[May 2014]

Empowered lives.
Resilient nations.

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

Sector	Renewable Energy and South-South Cooperation
Location	Zambia, China
Executing Agency	United Nations Development Program
Implementing Partners	Zambia Ministry of Mines, Energy and Water Development China Ministry of Science and Technology
Project Duration	4 Years
Project Budget	USD 2.624.400

United Nations Development Programme

Country: China

Project Document

Project Title	China-Zambia 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 Zambia:	Ministry of Energy, Water and Mines
Implementing Agency in China:	Administration Center for China Agenda 21, (MOST)
Implementing entity in Zambia:	Ministry of Energy, Water and Mines

Project Summary

As part of the Danish focus on South-South Cooperation (SSC), to enable better and more coherent cooperation between China and countries in Africa, in particular around the promotion of the UN's Sustainable Energy for All initiative (SE4ALL), UNDP China has been funded to develop the project proposal in consultation with public and private stakeholders in Zambia and China.

Aiming to support the access to electricity for rural communities in Zambia, the project seeks to achieve three strategic outcomes; i) Strengthen the enabling environment for the transfer and use of priority renewable technologies in Zambia, ii) Remove market barriers to the adoption of renewable technologies for the rural poor in Zambia, and iii) Invigorate the Chinese capacity for South – South Cooperation on renewable energies.

The project will be one of the first examples of strategic South-South Cooperation between China and Africa supported by UNDP and the Danish Embassy in China. While China has extensive experience in cooperating with African countries, South-South Cooperation however is still a relatively new phenomenon with significant gaps in institutional, situational and cultural knowledge and global good practice. To address these gaps, the project will support the creation of a South-South Cooperation unit within the Chinese Ministry of Science and Technology.

Programme Period: **2014 – 2018** Key Result Area (Strategic Plan): Project ID: 00091277 Atlas Award ID: 00082284 Start date: September 2014 End Date: August 2018 Management Arrangements: NEX	Total resources required 2,624,400USD Total allocated resources: • Regular • Other: • Funding from Danish Government: 2,624,400USD (including 1,593,300 US$ for Zambia; 1,031,100 US$ for China)

Agreed by MOST:

Mr. Guo Risheng, Director General, ACCA 21

Agreed by UNDP China:

Mr. Christophe Bahuet, Country Director

TABLE OF CONTENTS


ZAMBIA
Political Map
TANZANIA
DEMOCRATIC REPUBLIC OF THE CONGO
ANGOLA
MALAWI
MOZAMBIQUE
ZIMBABWE
NAMIBIA
BOTSWANA
Mpulungu
Mporokoso
Isoka
Kasama
LUAPULA
Mansa
NORTHERN
Mpika
Lundazi
Mwinilunga
Solwezi
NORTH WESTERN
Zambezi
Chingola
Ndula
COPPERBELT
Serenje
Chipata
EASTERN
Katete
CENTRAL
Kabwe
LUSAKA
LUSAKA
Mumbwa
Kaoma
Mongu
WESTERN
SOUTHERN
Monze
Mulobezi
Choma
Livingstone
0 50 100 150 Km
Copyright © 2012 www.mapsofworld.com
(Updated on 11th May, 2012)
LEGEND
International Boundary
Province Boundary
National Capital
Province Capital
Other Cities

1. EXECUTIVE SUMMARY

As part of Denmark's focus on South-South Cooperation, to enable better and more coherent cooperation between China and countries in Africa, in particular around the promotion of the UN's Sustainable Energy for All initiative (SE4ALL), UNDP China has been funded to develop this project document. The project proposal has been developed with the Zambian Ministry of Mines, Energy and Water Development, China's Ministry of Science and Technology and the advice of stakeholders from government, the private sector and research institutions in Zambia and China.

The project aims to support the access to electricity for rural communities in Zambia. It will do so through the creation of an enabling environment to up-scale renewable energy technology deployment. This includes removing market barriers for introduction of improved renewable energy technologies and the strengthening of South – South Cooperation between Zambia and China.

Zambia has the second largest potential for solar power in the world, currently virtually unused, and an abundance of rivers and water resources in the rural areas. Building on this potential, solar- and hydro power are identified as the most appropriate renewable energy technologies for Zambia and thus consistent with the Chinese development experience.

The project seeks to achieve three strategic outcomes; i) Strengthen the enabling environment for the transfer and use of priority renewable technologies in Zambia, ii) Remove market barriers to the adoption of renewable technologies for the rural poor in Zambia, and iii) Invigorate the Chinese capacity for South – South Cooperation on renewable energies.

The project will include support for the development of an appropriate regulatory framework for promoting renewable energy in Zambia, the development of financing options for renewable energy, the establishment of demonstration and testing facilities to showcase renewable energy technologies and build capacity.

In addition, the direct financing of a pilot project for rural electrification in Zambia will highlight the opportunities for rural development through technology transfer and South-South Cooperation. The project will involve a wide range of stakeholders, from the private sector to research institutions, and create communities of practice in the sphere of renewable energy in Zambia and China that will facilitate project implementation and continued cooperation beyond the project.

The project will be one of the first examples of strategic South-South Cooperation between China and Africa supported by the United Nations Development Programme and the Danish Embassy in China. While China has extensive experience in cooperating with African countries, South-South Cooperation however is still a relatively new phenomenon with significant gaps in institutional, situational and cultural knowledge and global good practice. To address these gaps, the project will support the creation of a South-South Cooperation unit within the Chinese Ministry of Science and Technology.

This will include support to review guidelines, develop training materials, build capacity and disseminate information on good practices for South-South Cooperation. The project will be implemented by the Zambian Ministry of Mines, Energy and Water Development and the Chinese Ministry of Science and Technology, with UNDP China and UNDP Zambia supporting implementation and providing technical expertise. The project will take four years to implement and has a budget of USD$ 2.624.400

2. PROJECT RATIONALE

Zambia is on a path of economic development with reduced inflation and GDP growth rates of 7% (2010). Powering the country is a key component of continuing this development, in particular for rural communities who are currently missing out on the development opportunities of electrification. Zambia has concentrated its efforts on providing electricity to urban areas mainly through Zambia Electricity Supply Corporation (ZESCO), its state owned Power Company. Lusaka, the capital, enjoys approximately 80% electrification, with other large cities having electrification rates of less than 50%. Significantly, most of rural Zambia is not connected to the national grid and hence only 3% of the rural population has access to electricity.

In response, Zambia' Rural Electrification Master Plan (REMP) calls for 50% of rural households to be electrified by 2030. The first priority has been to electrify the residences of traditional chiefs, which serve the dual function of office and residence, followed by Rural Growth Centres (RGCs), clusters of residential, public service and commercial activities that could support significant demand. The REMP calls for 100% of the 1,217 RGCs to be electrified by 2030. As Zambia has significant renewable energy potential, and China has unique expertise in this field, an enhanced effort of implementing renewable, off-grid energy solutions will be a significant contribution to achieving this goal of increased electrification of rural Zambia.

2.1 Zambia's Renewable Energy Potential

Renewable energy sources in Zambia include solar power, mini/micro-hydro power, biomass, geothermal, and small-scale wind-power. This project concentrates on mini-hydropower and solar technologies, consistent with Zambia's Rural Electrification Master Plan. For this project, mini-hydropower is defined as hydropower of 10 MW or less in line with the Rural Electrification Authority's (REA) classification and includes run-of-river and hydrokinetic turbines. For the purpose of this proposal, solar includes solar photovoltaic (PV), solar thermal, solar water pumping and solar cook stove technology, however, the main priority will be solar PV.

These technologies were selected based on several factors, including a) appropriateness to Zambian conditions (including institutional capacity and natural resources such as availability of sunshine, water and wind), b) appropriateness to the objective of supporting rural electrification, and (c) the proven potential and degree of confidence in the particular type of renewable energy and the risks associated

with the technology, and (d) availability of institutional support systems, including technology expertise from Chinese project partners.

2.1.1 Zambia's Hydropower Potential

Several studies, including Zambia's Rural Electrification Master Plan and Draft Renewable Energy Strategy, confirm that Zambia has a tremendous potential for small hydropower development. The installed capacity of power generation facilities in Zambia totals about 1870 MW of which only 23.75 MW comes from mini hydropower (PSDMP 2010-2030). The target is to increase this share to 200MW by 2030. This is expected to come from upgrading and expansion of existing small hydropower as well as new developments. The Zambian government currently only has one off-grid mini hydropower plant developed, with several more in the pipeline. Many more projects are under development by the private sector, testifying to the large, untapped potential for mini hydropower in Zambia.

2.1.2 Zambia's Solar Energy Potential

Solar radiation levels in Zambia are amongst the highest in the world. A number of solar energy projects have been implemented in the country mostly supported by the public sector or donors and have been developed as pilot projects. According to data collected by the Meteorological Department of Zambia, annual average solar radiation over Zambian locations is in a range of about 6600MJ/m2 to 7700MJ/m2 and the country average is about 7100MJ/m2. This translates into 15.66MJ/m2/day or 4.35kWh/m2, and the amount of solar energy is sufficient for use on both small and large scale. Zambia aims to have 500,000 installations of PV systems, 40MW saving from solar water heating and 100 MW contribution from solar farms by 2030. Government has planned to develop 30 MW of solar PV but requires implementation of cost-reflective policy and legislation on leveraging tariffs. In addition, the REA is currently developing a 60 kW solar mini grid in Mpanta to supply a community of about 480 households, and in the recent past REA has implemented projects on Sustainable Solar Market Packages (SSMP) in Lukulu, Kalomo and Isoka districts, with similar programmes in Chama, Lundazi, Mwinilunga and Zambezi districts.

2.1.3 Other technologies and approaches considered

Other renewable technologies include wind, geothermal and bio-energy. Whereas solar energy and hydropower are well tested technologies with significant resources in Zambia, exploitation of wind and geothermal resources are in their infancies in Zambia with uncertainties around the real potential of these sources of energy.

Studies on biomass estimate significant resources in Zambia, with overall biomass resource and economic bio-energy potential for electricity generation at about 500 MW. This includes biomass from agriculture waste at 447 MW, forest waste at 46 MW and municipal waste at 4 MW. A target of 100 MW contributions for biomass by 2030 has been proposed by the Zambia government. However,

notwithstanding the high targets for bio-energy, most bio-energy resources are currently used by households in rural areas through gathering wood and other combustible materials. Scaling up the potential for bio-energy raises significant social, environmental and economic issues. Large-scale use of bio-energy by a power plant could compete with traditional uses and biofuels would involve significant changes to Zambia's land use patterns. Of its 70 million hectares, arable land is estimated at 42 million hectares with only 14% presently under active cultivation. Intensive use of biofuels may jeopardize food security and risk inflation. In addition, current experience with large-scale bio-energy in Zambia is limited.

Technologies that promote efficiency in biomass energy sources such efficient cook stoves and improved charcoal kilns are becoming popular in sub sahara but have not yet matured for upscaling. Agriculture waste being used in generation of energy/electricity is also still in its early stages of development. This project will continue to monitor the progress being made on the biomass energy generation/use efficiency and generation of electricity using agriculture waste around the world.

The terms of reference for the preparatory phase of this project to produce this proposal included consideration of carbon markets as a means to support renewable energy technology adoption in Zambia. Analysis of the state of the carbon markets suggests that Zambia should exploit carbon markets where possible. However due to the low prices in these markets the economic contribution from the sale of carbon credits is likely to remain uncertain in the foreseeable future, and the project will not rely on carbon markets as a primary means of financing renewable energy technology in Zambia. Instead the project will encourage policy and private stakeholders to take robust and realistic approaches to the problem of renewable energy adoption and focus on solutions appropriate to current market realities.

2.2 Zambia's institutional, legal and regulatory framework for renewable energy

2.2.1 Institutional framework

- The **Ministry of Mines, Energy and Water Development (MMEWD)** is the principal institution with the mandate of carrying out energy planning and policy development.

- The **Energy Regulation Board (ERB)** is responsible for regulating the energy sector by monitoring the efficiency and performance of undertakings.

- The **Rural Electrification Authority's (REA)** primary aim is to provide electricity infrastructure to the whole nation targeting rural communities as mandated by Government. The REA issued the Rural Electrification Master Plan (REMP) as a blue print for executing this program in 2011. The REA is mandated with the tasks of administering and managing the **Rural Electrification**

Fund (REF), developing and implementing the REMP, mobilizing funds to support rural electrification, encouraging private sector participation in rural electrification through provision of smart subsides, competitive bidding and community mobilization, financing project preparation studies for rural electrification and recommending policies to the government.

- The **Office for Promoting Private Power Investment (OPPPI)** was set up to be a 'One Window Operation' to reduce the complexity of procedures, rules and regulations and red tape usually associated with obtaining the required approvals, permits and licences for investors in the electricity sector.

- The **state-owned power company**, ZESCO, retains a monopoly on operating the distribution and transmission network and collects a 5% government excise duty on their monthly electricity bills, 3% of which is appropriated for the Rural Electrification Fund (REF), which is used to finance rural electrification projects and 2% reserved for other government programs.

2.2.2 Legal and regulatory framework

The **2008 National Energy Policy** seeks to expand generation and transmission capacity and also increase accessibility to electricity and private sector participation. The Policy includes a specific objective to address barriers to Renewable Energy Technologies and Sources (RETS). The measures and strategies for RETS include:

1. Ensure **availability of data and information** on market demand, resource assessment and applicability of RETS by undertaking relevant studies

2. Strengthen the **institutional framework** and build capacity for research and development, and promotion of RETS

3. Provide appropriate **financial and fiscal instruments** for stimulating the implementation of RETs

4. Continue **promotion, enhancement, development and deployment of RETs** through support for local systems and development and implementation of standards and codes

5. Raise **public awareness and develop capacity** for implementation through public education and training; involving women in decision making; and inclusion of basic principles of RETs in school curriculum.

6. Promote **research** on utilization of available technologies and encourage pilot projects.

Following the policy, a draft Renewable Energy Strategy was formulated in 2010 aiming to increase RET contribution to total national energy needs, including accelerating deployment of solar energy and exploiting the energy potential from small hydropower plants.

In 2011, government amended the second schedule of the Zambia Development Authority Act through issuing of Statutory Instrument No. 15 of 2011 which declared the energy sector to be a priority sector. As a result, power generation projects, including operation of mini hydro and solar PV qualify for incentives are provided for under ZDA. The amendment was in recognition of the need to reduce the cost of developing power plants and attract independent power producers to increase generation capacity in Zambia to meet the growing demand for power for the productive sectors, especially mining.

The Energy Regulation Act Cap 436 recognizes solar, wind and biofuels energy sources and also establishes licenses and guidelines to facilitate the adoption of renewable, including for solar power, bio-energy and off-grid tariffs. Notwithstanding these reforms, renewable energy faces significant barriers in adoption due to current low tariffs to support relatively high cost of electricity generation, and a tariff system that provides favorable rates to mining companies and higher rates for households. This situation has discouraged investment by private actors in the power sector.

UNDP–supported stakeholder consultations held in Zambia, however, revealed that the ERB, ZESCO, MMEWD and other stakeholders are well aware of the need for tariff reform. Importantly, the ERB is in the process of studying these issues drawing on policies such as feed-in-tariffs and best practices from South Africa, India and other countries. Projects with other international organizations and governments are currently addressing the need for policy reform and Zambian stakeholders both in private meetings and at stakeholders meeting expressed the view that it is necessary to ensure proper knowledge management and sharing by convening stakeholder meetings to follow up on the developments on the work being done, identify gaps and ensure that policies and implementation plans regarding off grid technologies are being properly developed and implemented.

2.3 On-going Initiatives

Zambia's Sixth National Development Plan (SNDP) provides for introduction of a cost-reflective electricity tariff regime, establishing an open and non-discriminatory transmission access regime in the sector, and introducing an appropriate cost-effective renewable energy feed-in tariff. In line with the Sixth National Development Plan, the following initiatives are currently underway to implement the policy and address regulatory barriers for renewable energy:

Grid Code Development The Government of Zambia has, through MMEWD, developed a grid code which is yet to be adopted by the cabinet. The grid code shall regulate the reciprocal obligation of the industry participants on the use of the Transmission System (TS) and operation of the Interconnected Power Systems (IPS).

Implementation of Rural Electrification Master Plan (REMP) **The** Japanese Government, through JICA, is providing technical assistance on capacity building on the implementation of the REMP which has been under implementation since 2012 and should be concluded by December 2013.

Feed in tariff development. MMEWD is in the process of developing a renewable energy feed in tariff (REFIT) in an effort to promote increased generation of electricity from renewable energy sources in Zambia. The initiative is supported by the Southern African Trade Hub (SATH) with funding from USAID. It is anticipated that REFIT will be in place by 2014.

Mini-hydro Power Development Framework The Rural Electrification Authority with the assistance of the World Bank is undertaking a study to develop a Mini Hydro Power Development Framework. The study will be completed in 2014.

In addition to these, Zambia has a range of experiences in renewable energy, through past and on-going projects, that will provide valuable inputs to some of the deliverables under this project. This project will interface and build on past and on-going renewable energy related projects. The table below provides an overview of relevant projects and potential synergies with the present project.
For a list of the linkages to programmes/projects in Zambia Please see Annex 4.

2.4 Barriers for renewable energies in Zambia

Expansion of renewable energies in Zambia faces significant barriers and the ones which are to be addressed by this project are presented below and they can be grouped into i) policy and regulatory, ii) technical, iii) institutional, iv) financial, and v) information and human resource barriers.

Policy and regulatory barriers
Small electricity producers have difficulties connecting to the grid network. Inadequate incentives for renewable energy development Lack of standardized Power Purchase Agreements deters potential investors in power generation. Lack of fair competition in the energy sector to attract Independent Power Producers in the energy sector. Incomplete implementation of Zambia's policy/legal and institutional framework to promote renewable energy production and diffusion
Technical
Limited technical capacity to design, install, operate, manage and maintain renewable energy systems Limited or non-existent standards for energy performance, manufacture, installation and maintenance Lack of local manufacturing and/or assembly of renewable energy technology components
Institutional
Limited capacity to evaluate technical, financial and economic proposals as well as, market development, and marketing of renewable energy projects Spatial distribution of suppliers' limit access to renewable energy equipment Limited coordination among ministries Open access regime incomplete
Financial
The Rural Electrification is Fund ineffective High capital cost of renewable energy products Lack of economies of scale due to dispersed market

Lack of bulk procurement limited due to market size
Information, awareness and human resources
Limited availability and access to existing information on renewable energy resources and potential Limited public awareness of renewable technologies Availability of resources for mini-hydro is site specific, requiring detailed analysis of local conditions

For a list of how the barriers in Zambia are addressed by the project please see 3.

