibilities among relevant institutions and a roadmap for up-scaling, c) a work plan, d) a capacity needs assessment for implementation and e) an awareness raising plan. In this connection, the Ministry of Energy will set up a task force with the mandate to coordinate and provide the technical inputs to the development of the Plan. This will be done in collaboration with other projects funded by other development partners and implemented by the Ministry. This project will strategically focus on the off-grid decentralized renewable energy solutions of the Plan. The drafted REMP will be reviewed through wide stakeholder consultations and submitted to Parliament for approval. Upon approval, an official launch will be organized and the main elements of REMP and its drivers disseminated through electronic and print media. The project will collaborate with

the GCIC to conduct a wide roll-out of the REMP and with CNREC in reviewing and mapping the Chinese approach.

The main activities for this Output can be summarized as follows:

Activity Result 1.1.1: Review Chinese and Ghanaian RE policies and strategies to identify capacity building gaps and solutions to address them.
Activity Result 1.1.2: Draft and submit to Parliament the Renewable Energy Master Plan (REMP).
Activity Result 1.1.3: Launch and disseminate the REMP.

Output 1.2: Barriers to effective transfer of Renewable Energy Technologies removed.

The output will focus on identifying and removing remaining social, technical, regulatory and financial barriers that hinder effective RET transfer. To do so, experts will be hired to conduct an in-depth analysis of the situation by carrying out desk review studies, surveys, and interviews. This will form the basis for the identification of specific and tailored solutions, which will be compiled in a roadmap to accompany the Master Plan developed under output 1.1 and include specific targets, technology applications and timelines for addressing the identified barriers. Training programmes will be designed and conducted for Ghanaian stakeholders, including governmental agencies, research institutions, private sector, and small and medium enterprises to discuss and acquire skills and competences to implement the suggested road map. Training programmes will also be conducted to address the identified capacity building needs for Chinese institutions involved in renewable energy and South-South Cooperation and the Ghanaian institutions on 1) project identification, 2) project development, 3) technology identification and modification 4), implementation and evaluation of development projects related to energy and environment. This exercise will facilitate the RET demonstration, and in particular the RET transfer between China and Ghana, which constitutes the core of Outcome 2.

The main activities for this Output can be summarized as follows:

Activity Result 1.2.1: Conduct in depth analysis of regulatory, technical, social and other barriers in Ghana and China currently hindering effective and widespread absorption of RET.
Activity Result 1.2.2: Develop a roadmap to remove or reduce barriers to effective RETT in Ghana

3.1.2 Outcome 2: Access to and use of relevant Renewable Energy Technologies (RETs) increased in Ghana.

This outcome will focus on transferring specific and appropriate RETs to Ghana on a pilot basis (output 2.1) and creating the conditions for subsequent up scaling (output 2.2). It is therefore expected that the project will contribute to increasing access and use of RETs in Ghana, primarily by filling the current technological gap in the renewable energy sector. This outcome will take into consideration three main factors in order to ensure the success and above all the sustainability of the RET transfer promoted. First of all, the project will demonstrate the appropriateness of the selected Chinese RETs in the specific Ghanaian context. To do so, a prominent role will be played by the cooperation between Chinese and Ghanaian research institutions, which is fundamental to develop criteria/standards and understanding the cultural/social/economic requirements for the selection of the technologies to be transferred, but also to facilitate long-term institutional exchange and cooperation, as well as monitoring after the end of the project.

The project will ensure that the selection of the projects and sites benefitting from the RETs transfer is in line with the priorities set by the Government of Ghana in the SE4ALL Action Plan, in particular with regard to productive uses of energy and off-grid solutions for decentralized energy access. This will be critical to ensure wide ownership of the interventions on the side of the government and the other stakeholders involved. Further, the project will facilitate private sector involvement in the RETs technologies up-scaling. Relying on the development of financing mechanisms and business models and on the collaboration with Chinese private companies, the main objective will be to further strengthen and develop the capacity of the local private sector in producing, assembling and managing renewable energy technologies and products, both on its own and more importantly in partnership with the public sector. This will be fundamental for a sound market-based development of the renewable energy sector, as well as for the potential benefits in terms of creating jobs and local economic development.

While this outcome is focused on practical downstream interventions, it is expected that the best practices and the lessons learnt gathered through the implementation of the pilot RETs transfer and subsequent up-scaling will further inform and provide inputs to the strengthening of the RE regulatory framework and the overall enabling environment even after the completion of the project. It is also expected that, through the replication and up-scaling of the pilot demonstration projects, as well as through the dissemination of lessons learnt, the project will constitute an opportunity to stimulate the local demand for renewable energy and therefore contribute more substantively to reach the Government's policy objective of 10% contribution of renewable energy in the electricity generation mix.

Outcome 2 has two components:

Output 2.1: Appropriateness of selected technologies (biogas, improved cook stoves, solar and wind power, and mini hydro) for transfer demonstrated.

This output constitutes the core component of the project, as it will entail the selection of Chinese RETs and their transfer to Ghana on a pilot basis. In order to make an appropriate selection of the technologies, a number of complementary steps will be taken: 1) Chinese and Ghanaian research institutions will develop criteria and standards to identify the technologies to be transferred; this will be done by taking into account main differences between China and Ghana in terms of geographical conditions and socio-cultural technological requirements; 2) an in-depth review of readily available technologies in China potentially suitable for transfer to Ghana or which could be modified and become applicable to Ghana will be conducted; this will also facilitate the identification of private sector partners from China who can partner with the Ghanaian local private sector; 3) economic and marketing experts will conduct a regional market research and an Inputs Value Chain analysis on the potential technologies.

The Chinese RETs selected through this process will then be piloted in identified demonstration sites. The pilot phase will require the development of technological adaptation plans (including business plans), the setting up of testing sites with RE experts from China and Ghana (in collaboration with government and research institutions from both countries), the design and implementation of on-the-job training for maintenance and servicing of the RETs, to ensure the sustainability of the testing sites. Proper mechanisms to monitor the implementation of the pilot phase and the gained benefits (CO_2 reduction, energy output, socio-economic progress etc.) will be concurrently designed and implemented. The monitoring results and the lessons learnt will then be shared in a web-based Virtual Centre, which will be instrumental in informing other RETs related projects, as well as providing useful information to policy makers and regulatory institutions with the overall aim to expand further the development/absorption of RETs and improve the enabling environment.

In implementing this output, the project will potentially rely on a range of services provided by the GCIC, especially in the area of technology and product development, such as access to R&D facilities and technical courses. This collaboration will assist the South-South cooperation efforts by promoting strong interlinkages between research and private sector.

The main activities for this Output can be summarized as follows:
Activity Result 2.1.1: Selection and adaptation of appropriate RETs to be transferred

Activity Result 2.1.2: Facilities to receive, test, demonstrate and exhibit equipment and publish performance results

Output 2.2: Increased use of Renewable Energy Technologies in Ghana supported through capacity building and financing mechanisms

This output will focus on creating the enabling conditions for the up scaling of the most successful RETs piloted under Output 2.1, having the local private sector as the main target. To do so, a preliminary review of the pilot RETs will be conducted, relying on the information provided by the monitoring mechanisms previously established and the lessons learned exercises conducted. This, combined with a stakeholder consultative process, will facilitate the selection of the RETs to be up scaled and determine the specific methodologies. This will include i) capacity building through the development of training material and support to technology training facilities in Ghana, ii) exploration of institutional financing mechanisms to support technology transfer, iii) support to the development of business models for increased private sector involvement, including the identification of potential investors for collaboration and future technology exchange, and iv) development of business development mechanisms for production start-up and facilitation of linkages between financial institutions (and finance mechanisms) and business developers. It is expected indeed that the interested private actors will submit specific business proposals that require financial support from the financial institutions. The project will also explore the possibility of developing public private partnerships and platforms. It is expected that, through this process, the new business activities created can effectively be self-sustained after the project is completed and no other donors or development partners' funding is available.

In implementing this output, the project will seek synergies with the GCIC, mainly to assist the local private companies in the areas of entrepreneurship and venture acceleration (business advisory, mentoring and access to professional services), market growth and access (market research and analysis, technology quality and performance database and information), and above all access to finance. In this area, there might be the opportunity for local start-up companies to access seed capital investments funds provided by the GCIC to upscale the piloted RETs and access attract other sources of funding and investments.

The main activities for this Output can be summarized as follows:
Activity Result 2.2.1: Support to training facilities within existing institutions for increased capacity building on RETs
Activity Result 2.2.2: Develop institutional financing mechanisms to up-scale RETT in Ghana

Activity Result 2.2.3: Develop business models to support private sector involvement and public – private partnerships in RETT in Ghana

3.1.3 Outcome 3: China has strengthened capacity for South-South Cooperation in relation to RET transfer

This outcome will focus on the Chinese institutional and private sector capacity to engage in mutually beneficial technology transfer through the South-South Cooperation approach. In the separate project between UNDP China and Zambia, the Chinese Centre for South-South Cooperation on RET transfer will be established. The following outputs and activities under outcome 3 will all be linked to the functioning of this center. To support the project implementation and create the foundations for future constructive Chinese support to Ghana's renewable energy to continue beyond the project, a number of activities to build Chinese capacity will be supported, lessons learned from the Chinese development experience will be gathered, guidelines will be revised and China – Ghana networks and information exchange platforms will be created. Similar activities will be done under the Zambian project adding to the Centers capacity. In addition under the Zambian project the vision and mission of the SSC Unit will be established. China's approaches to technology selection and transfer will be Map, update and share and training materials will be developed on South–South Cooperation and Renewable Energy Technologies and trainings conducted. This will build on priority actions and gaps identified throughout the consultations and study visits carried out as part of the preparation of this project. This includes addressing significant gaps in China's current ability to appropriately share targeted lessons learned and good practice from its development experience, a key component of effective and appropriate South-South Cooperation. It also addresses the lack of updated guidelines and material on mutually beneficial participatory cooperation modalities in the Renewable Energy Sector in general and specifically relating to the Ghanaian context.

The Outcome has two components:

Output 3.1: Knowledge base and China – Ghana networks for South-South Cooperation on technology transfers created

This output focuses on creating the necessary information and knowledge base and stakeholder networks for increased South-South Cooperation between China and Ghana on technology transfers, to continue and upscale efforts also beyond this project. Key parts of the Chinese RET development experience which could inspire and support Ghana's development process is not centrally available, and to address this the project will support the mapping of national and regional planning approaches, laws, programs, financing

mechanisms and institutional set-ups and make this mapping available to Ghanaian stakeholders through training workshops and on-line information exchange platforms. To support the review of China's manuals and guidelines, Chinese stakeholders, including CNREC, will visit Ghana to study Ghana's energy sector and the revised Rural Electrification Master Plan and related roadmap. Findings from the study tour will inform the design of the knowledge exchange platform and the information to be shared to fit directly with the specific context in Ghana. The knowledge exchange platform will include a website with key information and the establishment of a China – Ghana expert community through study tours and knowledge exchange to provide continuous support to the up scaling of technology transfer.

The main activities for this Output can be summarized as follows:
Activity Result 3.1.1: Map, update and share China's experience and approaches to technology selection and transfer in collaboration and consultation with CNREC
Activity Result 3.1.2: Organize exchange visits to share knowledge on the Chinese and Ghanaian contexts and build foundations for technology transfers
Activity Result 3.1.3: Share and disseminate knowledge on mission findings and project achievements

Output 3.2 Mechanisms for up scaling Renewable Energy Technology Transfer from China to Ghana established

This output focuses on establishing a Chinese strategy and stakeholder alliance for up scaling technology transfer of Renewable Energy Technologies from China to Ghana. Through other project activities the necessary information on markets, regulatory frameworks, technological and cultural issues have been produced. This information will be consolidated in a practical roadmap for up scaling of technology transfer to be followed by Chinese stakeholders. Importantly, this output will address the issues of 'how to proceed with up scaling', 'how to finance up scaling' and 'who will be involved in the up scaling'. It will do so through a series of stakeholder meetings and a drafting process to create the roadmap – answering the question of 'how to proceed'. Concurrently, a task force will be created to develop a financing strategy and seek additional institutional financing for technology transfer among Chinese institutions – seeking to answer the question of 'how to finance up scaling'.

The creation of a Chinese stakeholder alliance will gather the key actors involved in different stages of the technology transfer process at the Chinese side. Training material will be developed and strategically selected stakeholders among Chinese institutions and the private sector will be trained on policy, market and cultural aspects of technology transfer and socially responsible business in Ghana in support of national development

goals, while Ghanaian stakeholders will come to China for trainings on application of identified biogas, improved cook stoves, mini-hydro and solar/wind pump technology, supporting the adoption capacity for technology transfer at the Ghanaian end. These activities will answer the question of 'who will be involved in the up scaling and importantly, build stakeholder capacity to carry out the up scaling in a socially and environmentally responsible manner in support of Ghana's development goals.

The main activities for this Output can be summarized as follows:
Activity Result 3.2.1: Develop roadmap for Renewable Energy Technology Transfer from China to Ghana
Activity Result 3.2.2: Seek institutional financing to support technology transfer from China to Ghana
Activity Result 3.2.3: Set up a Chinese stakeholders alliance for China – Ghana RETT
Activity Result 3.2.4: Conduct training of Chinese stakeholders in relation to RETT
Activity Result 3.2.5: Support Ghana's adoption capacity for Renewable Energy Technology Transfer

3.1.4 Outcome 4: Project management and coordination mechanisms established

This outcome focuses on establishing the key project management set up for project implementation. Specifically, this involves the creation of two project management units within the relevant Ghanaian and Chinese institutions and two project steering committees to oversee implementation and provide strategic direction for the project in each country.

For details of the overall management and coordination structures in which outcome four is embedded, please see the section on Management Arrangements below.

This outcome has the following output:

Output 4.1 Project Management Structures established and implementation supported

The project will be implemented using the existing UNDP framework for project implementation and will therefore be implemented through coordinated separate national interventions – hereafter called national components.

To ensure sustainability (after the end of the project) and strong national ownership of the project outputs and outcomes a PMU will be located in both Ghana and China. These PMUs will serve as the coordination and implementation bodies for the project, and will be established within and driven by the Energy Commission (in Ghana) and the Ministry of Science and Technology (in China). In China the PMU will manage both the Ghana/China

project as well as the Zambia/China project. In addition the PMU will be/become an integrated part of the Chinese Center for South-South Cooperation (mentioned on page 24), thus being the key driver for its establishment of the center. A major focus of the PMUs' work will be oversee the day to day implementation of the national components of the project and prepare detailed national two year work plans for the project including activity budgets. UNDP through its offices in China and Ghana will ensure coordination and compatibility between the two national work plans. The PMUs will play key roles in identifying and reaching out to stakeholders and coordinating within the two governments for policy-focused parts of the project and within private sector and research institutions for technology-focused aspects of the project.

To provide strategic direction to project activities and oversee project implementation of the two national components, Project Steering Committees (PSC) will be established, one in China and one in Ghana. These PSCs will meet at once a year and include representative from key government agencies, UNDP and other stakeholders at national level. The PSCs will approve reports from the PMUs. Additionally, the UNDP China and Ghana Country Office will provide managerial, technical and financial support, as outlined in the Management Arrangements section.

With regard to the national Project Steering Committees to be held annually in China and Ghana, the Chinese embassy will represent China in Ghana and the embassy of Ghana will represent Ghana in China. However, the Energy Commission and the Ministry of Science and Technology might also partake (in China and Ghana respectively) but this would incur an added management cost. Along similar lines, the project will not have an overall Project Steering Committee that brining national stakeholders from Ghana and China together, as the associated cost is deemed to be too high. Also it is perceived that the two national PSC's together with the coordinating role of UNDP will ensure adequate steering of the project processes.

The main activities for this Output can be summarized as follows:

Activity Result 4.1.1: Set up PMUs in Ghana and China
Activity Result 4.1.2: Set up PSCs in Ghana and China
Activity Result 4.1.3: Support project implementation

3.2 Alignment of the strategy with UNDP's programmatic framework

UNDP China

In 2010, UNDP and China signed a new agreement to strengthen their partnership – the first such agreement between China and a multilateral or bilateral partner. Since then, UNDP and China have set up innovative programmes, which promote South-South Cooperation between China and other developing countries and China's regional and global engagement. These programmes are aimed at fostering the exchange of good practices and expanding the range of policy options available to a nation, based on the understanding that each country has a specific set of challenges that require tailor-made solutions.

As China's global role and development assistance continues to grow, UNDP's work with China under the Strengthened Partnership agreement focuses on five key areas:
1) Trilateral Cooperation
2) Experience Sharing on Foreign Aid Systems
3) Global and Regional Issues
4) Private Sector Engagement and South-South Cooperation
5) Sharing Development Experiences and Lessons through South-South Dialogue

Trilateral cooperation supported by UNDP is a specific approach under which UNDP development expertise is combined with Chinese knowhow to respond to sustainable development challenges facing developing countries.

An increasing number of developing countries regard access to low-cost renewable energy technology as an important step toward sustainable development and are interested in developing cooperation with China in this area.

In the context of the UN's Sustainable Energy for All initiative, this project, 'China-Ghana South-South Cooperation on Renewable Energy Technology Transfer' is implemented in line with UNDP's objectives:

1) To bring greater benefits to developing countries than what would be achieved by UNDP or China acting alone.
2) To enable China and UNDP to learn more about each other's ways of providing development cooperation.

UNDP Ghana

In line with the United Nations Development Assistance Framework (UNDAF 2012-2016), UNDP Ghana is supporting the Government of Ghana in strengthening its capacity to comprehensively tackle the root causes of unsustainable development and address environmental and energy challenges at national, regional, and local levels. Specifically, UNDP Ghana's programmatic support in the area of energy and environment (hence this

project) aligns with UNDAF Outcome 3: *"National systems and existing institutional arrangements for Climate Change mitigation and adaptation and for disaster risk reduction, as defined in the Hyogo Framework for Action at the district, regional and national level are functional"*. In this context, UNDP Ghana is providing support in the areas of climate change, disaster risk reduction, energy and biodiversity.

