MINISTRY OF FOREIGN AFFAIRS
OF DENMARK

PROJECT EVALUATION OF THE CHINA-GHANA AND CHINA-ZAMBIA SOUTH-SOUTH COOPERATION ON RENEWABLE ENERGY TECHNOLOGY TRANSFER PROJECTS

Projects funded by the Government of Denmark

EVALUATION REPORT

July 2019

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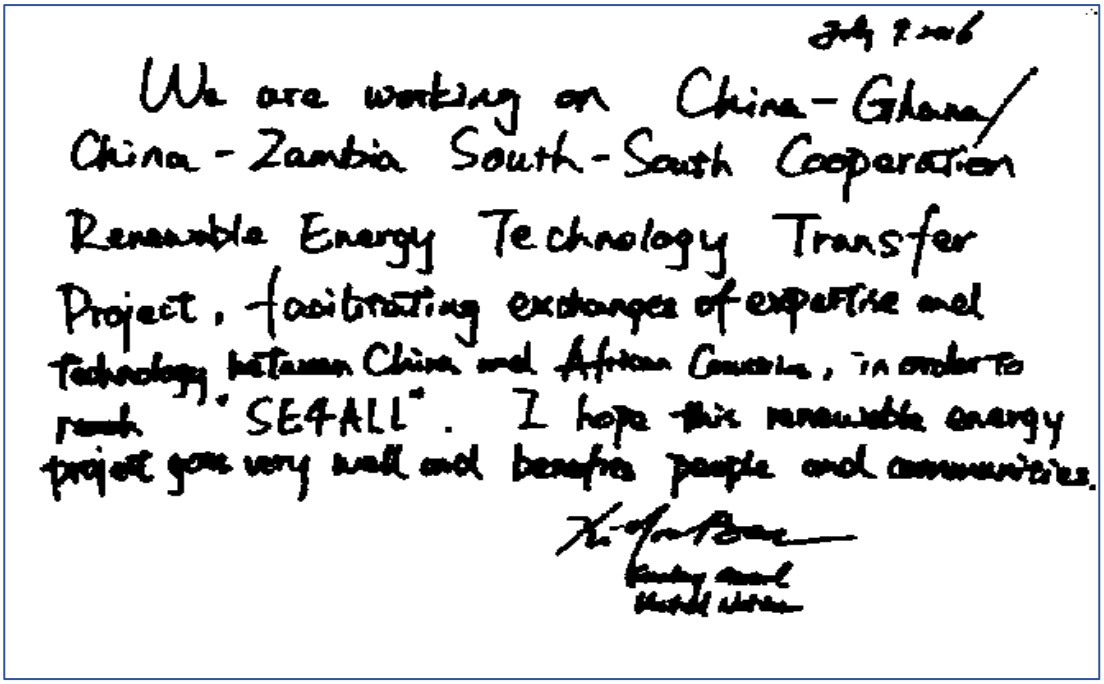

Ban Ki-moon,
Secretary General of the United Nations from 2007 to 2016

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Acronyms

ACCA21	Administrative Centre for China's Agenda 21
APR	Annual Progress Reports
AWP	Annual Work Plan
CSIR	Council for Scientific and Industrial Research
DAC	Development Assistance Committee
DANIDA	Danish International Development Agency
ICSHP	International Center on Small Hydro Power
IE	Independent Evaluator
IR	Inception Report
KGRTC	Kafue Gorge Regional Training Centre
M&E	Monitoring and Evaluation
MOFCOM	Ministry of Commerce
MOST	Ministry of Science and Technology
MOU	Memorandum of Understanding
NDC	National Determined Contributions
NISIR	National Institute for Scientific and Industrial Research
OECD	Organization for Economic Co-operations and Development
PMU	Project. Management Unit
PSC	Project Steering Committee
REA	Rural Electrification Authority
REMP	Renewable Energy Master Plan
RET	Renewable Energy Technology
RETT	Renewable Energy Technology Transfer
SADC	Southern African Development Community
SE4ALL	Sustainable Energy for All
SEC	Solar Energy Center
SSC	South-South Cooperation
TE	Terminal Evaluation
ToC	Theory of Change
ToR	Terms of Reference
UN	United Nations
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNEG	United Nations Evaluation Group
UNZA	University of Zambia
ZESCO	Zambia Electricity Supply Corporation

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Executive summary

The Renewable Energy Technology Transfer (RETT) projects are funded by the Government of Denmark and implemented by the Ministry of Science and Technology in China, the Energy Commission in Ghana and the Ministry of Energy in Zambia, with the support of the UNDP in China, Ghana and Zambia.

Before the RETT project, the government of Ghana had several policies and instruments in place to regulate the energy sector and promote renewable energy. However, significant challenges remained, which revolved around remaining gaps in the institutional and regulatory framework, the capacity of implementers to develop and run viable renewable energy businesses, inadequate functioning of technical and research institutions, and skepticism towards renewables due to cultural reasons or perceived business risks. In Zambia, to promote energy production and reduce barriers to RET, a National Energy Policy was developed in 2008. Additionally, steps were taken to strengthen regulations and institutional framework for RE. However, similarly to the case of Ghana, despite these efforts significant barriers remained. The main barriers concerned the ineffective regulatory framework, lack of technical capacity for RET and weak government capacity to evaluate technical and financial proposals, compounded by lack of administrative coordination and the sparseness of the RET market in Zambia.

The SSC on RETT projects were designed to promote renewable energy technology transfer and expertise exchange between China and Ghana, and China and Zambia, building on China's experience. These projects include strengthening policy framework and technical capacity in Ghana and Zambia; and creating supporting mechanisms to facilitate SSC between the participating governments, private sector and research institutions in order to create partnerships and sustainability for RETT.

The objective of the evaluation is to assess whether the projects have built capacity on RETT, created partnerships and strengthened SSC between China and Ghana and China and Zambia. In this sense, the evaluation assesses the performance and progress of the project outcomes with the purpose of identifying lessons learned and providing recommendations, in order to allow participating institutions, make informed strategic decisions for future trilateral and South-South Cooperation projects.

The RETT trilateral cooperation projects have been overall a success, despite the challenges and difficulties faced. The multi-stakeholder coordination mechanism~~,~~ overall managed by UNDP has set an example for South-South Cooperation that goes beyond funding infrastructure and capital transfers to include a more learning-based and country driven approach. China has not only strengthened its capacity to engage in this innovative way of SSC, it has proven its commitment to fostering knowledge and experience exchange between South-South countries through replicating the RETT projects – this time also as the donor - with Sri Lanka and Ethiopia. Furthermore, through the RETT projects, UNDP is leading the way in a new and innovative way of SSC for the private sector. Partnerships facilitated by the RETT projects between private sector in Ghana, Zambia and China are a crucial element of the more than likely sustainability of the projects' results.

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Delegations from all three partner countries have taken part in people-to-people exchanges in renewable energy technology that have brought to life best practices, challenges and possible ways forward. Training facilities have been set up in Ghana and Zambia, which will help fill critical human resources and knowledge gaps on RE in both countries and their respective regions. Moreover, the project has been instrumental in advancing the development of critical renewable energy infrastructure such as the Chipota Falls Mini-hydro in Zambia and the Tsatsadu mini-hydro in Ghana.

Notwithstanding notable success, the project has suffered from its overambitious goals and design flaws. Being a new and complex model of trilateral SSC project, it is not surprising that the project has run into delays and is now running behind schedule, and that most likely some outcomes will not be achieved before the end of the project. The project aimed to develop complex RE infrastructure in the space of 4 years, which is a short timeframe considering the sub-activities involved for each activity (which were not identified in the design phase, like site selection, design, etc.) and the limitations of the available budget. The over ambitiousness of the goals was compounded by lack of foresight and planning in the design stage, which has led to further budget limitations caused by exchange rate fluctuations that were not considered during the risk analysis, and by procurement processes that took longer than expected and were administratively burdening.

The Evaluation report recommends stakeholders to continue enagaging in trilateral South-South Cooperation projects with national implementation and continue to do so not only for national governments but also the private sector. SSC could have been more effective if strengths of Ghana and Zambia had been leveraged to promote knowledge and experience exchange with the relatively weak country (Ghana-Zambia or Zambia-Ghana, as the case may be) in each specific area.

The evaluation has learnt that challenges have arisen from a weak project design and a complex project management set up, and it should therefore be simplified, integrated and included risks as part of the results framework (both general risks and risks tied to specific activities) to ease their identification and management.

Finally, finananing has limited the participation of the private sector, the setting up demonstration sites, and project scale-up. It is therefore recommended that future projects assist stakeholders in identifying diversified sources of financing and that the project promotes PPPs to release the private sector from unbearable risks and costs.

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1. Introduction

In April 2019 the Independent Evaluator (IE), Ms. Cecilia Requena, was commissioned by UNDP China to carry out a Project Evaluation[1] of the China-Ghana and China-Zambia South-South Cooperation (SSC) on Renewable Energy Technology Transfer (RETT) projects. The IE is pleased to respond to this assignment with this Final Report and accompanying documents.

The evaluation is taking place at this time because all primary stakeholders (donor and implementing partners) have agreed that both projects will benefit from an Independent Evaluation before the completion of project implementation. The China-Ghana and China-Zambia South-South Cooperation (SSC) on Renewable Energy Technology Transfer (RETT) projects were expected to end in December 2018. However, a no-cost extension was approved by the Government of Denmark in April 2019 and the project will end on 31st December 2019.

The main purpose of the Terminal Evaluation is to identify lessons learned and produce recommendations for the future. Accordingly, the evaluation assesses the performance and progress of the expected results of the projects; the reasons for observed success/failure; and draws lessons learned with the dual purpose of accountability and learning, mainly the latter.

The Evaluation focuses on providing recommendations for the primary stakeholders of the project and, where relevant, for other stakeholders. The primary stakeholders of the projects are:

a) ACCA21, Ministry of Science and Technology (MOST), Energy Commission of Ghana and Ministry of Energy of Zambia (the project implementers)
b) UNDP China, Ghana and Zambia (project coordinators)
c) Danish Government (the project donor)

The draft Report for the Terminal Evaluation includes the following sections: 1) Introduction: this section outlines the projects being evaluated, why the evaluation is being carried out and who the audience of the evaluation is; 2) Description of the intervention: describes the projects that are being evaluated and their background, outlining key aspects such as key stakeholders, resources, project duration and geographical scope of the projects; 3) Evaluation scope and objectives: outlines the purpose of the aspects of the projects that are being assessed; 4) Evaluation approach and methods: presents the overall approach of the evaluation, the phases and sample selection method, and the expected deliverables throughout the evaluation; 5) Independent evaluator: 6) Findings: based on the data collected and analyzed, the progress in the achievement of the projects' outcomes are presented, as well as the identified factors that have affected implementation; 7) Conclusions; 8) Recommendations and lessons learned: linked to the key findings of the report, this section offers specific suggestions for future or similar projects. The report also includes annexes that include documents supporting the findings presented in the evaluation report.

[1] The PSC agreed on a Project Evaluation instead of a Terminal Evaluation in a GSC meeting on July 9, 2018.

2. Description of the intervention

2.1 Alignment with UNDAF priorities

Under the Sustainable Energy for All (SE4ALL) initiative, the SSC on RETT projects are aligned with UNDP China's objectives to: i) "*bring greater benefits to developing countries than what would be achieved by UNDP or China acting alone"* and *ii) "enable China and UNDP to learn more about each other's ways of providing development* cooperation". It builds on one of China's United Nations Development Assistance Framework (UNDAF) outcomes: "*China's development experience is effectively shared with other countries".*

Further, the project in Ghana is in line with 2012 - 2016 UNDAF's outcome 3: "*National systems and existing institutional arrangements for Climate Change mitigation and adaptation and for disaster risk reduction, as defined in the Hyogo Framework for Action at the district, regional and national level are functional*" under which UNDP Ghana is providing support in energy, climate change, disaster risk reduction and biodiversity. In the energy sector, one of UNDAF targets in outcome 3 that states that "*The share of modern forms of renewable energy (excluding large hydro) in the electricity generation mix is increased to 5% by 201*6", UNDP is supporting the government to increase the share of renewables in the energy mix and improve energy efficiency.

The China-Zambia SSC on RETT is aligned with the country's long-term aspiration of fostering sustainable development and reducing people's vulnerability from climate change and environmental degradation - pillars under the framework of Zambia's UNDAF 2011 – 2015 and the Sixth NDP vision for the Natural Resources Sector. Following the end of UNDAF 2011 – 2015, Zambia-UN Sustainable Development Partnership Framework 2016 – 2021 was signed between the government of Zambia and the UN. This partnership highlights the importance of 'Leaving No-one Behind' and reaching those in Zambia who are marginalized and vulnerable through poverty, discrimination, ignorance or prejudice. The UN's support to Zambia under the Sustainable Development Partnership Framework is designed around three inter-connected pillars: inclusive social development; inclusive and environmentally-sustainable economic development; and governance and participation.

2.2 South-South Cooperation on Renewable Energy Technology Transfer projects

The development objective of the *China-Ghana and China-Zambia South-South Cooperation (SSC) on Renewable Energy Technology Transfer* (RETT) projects is "*Enhanced capacity for South-South development cooperation between China and countries in Africa within renewable energy transfer has been developed and tested*" with the specific objectives of "*contributing to climate change mitigation and reducing poverty by increasing access to renewable energy solutions through enhanced investment and production of Renewable Energy Technologies (RET) in Ghana, within the framework of SSC between Ghana and China*"; and "*improving energy access and living conditions in rural Zambia through SSC*".

The RETT projects are funded by the Government of Denmark and implemented by the Ministry of Science and Technology in China, the Energy Commission in Ghana and the Ministry of Energy in Zambia, with the support of the UNDP in China, Ghana and Zambia. The two trilateral projects constitute a SSC programme that aims to promote the United Nations' (UN) SE4ALL initiative and is

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aligned with Denmark's focus on promoting cooperation between China and Africa and strengthening climate change cooperation.

The SSC on RETT projects promote renewable energy technology transfer and expertise exchange between China and Ghana, and China and Zambia, building on China's experience. They take a multi-pronged approach that includes demonstration of Renewable Energy Technology (RET), building an enabling environment, and reducing barriers for the transfer, adoption, and use of RETs, strengthening technical capacity and supporting mechanisms to facilitate SSC between the participating governments, private sector and research institutions in order to create alliances and sustainability for RETT.

Both projects are structured in a similar way, with four outcomes and several outputs associated to each one. The first two outcomes of each project are aimed at setting up an enabling framework to develop renewable energy technology in Ghana and Zambia. Outcome 3 looks into strengthening China's engagement in a systemized and country-driven South-South Cooperation. The revised results framework for both projects is presented in Annex I.

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

Before the RETT project, the government of Ghana had in place several policies and instruments to regulate the energy sector and promote renewable energy. The main legislative and policy instrument in place was the Renewable Energy Act 2011 - REA (Act 832), which provided a regulatory framework and fiscal incentives to encourage private sector investment in the energy sector. These incentives ranged from guaranteed prices for the sale of electricity generated from renewable sources to the establishment of a Renewable Energy Authority, incentives to renewable energy research and development, and financial incentives to encourage investment in renewables.

However, significant challenges remained. Upstream, the main challenges revolved around remaining gaps in the institutional and regulatory framework. For example, the Renewable Energy Authority had not been created, and public financing mechanisms for the Renewable Energy Fund had not been identified. At the downstream level, the main challenges were the capacity of implementers to develop and run viable renewable energy businesses, inadequate functioning of technical and research institutions, and skepticism towards renewables due to cultural reasons or perceived business risks.

Broadly, the project was expected to contribute to socio-economic and environmental objectives (poverty reduction through employment generation and climate change mitigation). The China-Ghana RETT project was designed to effect off-grid community-based electrification, increase the share of renewable energy and promote the productive uses of it. Specifically:

- In Ghana, the RETT project aims to create an enabling environment to absorb new technology. It also promotes the production of renewable energy technologies with a strong focus on private sector development and inclusion. The project is aligned with Ghana's national development goals and priorities for poverty reduction and provision of energy.
- In China, the project aims to create an enabling environment to provide new technologies appropriately. It supports the review and update of SSC policies and guidelines; and

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contributes to strengthening capacity building, enabling China to engage in SSC in a more systematic manner.