2.5 China's renewable energy experience: Relevance for the Zambian context

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 increase, 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 (FYP 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.

2.5.1 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

2.5.2 China's institutional framework

- **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 implementation of China's sustainability commitments under Agenda 21, and will host the PMU and the South-South Cooperation Center (SSCS) to be supported by the project, and where it is envisaged that the PMU will be an integrated part of the SSCS.

- 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 Electric 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.

[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 **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.

2.5.3 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 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. Among these, small hydropower is the rural renewable energy source with the most mature technology, the longest development history, and the most rewarding benefits.

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% 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 great effort into developing renewable energy sources in rural areas, and has 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 centres in Zambia.

2.5.4 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, with an annual estimated increase of 16.5% 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 Zambian 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, including a small hydropower demonstration plant in Zambia, 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. China is the world's largest producer of solar panels. One of China's key policies for promoting the adoption of solar technology in China 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 is designed to subsidize the total cost of both on-grid and off-grid applications. Incentives for off-grid applications are 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.

China has also deployed various solar technologies in developing countries, including solar PV, solar water pumps, solar thermal 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.

2.5.5 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 institutional, 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 and sub optimal.

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 technologies 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 inhibits 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 supporting policy/legislation review processes and the roll out of renewable energy technologies in Zambia.

3. STRATEGY

In order to deploy renewable energy to provide electrification to rural areas, the proposed project will seek to create an enabling policy environment, create greater transparency in market operation, and reduce the cost of renewable energy technology in Zambia by the provision of training, financing and strengthening the global and local value chain for renewable off grid technologies for Zambia. By doing so, the project will attempt to reduce the cost of selected technologies – solar and hydropower - to the point that business opportunities will be created for local entrepreneurs serving the rural electrification market in Zambia.

For Zambia to promote renewable energy and energy access in rural areas it must address both regulatory and market barriers. As the Government of China has made substantial strides in this domain, the project will establish a partnership with China in the framework of South - South Cooperation. The project will seek to increase the use of renewable energy in Zambia by drawing on China's ability to support policy review processes and provide technical assistance and low cost technology for rural electrification and strengthening the value chain for renewable technologies, and the transfer of technology, from China to Zambia.

This project will equally support the build-up of Chinese capacities to do better, more targeted and sustainable South-South Cooperation building on partner countries priorities, conditions and needs. Through the South-South Centre under MOST engagement will be promoted, getting to know players beyond regulators or decision makers. Getting beyond government, becoming visible participant in policy debates and formulations and a responsive player when it comes to land and other key issues. It will train Chinese stakeholders to be part of policy design dialogues that often involve competitors, regulators, and finance/treasury departments. This is to better understand industrial strategy aspects as well as energy generation issues and hence strengthen the understanding of localisation strategies of value chains. The project will, through providing training materials and trainings of Chinese stakeholders, seek to strengthen the understanding of the policy and civil society landscape/actors and how to engage with them especially on land, water and related aspects of making projects happen on the ground.

Notwithstanding Zambia's national goal to increase electrification of rural areas, rates of household electrification in rural areas have remained low due to the high capital cost and low financial returns. The demographic conditions of Zambia, where small businesses and households are scattered countrywide, make it hard to cover the cost of extending long spans of distribution lines. Remoteness of locations and low population densities make

grid extension to most rural areas uneconomic worsened by lack of capacity to pay for the electricity by most households. Distributed renewable energy, including off-grid and mini-grid approaches, offers the most promising potential solution.

In response to these challenges, the project shall focus on contributing to Zambia reaching its target of 100% electrification of the country's Rural Growth Centres (RGCs) by 2030 and on promoting policies and business models that will extend electrification to households beyond RGCs in order to further advance Zambia's rural electrification efforts. RGCs commonly consist of a government building, health facility, school and other public buildings. These RGCs are expected to be electrified either through connection of the RGCs to the grid or the establishment of mini-grids. For mini-grid units, the source of power is expected to be solar, mini-hydro or other form of renewable energy. Zambia's Rural Electrification Master Plan contemplates that households in the area of an electrified RGC could then connect to the grid. In practice, however, the cost of connection (which is shared by ZESCO and the consumer) and for some the affordability of electricity has proven to be a barrier to the ability of households to gain access to electricity.

The project will concentrate on solar (PV and thermal) and mini-hydro technologies, both of which are proven, low-risk technologies that show promise of achieving adoption on a cost-effective, commercial basis in Zambia.

As noted in section 2, a number of barriers inhibit the effective increase of use of renewable energy for rural electrification in Zambia. This project aims to address a number of these barriers, including policy and legislation, capacity, technology, information and institutional barriers. The approach for doing so will include:

- To address policy and legislative barriers, **facilitation of a policy/legislation review process** with policymakers will aim at achieving adoption of policies and laws for creating an enabling environment for renewable energy in Zambia. To support the policy/regulatory review process, the project will **develop capacity within the Zambian government** to review and implement policy through a consultative approach.

- To address technology and information barriers**, the establishment of separate renewable energy technology demonstration, testing and training centers** for solar and mini-hydro at Zambian institutions aims to enhance knowledge of technology and improve the transparency of the market for renewable energy **technology through the provision of published information on performance and training. Zambia's Ministry of Mines, Energy and Water Development** has identified the University of Zambia's Physics Department and the Kafue Gorge

Regional Training Centre as the proposed hosts for the solar and mini-hydro centers, respectively.

- To address the key institutional barrier of financing use of renewable energies, the **development of a financing mechanism for renewable energy** will aim to drive down the cost of these technologies in Zambia. Subject to a decision by the Zambian government to invite the involvement of third parties, this phase is expected to be developed in cooperation with financing institutions to be identified during project implementation in order to provide trade financing for renewable energy projects. The financing mechanism may also include other measures to drive down the cost of equipment, such as the development of a bulk purchasing program.

- To illustrate how addressing technology barriers can support achievement of policy objectives, the **development of one mini-hydro pilot project** for electrifying a rural area will aim to demonstrate how the objectives of the Rural Electrification Master Plan can be achieved in an affordable way in and identifying how to improve practices in the future.

- To address capacity in the sector and build a foundation for further sector development, the project will support **outreach to young entrepreneurs and development of a community of practice** for enhanced expertise and capacity in the use renewable energy in Zambia bringing together creative talent, research institutions, established companies, policy makers and other relevant stakeholders.

- To address China's lack of capacity to design and implement driven South-South Cooperation based on local development plans and goals, this project will support Chinese capacity development through **establishing a coordinating center within MOST, through which training material, good practice guidelines and trainings, networks and knowledge exchange** will be executed.

In order to maximize benefits and impact, the project will seek to establish synergies with another initiative in China. The project will create linkages and collaboration with CNREC, Chinas Renewable Energy Centre, which is partly established by Denmark.

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:

1. Coordination, regulation and implementation of industrial standardisation
2. Track keeping of the development trend for RE industry and technology

3. Pushing the establishment and improvement of the system for RE technology and product testing and certification
4. Implementation, monitoring and assessing national pilot projects and
5. Managing and coordinating international and regional cooperation

CNREC has therefore build up valuable knowledge in its mapping of the Chinese Renewable Energy capacities. CNREC was established in February 2012 as part of the Sino-Danish Renewable Energy Development (RED) Program. The RED program is carried out from 2009 to 2014 with the aim to strengthen the capacity of the Chinese central energy administration to develop and deploy renewable energy.

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. CNREC manages bilateral agreements with a number of countries, including Denmark, Germany and the United States, as well as cooperating with international institutions as IRENA and IEA. Furthermore, CNREC is engaged in collaboration with national and international NGOs and the UN SE4AL initiative. CRNEC is the main focal point for the cooperation with the International Renewable Energy Agency (IRENA) facilitates access to all relevant renewable energy information, including technical data to promote widespread use of all forms of renewable energy. 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.

These priority actions have been organized in four overall outcomes with related outputs and activities.

3.1 Outcomes, Outputs and Activities

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: improve *energy access and living conditions in rural Zambia through South-South Cooperation***. It seeks to achieve this by contributing directly to the achievement of Zambia's rural electrification goals of 50% of rural areas electrified by 2030.[4] By supporting the government's efforts in achieving this goal, the project increases the likelihood of success in promoting policy/legal reform and removal of market and non market barriers necessary to accomplish broader rural electrification.

The project has two **specific objectives:**

1. ***To promote electrification of rural communities in Zambia***. The project will focus on communities that are located far from the power grid and thus will require off-grid solutions. For rural electrification, the project will concentrate specifically on mini- or micro-grid and off-grid solutions. The focus on rural electrification is specifically intended to address the part of the Zambian population that is missing out on development opportunities, and to enhance their livelihood in several areas through the provision of electricity.

2. ***To strengthen China's capacity for South-South Cooperation.*** Through supporting the creation of a South-South Center within the Chinese Ministry of Science and Technology, and facilitating direct Chinese support for rural electrification in Zambia, the project will contribute significantly to building Chinese capacity for engaging in mutually beneficial South-South cooperation based on clear analysis and responding to local conditions.

3.1.1 Outcome 1: The enabling environment for the transfer and use of priority renewable technologies in Zambia is strengthened

Outcome 1 comprises two outputs: (a) improvements in policies, legislation and standards for the transfer and use of project technologies for rural electrification, and (b) the development of financial mechanisms for RETs to support renewable energy for rural areas in Zambia.

Output 1.1. Improved policies/legislation and standards for the transfer and use of project technologies for rural electrification

To address a number of the identified policy/laws and institutional barriers for the increase in use of renewable energy technology, a policy and legal reform review process will be initiated, informed by the priorities of the Zambian government in achieving rural

[4] Zambian rural electrification policy targets the electrification of rural growth centers (typically consisting of village school, health facility and other public buildings). A rural community is deemed electrified when the rural growth center is electrified, although households may not be electrified.

electrification goals. The specific reforms and programs to be reviewed will be determined by the Department of Energy of MMEWD in Zambia and stakeholders with support by the project partners to identify and develop policies, legislation, standards and guidelines that will contribute to the achievement of the rural electrification goals. Project consultants and stakeholders will provide support in identifying options for Zambia to consider based on good practices and conditions for Zambia.

Output 1.1 comprises the following distinct activities:

Activity Result 1.1.1: Finalization of review of the implementation of policies and legislation for rural electrification using off-grid technologies

This will include the preparation of a short briefing document on priority policies/legislation and gaps for the enabling environment for renewable technologies. This document will serve as an initial draft of priorities for Zambian policy makers to review and use as a basis for discussion and decision making in a series of meetings to be convened as Activity Result 1.1.2 (see below). Based on previous stakeholder meetings, the Zambian government, academic and private sector stakeholders have already identified a range of priorities and thus the project will focus on organizing these and conduct a stakeholder consultation process to finalize the briefing document,

The following have been preliminarily identified by the Ministry of Mines, Energy and Water Development (MMEWD) as specific areas appropriate for consideration by the Zambian government as part of the policy/legislation review process that is designed to promote rural electrification:

- Grid codes for less than 66 KV;
- Tariff reform for off-grid electricity;
- Resource mobilization strategies
- Capacity building for rural electrification and the REA: and
- Supporting finalization of a National Renewable Energy Strategy.

MMEWD-identified objectives can be further elaborated as a comprehensive plan to operationalize renewable energy for rural electrification. Thus, the review and engagement process may include the following specific elements:

- An implementation plan for achieving goals outlined in the Rural Electrification Master Plan, which may include possible business models permitted under Zambian policy/legislation for private sector to support achieving government goals;
- Rural electrification tariff rates;
- Financing and subsidies policies/legislation and programs;
- Technical standards for rural electrification equipment for generation, transmission and distribution (hardware and software), including for possible interconnection among mini-grids;
- Equipment testing and certification requirements (to be implanted with testing and training centers proposed in this project);
- Governance structure and requirements for license and regulation of mini-grid and off-grid utilities;
- Open access policies and off-take terms for mini-grids;
- Monitoring and verification of generation, transmission and consumption;
- Training and certification of personnel (to be implanted with testing and training centers proposed in this project); and
- Rules regarding collections and consumer matters, including access policies.

Activity Result 1.1.2: Convene working group meetings to review implementation of policies and legislation to address gaps and develop and revise policies/legislation for rural electrification using off-grid technologies

A series of meetings will be convened with Zambian policy makers from the executive and legislative branches of government, together with sector experts to identify and prepare policy/legal reforms.

The meetings of Zambian policymakers would be convened over a period of 24 to 36 months and would constitute the culmination of the first phase of the project. The project will support this process with targeted policy and sector studies to support the meetings of policymakers. Studies will be carried out as requested by the policymakers in order to support their work with a budget approved by the Project Advisory Board.

The result should be the development and finalization of coherent policies implementation to support government and private efforts to achieve rural electrification goals outlined in Zambia's Rural Electrification Master Plan and National Energy Policy.

Activity Result 1.1.3: Build capacity of government officials and other stakeholders to implement policy reforms and programs identified in Activity Result 1.1.2.

To support the review and implementation process, targeted capacity building will be carried out for Zambian officials and other stakeholders to create awareness of policy reforms and support implementation of programs identified in Activity Result 1.1.2. Capacity building will in practice commence concurrent to Activity Result 1.1.2 as the collaborative process among stakeholders itself is the first step in informing key stakeholders and building consensus and support for particular policy actions. Activity Result 1.1.3 will, within a defined budget, further expand capacity building for the specific policy reforms that are developed. CNREC will be involved as a consulting partner and expert in the implementation of this activity.

Output 1.2 Financial mechanisms for RETs established

Access to capital and the high cost of renewable energy technology are key barriers to address in order to promote the effective adoption of renewable energy for rural electrification in Zambia. Three specific activities are planned to address these barriers:

Activity Result 1.2.1: Review opportunities for additional financing for funding agencies such as the Development Bank of Zambia to fund its Renewable Energy Fund

First, for financing, at the request of the Zambian government, the project will support the government in reviewing opportunities for additional financial support by way of grants or other modalities for some of its funding agencies such as the Development Bank of Zambia to increase resources for its Renewable Energy Fund. The Renewable Energy Fund is the primary means for the promotion of private sector initiatives for renewable energy.

Activity Result 1.2.2: Develop options for a renewable energy technologies equipment financing facility for rural electrification to support private sector and/or government rural electrification initiatives

Second, with respect to government and private sector financing, the project will develop a trade-financing scheme centered on supporting the efforts of government, communities and/or entrepreneurs. Preliminarily, the project contemplates that such a financing scheme would be based on micro-finance principles and would help finance business with trade credit and/or end users. The Zambian government will direct the engagement of possible partner organizations for supporting a trade finance mechanism.

Activity Result 1.2.3: Develop a value chain strategy for driving down cost of technology that can support private sector and government actors

Third, with respect to a value chain strategy, the primary goal is to reduce the cost of renewable energy technologies in Zambia. The project will support an independent sector

value chain study to review barriers and make recommendations for improving the supply chain with the aim of reducing costs. Such a comprehensive value chain analysis will also inform the policy/ legislation review and help target the policy reforms to address market related barriers as well. Other strategies for driving down the costs of technology will also be considered such as possibilities of assembly plant for RETs being established in Zambia.

3.1.2 Outcome 2: Reduced barriers to the adoption of renewable technologies for the rural poor in Zambia

In combination with the development of Zambian government policy/legislation to support the adoption of renewable energy technologies for rural electrification, market barriers for the adoption of these technologies, including technological, institutional and information barriers, must also be addressed. The enhancement of policy/legislation and removal of market barriers are both essential to facilitating the development of a robust market for renewable energy for rural electrification in Zambia.

Outcome 2 focuses on the removal of several of the important market barriers to the adoption of renewable energy technology in Zambia, identified in section 2.4. In particular, this outcome will address barriers associated with the limited knowledge of available and appropriate technologies and the limited capacity to operate and maintain equipment.

To address these barriers, Outcome 2 will include two primary outputs:

- Establishment of an equipment demonstration, testing and training center to (a) improve the quality of information about, and performance of, renewable energy technology; (b) enhance the level of training of Zambian government officials and private sector;

- Support a rural electrification demonstration project in order to demonstrate cost-effective development of rural electrification capacity and build institutional and technological capacity among stakeholders to support further diffusion.

Outcome 2 is estimated to require approximately 2 years to complete, and is planned to commence in year 2 of the project, partially overlapping with Outcome 1, thus achieving Outcome 2 within 4 years of the project's commencement.

Output 2.1 Priority technologies tested and demonstrated at dedicated testing and training facilities and community of practice established

Activity Result 2.1.1: Creation of demonstration, testing and training facilities for priority technologies within an existing institution, specifically for a solar-mini grid within the Department of Physics at UNZA, and for mini-hydro at the Kafue Gorge Regional Training Center

The creation of demonstration and testing facilities at existing institutions will provide physical facilities with space for equipment suppliers to exhibit, and center staff to conduct tests of equipment and publicly report on performance in order to facilitate the orderly development of the renewable energy market and assist Zambian entrepreneurs. The project contemplates that equipment will be donated, purchased or loaned for exhibition and that companies seeking testing and certification of performance may be charged a modest fee to cover the cost of the testing and issuance of the certificate. Zambian stakeholders have expressed a strong need to set up testing facilities and demonstration sites for RE technologies. The facilities will also periodically conduct training and make its facilities available for other institutions involved in renewable energy technologies to conduct training.

A training and demonstration facility already exists for hydroelectric power generation at the Kafue Gorge Regional Training Centre. This facility will be evaluated as a candidate to host the mini-hydro testing and training center to be established under this project. A separate testing and training facility will be established at the University of Zambia under the auspices of the Physics Department for solar technologies.

One of the key activities to be facilitated by the centers is to launch a renewable energy forum to establish a community of practice in Zambia. An entrepreneurs' forum will encourage private sector initiative. The forum can convene in Zambia and, subject to the availability of funding, could involve Zambia-China exchanges to provide insight for both Zambian and Chinese stakeholders on how to address capacity gaps in renewable energy development. The exchanges will be designed to foster a network of professionals and to work with universities, companies and industry associations to expand the network. The community of practice should target the inclusion of young and rural entrepreneurs as part of its mission. The community of practice will operate under the project for a period of at least one year with the objective of it continuing through the efforts of its members and the training centers.