In the area of energy, building on lessons learnt from several years of working alongside the Energy Commission, UNDP is contributing to achieving the Government of Ghana's twin objectives of securing diverse energy sources, primarily by increasing the share of renewable energy in the country's energy mix, and improving energy efficiency. This will be instrumental for Ghana to achieve its goal in becoming a middle-income inclusive economy in a sustainable way, within the framework of the Sustainable Energy for All Initiative. Specifically, this project will contribute to achieve one of the UNDAF Outcome 3 targets: *"The share of modern forms of renewable energy (excluding large hydro) in the electricity generation mix is increased to 5% by 2016".*

This project will complement other UNDP's efforts in the area of energy, in particular the *Institutional Support to the Implementation of the SE4ALL Action Plan project*, which, besides providing overall policy support to the Government of Ghana in the context of the SE4ALL Initiative, has the double objective of supporting the development of a participatory system for monitoring and evaluating energy access programmes in Ghana, as well as developing and setting up a system to enforce a regulatory framework for the improved cook stoves market in Ghana.

Additionally, the *Low Emission Capacity Building (LECB) project* is focusing on strengthening Ghana's capacity to align its economic development to a low carbon path. In doing so, the project seeks (inter alia) to develop up to 2 financeable energy-related Nationally Appropriate Mitigation Actions (NAMAs). Finally, the *Refrigerating Appliances Energy Efficiency project* (GEF), seeks to reduce energy consumption and carbon emissions through the introduction and enforcement of minimum energy performance standards and labels for refrigerating appliances, as well as the use of innovative economic tools to stimulate the demand for energy efficient refrigerators.

4. SUSTAINABILITY

There are several critical factors which the project need to bring about in order to ensure long term sustainability of the project interventions.

In Ghana, it is paramount that Government drives the process and actively involves all stakeholders in the development of the Renewable Energy Master Plan the Government also needs to secure and indeed ensure that the financial and technical parameters included in the REMP are in place. This however is already recognized by the Government of Ghana and the fact that they pushed for the inclusion of the REMP as key outcome in this project is a testament to this. Ensuring long term buy-in of the Government buy-in will be critical to sustain a vastly improved enabling environment which will facilitate the up scaling and broad based engagement of private sector in the electrification of, and energy access in, Ghana. This enabling environment is not only to support local actors, although develop the local capacity is a big part of Ghana's strategy. It is also to support an open and transparent absorption of state of the art technologies from abroad enabling Ghana to make appropriate development choices based on its own needs and strategic approach.

The support for capacity building and establishing the delivery mechanism of said capacity building is also vital for securing long term sustainability – this both in Ghana and China although in different areas. Common for both is however to build the national capacity for how to engage in valid technology transfer both in terms of equipment as well as soft knowledge. In Ghana this will include both a technical and financial component: on one side, support will be given to research and training institutions, with the objective of creating a pool of technical experts; on another side, the project will explore institutional financing mechanisms and capacity building for development of business models. These aspects are to be part of the REMP but will be initially supported by the current project to 1) highlight the importance of such capacity building and 2) to build the capacity of the front runners in Ghana which will help spread renewable energy in Ghana through the mechanisms established. So, it is expected that after receiving appropriate technical and financial training, the demonstration technologies will be up scaled and/or replicated after project completion.

Another key issue is ensuring that the facilities and equipment at the demonstration sites in Ghana are properly maintained during and after project implementation. Different measures will be put in place to address this issue. First of all, the selected technology providers in China will conduct on-site training to the Ghanaian partners who will run the facility at the time of installation of the equipment. Secondly, extensive technical training on use and maintenance of technologies and related equipment will be conducted for each technology. The objective is to create a pool of competent technicians that can enter the renewable energy market with the requisite knowledge to use and repair if needed RE equipment, whilst training other technicians as an additional benefit. Through the project, one or two of these trained technicians will be hired for a period of one year in each demonstration site. In order to promote the absorption of the technicians by the companies

running the facilities, the project will cover 100% of the salary only in the first six months and will gradually withdraw with increasing support from the companies.

In China MOST will establish a Chinese Centre for South-South Cooperation (through initial start up support via a separate project between Zambia and China – also to be funded by Denmark) to address the significant gaps in China's current ability to appropriately share good practice from its development experience. The center will also address the lack of updated guidelines and material on mutually beneficial participatory cooperation modalities in the Renewable Energy Sector in general and specifically relating to the Ghanaian context. Furthermore the center will map the national and regional planning approaches, laws, programs, financing mechanisms and institutional set-ups and make this mapping available to Ghanaian (and Zambian) stakeholders through training workshops and on-line information exchange platforms. Once established the center will also cater to stakeholders from any other country which is interested in using the centers services. Equally important the center will training material and train Chinese institutions and the private sector entities on policy, market and cultural aspects of technology transfer and socially responsible business in Ghana (Zambia and other countries).

Innovation and synergy

This project is innovative in that bring countries together to work with new and non-traditional partners the more innovative aspect of the project lies in the management structure and the new opportunities these bring about. While taking advantage of the fact that UNDP has country office in 170 countries including Ghana (and Zambia) the project provides for a new national mini platform for dialogue where issues related to South-South cooperation and engagement between countries could be touched upon. This mini platform is the national project steering committee which aside from being the PSC could be a channel/ platform/ spring-board for future dialogue to create synergies and bring about positive experience and new initiatives involving one or more partners.

In addition, the project is innovative in that new communication channels will be established between non traditional partners – for the current project the Energy Commission and ACCA 21, however it also opens up for cross communication between the Danish Embassies in China and Ghana. Also the project will make use of the virtual environment to increase communication. For instance, as noted, the Global Steering Committee will be done via video conferences. Meetings with the Danish Embassy in Beijing and the projects counterparts in Ghana (and Zambia) will be facilitated to facilitate information exchange and accountability.

One key innovation is that this project (together with its sister Zambian project) is not being implemented in seclusion in one country but "it involves a subset of development

partners in other countries. Also the interest in the project and the apparent change in "mind sets" within the involved parties that has occurred during past project formulation phase underlines that this project is breaking new ground. To what extent this will continue is depending upon the vision of the project partners and their interest in doing things different.

Furthermore, UNDP Ghana and UNDP Zambia country offices will during the project implementation (of the two projects) establish communications link to share information and lessons learned etc. Just as importantly the PMU 's in the two countries will also establish linkages.

Recognizing the fact that there is only a small pool of renewable energy experts in Ghana, the project presents some opportunities to build the capacity of junior officers, researchers and professionals to become future experts in the sector and apply their expertise in the local public and private sectors. To do so, the Implementing Partner will ensure that junior staff are placed side by side the project team and the different consultants hired under the project during the implementation of activities. For example, the development of the REMP will entail extensive field research to assess the status of RE installations throughout the country. A junior staff will join the consultants in the field research and subsequent analysis. This will also constitute a "tool" to monitor activities. To select the junior staff, the IP will rely on existing programmes such as the National Service Scheme. In addition to being an innovative approach it also addresses the issue of sustainability of project interventions.

The synergy that the project creates can perhaps best be illustrated by that the project will involve and rely on the China National Renewable Energy Centre (CNREC) in China for policy related work and trainings. In addition, the project will work with Ghana Climate Innovation Center (GCIC) in Ghana, both these centers are supported by Denmark and provides for an additional synergy. With the involvement of these two centers it is also anticipated that they will engage in cross-referenced work on their own accord.

Furthermore, stakeholders in Ghana including the Chinese and Danish Embassies will be invited to participate in the national barrier analysis as well as the business planning process. The project is also expecting to present the REMP in China and Denmark to inform relevant business partners as well as the respective Governments of the new possibilities for engaging constructively in the renewable energy expansion in Ghana. Synergies are also expected to derive from the project's NPSC's which will, as noted earlier, provide for a mini-platform which will (or at least have the potential of) facilitating discussions not only on the project but also other initiatives which are inspired through the NPSC discussions.

5. IMPLEMENTING PARTNERS

Ministry of Science and Technology (MOST)

Ministry of Science and Technology (MOST) has had a long-standing partnership with UNDP when MOST still the State Science and Technology Commission (SSTC) in the 1990s. SSTC that took the lead for China's involvement in the 1992 United Nations Conference on Environment and Development in Rio de Janeiro. Using sustainable development as its rationale, SSTC initiated the process that led to the creation of the high-level China Council for International Cooperation in Environment & Development (CCICED) and the Ministry of Environmental Protection. With UNDP's close collaboration with the SSTC, China was the first country to prepare a country Agenda 21. Subsequently, it was with the SSTC that UNDP worked more closely to promote Agenda 21 in China and sparked China's major investments in renewable energy, sustainable agriculture, clean production, etc.

Firstly, MOST is the government takes the lead in drawing up science and technology (S&T) development and transfer plans and policies, drafting related laws, regulations and department rules, and guaranteeing the implementation. It is also responsible for budgeting, final accounting, and supervising of S&T funds; and proposes, with relevant departments, major policies and measures on rational allocation of S&T resources. Furthermore, MOST issues policies to encourage the synergy of enterprise, university and research institute, promote application and transfer of scientific discovery and technological invention, and enhance the south-south technology cooperation.

Secondly, ACCA21, affiliated with the Ministry of Science and Technology (MOST), has extensive experience on international cooperation on technology transfer. Also, MOST and ACCA21 have well developed expert network in China, sound collaborative relations with government offices, research institutes, social organizations and businesses.

MOST has worked with UNDP China in the energy and environment area since 2003 and MOST became a key partner for UNDP South-South work where UNDP and MOST have, since 2011, jointly hosted an International Workshop on "South-South Cooperation on Science and Technology to Address Climate Change" annually. In 2011 the workshop was done with Danish support. The workshops (three in all) invites participation Africa and Asia pacific to an intense two day presentation of new technologies in China and elsewhere and the event allowed for the sharing of China's experience and a China-Africa discussion on technology needs in developing countries and potential mechanism of South-South cooperation on science and technology to address climate change.

Energy commission

The Energy Commission of Ghana is statutory body established by the Act of Ghanaian Parliament with functions relating to the regulation, management, development and utilization of energy resources in Ghana. The Commission is the technical regulator of Ghana's electricity, natural gas and renewable energy industries, and the advisor to Government in energy matters.

The Energy Commission was in 2013 given the additional responsibility of coordinating the implementation of the Ghana Action Plan under the UN Secretary General's Sustainable Energy for All (SE4ALL) initiative. The SE4ALL Secretariat is therefore housed, equipped and managed by the Energy Commission. The Secretariat has been supported strongly by the UNDP and is further developing partnerships and relationships with key stakeholders to ensure the successful and effective implementation of the SE4ALL Action Plan. One such partnership is the one with the Global Alliance for Clean Cook stoves, which is focused on achieving the objectives for clean cooking. The Secretariat is currently focused on identifying project opportunities in the productive energy uses sector in association with a team from the US State Department.

The Commission was instrumental in the passage of the Renewable Energy Act, 2011 (Act 832), and since the passage of the Act the Renewable Energy Division has amongst others developed guidelines for the implementation of the RE Fund, draft Renewable Energy Grid Code and Net-metering Code.

The primary responsibility of the Renewable Energy Division within the context of Commission's mandate is to ensure the promotion, effective development and utilization of the country's renewable energy resources. In that regard, the focus of the RE Division been on renewable energy resource assessments; RE policy analysis and strategy development; promotion of proven renewable energy technologies; and regulation of the RE industry. A key objective of the Division is to develop a master plan for the RE sector. The REMP is expected to give a clearer direction for private sector participation in line with government's vision for the RE sub-sector. The Energy Policy Strategy, Sustainable Energy for All (SE4ALL) Country Action Plan, among other things will feed into the development of the Renewable Energy Master Plan (REMP) will describe a systematic approach to achieving renewable energy policy targets.

The Energy Commission has a consolidated relationship with UNDP since 2006. Through its Household Energy Project (2006-2007), UNDP contributed to rekindle the interest in biomass energy at the Energy Commission and the Ministry of Energy. The project also

supported the development of a policy for sustainable supply and utilization of wood fuel and promoted LPG and improved cook stoves at household, commercial and institutional levels. The Energy Commission is currently implementing one of UNDP's flagship projects in Ghana, namely the Refrigerator Energy Efficiency Project, which aims at transforming the refrigeration market in Ghana towards the promotion of energy efficient appliances. UNDP also is a key partner of the Energy Commission in the context of the SE4ALL Initiative. UNDP indeed provided support for the development of the national Action Plan and is currently supporting the implementation of some of its component (e.g. the establishment of a regulatory framework for improved cook stoves).

6. MANAGEMENT ARRANGEMENTS

UNDP China will sign the donor agreement and be the overall responsible for the interaction with the Donor including appropriate donor reporting in accordance with the project agreement, coordination meetings with the Donor representatives, as well as be responsible for the overall UNDP financial and management oversight.

The general oversight the project will be done through the UNDP country offices in China and Ghana, which will provide administrative and technical support throughout the project and disburse funds to the implementing partners in Ghana and China. While the national components will be overseen by UNDP China and UDNP Ghana respectively, UNDP Ghana will report back to UNDP China enabling UNDP China to provide complete reporting to the Donor. Also to ensure close coordination of the two national components, UNDP China and Ghana will establish new procedures for interoffice communication and coordination aimed at ensuring quick response times to address country specific matters that might arise. In addition the Energy Commission and the Ministry of Science and Technology will also establish direct communication links to facilitate coordination.

As noted, the project will be implemented using the existing UNDP framework for project implementation and will therefore be implemented through coordinated separate national interventions – hereafter called national components. For the project a Global Project Steering Committee will be established and it will meet virtually once a year. However, if the situation calls for it a "face to face" GPSC meeting can be called for by any of the respective parties. Within Ghana and China National Project Steering Committees (NPSC) with key stakeholder representation will oversee project progress and set the strategic directions while a Project Management Unit in each country will be responsible for implementation of project activities. In both Ghana and China the project will be nationally executed (NEX), in line with the Standard Basic Assistance Agreement between UNDP and the respective national Governments. In China, the Ministry of Science and Technology

(MOST) is to be the Implementing partner (IP), whereas in Ghana this will be the Energy Commission (EC).

The supervision of the national components activities will be the responsibility of the NPSCs in China and Ghana. MOST and EC will take overall responsibility for the project execution, and the timely and verifiable attainment of project objectives and outcomes according to the work plan and responsibility matrix, and will report to the respective PSCs. MOST and EC will provide support to, and inputs for, the implementation of all project activities, and recruitment of project staff and contracting of consultants and service providers with the advice from and involvement of UNDP. International procurement will be mainly handled by the UNDP Country offices in China and Ghana upon request of MOST and EC respectively. MOST and EC will set up Project Management Units (PMU) within their respective institutions. In China the PMU will manage both the Ghana/China project as well as the Zambia/China project. In addition the PMU will be/become an integrated part of the Chinese Center for South-South Cooperation (mentioned on page 24), thus being the key driver for its establishment of the center. MOST and EC will also appoint National Project Directors (NPD) and National Project Managers (NPM) to be responsible for the overall management of the project and PMUs. The PMUs will ensure that the project practices due diligence with regard to UNDP's Environmental and Social mandate for all procurement and contractual services provided under the project.

The UNDP Country Offices in Ghana and China staff will be designated to oversee the national components and will be responsible for the day-to-day management and control of project finances including: (i) providing financial and audit services to the project; (ii) overseeing financial expenditures against project budgets approved by PSC; (iii) appointing independent financial auditors and evaluators; (iv) collect review and approve quarterly and annual reporting; and (v) ensuring that all activities including procurement and financial services are carried out in strict compliance with UNDP procedures. In addition, the designated staff in UNDP China and Ghana will be responsible for the interoffice communication and coordination. In addition, designated staff at UNDP China will also be the focal person for all interaction with the donor in Beijing, as well as be the focal point for the Zambia/China project also submitted for Danish funding consideration. As mentioned above formal reporting and donor communication will be through UNDP China. With regard to UNDP interaction with the Donor the official reporting and interaction will be done through UNDP China. However, donor interaction is also expected to happen in Ghana through the involvement of the Danish representation there, which is expected to be a member of the National Project Steering Committee. Coordination with the Chinese Embassy is also expected as is coordination with the Embassy of Ghana in China.

The National Project Steering Committees (NPSC) will be convened by MOST and EC and will include representatives from the national government, UNDP, the donor and the counterpart country. For the donor and the counterpart country said representation is foreseen to be through in-country representation i.e. the embassies. The NPSCs will serve as the national project's coordination and decision-making bodies. The NPSC meetings will be chaired by the NPDs in each country. They will meet according to necessity, but not less than once a year. The NSCs are responsible for ensuring that the project remains on course to deliver products of the required quality to meet the outcomes defined in the project document. The NSCs' roles will include: (i) overseeing implementation of the national component; (ii) approving annual project work plans, deliverables and budgets for the national component; (iii) approving minor changes in project plans related to the national component; and (iv) providing technical input and advice.

The global Project Steering Committee' role will include; (i) approving any major changes in project plans or programs; (ii) ensuring commitment of resources to support project implementation; (iii) arbitrating any conflicts within the project and/or negotiating solutions between the project and any parties beyond the scope of the project; and (iv) overall project evaluation and project steering.

With regard to the NPSC and the GPSC efforts will be made to hold these meetings in quick succession to ensure smooth project implementation.

1) The day-to-day administration of the national components will be carried out by Project Management Units (PMU) within MOST and EC comprised of a National Project Director, Project Manager (PM), and additional support staff. The project staff will be recruited following UNDP recruitment procedures. The PMs will, with the support of the Project Assistants, manage the implementation of all project activities, including: 1) Manage and coordinate project implementation in accordance with objectives, work plan and planned budget, to ensure that the activities in each output area are timely, efficiently and effectively implemented in accordance with the project document and work plan;2) Manage the day-to-day operations of the budget, including the management of financial and other records to facilitate audits of the project; this includes monitoring of financial resources and accounting to ensure accuracy and reliability of financial reports; 3)Manage financial resources according to value-for-money and cost effectiveness principles; 4) Prepare an annual work plan and associated budget; 5) Plan and coordinate project activities and project-related meetings. It will also include (i) record keeping, accounting and quarterly and annual progress reporting; (ii) drafting of terms of reference, technical specifications and other documents as necessary; (iii) identification, proposal of project consultants to be approved by the PSCs, coordination and supervision of consultants and suppliers; (iv)

organization of duty travel, seminars, public outreach activities and other project events; (v) maintaining working contacts with project partners at the central and local levels vi) organize the exchange and cooperation activities between the PMUs in China and Ghana.