Budget	2,720,000 USD (1,764,000 USD for Ghana and 956,100 USD for China)
Implementing partner in China	The Administrative Centre for China's Agenda 21 (ACCA21) under the Ministry of Science and Technology (MOST)
Implementing partner in Ghana	Energy Commission of Ghana
Start date	December 2014
End date	December 2019 (initially Dec 2018)

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

In Zambia, a National Energy Policy was developed in 2008 to expand energy generation and reduce barriers to renewable energy technologies. Following the policy, several steps were taken to strengthen the regulatory and institutional framework for RE. However, at the time when the RETT project was designed, much like in the Ghana case, significant barriers remained. The main policy barriers concerned the incomplete implementation of the regulatory framework leading to issues like insufficient incentives for producers, poor regulation of competition, lack of standardized Purchase Agreements, etc. A second set of barriers had to do with lack of technical capacity for the manufacturing, installation, maintenance, and operation of RET components. Similarly, the Government lacked sufficient capacity to evaluate technical and financial proposals, which was compounded by a weak coordination amongst ministries. A final set of barriers revolved around the RET market in Zambia with high costs due to lack of economies of scale and high capital costs, which should have been partially addressed by the Rural Electrification Fund. The general lack of information and awareness of the general public regarding RET was also considered a barrier. However, it was most likely a result of the sparse RET market in the country.

The project aims to support access to electricity for rural communities in Zambia and strengthen Chinese capacity for SSC. Specifically,

- In Zambia, the project aims to strengthen the enabling environment for the transfer and use of selected RET and remove access barriers for the adoption of RET in rural areas.
- In China, the project aims to strengthen Chinese capacity in SSC on renewable energies through the creation of a South South Cooperation Centre within the Chinese Ministry of Science and Technology.

Budget	2,624,400 USD (1,593,300 USD for Zambia and 1,031,100 USD for China)
Implementing partner in China	The Administrative Centre for China's Agenda 21 (ACCA21) and Ministry of Science and Technology (MOST)
Implementing partner in Zambia	Ministry of Energy (MoE)
Start date	December 2014
Expected end date	December 2019 (initially Dec 2018)

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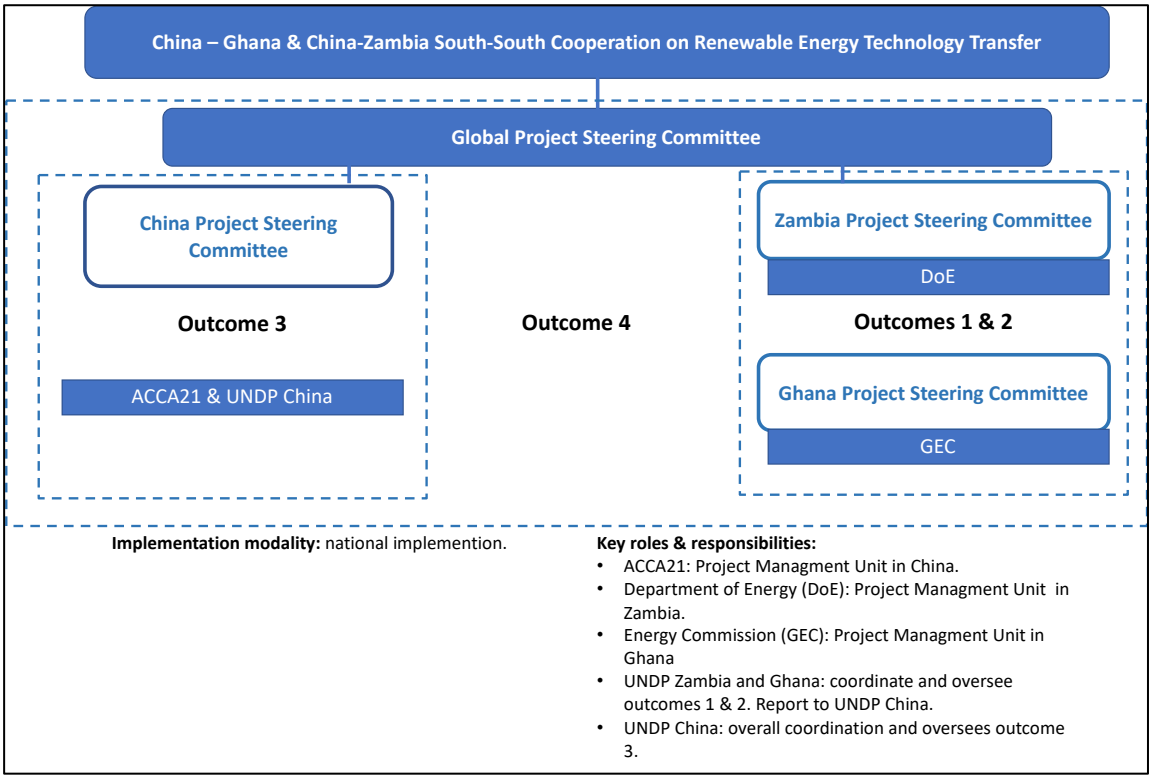
Figure 1: Implementation and management structures of RETT projects



3. Evaluation scope and objectives

3.1. Objective and purpose of the evaluation

The objective of the Evaluation is to assess whether the projects have built capacity on RETT, created effective and sustainable partnerships and strengthened SSC between China and Ghana and China and Zambia. Capacity building refers to a number of different aspects, such as: i) Ghana's ability to develop a renewable energy master plan, ii) Zambia's ability to oversee key planning processes for construction of mini-hydropower plants and reduce barriers to access RE in rural areas, iii) Ghana and Zambia's capacity to strengthen the enabling environment for RET, and iv) China's ability to engage in demand-driven South-South Cooperation. The capacity building assessment focuses on identifying key achievements and contributions of the project to improving the relevant knowledge and skills of key partner institutions and organizations engaged in RETT in Ghana, Zambia and China.

The evaluation's purpose is to identify lessons learned and provide recommendations and allow the respective participating institutions to make informed strategic decisions for future trilateral cooperation projects. In particular, the evaluation aims to:

1. Provide an independent assessment of:
    - The level of ownership of the project by partners and commitment from participating institutions.
    - The extent to which capacity development and technology transfer have taken place between the participating countries, institutions and organizations, considering the

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specific roles and context of each partner country. For China, particular attention has been paid to its ability to engage in demand-driven South-South Cooperation and to build the capacity of Ghana and Zambia in the adoption of RETs, including its ability to consider the local context when providing development assistance. For Ghana and Zambia, the evaluation has focused on their progress in creating an enabling environment for RETs.

- The effectiveness of the project's strategies and methods, including the structure for project implementation and its efficiency, considering the complexity and novelty of a trilateral project.
- The project's contribution to South-South and trilateral cooperation, as well as the value-added of setting up the project as a trilateral project vis-à-vis bilateral projects.
- The exchanges between the partner countries as a result of the project and the lessons learned from these exchanges.

2. Assess the Theory of Change (ToC) behind the projects' results frameworks and whether the underlying logic of the projects hold.
3. Make recommendations and identify lessons learned for the project implementers and donor, in order to support maximum delivery of results during the remainder of the project and improve the design and implementation of future projects of a similar nature.
4. Make recommendations and identify relevant lessons learned for any other stakeholders, as deemed helpful, including lessons learned on the type of development cooperation model employed in this project, its benefits and disadvantages.

South-South Cooperation is a key pillar of both projects and its assessment has been a core objective of this evaluation. Gender issues have been considered as cross-cutting themes of this project. Given the complexity of the RETT projects, the multi-country dimension, the reduced timeframe, and the available budget, prioritization has been key to carry out the assignment.

3.2. Scope of work

The Terminal Evaluation of the RETT projects has been conducted in the three countries in which the trilateral projects are being implemented: China, Ghana and Zambia.

Table 1: Summary characteristics of the Evaluation

Focus	• Assessment of progress against its results framework; • Exploration of underlying risks and assumptions; • Assessment of financial resources (where possible) • Identification of limitations and challenges; • Emphasis on recommendations for future similar initiatives.
Timeframe	From May 15th to July 1st, 2019 (26 days of work)
Values & Emphasis	• Independent external assessment; • Participatory and collaborative approach; • Exploring opportunities to strengthen the approach for similar projects in the future.
Budget	13,855 USD

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Deliverables	• Inception Report; • A Draft Evaluation Report • A Lessons learned and Recommendations report (as per the UNDP template, it will be included as sections of the Evaluation Report); • A Final Evaluation Report

3.3. Evaluation criteria and questions

As per the ToR, this evaluation follows the core components of the standard OECD/DAC Evaluation Criteria for Evaluation of Development Assistance, and it also aligns with United Nations Evaluation Group (UNEG) evaluation guidelines [2] to assess the Relevance, Effectiveness, Efficiency and Sustainability of the projects. At this stage and as indicated in the ToR, the criterion on impact, which is a core component of OECD/DAC criteria and UNEG guidelines, has not been specifically assessed, although any relevant findings have been included in the report.

Therefore, the evaluation has attempted to respond to the following questions under each of the OECD/ DAC criteria:

Table 2: OECD/DAC criteria questions for the evaluation

Relevance	• To what extent do the intended outcomes and relevant outputs address the central purpose of this project? To what extent are these aligned with RETT priorities of key stakeholders of the Governments of China, Zambia and Ghana? • Is there a need and demand for the kind of capacity building, knowledge sharing and exchange offered by this project in the participating countries? • To what extent have the research, knowledge products, tools, guidance and practices developed under this project proven to contribute to the results of the projects?
Effectiveness	• Is there a clear implementation logic and theory of change underpinning the project that informs outcome, output and activities under this project? • To what extent has or is the planned outcome being achieved? Are there any additional outcome(s) being achieved beyond the intended outcome? • How have corresponding results at the output level delivered by the project affected the outcome? What are the challenges to achieving the outcome? • Has a partnership strategy between the countries been effective in contributing to the outcome? • Is there evidence of South-South exchange and learning from each other through this project within each country (with research institutes for example) and between countries? And what, if any, potential exist for further development in this regard? • Is the current set of indicators for both outcome and output effective in informing the progress made towards the outcomes? If not, what indicators should be used? Are the progress reports evidence-based and do these track outcomes?

[2] file:///Users/ceciliarequenapallares/Downloads/UNEG%20Norms%20&%20Standards%20for%20Evaluation_English-2017.pdf

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	• Assess the knowledge management platforms and initiatives developed so far, and comment on their contribution to the project outcome.
Efficiency	• Were programme resources/funds efficiently applied? What internal factors (design, management, human and financial resources, field delivery capacity etc.) and what external factors are affecting the achievement of planned results? • Were the risks identified in the project design adequate and sufficient? Was there a risk management strategy in place? • What M&E system/strategy and quality assurance system have been put in place and how effective are these?
Sustainability	• How strong is the level of ownership of the results by the relevant government entities and other stakeholders? • What is the level of capacity and commitment from the Government and other stakeholders to ensure sustainability of the results achieved? Has a partnership strategy enabled integration and embedding of programme implementation in the government system? • Are the partnerships created under the projects likely to remain beyond the duration of the project? • Does the project have an exit strategy? What will happen at the end of the project with assets such as the demonstration sites and key structures established such as the South-South Centre? What could be done to strengthen sustainability?

4. Evaluation approach and methods

4.1. Evaluation approach and phases

The evaluation focuses on the assessment of the progress against its results framework; monitoring of implementation, revision of underlying risks and assumptions of the projects; and emphasizes recommendations and lessons learned.

The approach for the evaluation is a three-staged: (i) Inception phase, (ii) Data collection and analysis phase and (iii) Closeout phase.

4.1.1 Inception phase (approx. 8 days)

During this phase the IE delineated the boundaries of the assignment. The IE conducted a stakeholder analysis to identify stakeholders who could provide relevant information for the evaluation in the three countries. These included project focal points from each country, including the donor of the project – Denmark – Project Management Units (PMUs) in China, Ghana and Zambia, line ministries at the national level, private sector and research and training institutions, among others. The full list of stakeholders who have participated in the evaluation is provided in Annex II.

4.1.2 Data collection and analysis phase (approx. 14 days)

During this phase the IE gathered different types of data through different sources (see section *4.2 Data sources and collection*), processed and analyzed it. During this phase an assessment of the projects outcomes and the target indicators has been carried out. The project documents include

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national indicators. Targets were set in the project design phase, however many of the indicators did not have baselines. The indicators, baselines and targets have also been assessed in the evaluation with the purpose of strengthening the project design phase, project logic and theory of change for future projects in this domain.

4.1.3 Close out phase (4 days)

Results of analyzed data from the previous phase have been used to produce this draft Final Evaluation Report, which will, in its final version, include lessons learned and recommendations. The report provides supporting graphs, charts tables and it also identifies key challenges faced during the evaluation.

The specific activities in each phase, their duration and sequence are presented in the Gantt Chart in Annex III.

4.2. Data sources and collection

The data collection process comprised the following activities: i) Literature review, which entailed a context analysis of relevant project documentation from the three countries of intervention. This served as a source of secondary data (qualitative and quantitative) and ii) Field work, which entailed primary data collection through interviews (face-to-face or WeChat) in all the three project countries. There was an additional activity identified: a workshop on 25th and 26th June 2019 in Hangzhou hosted by the International Center on Small Hydro Power (ICSHP) on "Technical Guidelines for the Development of Small and Hydropower Plants". The Evaluation could have benefited from attending as it could have served as an additional source of data and information gathering. However, budget and time available did not allow the Evaluator to attend the workshop. As ICSHP is a key stakeholder of both projects, specifically for the capacity building components, the IE organized for an online interview (via WeChat) with the Deputy Division Chief of the Center.

4.2.1 **Desk review and research**:

Key documents and findings will be identified and validated through interviews with stakeholders. Sources of information gathered through this source may include:

- Policy and strategy documents;
- Reports: relevant reports for each country (including inception, quarterly and annual reports, risk and assumptions monitoring and evaluation, etc.);
- Communications material – including media interviews, videos, infographics, social media messages, etc.;
- Workshops, training and exchange visits reports;
- List of participants in the different activities organized by the projects in the 3 countries.
- Surveys and pieces of research developed in the framework of the project.

The full list of documents reviewed is provided in Annex IV.

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4.2.2 Online surveys and Face-to-face Phone/Online interviews:

The IE is based in Beijing and has carried out field visits to Ghana and Zambia. In the three countries, face-to-face interviews with identified key stakeholders were conducted (as advised by UNDP and implementing partners in the three countries and identified in relevant project documents).

Due to the limitation of resources and time, interviews for China, Ghana and Zambia were limited to a maximum of one week each, although online interviews were conducted when face-to-face interviews were not possible. Due to the complexity of the projects and the different outcomes implemented nationally, different sets of questions were prepared for the three countries and the different groups of stakeholders. The full list of questions for the interviews is presented in Annex V. However, the interviews were flexible and adapted according to the role, level of engagement, and time availability of each stakeholder.

The IE has also conducted an online survey (through the use of Survey Monkey) to share with project teams and all relevant stakeholders in the three project countries. Email and WeChat invitations were sent to all relevant stakeholders, as well as several reminders to encourage participation. In total, out of 65 invitations 30 responses were received for a 46% response rate. The questionnaire for the online survey shared with stakeholders is presented in Annex VI.

4.3. Sample selection approach

Respondents for the interviews and online survey have been sought in the three countries and constitute the project stakeholders. The purposive sampling approach has been employed. This implies that stakeholders that are involved in the project in the three countries and possess a potential for providing valuable information or data to the IE will be purposively selected as respondents for the interviews (face-to-face and online). The "critical stakeholders" list has been determined by the IE, in consultation with UNDP China, Ghana and Zambia who have provided support and coordinate on behalf of the IE.

4.4. Data analysis

As mentioned above, the evaluation involves desk research, field visits to the three countries -to carry out interviews with a pool of stakeholders, who were or are currently involved in the implementation in their respective countries, and site visits - and an online survey.

During the evaluation, two major types of data has been collected:

- *Qualitative data*: provides an understanding of the context in which the RETT projects operate in each country, the level of progress in each country as well as challenges and opportunities phased by the project.
- *Quantitative data:* provides information to support the identification of trends and enable cross-country comparison as well as triangulation of data and information gathered in interviews to ensure quality control.

Primary data (quantitative and qualitative) collected from the field and survey has been processed (cleaned to remove outliers and then keyed into statistical software). Secondary data (qualitative and

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quantitative) collected from literature has been triangulated with primary data. Where possible, both quantitative and qualitative data has been subjected to statistical analysis using MS Excel or other relevant statistical software. Analyzed data is presented in the report in a comprehensive manner – e.g. in the form of bar charts, pie charts, infographics and tables to enhance understanding of key findings and conclusions.