Developing the facilities in coordination with existing institutions is intended to ensure these centers are financially sustainable and robust. As part of the project, Zambia training center directors and senior staff will receive training in China. The project will also support the development of the work plans and long term funding and outreach strategies

for the facilities. The facilities will operate under the auspices of the project for at least one year to support the demonstration of the new technologies and then continue with the support of their host institution and solicit additional funding using the long-term funding strategies developed under the project.

Activity Result 2.1.2: Facilities to receive exhibit and demonstrate equipment and publish performance results including via web

This activity will entail the selection of Chinese RETs and their transfer to Zambia 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 Zambian 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 Zambia 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 Zambia which could be modified and become applicable will be conducted; this will also facilitate the identification of private sector partners from China who can partner with the Zambian 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 be then piloted in previously 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 Zambia (in collaboration with government and research institutions from both countries) and actual demonstration and testing of technologies. Proper mechanisms to monitor the implementation of the demonstration and testing of technologies 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 enhance the awareness of the potentials of renewable energy technologies.

Output 2.2 Institutional and technological capacity among stakeholders built

Activity Result 2.2.1: Facilities to conduct periodic training on renewable energy technology and practice, and make its facilities available for third parties to conduct training

It is intended that the demonstration facilities will evolve to serve as a resource and collaboration hub for government, the private sector and research institutions in Zambia.

This future evolution of the centers will depend upon how it is located (city and sponsor institution) and staffed. The project will support the creation of the centers as well as initial training sessions. Training efforts will focus on entrepreneurs, students and skilled workers for starting or supporting a renewable energy business in Zambia. Training topics include testing process, technical standards, project installation and maintenance, and business management and fee collection. Depending on demand, the center will have the facilities to conduct various training for government officials on policy analysis and reviews and the aim is for the center to become a resource in the development of standards and renewable energy policy analysis, the information which would be used by the Department of Energy to review policies and legal frameworks.

Activity Result 2.2.2 Support one renewable energy rural electrification mini-hydro pilot project

With the aim of building institutional and technological capacity among stakeholders, a renewable energy rural electrification pilot project will be supported by the project. The objective is to demonstrate how stakeholders in Zambia with the support of Chinese stakeholders can cooperate to electrify a rural area. The demonstration project(s) will demonstrate technologies, and thus build capacity among stakeholders, as well as policies supported by the project.

Based on discussions with stakeholders in both China and Zambia, several concepts have been proposed for consideration, including:

- Implementation of a greenfield mini hydro/pico hydro with a suitable Chinese partner institution such as International Centre for Small Hydro Power (IN-SHP);
- Electrify a Rural Growth Center as a pilot project using solar PV;
- Conduct a study of, or replicate as a pilot, a Zambian "Green Village" (a program sponsored by the Zambian government's NTBC);
- Support electrification of a marketplace by replacing diesel generation with renewable power in a rural area.

The selection of the demonstration project(s) will be based on Zambian priorities considering Chinese stakeholders' technical and other capacity to provide support. By matching Zambian needs to Chinese capabilities, the project seeks to ensure that selected pilot project(s) will enjoy the support of both countries' project partners.

Five phases are contemplated which reflect the progression of the demonstration project from selection through implementation and concluding in evaluation of results to provide guidance for the future development of renewables in Zambia:

1. Form project selection committee
2. Agree on criteria for receiving, evaluating and selecting proposals
3. Request, receive and evaluate proposals according to set criteria and selection of project(s)
4. Project implementation
5. Evaluation of project progress and results to be made in order to formulate lessons and future guidance.

Based on study tours for Zambian delegates to visit their counterparts in China, Zambian stakeholders identified a priority project being the implementation of a greenfield mini or pico hydro project with a Chinese institution such as the UN founded China's International Centre for Small Hydro Power (ICSHP). Zambian stakeholders identified a hydro project as a priority because it has the potential to provide 24-hour electricity on a cost-competitive basis at significantly sized capacity, provided a technically and financially viable project proposal is presented by REA. There is also strong interest among Chinese stakeholders in supporting such a demonstration project. Chinese companies have extensive technical capability in the hydropower field, and the Chinese government has long identified hydropower as a priority area both for China and commercial development. Moreover, the ICSHP's mandate specifically includes supporting cooperative efforts with other countries.

The ultimate project would be selected and designed to maximize learning by Zambian and Chinese stakeholders in order to promote the rapid deployment of renewable energy and achieving Zambia's goals for rural electrification as outlined in the Zambia Rural Electrification Master Plan.

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 increasing contribution of off grid renewable energy in the electricity generation mix.

3.1.3 Outcome 3: China has increased capacity to implement South-South Cooperation projects in relation to RET transfer

While China has extensive experience in cooperating with African countries, strategic South-South Cooperation is still a relatively new phenomenon with significant gaps in institutional, situational and cultural knowledge and global good practice. To build Chinese capacity to maximize the mutual benefits of strategic South-South Cooperation, the project

will support the compilation and dissemination of information on different approaches and good practice, facilitate the creation of Chinese – Zambian networks through exchange visits and support the creation of a South-South Cooperation unit within the Chinese Ministry of Science and Technology.

The work done under outcome 3 can be seen as independent but in actual terms have to be seen as an integrated approach to build the capacity within China and these efforts are not only supported by the outcome 3 in the current project but also outcome 3 in the Ghana/China project which is also to be financed by Denmark

Output 3.1: Chinese stakeholders have increased understanding of the Zambian context and knowledge exchange with Zambian stakeholders initiated

Activity Result 3.1.1: Map, update and share China's approaches to technology selection and transfer

The project will revise the manual on South-South Cooperation on RET to address climate change to include a broader variety of sector representatives and prepare a briefing paper on technology selection and transfer approaches for Chinese stakeholders. It will include a comprehensive review of China's RET experience and create a central repository of lessons learned and policy and technology examples which currently only exists at regional levels or dispersed with several institutions. The centralization of lessons learned and development examples will facilitate the transfer of knowledge in particular on the policy and development planning aspects of renewable technology up-scaling to Zambian counterparts. The expertise and knowledge of CNREC will be included and drawed upon implementing this activity.

Activity Result 3.1.2: Organize visit by Chinese stakeholders to Zambia to learn about Zambia's RET sector, policies, market and cultural barriers

The first visit of Chinese stakeholders under the project will be a study tour of Zambia's energy sector. During the study tour, the Chinese delegation will join Zambian stakeholder meetings to begin knowledge transfer and to strengthen mutual understanding of Zambian policy and market conditions. This will inform the technology identification process as well as lay the foundation for several of the capacity building activities to make Chinese South-South Cooperation more responsive to local conditions and requirements.

Activity Result 3.1.3: Share and disseminate knowledge on mission findings and project achievements:

A mission report and strategy to identify barriers and solutions to RET in Zambia will be developed based on the findings of the Chinese stakeholder mission to Zambia. Based on

the report and its recommendations, trainings will be conducted and a website to share project findings and results will be developed. These activities will support the establishment and servicing of a Chinese expert community to support continuous learning on RET transfer between China and Zambia.

Output 3.2 A Chinese Centre for South-South Cooperation within the Ministry of Science and Technology supported

Activity Result 3.2.1: Establish vision and mission of the SSC Center

Building on prior activities under the project, China will set up a steering committee and develop a work plan, and long-term funding and outreach strategy for a South-South Cooperation (SSC) Center. It is contemplated that the China PMU will be folded into the SSC Center and the SSC Center will take over operations for the project on the China side. The aim is for SSC Center to be a hub for development of China's approach to South-South Cooperation with an initial focus on Zambia and Renewable Energy but with the potential to expand and cover a broader range of China's South-South policies and engagement. Again, CNREC will be involved as a consulting partner and expert in the implementation of this activity.

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

In order to support Zambia's objectives of developing a supply-chain strategy, China will identify suppliers and create an alliance of Chinese stakeholders to help bring down the cost of RET for Zambia. As part of this effort, the SSC will assess and revise China's own criteria and standards for RET selection to unify existing practices. Based on these efforts, the SSC Center will then revisit barriers to RET deployment and draft a refined strategy for future joint collaboration.

Activity 3.2.3: Develop training materials on South–South Cooperation and Renewable Energy Technologies:

The SSC Center will develop a practical guide to SSC for RET in Chinese and English to be made available via the web and in printed form. The topics will include; the necessity of and how to do thorough needs assessment, stakeholder analysis, how to ensure proper and continuous feedback mechanisms and the need for adjusting work plans to feedback, how to screen project for social and environmental impact and general principles of corporate responsibility building on the Chinese Government agency SASACs upcoming guidelines for Chinese enterprises going abroad including standards such as ISO26000. Also topics of how to ensure proper intercultural communication and feedback mechanisms will be included.

Activity Result 3.2.4: Conduct training of Chinese stakeholders on South– South Cooperation and Renewable Energy Technologies:

The project will organize trainings for selected Chinese stakeholders, including CNREC, in support of the project, to be selected in coordination with MOST, on policy, market and cultural aspects of doing business in Africa sustainably. Training participants will be part of the stakeholder alliance to be supported by the project, and participants will receive the practical guide to SSC for RET at trainings as well as other materials.

Activity Result 3.2.5: Support the Renewable Energy Technology platform:

As part of China's efforts to support the creation of testing and training facilities in Zambia, delegation(s) from Zambia will come to China for training with respect to solar, mini-hydro and biogas technologies. The SSC Center will also provide support for the demonstration project in Zambia in coordination with the Zambia PMU.

3.1.4 Outcome 4: Project organization and coordination structures established

The project management set up for the project involves project management units within the relevant Zambian and Chinese institutions as well as a UNDP support structure in Zambia and China. In addition, the project emphasizes outreach and liaison with a number of partners, in particular private sector actors and research institutions which will play key roles in identifying appropriate technologies and business opportunities for renewable energy in Zambia.

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

Output 4.1: Project Management Structures established

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 ACCA21 in China and Department of Energy in Zambia will ensure that project activities are part of the regular structure and work plans as an exit strategy. These will serve as the coordination and implementation bodies for the project. In China the PMU will manage both the Zambia/China project as well as the Ghana/China project. In addition the PMU will be/become an integrated part of the

Chinese Center for South-South Cooperation, thus being the key driver for 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 Zambia 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.

Activity Result 4.1.1: Set up PMU in Zambia

The PMU will serve as the coordination body for the Zambia side of the project. It is expected that the PMU will be created within the MMEWD. A major focus of the PMU's initial work will be preparing detailed work plan for the project and a budget for Zambian activities. The PMU will play a key role in identifying and reaching out to Zambian stakeholders, identifying sites for implementation and coordinating within the Zambian government for policy implementation focused parts of the project.

Activity Result 4.1.2: Set up PMU in China

The PMU will serve as the coordination body for the Chinese side of the project. It is expected that the PMU will be created within the Ministry of Science and Technology. Initially, the PMU will be preparing detailed work plan for the project and a budget for Chinese activities, and will form the backbone of the envisaged South- South Cooperation Center within the MOST. As such it will also play a role in broader policy coordination activities in China and be responsible for reaching out to stakeholders and Chinese partners and identify key topics and experts for trainings and development of guidelines for the Center.

Activity Result 4.1.3: Set up Project Steering Committees

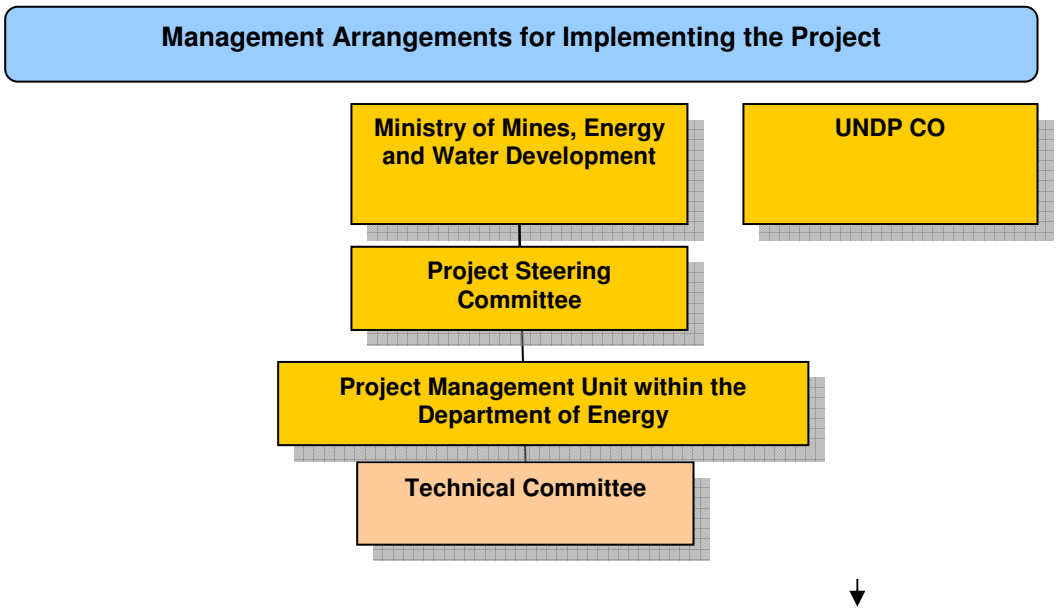
To provide strategic direction to project activities and oversee project implementation of the two national components, National Project Steering Committees (NPSC) will be established, one in China and one in Zambia. These NPSCs will meet at least once a year and include representatives from key government agencies, UNDP and other stakeholders at national level. The NPSCs will approve work plans and progress reports from the PMUs. Additionally, the UNDP China and Zambia 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 Zambia, the Chinese Embassy will represent China in Zambia and the Embassy of Zambia will represent Zambia in China. However, the Department of Energy and the Ministry of Science and Technology might also partake (in China and Zambia respectively) but this would incur an added management cost. Along similar lines, the project will have an overall Project Steering Committee called the Global Steering Committee that will bring national stakeholders from Zambia and China together, and will interact by virtual means.

Output 4.2 Project Coordination Structures established

Activity Result 4.2.1: Create project coordination and management structure

This includes the initial project kick off meeting to be held between Zambia DoE, China MOST and the UNDP country offices to agree on coordination modalities for all project activities. It will include the signing of MoUs guiding overall project implementation and separate agreements for specific project activities as required. The proposed structure for the Zambian component is as follow:



Activity Result 4.2.2: Convene stakeholder group meetings

During project formulation, a preliminary list of stakeholders for project activities in Zambia and China has been developed. This list will be revised and updated during the initial stages of the project to facilitate and target stakeholder outreach.

The first stakeholders group shall be convened in Zambia to kick-off the project and to begin the process of engagement. The PMU will maintain and adjust the list of stakeholders on the Zambian side. Stakeholders groups will organize regular meetings in Zambia, which

will support key activities including policy engagement, market formation activities and the development of a community of practice.

In China, a first stakeholder meeting will be convened by the PMU with the objectives of identifying appropriate private sector partners and research institutions for technology transfer and input into the policy review process. This stakeholder group will also be used to review the procedures for the South-South Cooperation Center, and will be consulted throughout the project.

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 through 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, which 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-Zambia 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 ZAMBIA

The formulation of a United Nations Development Assistance Framework (UNDAF) forms part of the core ingredients of the UN Common Country Programming Process (CCPP). The latter is one of the mechanisms for translating the UN Secretary-General's Reform Programme at the country level. The UN Reform aims at greater harmonization, coherence and coordination of UN System activities in support of the national development aspirations of programme countries. In Zambia, the overarching long-term context of national aspiration is defined by the Zambia National Long-term Vision 2030: "to become a prosperous middle income country by the year 2030" (see UNDAF for the Republic of Zambia 2011-2015).

Fostering sustainable development and reducing people's vulnerability from the risk of climate change, natural and man-made disasters and environmental degradation are key pillars under the framework of UNDP Zambia's Country Programme Action Plan 2011 – 2015 and the Sixth National Development Plan Vision for the Natural Resources Sector.

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.

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 Zambia 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 Zambia, 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.

In this regard Kafue Gorge Regional Training Centre and University of Zambia will continue proving mini hyro and solar trainings respectively. Further through community of practice fora that will be established, the stakeholders will be always engaged to exchange

information and knowledge. REA will ensure the formation of a cooperative that will continue managing the mini hydro plant upon commissioning.

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 Zambian 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 Zambian (and Ghanaian) 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 Zambia (Ghana and other countries).

.

Innovation and synergy

This project takes advantage of the fact that UNDP has country offices in 170 countries including Zambian the project provides for a new national platform for dialogue where issues related to South-South cooperation and engagement between countries will be touched upon. It also brings triangular cooperation dimension among China, Zambia and Denmark to dialogue on issues of promoting renewable energy technology transfer. This 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 Department of Energy and ACCA 21. 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 Zambia (and Ghana) will be facilitated to facilitate information exchange and accountability.

One key innovation is that this project (together with its sister Ghana 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. The extent to which this will continue

is dependent on the vision of the project partners and their interest in doing things differently.

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.

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 within China and in Zambia and Ghana.

Specifically for Zambia, this project will create synergies with the Rural Electrification Master Plan (REMP) one of whose strategy is to promote renewable energy using off grid system. At University of Zambia and Kafue Gorge Regional Training Centre the project will provide linkages and augment curriculum and research for solar and minihydro technologies respectively.

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.

Department of Energy

The Department of Energy is mandated with the responsibility of ensuring the implementation of government's objectives on energy. The outputs of the DoE include, among others, ensuring the following:

- Increased access to modern energy, particularly in rural areas through various energy options forms;
- Efficient production and utilization of energy;
- Minimization of the negative environmental and health effects of energy production, transportation and use;
- Reduced dependence on imported petroleum and switch to locally available energy supplies;
- Development of mutually beneficial co-operation in the energy sector with other countries and international organizations; and
- Increased utilization of renewable energy.

Due to the fact that the Zambia China South to South collaboration on Renewable Energy project focuses on increasing the role of RET participation in the Zambian National Energy mix by way of building capacity for transfer of RETS from China to Zambia as well as their successful use, establishment of training centres and development of a small hydro power plant, the project will be directly contributing towards fulfilling the mandate of DoE and contributing to the implementation of the Sustainable Energy for All (SE4ALL) initiative which Zambia joined in 2012.