The PMs are accountable to the MOST and EC respectively and the NPSCs in each country for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds. Following UNDP's planning procedures and reporting modality the PMs will produce two year Work Plans and Budget Plans to be approved by the NPSCs. These plans will provide the basis for allocating resources to planned activities. The PMs will further produce quarterly operational reports and Annual Progress Reports (APR) for submission to the NPSCs. These reports will summarize the progress made by the project versus the expected results, explain any significant variances, detail the necessary adjustments and be the main reporting mechanism for monitoring project activities. UNDP China will combine the individual national reports into one donor report which will be submitted to the donor in accordance with the agreed submission schedules. The PMs will also be technically supported by contracted national and international service providers. Recruitment of specialist services for the project will be done by the PMs in consultation with the UNDP and MOST in China and EC in Ghana.

Finally UNDP China will have a yearly coordination meeting with the donor, to be held in Beijing, where overall project progress is presented and the work-plan for the upcoming year is discussed and approved. More frequent meetings will be arranged as agreed and as needed. As noted, UNDP China will provide the donor with the combined annual report including the overall projects financial details.

7. MONITORING AND EVALUATION FRAMEWORK

The following section outlines the basic activities related to project monitoring and evaluation which follows the programming policies and procedures outlined in the UNDP User Guide. In addition the annual reporting, as well as other reporting requested by the Donor, will be done for each of the national components and will be combined into a Donor Report by UNDP China and submitted to Denmark. In addition UNDP China will prepare an analytical document on the differences and similarities with regard to implementation and management etc. between the Ghana and Zambian projects. The PMU in Ghana and China will submit to UNDP for its review and approval the following as part of the projects monitoring:

<u>Within the annual cycle</u>

- **Quarterly reports.** On a quarterly basis, the project will provide to UNDP a quarterly narrative report outlining project progress and undertaken monitoring activities such as site visits and review meetings etc. as well as a financial report. In addition the project will be forwarding requests for advance payments (FACE) to UNDP on a quarterly basis.
- **Issue Log**. An Issue Log shall be kept by the project to facilitate tracking and resolution of potential problems or requests for change.
- **Risk analysis.** Based on the initial project risk analysis the project should as part of the quarterly narrative reporting be regularly updated by reviewing the external environment that may affect the project's implementation.
- **Lesson-learned log.** A project Lesson-learned log will be activated and regularly updated to ensure on-going learning and adaptation within the organization, and to facilitate the preparation of the Lessons-learned Report at the end of the project
- **Monitoring Schedule Plan**. A Monitoring Schedule Plan shall be part of the project work-plans and updated to track key management actions/events.
- **Project visit**. The project is to arrange for a project visit by UNDP at least once a year during which on the ground progress is to be assessed accompanied by meetings to review general project progress as well as project management (including financial management) – field visit reports are to be submitted to UNDP

Annually

- **Annual Review Report**. An Annual Review Report following UNDP's reporting format will be prepared by the Project Manager and shared with UNDP and presented to the Project Steering Committee.
- **Annual Project Review**. Based on the above report, an annual project review shall be conducted annually at a time specified during the project inception but preferably within the first quarter of a given year, to assess the performance of the project and appraise the Two Year Work Plan (TYWP) with specific focus on the following year. In the last year, this review will be a final assessment. This review is driven by the Project Steering Committee but may involve other stakeholders as required. It shall focus on the extent to which progress is being made towards outputs, and that these remain aligned to appropriate outcomes.

Other

- **Inception Report.** Following the project signature the PMU will be established and once the PMU staff is hired they will engage in starting up the project including preparing for the initial consultancies and subcontracts as well as review the overall work plan and based on it prepare the first Two Year work plan. The inception period is expected to last between three to four months. As part of the inception workshop a Project Inception Report will be prepared. It will include a detailed Two

Year Work Plan. The Report will also include the detailed project budget for the first two years of implementation, prepared on the basis of the Two Year Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 24 months time-frame. The Inception Report will include a detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners similar to that listed in the project document. In addition, a section will be included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation.

- **Project Terminal Report**: During the last three months of the project the project team will prepare the Project Terminal Report. This comprehensive report will summarize all activities, achievements and outputs of the Project, lessons learnt, objectives met, or not achieved, structures and systems implemented, etc. and will be the definitive statement of the Project's activities during its lifetime.

As part of the project monitoring site visits are as noted envisaged and while these are mainly the responsibility of the national PMUs in Ghana and China. It is expected that UNDP also will be involved as would other national stakeholders as appropriate. However, due to cost it is not expected that the counterpart country will take part in such visits unless they are planned in connection with planned country visits), but counterpart countires representatives (i.e. from the embassies) could/should, based on interest. Furthermore, due to the nature of the project, and the attentions is already have revieved, it is expected that the project will host a comprative high number of visits from government including government representatives from the counterpart country, as well as the donor and UNDP (including headquarters and regional bureaus).

In addition to the regular monitoring activities the project will also undergo a midterm evaluation following the normal UNDP rules and procedures. The midterm evaluation will be performed by independent consultants who will visit both Ghana and China. National consultant/s will supporting nationally (but will not travel with him/her to the counterpart country). The consultancy team will review the project progress against the project document set objectives outcomes and targets.

Project Communication

The project will develop a communications strategy in the first year, which will be updated annually and have its implementation supported by a communications, education and awareness specialist. This will include capturing and disseminating lessons learned for review at PSC meetings in order to demonstrate the direction and management of the project, and shared with project stakeholders as appropriate. A full color popular style project completion report will document the project's stories, achievements and lessons

learned at the end of the project. Results from the project, as well as the awareness raising materials, will also be disseminated within and beyond the project intervention zone through a number of 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. Project staff will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Identifying and analyzing lessons learned is an on-going process, and lessons learned will be included in project updates or highlighted in separate project communication at least once a year during the project.

8. RISK ASSESSMENT

For the preparation of the projects risk assessment the DANIDA Guideline to Risk Management (August 2013) was consulted by and large followed. However, for the risk levels were determined using the guidelines used for UNDP China's Global Environment Facility projects because it has a table enabling a quick reference for combining the risk likelihood and risk impact. In addition the used table has five categories (likelihood and impact) compared to four in the DANIDA guidelines.

RISK ASSESSMENT GUIDING MATRIX

		Impact				
		CRITICAL	HIGH	MEDIUM	LOW	NEGLIGIBLE
Likelihood	CERTAIN / IMMINENT	Critical	Critical	High	Medium	Low
	VERY LIKELY	Critical	High	High	Medium	Low
	LIKELY	High	High	Medium	Low	Negligible
	MODERATELY LIKELY	Medium	Medium	Low	Low	Negligible
	UNLIKELY	Low	Low	Negligible	Negligible	Considered to pose no determinable risk

In addition, the projects risks have been classified in the three DANIDA categories Contextual Risk, Programmatic Risks and Institutional Risk, however the risk were further elaborated and classified according to UNDP/GEF Risk Standard Categories[4]. These risks

[4] Includes the following eight categories: environmental; financial; operational; organizational; political; regulatory; strategic; and other.

and the mitigation measures outlined in the table below will be continuously monitored and updated yearly throughout the project, and will be part of the UNDP reporting to the Donor.

PROJECT RISKS ASSESSMENT AND MITIGATION MEASURES

Identified Risks	Category	Likelihood	Impact	Risk Assessment	Elaboration of Risks	Mitigation Measures
Contextual Risk						
Change in UNDP's approach to South-South cooperation.	Organizational/ strategic	Unlikely	Medium	Negligible	The UNDP's Strategic Plan (2014-2017) has a strong focus on SSC. It is not expected this is going to change in the next Strategic Plan	Regardless of UNDP's eventual change in strategic focus, the two Country Offices will maintain adequate support to project implementation in line with the signed project document between UNDP and Implementing Partners.
Changes in the country to country relationships	Political	Unlikely	High	Low	Changes in China-Ghana relationships may affect mobility of goods and people.	The project and project partners would not be in a position to mitigate this risk, but adaptive measures will be put in place to the extent possible to address potential shortcomings.
Chinese government refrains from positively acting on the project's barriers removal interventions	Political/ Strategic	Unlikely	High	Low	Key Ministries needed for successful implementation of the project might have limited understanding of project rationale and provide limited support to removal of the barriers for effective RETT.	Key Ministries have already been involved in project development and will be fully consulted, updated and provide inputs throughout project implementation leading to a joint Government's acceptance of project proposed strategies. The Sustainable Development Office, established under ACCA21 in 1997, is the national leading group office and will perform a liaison function.
The Renewable	Financial /	Moderately	Low	Low	The lack of	Since the Renewable Energy Act

Energy Master Plan will not be endorsed by Parliament	enforcement/ political	likely			endorsement of the REMP might affect the sustainability of project outputs.	was passed by Parliament, it is expected that the REMP (which constitutes the implementation plan for the Act) will be approved. The project will ensure adequate sensitization of the Parliamentary Committee of Mines and Energy. The Ministry of Energy and Petroleum is actively involved in this project and will table the REMP to Parliament.
The Renewable Energy Fund is not resourced in time and adequately to provide effective support for the project interventions	Political/ Financial	Moderately Likely	Medium	Low	Delays in adequately resourcing the Fund will not affect project activities, but might negatively impact on the scaling up and replication of demonstration projects.	The REMP will be used as a resource mobilization tool to encourage Government and international financial support to the Fund. As part of project implementation, both UNDP and the Implementing Partner will influence discussions in the Energy Sector Working Group.
The Renewable Energy Authority is not established.	Organizational/ regulatory	Moderately likely	Medium	Low	The Energy Commission and MOEP are not in a position to sign PPP agreements with private sector, and the RE Authority would have that mandate.	The REMP will highlight the need for the creation of the Authority, e.g. for promotion of PPPs. The project will anyway equip the private sector with the needed technical and financial skills and expertise to make business on RET.
Programmatic Risk						

Inappropriate selection of technologies/ providers	Operational	Unlikely	High	Low	Inappropriate selection of technologies and providers would lead to rejection by users and non performance of demonstrations sites resulting in project failure.	The project will ensure the involvement of high quality experts (including government, research institutes and consultants) for the development of criteria/specification for selection of the appropriate technologies and providers. These experts will also collaborate to adapt the Chinese technologies to the Ghanaian characteristics. UNDP will ensure due diligence and general compliance with UNDP Procurement Rules and Regulations.
Inappropriate selection of pilot sites and recipients	Operational	Unlikely	High	Low	Inappropriate selection of sites and recipients would lead to rejection by users, and non performance and non utilization of demonstrations sites. This would also negatively impact on the eventual up scaling of the technologies.	The project will ensure the involvement of high quality experts (including government, research institutes and consultants) for the development of criteria/specification for selection of the demonstration sites and recipients. These experts will also collaborate to conduct feasibility studies to select the appropriate sites among the pre-selected potential sites identified during the development of the REMP.
Insufficient maintenance of equipment provided	Operational	Moderately likely	High	Medium	Insufficient maintenance would lead to premature deterioration and break down of	The Chinese partners will provide on-site training to the Ghanaian partners who will run the demonstration sites. Additionally, the project will provide extensive technical training on use and

					equipment leading to non sustainability of project interventions	maintenance of technologies and related equipment resulting in the creation of a pool of competent technicians. Finally, the project will provide each demonstration sites with technicians to ensure proper maintenance of equipment.
Local stakeholders in Ghana do not want to engage in project led initiatives leading to failure or poor performance of absorption.	Political	Moderately likely	Medium	Low	Ghanaian public and private stakeholders might decide not to support and be involved in project interventions leading to slow down of project implementation, development of sub-par business models, and slow down or unsuccessful up scaling of technologies.	The project will conduct several stakeholders consultations to ensure continuous and active engagement of key stakeholders. Additionally, the project will leverage on the convening power of the Sustainable Energy for All (SE4All) Secretariat, established under the Energy Commission, to act as a platform to maintain and strengthen partnerships.
Local stakeholders in China do not want to engage in project led initiatives leading to limited technology transfer.	Political	Moderately likely	Medium	Low	Chinese public and private stakeholders might decide not to support and be involved in project interventions (including the implementation of the RETT	The development of the RETT roadmap will entail an extensive consultation process, including large scale engagement of private companies in determining their requirements for effective technology transfer. Further consultations will be held with key Ministries to provide relevant policy and financial support to meet the requirements and

					roadmap) leading to slow down of project implementation and constrained technology transfer.	address identified barriers.
Institutional Risk						
Coordination between ACCA21 and EC PMUs does not functions optimal	Operational	Moderately likely	Medium	Low	Poor coordination between the two PMUs would lead to slow down of implementation of project activities, especially those conducted jointly.	A regular communication system will be put in place to ensure that the two PMUs have continuous dialogue to discuss progress of activities and provide the inputs needed by both sides. For example, an online management tool will be used to have day-to-day update on the progress of project implementation on both sides. UNDP COs will also engage in the communication flow especially in relation to implementation of joint activities.
Coordination between UNDP offices does not function optimal.	Operational	Moderately likely	Medium	Low	Poor coordination between the two COs would lead to slow down of implementation of project activities, delays in disbursement of funds and reporting to the donor.	A regular communication system will be put in place to ensure that the two PMUs have continuous dialogue to discuss progress of activities and provide the inputs needed by both sides. Additionally, UNDP Senior Management will play an oversight role in ensuring proper communication, even more because South-South Cooperation is one of the priorities of the UNDP's Strategic Plan (2014-2017)

						and this project constitute a flagship project to pilot an innovative SSC approach, which has got high level attention at UNDP HQ.
Lack of support from Implementing Partners	Operational / Political	Unlikely	Medium	Negligible	Lack of support from IPs would result in slow down of project activities and ineffective ownership of project interventions and outputs by the two governments.	The Implementing Partners have been carefully selected considering their mandate and established relationships with UNDP. Additionally, this project fits in the IPs' current policies and programmes and this will ensure ownership of the project. UNDP will anyway keep engaging with the IPs to ensure continuous support.
The South-South Cooperation Center cannot be mandated	Operational/ Political	Moderately likely	Medium	Low	Without the center established, the project would be slowed down and face challenges to scale up the RETT from China to Ghana	This Center is in line with ACCA21's organizational vision and is being set up as the new target to achieve an effective south-south technology transfer. Most importantly, this Centre is fully resourced by current project.
ACCA 21 is not able to raise financial support for continuation of the South-South Cooperation Center after the project finalization	Operational/ Political	Moderately likely	Medium	Low	Without the Center, the awareness on the innovative South-South Cooperation approach promoted by this project would be lower.	A proposal to apply for further financial support for the sustainability of this center would be made during the project implementation. All the documentation developed during project implementation will be made available, also for ACCA21 and UNDP to keep promoting the innovative SSC approach even

						without the Center in place.
UNDP staff turnover will result in poor oversight of the project leading to under par performance of the project.	Operational	Moderately likely	Low	Low	UNDP, as an international organization, has frequent turnover of staff (especially international). This could cause delays in disbursement of funds and reporting, as well as discontinuous support to the PMUs.	In case of turnover, the COs will ensure proper handover of project related functions, under the supervision of UNDP Senior Management.
PMUs' staff turnover will result in slow implementation and/or under par performance of the project.	Operational	Moderately likely	Medium	Low	Turnover of staff of the PMUs (especially the Project Manager) could result in delayed implementation and reporting to allow the new staff to get up to speed and be fully knowledgeable about the project.	As the two PMUs will be fully integrated within the IPs' internal structures, in case of turnover the IP will keep institutional memory, ensure proper handover and provide additional implementation support during the transition phase.
Inadequate management capacity due to Human Resource constraints of the IPs	Operational	Moderately likely	Medium	Low	Due to the complexity of the project and pressure on existing staff, inadequate	A Project Management Unit (PMU), made of at least a Project Manager and a Project Associate, will be created within the IPs to ensure full time dedication to project implementation.

					management capacity of the IPs would result into delayed and ineffective implementation of project activities.	

9. LEGAL CONTEXT

This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government and UNDP.

Consistent with the Article III of the SBAA, 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. To this end, the Implementing Partner shall:

a) 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;
b) 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 the Implementing Partner's obligations under this Project Document.

The Implementing Partner agrees to undertake all reasonable efforts to ensure that no 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 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/further to this Project Document.

10. PROJECT RESULTS AND RESOURCES FRAMEWORK

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
Outcome 1: Ghana has an enabling environment in place for the transfer, production and regulation of the use of Renewable Energy Technologies in Ghana.					
Output 1.1: Strategy and policies for enhanced use, regulation and promotion of RET in Ghana in place.	Ghana adopted the Renewable Energy Act in 2011, but there is no master plan to implement it.	1. Number of consultative meetings on RE policy and gaps in Ghana held.	**Targets (year 1)**	**Activity Result 1.1.1: Review Chinese and Ghanaian RE policies and strategies to identify capacity building gaps and solutions to address them**	**294.000**
		2. # of joint reviews, consultations held and more than % of participants giving positive feedback.	At least 3 consultative meetings not RE policy and gaps in Ghana held	**Sub-activity 1:** Conduct workshops in Ghana for Stakeholders on China and Ghana's Renewable Energy policy	
		3. # of launch workshops/ seminars organized and # participants	Minimum 2 reviews held with minimum 60% positive feedback	**Sub-activity 2:** Joint review Renewable Energy policies in Ghana	
		4. Baseline study to evaluate status of RE teechnologies	Baseline study developed	**Sub-activity 3:** Conduct gaps analysis through stakeholder consultations and seminars	
			Renewable Energy Master Plan drafted		
		4. Master plan approved	**Targets (year 2)** Renewable Energy Master Plan submitted for Parliamentary approval.	**Sub-activity 4:** Organize workshop/seminars to identify solutions to address the identified gaps	
			Renewable Energy Master Plan Launched at a minimum of 2 launch events with minimum 100 participants	**Activity Results 1.1.2: Draft and submit to Parliament the Renewable Energy Master Plan (REMP)**	
				Sub-activity 1: Draft Renewable Energy Master Plan based on Ghana's National RE Strategies	
				Sub-activity 2: Conduct multi-stakeholder consultation to review the Plan	
				Activity Results 1.1.3: Launch and disseminate the REMP	
				Sub-activity 1: Organize the official launch of the REMP	
				Sub-activity 2: Organize national and international dissemination of REMP for Ghanaian, Chinese and Danish stakeholders	

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
Output 1.2: Barriers to effective transfer of Renewable Energy Technologies removed.	Barriers to effective transfer of Renewable Energy existed.	1. Report on barriers for RET transfer	**Targets (year 2)** Report on barriers completed	**Activity Results 1.2.1: Conduct in depth analysis of regulatory, technical, social and other barriers in Ghana and China currently hindering effective and widespread absorption of RET.**	**84.000**
		2. # consultation meetings or group interviews held.	Minimum 3 consultation meetings / group interviews held	**Sub-Activity 1:** Conduct a desk review and surveys/interviews to identify barriers for RET Transfer	
		3. Road map launched	Roadmap draft prepared and launched	**Sub-Activity 2:** Prepare a report to summarize and analyze identified barriers.	
				Activity Results 1.2.2: Develop a roadmap to remove or reduce barriers to effective RETT in Ghana	
				Sub-Activity 1: Organize stakeholders meetings to identify strategies and solutions to remove barriers in Ghana	
				Sub-Activity 2: Draft a roadmap to set goals, objectives and priorities to remove or reduce barriers.	
				Sub-Activity 3: Convene a conference to launch and disseminate the roadmap	
				Total Outcome 1	**378.000**

Outcome 2: Access to and use of relevant Renewable Energy Technologies (RETs) increased in Ghana.