4.5. Limitations of the evaluation

The Evaluation has been marked by the budget and time available. Given the complexity of the projects, implementation set up, project budget and duration, the evaluation would have benefited from a longer period to be carried out. Nevertheless, the Evaluator is confident in the overall conclusions based on the evidence able to gather.

Overall, the Evaluator was able to gather views from all primary institutions engaged in the projects: donor, implementing partners and executing agencies. A key limitation has been the high rotation in project staff. This is typical in international organizations such as UNDP when project-based contracts are used, as when the end of the project approaches staff start to look for new opportunities. Despite this, the Evaluator was able to collect insights from previous participants in the project, either via email, telephone interview or online survey.

During the trips to Ghana and Zambia a number of interviews and field visits were carried out. However, key visits could not take place due to the limited time of the evaluator in the country and the long distance to sites. This was the case of the Tsatsadu project and the Chipota falls site where a mini-hydro will be constructed.

Deficiencies in the design of the results framework limited the assessment of the implementation. As explained in section *2.3 Limitations of the project design and implementation,* the results framework lacks a proper definition and alignment of indicator baselines and targets, which hinders assessment. PMUs have reported not being able to look into other cross-cutting issues such as gender balance in the project because indicators and targets were not included in the design of the projects.

5. Independent Evaluator

The evaluation has been carried out by an independent evaluator, who offers unique expertise to ensure a clear, robust, evidence-based and analytical assessment, that will not only be relevant for this particular project but will also serve as a reference for future similar interventions in the area of South South and Triangular Cooperation.

Independent Evaluator: Ms. Cecilia Requena.
Cecilia is a development economist who has focused her career in consultancy and management of international development projects in the fields of economic and social development. She has experience in Asia, the Middle East, Africa and Latin America. Cecilia has a solid academic background and extensive experience in research, analysis and policy advice in developing countries. Ms. Requena has experience in government capacity building and has worked in consultation processes with stakeholders across government, private sector and civil society. She has extensive experience carrying out economic analysis and has participated in the formulation of sector development plans

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(i.e. coffee, forestry, etc.). She has also acquired experience in survey design and analysis, including the review and optimization of questionnaires and methodologies, as well as survey data analysis. She has previously participated in revision of projects, assessing results frameworks, ToC and OECD /DAC criteria and is familiar with UN rules and procedures. Cecilia is a native Spanish speaker and is fluent in English and French.

Summary of the evaluator's expertise	Cecilia Requena
Development effectiveness principles and evaluation criteria	***
UN rules and procedures	**
Renewable Energy Technology policies	**
Social & economic conditions of project countries	**
Quantitative and qualitative research/ statistical analysis	***
Institution capacity building in developing countries	***
Experience in the design and analysis of surveys	***
Project Management	***
Organizational assessments	**
Languages	Spanish, English and French.

The Evaluator has received logistical support from UNDP in China and the PMUs in Ghana and Zambia. In exceptional cases supporting national staff from UNDP China has accompanied the Evaluator to interviews held in China for translating purposes.

6. Findings

6.1 Limitations of project design and implementation

The projects were designed as two separate projects and due to project management set up, treated as 4 projects (2 in China, 1 in Ghana and 1 in Zambia). China's role in both projects is very similar and the expected results for Ghana and Zambia are, to a large extent, the same.

The projects are two trilateral projects involving in each case as primary stakeholders two national governments and UNDP. This trilateral system, new to all parties involved, has allowed a relatively smooth implementation of projects - as it is explained in the assessment of Outcome 4's progress - that require a complex set up and strong coordination.

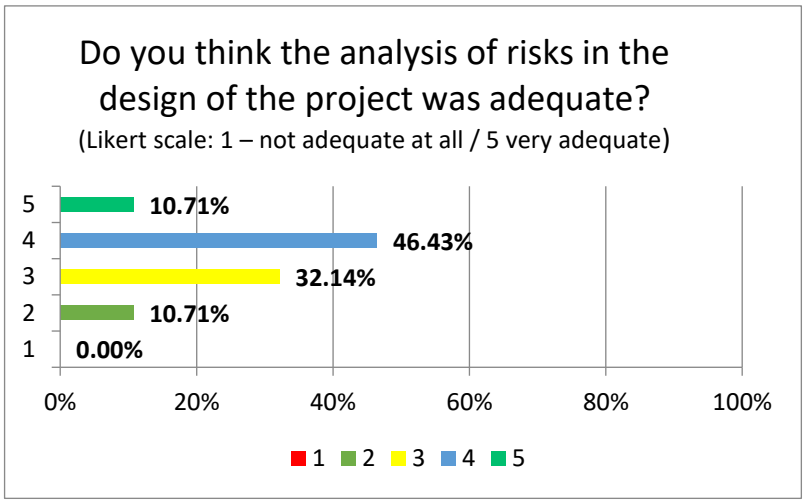
The design of the projects follows a logical sequence of activities, outputs and expected outcomes. Moreover, the RETT projects are rooted in Ghana, Zambia and China, responding to the three countries' priorities and creating national ownership of the expected outcomes. Local stakeholders were highly involved in the design of both projects, which ensured a demand-driven design process and a tailored response to the needs and priorities of each of the countries. Out of the 27 respondents who answered the survey question regarding participation of local stakeholders during the design phase, more than half of them assessed engagement of national institutions as "fully engaged" and over 85% of respondents valued positively their engagement. A clear example of the importance of engaging local stakeholders has been the Renewable Energy Master Plan for Ghana. This master plan was identified by the Ghanaian government as a key priority for the country in order to develop the

renewable energy sector and an area in which the RETT project could provide support. Therefore, government officials and decision-makers involved in the design of the RETT project advocated for the master plan to be a key outcome and have since led the policy process, supported by the project.

National ownership and a country-driven design of projects have definitely been crucial for the success of the project. However, implementation has been faced with some challenges, which can be grouped as follows:

- **Monitoring progress.** The assessment of progress has been hampered by the way the results frameworks were designed. Reporting and monitoring of progress have mostly been done against activities and not the defined indicators - although this has not been consistent across time and countries. This allows a yes/no reporting but does not allow for an evaluation of the degree to which a result was achieved. Indicators are usually defined with this purpose, with baselines and targets defined in order to determine progress and relative achievement. In this case, there were no baselines defined – although there was a baseline column where a very general qualitative assessment was done at the beginning of the project, it didn't always correspond to the defined indicator. In fact, baselines in the project design are assigned to outputs and not indicators. Furthermore, it is not clear in the results framework if the indicators are activity indicators or output indicators, some activities are missing indicators, not all indicators have been assigned targets and some targets do not correspond to the indicator they had been assigned to. These factors have hindered M&E of the RETT projects. An attempt to allocate the defined indicators to each activity has been made in Annex I - s

- **Risks.** Several risks were identified in the design phase of the project. Participating stakeholders (28 respondents answered this question in the online survey) have, on average, assessed the risks analysis carried out as part of project design as being slightly above average in adequacy (3.5 on average in a 5-point Likert scale). However, it is important to note that there is almost a 0.6 point difference between the assessment of those who were involved in the design of the project (3.85) and those who weren't (3.29). During the evaluation, several stakeholders pointed out a key risk that was not identified in the design phase and that has proven to be a key obstacle during implementation: currency exchange losses. The project involves 5 currencies: Danish krone (DKK), United States Dollar (USD), Chinese Renminbi (RMB), Ghanaian Cedi (GH₵) and Zambian Kwacha (ZMK), and although financial management of the project could have been complicated, the losses were generated in the first stage of fund transfers, from Denmark to UNDP Headquarters. As the projects were budgeted in



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USD, this risk was not foreseen in the design phase and therefore there was no risk mitigation strategy for it.

- **Procurement.** There have been significant delays in the project because of procurement processes. The project stipulated that UN procedures were to be followed in all procurement processes, which ensures transparency, fair competition and quality, but it has also meant that projects have taken more time than expected causing delays in implementation. For example, when the projects started hiring project staff for the PMU in Zambia took between 6 to 9 months; the procurement process to award the construction of the mini-hydro in Chipota Falls in Zambia took 1 year – and was later canceled (further details on this are provided below).

- **Project budget.** The budget has been affected by currency exchange losses mentioned above. However, even without accounting for these losses, the allocated budget to some activities was not realistic and this has had a significant impact on the project. This has mostly been the case of activities that involved construction: the mini-hydro project that is being constructed at Chipota Falls in Serenje, Zambia, was assigned a 800,000 USD budget. However, the project was tendered and the lowest bid received was over 1 million USD, which meant that additional funding had to be secured in order to construct the site. In fact, the awarded contract was later canceled because the company could not deliver within the approved budget and the procurement process had to start over again.

- **Bottlenecks.** The complexity and requirements of the projects required a heavy set up for project management. Despite the overall successful project management, a simplified management structure with have streamlined procedures allowing for an earlier identification of bottlenecks, could have helped minimize some challenges and/or delivered faster and more effective reactions and solutions to them.

6.2 Overall progress

Based on the review of project activities as set out in the projects' design, this evaluation can confirm that the RETT project has successfully carried out several of the planned activities, especially those related to knowledge transfer.

Some activities have taken place later than expected and are lagging behind. For instance, the Renewable Energy Strategy for Zambia started in 2017 and has not yet been finalized due to delays faced along the way. This is explained below in Zambia – China RETT, Outcome 1: the establishment of the South-South Cooperation Center within MOST and the Chipota mini-hydro project. However, this does not mean that outcomes and outputs have not been achieved.

As explained in section *6.1 Limitations of project design and implementation,* the annual reporting of both projects has been done against activities and not indicators and APRs have not included evidence of targets for indicators being achieved. Evidence for outcome or output achievement has consisted on yes/no verification of activities being implemented. In the sections below, we explore the overall evidence for the achievement of each outcome following the projects' results framework.

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

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

The Renewable Energy Master Plana (REMP) was drafted through a consultative process led by the Energy Commission, the Ministry of Energy and the Planning Commission in Ghana. It is the long-term vision of the country (30 years with revisions every 5) for renewable energy and provides guidance for investors and other stakeholders interested in developing the renewables sector in the country. It serves the government as a tool to identify its needs and priorities – through a list of projects that require support- and to make sure all the support that the country receives in the future is aligned with long term goals.

However, the REMP has not yet been approved by Parliament. It is expected that the Minister of Energy presents it to Cabinet in the third quarter of 2019 and to Parliament before the end of the year, which would institutionalize the Master Plan and ensure support and endorsement from current and future governments. A coordinating structure has already been designed and will be set up – likely at the Energy Commission - as soon as the REMP is approved by Parliament.

The private sector has been a key stakeholder in the development of the REMP. The government identifies the private sector as the engine to develop RE in the countries and promote technology transfer, therefore the REMP includes incentives for the private sector to encourage its participation. These incentives can play a key role in ensuring the continuation of the basis that the RETT project has created.

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

Stakeholders have expressed their satisfaction with the technologies selected, the assessment carried out and the inputs received from Chinese stakeholders. For example, the case of biogas is very relevant for Ghana and there is a lot of potential to develop the technology in the country. Ghana has no underground waste management system and people usually build their own. Therefore, biogas is very relevant and biogas RETT is much needed for Ghana, an underground waste management system could be developed with a built-in biogas facility.

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Generator for the Tsatsadu mini-hydro procured by the RETT project

However, outcome 2 has been the most challenging one to achieve in the Ghana – China project. The main reason has been delays in pilot projects. The delays have mostly been caused by the following factors:

- Procurement: The mini hydro managed by BUI Authority has moved forward but even this project has experienced delays. The delays were caused by an incompatibility between UNDP procurement procedures and the expectations of Chinese suppliers. Whereas UNDP procedures stipulate that payment is done upon delivery of equipment and the Chinese company delivering the generator (Henan Company Limited), as Chinese companies generally do, expected an upfront payment.

  Similar delays due to procurement were experienced when CREK and CSIR-IIR conducted pre-feasibility studies to identify sites and technology suitable for Ghana. Based on the outcomes of the report, Sichuan CDM Center collaborated with the project to identify potential partners who could develop these technologies and transfer to Ghana. UNDP Ghana then opened a tender process for Chinese firms to express interest. However, and due to the communication challenges that procuring in Ghana for Chinese firms presented, the process was not successful. In particular, the Chinese company selected to provide technology for cookstoves requested to change several clauses in the UNDP contract – changes caused by the lengthy process from submitting the proposal to contract signing - which prevented the signature of the final contract. The process will have to be restarted and this time it will be led by UNDP China to avoid communication problems.

- Conscious efforts to find committed partners who could lead these projects beyond the RETT project in order to ensure sustainability have taken longer than expected. The case of Tobinco Asida Energy is a good example of this. Tobinco was invited by the Energy Commission to participate in the project – solar pilot project – and eventually, jointly with another Ghanaian company (Reroy), signed a Joint Venture (JV) with a Chinese partner (Shanghai Evergreen New Energy Science & Technology based in Shanghai). The site for the solar project has been selected and they expected to finalize construction by the end of 2019. Tobinco highlighted that the Energy Commission and UNDP Ghana have been very supportive during the process in which they provided technical support in setting up the JV and accompanied to meetings with Chinese partner in a visit to China.

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Photos from the evaluator's visit to Tobinco. Selected site where solar project will be constructed.

- High risk: the private sector in Ghana has seen successful projects in China but not in Africa. Several businesses have shared their concerns regarding the profitability of the projects in the Ghanaian and African context. This coupled with the high cost of financing in Ghana has prevented a larger participation of the private sector in pilot projects and is causing that activities under this outcome lag behind. The success of the Tsatsadu mini-hydro project could be key to encourage other players to engage in pilot projects.

There has been no scaling-up of pilots during the project. Delays in pilot projects have negatively affected the prospects of scaling up, and a mismatch in expectations also hindered this possibility. There have been initial contacts established between Chinese and Ghanaian companies, but these have not materialized yet mainly because (i) the Chinese side was looking for a bigger market than Ghana and (ii) the cost of financing for the private sector in Ghana is unbearable (loan interest rates can reach 30%).

Outcomes 3 and 4 are assessed jointly for both projects in section 6.1.3 below.

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

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

Building an enabling environment is a lengthy process. The RETT project has made significant progress in strengthening the enabling environment for RET in Zambia. First of all, it has raised awareness on the importance of increasing the use of RET within the government and has identified key existing barriers. The project developed a report assessing existing policy and framework as well as the barriers hindering adoption and use of RET in Zambia. The Ministry of Energy reviewed this report, conducted a validation workshop and facilitated a training workshop on the RETT project objectives and the way forward to implement policy reforms identified in the assessment to develop RET. The training was delivered by the project for government officials and members of Parliament in December 2017. This assessment has also been used as a reference by other related projects, such as the EU project to increase access to electricity and renewable energy production and the WB Energy access program.

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One of the key recommendations of the assessment was to develop a Renewable Energy Strategy – or pick up on the strategy that was started and never finished in 2010. This process has faced several difficulties and has not yet been finalized. The purpose of the strategy is to provide guidance to the RE sector. A consultant to develop the strategy was engaged by the project, but he terminated his contract and only got as far as the inception report of his mission. The project then faced important difficulties to deliver because of the lack of remaining time and budget to complete this activity.

The project looked for an efficient way of ensuring that the Strategy was developed and partnered with the EU to finalize it. It was agreed by both projects that donors will co-finance the consultancy – EU will fund an international consultant and RETT will fund a national consultant - to finalize the drafting and necessary consultations to develop the RE Strategy. Although it is unlikely that the strategy will be accomplished before the project finalizes, this agreement ensures a longer period of support for it to be completed.

The second component of this outcome was initiated in 2016 when Zambia's PMU engaged with several microfinance institutions to explore financing options for RET. Preliminary meetings with microfinance institutions and the Development Bank of Zambia were held in 2016 and 2017 but these did not materialize in any result.

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

This outcome represents almost half of the total project budget (42%) and although it has presented some challenges, key milestones have been completed and the foundation for its full achievement has been established.

Barriers to adopting RET have been reduced mainly through strengthening capacity for RET. Key research and training centers have participated in missions to China and received trainings on RETs. On solar, the Solar Energy Center has received several trainings both in China and Zambia and signed an MoU with a Chinese company (Poly Solar) to promote knowledge exchange. The SEC was created within the University of Zambia (UNZA) School of Engineering. The center is co-financed between the RETT project and UNZA SEC, and has 6 core functions: (I) education, (ii) research and development, (iii) training, (iv) testing, (v) social awareness, and (vi) consultancy and advisory services.