In implementing its mandate, the department collaborates with institutions which, among others, include: the Rural Electrification Authority (REA), University of Zambia (UNZA), ZESCO Limited the public power utility which hosts the Kafue Gorge Regional Training Center (KGRTC) and UNDP; the four institutions identified as key stakeholders in the implementation of this project. This is the reason why DoE is the most suitable institution to host the PMU.

Further, UNDP has been partnering with the Department of Energy in strengthening the Department through technical assistance towards the development of the RE Strategy. The project will further enhance the UNDP support to the Department by contributing to the implementation of the RE strategy and SE4ALL.

THE RURAL ELECTRIFICATION AUTHORITY

The Rural Electrification Authority (REA) was established by an Act of Parliament to administer and manage the Rural Electrification Fund (REF); to develop, implement and update the Rural Electrification Master Plan (REMP) for the systematic electrification of the rural areas.

The REMP is a blue print of 1,217 Rural Growth Centres targeted for electrification by the year 2030 in order for the country to attain 51% of rural access to electricity. Some of the rural growth centres are to be electrified through off grid systems such as mini hydro power stations. The REMP identified mini hydro sites from where, the REA has already completed four feasibility studies and is the process of implementing the construction of a 600kW mini hydro power plant. The Authority is also in the process of finalizing the formulation of the Mini hydro development framework.

KAFUE GORGE REGIONAL TRAINING CENTRE

Kafue Gorge Regional Training Centre (KGRTC) is a long established institution for hydro-power training, which was rehabilitated and transformed to provide quality training to power utilities in Central Africa. The Center employs a variety of teaching methods, including formal lectures, tutorials, study tours, computer based training and state of the art simulators, computerized and conventional, software packages and laboratory work. Library and computer facilities provide excellent support for academic work. KGRTC is an ISO 9001 Certified Training Centre.

University of Zambia

The University of Zambia is the highest learning institution in Zambia. The University's Department of Physics has an Energy and Environment Research Group (EERG) which is a research and consultancy group. The EERG is involved in technical training and consultancy in rural electrification. The EERG has three sub-groups under its organization namely the solar energy material and photovoltaic systems, the climate Group and Sustainable energy engineering group.

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 or 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 Zambia, which will provide administrative and technical support throughout the project and disburse funds to the implementing partners in Zambia and China.
While the national components will be overseen by UNDP China and UNDP Zambia respectively, UNDP Zambia 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 Zambia 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 Department of Energy 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 Zambia and China National Project Steering Committees (PSC) 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 Zambia 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 Zambia this will be the Ministry of Mines, Energy and Water Development.

The supervision of the national component activities will be the responsibility of the NPSC's in China and Zambia. MOST and MMEWD 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 DoE 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 handled mainly by the UNDP Country offices in China and Zambia upon request of MOST and DoE respectively. MOST and DoE will set up Project Management Units (PMU) within their respective institutions. In China the PMU will manage both the Zambia/China project as well as the Ghana/China project. In addition the PMU will be/become an integrated part of the Chinese Center for South-South Cooperation, thus being the key driver for its establishment of the center. MOST and DoE will also appoint National Project Coordinators (NPC) and National Project Managers (NPM) to be responsible for the overall management of the project and PMUs. The PMU's 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 Zambia and China will designate staff to oversee the national components and will be responsible for providing project management support 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 reports and (v) ensuring that all activities including procurement and financial services are carried out in compliance with UNDP procedures. In addition, the designated staff in UNDP China and Zambia will be responsible for the interoffice communication and coordination. In addition, designated staff at UNDP China will also be the focal point 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 Zambia 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 Zambia in China.

The National Project Steering Committees (NPSC) will be convened by MOST and DoE 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 the country representation i.e. the embassies. The NPSCs will serve as the project's coordination and decision-making bodies. The NPSC will meet at least once a year to review and approve the AWP and Project reports. They may also call for extra-ordinary meetings to address any urgent matters. They will meet according to necessity, but not less than once a year. The NPSCs 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.

The day-to-day administration of the national components will be carried out by Project Management Units (PMU) within MOST and DOE comprised of a National Project Coordinator, Project Manager (PM), and additional support staff (Administrative Assistant, Office Assistant and driver). 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) organization of duty travel, seminars, public outreach activities and other project events; (iv) maintaining working contacts with project partners at the central and local levels; and (v) organize the exchange and cooperation activities between the PMUs in China and Zambia.

The PMs are accountable to the MOST and DoE respectively and the PSCs in each country for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds. Following UNDP China's planning procedures and reporting modality the PMs

will produce two year Work Plans and Budget Plans to be approved by the PSCs. 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 PSCs. 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 DoE in Zambia.

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 Zambia and China will submit to UNDP for its review and approval the following as part of the projects monitoring:

Within the annual cycle

- **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 month- time-frame. The Inception

Report will include a detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners. 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 Zambia 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 Zambia 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. Project staff 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, lessons learned will be included in project updates or highlighted in separate project communication at least once a year during the project.

8. RISK ASSEMENT

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.

BOX 1. RISK ASSESSMENT GUIDING MATRIX

		Impact				
Likelihood		CRITICAL	HIGH	MEDIUM	LOW	NEGLIGIBLE
	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[5]. These risks 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.

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

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.
Differences among member countries for the Global steering committee	political	Unlikely	High	Low	Changes in the bilateral relations amongst the three countries i.e. Denmark, China and Zambia 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 and organizational 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 Rural Electrification Fund is not resourced in time and adequately to provide effective support for the	Financial/operational	Moderately Likely	Low	Low	Delays in adequately resourcing the Fund will not affect project activities, but might negatively impact on the scaling up and replication of demonstration	Since the rural electrification is one of the top agenda of the government for poverty reduction, the REA will engage Government and international financial institutions to support the Fund. As part of project implementation, both UNDP and the Implementing Partner will influence discussions in Ministry of Finance, who is

Identified Risks	Category	Likelihood	Impact	Risk Assessment	Elaboration of Risks	Mitigation Measures
project interventions					projects.	the controller of the fund. In addition to the fund, Ministry of Mines Energy and Water Development is looking into Innovative and alternative financing mechanisms such as PPPs
Environmental impact for the demonstration project not properly assessed.	Organizational/ regulatory	Moderately likely	Medium	Low	If not properly assessed, there is a likelihood of affecting the ecosystems and downstream livelihood.	In Zambia, it is a requirement to obtain an impact assessment report before constructing a project. For the demonstration project, an Environmental project brief (EPB) shall be sufficient.
EPB concludes that mitigation is actions are needed	Financial/ regulatory	Unlikely	High	Low	If proposed mitigations are not addressed, they may affect ecosystems and downstream livelihood.	Sites have been identified and Prefeasibility studies completed and which do not indicate that mitigation measures are needed. However if mitigation are needed for specific sites, alternative sites will be identified
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 Zambian 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 beneficiaries and	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

Identified Risks	Category	Likelihood	Impact	Risk Assessment	Elaboration of Risks	Mitigation Measures
					non-performance and non-utilization of demonstrations sites. This would also negatively impact on the eventual up scaling of the technologies.	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 equipment leading to non sustainability of project interventions	The Chinese partners will provide on-site training to the Zambian partners who will run the demonstration sites. Additionally, the project will provide extensive technical training on use and 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 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 roadmap) leading to slow down of project implementation and constrained technology transfer.	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 address identified barriers.
Institutional Risk						
Coordination between ACCA21 and DoE PMUs	Operational	Moderately likely	Medium	Low	Poor coordination between the two PMUs would lead to	A regular communication system will be put in place to ensure that the two PMUs have continuous dialogue to discuss

Identified Risks	Category	Likelihood	Impact	Risk Assessment	Elaboration of Risks	Mitigation Measures
does not function optimal					slow down of implementation of project activities, especially those conducted jointly.	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 Zambia	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.

Identified Risks	Category	Likelihood	Impact	Risk Assessment	Elaboration of Risks	Mitigation Measures
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	Operational	Moderately likely	Medium	Low	Due to the complexity of the project and pressure on existing staff,	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

Identified Risks	Category	Likelihood	Impact	Risk Assessment	Elaboration of Risks	Mitigation Measures
constraints of the IPs					inadequate management capacity of the IPs would result into delayed and ineffective implementation of project activities.	implementation.

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 of (country) and UNDP, signed on (date).

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 [and the Project Cooperation Agreement between UNDP and the Implementing Partner][6].

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.

[6] Use bracketed text only when IP is an NGO/IGO

SULTS AND RESOURCES FRAMEWORK

ASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
environment for the transfer and use of priority renewable technologies in Zambia strengthened				
raft review report of he implementation of olicies and egislation for rural lectrification using ff-grid technologies xists Current egislation ineffective nd incomplete baseline: UNDP coping mission to ambia 2013)	1. Final review report on review of the implementation of policies and legislation for rural electrification using off-grid technologies.	**Targets (year 1)** Review report on review of the implementation of policies and legislation for rural electrification using off-grid technologies finalized.	**Activity Result 1.1.1: Finalization of review of the implementation of policies and legislation for rural electrification using off-grid technologies.** i) Preparation of a briefing paper / baseline study on RET policy/legal reforms	**67,650**
	2. # of people trained/participates in workshops	**Targets (year 2**) **3** working group meetings held with minimum of **45** participants	**Activity Result 1.1.2: Convene working group meetings to review implementation of policies and legislation to address gaps and develop and finalize policies for rural electrification using off-grid technologies**. Convene 3 meetings with 15 participants to reach consensus on specific legislation, policy, regulation or grid code conventions that are priorities for supporting rural electrification, ii) Draft legislation, policy, regulation or grid code, as required, based on consensus of stakeholders with guidance from Zambian government	
	3. # of instruments developed and implemented	Target (Year 2) Minimum of 1 policy/legislation document drafted	**Activity Result 1.1.3: Build capacity of government officials and other stakeholders to implement policy reforms and programs identified in Activity Result 1.1.2**.	
	4. % of people trained / participate in workshops with increased knowledge of policies and renewable energy	**Targets (year 3)** 40 people trained	i) Convene 3 workshops and training sessions of minimum 40 participants to create awareness about key policies and reform processes for rural electrification, ii) Convene series (3) of workshops and capacity building training sessions on implementation of key renewable energy policies	

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
Output 1.2 Financial mechanism for RETs established	Financial mechanisms insufficient (baseline: UNDP scoping mission to Zambia 2013)	# of finance mechanisms for RET established	**Targets (year 1)** Financial institutions engaged by DoE for resourcing of the RE Fund	**Activity Result 1.2.1: Review opportunities for additional financing institutions such as the Development Bank of Zambia to fund its Renewable Energy Fund.** i) Engage with financial institutions with support of project for developing proposal to support Renewable Energy Fund**,** ii) If successful, funding structure design to be supported by project	**30,500**
		Amount of $ secured in financial support for REF	**Targets (year 2**): Funding structure developed	**Activity Result 1.2.2: Develop options for renewable energy technologies equipment financing for rural electrification, to support private sector, and/or government rural electrification initiatives.** i) Engage with World Bank, African Development Bank and other financial institutions to develop micro-finance structure to support communities for rural electrification, ii) Review options for micro-finance scheme designs to support rural electrification	
		# of value chain strategies adopted	Target (Year 3) 1 comprehensive value chain strategy study completed	**Activity Result 1.2.3: Develop a value chain strategy for driving down cost of technology that can support private sector and government actors.** i) Conduct comprehensive value chain study, ii**) 3 consultative value chain** stakeholder discussions with minimum 40 participants	
			Targets (year 3) : Funding proposals developed **3** consultative value chain stakeholder discussions held with minimum of **40** participants		

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
			Targets (year 4): Supply chain facility established and Supply chain options identified Micro financing accessed to promote RETs		
				Total Outcome 1	**98,150**
Outcome 2: Reduced barriers to the adoption of renewable technologies for the rural poor in Zambia					
Output 2.1 Priority technologies tested and demonstrated at dedicated testing and training center and community of practice established	Testing and training centers not equipped and functional (baseline: UNDP scoping mission to Zambia 2013)	The of demonstration, testing and training facilities established	**Targets (year 1) :** Work plan and long term funding and outreach strategy in place	**Activity Result 2.1.1: Creation of demonstration, testing and training facilities for priority technologies.**	**69,750**
			Targets (year 2) : Terms of Reference (TORS)s for facilitation of the community of practice in place	i) Develop the work plan and long term funding and outreach strategy for the facilities, ii) Zambia training center directors to convene meeting of stakeholders to agree on responsibilities for facilitating community of practice, iii) Community of practice to operate under project for period of one year, iv) Center directors and senior staff to receive training in China.	
			Target (Year 1) Community of practice operational Centers receive identified equipment	**Activity Result 2.1.2: Facilities to receive exhibit and demonstrate equipment and publish performance of results via web.** i) Support facilities implementation through acquisition of testing and demonstration equipment	
		# and type of equipment received and exhibited by centers	**Targets (year 3):** Testing centers fully functional		

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
Output 2.2 Institutional and technological capacity among stakeholders built	Capacity gaps exist (baseline: UNDP scoping mission to Zambia 2013)	# and type of education materials developed by centers	**Targets (year 1):** Project selection committee established	**Activity Result 2.2.1: Facilities to conduct periodic training on renewable energy technology and practice, and make its facilities available for third parties to conduct training.** i) Demonstration facilities to develop educational materials, ii**)** Demonstration facilities to commence 3 training modules for minimum 30 participants, product evaluation and outreach program for a full-year sub program	**941,500**
		# of people trained in renewable energy technology and practice	**Targets (Year 2)** 30 people trained		
			Targets (year 2) : Request for proposals issued	**Activity Result 2.2.2: Support one renewable energy rural electrification project.** i) Form project selection committee, ii) Agree on criteria for receiving, evaluating and selecting proposals, iii) Request, receive and evaluate proposals according to set criteria resulting in selection of 3 project(s) and MOUs to be signed with project developers, iv) Project to be implemented with supervision of project, v) evaluation of project progress and results to be made in order to formulate lessons and future guidance.	
		% of people trained with increased knowledge on renewable energy technology and practice			
			Targets (Year 2) Projects screened, MoU signed		
		1 project successfully selected according to established criteria			
			Targets (year 3) :		
		Amount and type of support provided to selected project	Rural electrification project implemented		
		Evaluation and lessons learned document	**3** training modules developed		

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
		produced			
			Targets (year 4)		
			Minimum of **30** people trained; Evaluation and lessons learned exercise commenced; Rural electrification project completed, final evaluation results available		
				Total Outcome 2	**1,011,250**
Outcome 3: China has increased capacity to implement South-South Cooperation projects in relation to RET transfer					
Output 3.1: Chinese stakeholders have increased understanding of the Zambian context and knowledge exchange with Zambian stakeholders initiated	Knowledge gaps exist (baseline: UNDP / MOST dialogue 2013)	# and type of briefing papers and guidelines developed and distributed	**Targets (year 1)** (1)List of reliable technology providers and contact information in China, Survey should cover at least 30 provinces in China; At least 1000 questionnaires are collected.	**Activity Result 3.1.1: Map, update and share China's approaches to technology selection and transfer.** i) Update the manual: "South-South Cooperation on science and technology to address climate change – applicable technology" for Zambia, ii) Prepare briefing paper on technology selection and transfer approaches for Chinese stakeholders	**427,100**
			(2)Study tour for 20 participants completed, and workshop for 50 persons for briefing papers and guidelines, and workshop with 10 experts and 5 government officials from key ministries		

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
		# of people reached with new information and approached through dissemination of briefings / papers / reports	at least 300 Manual been diseminated; English vision well be available on internet	**Activity Result 3.1.2: Organize visit by Chinese stakeholders to Zambia to learn about Zambia's RET sector, policies, market and cultural barriers,** i)	
			(3)Minimum of 20 project stakeholders participates in visits exchange visits	Study tour for a Chinese delegation to study Zambia's energy sector, ii) Joint Zambia / China stakeholder meeting to begin knowledge transfer and to strengthen mutual understanding of Zambian policy and market conditions	
		# and type of agreements on technology transfer	**Targets (year 2**)		
			(1)draft reports on cost and financial analysis for RETT from China to Zambia; draft possible policy support strategy (2)Training for government officials (1 person for each province, in total 30 persons); training for industrial leaders and Key ministries in China, at least 25 persons; National strategy to overcome the barriers to be published and translated into English.	**Activity Result 3.1.3: Share and disseminate knowledge on mission findings and project achievements**, i) Draft report and strategy identifying barriers and solutions to RET to Zambia, ii) Conduct training based on report, iii) Develop and maintain website to share project findings and results**,** iv) Establish and maintain Chinese expert community to support continuous learning on RET transfer between China and Zambia	
			Targets (year 1-4) **(**1)Website and online system for RETT from China to Zambia/Ghana; Maintenance and data updating; (2)A Chinese expert's community will be		

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
			formed with 10 consultants to support the continuous learning, and also will support the PMU of both China and Zambia sides from technical perspective.		
Output 3.2 A Chinese Centre for South¬-South Cooperation within the Ministry of Science and Technology supported	Chinese Center for South-South Cooperation within MOST does not exist	# and type of guiding documents for the SSC Center produced and adopted	**Targets (year 1)**	**Activity Result 3.2.1: Establish vision and mission of the SSC Centre,** i) Set up steering committee, ii) Develop the work plan of the Centre, iii) Develop long term funding and outreach strategy for the Centre	**439,000**
			(1)Prepare meeting with key Ministries and RET industry leaders; Meeting to set up the SC for SSC Centre (2)Stakeholder meeting with government officials to review the work plan for SSC centre; (3)4 experts to develop the long-term SSC centre work plan (4)5 experts for preparing the proposal for funding application and outreach strategy developed; (5)meeting for government stakeholders consultation including 20 persons		