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
Output 2.1: Appropriateness of selected technologies (either biogas, improved cook stoves, solar PV, biogas power generation and mini hydro) for transfer demonstrated.	Currently, there is no demonstration site set up for RE Technology Transfer	1. Report on criteria and specifications for selection of 4 RETs	**Target (year 2)** Report on criteria and specifications for selection of 4 RETs developed and submitted to China	**Activity Result 2.1.1: Selection and adaptation of appropriate RETs to be transferred**	**652.000**
		2. Number of Chinese technology suppliers identified for adaptation and transfer to Ghana	At least 3 Chinese technology suppliers identified for adaptation and transfer to Ghana		
		3. Number of feasibility studies to select demonstration sites in Ghana conducted	At least 4 feasibility studies to select demonstration sites in Ghana conducted	**Sub-activity 1:** Develop criteria and standards for the selection of appropriate Renewable Energy Technologies	
		4. Number of demonstration sites for RETT successfully established	4 demonstration sites in Ghana successfully established	**Sub-activity 2:** Review the selected technologies and adapt specifications to Ghana's requirements	
				Activity Result 2.1.2: Facilities to receive, test, demonstrate and exhibit equipment and publish performance results	
				Sub-activity 1: On-site investigation and feasibility study of appropriate facilities	
			Target (year 3-4)	**Sub-activity 2:** Identification of projects and technology providers to supply facilities	
		5. Number of users and percentage of users of demonstration sites reporting satisfaction with sites.	Minimum 3 users of demonstration sites recorded, with minimum 70% satisfaction rate	**Sub-activity 3:** Provide facilities with testing and demonstration equipment	
			Performance results published and lessons learned captured	**Sub-activity 4:** Website update to share performance results and experience	

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
				Sub-activity 5: Monitor performance and based on testing and demonstration, capture lessons learned to develop training programs for stakeholders, incl. operators, administrators, etc in Ghana	
Output 2.2 Increased use of Renewable Energy Technologies in Ghana supported through capacity building and financing mechanisms	There is no mechanism for up-scaling of RETs for Public-Private actors established, and capacity building required	1. # and type of training packages developed	**Target (year 3)** Minimum of 3 training packages developed	**Activity Result 2.2.1: Support to training facilities within existing institutions for increased capacity building on RETs**	**399.000**
		2. # of people technically trained and % of people trained with increased knowledge and skills	Minimum of 40 people technically trained, with minimum of 70**%** with increased knowledge	**Sub-activity 1:** Develop work plans and long term funding and outreach strategies for the facilities	
				Sub-activity 2: Adaptation of monitoring results and lessons learned into training programs on RET to be offered by training facilities	
		3. Set of options for business and financing models developed	At least 2 options for business and financing models developed	**Sub-Activity 3:** Training of private sector and institutional partners to ensure sustainability of testing sites.	
		1 **A report about** cost and benefit analysis of RETT activities from China to Ghana	**Target(year 3)** **A cost report to be published in Chinese and translation to English**	**Sub-activity 4:** Convene meeting of stakeholders to agree modalities for facilitating community of practice.	
		2 A financial proposal to promote RETT	**A financial report to be published and translation into English**	**Sub-activity 5:** Project support to the community of practice to operate under project for period of one year.	
		3 A consultation meeting to raise fund for RETT from China to Ghana	A consultation meeting will be held	**Activity Results 2.2.2: Develop institutional financing mechanisms to up-scale RETT in Ghana**	
			Reports about raising fund for RETT will be finished	**Sub-Activity 1:** Cost and benefit analysis of RETT activities from China to Ghana	

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
Output 2.2 Increased use of Renewable Energy Technologies in Ghana supported through capacity building and financing mechanisms				**Sub-Activity 2:** Prepare a financial proposal to promote RETT from China to Ghana	
			Guide book related to RETT in Ghana published	**Sub-Activity 3:** Convene investors consultation meeting to rise fund for RETT from China to Ghana	
		4. # of people trained and % of people trained on Business Model with increased knowledge and skills	**Target (year 4)** Minimum of 100 people trained on Business Model, with minimum of 70**%** with increased knowledge	**Activity Results 2.2.3: Develop business models to support private sector involvement and public – private partnerships in RETT in Ghana**	
		5. # of participants in community of practice	Minimum of 20 stakeholders participate in community of practice	**Sub-Activity 1:** Convene China-Ghana stakeholder discussions on business model development	
		6. # of technically trained people actively employed in the RE sector	At least 10 technically trained people actively employed in the RE sector	**Sub-Activity 2:** Conduct strategic research on business models to facilitate the involvement of private sectors in RETT	
				Sub-Activity 3: In cooperation with training facilities, design and conduct training programmes for both Chinese and Ghanaian stakeholders, including governmental agencies, research institution, private sector, SME, etc on developed models.	
				Total Outcome 2	**1.051.000**

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
Outcome 3: China's has strengthened capacity for South-South Cooperation in relation to RET transfer					
Output3.1: Knowledge base and China – Ghana networks for South-South Cooperation on technology transfers created	The UNDP South-South Cooperation Framework	1. # of reports and surveys developed and published;	**Target (year 1)** Minimum of 3reports on China's national and regional planning approaches, laws and programs, institutional set ups, technology capacity, and financial models produced and shared	**Activity Result 3.1.1: Map, update and share China's experience and approaches to technology selection and transfer**	**326.000**
		2. # of exchange visits	A report on China's experience on rural electrification will be published	**Sub-activity 1**: Map National and Regional planning approaches, laws and programs, institutional set ups and financial models into a comprehensible set of reports on China's experience creating widespread access to renewable energy and becoming a key producer of RETs.	
		3. Web platform established with access to reports, surveys and other resources	A draft brief paper on technology selection and transfer approaches for Chinese stakeholders	**Sub-activity 2:** Conduct in-depth analysis of China's experience on rural electrification and make recommendations for good practice for the Ghanaian context	
		4. # of stakeholders participating in Chinese community of experts	**Target (year 2)** 4 meetings for understanding of Chinese policy and regulations on RET development and identify the potential gaps for RETT from China to Ghana	**Sub-activity 3:** Organize training/workshop/seminars to review documentation and receive feedback for appropriate revisions and modalities for sharing information	
		5 consultants meetings on cooperation framework	Minimum of 18 project stakeholders participates in visits exchange visits	**Sub-activity 4:** Draft briefing paper on technology selection and transfer approaches for Chinese stakeholders	
			Target(year 2,4) Meetings for initiating knowledge transfer and Ghana's context	**Activity Result 3.1.2: Organize exchange visits to share knowledge on the Chinese and Ghanaian contexts and build foundations for technology transfers**	

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
Output3.1: Knowledge base and China – Ghana networks for South-South Cooperation on technology transfers created					
				Sub-activity 1: Organize exchange visits from China to Ghana and vice-versa to study each country's energy sectors	
				Sub-activity 2: Carry out joint stakeholder meetings to initiate knowledge transfer and strengthen mutual understanding of Ghanaian policy and market conditions	
			Target (year 3) Meetings about draft reports and strategy documents identifying barriers and solutions, including 20 policy-makers	**Activity Result 3.1.3 Share knowledge and establish knowledge networks on Renewable Energy**	
			A web platform fully functional and loaded with all relevant reports, surveys and other resources and accessed by relevant stakeholders	**Sub-activity 1**: Draft reports and strategy documents identifying barriers and solutions to RET to Ghana	
			Target (year3, 4)	**Sub-activity 2:** Develop and maintain a web platform to **Sub-activity 2:** Draft strategy of RETT from China based on Ghana's national strategies and priorities for Renewable Energy	
			Minimum of 20stakeholders participate in community of experts	**Sub-activity 3:** Establish and maintain expert communities and knowledge networks to support continuous learning on RET transfer between China and Ghana	
Output 3.2 Mechanisms for promoting RETT from China to Ghana established	There is no existing mechanism for promoting RETT	1. Roadmap launched and disseminated;	**Target (year 1)** A meeting for a task force responsible for China-Ghana RETT financing through the SSC center	**Activity Result 3.2.1: Develop roadmap for Renewable Energy Technology Transfer from China to Ghana**	**385.000**
		2. Finance strategy developed and # of proposals submitted	Minimum of one proposal to apply for additional financial support from MOST and other Ministries in China through SSC Centre submitted	**Sub-activity 1:** Convene a series of meetings of stakeholders to agree the vision and goals for Renewable Energy Technology Transfer from China to Ghana	

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
Output 3.2 Mechanisms for promoting RETT from China to Ghana established		3. # of meetings for Chinese stakeholders alliance, and # and type of participants in the alliance	A kick-off meeting for agreeing on modalities for the alliance	**Sub-activity 2:** Develop and maintain a web platform in Chinese to share project findings and results	
		4. # of people trained and % of people trained with increased knowledge and skills	A meeting to assess and revise criteria and standards for RET selection to unify existing practices	**Sub-activity 3:** Launch and disseminate the Strategy within China	
		5 Develop training material in Chinese based on information from policy development process, technology review, demonstration sites, mapping and exchange visits	**Target (year 2, 4)** A report on RETT financing mechanisms		
			Target (year 2) Meetings and a report about the vision and goals for Renewable Energy Technology Transfer from China to Ghana	**Activity Result 3.2.2: Seek institutional financing to support technology transfer from China to Ghana**	
			A meeting for revising barriers to RET deployment and develop strategy for joint collaboration	**Sub-activity 1:** Set-up a task force responsible for China-Ghana RETT financing through the SSC center	
				Sub-activity 2: Prepare proposals and reports to apply for additional financial support from MOST and other Ministries in China through SSC Centre	
			Target (year 2, 3) Develop training material in Chinese and publicize, based on information from policy development process, technology review, demonstration sites, mapping and exchange visits	**Sub-activity 3:** *Develop report on RETT financing mechanisms*	
			Target(year 2, 3) Training materials will be prepared, and Minimum of 20stakeholders trained, minimum of 70**%** with increased knowledge and skills		

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
Output 3.2 Mechanisms for promoting RETT from China to Ghana established			**Target(year 3)** Roadmap for RETT from China to Ghana agreed, and launch it	**Activity Result 3.2.3: Set up a Chinese stakeholders alliance for China – Ghana RETT**	
			Target (year 3, 4) Design a training material about technologies at solar, mini-hydro and biogas facilities for Ghanaian stakeholders studying in China	**Sub-activity 1:** Identify stakeholders, agree on modalities for the alliance and hold kick off meeting	
			An visit from Ghana to China for the training about technologies	**Sub-activity 2:** Assess and revise criteria and standards for RET selection to unify existing practices	
				Sub-activity 3: Revisit barriers to RET deployment and draft strategy for joint collaboration	
				Activity Result 3.2.4: Conduct training of Chinese stakeholders in relation to RETT	
				Sub-activity 1: Develop training material in Chinese based on information from policy development process, technology review, demonstration sites, mapping and exchange visits	
				Sub-activity 2: Organize trainings on policy, market and cultural aspects of doing socially responsible business in Ghana in support of national development goals	
				Activity Result 3.2.5: Support Ghana's adoption capacity for Renewable Energy Technology Transfer	
				Sub-activity 1: Training of Ghanaian stakeholders in China on technologies at solar, mini-hydro and biogas facilities.	
				Total Outcome 3	**711.000**

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
Outcome 4: Project management and coordination structures established					
Output 4.1 Project management structures established	PMUs and PSCs haven't been established.	1. Documents establishing PMUs and PSCs	**Target (year 1)**	**Activity Result 4.1.1: Set up PMUs in Ghana and China**	**378.519**
		2. Detailed work plans developed	Stakeholder list developed; Project organization established; regular meetings held	Sub-activity 1: Prepare stakeholder list and identify PMU members	
		3. Regular meetings held in Ghana and China	Detailed work plan agreed for the project outlining roles and responsibilities, budget and administration; PMUs and PSCs meet according to schedule	Sub-activity 2: Establish PMU with required documentation and terms of reference	
		4 A mid-term evaluation		Sub-activity 3: Convene regular meetings for work plans, project monitoring, implementation and other discussions	
			Target (year 2)		
			PSCs meet at least once per year	**Activity Result 4.1.2:** Set up PSCs in Ghana and China	
			A mid-term evaluation including international consultants and national consultants	Sub-activity 1: Prepare stakeholder list and identify PSC members	
			Target (Year 3&4)	Sub-activity 2: Establish PSC with required documentation and terms of reference	

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET $
			PSCs meet at least once per year	Sub-activity 3: Hold PSC meetings to review project plans and reports	
				Activity Result 4.1.3: Support project implementation	
				Total Outcome 4	**378.519**
Total Direct Cost					**2.518.519**
GMS					**201.481**
Grand Total					**2.720.000**

11. WORK PLAN AND BUDGET

The presented project work plan and budget has the financial data broken down in its respective UNDP budget Categories as well as distributed per year as well as total cost. For the descriptions of what the individual budget items contains please see ANNEX 1 for reference

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
					Year 1				Year 2				Year 3				Year 4				year 1	Year 2	year 3	year 4
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Outcome 1: Ghana has an enabling environment in place for the transfer, production and regulation of the use of Renewable Energy Technologies in Ghana.																								
	Output 1.1	**Activity Result 1.1.1.: Review Chinese and Ghanaian RE policies and strategies to identify capacity building gaps and solutions to address them**																						
		Sub-activity 1: Conduct workshops in Ghana for Stakeholders on China and Ghana's Renewable Energy policy	Ghana Energy Commission (GEC)	9,000	X																			
		Local Consultants		6,000	X																6,000			
		Contractual Services /Companies		2,000	X																2,000			
		Miscellaneous Expenses		1,000	X																1,000			
		Sub-activity 2: Joint review Renewable Energy policies in Ghana	GEC	10,000		X																		
		Travel		7,000		X															7,000			
		Contractual Services /Companies		3,000		X															3,000			
		Sub-activity 3: Conduct gaps analysis through stakeholder consultations and seminars	GEC	24,000	X	X																		
		Local Consultants		12,000	X	X															12,000			
		Travel		2,000		X															2,000			
		Contractual Services /Companies		10,000		X															10,000			

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
		Sub-activity 4: Organize workshop/seminars to identify solutions to address the identified gaps	GEC	16,000		X	X																
		Local Consultants		3,000		X	X													3,000			
		Travel		1,500			X													1,500			
		Contractual Services /Companies		10,000			X													10,000			
		Miscellaneous Expenses		1,500		X	X													1,500			
		Subtotal 1.1.1.		**59,000**																			
		Activity Results 1.1.2: Draft and submit to Parliament the Renewable Energy Master Plan (REMP)																					
		Sub-activity 1: Develop Renewable Energy Master Plan based on Ghana's National RE Strategies	GEC	140,000			X	X															
		Local Consultants		100,000			X	X												100,000			
		Travel		21,000			X	X												21,000			
		Contractual Services /Companies		15,000			X	X												15,000			
		Miscellaneous Expenses		4,000			X	X												4,000			
		Sub-activity 2: Conduct multi-stakeholder consultation to review the Plan	GEC	37,000				X															
		Travel		13,000				X												13,000			
		Contractual Services /Companies		24,000				X												24,000			
		Sub-Activity 3: Submit REMP to Parliament for review and approval.	GEC	0					X														
		Subtotal 1.1.2		**177,000**																			
		Activity Results 1.1.3: Launch and disseminate the REMP																					

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	Sub-activity 1: Organize the official launch of the REMP	GEC	18,000						X														
	Contractual Services /Companies		10,000						X												10,000		
	Communication/publication		7,000						X												7,000		
	Miscellaneous Expenses		1,000						X												1,000		
	Sub-activity 2: Organize national and international dissemination of REMP for Ghanaian, Chinese and Danish stakeholders	GEC	40,000							X	X	X	X										
	Travel		12,200								X		X								5,800	6,400	
	Contractual Services /Companies		15,000								X		X								12,000	3,000	
	Communication/publication		12,000							X	X	X	X								6,000	6,000	
	Miscellaneous Expenses		800							X	X	X	X								400	400	
	Subtotal 1.1.3		**58,000**																				
	Total Output 1.1		**294,000**																				
	Activity Results 1.2.1: Conduct in depth analysis of regulatory, technical, social and other barriers in Ghana and China currently hindering effective and widespread absorption of RET.																						
Output 1.2	**Sub-Activity 1:** Conduct a desk review and surveys/interviews to identify barriers for RET Transfer	GEC	27,000			X	X																
	Local Consultants		21,000			X	X													21,000			
	Travel		4,500				X													4,500			
	Miscellaneous Expenses		1,500			X	X													1,500			
	Sub-Activity 2: Prepare a report to summarize and analyze identified	GEC	9,000					X															

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	barriers.																						
	Local Consultants		9,000					X													9,000		
	Subtotal 1.2.1		**36,000**																				
	Activity Results 1.2.2: Develop a roadmap to remove or reduce barriers to effective RETT in Ghana																						
	Sub-Activity 1: Organize stakeholders meetings to identify strategies and solutions to remove barriers in Ghana	GEC	10,000					X															
	Contractual Services /Companies		10,000					X													10,000		
	Sub-Activity 2: Develop a roadmap to set goals, objectives and priorities to remove or reduce barriers.	GEC	27,000					X	X														
	Local Consultants		9,000					X	X												9,000		
	Travel		4,500						X												4,500		
	Contractual Services /Companies		12,000						X												12,000		
	Miscellaneous Expenses		1,500					X	X												1,500		
	Sub-Activity 3: Convene a conference to launch and disseminate the roadmap	GEC	11,000							X													
	Local Consultants		1,200							X											1,200		
	Contractual Services /Companies		5,000							X											5,000		
	Communication/publication		3,000							X											3,000		
	Miscellaneous Expenses		1,800							X											1,800		
	Subtotal 1.2.2		**48,000**																				
	Total Output 1.2		**84,000**																				