Photo taken during the evaluator's visit to the Solar Energy Center (SEC)

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The RETT project has facilitated the prefabricated construction for the training and demonstration center (Output 2.1). The project initially indicated that the solar energy systems would be donated by Chinese stakeholders, but the PMU in Zambia assisted the SEC in looking for alternatives and it was finally the Ministry of Energy of Zambia who donated the equipment for the center. The SEC has two constructed modules, one for training sessions and another for demonstration and testing of selected solar technologies.

Before the RETT project, Zambia had to hire international consultants to carry out feasibility studies. This capacity has now been built in Zambia through the RETT project. For output 2.2 Kafue Gorges Regional Training Center (KGRTC) has been the main counterpart of knowledge transfer from China to Zambia. KGRTC is a center of excellence that was set up to build capacity on efficient energy, mainly hydro, for Southern African Development Community (SADC) countries[3]. KGRTC was engaged in the RETT project since the inception phase and was the chosen partner to ensure building capacity in mini-hydro in Zambia. KGRTC signed an MoU with ICSPH and have attended trainings in China and received Chinese experts in Zambia who have facilitated capacity building on mini-hydro, specifically on feasibility studies: site identification and selection, design and construction of mini-hydro and efficient management once constructed. ZESCO, REA and staff from the Ministry of Energy also participated in these on-the-ground trainings on mini-hydro. Kafue now run courses on mini-hydro, which they didn't before their engagement in the RETT project. They are contributing to building the capacity of personnel of mini-hydro plants around Zambia and also the SADC region – during the evaluator's visit a student from Tanzania was attending courses and KGRTC staff informed that it was not unusual to see international students attend their trainings.

The construction of the mini-hydro is lagging behind. It was first procured in 2017 a process took 1 year and awarded to a Chinese company (HNAC) for 1.4 million USD, the lowest bid received, but the contract was later canceled because the contractor expressed its inability to deliver within the agreed budget. This demonstrated that the budget of the project was not accurately contrasted against market prices at the time and this activity was underbudgeted at the time of the design. In fact, the contract with the Chinese company was canceled because of the company's inability to deliver within the agreed budget.

In 2016, after an assessment of public and private relevant stakeholders in Zambia, it was decided and approved by the PSC that Kafue – the only center that offered training on hydropower by then, although not yet mini-hydro - would lead and take ownership of the rural electrification project (mini-hydro)[4] and once the project was finished the center would take over the management of the mini-hydro, ensuring its sustainability. ICSHP has supported KGRTC, transferring knowledge and skills as explained above. Therefore, the site has been selected and KGRTC will now identify a constructor and supplier of equipment. The RETT project has provided software for the design of the mini-hydro.

[3] Zambia, Tanzania, Swaziland, Malawi and Uganda.

[4] Kafue will take on effective ownership of the project once PwC finalizes a Harmonization Cash Transfer Assessment and then the funds for construction will be transferred by UNDP.

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Budget challenges have had a significant impact on the delivery of output 2.2. A large sum of the initially budgeted USD 800.000 was spent in the first awarded contract, and only USD 500.000 remained. The project team has reacted to this challenge and has looked for alternative sources to co-finance the mini-hydro, which has caused delays but has also proved the ownership and commitment of the Department of Energy and KGRTC - proposals to the African Development Bank (AfDB) and European Union (EU) have been submitted. Another challenge related to the budget for this output is that the project did not account for the phases before the construction and there was no budget allocated for feasibility studies.

Evaluator's visit to KGRTC. Staff from Kafue, Department of Energy and UNDP RETT.

The mini-hydro will be constructed in a rural off-the grid area. Schools, health centers, small groups of farming cooperatives and SMEs will benefit from the mini-hydro. The mini-hydro will reduce barriers towards self-employment and will create income generation opportunities. Access to renewable energy will reduce their utilities costs, allow the operation of business equipment like refrigerators and machines and will grant them access to TV, light at night expected to improve the performance of students, etc. For instance, currently they use kerosene or firewood to cook and for heating which have a higher cost than green energy.

A market survey was carried out during the site selection phase and results showed that the community welcomes the construction of the mini-hydro and believes that it will improve livelihoods for the rural population in Serenje. Broad consultations were held before the site was selected, which created great acceptance of the project. In fact, the Chief of the area and other members of the community have approached KGRTC and Department of Energy asking about the delays of the mini-hydro.

KGRTC is expected to identify a constructor and move to site by 2020 and then the construction is estimated to take 18 months. Despite the delays in the implementation of this output, the project has strongly reacted and looked for sustainable alternatives that ensure the results are achieved even if it is after the end of the project.

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

Outcome 3 (China - Ghana): China's has strengthened capacity for South-South Cooperation in relation to RET transfer

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Knowledge transfer and experience exchange is one of the most valued outcomes of the project by stakeholders. Knowledge transfer has taken place in the form of traditional capacity building sessions, but mostly by providing on the ground technical support. A case in point was when ICSHP, based in Hangzhou, provided support to BUI Power Authority in Ghana to redesign the mini -hydro project and visited the site in November 2017 to provide further technical support. A similar case is the knowledge transfer from ICSHP to Kafue Gorges, ZESCO, REA and the Department of Energy in mini-hydro, delivering on the ground trainings for site selection, efficient plant management practices and providing technical inputs to several studies and reports.

ACCA21, Energy Commission in Ghana and the Ministry of Energy in Zambia have proven to be key in knowledge exchange activities and they have facilitated the process for all parties involved. Stakeholders in Ghana and Zambia have valued very positively UNDP's role in facilitating knowledge exchange between China and Ghana and China and Zambia, particularly in communicating the country's needs to China to maximize SSC.

ACCA21 organized several matchmaking events between Ghanaian, Zambian and Chinese private sector, which allowed firms in both African countries to be exposed to Chinese expertise, visit manufacturers and, in general, establish contact for the first time with Chinese RE companies.

The overall level of satisfaction of African stakeholders was high, they assessed these visits to China as a positive learning experience. In these visits, government delegations from Ghana and Zambia also joined and meetings at the government level took place (training sessions, management meetings), maximizing the available travel budget given the financial challenges faced during the project. For instance, the Energy Commission attended a training organized in the University of Science and Technology by MOST/ ACCA21. Officials from the Energy Commission expressed their satisfaction with this training. In particular, they highly valued the relevance of the topics covered, the representatives that delivered the training, and the consideration of the Ghanaian context in the training.

Contacts established in the match-making events have mostly been maintained since then. Some companies have visited China again on their own account and although no commercial relations have yet been formalized, the project has opened the opportunity. During this evaluation, several participants expressed that Chinese partners identified for the matchmaking events were not always suitable and, in some cases, their manufacturing was tailored to China (ex: cookstoves manufacturer in China was not suitable for Ghanaian market because of the shape). However, these were specific cases, and in general Chinese manufacturers were willing to adjust their products for the Ghanaian or Zambian market.

ACCA21 put together in 2017 and published in 2018, a catalogue of Chinese potential partners which could respond to Ghanaian and Zambian demands for RETT. Ghanaian and Zambian stakeholders value very positively this document although no commercial relations have been officially established under the project. The project has created strong relations between the Chinese and Ghanaian and the Chinese and Zambian governments, and it has built a bridge to develop a strong relation between the private sector in these countries. The ongoing Ghana - China solar PV manufacturing project evidences that, although partnerships have only reached the stage of MoUs, there is great potential to develop

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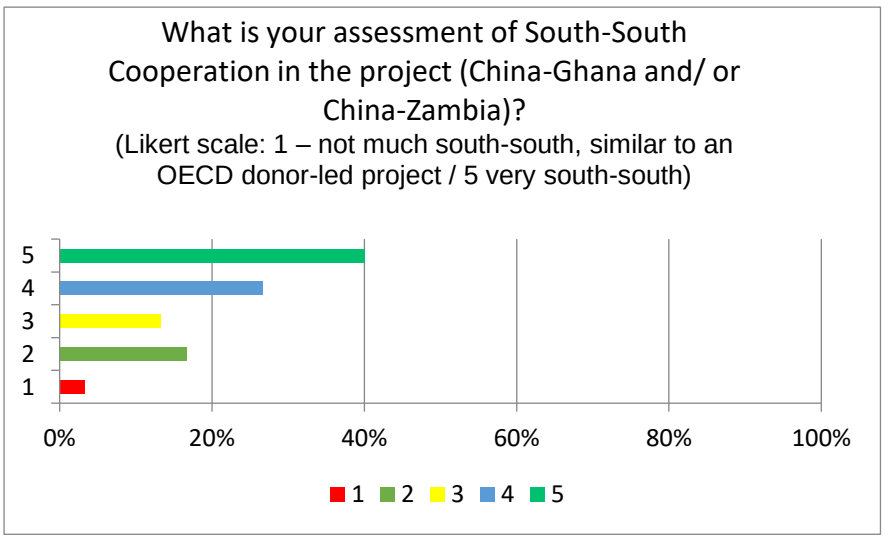
and formalize these partnerships and explore an innovative way of SSC for the private sector. In particular, an MoU was signed with Poly Solar Technologies in China who is interested in further developing partnerships with Ghana (and Zambia) and the company sent two of its engineers to Ghana in 2017 to carry out research and better understand the Ghanaian market. Following the trip to Ghana, Poly Solar submitted two collaboration proposals – one for water pumps and the other one for solar systems – to UNDP Ghana and ACCA21 but did not receive any feedback. Another example of an advanced partnership is the joint venture agreement between two Ghanaian companies and a Chinese manufacturer of solar PV – this example is further explained in the Overall assessment section, Ghana's Outcome 2. The JV has been signed, the site selected and construction is expected to be finalized before the end of 2019.

In order to understand and respond to Ghanaian and Zambian demands, ACCA21 undertook several activities. First, a questionnaire was sent to gather information on existing challenges and demands that Ghana and Zamia had. Then, in-depth interviews were held with government and private sector. And lastly, fields visits were carried out to complete the assessment.

5 years ago, there were barely any private sector bridges in RET between China and the two African countries. The project has supported the three countries to create those bridges. In China, this has been done by building capacity among RET companies on how to do business in Africa, raising awareness on the importance of adapting to the local context and, mostly, focusing on the importance of knowledge transfer. This last aspect has been a key milestone of the project and Chinese stakeholders have shifted from solely engaging in equipment supply to understanding the context of the African countries and being able to engage in knowledge and skills transfer driven by the needs of the country. Fields visits have highly contributed to achieving this shift in focus. In Ghana and Zambia, the enabling environment has been strengthened as a result of the project and therefore there is an increased capacity in the countries to absorb RETs.



Stakeholders have evaluated SSC positively (almost 70% of the respondents to the online survey). Ghanaian stakeholders rated SSC in the project somewhat lower, with an average score of 3.45 versus an average of 3.70 among Zambians.

During the interview for this evaluation, ACCA21 reported that the Chinese Centre for South-South Cooperation was formally

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established and approved by the Chinese government while this evaluation took place[5]. Although progress had been made and the mission, objectives, activity design, regulations and procedures had been defined, the documents and tasks were still under ACCA21 with no formal structure for the SSC. The Minister of Science and Technology has recently approved the design and functions of the Center. It has taken longer than the project expected due to restructuring in the government and internal procedures and approvals required. Delays in establishing the SSC was identified as a risk during the project design phase, but the impact of not formally establishing the SSC Center until recently has not greatly impacted the outcome of the project because ACCA21 has been fulfilling its functions in the project. Although in the 2014 APR it was reported that the SSC Center was established then[6], it has been confirmed with ACCA21 that the Center was only formally approved and created in the last months. Stakeholders in Ghana and Zambia are not yet aware of the formal approval of the Center and still believe the output has not been achieved. Although the official signed document by the Minister of Science and Technology has not been provided, due to formal processes in the Chinese government, staff in ACCA21 informed the evaluator that MOST is looking into a suitable date to hold a launch event and it will then inform and invite Ghanaian and Zambian stakeholders of this milestone.

Once created, the Center has been pledged funds from MOST and the Ministry of Environment to continue its functions beyond the duration of the RETT projects. Formally establishing a Center for SSC within ACCA21/ MOST will contribute to enlarging the network for SSC on RET, creating a platform to engage with more South-South countries and strengthen ties with the private sector for RETT–ACCA21's mandate which includes regulation, policy and research.

SSC has been successful in both projects. However, there was potential for more cooperation between Ghana and Zambia. Both countries have participated together in missions, trainings and matchmaking events in China and stakeholders from Zambia attended a RE workshop in Ghana, but overall, very little collaboration between the two African countries has taken place. Both countries are at a similar stage of development in RET and would have benefited from exchanging experiences and lessons learned along the way. In fact, when stakeholders were asked if they thought the project would have benefitted from increased SSC between Ghana and Zambia, nearly 80% of the respondents answered that it would have been beneficial or very beneficial. Additionally, looking into case studies beyond China (Indonesia, India, Brazil or African countries with RE successful projects) would have added value to the capacity building components.

[5] The official approval letter signed by the Minister of Science and Technology was requested to ACCA21 to include as an annex of this report but Chinese government procedures do not allow sharing the soft copy of the document.

[6] Refer to *2. Key Results* section in the 2014 APR.

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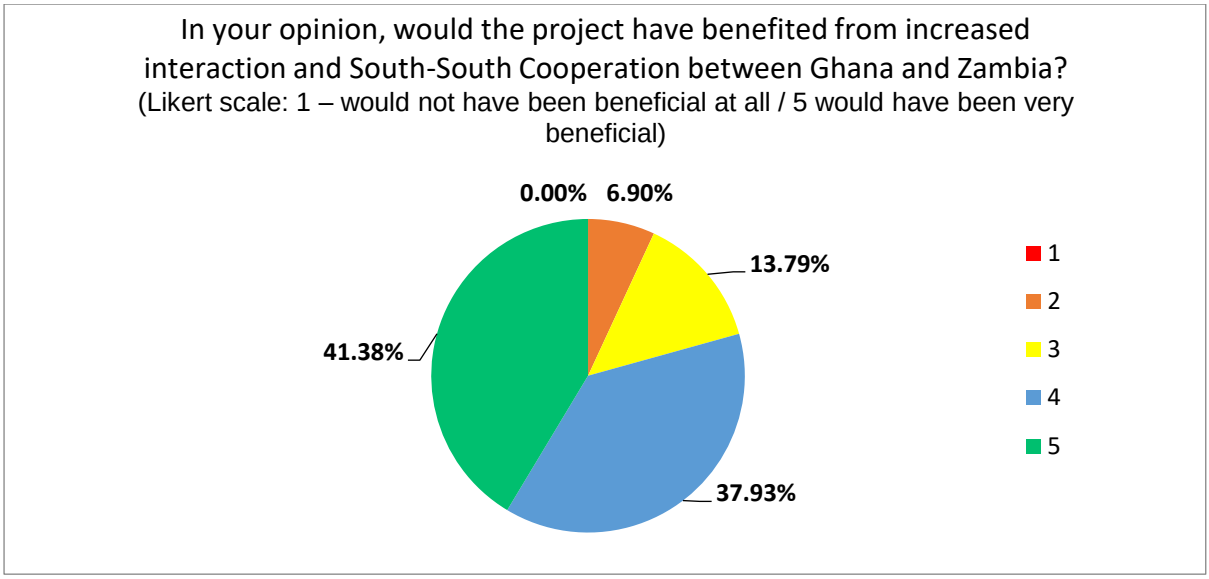

Outcome 4 (China – Ghana and China – Zambia): Project management and coordination structures established

The scope and complexity of the project have required a heavy set up for project management. All stakeholders involved in the project have mentioned that the role of UNDP in China, Ghana and Zambia has been key in facilitating and maintaining smooth and close communication between stakeholders. UNDP Zambia and UNDP Ghana have been the conduit of communication with UNDP China and have jointly worked in facilitating communication between PMUs, resolving bottlenecks and ensuring that countries priorities were being considered.

Coordination in the RETT projects has been close and benefitted from the trilateral set up. Given the cross-cutting dimension of the outcome, a different set up could have jeopardized the accomplishment of the other outcomes. For example, although not directly involved in capacity building activities, UNDP country offices have played a key role in facilitating the process and ensuring that skills were transferred from China to Zambia and Ghana and that China's transfer of technology and knowledge was responding to demands from the two African countries.