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
		# of meetings held by the SSC steering committee and stakeholders under the auspices of the SCC Center	(6)Meeting to establish the RE alliance (7)4 experts for developing criteria and standards to unify the existing practices for RET report; and drafting National strategy to overcome the barriers to be published and translated into English.	**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.** i) Identify stakeholders and kick off meeting, ii) Assess and revise criteria and standards for RET selection to unify existing practices, iii) Revisit barriers to RET deployment and draft strategy for joint collaboration	
			Targets (year 2)		
		# of people trained on SSC and RET	**(1)**meetings with minimum of **50**stakeholders held in Beijing	**Activity 3.2.3: Develop training materials on South – South Cooperation and Renewable Energy Technologies**	
			(2)Draft the strategy for joint collaboration; (3)meeting to collect the feedback and comments from stakeholders; Seminar for joint collaboration strategy to be signed	**i)** Develop practical guide to SSC for RET in Chinese to be made available via the web and in printed form	
		% of people trained with increased knowledge of SSC and RET	(4)Best practices case studies for each technology; (5)Develop business model for the RETT from China to Africa; (6)Policy, culture and enabling environment development and publications (7)meeting for industrial stakeholder consultation, and meeting for revising and approval of proposal and outreach		

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
			strategy		
			.	**Activity Result 3.2.4: Conduct training of Chinese stakeholders South – South Cooperation and Renewable Energy Technologies**	
			(8)Minimum **10**people participates in study **tour** **6 experts training from Zambia to China at solar, mini-hydro and biogas facilities**	i) Organize trainings in coordination with MOST on policy, market and cultural aspects of doing business in Africa, ii) Distribution of practical guide to SSC for RET at trainings.	
			Targets (year 1-4) **(**1)6RET stakeholder trainings on South-South Cooperation; (2)3 Entrepreneur trainings for doing business in Africa	**Activity Result 3.2.5: Support the Renewable Energy Technology platform,** i) Study tour for a delegation from Zambia to China for training at solar, mini-hydro and biogas facilities.	
				Total Outcome 3	**866,100**
Outcome 4: Project organization and coordination structures established					
Output 4.1: Project Management Structures established	Project management structures not in placed	# of PMUs and PSCs established with guiding principles and detailed work plans	**Targets (year 1) :** PMUs set-up, AWP approved, PSC set up and functional, Office equipment and staff in place, Quarterly and Annual Reports produced, SC meetings held Annual meeting of SSC stakeholders held	**Activity Result 4.1.1: Set up PMU in Zambia.** i) Set up coordination mechanisms, ii) Prepare detailed work plan for the project	**79,000**
		# of meetings held	**Targets (year 2**): Quarterly and Annual Reports produced, SC meetings held; Annual meeting of SSC stakeholders held	**Activity Result 4.1.2: Set up PMU in China,** i) Set up coordination mechanism**,** ii) support the SSC centre and long term operation	

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
			Targets (year 3): Quarterly and Annual Reports produced, SC meetings held; Annual meeting of SSC stakeholders held	**Activity Result 4.1.3: Set up Project Steering Committees** i): Prepare stakeholder list and identify PSC members, ii): Establish PSC with required documentation and terms of reference, iii): Hold PSC meetings to review project plans and reports	
			Targets (year 4): Quarterly and Annual Reports produced, SC meetings held; Annual meeting of SSC stakeholders held		
Output 4.2 Project Coordination Structures established		# and type of project MoUs and agreements signed	**Targets (year 1) :** MoUs signed	**Activity Result 4.2.1: Create project coordination and management structure**-. i) Kick off meeting between Zambia DoE, China MOST and the UNDP country offices to agree on coordination modalities for all project activities, ii) Sign MoUs guiding overall project implementation and separate agreements for specific project activities as required	**25,500**
		# of project management meetings held with Zambia, China and UNDP participation	**Targets (year 2**): Minimum **2** Coordination meetings held	**Activity Result 4.2.2: Convene stakeholder group meetings,** i) Review and adjust stakeholder lists for Zambia and China, ii) Kick off and organize regular meetings for project stakeholders in Zambia	
		# and type of stakeholders invited and participate in meetings	**Targets (year 3)):** Minimum **2** Coordination meetings held		
		# of stakeholder meetings convened	**Targets (year 4)):** Minimum **2** Coordination meetings held		

OUTPUTS	BASELINES	INDICATORS	TARGETS	ACTIVITY RESULTS	BUDGET$
Output 4.3 Support project implementation			**Targets (year 1):** PM, PA in position; annual progress report submitted to donor; **Targets (year 2):** Mid-term Review conducted; audit conducted; annual progress report submitted to donor; **Targets (year 3):** audit conducted; annual progress report submitted to donor; **Targets (year 4):** audit conducted; Final progress report submitted to donor	Activity Result 4.3 : Support project implementation	**350,000**
				Total Outcome 4	**454,500**
Total Direct Cost					**2,430,000**
GMS					**194,400**
Grand Total					**2,624,400**

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

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe												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: The enabling environment for the transfer and use of priority renewable technologies in Zambia strengthened																								
	Output 1.1	**Activity Result 1.1.1: Finalization of review of the implementation of policies and legislation for rural electrification using off-grid technologies.**																						
		Sub-Activity 1: Preparation of a briefing paper / baseline study on RET policy reforms	**Dept of Energy (DoE)**	3,000		X																		
		Local Consultant		3,000		X															3,000			
		Subtotal 1.1.1		**3,000**																				
		Activity Result 1.1.2: Convene working group meetings to review policies to address gaps and develop and finalize policies for rural electrification using off-grid technologies																						
		Sub-Activity 1: Convene 3 meetings with 15 participants to reach consensus on specific legislation, policy, regulation or grid code conventions that are priorities for supporting rural electrification	DoE	15,000				X																
		Contractual Service/ Companies		15,000				X													15,000			

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe														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 2: Draft legislation, policy, regulation or grid code, as required, based on consensus of stakeholders with guidance from Zambian government	DoE	22,000					X															
		Local Consultant		12,000					X													12,000		
		Contractual Service/ Companies		8,580					X													8,580		
		Miscellaneous Expenses		1,420					X													1,420		
		Subtotal 1.1.2		**37,000**																				
		Activity Result 1.1.3: Build capacity of government officials and other stakeholders to implement policy reforms and programs identified in Activity Result 1.1.2.																						
		Sub-activity 1: Convene 3 workshops and training sessions or min. 40 participants to create awareness about key policies and reform processes for rural electrification	DoE	8,900							X													
		Local Consultant		4,200							X											4,200		
		Contractual Service/ Companies		3,000							X											3,000		
		Local travel		1,000							X											1,000		
		Miscellaneous Expenses		700							X											700		

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe														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 2: Convene series (3) of workshops and capacity building training sessions on implementation of key renewable energy policies	DoE	18,750								X												
		Contractual Service/ Companies		13,000								X										13,000		
		Travel cost		3,750								X										3,750		
		Miscellaneous Expenses		2,000								X										2,000		
		Subtotal 1.1.3		**27,650**																				
		Total Output 1.1		**67,650**																				
		Activity Results 1.2.1: Review opportunities for additional financing for institutions such as the Development Bank of Zambia to fund its Renewable Energy Fund																						
		Sub-Activity 1: Engage with financial institutions with support of project for developing proposal to support Renewable Energy Fund	DoE	0							X	X												
		Sub-Activity 2: If successful, funding structure design to be supported by project	DoE	3,000								X												
		Local Consultant		3,000								X										3,000		
		Subtotal 1.2.1		**3,000**																				

Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe																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				
	Activity Result 1.2.2: Develop options for renewable energy technologies equipment financing for rural electrification to support private sector, and/or government rural electrification initiatives.																						
	Sub-Activity 1: Engage with World Bank, African Development Bank and other financial institutions to develop micro-finance structure to support communities for rural electrification	DoE	0							X	X	***X***	***X***										
	Sub-Activity 2: Review options for micro-finance scheme designs to support rural electrification	DoE	10,500							X													
	Travel cost		10,500							X											10,500		
	Subtotal 1.2.2		**10,500**																				
	Activity Result 1.2.3: Develop a value chain strategy for driving down cost of technology that can support private sector and government actors																						
	Sub-activity 1: 1 comprehensive value chain strategy	DoE	12,000										X	X	X								
	Local Consultant		12,000										X	X	X							12,000	
	Sub-activity 2: 3 consultative value chain stakeholder discussions with min. 40 participants	DoE	5,000											X									

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe														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
		Contractual Services/ Companies		3000											X								3,000	
		Miscellaneous Expenses		2,000											X								2,000	
		Subtotal 1.2.3		17,000																				
		Total Output 1.2		**30,500**																				
		TOTAL OUTCOME 1		**98,150**																				
				71300	***Local Consultants***																3,000	19,200	12,000	0
				71600	***Travel***																0	15,250	0	0
				72100	***Contractual Services /Companies***																15,000	24,580	3,000	0
				74500	***Miscellaneous Expenses***																0	4,120	2,000	0
Outcome 2: Reduced barriers to the adoption of renewable technologies for the rural poor in Zambia																								
		Activity Result 2.1.1: Creation of a demonstration, testing and training facilities for priority technologies																						
	Output 2.1	**Sub-activity 1:** Develop the work plan and long term funding and outreach strategy for the facilities	UNZA	0		X																		
		Sub-activity 2: Zambia training center directors to convene meeting of stakeholders to agree on responsibilities for facilitating community of practice	DoE	2,000			X																	
		Contractual Service/ Companies		2,000			X														2,000			

Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe												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 3: Community of practice to operate under project for period of one year	PM/ UNZA	17,750				X				x				x				x				
	Contractual Service/ Companies		12,000				X				X				X				X	3,000	3,000	3,000	3,000
	Travel cost		5,750					X													5,750		
	Sub-Activity 4: Center directors and senior staff to receive training in China.	ACCA21	15,000					X															
	Travel cost		15,000					X													15,000		
	Subtotal 2.1.1		**34,750**																				
	Activity Result 2.1.2: Facilities to receive, exhibit and demonstrate equipment and publish performance results via web																						
	Sub-activity 1: Support facilities implementation through acquisition of testing and demonstration equipment.	ACCA21	35000				**X**																
	Local Consultant		21000				X													21,000			
	Equipment and furniture		5000				X													5,000			
	Travel cost		8000				X													8,000			
	Miscellaneous Expenses		1000				X													1,000			
	Subtotal 2.1.2		**35,000**																				

Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe															
				Year 1				Year 2				Year 3				Year 4			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	Total Output 2.1		**69,750**																
Output 2.2	**Activity Result 2.2.1: Facilities to conduct periodic training on renewable energy technology and practice, and make its facilities available for third parties to conduct training.**																		
	Sub-activity 1: Demonstration facilities to develop educational materials	KGRTC/UNZA	10,000					X											
	Local Consultant		6,000					X											
	Contractual Service/ Companies		4,000					X											
	Sub-activity 2: Demonstration facilities to commence 3 training modules for min. 30 participant, product evaluation and outreach program for a full-year sub program	PM/UNZA	17,000							X	X								
	Local Consultant		9,000							X	X								
	Contractual Service/ Companies		8,000								X								
	Subtotal 2.1.1		**27,000**																
	Activity Result 2.2.2: Support one renewable energy rural electrification project																		
	Sub-activity 1: Form project selection committee	DoE	0		X														

Budget			
Year 1	Year 2	Year 3	Year 4
	6,000		
	4,000		
	9,000		
	8,000		

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe														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 2: Agree on criteria for receiving, evaluating and selecting proposals	DoE	0			X	X																
		Sub-activity 3: Request, receive and evaluate proposals according to set criteria resulting in selection of project(s) and MOUs to be signed with project developers	DoE	4,500			X																	
		Local Consultant		4,500			X														4,500			
		Sub-activity 4: Project to be implemented with supervision of project	DoE	900,000					X	X	X	X												
		Local Consultant		66,000					X	X	X	X										66,000		
		Contractual Service/ Companies		800,000					X	X	X	X										800,000		
		Travel cost		30,000					X	X	X	X										30,000		
		Miscellaneous Expenses		4,000					X	X	X	X										4,000		
		Sub-Activity 5: valuation of project progress and results to be made in order to formulate lessons and future guidance.	REA	10,000					X	X	X	X												
		Travel		10,000					X	X	X	X										10,000		

Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe																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				
	Subtotal 2.2.2		914,500																				
	Total Output 2.2		941,500																				
TOTAL OUTCOME 2			1,011,250																				
			71300	*Local Consultants*																25,500	81,000	0	0
			71600	*Travel*																8,000	60,750	0	0
			72100	*Contractual Services /Companies*																5,000	815,000	3,000	3,000
			72200	*Equipment*																5000	0	0	0
			74500	*Miscellaneous Expenses*																1,000	4,000	0	0
Outcome 3: China has increased capacity to implement South-South Cooperation projects in relation to RET transfer																							
	Activity Result 3.1.1: Map, update and share China's approaches to technology selection and transfer																						
Output 3.1	**Sub-activity 1:** Update the SSC on RET Manual for Zambia	ACCA21	27,100		X	X																	
	Local Consultant		12,000		X															12,000			
	Contractual Service/ Companies		6,500		X															6,500			
	Communication/publication		8,500			X														8,500			
	Miscellaneous Expenses		100		X															100			
	Sub-activity 2: Prepare briefing paper on technology selection and transfer approaches for Chinese stakeholders	ACCA21	70,000			X	X																
	Local Consultant		18,000			X														18,000			

Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe												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
	Contractual Service/ Companies		39,000				X													39,000			
	Travel cost		11,000				X													11,000			
	Miscellaneous Expenses		2,000				X													2,000			
	Subtotal 3.1.1		**97,100**																				
	Activity Result 3.1.2: Organize visit by Chinese stakeholders to Zambia to learn about Zambia's RET sector, policies, market and cultural barriers																						
	Sub-activity 1: Study tour for a Chinese delegation with 10 participants to study Zambia's energy sector	ACCA21	75,000			X	X																
	Local Consultant		35,000			X														35,000			
	Travel cost		40,000				X													40,000			
	Sub-activity 2: Joint Zambia / China stakeholder meeting to begin knowledge transfer and to strengthen mutual understanding of Zambian policy and market conditions	ACCA21	10,000			X	X	X	X														
	Local Consultant		10,000			X	X	X	X											5,000	5,000		
	Subtotal 3.1.2		**85,000**																				
	Activity Result 3.1.3: Share and disseminate knowledge on mission findings and project achievements																						

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe																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: Draft report and strategy identifying barriers and solutions to RET to Zambia	ACCA21	50,000					X	X														
		Local Consultant		48,000					X	X												48,000		
		Miscellaneous Expenses		2,000					X	X												2,000		
		Sub-Activity 2: Conduct training based on report with 50 people trained and 60 people reached with new information	ACCA21	70,000							X	X												
		Local Consultant		12,000							X											12,000		
		Contractual Service/ Companies		28,500								X										28,500		
		Travel cost		20,000								X										20,000		
		Communication/publication		8,500								X										8,500		
		Miscellaneous Expenses		1,000								X										1,000		
		Sub-Activity 3: Develop and maintain website to share project findings and results	ACCA21	50,000			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
		Local Consultant		50,000			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	35,000	5,000	5,000	5,000

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe																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 4: Establish and maintain Chinese expert community to support continuous learning on RET transfer between China and Zambia	ACCA21	75,000			X	X	X	X	X	X	X	X	X	X	X	X	X	X				
		Local Consultant		75,000			X	X	X	X	X	X	X	X	X	X	X	X	X	X	15,000	20,000	20,000	20,000
		Subtotal 3.1.3		**245,000**																				
		Total Output 3.1		**427,100**																				
	Output 3.2	**Activity Result 3.2.1: Establish vision and mission of the SSC Centre**																						
		Sub-activity 1: Set up steering committee	ACCA21	10,000	X	X																		
		Contractual Service/ Companies		4,500	X																4,500			
		Travel cost		5,000		X															5,000			
		Miscellaneous Expenses		500	X																500			
		Sub-activity 2: Develop the work plan of the Centre	ACCA21	30,000	X	X																		
		Local Consultant		18,000	X																18,000			
		Contractual Service/ Companies		5,000		X															5,000			
		Travel cost		5,000		X															5,000			
		Miscellaneous Expenses		2,000		X															2,000			

Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe																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 3: Convene 3 meetings with minimum of 50 stakeholders to develop long term funding and outreach strategy for the Centre	ACCA21	60,000			X	X	X	X													
		Local Consultant		30,000			X		X												15,000	15,000		
		Contractual Service/ Companies		21,000				X	X	X											7,000	14,000		
		Travel cost		9,000				X	X	X											3,000	6,000		
		Subtotal 3.2.1		**100,000**																			
		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																					
		Sub-activity 1: Identify stakeholders and kick off meeting	ACCA21	20,000	X	X																		
		Local Consultant		7,200	X																7,200			
		Contractual Service/ Companies		10,000		X															10,000			
		Travel cost		2,500		X															2,500			
		Miscellaneous Expenses		300		X															300			
		Sub-activity 2: Assess and revise criteria and standards for RET selection to unify existing practices,	ACCA21	40,000			X	X																
		Local Consultant		36,000			X														36,000			

Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe																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
		Contractual Service/ Companies		4,000				X													4,000			
		Sub-Activity 3: Revisit barriers to RET deployment and draft strategy for joint collaboration	ACCA21	30,000				X	X														
		Local Consultant		18,000				X													18,000		
		Contractual Service/ Companies		12,000					X												12,000		
		Subtotal 3.2.2		**90,000**																			
		Activity Result 3.2.3: Develop training materials on South – South Cooperation and Renewable Energy Technologies																					
		Sub-activity 1: Develop 4 training modules to SSC for RET in Chinese to be made available via the web and in printed form	ACCA21	50,000				X	X	X	X												
		Local Consultant		42,000				X	X												42,000		
		Communication/publication		7,500						X	X										7,500		
		Miscellaneous Expenses		500						X	X										500		
		Subtotal 3.2.3		**50,000**																			
		Activity Result 3.2.4: Conduct training of Chinese stakeholders South – South Cooperation and Renewable Energy Technologies																					

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe														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 6 trainings with 60 people trained in coordination with MOST on policy, market and cultural aspects of doing business in Africa	ACCA21	85,000			X			X	X				X		X							
		Contractual Service/ Companies		66,000			X			X	X				X		X				16,000	22,000	14,000	14,000
		Travel cost		18,000			X			X	X				X		X				4,000	6,000	4,000	4,000
		Miscellaneous Expenses		1,000			X			X	X				X		X				250	250	250	250
		Sub-activity 2: Distribute 300 of manuals at the trainings	ACCA21	34,000			X			X	X				X		X							
		Local Consultant		34,000			X			X	X				X		X				8,000	10,000	8,000	8,000
		Subtotal 3.2.4		**119,000**																				
		Activity Result 3.2.5: Support the Renewable Energy Technology platform																						
		Sub-Activity 1: Study tour for a delegation with minimum 10 participants from Zambia to China for training at solar, mini-hydro and biogas facilities.	ACCA21	80,000						X	X													
		Local Consultant		18,000						X												18000		
		Contractual Service/ Companies		25,000							X											25000		
		Travel cost		36,000							X											36000		