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	TOTAL OUTCOME 1		**378,000**																				
			71300	***Local Consultants***																**142,000**	**19,200**	**0**	**0**
			71600	***Travel***																**49,000**	**10,300**	**6,400**	**0**
			72100	***Contractual Services /Companies***																**64,000**	**49,000**	**3,000**	**0**
			74200	***Communication/publication***																**0**	**16,000**	**6,000**	**0**
			74500	***Miscellaneous Expenses***																**8,000**	**4,700**	**400**	**0**
Outcome 2: Access to and use of relevant Renewable Energy Technologies (RETs) increased in Ghana.																							
	Activity Result 2.1.1: Selection and adaptation of appropriate RETs to be transferred																						
Output 2.1	**Sub-activity 1:** Develop criteria and standards for the selection of appropriate Renewable Energy Technologies	GEC	81,000				X	X															
	Local Consultants		42,000				X	X												6,000	36,000		
	Contractual Services /Companies		7,500				X	X												4,000	3,500		
	Equipment		30,000				X	X												20,000	10,000		
	Miscellaneous Expenses		1,500				X	X												1,000	500		
	Sub-activity 2: Review the selected technologies and adapt specifications to Ghana's requirements	ACCA21	30,000						X														
	Travel		14,000						X												14,000		
	Equipment		16,000						X												16,000		
	Subtotal 2.1.1		**111,000**																				
	Activity Result 2.1.2: Facilities to receive, test, demonstrate and exhibit equipment and publish performance results																						

Output	Sub Activities	Respo nsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	Sub-activity 1: On-site investigation and feasibility study to select facilities for demonstration	GEC	65,000				X	X															
	Local Consultants		40,000				X	X												20,000	20,000		
	Travel		11,200				X	X												5,000	6,200		
	Equipment		10,000				X	X												7,000	3,000		
	Miscellaneous Expenses		3,800				X	X												1,800	2,000		
	Sub-activity 2: Identification of technology providers to supply facilities	ACCA2 1	5,000					X															
	Local Consultants		4,800					X													4,800		
	Miscellaneous Expenses		200					X													200		
	Sub-activity 3: Provide facilities with testing and demonstration equipment	GEC	390,000						X	X	X												
	Travel		37,500							X	X										37,500		
	Contractual Services /Companies		300,000						X	X	X										300,000		
	Equipment		40,000							X	X										40,000		
	Miscellaneous Expenses		12,500							X	X										12,500		
	Sub-activity 4: Website update to share performance results and experience	GEC	1,000								X		X		X		X		X				
	Communication/public ation		1,000								X		X		X		X		X		200	400	400

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame																Budget			
					Year 1				Year 2				Year 3				Year 4							
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
		Sub-activity 5: Monitor performance and based on testing and demonstration, capture lessons learned to develop training programs for stakeholders, incl. operators, administrators, etc in Ghana	GEC	80,000									X	X	X	X	X	X	X	X				
		Travel		62,500									X	X	X	X	X	X	X	X			31,500	31,000
		Equipment		15,000									X				X						10,000	5,000
		Miscellaneous Expenses		2,500									X	X	X	X	X	X	X	X			1,000	1,500
		Subtotal 2.1.2		**541,000**																				
		Total Output 2.1		**652,000**																				
	Output 2.2	**Activity Result 2.2.1: Support to training facilities within existing institutions for increased capacity building on RETs**																						
		Sub-activity 1: Develop work plans and long term funding and outreach strategies for the training facilities	GEC	40,000									X	X										
		Local Consultants		24,000									X	X									24,000	
		Travel		9,500									X	X									9,500	
		Contractual Services /Companies		5,000									X	X									5,000	
		Communication/publication		1,500									X										1,500	
		Sub-activity 2: Adaptation of monitoring results and lessons learned into	GEC	20,000										X	X									

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
		training programs on RET to be offered by training facilities																					
		Contractual Services /Companies		20,000									X	X								20,000	
		Sub-Activity 3: Training of private sector and institutional partners to ensure sustainability of testing sites.	GEC	73,000											X	X	X	X	X				
		Local Consultants		38,400												X	X	X	X				38,400
		Travel		3,000												X	X	X	X				3,000
		Contractual Services /Companies		30,000											X	X	X	X	X			10,000	20,000
		Miscellaneous Expenses		1,600													X						1,600
		Sub-activity 4: Convene meeting of stakeholders to agree modalities for facilitating community of practice.	GEC	10,000												X							
		Travel		4,500												X							4,500
		Contractual Services /Companies		4,000												X							4,000
		Miscellaneous Expenses		1,500												X							1,500
		Sub-activity 5: Project support to the community of practice to operate under project for period of one year.	GEC	16,000													X	X	X				
		Contractual Services /Companies		12,000													X	X	X				12,000
		Communication/publication		3,000													X	X	X				3,000

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame																Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	Miscellaneous Expenses		1,000														X	X	X				1,000
	Subtotal 2.2.1		**159,000**																				
	Activity Results 2.2.2: Develop institutional financing mechanisms to up-scale RETT in Ghana																						
	Sub-Activity 1: Cost and benefit analysis of RETT activities from China to Ghana	ACCA21	20,000										X	X									
	Local Consultants		12,000										X	X								12,000	
	Travel		6,000										X	X								6,000	
	Communication/publication		2,000											X								2,000	
	Sub-Activity 2: Prepare a financial proposal to promote RETT from China to Ghana	ACCA21	40,000										X	X									
	Local Consultants		24,000										X	X								24,000	
	Travel		6,600										X	X								6,600	
	Contractual Services /Companies		8,000											X								8,000	
	Communication/publication		1,400											X								1,400	
	Sub-Activity 3: Convene investors consultation meeting to raise fund for RETT from China to Ghana	ACCA21	20,000											X									
	Local Consultants		6,000											X								6,000	
	Travel		4,300											X								4,300	
	Contractual Services /Companies		8,600											X								8,600	
	Communication/publication		1,100											X								1,100	
	Subtotal 2.2.2		**80,000**																				
	Activity Results 2.2.3: Develop business models to support private sector involvement and public – private partnerships in RETT in Ghana																						

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame																Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	Sub-Activity 1: Convene stakeholder discussions on business model development in Ghana	GEC	40,000									X	X										
	Local Consultants		5,500									X	X									5,500	
	Travel		18,000									X	X									18,000	
	Contractual Services /Companies		15,000									X	X									15,000	
	Miscellaneous Expenses		1,500									X	X									1,500	
	Sub-Activity 2: Conduct strategic research on business models to facilitate the involvement of private sectors in RETT	GEC	50,000										X	X	X								
	Contractual Services /Companies		50,000										X	X	X							50,000	
	Sub-Activity 3: In cooperation with training facilities, design and conduct training programmes for both Chinese and Ghanaian stakeholders, including governmental agencies, research institution, private sector, SME, etc on developed models.	GEC	70,000													X	X	X					
	Travel		9,250													X	X	X				9,250	
	Contractual Services /Companies		54,000													X	X	X				54,000	
	Communication/publication		2,000													X	X	X				2,000	
	Miscellaneous Expenses		4,750													X	X	X				4,750	
	Subtotal 2.2.2		**160,000**																				

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
					Year 1				Year 2				Year 3				Year 4			
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
		Total Output 2.2		**399,000**																				
		TOTAL OUTCOME 2		**1,051,000**																				
				71300	***Local Consultants***																**26,000**	**60,800**	**71,500**	**38,400**
				71600	***Travel***																**5,000**	**57,700**	**85,150**	**38,500**
				72100	***Contractual Services /Companies***																**4,000**	**303,500**	**170,600**	**36,000**
				72200	***Equipment***																**27,000**	**69,000**	**10,000**	**5,000**
				74200	***Communication/publication***																**0**	**200**	**8,400**	**3,400**
				74500	***Miscellaneous Expenses***																**2,800**	**15,200**	**7,250**	**5,600**
Outcome 3: China's has strengthened capacity for South-South Cooperation in relation to RET transfer																								
	Output 3.1	**Activity Result 3.1.1: Map, update and share China's experience and approaches to technology selection and transfer**																						
		Sub-activity 1: Map National and Regional planning approaches, laws and programs, institutional set ups and financial models into a comprehensible set of reports on China's experience creating widespread access to renewable energy and becoming a key producer of RETs.	ACCA21	50,000	X	X	X																			
		Local Consultants		45,000	X	X	X																45,000			
		Communication/publication		5,000			X																5,000			
		Sub-activity 2: Conduct in-depth analysis of China's experience on rural electrification and make recommendations for good practice for the Ghanaian context	ACCA21	20,000			X	X																		
		Local Consultants		18,000			X	X															18,000			

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
					Year 1				Year 2				Year 3				Year 4				
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
		Communication/publication		2,000				X													2,000			
		Sub-activity 3: Organize training/workshop/seminars to review documentation and receive feedback for appropriate revisions and modalities for sharing information	ACCA21	50,000					X	X														
		Local Consultants		12,000					X	X												12,000		
		Contractual Services /Companies		36,000					X	X												36,000		
		Miscellaneous Expenses		2,000					X	X												2,000		
		Sub-activity 4: Draft briefing paper on technology selection and transfer approaches for Chinese stakeholders	ACCA21	0			X	X																
		Subtotal 3.1.1		**120,000**																				
		Activity Result 3.1.2: Organize exchange visits to share knowledge on the Chinese and Ghanaian contexts and build foundations for technology transfers																						
		Sub-activity 1: Organize exchange visits from China to Ghana and vice-versa to study each country's energy sectors	ACCA21	100,000					X	X							X							
		Travel		88,000					X	X							X					54,000		34,000
		Contractual Services /Companies		12,000													X							12,000

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4				year 1	Year 2	year 3	year 4
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
		Sub-activity 2: Carry out stakeholder meetings to initiate knowledge transfer and strengthen mutual understanding of Ghanaian policy and market conditions	ACCA21	50,000						X	X					X	X						
		Local Consultants		18,000						X						X					18,000		
		Travel		6,000							X						X				6,000		
		Contractual Services /Companies		26,000							X						X				26,000		
		Subtotal 3.1.2		**150,000**																			
		Activity Result 3.1.3 Share knowledge and establish knowledge networks on Renewable Energy																					
		Sub-activity 1: *Draft reports and strategy documents identifying barriers and solutions to RET to Ghana*	ACCA21	20,000						X	X	X			X								
		Local Consultants		12,000						X	X	X			X						6,000	6,000	
		Contractual Services /Companies		8,000											X							8,000	
		Sub-activity 2: Develop and maintain a web platform in Chinese to share project findings and results	ACCA21	3,000										X	X	X	X						
		Communication/publication		3,000										X	X	X	X						3,000
		Sub-activity 3: Establish and maintain expert communities within China and knowledge networks to support continuous learning on RET transfer between China and Ghana	ACCA21	33,000								X	X	X	X	X	X						

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame																Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	Local Consultants		30,000									X	X	X	X	X	X					15,000	15,000
	Miscellaneous Expenses		3,000									X	X	X	X	X	X					3,000	
	Subtotal 3.1.3		**56,000**																				
	Total Output 3.1		**326,000**																				
	Activity Result 3.2.1: Develop roadmap for Renewable Energy Technology Transfer from China to Ghana																						
Output 3.2	**Sub-activity 1:** Convene a series of meetings of stakeholders within China to agree the vision and goals for Renewable Energy Technology Transfer from China to Ghana	ACCA21	50,000							X	X												
	Local Consultants		45,000							X	X										45,000		
	Contractual Services /Companies		5,000							X	X										5,000		
	Sub-activity 2: Draft strategy of RETT from China based on Ghana's national strategies and priorities for Renewable Energy	ACCA21	50,000									X	X										
	Local Consultants		42,000									X	X									42,000	
	Contractual Services /Companies		4,000										X									4,000	
	Communication/publication		3,000										X									3,000	
	Miscellaneous Expenses		1,000										X									1,000	
	Sub-activity 3: Launch and disseminate the Strategy within China	ACCA21	30,000												X								
	Local Consultants		4,500												X							4,500	
	Contractual Services /Companies		10,000												X							10,000	

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	Communication/publication		14,500												X							14,500	
	Miscellaneous Expenses		1,000												X							1,000	
	Subtotal 3.2.1		**130,000**																				
	Activity Result 3.2.2: Seek institutional financing to support technology transfer from China to Ghana																						
	Sub-activity 1: Set-up a task force responsible for China-Ghana RETT financing through the SSC center	ACCA21	10,000	X																			
	Local Consultants		6,000	X																6,000			
	Contractual Services /Companies		4,000	X																4,000			
	Sub-activity 2: Prepare proposals and reports to apply for additional financial support from MOST and other Ministries in China through SSC Centre	ACCA21	20,000	X	X	X			X				X				X						
	Local Consultants		18,000	X	X	X			X				X				X			18,000			
	Contractual Services /Companies		2,000	X	X	X														2,000			
	Sub-activity 3: *Develop report on RETT financing mechanisms*	ACCA21	20,000							X	X					X							
	Local Consultants		15,000							X	X										15,000		
	Contractual Services /Companies		3,500													X							3,500
	Communication/publication		500													X							500
	Miscellaneous Expenses		1,000							X	X										1,000		
	Subtotal 3.2.2		**50,000**																				
	Activity Result 3.2.3: Set up a Chinese stakeholders alliance for China – Ghana RETT																						

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
		Sub-activity 1: Identify stakeholders, agree on modalities for the alliance and hold kick off meeting	ACCA21	5,000			X																
		Local Consultants		3,000			X														3,000		
		Contractual Services /Companies		2,000			X														2,000		
		Sub-activity 2: Assess and revise criteria and standards for RET selection to unify existing practices	ACCA21	40,000			X	X							X								
		Local Consultants		30,000			X	X												30,000			
		Contractual Services /Companies		4,000											X							4,000	
		Communication/publication		5,000											X							5,000	
		Miscellaneous Expenses		1,000											X							1,000	
		Sub-activity 3: Revise barriers to RET deployment and develop strategy for joint collaboration	ACCA21	30,000					X	X	X					X							
		Local Consultants		18,000					X	X	X										18,000		
		Contractual Services /Companies		11,000							X					X					7,000		4,000
		Miscellaneous Expenses		1,000							X										1,000		
		Subtotal 3.2.3		**75,000**																			
		Activity Result 3.2.4: Conduct training of Chinese stakeholders in relation to RETT																					
		Sub-activity 1: Develop training material in Chinese based on information from policy development process, technology review, demonstration sites, mapping and exchange	ACCA21	40,000			X	X	X	X	X	X					X	X					

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	visits																						
	Local Consultants		36,000			X	X	X	X	X	X					X	X			9,000	18,000		9,000
	Communication/publication		4,000							X	X						X				3,000		1,000
	Sub-activity 2: Organize trainings on policy, market and cultural aspects of doing socially responsible business in Ghana in support of national development goals	ACCA21	40,000							X	X			X	X								
	Local Consultants		22,500							X	X			X	X						9,000	13,500	
	Contractual Services /Companies		16,000								X				X						8,000	8,000	
	Miscellaneous Expenses		1,500												X							1,500	
	Subtotal 3.2.4		**80,000**																				
	Activity Result 3.2.5: Support Ghana's adoption capacity for Renewable Energy Technology Transfer																						
	Sub-activity 1: Training of Ghanaian stakeholders in China on technologies at solar, mini-hydro and biogas facilities.	ACCA21	50,000									X	X	X	X			X	X				
	Local Consultants		12,000									X	X	X	X			X	X			12,000	
	Travel		26,000									X	X	X	X			X	X			26,000	
	Contractual Services /Companies		11,000									X	X	X	X			X	X			11,000	
	Miscellaneous Expenses		1,000									X	X	X	X			X	X			1,000	
	Subtotal 3.2.5		**50,000**																				

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame																Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	Total Output 3.2		**385,000**																				
	Total Outcome 3		**711,000**																				
			71300	***Local Consultants***																**126,000**	**144,000**	**93,000**	**24,000**
			71600	***Travel***																**0**	**60,000**	**26,000**	**34,000**
			72100	***Contractual Services /Companies***																**6,000**	**84,000**	**45,000**	**19,500**
			74200	***Communication/publication***																**7,000**	**3,000**	**22,500**	**4,500**
			74500	***Miscellaneous Expenses***																**0**	**4,000**	**8,500**	**0**
Outcome 4: Project management and coordination structures established																							
	Activity Result 4.1.1: Set up PMUs in both Ghana and China																						
Output 4.1	**Sub-activity 1:** Prepare stakeholder list and identify PMU members	ACCA 21 /GEC	0	X																			
	Sub-activity 2: Establish PMU with required documentation and terms of reference	ACCA 21 /GEC	0	X	X																		
	Sub-activity 3: Convene regular meetings for work plans, project monitoring, implementation and other discussions	ACCA 21/GEC	5,000		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
	Miscellaneous Expenses		5,000		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2,000	1,000	1,000	1,000
	Subtotal 4.1.1		**5,000**																				
	Activity Result 4.1.2: Set up PSCs for Ghana -China project																						
	Sub-activity 1: Prepare stakeholder list and identify PSC members	ACCA 21 /GEC/ UNDP/ EMBASSY	0	X																			
	Sub-activity 2: Establish PSC with required	ACCA 21 /GEC/	0	X	X																		

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame																Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	documentation and terms of reference	UNDP/ EMBASSY																					
	Sub-activity 3: Hold PSC meetings to review project plans and reports	ACCA 21 /GEC/ UNDP/ EMBASSY	20,519	X				X				X				X							
	Miscellaneous Expenses		20,519																	5,518.5	5,000	5,000	5,000
	Subtotal 4.1.2		**20,519**																				
	Activity Result 4.1.3: Support project implementation																						
	Human Resources	UNDP Ghana /GEC	140,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
	Salary Costs		140,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	35,000	35,000	35,000	35,000
	Human Resources	UNDP China/ MOST	130,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
	Salary Costs		130,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	32,500	32,500	32,500	32,500
	Monitoring & Evaluation	UNDP	50,000							X	X												
	International Consultant		50,000							X	X											50,000	
	Audit	UNDP	13,000					X				X				X							
	Contractual services – Companies		13,000					X				X				X						13,000	
	Communication	UNDP Ghana. /GEC	5,000	X		X		X		X		X		X		X		X					
	Communication/publication		5,000	X		X		X		X		X		X		X		X		1,250	1,250	1,250	1,250
	Equipment	UNDP Ghana /GEC	10,000	X				X				X				X							

Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Time Frame												Budget			
				Year 1				Year 2				Year 3				Year 4							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	year 1	Year 2	year 3	year 4
	Equipment		10,000	X				X				X				X				7,000	1,000	1,000	1,000
	Miscellaneous	UNDP Ghana /GEC	5,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
	Miscellaneous Expenses		5,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1,250	1,250	1,250	1,250
	Subtotal 4.1.3		**353,000**																				
	Total Output 4.1		**378,519**																				
TOTAL OUTCOME 4			**378,519**																				
			71200	international Consultant																**0**	**0**	**50,000**	**0**
			61100	***Salary Costs***																**67,500**	**67,500**	**67,500**	**67,500**
			72100	***Contractual Services /Companies***																**0**	**0**	**13,000**	**0**
			72200	***Equipment***																**7,000**	**1,000**	**1,000**	**1,000**
			74200	***Communication/publication***																**1,250**	**1,250**	**1,250**	**1,250**
			74500	***Miscellaneous Expenses***																**8,769**	**7,250**	**7,250**	**7,250**
Total Direct Cost			**2,518,519**																				
General Management Services (8%)			**201,481**																				
GRAND TOTAL			**2,720,000**																				

12. PROJECT BUDGET

Award ID									
Project ID									
Business Unit									
Project Title	CHINA-GHANA SOUTH-SOUTH COOPERATION ON RENEWABLE ENERGY TECHNOLOGY TRANSFER								
Implementing Partners	GHANA ENERGY COMMISSION AND CHINA MINISTRY OF SCIENCE AND TECHNOLOGY								
Outcome/Atlas Activity	Fund ID	Donor Name	Account Code	Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)
Outcome 1	30000	Danish Government	71300	Local Consultants	142,000	19,200	0	0	161,200
			71600	Travel	49,000	10,300	6,400	0	65,700
			72100	Contractual Services /Companies	64,000	49,000	3,000	0	116,000
			74200	Communication/ publication	0	16,000	6,000	0	22,000
			74500	Miscellaneous Expenses	8,000	4,700	400	0	13,100
			Total Outcome 1		**263,000**	**99,200**	**15,800**	**0**	**378,000**
Outcome 2	30000	Danish Government	71300	Local Consultants	26,000	60,800	71,500	38,400	196,700
			71600	Travel	5,000	57,700	85,150	38,500	186,350
			72100	Contractual Services /Companies	4,000	303,500	170,600	36,000	514,100
			72200	Equipment	27,000	69,000	10,000	5,000	111,000
			74200	Communication/ publication	0	200	8,400	3,400	12,000
			74500	Miscellaneous Expenses	2,800	15,200	7,250	5,600	30,850
			Total Outcome 2		**64,800**	**506,400**	**352,900**	**126,900**	**1,051,000**
Outcome 3	30000	Danish Government	71300	Local Consultants	126,000	144,000	93,000	24,000	387,000
			71600	Travel	0	60,000	26,000	34,000	120,000

			72100	Contractual Services /Companies	6,000	84,000	45,000	19,500	154,500
			74200	Communication/ publication	7,000	3,000	22,500	4,500	37,000
			74500	Miscellaneous Expenses	0	4,000	8,500	0	12,500
			Total Outcome 3		**139,000**	**295,000**	**195,000**	**82,000**	**711,000**
Outcome 4	30000	Danish Government	61100	Salary Costs	67,500	67,500	67,500	67,500	270,000
			71200	International Consultant	0	0	50,000	0	50,000
			72100	Contractual services – Companies	0	0	13,000	0	13,000
			72200	Equipment	7,000	1,000	1,000	1,000	10,000
			74200	Communication/ publication	1,250	1,250	1,250	1,250	5,000
			74500	Miscellaneous Expenses	8,769	7,250	7,250	7,250	30,519
			Total Outcome 4		**84,519**	**77,000**	**140,000**	**77,000**	**378,519**
PROJECT TOTAL					551,319	977,600	703,700	285,900	2,518,519
GMS (8%)					44,106	78,208	56,296	22,872	201,481
GRAND TOTAL					**595,425**	**1,055,808**	**759,996**	**308,772**	**2,720,000**

LIST OF ABBREVIATIONS

APR	Annual Progress Report
BOOT	Build, Own, Operate and Transfer
C4	Clean, Convenient, Cost-effective, and fuel Conserving
CREDP	China Renewable Energy Development Project
EC	Energy Commission
FACE	Funding Authorization and Certificate of Expenditures
FYP	Five Year Plan
GoG	Government of Ghana
ICT	Information and Communications Technology
IP	Implementing Partner
LPG	Liquid Petroleum Gas
MOEP	Ministry of Energy and Petroleum
MOST	Ministry of Science and Technology, China
NDRC	National Development and Reform Commission, China
NEA	National Energy Administration, China
NEC	National Energy Commission, China
NEX	Nationally Executed (Project)
NPD	National Project Directors
NPM	National Project Managers
PM	Project Manager
PMU	Project Management Unit
PPP	Public Private Partnerships
PPP	Purchasing Power Parity
PSC	Project Steering Committee
PV	Photovoltaic
RE	Renewable Energy
REMP	Renewable Energy Master Plan, Ghana
RET	Renewable Energy Technologies
RETT	Renewable Energy Technology Transfer
RMB	Renminbi, currency of China
SASAC	State-Owned Assets Supervision and Administration Commission, China
SBAA	Standard Basic Assistance Agreement
SERC	State Electricity Regulatory Commission, China
SSC	South-South Cooperation
TYWP	Three Year Work Plan
UN	United Nations
UNDP	United Nations Development Programme
UNDP-CO	UNDP Country Office
VAT	Value Added Tax
VRA	Volta River Authority

ANNEX 1 Budget Description

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
Outcome 1: Ghana has an enabling environment in place for the transfer, production and regulation of the use of Renewable Energy Technologies in Ghana.					
		Activity Result 1.1.1.: Review Chinese and Ghanaian RE policies and strategies to identify capacity building gaps and solutions to address them			
	Output 1.1	**Sub-activity 1:** Conduct workshops in Ghana for Stakeholders on China and Ghana's Renewable Energy policy	Ghana Energy Commission (GEC)	9,000	
		Local Consultants		6,000	Local consultant (or team of consultant) to review Chinese policies: $300*20 man days
		Contractual Services /Companies		2,000	Cost of venue for workshop to review Chinese policies for 20 key Ghanaian participants for 1 day
		Miscellaneous Expenses		1,000	Miscellaneous
		Sub-activity 2: Joint review Renewable Energy policies in Ghana	GEC	10,000	
		Travel		7,000	2 return tickets Beijing-Accra-Beijing (2x$2,000) and 5 days DSA for 2 experts at $300
		Contractual Services /Companies		3,000	One day workshop to clarify Chinese policies to 30 key Ghanaian stakeholders for 1 day
		Sub-activity 3: Conduct gaps analysis through stakeholder consultations and seminars	GEC	24,000	
		Local Consultants		12,000	Local consultant to do gap analysis and review of implementation of Ghanaian policies: $300*40 man days
		Travel		2,000	Travel for 5 Ghanaian experts to Accra: DSA ($300*5); transportation ($500)
		Contractual Services /Companies		10,000	One main workshop to review gaps and results for 50 participants for 1 day; 3 smaller workshops for consultant to meet specific groups of stakeholders.
		Sub-activity 4: Organize workshop/seminars to identify solutions to address the identified gaps	GEC	16,000	
		Local Consultants		3,000	Local consultant to identify solutions: $300*10 man days

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Travel		1,500	Travel for 5 Ghanaian experts to Accra: DSA ($300*5)
		Contractual Services /Companies		10,000	One main workshop to review gaps and results for 50 participants for 1 day; 3 smaller workshops for consultant to meet specific groups of stakeholders.
		Miscellaneous Expenses		1,500	Miscellaneous
		Subtotal 1.1.1.		**59,000**	
		Activity Results 1.1.2: Draft and submit to Parliament the Renewable Energy Master Plan (REMP)			
		Sub-activity 1: Develop Renewable Energy Master Plan based on Ghana's National RE Strategies		140,000	
		Local Consultants		100,000	Team of consultants with one lead consultant and 4 sectoral consultants. Lump sum contract. Consultancy fees: $75,000 ($300*250 working days); travel: $21,000 ($300 DSA and $300 fuel/car for 35 days in the field); $4,000 (miscellaneous costs).
		Travel		21,000	Cost of travel for two members of project team to go to the field with consultants: $21,000 ($300*2people*35 days in the field)
		Contractual Services /Companies		15,000	Cost of 10 stakeholder consultations to gather data and discuss issues related to the REMP for 15 people each: $15,000 ($100*15*10).
		Miscellaneous Expenses		4,000	Miscellaneous
		Sub-activity 2: Conduct multi-stakeholder consultation to review the Plan	GEC	37,000	
		Travel		13,000	Reduced DSA for 30 participants for 4 days: $7,000; cost of air ticket for two Chinese experts: $4,000 ($2,000*2); DSA for 2 Chinese experts for 5 days ($200*5*2)
		Contractual Services /Companies		24,000	Cost of conference package for 40 people for 4 days outside Accra ($150*40*4)
		Sub-Activity 3: Submit REMP to Parliament for review and approval.	GEC	0	
		Subtotal 1.1.2		**177,000**	
		Activity Results 1.1.3: Launch and disseminate the REMP			
		Sub-activity 1: Organize the official launch of the REMP	GEC	18,000	
		Contractual Services /Companies		10,000	Hiring of venue for 100 participants for 1 day: $10,000 ($100*100)
		Communication/publication		7,000	Printing of 500 copies: $5,000 ($10*500); Cost of advertising: $2,000
		Miscellaneous Expenses		1,000	Miscellaneous

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Sub-activity 2: Organize national and international dissemination of REMP for Ghanaian, Chinese and Danish stakeholders	GEC	40,000	
		Travel		12,200	Travel to China of 2 Ghanaian Government officials: air ticket ($2,000*2); DSA ($300*2*3days) Travel to Denmark of 2 Ghanaian Government officials: air ticket ($2,000*2); DSA ($400*2*3days)
		Contractual Services /Companies		15,000	Renting of venue for one day event for 100 people in Beijing ($100*100) Renting of venue for one day event for 30 people in Copenhagen ($100*30) Cost of interpreters in Beijing ($2,000)
		Communication/publication		12,000	Cost of air time on radio and TV stations to present the REMP to the general public.
		Miscellaneous Expenses		800	Miscellaneous
		Subtotal 1.1.3		**58,000**	
		Total Output 1.1		**294,000**	
	Output 1.2	**Activity Results 1.2.1: Conduct in depth analysis of regulatory, technical, social and other barriers in Ghana and China currently hindering effective and widespread absorption of RET.**			
		Sub-Activity 1: Conduct a desk review and surveys/interviews to identify barriers for RET Transfer	GEC	27,000	
		Local Consultants		21,000	Hiring of a consultancy team (at least two consultants with survey assistants): $21,000 ($300*70 man days)
		Travel		4,500	Cost of travel of members of project team to conduct surveys with consultant: DSA: $3,000 ($300*5days*2 people); transportation: $1,500 ($300*5days)
		Miscellaneous Expenses		1,500	Miscellaneous
		Sub-Activity 2: Prepare a report to summarize and analyze identified barriers.	GEC	9,000	
		Local Consultants		9,000	Cost of consultancy team to analyze desk review and survey results and prepare report: $9,000 ($300*30man days)
		Subtotal 1.2.1		**36,000**	
		Activity Results 1.2.2: Develop a roadmap to remove or reduce barriers to effective RETT in Ghana			

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Sub-Activity 1: Organize stakeholders meetings to identify strategies and solutions to remove barriers in Ghana	GEC	10,000	
		Contractual Services /Companies		10,000	Renting of venue to present results of barriers study for 1 day for 50 participants: $5,000 ($100*50); cost of 3 smaller consultations with specific stakeholders: $5,000
		Sub-Activity 2: Develop a roadmap to set goals, objectives and priorities to remove or reduce barriers.	GEC	27,000	
		Local Consultants		9,000	Cost of consultants to facilitate development of roadmap: $9,000 ($300*30 man days)
		Travel		4,500	Reduced DSA for 40 participants for 2 days to develop roadmap: $4,500
		Contractual Services /Companies		12,000	Conference package for 40 participants for 2 days to develop roadmap: $12,000 ($150*40*2)
		Miscellaneous Expenses		1,500	Miscellaneous
		Sub-Activity 3: Convene a conference to launch and disseminate the roadmap	GEC	11,000	
		Local Consultants		1,200	Cost of consultants to facilitate validation workshop: $1,200 ($300*4 man days)
		Contractual Services /Companies		5,000	Hiring of venue to validate the roadmap: $5,000 ($100*50participants)
		Communication/publication		3,000	Printing of leaflets: $3000 ($3*1000 copies)
		Miscellaneous Expenses		1,800	Miscellaneous
		Subtotal 1.2.2		**48,000**	
		Total Output 1.2		**84,000**	
		TOTAL OUTCOME 1		**378,000**	
Outcome 2: Access to and use of relevant Renewable Energy Technologies (RETs) increased in Ghana.					
	Output 2.1	**Activity Result 2.1.1: Selection and adaptation of appropriate RETs to be transferred**			
		Sub-activity 1: Develop criteria and standards for the selection of appropriate Renewable Energy Technologies	GEC	81,000	
		Local Consultants		42,000	4 Chinese consultants to support Ghanaian research institutions to develop standards and

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
					criteria, 20 days each (5 before Gh, 10 in Gh, 5 after Gh), lump-sum contract: $24,000 fees ($300*4*25); $8,000 air ticket ($2,000*4); $10,000 DSA ($250*4*10). This is related to the on-site investigation too.
		Contractual Services /Companies		7,500	Cost of meetings led by Ghanaian research institutions to develop the criteria and standards.
		Equipment		30,000	Cost of equipment for research institutions needed to develop the criteria (e.g. testing facility)
		Miscellaneous Expenses		1,500	Miscellaneous
		Sub-activity 2: *Review the selected technologies and adapt specifications to Ghana's requirements*	ACCA21	30,000	
		Travel		14,000	Travel to China of 4 Ghanaian exerts: air ticket ($2,000reture fights*4persons); DSA ($300/day*4persons*5days)
		Equipment		16,000	To adjust technologies or equipments to meet Ghanaian requirements.(4-8 companies)2000-4000$/company
		Subtotal 2.1.1		**111,000**	
		Activity Result 2.1.2: Facilities to receive, test, demonstrate and exhibit equipment and publish performance results			
		Sub-activity 1: On-site investigation and feasibility study to select facilities for demonstration	GEC	65,000	
		Local Consultants		40,000	Cost of consultants to conduct feasibility studies in 2-3 pre-shortlisted sites for each technology: $25,800 fees ($300*86 man days); $14,000 field trips (28 days, $200 per diem, $300 fuel/vehicle); $200 incidentals
		Travel		11,200	Travel of 2 Government or research representatives to go to the field with consultants: $11,200 per diem ($200*28*2)
		Equipment		10,000	Equipment to facilitate field work.
		Miscellaneous Expenses		3,800	Miscellaneous
		Sub-activity 2: Identification of technology providers to supply facilities	ACCA21	5,000	China will lead and supply the facilities to select and identify the name list of the technology providers according to the technology demand from Ghana
		Local Consultants		4,800	Cost of consultants for 4 Chinese experts to conduct research in technology providers for

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
					each RE technology: 4800$ (300$/day*4persons*4 days=4800$)
		Miscellaneous Expenses		200	Miscellaneous fee
		Sub-activity 3: Provide facilities with testing and demonstration equipment	GEC	390,000	
		Travel		37,500	Cost of travel of project team (3 people) to demonstration sites: $30,000 ($300*3*50days); $7,500 fuel/vehicle ($150*50days)
		Contractual Services /Companies		300,000	Contractual services for supply, shipment, installation of technologies for demonstration. This will include on-site training.
		Equipment		40,000	Cost of local materials and equipment needed to set up the demonstration facilities.
		Miscellaneous Expenses		12,500	Miscellaneous
		Sub-activity 4: Website update to share performance results and experience	GEC	1,000	
		Communication/publication		1,000	Communication costs
		Sub-activity 5: Monitor performance and based on testing and demonstration, capture lessons learned to develop training programs for stakeholders, incl. operators, administrators, etc in Ghana	GEC	80,000	
		Travel		62,500	Cost of travel for 2 people from ACCA21 for 12 days: 4,000 ticket ($2,000*2); 6,000 DSA ($250*12*2) Cost of monitoring for project team (3 people on average, 210 man days over the period): $42,000 DSA ($200*3*70days); $10,500 fuel/vehicle ($150*70)
		Equipment		15,000	Cost of equipment to do monitoring (e.g. cameras, additional testing equipment etc.
		Miscellaneous Expenses		2,500	Miscellaneous
		Subtotal 2.1.2		**541,000**	
		Total Output 2.1		**652,000**	
	Output 2.2	**Activity Result 2.2.1: Support to training facilities within existing institutions for increased capacity building on RETs**			

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Sub-activity 1: Develop work plans and long term funding and outreach strategies for the training facilities	GEC	40,000	
		Local Consultants		24,000	Cost of consultancy to reach potential research institutions, assess needs and gaps, and develop work plans and long term funding and outreach strategies: $12,000 fees ($300*40 man days); $12,000 travel ($6,000 DSA and $6,000 fuel/vehicle for 10 days)
		Travel		9,500	Cost of travel for 4 members of project team to join consultant in the field: $8,000 DSA ($200*4*10) and $1500 fuel/vehicle ($150*10)
		Contractual Services /Companies		5,000	Cost of various meetings to discuss work plan and strategy
		Communication/publication		1,500	Cost of advert for call for proposal
		Sub-activity 2: Adaptation of monitoring results and lessons learned into training programs on RET to be offered by training facilities	GEC	20,000	
		Contractual Services /Companies		20,000	Partnership with training institutions to develop training programmes (preferably one per technology)
		Sub-Activity 3: Training of private sector and institutional partners to ensure sustainability of testing sites.	GEC	73,000	
		Local Consultants		38,400	Provide technical support to the demonstration sites by hiring 8 of the trained people (assuming 2 people for 4 sites) as long-term technical consultant ($400per month*8people*12months)
		Travel		3,000	Eventual travel for the project team to monitor the training
		Contractual Services /Companies		30,000	Partnership with training institutions to conduct two-month sessions training. The project will support training for 40 people (tuition and boarding for 10 at $1,500 each, only tuition for 30 at $500 each). Other participants will have to pay for their tuitions.
		Miscellaneous Expenses		1,600	Miscellaneous
		Sub-activity 4: Convene meeting of stakeholders to agree modalities for facilitating community of practice.	GEC	10,000	
		Travel		4,500	Cost of travel for 15 people coming from outside Accra ($300*15)
		Contractual Services /Companies		4,000	Cost for renting venue for one day meeting in Accra ($100*40 participants)