Management and coordination structures were established in the early stages of the projects: A Global Steering Committee (GSC) where stakeholders from China, Ghana and Zambia are represented, as well as National Project Steering Committees in China, Ghana and Zambia. National Project Steering Committees (PSC) have held meetings on a biannual basis and the GSC met annually. Additionally, Zambia set up a Project Technical Team that is responsible for everyday technical and operational decisions and reports to the National PSC.

The geographical scope of the projects, i.e. different time zones, access to different voice over IP (VOIP) services and budget restrictions for travels are some factors that have presented additional challenges to the communication and coordination between the three PMUs. UNDP incorporated an additional mechanism of coordination: WeChat calls with PMUs and UNDP offices in the three countries for

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updates on progress. These calls have helped to strengthen the relationship between PMUs and UNDP country offices and have facilitated communication beyond the formal project channels.

UNDP has been in charge of the overall management of the project which has ensured that the project follows international standards and leverages UNDP's experience in managing complex projects and working on South-South cooperation.

6.3 OECD/DAC criteria for Evaluating Development Assistance

6.3.1 Relevance

The relevance criterion considers the extent to which the project is suited to the priorities and policies of the countries, implementing partners and donor, including whether there is a demand for the kind of intervention offered by this project in the participating countries and the initiative is aligned with national priorities and if the expected outcomes and outputs address the general objective of the projects.

The RETT projects, which promote the use and adoption of RET, are aligned with the SDGs and support the Paris Agreement's goal of limiting the rise in global average temperatures to under 1.5 degree Celsius. They are consistent with Denmark's objective to promote cooperation between China and Africa and mitigate climate change impact through the promotion of renewable energies.

Ghana and Zambia participate in the UN's SE4ALL that aims to ensure universal access to energy, promote renewable energy and energy efficiency. In this framework, the RETT projects are particularly relevant to both countries.

The RETT project is aligned with Ghana's national priority of increasing access to electricity and shifting from the current 0.6% use of renewable energy to 10%. This target was initially set for 2020 and later moved to 2030, and Ghana has expressed that the project has supported the country in creating an adequate regulatory and institutional framework to meet this goal and at the same time it has helped identify the main barriers and the areas where Ghana has more potential for RET. The project has supported the draft of several reports and studies that have contributed to raising awareness among the government, private sector, academia and other stakeholders, and strengthen knowledge on RET, like the Renewable Energy Policy Review, identification of gaps and solutions in Ghana (2015), Baseline Study of Renewable Energy Technologies in Ghana (2016), and the Identification of barriers to renewable energy technology transfer in Ghana. The RETT project also aligns with broader national objectives of improving people's livelihoods, creating employment opportunities and reducing poverty.

> *"Energy transition from traditional to renewable is needed to mitigate climate change impact and projects like this one are very much needed to do so."*
>
> Mr. Kofi Agyarko, Director of Renewable Energy, Energy Efficiency, & Climate Change in Ghana
> (Mr. Agyarko agreed to be quoted in this report)

Zambia has expressed that there was a need for a project of this scope to help the country achieve its RE targets and support National Determined Contributions (NDC) commitments under the Paris Agreement. Further, it is aligned with the 6th and 7th National Development Plans (NDP) as energy is

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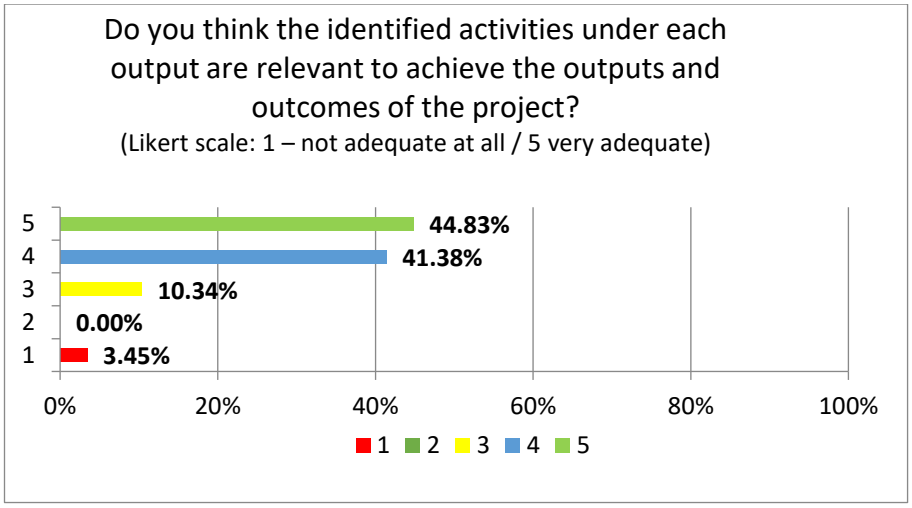
a cross-cutting issue that can improve health, education, livelihoods and generate income opportunities for the Zambian population, and both NDPs have sections emphasizing on the need to shift focus from traditional energy to renewable energy. It is clear that, given the country's characteristics, there is high potential for RE. The Chinese case is of particular relevance for Zambia and reviewing China's experience has showcased that government support and creating an adequate enabling environment for the sector is crucial to develop RET.

The relevance of the project for China is in line with its increasing role in global development and its relatively new participation in South-South Cooperation. China has broad experience in cooperating with African countries, usually in the shape of the provision of equipment, infrastructure or other goods. South-South Cooperation entails a new approach to cooperation with a strong focus on cultural and context knowledge in order to be able to engage in country-driven cooperation.

The online survey shows an overall satisfaction of stakeholders with the activities and their relevance to achieving expected outputs and outcomes. Out of the 29 respondents who answered this question, 86% of them assessed positively the adequacy of activities and almost half of the respondents (46,43%) assessed them as very adequate.

Figure 2: Assessment of activity relevance under each output



The three countries have followed the activities identified and planned in the design phase adjusting to priorities and current context. Annual work plans were jointly developed by Ghana and China and China and Zambia which targeted the original outcomes adjusting the activities sequence and timing to priorities, challenges faced in the implementation of other activities, budget constraints and resources capacity.

6.3.2 Effectiveness

The effectiveness criteria for evaluation questions to what degree the project has attained its objectives, including whether there is a clear implementation logic.

The projects' design and the logic and underpinning assumptions of both projects have contributed to the success in achieving the expected results. It is important to note that neither project has an explicit

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Theory of Change (ToC) and a specific assessment of the project's ToC cannot be done. Activities under each output and outcome are appropriately focused towards achieving the expected results, but indicators included in the design of the project have not been effective to report on progress. In fact, reporting (in the APRs) has mostly been done against activities. This is explained in more detail in section *2.3 Limitations to project design and implementation.* In this section, key challenges in implementing the project and achieving the outcomes are also explained - financial constraints and procurement have been the main ones.

The enabling environment has been significantly improved in Ghana and Zambia, through increased capacity in the country to adopt and use RET and improved policy framework – although not fully accomplished in the case of Zambia and awaiting Parliament approval in the case of Ghana. China's has contributed with technical inputs for policy documents and providing feedback to drafts prepared by Ghanaian and Zambian stakeholders and most importantly, it has set an example and made Ghana and Zambia further realize the importance of creating an enabling environment to develop the RE industry.

In Zambia, the RETT project has engaged with other projects and partners, increasing the impact of the project and expanding the room for knowledge transfer on RET. The project has collaborated with five rural clinics in Chongwe, two in Kafue and one in Shibulunji . Solar panels were installed by a Norwegian funded project in some of the clinics and main hospital of the Chongwe region, allowing them to have electricity and improve operations (e.g. maintain medicines refrigerated) when there is no daylight or there is a power cut. These clinics and hospital are off the national grid and before solar was installed, they had no alternative power source. Most of the 39 clinics in Chongwe still don't have an alternative source of power, but those of them that have had a solar panel installed have experienced a radical improvement and can now provide continuous service. The RETT project's engagement with the health facilities has consisted of providing on the ground training on panel installation and maintenance at the time when they were installed. It was a training of trainers, so it is expected that those trained can continue building capacity among other technicians. Trained staff can now do basic maintenance of panels, simple repairs and can report more accurately when there is a part that needs repairing. There is great potential for further collaboration with the clinics, out of 39 of them only 5 of them including the main hospital have newly installed solar systems, and the hospital is not yet equipped to fully run on solar energy.

This project has highly contributed to increasing China's interest in engaging in demand-driven SSC projects. ACCA21 has led Outcome 3 (Strengthening SSC in China) in both projects and has gone beyond its own institution involving a broad range of stakeholders not directly involved in RET but who are also key players in China's cooperation agenda. After each of its missions to Ghana and Zambia, ACCA21 organized workshops and shared knowledge materials with other ministries, private sector and think tanks to share their experience engaging in South-South Cooperation with the two African countries. These sessions were very interactive and had high participation from other ministries. MOFCOM is already supporting two other trilateral projects on SSC on RET, one in Ethiopia and the other one in Sri Lanka, and has 7 other projects in the pipeline. In the Ethiopia and Sri Lanka projects, ACCA21 is the implementing partner, it is being managed by UNDP China, UNDP Ethiopia and UNDP Sri Lanka and this time the project is directly financed by the Chinese government.

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The trilateral set up of the project has added value in general and, in particular, it has been very effective for the South-South cooperation components. UNDP, as a liaison between the implementing partners in the three countries, has played a determinant role in bringing priorities of the 3 countries to the table and ensuring that cooperation was demand-driven. Consultations with local stakeholders and decision-makers in Ghana and Zambia were carried out at an early stage of the project design and the outcomes and activities of the projects responded to the priorities identified then. Furthermore, UNDP's participation has allowed the projects to leverage its partnerships in the three countries, facilitating consultations with different levels of stakeholders. UNDP has also been key in promoting a very "practical, on-the-ground" approach to SSC: although research has been a key part of SSC, on-the-ground training with proven impact on knowledge transfer on RET from China to Ghana and China to Zambia have been the core of SSC.

Figure 3: RETT projects featured in UN South-South Cooperation reports

The implementing partners in the three countries have been the main parties involved in SSC, but not the only ones. A key success factor of the projects has been that it has been able to engage leading research and training institutions in the training and knowledge exchange, both in delivering and receiving training. This has contributed to expanding the effectiveness of the project and at the same time strengthening their sustainability ensuring that capacity building on RET will continue beyond the duration of the project. The key Chinese institution involved in knowledge transfer has been the International Center on Small Hydro Power (ICSHP), which has built the capacity of Zambian and Ghanaian institutions. One of the institutions participating in these trainings in Zambia is Kafue Gorge Regional Training Centre (KGRTC). Experts from KGRTC participated in trainings for feasibility studies, site selection, design and construction of the mini-hydro in Serenje allowing them to participate in the mini-hydro project from the beginning, leading the process and promoting national ownership of this project and the overall RETT project. Zambians who attend these trainings are then prepared and certified to manage mini hydropower plants in Zambia. Therefore, although SSC is Outcome 3, it has also contributed to strengthening the enabling environment for RETTs - Outcome 1 - beyond the 2 defined outputs for this outcome.

At the private sector level, some Chinese companies had previous experience working with Ghanaian and Zambian companies, but others didn't and through the project they have learnt how to do business in Africa, which has allowed them to increase their knowledge of the context, culture and country's context. For Ghanaian and Zambian firms, establishing contact with Chinese companies and deepening in their knowledge of the Chinese experience has allowed them to acquire enough confidence to search for new partnerships and strengthen them beyond the project.

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6.3.3 Efficiency

The efficiency criterion for evaluation measures the outputs in relation to the inputs. It is an economic term which signifies that the project uses the least costly resources possible in order to achieve the desired results. In this section, we will look at whether budget allocation and budget executed so far – and where possible to assess - were efficient and management structure and procedures were well set up and used resources efficiently.

Table 3: Outcome budget allocation in RETT projects

	Ghana		**Zambia**	
	USD	***%***	***USD***	***%***
Outcome 1	378.000	*15%*	98.150	*4%*
Outcome 2	1.051.000	*42%*	1.011.250	*42%*
Outcome 3	711.000	*28%*	866.100	*36%*
Outcome 4	378.519	*15%*	454.500	*19%*

Looking at budget allocated vs impact of each outcome, the initial assessment is relatively efficient resource allocation. Outcomes 1 - enabling environment for RETT – has a significant impact on the development of RETTs. This outcome has allowed to carry out an in-depth assessment of the current situation, barriers and potential for RET in Ghana and Zambia, and put in place effective policy documents that are expected to address challenges and barriers and maximize the potential for RETs.

The second output of Outcome 1 in the China-Zambia project: *Financial mechanisms for RETT established* has not been achieved. As explained in the overall assessment section of the report, initial meetings with micro-finance institutions and the Zambian Development Bank were held but progress did not go beyond that. However, looking at the budget almost 40,000 USD were spent in this outcome. Considering that only meetings took place and no results were achieved, the allocation for this output did not contribute to efficient use of resources.

The projects allocated in both cases almost half of the budget to outcome 2, aimed at reducing barriers and increasing access and use of RET in Ghana and Zambia. These outcomes included testing and demonstrating appropriate technologies and capacity building (as well as financing mechanisms in the case of Ghana, which is part of Outcome 1 in Zambia). Looking into the executed budget, the lion's share of this outcome has been spent on selection and adaptation of appropriate RETs, in the case of Ghana and in the case of Zambia it is relatively evenly spent. Capacity building has been successful in both projects and effectively carried out since key strategic institutions have been engaged and they now have the capacity to transfer knowledge and continue strengthening capacity on RET.

It is important to note that a major part of Outcome 2 was initially allocated to demonstrating and testing equipment. However, the budget allocated for equipment was only 5% in the case of Ghana and 1% in the case of Zambia. This has meant that the project has faced challenges to procure equipment and, in some cases, has had to look for alternative sources of supply. For example, for the Solar Center in Zambia, the Ministry of Energy, instead of the project as it was expected, supplied the equipment. In some cases, China's responsiveness in facilitating equipment has been less than

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expected: some companies expected to supply equipment for commercial purposes and not for testing and demonstration and therefore it has significantly hindered the rate of delivery of this output.

The budget allocated to consultancy is a large share of both projects. Developing research, reports and knowledge products have been highly achieved in the projects and they have informed the drafting of key policy documents supported - or being supported - by the project and necessary to provide an enabling environment that supports the development of RETs in Ghana and Zambia. Therefore, we can conclude that there has been an efficient allocation of these resources.

Travel was required for a large sum of activities during implementation. This share of the budget has been very efficient and had a significant impact on building capacity and facilitating knowledge exchange between countries, i.e. on the ground training delivered by Chinese experts in Ghana and Zambia have been very highly valued by African stakeholders and visits to Chinese mini-hydro and solar plants and cookstove manufacturers, to name a few, is also highly valued by Ghanaian and Zambian stakeholders.

Table 4: Budget allocation in RETT projects

	Ghana	Zambia
Local Consultants	30%	36%
Travel	15%	10%
Contractual Services /Companies	32%	47%
Communication/ publication	3%	2%
Equipment	5%	1%
Salary Costs	11%	-
International Consultant	2%	2%
Miscellaneous Expenses	3%	2%

Almost 20% of the funds have been lost due to DKK- USD fluctuations, which has greatly impacted the rate of budget delivery. Although activity delivery has been impacted by these losses, the project has mitigated this impact through partnerships and efficient allocation of available resources. The project was signed in USD, but Denmark disburses programmable funds in DKK, due to fluctuations during the four-year period and because installments were done annually and not at the time when the project agreements were signed, the amount of USD actually received by UNDP China fell short by USD 856.832,50.

6.3.4 Sustainability

Assessing the sustainability of a project means measuring whether the benefits and results achieved are likely to continue after donor funding has been withdrawn and the project has ended. In this section, we will look into the likelihood of continuation after the project has ended and the factors that affect the continuation or lack thereof, for example, ownership, capacity, partnerships, among others.

Overall, sustainability of the project is very likely to be ensured. Although some activities are lagging behind and achievement of certain outputs is not complete, the achievement of strategic results will

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have a determinant impact on the capacity of Ghana and Zambia to continue adopting and using RETs and on the ability of China to continue engaging in demand-driven SSC.

A key success factor of the project has been the level of ownership of Ghana, Zambia and China and the relevant institutions engaged. Below we highlight some key areas in which continuation will be key - and how we assess the likelihood of this happening – to ensure the sustainability of the achieved results of the projects.