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe															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											1000		
		Subtotal 3.2.5		**80,000**																				
		Total Output 3.2		**439,000**																				
TOTAL OUTCOME 3				**866,100**																				
				71300	***Local Consultants***																204,200	193,000	33,000	33,000
				71600	***Travel***																70,500	68,000	4,000	4,000
				72100	***Contractual Services /Companies***																92,000	101,500	14,000	14,000
				74200	***Communication/publication***																8,500	16,000	0	0
				74500	***Miscellaneous Expenses***																5,150	4,750	250	250
Outcome 4: Project organization and coordination structures established																								
	Output 4.1	**Activity Result 4.1.1: Set up PMU in Zambia**																						
		Sub-Activity 1: Set up coordination mechanisms	DoE	0	X																			
		Sub-activity 2: Prepare detailed work plan for the project	DoE	0	X	X																		
		Subtotal 4.1.1		**0**																				
		Activity Result 4.1.2: Set up PMU in China																						
		Sub-activity 1: Set up coordination mechanism	ACCA21	5,000	X																			
		Miscellaneous Expenses		5,000	X																5,000			

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe																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 2: Support operation of SSC centre and prepare detailed work plan for the project outlining roles and responsibilities, budget and administration	ACCA21	45,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
		Local Consultant		7,200			X				X				X				X		1,800	1,800	1,800	1,800
		Equipment		5,000	X																5,000			
		Contractual Services/ Companies		32,000			X				X				X				X		8,000	8,000	8,000	8,000
		Miscellaneous Expenses		800			X				X				X				X		200	200	200	200
		Subtotal 4.1.2		**50,000**																				
		Activity Result 4.1.3: Set up Project Steering Committees																						
		Sub-activity 1: Prepare stakeholder list and identify PSC members	DoE	500	X																			
		Miscellaneous Expenses		500	X																500			
		Sub-activity 2: Establish PSC with required documentation and terms of reference	DoE	500	X																			
		Miscellaneous Expenses		500	X																500			

Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe																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 3: Hold PSC meetings to review project plans and reports in China and Zambia	DoE/ACCA21	28000	X				X				X				X							
	Contractual Service/ Companies		24000	X				X				X				X				6,000	6,000	6,000	6,000
	Miscellaneous Expenses		4000	X				X				X				X				1,000	1,000	1,000	1,000
	Subtotal 4.1.3		**29,000**																				
	Total Output 4.1		**79,000**																				
	Activity Result 4.2.1: Create project coordination and management structure																						
Output 4.2	**Sub-activity 1:** Kick off meeting between Zambia DoE, China MOST and the UNDP country offices to agree on coordination modalities for all project activities	DoE	15,000	X																			
	Travel cost		14,000	X																14,000			
	Miscellaneous Expenses		1,000	X																1,000			
	Sub-Activity 2: Sign MoUs guiding overall project implementation and separate agreements for specific project activities as required	DoE	500	X																			
	Miscellaneous Expenses		500	X																500			

Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe																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
	Subtotal 4.2.1		**15,500**																				
	Activity Result 4.2.2: Convene stakeholder group meetings																						
	Sub-Activity 1: Review and adjust stakeholder lists for Zambia and China	ACCA21/DoE	0		X	X																	
	Sub-Activity 2: Kick off and organize regular meetings for project stakeholders in Zambia and China	ACCA21/DoE	10,000	X				X				X				X							
	Contractual Service/ Companies		6,000	X				X				X				X				1,500	1,500	1,500	1,500
	Miscellaneous Expenses		4,000	X				X				X				X				1,000	1,000	1,000	1,000
	Subtotal 4.2.2		**10,000**																				
	Total Output 4.2		**25,500**																				
Output 4.3	**Activity Result 4.3 : Support project implementation**																						
	Human Resources	DoE	130,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
	Staff cost		130,000																	32,500	32,500	32,500	32,500
	Human Resources	ACCA 21	130,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
	Staff cost		130,000																	32,500	32,500	32,500	32,500
	Communication	PMU	20,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
	Communication		20,000																	3,000	4,000	6,000	7,000
	Monitoring & Evaluation	UNDP	40,000						X									X					

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Timeframe														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
		International consultant		40,000																		40,000		
		Travel cost	PMU	10,000					X				X				X							
		Travel		10,000																		4,000	3,000	3,000
		Equipment	DoE	10,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
		Equipment		10,000																	10,000			
		Miscellaneous	DoE	10,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
		Miscellaneous		10,000																	4,000	3,000	3,000	
		Subtotal 4.3		**350,000**																				
TOTAL OUTCOME 4				**454,500**																				
		71,200		40,000	***International Consultant***																0	40,000	0	0
		61100		267200	***Local Consultants***																66800	66800	66800	66800
		71600		24000	***Travel***																14000	4000	3000	3000
		72100		62000	***Contractual Services /Companies***																15500	15500	15500	15500
		72200		15000	***Equipment***																15000	0	0	0
		74200		20000	***Communication/publication***																3000	4000	6000	7000
		74500		26300	***Miscellaneous Expenses***																13700	5200	5200	2200
Total Direct Cost				**2,430,000**																				
General Management Services (8%)				**194,400**																				
GRAND TOTAL				**2,624,400**																				

12. PROJECT BUDGET

Award ID									
Project ID									
Business Unit	CHN 10								
Project Title	ZAMBIA-CHINA COOPERATION ON CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT								
Implementing Partners	ZAMBIA DEPARTMENT OF ENERGY 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*	3,000	19,200	12,000	0	34,200
			71600	*Travel*	0	15,250	0	0	15,250
			72100	*Contractual Services /Companies*	15,000	24,580	3,000	0	42,580
			74500	*Miscellaneous Expenses*	0	4,120	2,000	0	6,120
				Total Outcome 1	**18,000**	**63,150**	**17,000**	**0**	**98,150**
Outcome 2	30000	Danish Government	71300	*Local Consultants*	25,500	81,000	0	0	106,500
			71600	*Travel*	8,000	60,750	0	0	68,750
			72100	*Contractual Services /Companies*	5,000	815,000	3,000	3,000	826,000
			72200	*Equipment*	5000	0	0	0	5,000
			74500	*Miscellaneous Expenses*	1,000	4,000	0	0	5,000
				Total Outcome 2	**44,500**	**960,750**	**3,000**	**3,000**	**1,011,250**
Outcome 3	30000	Danish Government	71300	*Local Consultants*	204,200	193,000	33,000	33,000	463,200
			71600	*Travel*	70,500	68,000	4,000	4,000	146,500
			72100	*Contractual Services /Companies*	92,000	101,500	14,000	14,000	221,500
			74200	*Communication/publication*	8,500	16,000	0	0	24,500
			74500	*Miscellaneous Expenses*	5,150	4,750	250	250	10,400
				Total Outcome 3	**380,350**	**383,250**	**51,250**	**51,250**	**866,100**
Outcome 4	30000	Danish Government	71,200	*International Consultant*	0	40,000	0	0	40,000
			61100	*Local Consultants*	66800	66800	66800	66800	267,200
			71600	*Travel*	14000	4000	3000	3000	24,000
			72100	*Contractual Services /Companies*	15500	15500	15500	15500	62,000
			72200	*Equipment*	15000	0	0	0	15,000
			74200	*Communication/publication*	3000	4000	6000	7000	20,000
			74500	*Miscellaneous Expenses*	13700	5200	5200	2200	26,300

			Total Outcome 4	128,000	135,500	96,500	94,500	454,500
			PROJECT DIRECT TOTAL	570,850	1,542,650	167,750	148,750	2,430,000
			GMS (8%)	45,668	123,412	13,420	11,900	194,400
			GRAND TOTAL	616,518	1,666,062	181,170	160,650	2,624,400

LIST OF ABBREVIATIONS

ACCA21	Administrative Center for China's Agenda 21
APR	Annual Progress Reports
AWP	Annual Work Plan
CAS	Chinese Academy of Sciences
CDM	Clean Development Mechanism
CDT	China Datang Corporation
CEC	China Electricity Council
CEEEZ	Centre for Energy, Environment and Engineering
CHAZ	Churches Health Association of Zambia
DoE	Department of Energy, Zambia
ERB	Energy Regulation Board
FACE	Funding Authorization and Certificate of Expenditures
FAWEZA	Forum for Women Education in Zambia
FYP	Five Year Plan, China
GEF	Global Environment Fund
ICSHP	International Centre for Small Hydro Power
IP	Implementing Partner
IPS	Interconnected Power Systems
ISES	International Solar Energy Society
MMEWD	Ministry of Mines, Water, Energy Development
MOST	Ministry of Science and Technology, China
MoU	Memorandum of Understanding
NASHPEM	National Association for Medium and Small Hydropower Equipment Manufacturers
NDRC	National Development and Reform Commission, China
NEA	National Energy Administration
NEC	National Energy Commission, China
NEX	Nationally Executed (Project)
NGOCC	Non-Governmental Organization Coordinating Committee
NHRI	Nanjing Hydraulic Research Institute
NPC	National Project Coordinator
NPM	National Project Manager
NTBC	National Technology Business Centre
OPPPI	Office for Promoting Private Power Investment
PM	Project Manager
PMU	Project Management Unit
PSC(s)	Project Steering Committee(s)
PV	Photovoltaic
REA	Rural Electrification Authority
REF	Rural Electrification Fund
REFIT	Renewable Energy Feed In Tariff
REMP	Rural Electrification Master Plan, Zambia
RET	Renewable Energy Technology

RETS	Renewable Energy Technologies and Sources
RGCs	Rural Growth Centers
RMB	Renminbi, currency of China
SADC	Southern African Development Community
SASAC	State-Owned Assets Supervision and Administration Commission
SATH	Southern African Trade Hub
SBAA	Standard Basic Assistance Agreement
SCTEC	China Science and Technology Exchange Center
SEE4All	UN's Sustainable Energy for All initiative
SERC	State Electric Regulatory Commission
SNC	Second National Communications
SSC	South-South Cooperation
SSMP	Sustainable Solar Market Packages
TNA	Technology Needs Assessments
TS	Transmission System
TYWP	Two Year Work Plan
UNDP	United Nations Development Program
UNDP-CO	United Nations Development Program-Country Office
UNFCCC	United Nations Framework Convention on Climate Change
UNZA	University of Zambia
USAID	United States Agency for International Development
ZESCO	Zambia Electricity Supply Corporation Limited

lget Description

ties	Responsible Party	Proposed Budget (USD)	Description
environment for the transfer and use of priority renewable technologies in Zambia strengthened			
esult 1.1.1: Finalization of review of the implementation of policies and legislation for rural electrification using off-grid es.			
ty 1: Preparation of a per / baseline study on reforms	**Dept of Energy (DoE)**	3,000	
ltant		3,000	Consultancy for review of RET Policy/ legal reforms implementation 1consultant X 10 days X USD 300
Subtotal 1.1.1		**3,000**	
esult 1.1.2: Convene working group meetings to review policies to address gaps and develop and finalize policies for rural tion using off-grid technologies			
ty 1: Convene 3 meetings rticipants to reach on specific legislation, lation or grid code s that are priorities for rural electrification	DoE	15,000	
l Service/ Companies		15,000	Workshops (payment for venue and lunch for 25 persons for 3 workshops @ USD 100 per person per day each lasting for 2 days)
ty 2: Draft legislation, lation or grid code, as ased on consensus of rs with guidance from overnment	DoE	22,000	
ltant		12,000	Consultants for drafting legislation policy / regulation or grid code(2 consultants for 20 days at USD 300 each- 1 legal and 2nd Drafts man person)
l Service/ Companies		8,580	2 days residential workshop payment for venue, board and lodging for 25 people for two days at USD 130 per person.
us Expenses		1,420	
Subtotal 1.1.2		**37,000**	
esult 1.1.3: Build capacity of government officials and other stakeholders to implement policy reforms and programs identified in esult 1.1.2			

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		Sub-activity 1: Convene 3 workshops and training sessions or min. 40 participants to create awareness about key policies and reform processes for rural electrification	DoE	8,900	
		Local Consultant		4,200	Consultants- 1 from China and 1 local for 7 days each at USD 300 per day
		Contractual Service/ Companies		3,000	1 day workshop Hire of venue for 30 participants at USD 100 per person
		Local travel		1,000	USD 1000 is for transportation
		Miscellaneous Expenses		700	Information tool kit.
		Sub-activity 2: Convene series (3) of workshops and capacity building training sessions on implementation of key renewable energy policies	DoE	18,750	
		Contractual Service/ Companies		13,000	2 Residential workshops for 25 people for two days. At 130 US$ per day per person.
		Travel cost		3,750	Transport for 1 Chinese consultant (2000 air ticket and 300 per day for 5 consultancy fees) and DSA (1750) at days
		Miscellaneous Expenses		2,000	Information tool kit.
		Subtotal 1.1.3		**27,650**	
		Total Output 1.1		**67,650**	
		Activity Results 1.2.1: Review opportunities for additional financing for institutions such as the Development Bank of Zambia to fund its Renewable Energy Fund			
		Sub-Activity 1: Engage with financial institutions with support of project for developing proposal to support Renewable Energy Fund	DoE	0	Meetings organized by project manager
		Sub-Activity 2: If successful, funding structure design to be supported by project	DoE	3,000	
		Local Consultant		3,000	Consultancy for funding proposal development for 10 days a USD 300
		Subtotal 1.2.1		**3,000**	
		Activity Result 1.2.2: Develop options for renewable energy technologies equipment financing for rural electrification to support private sector, and/or government rural electrification initiatives.			
		Sub-Activity 1: Engage with World Bank, African Development Bank and other financial institutions to develop micro-finance structure to support	DoE	0	Meetings with World Bank

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		communities for rural electrification			
		Sub-Activity 2: Review options for micro-finance scheme designs to support rural electrification	DoE	10,500	
		Travel cost		10,500	Attachment of 3 Zambians to micro financing institutions in China for 5 days (payment for air tickets at USD 2000 X 3 , DSA at USD 250 X 5 days X 3 Persons and local travel
		Subtotal 1.2.2		**10,500**	
		Activity Result 1.2.3: Develop a value chain strategy for driving down cost of technology that can support private sector and government actors			
		Sub-activity 1: 1 comprehensive value chain strategy	DoE	12,000	
		Local Consultant		12,000	Consultancy for value chain study- 2 experts X 20 days X USD 300
		Sub-activity 2: 3 consultative value chain stakeholder discussions with min. 40 participants	DoE	5,000	
		Contractual Services/ Companies		3000	1 day workshop to review value chain strategy and sharing of experiences by team attached to Chinese institutions for 30 people at USD 100 per person
		Miscellaneous Expenses		2,000	Draft material production
		Subtotal 1.2.3		17,000	
		Total Output 1.2		**30,500**	
		TOTAL OUTCOME 1		**98,150**	
Outcome 2: Reduced barriers to the adoption of renewable technologies for the rural poor in Zambia					
		Activity Result 2.1.1: Creation of a demonstration, testing and training facilities for priority technologies			
	Output 2.1	**Sub-activity 1:** Develop the work plan and long term funding and outreach strategy for the facilities	UNZA	0	Work plan and Strategy for UNZA and KGRTC to be developed by the project manager in liaison with targeted institutions.