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Miscellaneous Expenses		1,500	Miscellaneous
		Sub-activity 5: Project support to the community of practice to operate under project for period of one year.	GEC	16,000	
		Contractual Services /Companies		12,000	Cost for renting venue for one day meeting in Accra in 3 quarters ($100*40*3)
		Communication/publication		3,000	Communication costs
		Miscellaneous Expenses		1,000	Miscellaneous
		Subtotal 2.2.1		**159,000**	
		Activity Results 2.2.2: Develop institutional financing mechanisms to up-scale RETT in Ghana			
		Sub-Activity 1: Cost and benefit analysis of RETT activities from China to Ghana	ACCA21	20,000	
		Local Consultants		12,000	Cost of consultants for 2 Chinese experts to conduct study in evaluation of transferring activities for each technology: 12,000$ (300$/day*2persons*20 days=12000$)
		Travel		6,000	Cost of the 2 Chinese experts to conduct the interviews and survey in local regions of China : local travel (300$ * 2persons*5 single air fare =3000$) and DSA (250$/day*2person*6days=3000$)
		Communication/publication		2,000	A cost report to be published in Chinese(500)and translation to English (1000)
		Sub-Activity 2: Prepare a financial proposal to promote RETT from China to Ghana	ACCA21	40,000	
		Local Consultants		24,000	Cost of consultants for 4Chinese experts to conduct investigation in 4 different regions in China and analyze the local situation: 24,000$ (300$/day*4persons*20 days=24000$)
		Travel		6,600	4 Chinese experts: local travel (300$*4persons*3single air fare=3600$) and DSA (250$/day*4persons*3days=3000$)
		Contractual Services /Companies		8,000	Workshop with 20 participants for 2 days to review the financial proposal. (Venue, 2000$/day*2day + meal, 20persons *100$/day*2days=8000$,)
		Communication/publication		1,400	Report publication of the financial proposal (400$) and translation into English (1000$)
		Sub-Activity 3: Convene investors consultation meeting to raise fund for RETT from China to Ghana	ACCA21	20,000	
		Local Consultants		6,000	Cost of consultants for 2 Chinese experts to prepare the meeting document and relevant

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
					reports: 6,000$ (300$/day*2persons*10 days=6000)
		Travel		4,300	2 Chinese experts: 4300$ local travel (300$*2person*3 single air fare=1800$) and DSA (250$/day*2person*5days=2500$)
		Contractual Services /Companies		8,600	One and half day workshops with 40 participants to assess the acceptance of Financial proposal to promote RETT by potential investors (2600venu*1.5days+ meal 40persons *100$/day*1.5days=8600$,)
		Communication/publication		1,100	Workshop materials: 1100$
		Subtotal 2.2.2		**80,000**	
		Activity Results 2.2.3: Develop business models to support private sector involvement and public – private partnerships in RETT in Ghana			
		Sub-Activity 1: Convene stakeholder discussions on business model development in Ghana	GEC	40,000	
		Local Consultants		5,500	Chinese consultant to support development of business models (lump-sum contract): $3000 fees ($300*10 man days); $2,000 air ticket; $1,500 DSA ($300*5 days).
		Travel		18,000	Cost of travel for 20 people from outside Accra to attend 3 meetings: $18,000 DSA ($300*20*3)
		Contractual Services /Companies		15,000	Cost of renting venue for 3 one-day meetings in Accra for 50 participants: $15,000 ($100*50*3)
		Miscellaneous Expenses		1,500	
		Sub-Activity 2: Conduct strategic research on business models to facilitate the involvement of private sectors in RETT	GEC	50,000	Present set of options for business models
		Contractual Services /Companies		50,000	Partnership with one Ghanaian research institute with requisite expertise and experience in socially relevant businesses. The institute will develop the business models (set of options)
		Sub-Activity 3: In cooperation with training facilities, design and conduct training programmes for both Chinese and Ghanaian stakeholders, including governmental agencies, research institution, private sector, SME, etc on developed models.	GEC	70,000	4 target groups: investment/trade, technology suppliers, financial sector and end users (private, public, NGO). 10 days training for end users in 3 sessions in 3 zones of Ghana; 2 days training for the other three grouped together in 3 sessions in 3 zones of Ghana.
		Travel		9,250	2 Chinese government representatives travelling to Ghana: ticket 2*2,000 ; 4 days DSA

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
					($300*2*4); monitoring of project team (4 members for 3 days): $2,400 DSA ($200*4*3) and $450 fuel/vehicle ($150*3)
		Contractual Services /Companies		54,000	Partnership with one Ghanaian research institution (as above): $1,500*36 training days.
		Communication/publication		2,000	Cost of communication and publicity
		Miscellaneous Expenses		4,750	Miscellaneous
		Subtotal 2.2.2		**160,000**	
		Total Output 2.2		**399,000**	
		TOTAL OUTCOME 2		**1,051,000**	
Outcome 3: China's has strengthened capacity for South-South Cooperation in relation to RET transfer					
		Activity Result 3.1.1: Map, update and share China's experience and approaches to technology selection and transfer			
	Output 3.1	**Sub-activity 1**: Map National and Regional planning approaches, laws and programs, institutional set ups and financial models into a comprehensible set of reports on China's experience creating widespread access to renewable energy and becoming a key producer of RETs.	ACCA21	50,000	
		Local Consultants		45,000	Cost of consultants for 5 Chinese experts, one is responsible for national planning approaches research, the others are responsible for the regional planning approaches in China(including north region, west region, south region and east region): 45,000$ (300$/day*5persons*30 days=45000$)
		Communication/publication		5,000	Three reports to be published and translated into English, 5000$
		Sub-activity 2: Conduct in-depth analysis of China's experience on rural electrification and make recommendations for good practice for the Ghanaian context	ACCA21	20,000	
		Local Consultants		18,000	Cost of consultants for 2 Chinese experts to study in how China to develop rural electrification: 18,000$ (300$/day*2persons*30 days=18000$)
		Communication/publication		2,000	Report on China's experience on rural electrification would be published with publication

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
					cost of 2000$
		Sub-activity 3: Organize training/workshop/seminars to review documentation and receive feedback for appropriate revisions and modalities for sharing information	ACCA21	50,000	
		Local Consultants		12,000	4 Chinese experts to prepare the meeting document and draft meeting summaries: 12,000$ (300$/day*4persons*10 days=12000$)
		Contractual Services /Companies		36,000	Four 1.5 day workshops with 35 participants to get better understanding of Chinese policy and regulations on RET development and identify the potential gaps for RETT from China to Ghana: 36000$ (2500venu*1.5days*4worshops+ meal 35persons *100$/day*1.5days*4workshops=36000$,)
		Miscellaneous Expenses		2,000	Miscellaneous Expenses
		Sub-activity 4: Draft briefing paper on technology selection and transfer approaches for Chinese stakeholders	ACCA21	0	Select appropriate technologies and providers to conduct the technology transfer. Budget is covered by activity 2.1.1 sub-activity 1
		Subtotal 3.1.1		**120,000**	
		Activity Result 3.1.2: Organize exchange visits to share knowledge on the Chinese and Ghanaian contexts and build foundations for technology transfers			
		Sub-activity 1: Organize exchange visits from China to Ghana and vice-versa to study each country's energy sectors	ACCA21	100,000	
		Travel		88,000	Exchange visit from China to Ghana for Chinese stakeholders to well understand Ghana context and business enviornment:54,000$, 6 Government officials : ticket ($2,000*6persons); DSA ($250/day*4days*6perosons); internal travel ($1,000/person*6persons); 6 technical Experts: ticket ($2,000*6persons); DSA ($250/day*4days*6perosons); internal travel ($1,000/person*6persons); 6 business men: internal travel ($1,000/person*6persons)China supports Ghana visitors in China: 4 persons internal travel($1000/person*4persons=4000$)
		Contractual Services /Companies		12,000	China supports Ghana visitors in China: 4 interpreters (1000$/person*4persons) ; Money for group discussion or meeting to rent local venue and miniworkshops.8000$

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Sub-activity 2: Carry out stakeholder meetings to initiate knowledge transfer and strengthen mutual understanding of Ghanaian policy and market conditions	ACCA21	50,000	
		Local Consultants		18,000	Cost of consultants for 4 Chinese experts to prepare the meeting reports and share the Ghanaian context with Chinese stakeholders: 18,000$ (300$/day*4persons*15 days=18000$)
		Travel		6,000	2 persons internal travel($500/person*2persons*4 workshops=4000$)+ DSA ($250/day*1days*2perosons*4workshops=2000$)
		Contractual Services /Companies		26,000	Four 1 day workshops with 40 Chinese stakeholders to share the information on Ghana policy and market conditions: 26000$ (2500venu*1day*4worshops+ meal 40persons *100$/day*1days*4workshops=26000$,)
		Subtotal 3.1.2		**150,000**	
		Activity Result 3.1.3 Share knowledge and establish knowledge networks on Renewable Energy			
		Sub-activity 1: *Draft reports and strategy documents identifying barriers and solutions to RET to Ghana*	ACCA21	20,000	
		Local Consultants		12,000	4 Chinese experts to identify barriers and solutions for RETT from China to Ghana: 12,000$ (300$/day*4persons*10 days=12000$)
		Contractual Services /Companies		8,000	Workshop with 20 policy-makers from key Chinese Ministries for 2 days to understand the barriers and collect their comments (Venue, 2000$/day*2day + meal, 20persons *100$/day*2days=8000$)
		Sub-activity 2: Develop and maintain a web platform in Chinese to share project findings and results	ACCA21	3,000	
		Communication/publication		3,000	Budget for website development will share with Zambia project and 3000$ is for the website maintains and data update only

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Sub-activity 3: Establish and maintain expert communities within China and knowledge networks to support continuous learning on RET transfer between China and Ghana	ACCA21	33,000	
		Local Consultants		30,000	Cost of consultants for 20 Chinese experts to conduct the research in how to establish the sustainable communication and provide the maintain knowledge networks : 30,000$ (300$/day*20persons*5 days=30000$)
		Miscellaneous Expenses		3,000	Miscellaneous Expenses
		Subtotal 3.1.3		**56,000**	
		Total Output 3.1		**326,000**	
	Output 3.2	**Activity Result 3.2.1: Develop roadmap for Renewable Energy Technology Transfer from China to Ghana**			
		Sub-activity 1: Convene a series of meetings of stakeholders within China to agree the vision and goals for Renewable Energy Technology Transfer from China to Ghana	ACCA21	50,000	
		Local Consultants		45,000	Cost of consultants for 10 Chinese experts to collect requirements of Chinese private companies, government officials and other stakeholders, and prepare the meeting reports : 45,000$ (300$/day*10persons*15 days=45000$)
		Contractual Services /Companies		5,000	Small group meeting to develop a comment vision and goals for RETT from China to Ghana venues rent (1000$/day*5meetings=5000$)
		Sub-activity 2: Draft strategy of RETT from China based on Ghana's national strategies and priorities for Renewable Energy	ACCA21	50,000	
		Local Consultants		42,000	7 Chinese experts to work out the national strategy of RETT in China based on Ghanaian REMP : 4,2000$ (300$/day*7persons*20 days=42000$)
		Contractual Services /Companies		4,000	Workshop with 20 policy-makers from key Chinese Ministries for 1 days to review the strategy (Venue, 2500$/day*1day + meal, 15persons *100$/day*1days=4000$)
		Communication/publication		3,000	Translate the strategy report into English: 3000$
		Miscellaneous Expenses		1,000	Miscellaneous Expenses

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Sub-activity 3: Launch and disseminate the Strategy within China	ACCA21	30,000	
		Local Consultants		4,500	Cost of consultant for 1 Chinese expert to prepare the workshop report: 4,500$ (300$/day*1person1*15 days=4500$)
		Contractual Services /Companies		10,000	Workshop with 60 participants for 1 days to share Chinese strategy(Venue, 4000$/day*1day + meal, 60persons *100$/day*1days=6000$)
		Communication/publication		14,500	Translation:4500$ and Publication and handbook to disseminate the strategy:$10000
		Miscellaneous Expenses		1,000	Miscellaneous expenses
		Subtotal 3.2.1		**130,000**	
		Activity Result 3.2.2: Seek institutional financing to support technology transfer from China to Ghana			
		Sub-activity 1: Set-up a task force responsible for China-Ghana RETT financing through the SSC center	ACCA21	10,000	
		Local Consultants		6,000	Cost of consultants for 2 Chinese expert to analyze the task force for RETT and develop the scientific suggestion for financing approaches through the SSC center : 6,000$ (300$/day*2persons*10 days=6000$)
		Contractual Services /Companies		4,000	Workshop with 20 participants for 1 days to collect feedback and comments (Venue, 2000$/day*1day + meal, 20persons *100$/day*1days=4000$)
		Sub-activity 2: Prepare proposals and reports to apply for additional financial support from MOST and other Ministries in China through SSC Centre	ACCA21	20,000	
		Local Consultants		18,000	Cost of consultants for 4 Chinese experts to prepare the financing research proposals in terms of different kinds of RET to explore additional funding: 18,000$ (300$/day*4persons*15days=18000$)
		Contractual Services /Companies		2,000	Venus rent for potential investor interviews and group discussion
		Sub-activity 3: *Develop report on RETT financing mechanisms*	ACCA21	20,000	
		Local Consultants		15,000	5 Chinese experts to prepare the Report on RETT financing mechanisms: 15,000$ (300$/day*5persons*10days=15000$)
		Contractual Services /Companies		3,500	Translation fee: 3500$
		Communication/publication		500	Publication Cost:500$

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Miscellaneous Expenses		1,000	Miscellaneous expenses:1000$
		Subtotal 3.2.2		**50,000**	
		Activity Result 3.2.3: Set up a Chinese stakeholders alliance for China – Ghana RETT			
		Sub-activity 1: Identify stakeholders, agree on modalities for the alliance and hold kick off meeting	ACCA21	5,000	
		Local Consultants		3,000	Cost of consultant for 1 Chinese experts to prepare the kick-off meeting materials: 3000$ (300$/day*1 person*10days=3000$)
		Contractual Services /Companies		2,000	Venus rent for Kick-off meeting: $2000
		Sub-activity 2: Assess and revise criteria and standards for RET selection to unify existing practices	ACCA21	40,000	
		Local Consultants		30,000	Cost of consultants for 4 Chinese experts to develop the workshop report, analyze the meeting feedback, revise the technical criteria and standards : 30000$ (300$/day*4 persons*25days=30000$)
		Contractual Services /Companies		4,000	Workshop with 20 participants for 1 days (Venue, 2000$/day*1day + meal, 20persons *100$/day*1days=4000$)
		Communication/publication		5,000	Publication: 5000$
		Miscellaneous Expenses		1,000	Miscellaneous expense:1000$
		Sub-activity 3: Revise barriers to RET deployment and develop strategy for joint collaboration	ACCA21	30,000	
		Local Consultants		18,000	3 Chinese experts to develop the collaboration strategy of Chinese stakeholders to bring down the RETT cost: 18000$ (300$/day*3 persons*20days=18000$)
		Contractual Services /Companies		11,000	Workshop with 40 participants for 1 day (Venue, 3000$/day*1day + meal, 40persons *100$/day*1days=7000$);workshop with 20 stakeholders for 1 day,(Venue, 2000$/day*1day + meal, 20persons *100$/day*1days=4000$)
		Miscellaneous Expenses		1,000	Miscellaneous expense:1000$
		Subtotal 3.2.3		**75,000**	
		Activity Result 3.2.4: Conduct training of Chinese stakeholders in relation to RETT			

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Sub-activity 1: Develop training material in Chinese based on information from policy development process, technology review, demonstration sites, mapping and exchange visits	ACCA21	40,000	
		Local Consultants		36,000	Cost of consultants for 3 Chinese experts to design the training materials: 36000$ (300$/day*3 persons*40days=36000$)
		Communication/publication		4,000	Publication and communication: 4000$
		Sub-activity 2: Organize trainings on policy, market and cultural aspects of doing socially responsible business in Ghana in support of national development goals	ACCA21	40,000	
		Local Consultants		22,500	Cost of consultants for 4 Chinese experts to conduct study in Ghana's policy/market/culture and develop the training materials: 18000$ (300$/day*4 persons*15days=18000$)
		Contractual Services /Companies		16,000	Training for 20 stakeholders for 2 day (Venue, 2000$/day*2day + meal, 20persons *100$/day*2days=8000$);workshop with 20 stakeholders on social responsibility in Ghana context for 2 day,(Venue, 2000$/day*2day + meal, 20persons *100$/day*2days=8000$)
		Miscellaneous Expenses		1,500	Miscellaneous expense:1500$
		Subtotal 3.2.4		**80,000**	
		Activity Result 3.2.5: Support Ghana's adoption capacity for Renewable Energy Technology Transfer			
		Sub-activity 1: Training of Ghanaian stakeholders in China on technologies at solar, mini-hydro and biogas facilities.	ACCA21	50,000	
		Local Consultants		12,000	Cost of consultants for 4 Chinese experts to design the training materials: 12000$ (300$/day*4persons*10days=12000$)
		Travel		26,000	Ghana guest travel cost:26000$
		Contractual Services /Companies		11,000	Interpreter: 5000$. Hosting Ghana group in China: 6000$
		Miscellaneous Expenses		1,000	Miscellaneous expense
		Subtotal 3.2.5		**50,000**	