- **Policy framework:**

The policy framework developed under the project in Ghana is crucial for the sustainability of the project. Including the Renewable Energy Master Plan (REMP), a key milestone, of the project was a request from the Government of Ghana during the design phase of the project and it reflects the government's commitment to developing, promoting and supporting renewable energy technologies in the country. The process of developing the document has been led by the Energy Commission, the Ministry of Energy and the Planning Commission, and supported by the project. Ghana welcomed inputs and feedback from Chinese stakeholders, like NDRC and Tsinghua University. The REMP is highly likely to be passed by Parliament and effectively implemented judging by the government's commitment and willingness to have a strong RE policy in place.

In Zambia, policy progress is considerably behind that progress made in Ghana and the key deliverable, the Renewable Energy Strategy, is yet to be finalized. However, steps have been taken to ensure progress will continue after the end of the project and the result will be achieved. The key action taken in this regard has been establishing a key partnership with an EU project that is targeted in the same direction, will continue once RETT is over and has available funds to take on the leadership of this activity. Having the EU project lead this activity and the strategy being an objective for this project too, ensures that work to finalize the strategy will be continued by the EU. Further, as mentioned above, assessment reports developed by the project have been key documents for other RE projects in Zambia. Therefore, in the event that it is necessary for the EU to engage with other partners once the RETT project has ended, it is likely that other projects will be willing to join the policy work being done as the strategy is a key recommendation of the assessment that was carried out in the first year of the project.

- **Capacity building and knowledge transfer on RET:**

Knowledge on RET has been considerably strengthened in both African countries. Several universities and research institutions, as well as government officials, staff from regulatory bodies, and private sector have participated in capacity building and knowledge transfer sessions and field missions to China. This broad range of stakeholders involved has maximized the effectiveness of knowledge transfer and among them there were key strategic institutions and therefore, although building capacity is a lengthy process and further strengthening can be done in both African countries, these key institutions are now in a position in which they can take on the responsibility of continue building capacity in their countries. This is the case for example of BUI Power Authority, The Council for Scientific and Industrial Research (CSIR) in Ghana and KGRTC and SEC in Zambia.

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ACCA21 has uploaded training materials and reports developed throughout the project onto a website which stakeholders will be able to access after the end of the project: http://rettc.ustb.edu.cn/zh/index.html.

- **Partnerships:**

A strong partnership has been built between ICSHP in China and KGRTC in Zambia. They signed an MoU and have since then worked together on the Chipota waterfalls mini-hydro. They have established a strong relation and both parties have expressed their willingness and commitment to keep working together beyond the duration of the RETT project.

On the other side, the MoUs signed between the Solar Energy Center in Zambia and (i) Poly Solar in China and (ii) International Solar Energy Center in Lanzhou, China, have not been so fruitful. The relation between these partners is not as strong as the one between partners mentioned above and, although parties have mentioned their willingness to continue collaborating, there is a chance that after the end of the project partnerships don't grow stronger.

The project has assisted Ghanaian private sector to build relations with Chinese companies and some have expressed that because of the support received during the project, they are now confident to establish relations and continue doing business with China on their own and beyond the project. It is the case of Translight Solar in Ghana, who visited China with a delegation of RETT stakeholders and visited Solax Power and Jinlong. Translight Solar assessed these visits as extremely useful and crucial to understand the areas for potential collaboration with Chinese manufacturers and how to do business in China. In a second visit to China, without the RETT delegation this time, Translight Solar met again with Solax Power. Translight Solar faces the challenges faced by the private sector in Ghana – cost of financing is the main one – but is exploring ways to formalize partnerships with Chinese firms. Despite these significant achievements in acting as a bridge between the private sector in the two countries, the project had higher expectations to establish partnerships between Chinese and Ghanaian companies and that has not been formally achieved. Several MoUs have been signed but no commercial activity has taken place yet. Strengthening partnerships during the last months of the project will be a key factor to ensure the sustainability of RETT from Chinese to Ghanaian businesses beyond the duration of the project.

China provided Ghana and Zambia with a catalogue in which suppliers vetted by the project (ACCA21) were included. The catalogue incorporated inputs from Ghana so that China had a better idea of the needs and priorities the document needed to respond to. It is an excellent tool for Ghanaian private sector looking for partnerships in China, as several companies had expressed the difficulty they had faced in the past to source equipment from China mostly due to the language barrier that hinders identifying the most suitable partners.

Engaging key strategic partners in pilot projects is key for sustainability. Although some delays have been experienced due to, among other reasons, the lengthy process of identifying and selecting a committed and suitable partner, the high likelihood that these partners will continue beyond the duration of the project and even scale- up the projects is high. BUI Power Authority has proven to be an engaged partner leading the Tsatsadu mini-hydro in Ghana, committing its own funds to ensure

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the success of the project. The project procured the generator for the project and BUI will continue running the mini-hydro beyond the RETT project.

Engaging KGRTC for the Chipota mini-hydro has been key to strengthen the sustainability of the project beyond RETT. KGRTC has pledged USD 100,000 to the project and already disbursed USD 30,000. Additionally, KRGTC and the Energy Commission have jointly presented several proposals to co-finance construction to make up for the shortfall between available funds and actual budget needed for construction, which is far from what was budgeted in the design phase. Once the mini-hydro has been constructed, KGRTC will take over management and operations of the mini-hydro. The established trajectory and diverse source of funds that the center has, coupled with the expertise of its staff ensure a likely sustainability of the mini-hydro.

- **Institutional reform**

After each of its missions to Ghana and Zambia, ACCA21 organized workshops and shared knowledge materials with other ministries, private sector and think tanks to share their experience engaging in South-South Cooperation on RETT with the two African countries. Interactive sessions were carried out with high participation from other ministries. These sessions and ACCA21/MOST participation in the RETT projects have highly contributed to increasing China's interest in engaging in demand-driven SSC projects. This means an important change in which China has traditionally engaged in cooperation projects. Sustainability of this outcome is already displayed: MOFCOM has recently started to support two other trilateral projects on SSC on RETT in Ethiopia and Sri Lanka. ACCA21 has been appointed the implementing partner in China and UNDP is again doing the overall management. The secured funds and engagement in these projects ensure the continuation of the SSC Center, its functions and China's increasing engagement in country-driven SSC. Furthermore, MOFCOM has another seven similar projects in its pipeline.

It is important to note that China is this time engaged in these projects not only as an implementing partner but also as the donor, a clear demonstration of China's increasing engagement in country-driven SSC. UNDP and China will continue to work together in the two newly started trilateral projects with Ethiopia and Sri Lanka, a demonstration of the strong established partnership.

- **Trilateral South-South Cooperation**

All stakeholders have expressed their agreement and appreciation for the trilateral set up of the project. It has brought significant benefits to the projects, as explained in sections above, especially for project management, facilitation and coordination between parties and ensuring close communication between stakeholders. This has allowed UNDP in China, Ghana and Zambia see the value-added of this set-up. The projects have been showcased in several best practice reports and received high commendations from high level UN offices. This will promote that UNDP continues to engage in similar trilateral SSC projects and will help secure funds and encourage countries' participation in similar initiatives.

The project has proven China's increasing engagement in country-driven SSC, which has been welcomed by participating countries, but will also encourage other countries' willingness to engage in cooperation projects with China.

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7. Conclusions

Overall, the RETT projects have been successful, achieving groundbreaking results in knowledge transfer for RETT in Ghana and Zambia and strengthening the way in which China approaches and engages in SSC. As described in the sections above, challenges have been faced along the way and not all the results have been achieved. However, these were pilot projects and have already been an example for new stakeholders (MOFCOM) who have recently engaged in similar trilateral SSC on RETT projects. And despite the challenges faced along the way, the RETT projects have not only been considered a success by stakeholders in Ghana, Zambia and China, but also by other government institutions in the three implementing countries and across UN agencies.

The overall success of the projects notwithstanding, the monitoring and reporting mechanism (result frameworks and APRs) have proven to be inefficient to properly assess progress. This is mainly due to the design of the monitoring framework, in which indicators, baselines and targets were not properly defined, making reporting against them difficult or impossible. As a second-best solution, reporting has been done against activities, leading to the loss of information that could have resulted in a more detailed assessment of actual project results.

Inefficiencies in procurement have had a significant negative impact on project implementation. For instance, bringing project staff on board in Zambia was not completed until after more than 6 months, which delayed activity implementation. Furthermore, key activities have been delayed due to the lengthy procurement process, e.g., the mini-hydro in Zambia. In a four-year project with construction activities involved – which take long to complete – a one-year procurement process is a very inefficient allocation of time.

The trilateral character of the projects has brought significant benefits. UNDP, in its role as a coordinator and facilitator, has leveraged its expertise in managing complex projects as well as its networks in China, Ghana and Zambia. This has strengthened communication among PMUs and stakeholders and has ensured cooperation was country-driven, bringing the three countries' priorities to the table.

However, project management could have been simplified with a more similar design between both projects. This would have contributed to streamlining procedures and creating synergies in outcome implementation, for example through a strengthened collaboration and exchange of lessons learned between the two African countries. A joint set up of both projects could have also contributed to simplifying project management requirements.

The RETT project has assisted Ghana in building an enabling environment that the country had previously identified as a priority to develop RE. The project has supported this process, but it has been led and owned by the government of Ghana. Although this outcome has not been fully achieved, the risk of Ghana not passing the REMP and effectively implementing it is low – as the implementing structure has already been designed by the government.

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Zambia's enabling environment has been strengthened because the government's awareness of the need to have adequate policies and strategies in place has significantly increased. Although the RE Strategy has not been finalized, mechanisms to ensure its completion are in place.

Pilot project and equipment demonstration and testing have faced challenges and have not been as successful as expected. The lack of financing mechanisms has prevented the projects from having additional resources available for pilot projects, equipment demonstration and testing, etc. hindering scaling up of projects and causing delays in the implementation of other activities. Due diligence in identifying financing mechanisms could have helped private sector overcome the challenges it faces to access financing in Ghana and Zambia. The role of private sector was not defined in the design of the project, which could have helped to achieve greater results in establishing partnerships between Chinese and Zambian companies, establish pilot projects, facilitate equipment supply for demonstration, and further ensure the sustainability of technology transfer from China to Zambia.

Knowledge transfer and capacity building have been very successful components of the projects. Key strategic partner institutions have been engaged, ensuring that knowledge transfer in Ghana and Zambia does not end with the project. Furthermore, a strong partnership between Chinese and African stakeholders (ICSHP – KGRTC and ICSHP – Bui) increases the likelihood of continuation of collaboration beyond the project.

The RETT project means a new and enriched way of China engaging in SSC. In general, Ghana and Zambia are pleased with the SSC of the project and believe that knowledge exchange has been adequately guided by their priorities and demands.

8. Lessons learned and Recommendations

1. UNDP to continue engaging in trilateral cooperation projects with national implementation

The donor and implementing partners in China, Ghana and Zambia highly value UNDP's participation in the project, as they have been able to benefit from the UN network, expertise in complex SSC projects and technical knowledge on renewable energy. The evaluation has evidenced the value added of setting up the project as a trilateral rather than a traditional bilateral cooperation project. It is a consensus opinion of stakeholders in the projects that UNDP's role as a facilitator has enriched the project and ensured that the project was responsive to the diverse needs of the three countries involved. UNDP has also been key to facilitate communication and relations between the three countries. Furthermore, communication between implementing partners and UNDP has been very close owing to UNDP having offices in the three countries. UNDP has also been crucial in promoting the use of international standards and procedures by the three countries and in all activities of the project, contributing to following best practices and ensuring transparency. Adherence to a common set of rules through the use of UNDP norms and standards has fostered trust amongst parties. **It is recommended that UNDP continues to engage in trilateral cooperation, offering its network and experience in SSC projects, with a national implementation modality that ensures ownership of implementing partners. All implementing partners should commit to inform all primary stakeholders, in a**

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timely fashion, of the achievement of milestones, or lack thereof, to avoid misunderstandings show commitment with the project from all parties.

2. *Promote South-South Cooperation for the private sector*

The projects have set the basis for an innovative way of engaging in South-South Cooperation. The project has facilitated the creation of private sector partnerships, which have the potential of creating a new channel for knowledge and experience exchange. Although no commercial activities have officially started there are several examples of established partnerships, such as the Joint Venture between Tobinco – Reroy and Evergreen for the soalr project, which has been signed and the facilities are expected to be finalized in Accra before the end of 2019. Another example is the case of Poly Solar, a Chinese company which has visited Ghana to learn about the context and how to better respond to the needs of private sector engaged in solar in the country. **It is recommended to continue to engage in private sector SSC and more visibility is given to this innovative mechanism of cooperation for future projects. UNDP staff from China, Ghana and Zambia should take every opportunity to share challenges and achievements with other country offices in order to promote UNDP's engagement in SSC for the private sector.**

3. *Encourage robust project design with adequate result frameworks that allow proper M&E*

A results framework is an important tool to closely monitor and evaluate projects. However, if it is not well designed it does not fully capture all the work done and may not be an accurate way to quantitatively and objectively monitor actual changes as a result of the project. The results framework for these projects did not include adequately defined indicators, neither did it have baselines and targets assigned to the indicators. As a result, reporting was done against activities and, consequently, there has been information lost. **It is recommended that the project design includes adequately defined indicators with corresponding baselines and targets so that progress is assessed against these, and a complete assessment of progress can be done. This will also allow evaluating cross-cutting issues such as adequate gender mainstreaming in the project.**

4. *Early identification of difficulties and integrate risk assessment in the results framework*

Risks identified in the project design phase were not assigned to specific activities or outcomes. They were classified in the Danish International Development Agency (DANIDA) categories: contextual, programmatic and institutional risks, and according to UNDP/GEF Risk Standard categories: environmental, financial, operational, organizational, political, regulatory, strategic, and other. Although during the evaluation the risk identification was evaluated as relatively adequate by stakeholders, there is room for improvement.

During the design phase, potential difficulties inherent to complex projects should be identified during the design phase as well as possible actions to avoid bottlenecks and delays. For example, UNDP procurement procedures stipulates that payment is done upon delivery and, generally, Chinese private sector requires upfront payments. This has caused delays in procurement process, such as for the generator for the Tsatsadu 40kW mini hydropower facility in Ghana. If this type of clashes are identified during the design phase – through increased consultations – and decisions made then, delays will be mitigated or avoided. It is thus recommended to review procedures

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and ways of working of all parties involved in a project and identify if any clashes exist to avoid delays during project implementation.

It is also recommended that as well as DANIDA and UNDP/GEF classifications, risks are associated to specific outcomes or even activities when possible. A detailed breakdown of risk analysis will allow to identify additional risks and closer assess their likelihood and impact on the project. This will also allow to isolate a challenge faced and a faster reaction to it. Additionally, it will facilitate project assessment, as impact assessment will contribute to learning each activity's contribution to its associated outcome. Revision of risks identified and management strategies will be easily carried out as it will be done as part of the overall revision of the project. These should be done periodically and when an unforeseen challenge is faced, national PSCs or GSC should convene to discuss and agree on a mitigation strategy.