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		Sub-activity 2: Zambia training center directors to convene meeting of stakeholders to agree on responsibilities for facilitating community of practice	DoE	2,000	
		Contractual Service/ Companies		2,000	1 day workshop for 20 people at USD 100 per person
		Sub-Activity 3: Community of practice to operate under project for period of one year	PM/ UNZA	17,750	
		Contractual Service/ Companies		12,000	4 community of practice workshops for 30 people at USD 100 per person
		Travel cost		5,750	Attachment for 2 Zambian to China on community of practice exchanges - travel cost USD 2000 per ticket and 3 days DSA at USD 250 per day and Local travel.
		Sub-Activity 4: Center directors and senior staff to receive training in China.	ACCA21	15,000	
		Travel cost		15,000	4 people to travel from Zambia to China for 7 days at USD 2000 for per person for tickets and USD 250 for DSA per day for 7 days
		Subtotal 2.1.1		**34,750**	
		Activity Result 2.1.2: Facilities to receive, exhibit and demonstrate equipment and publish performance results via web			
		Sub-activity 1: Support facilities implementation through acquisition of testing and demonstration equipment.	ACCA21	35000	**Identification of institutions with the technologies requiring testing.**
		Local Consultant		21000	consultants for technologies testing and adjustment: 7experts*300$/day*10days=21000 $
		Equipment and furniture		5000	Equipment cost for technology testing: 5000$
		Travel cost		8000	2 people to travel from Zambia to China for 8 days at USD 2000 for per person for tickets and USD 250 for DSA per day for 8 days
		Miscellaneous Expenses		1000	Miscellaneous Cost: 1000$
		Subtotal 2.1.2		**35,000**	
		Total Output 2.1		**69,750**	
	Output 2.2	**Activity Result 2.2.1: Facilities to conduct periodic training on renewable energy technology and practice, and make its facilities available for third parties to conduct training.**			
		Sub-activity 1: Demonstration facilities to develop educational	KGRTC/UNZA	10,000	KGRTC will lead in Mini hydro, UNZA will lead in Solar

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		materials			
		Local Consultant		6,000	Consultancy to develop a total of 6 modules (3 for Solar and 3 for mini hydro) for a USD 300 per day for 20 days
		Contractual Service/ Companies		4,000	Dry run workshop to test the developed modules for delivering the materials for 20 people for 2 days at USD 100 per day for 2 days per participant
		Sub-activity 2: Demonstration facilities to commence 3 training modules for min. 30 participant, product evaluation and outreach program for a full-year sub program	PM/UNZA	17,000	
		Local Consultant		9,000	Resource persons (3 X 10 days X USD 300 Consultancies to provide First, second and 3rd waves of training to target TOT and others to follow later depending on resources
		Contractual Service/ Companies		8,000	Workshop for 20 people for 4 days at USD 100 per participant per day
		Subtotal 2.1.1		**27,000**	
		Activity Result 2.2.2: Support one renewable energy rural electrification project			
		Sub-activity 1: Form project selection committee	DoE	0	
		Sub-Activity 2: Agree on criteria for receiving, evaluating and selecting proposals	DoE	0	
		Sub-activity 3: Request, receive and evaluate proposals according to set criteria resulting in selection of project(s) and MOUs to be signed with project developers	DoE	4,500	
		Local Consultant		4,500	Procurement of Chinese experts for 15 days at USD 300 to undertake feasibility study, build the power plant including signing of MoU
		Sub-activity 4: Project to be implemented with supervision of project	DoE	900,000	
		Local Consultant		66,000	Feasibility study of 3 experts by USD 300 by 30 days=$27000; Consultants travel & DSA for 20 days at USD 250 by 3 Consultants=$15000; Consultant supervisor for 60 days at USD 300=$18000; EIA Consultancy for 20 days at USD 300=$6000
		Contractual Service/ Companies		800,000	Contracts for micro hydro power stations (4 contracts @ USD 200000 each)

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		Travel cost		30,000	1) Travel cost (tickets and DSA for experts from China at USD 2000 X 3 experts and DSA USD 250 X 16 Days) 2) Hiring of vehicle for 16 days for both Chinese experts and PMU
		Miscellaneous Expenses		4,000	Expenses for construction , hiring of labor and local materials
		Sub-Activity 5: valuation of project progress and results to be made in order to formulate lessons and future guidance.	REA	10,000	REA will evaluate the progress of the plant
		Travel		10,000	Travelling and monitoring costs for 5 visits to the project site at USD 2000 per trip (DSA and hiring of vehicle)
		Subtotal 2.2.2		**914,500**	
		Total Output 2.2		**941,500**	
		TOTAL OUTCOME 2		**1,011,250**	
Outcome 3: China has increased capacity to implement South-South Cooperation projects in relation to RET transfer					
	Output 3.1	**Activity Result 3.1.1: Map, update and share China's approaches to technology selection and transfer**			
		Sub-activity 1: Update the SSC on RET Manual for Zambia	ACCA21	27,100	
		Local Consultant		12,000	300$/day * 2experts *20days=12000$ for surveying in China and preparing a list of reliable technology providers and contact information in China
		Contractual Service/ Companies		6,500	Workshop with 10 experts and 5 government officials from key ministries, 300$*10*1day=3000$; 2000$/day venue and other cost +100$/day*15persons*1day=1500$
		Communication/publication		8,500	5500$ for publication; 3000$ for editing and translation into English
		Miscellaneous Expenses		100	Miscellaneous cost 100$
		Sub-activity 2: Prepare briefing paper on technology selection and transfer approaches for Chinese stakeholders	ACCA21	70,000	
		Local Consultant		18,000	Conduct in-depth analysis of China's experience on rural electrification and make recommendations for good practice for the Zambia context, 300$/day * 4 persons *15days = 18000 $
		Contractual Service/ Companies		39,000	2000$ venue/day *3days + 100$/day * 20 persons * 3days = 12000 $; Workshop with 50 participants to be hold in Beijing, 4000 $ venue /day * 1 day+300$ /day * 50 persons * 1 day = 19000 $; Seminars with 20 participants from key Ministries in China, 2000 venue/day *1 day + 300$/day * 20person *1day=8000$.

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		Travel cost		11,000	Cost of training persons travelling, 7 persons * 500 travel = 3500 $; cost of workshop persons travelling, 10 persons * 500 travel = 5000 $; Seminars with 20 participants from key Ministries in China, 5 persons * 500=2500$.
		Miscellaneous Expenses		2,000	Miscellaneous cost 2000$
		Subtotal 3.1.1		**97,100**	
		Activity Result 3.1.2: Organize visit by Chinese stakeholders to Zambia to learn about Zambia's RET sector, policies, market and cultural barriers			
		Sub-activity 1: Study tour for a Chinese delegation with 10 participants to study Zambia's energy sector	ACCA21	75,000	Minimum of 20 project stakeholders participates in visits exchange visits
		Local Consultant		35,000	250$/day*20persons*7days=35000$ Cost of consultants for 20 Chinese experts exchange visit
		Travel cost		40,000	2000$*20person=40000$, cost of 20 experts travel from China to Zambia
		Sub-activity 2: Joint Zambia / China stakeholder meeting to begin knowledge transfer and to strengthen mutual understanding of Zambian policy and market conditions	ACCA21	10,000	
		Local Consultant		10,000	Stakeholder meeting preparation: 300$*2person*15days=9000$, 250$*2person*2days=1000$
		Subtotal 3.1.2		**85,000**	
		Activity Result 3.1.3: Share and disseminate knowledge on mission findings and project achievements			
		Sub-Activity 1: Draft report and strategy identifying barriers and solutions to RET to Zambia	ACCA21	50,000	Reports on cost and financial analysis for RETT from China to Zambia; possible policy support strategy will be drafted
		Local Consultant		48,000	300$*8persons*20days=48000$ for preparing reports on cost and financial analysis, and drafting possible policy support strategy
		Miscellaneous Expenses		2,000	Miscellaneous cost 2000$
		Sub-Activity 2: Conduct training based on report with 50 people trained and 60 people reached with new information	ACCA21	70,000	1. Training for government officials (1 person for each province); 2. Training for industrial leaders and Key ministries in China; 3. National strategy to overcome the barriers to be published and translated into English.

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		Local Consultant		12,000	300$*4experts*10days=12000$ for experts preparing national strategy to overcome the barriers
		Contractual Service/ Companies		28,500	$2000venus rent/day*3days+30 people *100$*3days = 15000$ for training for government officials; $2000venus rent/day*3days+25 people *100$*3 days = 13500 $ for training for industrial leaders and Key ministries
		Travel cost		20,000	30people *500$travel=15000$ for cost of government officials from provinces to Beijing; 10people *500$treval=5000$ for cost of industrial leaders and Key ministries travelling to Beijing
		Communication/publication		8,500	Publication 5500$ and translation 3000$
		Miscellaneous Expenses		1,000	Miscellaneous Cost: 1000$
		Sub-Activity 3: Develop and maintain website to share project findings and results	ACCA21	50,000	Website and online system for RETT from China to Zambia/Ghana; Maintenance and data updating for 4 years
		Local Consultant		50,000	Websites design and development 30000$;data updating and maintenance of the websites 20000$(5000$ for each year)
		Sub-Activity 4: Establish and maintain Chinese expert community to support continuous learning on RET transfer between China and Zambia	ACCA21	75,000	A Chinese expert's community will be formed with 10 consultants to support the continuous learning; This expert's community also will support the PMU of both China and Zambia sides from technical perspective.
		Local Consultant		75,000	$15000 = $1500*10consultants for the first year to a Chinese experts community formed;$60000 = $2000*10 consultants for next 3 years to support PMU from technical perspective
		Subtotal 3.1.3		**245,000**	
		Total Output 3.1		**427,100**	
	Output 3.2	**Activity Result 3.2.1: Establish vision and mission of the SSC Centre**			
		Sub-activity 1: Set up steering committee	ACCA21	10,000	Prepare meeting with key Ministries and RET industry leaders; Meeting to set up the SC for SSC Centre
		Contractual Service/ Companies		4,500	$1000venus rent/day*1days+20 people *100$=3000$ for meeting with key Ministries and RET industry leaders; $1000venus rent/day* 0.5days+20 people *50$ = 1500 $ for meeting to set up the SC for SSC Centre
		Travel cost		5,000	5people *500$treval=2500$ for cost of key Ministries and RET industry leaders travelling to attend the meeting; 5people *500$treval=2500$ for cost of experts and key ministries travelling to set up the SC for SSC Centre
		Miscellaneous Expenses		500	Miscellaneous Cost: 500$
		Sub-activity 2: Develop the work plan of the Centre	ACCA21	30,000	Stakeholder meeting with government officials to review the work plan for SSC centre; 4 experts to develop the long-term SSC centre work plan

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		Local Consultant		18,000	300$*4experts*15days=18000$ for 4 experts to develop the long-term SSC centre work plan
		Contractual Service/ Companies		5,000	$2000venus rent/day*1days+30 people *100$=5000$ for stakeholder meeting with government officials to review the work plan for SSC centre
		Travel cost		5,000	10people *500$treval=5000$ for cost of experts travelling to attend meeting
		Miscellaneous Expenses		2,000	Miscellaneous Cost: 2000$
		Sub-Activity 3: Convene 3 meetings with minimum of 50 stakeholders to develop long term funding and outreach strategy for the Centre	ACCA21	60,000	Prepare the proposal for funding application; outreach strategy developed; meeting for government stakeholders consultation, meeting for industrial stakeholder consultation, and meeting for revising and approval of proposal and outreach strategy
		Local Consultant		30,000	2 *(300$*5experts*10days)=30000$ for preparing the proposal for funding application and outreach strategy developed
		Contractual Service/ Companies		21,000	3 meetings * ($1500venus rent/day*2days+20 people *100$*2days)=3 * 7000$=21000$; meeting for government stakeholders consultation, meeting for industrial stakeholder consultation, and meeting for revising and approval of proposal and outreach strategy
		Travel cost		9,000	3 *6people *500$treval= 9000$ for cost of experts to attend the 3 meetings above
		Subtotal 3.2.1		**100,000**	
		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			
		Sub-activity 1: Identify stakeholders and kick off meeting	ACCA21	20,000	Prepare meeting documents and identify the key stakeholders; Meeting to establish the RE alliance
		Local Consultant		7,200	300$*4experts*6days=7200$ to prepare meeting documents and identify the key stakeholders
		Contractual Service/ Companies		10,000	$4000venus rent/day*0.5days+80 people *100$ =10000$ for meeting to establish the RE alliance
		Travel cost		2,500	5people *500$treval=2500$ for cost of experts travelling to attend the meeting above
		Miscellaneous Expenses		300	Miscellaneous Cost: 300$
		Sub-activity 2: Assess and revise criteria and standards for RET selection to unify existing practices,	ACCA21	40,000	Criteria and standards developed to unify the existing practices for RET report; National strategy to overcome the barriers to be published and translated into English.
		Local Consultant		36,000	300$*4experts*30days=36000$ for developing the criteria and standards to unify the existing practices for RET and make a report, and draft national

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
					strategy to overcome the barrier, published and translated into English.
		Contractual Service/ Companies		4,000	$4000venus rent for the group meetings and interviews
		Sub-Activity 3: Revisit barriers to RET deployment and draft strategy for joint collaboration	ACCA21	30,000	Draft the strategy for joint collaboration; meeting to collect the feedback and comments from stakeholders; Seminar for joint collaboration strategy to be signed
		Local Consultant		18,000	300$*4experts*15days=18000$ for draft the strategy for joint collaboration
		Contractual Service/ Companies		12,000	$2000venus rent/day*1days + 30 people *100$*1days=5000$ for meeting to collect the feedback and comments from stakeholders;$4000venus rent/day*0.5days + 100 people *50$=7000$
		Subtotal 3.2.2		**90,000**	
		Activity Result 3.2.3: Develop training materials on South – South Cooperation and Renewable Energy Technologies			
		Sub-activity 1: Develop 4 training modules to SSC for RET in Chinese to be made available via the web and in printed form	ACCA21	50,000	Best practices case studies for each technology; business model for the RETT from China to Africa; Policy, culture and enabling environment development; Publications
		Local Consultant		42,000	300$*7experts*20days=42000$ for case studies for each technology, .business model for the RETT from China to Africa, and policy, culture and enabling environment development
		Communication/publication		7,500	Publication and editing 7500$;
		Miscellaneous Expenses		500	Miscellaneous Cost $ 500
		Subtotal 3.2.3		**50,000**	
		Activity Result 3.2.4: Conduct training of Chinese stakeholders South – South Cooperation and Renewable Energy Technologies			
		Sub-activity 1: Organize 6 trainings with 60 people trained in coordination with MOST on policy, market and cultural aspects of doing business in Africa	ACCA21	85,000	RET stakeholder training on South-South Cooperation; Entrepreneur training for doing business in Africa
		Contractual Service/ Companies		66,000	For 6 RET stakeholder training: $1000venus rent/day*2days+30 people *100$*2days=8000$*6trainnings =48000$; for 3 entrepreneur training on social responsibility and cultural aspects: 3* ($1000venus rent/day*2days+20 people *100$*2days)=3*6000$= 18000$;
		Travel cost		18,000	4persons *500$treval=2000$*6 trainings =12000$ for cost of 6 RET stakeholder training travelling; 3 *4persons *500$treval=6000$ for cost of 3 entrepreneur training travelling
		Miscellaneous Expenses		1,000	Miscellaneous Cost $1000

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		Sub-activity 2: Distribute 300 of manuals at the trainings	ACCA21	34,000	Prepare meeting documents and conduct meeting courses ;DSA for management staff
		Local Consultant		34,000	300$*5experts*20days=30000$ for prepare meeting documents and conduct meeting courses; 250$*16days=$4000 (DSA for management staff, 4 days for each year);
		Subtotal 3.2.4		**119,000**	
		Activity Result 3.2.5: Support the Renewable Energy Technology platform			
		Sub-Activity 1: Study tour for a delegation with minimum 10 participants from Zambia to China for training at solar, mini-hydro and biogas facilities.	ACCA21	80,000	2000$ venue/day *3days + 100$/day * 20 persons * 3days = 12000 $; Workshop with 50 participants to be hold in Beijing, 4000 $ venue /day * 1 day+300$ /day * 50 persons * 1 day = 19000 $; Seminars with 20 participants from key Ministries in China, 2000 venue/day *1 day + 300$/day * 20person *1day=8000$.
		Local Consultant		18,000	Experts for training: 300$ /day *10days *6persons$= 18000 $;
		Contractual Service/ Companies		25,000	workshops*3*6000$=18000$; 3500$*2 English interpreters=7000$
		Travel cost		36,000	International travel2000$ *10persons=20000$; DAS 250$*10persons*4days=10000$; local travel: 300$ * 10 persons * 2 = 6000 $;
		Miscellaneous Expenses		1,000	Miscellaneous cost: 1000$
		Subtotal 3.2.5		**80,000**	
		Total Output 3.2		**439,000**	
TOTAL OUTCOME 3				**866,100**	
Outcome 4: Project organization and coordination structures established					
	Output 4.1	**Activity Result 4.1.1: Set up PMU in Zambia**			
		Sub-Activity 1: Set up coordination mechanisms	DoE	0	
		Sub-activity 2: Prepare detailed work plan for the project	DoE	0	
		Subtotal 4.1.1		**0**	
		Activity Result 4.1.2: Set up PMU in China			

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		Sub-activity 1: Set up coordination mechanism	ACCA21	5,000	
		Miscellaneous Expenses		5,000	For organizing Steering Committees
		Sub-activity 2: Support operation of SSC centre and prepare detailed work plan for the project outlining roles and responsibilities, budget and administration	ACCA21	45,000	
		Local Consultant		7,200	2 consultants to prepare meeting material for each year: 300$ /day *3days *2persons$= 1800 $*4years=7200$;
		Equipment		5,000	5000$ to buy two computers and office furniture for SSC centre
		Contractual Services/ Companies		32,000	annual meeting of SSC stakeholders for four years:2000$ venue/day *2days + 100$/day * 20 persons * 2days = 8000$* 4years=32000$;
		Miscellaneous Expenses		800	Miscellaneous cost: 200$ for printing meeting materials and other cost *4years=800$
		Subtotal 4.1.2		**50,000**	
		Activity Result 4.1.3: Set up Project Steering Committees			
		Sub-activity 1: Prepare stakeholder list and identify PSC members	DoE	500	
		Miscellaneous Expenses		500	Contribution to the cost of communication
		Sub-activity 2: Establish PSC with required documentation and terms of reference	DoE	500	
		Miscellaneous Expenses		500	For organizing Steering Committees
		Sub-activity 3: Hold PSC meetings to review project plans and reports in China and Zambia	DoE/ACCA21	28000	
		Contractual Service/ Companies		24000	Combined PSC meeting and Stakeholders Consultations for 8 workshops for 1 day each for 30 people in Zambia
		Miscellaneous Expenses		4000	Miscellaneous costs: 4000$ (printing, materials and other costs)
		Subtotal 4.1.3		**29,000**	
		Total Output 4.1		**79,000**	

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
	Output 4.2	**Activity Result 4.2.1: Create project coordination and management structure**			
		Sub-activity 1: Kick off meeting between Zambia DoE, China MOST and the UNDP country offices to agree on coordination modalities for all project activities	DoE	15,000	
		Travel cost		14,000	1 Contact Global Steering Committee meeting 5 people tickets at USD 2000 each and DSA USD 250 for 4 days (4000 USD) followed by virtual GSC
		Miscellaneous Expenses		1,000	Miscellaneous Cost: 1000$
		Sub-Activity 2: Sign MoUs guiding overall project implementation and separate agreements for specific project activities as required	DoE	500	Signing of MoUs and launching of the project activities between DoE and implementation partners
		Miscellaneous Expenses		500	Signing of MoUs and launching of the project activities between DoE and implementation partners
		Subtotal 4.2.1		**15,500**	
		Activity Result 4.2.2: Convene stakeholder group meetings			
		Sub-Activity 1: Review and adjust stakeholder lists for Zambia and China	ACCA21/DoE	0	
		Sub-Activity 2: Kick off and organize regular meetings for project stakeholders in Zambia and China	ACCA21/DoE	10,000	16 project review meetings covering 4 years
		Contractual Service/ Companies		6,000	Inception workshop, Quarterly review meetings and PSC meetings (payment for the venue and lunches for the National PSC and Secretariat
		Miscellaneous Expenses		4,000	Miscellaneous Cost: 4000$
		Subtotal 4.2.2		**10,000**	
		Total Output 4.2		**25,500**	
	Output 4.3	**Activity Result 4.3 : Support project implementation**			
		Human Resources	DoE	130,000	
		Staff cost		130,000	Salaries for project personnel in Zambia

	Outputs	Sub Activities	Responsible Party	Proposed Budget (USD)	Description
		Human Resources	ACCA 21	130,000	
		Staff cost		130,000	Salaries for project personnel in China
		Communication	PMU	20,000	
		Communication		20,000	PMU communication costs for both countries * This needs discussion and agreement on sharing of amounts given that communication costs are higher in Zambia
		Monitoring & Evaluation	UNDP	40,000	
		International consultant		40,000	Cost of International consultant to conduct midterm evaluation: 1 international consultant supported by 1 national consultant in Zambia. 5 Days in Zambia and 5 days in China for the international consultant
		Travel cost	PMU	10,000	
		Travel		10,000	PMU project related travels in country
		Equipment	DoE	10,000	
		Equipment		10,000	office furnishing
		Miscellaneous	DoE	10,000	
		Miscellaneous		10,000	Miscellaneous Cost: 10000$
		Subtotal 4.3		**350,000**	
TOTAL OUTCOME 4				**454,500**	

ANNEX 2: Endorsement letters

Endorsement letter from UNDP Zambia

United Nations Development Programme

Zambia

9th May, 2014

Dear Mr. Bahuet,

Endorsement of the "China-Zambia South- South Cooperation on Renewable Energy Technology Transfer" Proposal

Reference is made to the above mentioned subject.