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
		Total Output 3.2		**385,000**	
		Total Outcome 3		**711,000**	
Outcome 4: Project management and coordination structures established					
	Output 4.1	**Activity Result 4.1.1: Set up PMUs in both Ghana and China**			
		Sub-activity 1: Prepare stakeholder list and identify PMU members	ACCA 21 /GEC	0	
		Sub-activity 2: Establish PMU with required documentation and terms of reference	ACCA 21 /GEC	0	
		Sub-activity 3: Convene regular meetings for work plans, project monitoring, implementation and other discussions	ACCA 21 /GEC	5,000	
		Miscellaneous Expenses		5,000	Miscellaneous costs for project management and coordination ($2,500 for each country).
		Subtotal 4.1.1		**5,000**	
		Activity Result 4.1.2: Set up PSCs for Ghana -China project			
		Sub-activity 1: Prepare stakeholder list and identify PSC members	ACCA 21 /GEC/UNDP /EMBASSY	0	
		Sub-activity 2: Establish PSC with required documentation and terms of reference	ACCA 21 /GEC/UNDP /EMBASSY	0	
		Sub-activity 3: Hold PSC meetings to review project plans and reports	ACCA 21 /GEC/UNDP /EMBASSY	20,519	
		Miscellaneous Expenses		20,519	Miscellaneous expenses for PSC meetings ($10,259.5 for each country)
		Subtotal 4.1.2		**20,519**	
		Activity Result 4.1.3: Support project implementation			
		Human Resources	UNDP Ghana/GEC	140,000	
		Salary Costs		140,000	Salary of project manager: $86,400 ($1,800*48 months); Salary of project assistant: $33,600

	Output	Sub Activities	Responsible Party	Estimated Budget (USD)	Description
					($700*48 months); $20,000 (contribution to salary of UNDP staff)
		Human Resources	MOST	130,000	
		Salary Costs		130,000	Salary of project manager: $86,400 ($1,800*48 months); Salary of project assistant: $33,600 ($700*48 months); $10,000 (contribution to salary of UNDP staff)
		Monitoring & Evaluation	UNDP	50,000	
		International Consultant		50,000	Cost of international consultant to conduct mid-term evaluation: 1 international consultant supported by 2 national consultants in each country. 10 days in the field in Ghana, 5 days in the field in China.
		Audit	UNDP	13,000	
		Contractual services – Companies		13,000	Cost of audit firm ($3,000 for China, $8,000+2000 for Ghana)
		Communication	UNDP Ghana./GEC	5,000	
		Communication/publication		5,000	Cost of project related communication material and publicity
		Equipment	UNDP Ghana/GEC	10,000	
		Equipment		10,000	Cost of IT equipment (laptops, printer) and furniture for PMU in Ghana
		Miscellaneous	UNDP Ghana/GEC	5,000	
		Miscellaneous Expenses		5,000	Miscellaneous
		Subtotal 4.1.3		**353,000**	
		Total Output 4.1		**378,519**	
			TOTAL OUTCOME 4	**378,519**	
			GMS	**201,481**	
			Overall Project Total	**2,720,00**	

ANNEX 2: Endorsement letters

Endorsement letter from UNDP Ghana

- 8 MAY 2014

United Nations Development Programme

UNDP BEIJING
FILE: 00084499; 00084500
Sr MNGT: CB/PH
CC: CG
Action: ZwD
FILING

INTEROFFICE MEMORANDUM

TO: Mr. Christophe Bahuet
Country Director
UNDP China

Date: 5 May 2014

FROM: Mr. Dominic Sam
Country Director
UNDP Ghana

SUBJECT: ENDORSEMENT OF PROJECT PROPOSAL

I hereby confirm that I on behalf of the UNDP Ghana Country Office fully support the proposal ***"China-Ghana South-South Cooperation on Renewable Energy Technology Transfer"***, its objective, outcomes and outputs and that the UNDP Ghana Country Office will provide the needed implementation support for the project, as outlined in the project document.

The Ghana Country Office is very keen on embarking on this collaboration with the China Country Office, which will promote an innovative approach to South-South Cooperation between China and Africa. This is fully aligned with the new UNDP Strategic Plan, which has South-South Cooperation as one of its key priorities. Additionally, the focus of the project on renewable energy technology will form an important part of the support that UNDP is providing to the Government of Ghana for the implementation of the Sustainable Energy for All Action Plan. Through this project it is expected that Ghana will obtain from China the renewable energy technology most suitable to the country's needs as well as critical skills to operate and eventually produce it. Finally, this project constitutes a great and innovative opportunity for our two Country Offices to join efforts and collaborate to demonstrate the principles of south-south co-operation and work towards common objectives. The experiences and the lessons learnt from this cooperation will be instrumental for fostering new collaboration among UNDP Country Offices in future.

Endorsement from Ghana

ENERGY COMMISSION

Ghana Airways Avenue, Airport Residential Area (behind Alliance Française)

Private Mail Bag
Ministries Post Office
Accra - Ghana

Tel: 0302 813756/7
Fax: 0302 813764
IDD Code: (233-302)
E-mail: info@energycom.gov.gh
Website: http://www.energycom.gov.gh

Ref: EC/OREP/UNDP/RETT

5th May, 2014

The Country Director
United Nations Development Program (UNDP)
Accra Ghana

Dear Sir,

LETTER OF ENDORSEMENT: UNDP GHANA - CHINA RENEWABLE ENERGY TECHNOLOGY TRANSFER COOPERATION

The Renewable Energy Technology Transfer (RETT) initiated under the UNDP-Ghana and UNDP-China South-South Cooperation is in line with Ghana's Sustainable Energy for All (SE4ALL) Action Plan developed in 2012.

The technology transfer initiative will therefore go a long way to set the platform for the implementation of the SE4ALL Action Plan.

We hereby confirm that the Energy Commission fully supports the proposed "China-Ghana South-South Cooperation on Renewable Energy Technology Transfer", its objective, outcomes and outputs and that the Energy Commission will provide the needed implementation support for the project, as outlined in the project document.

Yours faithfully,

A. K. Ofosu Ahenkorah (Dr.)
(Executive Secretary)

Endorsement letter from MOST China

The Administrative Centre for China's Agenda 21
8 Yuyuantan South Road, Beijing 100038, P.R. China Tel: +86 10 5888 4888 Fax: +86 10 5888 4890

United Nations Development Program (UNDP)
China

Dear Mr. Christophe Bahuet,
Letter of Endorsement: UNDP CHINA-GHANA RENEWABLE ENERGY TECHNOLOGY TRANSFER COOPERATION

The UNDP CHINA-GHANA South-South Cooperation Project on Renewable Energy Technology Transfer is in line with the mission of The Administrative Center for China's Agenda 21 (ACCA21), Ministry of Science and Technology.

The proposal for CHINA-GHANA South-South Cooperation Project timely addresses the challenges of Renewable Energy Technology Transfer from China to Ghana. We hereby confirm that ACCA21 would provide the needed support to the project, as specified in the project documentation, to ensure an excellent implementation of the project.

Your sincerely

Peng Sizhen
Deputy Director General.
ACCA21,
Ministry of Science and Technology
The People's Republic of China

Annex 3: Linkages between identified barriers and project activities

Identified barriers in Ghana

Policy and regulatory barriers	Project Activities to Address Barriers
The Government is yet to develop a **Renewable Energy Master Plan** to design specific actions to put the Renewable Energy Act into implementation.	Activity Result 1.1.1**: Review Chinese and Ghanaian RE policies and strategies** to identify capacity building gaps and solutions to address them. Activity Result 1.1.2: Draft and submit to Parliament the **Renewable Energy Master Plan** (REMP). Activity Result 1.1.3: Launch and disseminate the REMP.
The established **Renewable Energy Fund** is yet to be resourced and detailed strategies to mobilize the necessary funding are yet to be defined.	Activity Result 1.1.1**: Review Chinese and Ghanaian RE policies and strategies** to identify capacity building gaps and solutions to address them. Activity Result 1.1.2: Draft and submit to Parliament the **Renewable Energy Master Plan** (REMP). Activity Result 1.2.1: Conduct **in depth analysis of regulatory, technical, social and other barriers** in Ghana and China currently hindering effective and widespread absorption of RET. Activity Result 1.2.2: Develop a **roadmap** to remove or reduce barriers to effective RETT in Ghana
The **Renewable Energy Authority**, necessary to form partnerships with private operators for PPP implementations, is yet to be established.	Activity Result 1.1.1**: Review Chinese and Ghanaian RE policies and strategies** to identify capacity building gaps and solutions to address them. Activity Result 1.1.2: Draft and submit to Parliament the **Renewable Energy Master Plan** (REMP). Activity Result 1.2.1: Conduct **in depth analysis of regulatory, technical, social and other barriers** in Ghana and China currently hindering effective and widespread absorption of RET. Activity Result 1.2.2: Develop a **roadmap** to remove or reduce barriers to effective RETT in Ghana *The establishment of the REA is not addressed in this project, but the REMP and the road map to remove transfer barriers will constitute a platform to raise awareness on the need to establish it.*
Technical	
Inadequate use and leverage of **technical and research institutions.**	Activity Result 2.2.1: Support to **training facilities** within existing institutions for increased capacity building on RETs Activity Result 2.1.2: Facilities to receive, test, **demonstrate** and exhibit equipment and publish performance results Activity Result 3.2.5: Support Ghana's **adoption capacity** for Renewable Energy Technology Transfer
Inefficiency in the operation and maintenance of	Activity Result 2.2.1: Support to **training facilities** within existing institutions for increased capacity building on RETs

machinery and equipment, and in the adoption of technological improvements and upgrades.	Activity Result 2.1.2: Facilities to receive, test, **demonstrate** and exhibit equipment and publish performance results
Unsustainable biogas production techniques	Activity Result 2.2.1: Support to **training facilities** within existing institutions for increased capacity building on RETs Activity Result 2.1.2: Facilities to receive, test, **demonstrate** and exhibit equipment and publish performance results Activity Result 3.2.1: Develop **roadmap** for Renewable Energy Technology Transfer from China to Ghana
For solar and wind technologies, **lack of well trained personnel** at all levels; lack of certification of installers and service providers	Activity Result 2.2.1: Support to **training facilities** within existing institutions for increased capacity building on RETs Activity Result 2.1.2: Facilities to receive, test, **demonstrate** and exhibit equipment and publish performance results
Financial	
Poor business development capacity of key project implementers/managers, service providers and beneficiaries of renewable energy projects	Activity Result 2.2.2: Develop institutional **financing mechanisms** to up-scale RETT in Ghana Activity Result 2.2.3: Develop **business models** to support private sector involvement and public – private partnerships in RETT in Ghana
Limited business-oriented models and robust results-based planning, monitoring and evaluation indicators and targets for renewable energy projects to ensure their long-term impact and sustainability.	Activity Result 2.2.2: Develop institutional **financing mechanisms** to up-scale RETT in Ghana Activity Result 2.2.3: Develop **business models** to support private sector involvement and public – private partnerships in RETT in Ghana
Difficulty for investors to identify **matured bankable projects** with proper documentation and scale potential.	Activity Result 2.2.2: Develop institutional **financing mechanisms** to up-scale RETT in Ghana Activity Result 2.2.3: Develop **business models** to support private sector involvement and public – private partnerships in RETT in Ghana
Inability of the private sector (in particular small and medium enterprises) to obtain **credit or loans** to finance their investments in the sector	Activity Result 2.2.2: Develop institutional **financing mechanisms** to up-scale RETT in Ghana Activity Result 2.2.3: Develop **business models** to support private sector involvement and public – private partnerships in RETT in Ghana
Information, awareness and human resources	
Cultural constraints – e.g. many rural	Activity Result 1.2.1: Conduct in depth analysis of regulatory, technical, **social and other barriers** in Ghana and China currently hindering effective and

communities still regard renewable energy an inferior forms of energy.	widespread absorption of RET. Activity Result 1.2.2: Develop **a roadmap** to remove or reduce barriers to effective RETT in Ghana
Limited **public awareness** of the biomass technology and its benefits.	Activity Result 1.2.1: Conduct in depth analysis of regulatory, technical, **social and other barriers** in Ghana and China currently hindering effective and widespread absorption of RET. Activity Result 1.2.2: Develop **a roadmap** to remove or reduce barriers to effective RETT in Ghana Activity Result 1.1.3: Launch and disseminate the REMP.
Adequate data to help develop mini-hydro technology not easily assessable, unavailable and outdated.	Activity Result 1.1.1**: Review Chinese and Ghanaian RE policies and strategies** to identify capacity building gaps and solutions to address them. Activity Result 1.1.2: Draft and submit to Parliament the **Renewable Energy Master Plan** (REMP). Activity Result 2.1.1: Selection and adaptation of appropriate RETs to be transferred *The development of the REMP will require extensive data collection and analysis.*

Identified barriers in China

Barriers	Project Activities to Address Barriers
Policy and legislative barriers	
Lack of unified criteria and standards for the RET selection in China	**Activity Result 3.2.3:** Set up a Chinese stakeholders alliance for China – Ghana RETT (Ghana)
	Activity Result 3.1.1: Map, update and share China's approaches to technology selection and transfer （Zambia） *Activity Result 3.2.2: Set up alliance of Chinese stakeholders involved in RE to engage in projects bringing down the cost of Technology Transfer （Zambia）*
Inadequate incentives for transferring renewable energy technology to Africa	**Activity Result 3.2.1:** Develop roadmap for Renewable Energy Technology Transfer from China to Ghana (Ghana) **Activity Result 3.2.2:** Seek institutional financing to support technology transfer from China to Ghana (Ghana)
	Activity Result 3.1.2: Organize visit by Chinese stakeholders to Zambia to learn about Zambia's RET sector, policies, market and cultural barriers （Zambia） *Activity Result 3.2.2: Set up alliance of Chinese stakeholders involved in RE to engage in projects bringing down the cost of Technology Transfer （Zambia）*
Lack of assessment of Chinese RET in the Zambian/Ghanaian local condition	**Activity Result 3.1.2:** Organize exchange visits to share knowledge on the Chinese and Ghanaian contexts and build foundations for technology transfers (Ghana) **Activity Result 3.1.3:** Share knowledge and establish knowledge networks on Renewable Energy (Ghana)

	Activity Result 3.1.2: Organize visit by Chinese stakeholders to Zambia to learn about Zambia's RET sector, policies, market and cultural barriers（Zambia）
Limited data availability of Zambian/Ghanaian local conditions	**Activity Result 3.1.2:** Organize exchange visits to share knowledge on the Chinese and Ghanaian contexts and build foundations for technology transfers (Ghana) **Activity Result 3.1.3:** Share knowledge and establish knowledge networks on Renewable Energy (Ghana) **Activity Result 3.2.4:** Conduct training of Chinese stakeholders in relation to RETT(Ghana)
	Activity Result 3.1.2: Organize visit by Chinese stakeholders to Zambia to learn about Zambia's RET sector, policies, market and cultural barriers（Zambia） *Activity Result 3.2.4: Conduct training of Chinese stakeholders South – South Cooperation and Renewable Energy Technologies （Zambia）*
Limited availability of RET technicians in Zambia/Ghana	**Activity Result 3.1.2:** Organize exchange visits to share knowledge on the Chinese and Ghanaian contexts and build foundations for technology transfers (Ghana) **Activity Result 3.2.5:** Support Ghana's adoption capacity for Renewable Energy Technology Transfer(Ghana)
	Activity Result 3.2.5 Support the Renewable Energy Technology platform （Zambia）
Limited availability of Chinese experts with good knowledge of Zambia/Ghana	Activity Result 3.1.2: Organize exchange visits to share knowledge on the Chinese and Ghanaian contexts and build foundations for technology transfers (Ghana) **Activity Result 3.1.3:** Share knowledge and establish knowledge networks on Renewable Energy (Ghana)
	Activity Result 3.1.2: Organize visit by Chinese stakeholders to Zambia to learn about Zambia's RET sector, policies, market and cultural barriers（Zambia）
Institutional barrier	
Lack of an institute or mechanism to coordinate Chinese stakeholders involved in RET	**Activity Result 3.2.3:** Set up a Chinese stakeholders alliance for China – Ghana RETT (Ghana
	Activity Result 3.2.1: Establish vision and mission of the SSC Centre（Zambia） *Activity Result 3.2.2: Set up alliance of Chinese stakeholders involved in RE to engage in projects bringing down the cost of Technology Transfer （Zambia）*
Limited coordination among ministries The lack of a central coordination body in China	**Activity Result 3.2.3:** Set up a Chinese stakeholders alliance for China – Ghana RETT (Ghana) **Activity Result 3.2.4:** Conduct training of Chinese stakeholders in relation to RETT(Ghana)
	Activity Result 3.2.1: Establish vision and mission of the SSC Centre（Zambia）
Financial	
No subsidies to encourage RET from China to Zambia/Ghana	**Activity Result 3.2.2:** Seek institutional financing to support technology transfer from China to Ghana (Ghana) **Activity Result 3.2.3**: Set up a Chinese stakeholders alliance for China – Ghana RETT (Ghana)

	Activity Result 3.2.1: Establish vision and mission of the SSC Centre（Zambia） *Activity Result 3.2.2: Set up alliance of Chinese stakeholders involved in RE to engage in projects bringing down the cost of Technology Transfer （Zambia）*
High capital cost to design, install, operate, manage and maintain renewable energy systems	**Activity Result 3.2.2:** Seek institutional financing to support technology transfer from China to Ghana (Ghana) **Activity Result 3.2.3:** Set up a Chinese stakeholders alliance for China – Ghana RETT (Ghana)
	Activity Result 3.2.2: Set up alliance of Chinese stakeholders involved in RE to engage in projects bringing down the cost of Technology Transfer （Zambia） *Activity Result 3.2.5: Support the Renewable Energy Technology platform （Zambia）*
Information barriers	
Limited information on RE technologies and providers in China	Activity Result 3.1.1: Map, update and share China's experience and approaches to technology selection and transfer (Ghana) **Activity Result 3.2.4:** Conduct training of Chinese stakeholders in relation to RETT(Ghana)
	Activity Result 3.1.1: Map, update and share China's approaches to technology selection and transfer （Zambia）
Limited information on Zambia or Ghana's RE issues, policies and culture.	**Activity Result 3.1.2:** Organize exchange visits to share knowledge on the Chinese and Ghanaian contexts and build foundations for technology transfers (Ghana) **Activity Result 3.1.3:** Share knowledge and establish knowledge networks on Renewable Energy (Ghana)
	Activity Result 3.1.2: Organize visit by Chinese stakeholders to Zambia to learn about Zambia's RET sector, policies, market and cultural barriers（Zambia） *Activity Result 3.1.3: Share and disseminate knowledge on mission findings and project achievements（Zambia）* *Activity 3.2.3: Develop training materials on South – South Cooperation and Renewable Energy Technologies（Zambia）* *Activity Result 3.2.5: Support the Renewable Energy Technology platform （Zambia）*