5. Guard the project against the impact of currency fluctuations

The project has experienced an almost 20% loss of funds due to currency fluctuations, which has inevitably impacted on activity and result delivery. This risk was not foreseen in the project design phase, but it was in a revision of risks at a later stage. **It is recommended that the project does not bear the risk of currency fluctuations as it can impact on project delivery. This could be done in various ways:**

- **If possible, transfer the funds in one installment and when the agreement is signed. This eliminates the risk of currency fluctuation as the less time between signing and disbursement, the more likely that the amount in DKK and USD remain as stated in the project document.**
- **The project includes a contingency fund to compensate losses of currency fluctuations and mitigates the impact on the project budget.**

6. Simplify the project management structure of the projects and strengthen M&E

The projects have the same objectives and very similar expected results for Ghana and Zambia. However, they were designed as two separate projects and effectively treated as four projects (two in China, one in Ghana and one in Zambia) where UNDP China has had an overall coordinating and management role. **The evaluator recommends that project management is streamlined through an integrated project design of both projects. Aligning activities and outcomes would simplify reporting and monitoring of progress and the overall integration of APR, following the same guidelines. Setting up both projects as one would facilitate UNDP China's role as the overall coordinator of the project, facilitate communication among all parties and encourage continuous learning and experience exchange among all stakeholders. Furthermore, setting it up as one project, rather than two parallel projects would encourage and facilitate cooperation and interaction between Ghana and Zambia as well as between China and Ghana, on one hand, and China and Zambia, on the other hand. It is also recommended that M&E mechanisms are strengthened through mid-term reviews, audits and periodic reporting to the donor, not only through the APR but also informing about key messages arising from bi-weekly calls among the implementing partners and as soon as bottleneck are identified.**

7. Seek more strategic collaborations and partnerships

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During the evaluation, it was proven that partnerships have been key in achieving results, ensuring their sustainability and maximizing the impact of the project. For example, providing technical support to rural health facilities in Zambia significantly contributed to increasing access to RET in rural areas and improving people's livelihoods in those areas. There is great potential to expand these collaborations with not only health facilities but also supporting schools, housing, agriculture, etc. **It is therefore recommended that the project explores partnerships with ongoing RE projects and other projects and public services that already use or stand to benefit from RE, and seeks ways to collaborate with these projects, for example through capacity building or providing technical support. These collaborations will also allow stakeholders to exchange experiences with a wider network and ensure that RETT will continue beyond the projects.**

8. Promote South-South Cooperation among all participating countries

SSC in these projects has been significantly limited to China – Ghana, and China – Zambia cooperation. Further South-South cooperation and experience exchange should be promoted for these projects, specifically between Ghana and Zambia, to ensure continuous cooperation among countries and increase exposure to other experiences and lessons learned. An online platform to share success cases between countries would insert an additional component of SSC into the project. This would be a cost- effective and innovative way to promote South-South cooperation. Encouraging SSC among all participating countries and exchanging experiences would facilitate the implementation of other outcomes, as experience exchange can contribute to a faster and easier addressing of challenges. **It is recommended that countries' relative strengths and weaknesses in the different areas of the project be assessed and mechanisms be set up for the relatively advantaged country to share its knowledge and experience with the relatively disadvantaged country to strengthen a specific area.**

9. Expand the scope of case studies presented to build capacity

The Chinese case is relevant and has been of great value to build capacity in RETT in Ghana and Zambia. However, the private sector is still reluctant to engage in RE projects mainly because of the high cost of financing that renders the projects unbearably risky. **It is recommended that success cases from non-participating countries, but relevant for them, are also included in capacity building components. Exposing the private sector to case studies from other African countries with similar contexts would be helpful. As much as China's case has been helpful to build capacity, it is still seen as too different to Africa and it would be easier for them to relate with cases from similar countries.**

10. Identify additional sources of financing for the project during the design phase

Identifiying and setting up financing mechanisms, has been one of the underachieved outcomes of the project. It is recommended that the design and inception phases devote more resources to these activities, especially if the project is being implemented in countries with very high cost of **financing, like Ghana and Zambia, to avoid not having resources to achieve the expected results. A recommendation is to search for additional and diversified funds for pilot projects and other activities during the design phase, and to conduct broad consultations which include financial institutions as well as other international organizations.**

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11. Encourage Public Private Partnerships to incentivize RETT

It was confirmed during the interviews for this evaluation that a key barrier for more private sector engagement has been the high cost of financing and the inability of the private sector in Ghana and Zambia to bear the risk of projects. In light of this, the government should support the private sector to overcome these barriers. **For similar projects, it is recommended to encourage government's participation, at least in the early stages of projects, to take on part of the risks, co-finance projects and therefore facilitate private sector participation. Creating Public Private Partnerships (PPP) would allow the private sector to access funds without bearing the high risks of private lending. Fewer risks and less need for financing would encourage the private sector to participate in RETT projects in countries with similar context to Ghana and Zambia.**

12. Provide advisory services and capacity building to establish commercial partnerships

The project has been successful establishing partnerships with key strategic institutions that facilitate RETT between China and Ghana and Zambia, such as ICSHP, Bui Authority, KGRTC and the University of Zambia. Despite the results achieved, several challenges have been faced which have prevented more participation of the private sector – i.e. high cost of financing and poor technical business skills (develop business plans, cost benefit analysis, etc.) of the private sector in Ghana and Zambia. **It is recommended also that capacity building as part of the project is expanded to include not only technical RET know-how but also commercial, economic feasibility assesment, and marketing expertise and technicques. This can be done through partnerships with relevant institutions or trainings could be directly delivered by UNDP. This capacity building can assist firms in engaging in commercial partnerships, carrying out cost benefit analysis, negotiating contracts and securing funds from diversified sources, which would contribute to strengthening sustainability of RETT and developing stronger relations between Ghanaian and Chinese, and Zambian and Chinese firms to ensure RETT from China to Ghana and Zambia.**

13. Consult with governments and key partners at the end of the project to design an exit strategy

Sustainability of the project heavily relies on the exit strategy of a project and whether there is a plan to ensure continuity of the results achieved by the project. In the RETT projects no official consultations to design an exit strategy have been carried out, but actions to ensure sustainability have been. **To further ensure that these actions are efficient, it is recommended that an exit strategy is agreed among all key stakeholders. This will also assist UNDP in identifying future areas in which it can continue supporting the partners involved to ensure that the results continue beyond the duration of the project.**

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Annexes

I. Results Frameworks

CHINA-GHANA SOUTH-SOUTH COOPERATION ON RENEWABLE ENERGY TECHNOLOGY TRANSFER						
ACTIVITY RESULTS	INDICATORS	BASELINES	TARGET			
			Year 1	Year 2	Year 3	Year 4
Outcome 1: Ghana has an enabling environment in place for the transfer, production and regulation of the use of Renewable Energy Technologies in Ghana.						
Output 1.1: Strategy and policies for enhanced use, regulation and promotion of RET in Ghana in place.						
Activity Result 1.1.1: Review Chinese and Ghanaian Renewable Energy policies and strategies to identify capacity building gaps and solutions to address them • **Sub-activity 1:** Conduct workshops in Ghana for Stakeholders on China and Ghana's Renewable Energy policy • **Sub-activity 2:** Joint review Renewable Energy policies in Ghana • **Sub-activity 3:** Conduct gaps analysis through stakeholder consultations and seminars • **Sub-activity 4:** Organize workshop/seminars to identify solutions to address the identified gaps	- Number of consultative meetings on RE policy and gaps in Ghana held. - # of joint reviews, consultations held and more than ?? % of participants giving positive feedback. - # of launch workshops/ seminars organized and # participants. - Baseline study to evaluate status of RE technologies.	Ghana adopted the Renewable Energy Act in 2011, but there is no master plan to implement it.	- At least 3 consultative meetings not RE policy and gaps in Ghana held - Minimum 2 reviews held with minimum 60% positive feedback. - Baseline study developed			
Activity Results 1.1.2: Draft and submit to Parliament the	Master plan approved.		Renewable Energy Master Plan drafted	Renewable Energy Master Plan		

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	Renewable Energy Master Plan (REMP) • **Sub-activity 1:** Draft Renewable Energy Master Plan based on Ghana's National RE Strategies • **Sub-activity 2:** Conduct multi-stakeholder consultation to review the Plan				submitted for Parliamentary approval.		
	Activity Results 1.1.3: Launch and disseminate the REMP • **Sub-activity 1:** Organize the official launch of the REMP • **Sub-activity 2:** Organize national and international dissemination of REMP for Ghanaian, Chinese and Danish stakeholders				Renewable Energy Master Plan Launched at a minimum of 2 launch events with minimum 100 participants		
	Output 1.2: Barriers to effective transfer of Renewable Energy Technologies removed.						
	Activity Results 1.2.1: Conduct in depth analysis of regulatory, technical, social and other barriers in Ghana and China currently hindering effective and widespread absorption of RET. • **Sub-Activity 1:** Conduct a desk review and surveys/interviews to identify barriers for RET Transfer. • **Sub-Activity 2:** Prepare a report to summarize and analyze identified barriers.	- Report on barriers for RET transfer - # consultation meetings or group interviews held.	Barriers to effective transfer of Renewable Energy existed.		- Report on barriers completed - Minimum 3 consultation meetings / group interviews held.		
	Activity Results 1.2.2: Develop a roadmap to remove or reduce barriers to effective RETT in Ghana. • **Sub-Activity 1:** Organize stakeholders' meetings to	Road map launched			Roadmap draft prepared and launched		

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	identify strategies and solutions to remove barriers in Ghana • **Sub-Activity 2:** Draft a roadmap to set goals, objectives and priorities to remove or reduce barriers. • **Sub-Activity 3:** Convene a conference to launch and disseminate the roadmap						
Outcome 2: Access to and use of relevant Renewable Energy Technologies (RETs) increased in Ghana.							
	Output 2.1: Appropriateness of selected technologies (either biogas, improved cook stoves, solar PV, biogas power generation and mini hydro) for transfer demonstrated.						
	Activity Result 2.1.1: Selection and adaptation of appropriate RETs to be transferred • **Sub-activity 1:** Develop criteria and standards for the selection of appropriate Renewable Energy Technologies • **Sub-activity 2:** Review the selected technologies and adapt specifications to Ghana's requirements	- Report on criteria and specifications for selection of 4 RETs. - Number of Chinese technology suppliers identified for adaptation and transfer to Ghana.	Currently, there is no demonstration site set up for RE Technology Transfer	At least 3 Chinese technology suppliers identified for adaptation and transfer to Ghana	Report on criteria and specifications for selection of 4 RETs developed and submitted to China		
	Activity Result 2.1.2: Facilities to receive, test, demonstrate and exhibit equipment and publish performance results • **Sub-activity 1:** On-site investigation and feasibility study of appropriate facilities. • **Sub-activity 2:** Identification of projects and technology providers to supply facilities.	- Number of feasibility studies to select demonstration sites in Ghana conducted. - Number of demonstration sites for RETT successfully established		- At least 4 feasibility studies to select demonstration sites in Ghana conducted. - 4 demonstration sites in Ghana successfully established		- Minimum 3 users of demonstration sites recorded, with minimum 70% satisfaction rate. - Performance results published and	

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	• **Sub-activity 3**: Provide facilities with testing and demonstration equipment. • **Sub-activity 4:** Website update to share performance results and experience. • **Sub-activity 5:** Monitor performance and based on testing and demonstration, capture lessons learnt to develop training programs for stakeholders, incl. operators, administrators, etc. in Ghana.	- # of users and percentage of users of demonstration sites reporting satisfaction with sites.				lessons learnt captured.	
	Output 2.2 Increased use of Renewable Energy Technologies in Ghana supported through capacity building and financing mechanisms						
	Activity Result 2.2.1: Support to training facilities within existing institutions for increased capacity building on RETs. • **Sub-activity 1:** Develop work plans and long-term funding and outreach strategies for the facilities. • **Sub-activity 2:** Adaptation of monitoring results and lessons learnt into training programs on RET to be offered by training facilities. • **Sub-Activity 3:** Training of private sector and institutional partners to ensure sustainability of testing sites. • **Sub-activity 4:** Convene meeting of stakeholders to agree modalities for facilitating community of practice.	- # and type of training packages developed. - # of people technically trained and % of people trained with increased knowledge and skills.	There is no mechanism for up-scaling of RETs for Public-Private actors established, and capacity building required			- Minimum of 3 training packages developed. - Minimum of 40 people technically trained, with minimum of 70**%** with increased knowledge.	

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	• **Sub-activity 5:** Project support to the community of practice to operate under project for period of one year.						
	Activity Results 2.2.2: Develop institutional financing mechanisms to up-scale RETT in Ghana • **Sub-Activity 1:** Cost and benefit analysis of RETT activities from China to Ghana. • **Sub-Activity 2:** Prepare a financial proposal to promote RETT from China to Ghana. • **Sub-Activity 3:** Convene investors consultation meeting to rise fund for RETT from China to Ghana.	- Set of options for business and financing models developed. - A report about cost and benefit analysis of RETT activities from China to Ghana. - A financial proposal to promote RETT - A consultation meeting to raise fund for RETT from China to Ghana.				- A cost report to be published in Chinese and translation to English - A financial report to be published and translation into English. - A consultation meeting will be held. - Reports about raising fund for RETT will be finished.	
	Activity Results 2.2.3: Develop business models to support private sector involvement and public – private partnerships in RETT in Ghana • **Sub-Activity 1:** Convene China-Ghana stakeholder discussions on business model development. • **Sub-Activity 2:** Conduct strategic research on business models to facilitate the involvement of private sectors in RETT.	- # of people trained and % of people trained on Business Model with increased knowledge and skills. - # of participants in community of practice. - # of technically trained people actively employed in the RE sector.				- At least 2 options for business and financing models developed. - Guide book related to RETT in Ghana published.	- Minimum of 100 people trained on Business Model, with minimum of 70% with increased knowledge. - Minimum of 20 stakeholders participate in

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	• **Sub-Activity 3:** In cooperation with training facilities, design and conduct training programs for both Chinese and Ghanaian stakeholders, including governmental agencies, research institution, private sector, SME, etc. on developed models.						community of practice. - At least 10 technically trained people actively employed in the RE sector.
Outcome 3: China's has strengthened capacity for South-South Cooperation in relation to RET transfer							
	Output 3.1: Knowledge base and China – Ghana networks for South-South Cooperation on technology transfers created						
	Activity Result 3.1.1: Map, update and share China's experience and approaches to technology selection and transfer. • **Sub-activity 1**: Map National and Regional planning approaches, laws and programs, institutional set ups and financial models into a comprehensible set of reports on China's experience creating widespread access to renewable energy and becoming a key producer of RETs. • **Sub-activity 2:** Conduct in-depth analysis of China's experience on rural electrification and make recommendations for good practice for the Ghanaian context. • **Sub-activity 3:** Organize training/workshop/seminars to review documentation and receive feedback for	# of reports and surveys developed and published.	The UNDP South-South Cooperation Framework	- Minimum of 3 reports on China's national and regional planning approaches, laws and programs, institutional set ups, technology capacity, and financial models produced and shared. - A report on China's experience on rural electrification will be published. - A draft brief paper on	4 meetings for understanding of Chinese policy and regulations on RET development and identify the potential gaps for RETT from China to Ghana.		

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	appropriate revisions and modalities for sharing information. • **Sub-activity 4:** Draft briefing paper on technology selection and transfer approaches for Chinese stakeholders			technology selection and transfer approaches for Chinese stakeholders.			
	Activity Result 3.1.2: Organize exchange visits to share knowledge on the Chinese and Ghanaian contexts and build foundations for technology transfers. • **Sub-activity 1**: Organize exchange visits from China to Ghana and vice-versa to study each country's energy sectors. • **Sub-activity 2:** Carry out joint stakeholder meetings to initiate knowledge transfer and strengthen mutual understanding of Ghanaian policy and market conditions.	- # of exchange visits			- Minimum of 18 project stakeholders participates in visits exchange visits. - Meetings for initiating knowledge transfer and Ghana's context.		- Meetings for initiating knowledge transfer and Ghana's context.
	Activity Result 3.1.3 Share knowledge and establish knowledge networks on Renewable Energy. • **Sub-activity 1**: Draft reports and strategy documents identifying barriers and solutions to RET to Ghana. • **Sub-activity 2:** Develop and maintain a web platform to • **Sub-activity 3:** Draft strategy of RETT from China based on Ghana's national strategies and priorities for Renewable Energy.	- Web platform established with access to reports, surveys and other resources. - # of stakeholders participating in Chinese community of experts.				- Meetings about draft reports and strategy documents identifying barriers and solutions, including 20 policy-makers. - A web platform fully functional and loaded with all	- Minimum of 20 stakeholders participate in community of experts

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	• **Sub-activity 4:** Establish and maintain expert communities and knowledge networks to support continuous learning on RET transfer between China and Ghana.					relevant reports, surveys and other resources and accessed by relevant stakeholders. - Minimum of 20 stakeholders participate in community of experts.	
	Output 3.2 Mechanisms for promoting RETT from China to Ghana established						
	Activity Result 3.2.1: Develop roadmap for Renewable Energy Technology Transfer from China to Ghana • **Sub-activity 1:** Convene a series of meetings of stakeholders to agree the vision and goals for Renewable Energy Technology Transfer from China to Ghana. • **Sub-activity 2:** Develop and maintain a web platform in Chinese to share project findings and results. • **Sub-activity 3:** Launch and disseminate the Strategy within China.	Roadmap launched and disseminated;	There is no existing mechanism for promoting RETT			Roadmap for RETT from China to Ghana agreed, and launch it	
	Activity Result 3.2.2: Seek institutional financing to support technology transfer from China to Ghana	Finance strategy developed and # of proposals submitted		- A meeting for a task force responsible for China-Ghana	A report on RETT financing mechanisms.		A report on RETT financing mechanisms.