We have received the endorsement letter from the Ministry of Mines Energy & Water Development (MMEWD) for the above mentioned project. The copy of the letter is attached for your information. In this regard UNDP Zambia supports the endorsement of the project by the Government of Zambia and we confirm our commitment and support to the project which will contribute to strengthening Zambia-China South- South Cooperation in renewable energy technology transfer. Further, this project is seen as an initiative to support the implementation of the Sustainable Energy for All (SE4ALL). We also believe that the project is critical for the country in contributing to reduction of unequal energy access between rural and urban areas and poverty reduction.

May I take this opportunity to sincerely thank UNDP China for facilitating the development of the project document and we look forward to the continued collaboration and support during implementation of the project.

Yours sincerely,

Viola Morgan
Country Director

Mr. Christophe Bahuet
Country Director
UNDP China
Beijing

Cc Mr Charles Mulenga
Acting Permanent Secretary
Ministry of Mines Energy & Water Development
Lusaka

Enclosed: Letter of endorsement from Government of Zambia

UN House, 9350 Alick Nkhata Rd, P.O. Box 31966, Lusaka, Zambia Tel: (260-1) 250800 Fax: (260-1) 253805
www.undp.org.zm

Endorsement from Zambia

All communications should be addressed to the Permanent Secretary

Telephone: (260-1) 252011
Fax: (260-1) 252589

MMEWD/6/7/12
In reply please quote

No:.....

REPUBLIC OF ZAMBIA

MINISTRY OF MINES, ENERGY AND WATER DEVELOPMENT

P.O. Box 36079
LUSAKA
ZAMBIA

9th May 2014

The Country Representative
United Nations Development Programme
Alick Nkhata Road
LUSAKA

Dear Ms Morgan

SUPPORT FOR THE "CHINA-ZAMBIA SOUTH- SOUTH COOPERATION ON RENEWABLE ENERGY TECHNOLOGY TRANSFER PROPOSAL

Reference is made to the above mentioned subject.

We hereby confirm that the Ministry of Mines Energy and Water Development fully endorses and support the "China-Zambia South- South Cooperation on Renewable Energy Technology Transfer" proposal, its objective, outcomes and outputs. Therefore, the Ministry of Mines, Energy & Water Development through the Department of Energy will provide the needed implementation support for the aforementioned project, as outlined in the project document.

May I take this opportunity to express our gratitude for the support and collaboration that we continue to receive from UNDP.

Yours sincerely,

Charles L. Mulenga
Acting Permanent Secretary
MINISTRY OF MINES, ENERGY AND WATER DEVELOPMENT

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-ZAMBIA RENEWABLE ENERGY TECHNOLOGY TRANSFER COOPERATION

The UNDP CHINA-ZAMBIA 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-ZAMBIA South-South Cooperation Project timely addresses the challenges of Renewable Energy Technology Transfer from China to Zambia. 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 Zambia

Policy and regulatory barriers	**Project Activities to Address Barriers**
Small electricity producers have **difficulties connecting to the grid network**.	Activity Result 1.1.1: Conduct r**eview of implementation of policies and legislation** for rural electrification using off-grid technologies. Activity Result 1.1.2: Convene **working group meetings to review implementation of policies and legislation** to address gaps and develop and **revise policies and legislation** for rural electrification using off-grid technologies
Inadequate incentives for renewable energy development	Activity Result 1.1.1: Conduct **review of implementation of policies and legislation** for rural electrification using off-grid technologies. Activity Result 1.1.2: Convene **working group meetings to review implementation of policies and legislation** to address gaps and develop and **revise policies and legislation** for rural electrification using off-grid technologies Activity Result 1.2.3: Develop a **value chain strategy** for driving down cost of technology that can support private sector and government actors.
Lack of standardized Power Purchase Agreements deters potential investors in power generation.	Activity Result 1.1.1: Conduct **review of implementation of policies and legislation** for rural electrification using off-grid technologies. Activity Result 1.1.2: Convene **working group meetings to review implementation of policies and legislation** to address gaps and develop and **revise policies and legislation** for rural electrification using off-grid technologies
Lack of fair competition in the energy sector to attract Independent Power Producers in the energy sector.	Activity Result 1.1.1: Conduct **review of implementation of policies and legislation** for rural electrification using off-grid technologies. Activity Result 1.1.2: Convene **working group meetings to review implementation of policies and legislation** to address gaps and develop and **revise policies and legislation** for rural electrification using off-grid technologies Activity Result 1.2.3: Develop a **value chain strategy** for driving down cost of technology that can support private sector and government actors.
Incomplete implementation of Zambia's policy/legal and institutional framework to promote renewable energy production and diffusion	Activity Result 1.1.1: Conduct **review of implementation of policies and legislation** for rural electrification using off-grid technologies. Activity Result 1.1.2: Convene **working group meetings to review implementation of policies and legislation** to address gaps and develop and **revise policies and legislation** for rural electrification using off-grid technologies
Technical	
Limited technical capacity to design, install, operate,	Activity Result 2.1.1: **Creation of demonstration, testing and training facility** for priority technologies

manage and maintain renewable energy systems	Activity Result 2.2.1: Facilities to conduct **periodic training** on renewable energy technology and practice, and make its facilities available for third parties to conduct training
Limited or non-existent standards for energy performance, manufacture, installation and maintenance	Activity Result 1.1.2: Convene **working group meetings to review policies and legislation** to address gaps and develop and **revise policies and legislation** for rural electrification using off-grid technologies Activity Result 2.1.2: **Facilities to receive exhibit and demonstrate equipment and publish performance results** including via web.
Lack of local manufacturing and/or assembly of renewable energy technology components	Activity Result 2.2.1: Facilities to conduct **periodic training** on renewable energy technology and practice, and make its facilities available for third parties to conduct training. *The relocation of manufacturing clean energy technologies is not addressed by proposal. However, project activities serve as platform to explore future opportunities.*
Institutional	
Limited capacity to evaluate technical, financial and economic proposals as well as, market development, and marketing of renewable energy projects	Activity Result 1.1.3: **Build capacity of government officials and other stakeholders** to implement policy reforms and programs identified in Activity Result 1.1.2. Activity Result 1.2.3: Develop a **value chain strategy** for driving down cost of technology that can support private sector and government actors.
Spatial distribution of suppliers' limit access to renewable energy equipment	Activity Result 1.2.3: Develop a **value chain strategy** for driving down cost of technology that can support private sector and government actors.
Limited coordination among ministries	Activity Result 1.1.1: Conduct **review of the implementation of policies and legislation** for rural electrification using off-grid technologies. Activity Result 1.1.2: Convene **working group meetings** to review implementation of policies and legislation to address gaps and develop and revise legislation of rural electrification using off-grid technologies Activity Result 1.1.3: **Build capacity of government officials** and other stakeholders to implement policy reforms and programs identified in Activity Result 1.1.2.
Open access regime incomplete	Activity Result 1.1.1: Conduct **review of policies and legislation** for rural electrification using off-grid technologies. Activity Result 1.1.2: Convene **working group meetings** to review implementation of policies and legislation to address gaps and develop and **revise policies and legislation** for rural electrification using off-grid technologies
Financial	
The Rural Electrification is Fund ineffective	Activity Result 1.2.1: **Review opportunities for additional financing** for the Development Bank of Zambia to fund the Renewable Energy Fund Activity Result 1.2.2: **Develop options for the facility for financing** renewable energy technologies uptake under rural electrification support by the private sector and government

High capital cost of renewable energy products **Lack of economies of scale** due to dispersed market **Lack of bulk procurement** limited due to market size	Activity Result 1.2.3: Develop a **value chain strategy** for driving down cost of technology that can support private sector and government actors.
Information, awareness and human resources	
Limited availability and access to existing information on renewable energy resources and potential **Limited public awareness** of renewable technologies Availability of resources for mini-hydro is **site specific**, requiring detailed analysis of local conditions	Activity Result 2.2.1: **Creation of demonstration, testing and training facilities** for priority technologies Activity Result 2.2.1: Facilities to conduct **periodic training** on renewable energy technology and practice, and make its facilities available for third parties to conduct training. Activity Result 2.2.2: **Support one renewable energy rural electrification project**

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 3.1.1:** 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）
	Activity Result 3.2.3: Set up a Chinese stakeholders alliance for China – Ghana RETT (Ghana)
Inadequate incentives for transferring renewable energy technology to Africa	**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）
	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)*

Lack of assessment of Chinese RET in the Zambian/Ghanaian local condition	**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 3.1.2: 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 and disseminate knowledge on mission findings and project achievements(Ghana)*
Limited data availability of Zambian/Ghanaian local conditions	**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）
	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 and disseminate knowledge on mission findings and project achievements(Ghana)* *Activity Result 3.2.4: Conduct training of Chinese stakeholders in relation to RETT(Ghana)*
Limited availability of RET technicians in Zambia/Ghana	**Activity Result 3.2.5** Support the Renewable Energy Technology platform （Zambia）
	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)*
Limited availability of Chinese experts with good knowledge of Zambia/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 3.1.2: 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 and disseminate knowledge on mission findings and project achievements(Ghana)*
Institutional barrier	
Lack of an institute or mechanism to coordinate Chinese stakeholders involved in RET	**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）
	Activity Result 3.2.3: Set up a Chinese stakeholders alliance for China – Ghana RETT (Ghana)
Limited coordination among ministries The lack of a central coordination body in China	**Activity Result 3.2.1**: Establish vision and mission of the SSC Centre（Zambia）
	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)*

Financial	
No subsidies to encourage RET from China to Zambia/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）
	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)*
High capital cost to design, install, operate, manage and maintain renewable energy systems	**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）
	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)*
Information barriers	
Limited information on RE technologies and providers in China	**Activity Result 3.1.1:** Map, update and share China's approaches to technology selection and transfer （Zambia）
	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 (Ghana) *Activity Result 3.2.4: Conduct training of Chinese stakeholders in relation to RETT(Ghana)*
Limited information on Zambia or Ghana's RE issues, policies and culture.	**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）
	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 and disseminate knowledge on mission findings and project achievements(Ghana)*

Annex 4: Linkages to other programmes/projects

	Project	Brief Description	Area of Focus	Status	Supporting Institution	Synergy with China-Zambia RE project
1	Regional Roll out of the Renewable Assessment in the Southern African Development Community (SADC)	Renewable Readiness Assessment	Renewable Energy	On-going	International Renewable Energy Agency	Contribution to RE capacity development
2	Investment Incentives For Renewable Energy In Southern Africa covering Zambia, Mozambique and Tanzania	Assessment of RE incentives provided in Zambia	Renewable Energy	Completed	International Institute for Sustainable Development	Highlights on current incentives provided and gaps
3	Pilot gasification plant in Ndola-ZESCO	Electricity generation from gasification technology	Biomass electricity generation	On-going	ZESCO	Lesson and experience on gasification plant operation
4	Copperbelt Energy Corporation (CEC) Ndola demonstration project and the planned 1MW biomass gasification project.	Electricity generation from biomass gasification	Biomass electricity generation	On-going	Copperbelt Energy Corporation	Lessons on setting up RE demonstration site
5	Development of 30 MW solar PV (10 MW in Northwestern, 10 MW in Eastern, 10 MW in Luapula)	Solar farm electricity generation	Solar PV	On-going	Ministry of Mines, Energy and Water Development and Project Developers	Initial lessons on solar farm development and business model
6	Geothermal exploration by Kalahari	Electricity generation from geothermal	Geothermal	On-going	Kalahari and Ministry of Mines, Energy and Water Development	Geothermal resource potential
7	Currently REA is developing a 60 kW solar mini grid in Mpata to supply community of about 50 households	Mini grid PV	Solar PV	On-going	Rural Electrification Authority	Lessons on mini grid operations
8	Land zoning for biofuels started with	Land availability and	Biofuels	Completed	Brazilian Government	Status on land availability

	Project	Brief Description	Area of Focus	Status	Supporting Institution	Synergy with China-Zambia RE project
	support from government of Brazil	suitability assessments				and suitability for biofuels production
9	UNDP CDM scoping study	Assessment of CDM potential	Energy, Agriculture, LUCF and waste	Completed	UNDP-Lusaka	Contribution to CDM-mitigation project development
10	Second National Communication(SNC)	Preparation of national communication to UNFCCC	Mitigation analysis	Completed	GEF-UNDP	Contribution to CDM-mitigation project development
11	Climate Change Response Strategy	Support and facilitate coordinated response to climate change issues	Mitigation and low emission development related actions	Completed	UNDP-Climate Change Facilitation Unit-Norway	Contribution to CDM-mitigation project development
12	Technology Needs Assessments (TNA).	Identification of mitigation technologies	Energy, Agriculture, LUCF and waste	On-going	UNEP Risoe	Contribution to RE project identification

Annex 5: Preliminary List of Zambian and Chinese Stakeholders

The following organizations and individuals were identified by as possible stakeholders for inclusion in the policy engagement process:

Executive Branch:

Office of the President
Office of the Vice President
Ministry Mines, Energy and Water Development
Office for Promotion of Private Power Investments (MMEWD)
Rural Electrification Authority
Energy Regulation Board
National Technology and Business Centre
Zambia Environmental Management Agency
Ministry of Finance
National Institute for Scientific and Industrial Research
Zambia Development Agency
Ministry of Education, Science, Technology & Vocational Training
Ministry of Local Government & Housing

State-owned Industry

ZESCO

LEGISLATURE

Members of Parliaments
Parliamentary Committee on Energy & Environment

Local Government

House of Chiefs
Selected Tribal Chiefs
Ministry of Chiefs and & Traditional Affairs

Non-Governmental Organizations

Forum for Women Education in Zambia (FAWEZA)
Women for Change
Non-Governmental Organization Coordinating Committee (NGOCC)
Citizens for Better Environment
Churches Health Association of Zambia (CHAZ)

Academic Experts

Professor Francis Yamba, CEEEZ and University of Zambia
Professor Jorry Mwenechanya, Chairperson for REA
Mr. Robinson Mwansa, Vice Chairperson ERB
Professor Prem Jain, Professor for Physics - University of Zambia

Consumer Groups

Zambia Chamber of Commerce and Industry
Zambia Electricity Consumer Association

Private Sector

Charles Rea

Mr. Lawrence Smolders, Owner of Suntech Solar Ltd Company

LEGAL

Attorney General's Office
Ministry of Justice

Preliminary List of Chinese Stakeholders

Ministry of Science and Technology
China Science and Technology Exchange Center (SCTEC)
Administrative Center for China's Agenda 21 (ACCA21)

Mini-Hydro

Lead Unit and Cooperation Partners

Lead Unit

International Center on Small Hydropower (ICSHP)

Cooperation Partners

Association of SHP Industry

National Association for Medium and Small Hydropower Equipment Manufacturers (NASHPEM)

Research Institutions

International Center on Small Hydropower (ICSHP)

Nanjing Hydraulic Research Institute (NHRI)

HOHAI University

Zhejiang University of Water Resources and Electric Power

Enterprises of SHP Development and Industry

Hunan Chendian International Development Co., Ltd.

Gansu Heihe Hydro Power Development Co., Ltd.

Zhejiang Jinlun Electromechanic Co., Ltd.

HNAC Technology Co., Ltd. (HNAC)

NARI Group Corporation (NARI)

Hangzhou Guowang Technology Co., Ltd.

Solar

Lead Unit and Cooperation Partners

Lead Unit

HIMIN SOLAR CO., LTD.
皇明太阳能股份有限公司

Cooperation Partners

Association of Solar Energy
太阳能协会

International Solar Energy Society （ISES）
国际太阳能协会

Research Institutions

China-Europe joint venture energy saving building consulting company
中欧合资节能建筑咨询公司

Solar building planning and design research institute
太阳能建筑规划设计规划研究院

Chinese Academy of Sciences (CAS)
中国科学院

Fraunhofer Research Institute
德国 Fraunhofer 研究院

Tianjin University
天津大学

Shandong University
山东大学

Beijing University of Technology
北京工业大学

Enterprises of Solar Industry

China Datang Corporation (CDT)
中国大唐集团公司

Shang Dong Sacred Sun Power Sources co .ltd.
山东圣阳电源股份有限公司

Guanya Power Equipment co. ltd.
南京冠亚电源设备有限公司

JA Solar
晶澳太阳能

Sungrow Power Supply Co., Ltd.
阳光电源股份有限公司

Training

Himin training center and Himin College

State approved test center
国家认可委员会认可的实验室

Post-doctoral Scientific Research workstation
博士后科研工作站

Shandong Province solar thermo project engineering and technological research center
山东省太阳能热利用工程技术研究中心

Biogas

For training and consultation

环境无害化技术转移中心南方分中心
South Centre for Environmentally Sound Technology Transfer SCESTT

四川拓展清洁发展机制中心
Center for Clean Development Mechanism in Sichuan Province

四川省农村能源办公室
Sichuan Rural Energy Authority

For research and development

四川大学
Sichuan University

西南交通大学地球科学与环境工程学院
Faculty of Geosciences and Environmental Engineering

农业部沼气科学研究所
Biogas Institute of Ministry of Agriculture

Enterprises

四川五海环保生物工程有限公司
Sichuan Wuhai Environmental bio-engineering Limited company

成都泓奇实业股份有限公司
Chengdu Hongqi limited Company