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	• **Sub-activity 1:** Set-up a task force responsible for China-Ghana RETT financing through the SSC center. • **Sub-activity 2:** Prepare proposals and reports to apply for additional financial support from MOST and other Ministries in China through SSC Centre. • **Sub-activity 3:** Develop report on RETT financing mechanisms			RETT financing through the SSC center. - Minimum of one proposal to apply for additional financial support from MOST and other Ministries in China through SSC Centre submitted			
	Activity Result 3.2.3: Set up a Chinese stakeholders alliance for China – Ghana RETT • **Sub-activity 1:** Identify stakeholders, agree on modalities for the alliance and hold kick off meeting. • **Sub-activity 2:** Assess and revise criteria and standards for RET selection to unify existing practices. • **Sub-activity 3:** Revisit barriers to RET deployment and draft strategy for joint collaboration	# of meetings for Chinese stakeholders alliance, and # and type of participants in the alliance		- A kick-off meeting for agreeing on modalities for the alliance - A meeting to assess and revise criteria and standards for RET selection to unify existing practices	- Meetings and a report about the vision and goals for Renewable Energy Technology Transfer from China to Ghana - A meeting for revising barriers to RET deployment and develop strategy for joint collaboration.		

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	Activity Result 3.2.4: Conduct training of Chinese stakeholders in relation to RETT • **Sub-activity 1:** Develop training material in Chinese based on information from policy development process, technology review, demonstration sites, mapping and exchange visits. • **Sub-activity 2:** Organize trainings on policy, market and cultural aspects of doing socially responsible business in Ghana in support of national development goals	- # of people trained and % of people trained with increased knowledge and skills.			- Develop training material in Chinese and publicize, based on information from policy development process, technology review, demonstration sites, mapping and exchange visits. - Training materials will be prepared, and Minimum of 20 stakeholders trained, minimum of 70% with increased knowledge and skills.	- Develop training material in Chinese and publicize, based on information from policy development process, technology review, demonstration sites, mapping and exchange visits. - Training materials will be prepared, and Minimum of 20 stakeholders trained, minimum of 70% with increased knowledge and skills	
	Activity Result 3.2.5: Support Ghana's adoption capacity for Renewable Energy Technology Transfer • **Sub-activity 1:** Training of Ghanaian stakeholders in China on technologies at solar, mini-hydro and biogas facilities.					- Design a training material about technologies at solar, mini-hydro and biogas facilities for Ghanaian	- A visit from Ghana to China for the training about technologies.

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						stakeholders studying in China.	
Outcome 4: Project management and coordination structures established							
Output 4.1 Project management structures established							
Activity Result 4.1.1: Set up PMUs in Ghana and China. • **Sub-activity 1**: Prepare stakeholder list and identify PMU members. • **Sub-activity 2:** Establish PMU with required documentation and terms of reference. • **Sub-activity 3:** Convene regular meetings for work plans, project monitoring, implementation and other discussions	- Documents establishing PMUs and PSCs - Detailed work plans developed. - Regular meetings held in Ghana and China	PMUs and PSCs haven't been established.	- Stakeholder list developed; - Project organization established; Regular meetings held. - Detailed work plan agreed for the project outlining roles & responsibilities, budget & administration; PMUs and PSCs meet according to schedule.			
Activity Result 4.1.2: Set up PSCs in Ghana and China • **Sub-activity 1:** Prepare stakeholder list and identify PSC members. • **Sub-activity 2:** Establish PSC with required documentation and terms of reference. • **Sub-activity 3:** Hold PSC meetings to review project plans and reports.	A mid-term evaluation			- A mid-term evaluation including international consultants and national consultants. - PSCs meet at least once per year	PSCs meet at least once per year	PSCs meet at least once per year
Activity Result 4.1.3: Support project implementation							

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CHINA-ZAMBIA SOUTH-SOUTH COOPERATION ON RENEWABLE ENERGY TECHNOLOGY TRANSFER							
	ACTIVITY RESULTS	INDICATORS	BASELINES	TARGET			
				Year 1	Year 2	Year 3	Year 4
Outcome 1: The enabling environment for the transfer and use of priority renewable technologies in Zambia strengthened							
	Output 1.1 Improved policies, legislation and standards for the transfer and use of project technologies for rural electrification						
	Activity Result 1.1.1: Finalization of review of the implementation of policies and legislation for rural electrification using off-grid technologies.	Final review report on review of the implementation of policies and legislation for rural electrification using off-grid technologies.	Draft review report of the implementation of policies and legislation for rural electrification using off-grid technologies exists. Current legislation ineffective and incomplete (baseline: UNDP scoping mission to Zambia 2013)	Review report on review of the implementation of policies and legislation for rural electrification using off-grid technologies finalized.			
	Sub-activity 1: Preparation of a briefing paper / baseline study on RET policy/legal reforms						

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	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.	# of people trained/participates in workshops.			- 3 working group meetings held with minimum of 45 participants. - Minimum of 1 policy/legislation document drafted		
	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. **Sub-activity 2:** Draft legislation, policy, regulation or grid code, as required, based on consensus of stakeholders with guidance from Zambian government						
	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 of minimum 40 participants to create awareness about key policies & reform processes for rural electrification.	# of instruments developed and implemented. % of people trained / participate in workshops with increased knowledge of policies and renewable energy				40 people trained	

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	• **Sub-activity 2:** Convene series 3 of workshops & capacity building training sessions on implementation of key renewable energy policies.						
	Output 1.2 Financial mechanism for RETs established						
	Activity Result 1.2.1: Review opportunities for additional financing institutions such as the Development Bank of Zambia to fund its Renewable Energy Fund.	- # of finance mechanisms for RET established. - Amount of $ secured in financial support for REF.	Financial mechanisms insufficient (baseline: UNDP scoping mission to Zambia 2013)	Financial institutions engaged by DoE for resourcing of the RE Fund	Funding structure developed.		
	• **Sub-activity 1:** Engage with financial institutions with support of project for developing proposal to support Renewable Energy Fund**,** • **Sub-activity 2:** If successful, funding structure design to be supported by project.						
	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.						- Microfinancing accessed to promote RETs

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	• **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, • **Sub-activity 2:** Review options for micro-finance scheme designs to support rural electrification						
	Activity Result 1.2.3: Develop a value chain strategy for driving down cost of technology that can support private sector and government actors.	# of value chain strategies adopted				- 1 comprehensive value chain strategy study completed. - Funding proposal developed. 3 consultative value chain stakeholder discussions held with minimum of 40 participants	Supply chain facility established and supply chain options established.
	• **Sub-activity 1**: Conduct comprehensive value chain study, • **Sub-activity 2:** 3 consultative value chain stakeholder discussions with minimum 40 participants.						
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						
	Activity Result 2.1.1: Creation of demonstration, testing and training facilities for priority technologies.	The of # demonstration, testing and training facilities established	Testing and training centers not equipped and functional (baseline: UNDP scoping mission to Zambia 2013)	- Work plan and long-term funding and outreach strategy in place.	Terms of Reference (TORS)s for facilitation of the community of practice in place	Testing centers fully functional	
	• **Sub-activity 1**: Develop the work plan and long-term funding and outreach strategy for the facilities,						

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	• **Sub-activity 2:** Zambia training center directors to convene meeting of stakeholders to agree on responsibilities for facilitating community of practice, • **Sub-activity 3:** Community of practice to operate under project for period of one year, iv) Center directors and senior staff to receive training in China.			- 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.	# and type of equipment received and exhibited by centers					
	• **Sub-activity 1**: Support facilities implementation through acquisition of testing and demonstration equipment						
	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.	- # and type of education materials developed by centers. - # of people trained in renewable energy technology and practice.	Capacity gaps exist (baseline: UNDP scoping mission to Zambia 2013)		30 people trained	3 training modules developed.	Minimum of 30 people trained;
	• **Sub-activity 1**: Demonstration facilities to develop educational materials,						

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	• **Sub-activity 2**: Demonstration facilities to commence 3 training modules for minimum 30 participants, product evaluation and outreach program for a full-year sub program.	- % of people trained with increased knowledge on renewable energy technology and practice.					
	Activity Result 2.2.2: Support one renewable energy rural electrification project.	- 1 project successfully selected according to established criteria. - Amount and type of support provided to selected project. - Evaluation and lessons learnt document produced.		Project selection committee established	- Request for proposals issued - Projects screened, MoU signed.	Rural electrification project implemented.	- Evaluation and lessons learnt exercise commenced; Rural electrification project completed, final evaluation results available.
	• **Sub-activity 1**: Form project selection committee, • **Sub-activity 2:** Agree on criteria for receiving, evaluating and selecting proposals, • **Sub-activity 4:** Request, receive and evaluate proposals according to set criteria resulting in selection of 3 project(s) and MOUs to be signed with project developers, • **Sub-activity 5:** Project to be implemented with supervision of project, • **Sub-activity 6:** evaluation of project progress and results to be made in order to formulate lessons and future guidance.						
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						

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	Activity Result 3.1.1: Map, update and share China's approaches to technology selection and transfer. • **Sub-activity 1:** Update the manual: "South-South Cooperation on science and technology to address climate change – applicable technology" for Zambia, • **Sub-activity 2:** Prepare briefing paper on technology selection and transfer approaches for Chinese stakeholders.	# and type of briefing papers and guidelines developed and distributed	Knowledge gaps exist (baseline: UNDP / MOST dialogue 2013)	- 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. - At least 300 Manual been disseminated; English version well be available on internet.	- Draft reports on cost and financial analysis for RETT from China to Zambia; Draft possible policy support strategy		
	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 to study Zambia's energy sector, • **Sub-activity 2:** Joint Zambia / China stakeholder meeting to begin knowledge transfer and to strengthen mutual understanding of Zambian policy and market conditions.	# of people reached with new information and approached through dissemination of briefings / papers / reports # and type of agreements on technology transfer		- 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.			

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				- Minimum of 20 project stakeholders participates in visits exchange visits.			
	Activity Result 3.1.3: Share and disseminate knowledge on mission findings and project achievements,			- Website and online system for RETT from China to Zambia/Ghana; Maintenance and data updating;	- Website and online system for RETT from China to Zambia/Ghana; Maintenance and data updating; - National strategy to overcome the barriers to be published and translated into English.	- Website and online system for RETT from China to Zambia/Ghana; Maintenance and data updating;	- Website and online system for RETT from China to Zambia/Ghana; Maintenance and data updating;
	• **Sub-activity 1:** Draft report and strategy identifying barriers and solutions to RET to Zambia, • **Sub-activity 2:** Conduct training based on report, • **Sub-activity 3:** Develop and maintain website to share project findings and results**,** • **Sub-activity 4:** Establish and maintain 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 Centre,	# and type of guiding documents for the SSC Center produced and adopted	Chinese Center for South-South Cooperation within MOST does not exist	- Prepare meeting with key Ministries and RET industry leaders; Meeting to set up	- Meeting for industrial stakeholder consultation, and meeting for		

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	• **Sub-activity 1:** Set up steering committee, • **Sub-activity 2:** Develop the work plan of the Centre, • **Sub-activity 3:** Develop long term funding and outreach strategy for the Centre.			the SC for SSC Centre - Stakeholder meeting with government officials to review the work plan for SSC center; - 4 experts to develop the long-term SSC center work plan - 5 experts for preparing the proposal for funding application and outreach strategy developed; - Meeting for government stakeholders consultation including 20 persons.	revising and approval of proposal and outreach strategy		
	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	# of meetings held by the SSC steering committee and stakeholders under the auspices of the SCC Center		- Meeting to establish the RE alliance. - A Chinese expert's community will be formed with 10 consultants to support the continuous learning, and also will support the PMU of both China and Zambia	- A Chinese expert's community will be formed with 10 consultants to support the continuous learning, and also will support the PMU of both China and Zambia sides	- A Chinese expert's community will be formed with 10 consultants to support the continuous learning, and also will support the PMU of both China and Zambia sides	- A Chinese expert's community will be formed with 10 consultants to support the continuous learning, and also will support the PMU of both China and Zambia sides
	• **Sub-activity 1:** Identify stakeholders and kick off meeting,						

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	• **Sub-activity 2:** Assess and revise criteria and standards for RET selection to unify existing practices, • **Sub-activity 3:** Revisit barriers to RET deployment and draft strategy for joint collaboration.			will support the PMU of both China and Zambia sides from technical perspective. - 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.	sides from technical perspective. - Seminar for joint collaboration strategy to be signed - - Meetings with minimum of 50 stakeholders held in Beijing - Draft the strategy for joint collaboration; - Meeting to collect the feedback and comments from stakeholders;	from technical perspective.	from technical perspective.
	Activity 3.2.3: Develop training materials on South – South Cooperation and Renewable Energy Technologies • **Sub-activity 1:** Develop practical guide to SSC for RET in Chinese to be made available via the web and in printed form.	# of people trained on SSC and RET			- Best practices case studies for each technology; 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;		
	Activity Result 3.2.4: Conduct training of Chinese stakeholders	% of people trained with increased			- Develop business model for the		**Year 1 -4**

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	South – South Cooperation and Renewable Energy Technologies • **Sub-activity 1:** Organize trainings in coordination with MOST on policy, market and cultural aspects of doing business in Africa, • **Sub-activity 2:** Distribution of practical guide to SSC for RET at trainings.	knowledge of SSC and RET			RETT from China to Africa; - Policy, culture and enabling environment development and publications.		- 6 RET stakeholder trainings on South-South Cooperation; Entrepreneur trainings for doing business in Africa
	Activity Result 3.2.5: Support the Renewable Energy Technology platform, • **Sub-activity 1:** Study tour for a delegation from Zambia to China for training at solar, mini-hydro and biogas facilities.				- Minimum 10 people participates in study tour - 6 experts training from Zambia to China at solar, mini-hydro and biogas facilities		
Outcome 4: Project organization and coordination structures established							
	Output 4.1: Project Management Structures established						
	Activity Result 4.1.1: Set up PMU in Zambia. • **Sub-activity 1:** Set up coordination mechanisms, • **Sub-activity 2:** Prepare detailed work plan for the project	# of PMUs and PSCs established with guiding principles and detailed work plans - # of meetings held	Project management structures not in placed	- PMUs set-up, AWP approved, Office equipment and staff in place, Quarterly and Annual Reports produced,	- Quarterly and Annual Reports produced,	- Quarterly and Annual Reports produced,	- Quarterly and Annual Reports produced,
	Activity Result 4.1.2: Set up PMU in China,			- PMUs set-up, AWP approved,			

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	• **Sub-activity 1:** Set up coordination mechanism**,** • **Sub-activity 2:** support the SSC center and long-term operation.			- Office equipment and staff in place, - Annual meeting of SSC stakeholders held.	- Quarterly and Annual Reports produced, - Annual meeting of SSC stakeholders held.	- Quarterly and Annual Reports produced, - Annual meeting of SSC stakeholders held.	- Quarterly and Annual Reports produced, - Annual meeting of SSC stakeholders held.
	Activity Result 4.1.3: Set up Project Steering Committees			PSC set up and functional, SC meetings held	SC meetings held	SC meetings held	SC meetings held
	• **Sub-activity 1:** Prepare stakeholder list and identify PSC members, • **Sub-activity 2:** Establish PSC with required documentation and terms of reference, • **Sub-activity 3:** Hold PSC meetings to review project plans and reports.						
	Output 4.2 Project Coordination Structures established						
	Activity Result 4.2.1: Create project coordination and management structure-.	# and type of project MoUs and agreements signed		MoUs signed.			
	• **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, • **Sub-activity 2:** Sign MoUs guiding overall project implementation and separate agreements for specific project activities as required						

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	Activity Result 4.2.2: Convene stakeholder group meetings, • **Sub-activity 1:** Review and adjust stakeholder lists for Zambia and China, • **Sub-activity 2:** Kick off and organize regular meetings for project stakeholders in Zambia.	- # of project management meetings held with Zambia, China and UNDP participation. - # and type of stakeholders invited and participate in meetings. - # of stakeholder meetings convened.			Minimum 2 Coordination meetings held	Minimum 2 Coordination meetings held	Minimum 2 Coordination meetings held
	Output 4.3 Support project implementation						
	Activity Result 4.3: Support project implementation.			PM, PA in position; annual progress report submitted to donor;	Mid-term Review conducted; audit conducted; annual progress report submitted to donor.	Audit conducted; annual progress report submitted to donor.	Audit conducted; Final progress report submitted to donor.

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II. List of stakeholders

	Country	Organization	Name	Title	Position	Email address	Interviewed	Online survey sent
1	Denmark	Danish Embassy in China	Helle Meinertz	Ms.	Deputy Head of Mission, Minister	helmei@um.dk	√	√
2	Denmark	Danish Embassy in China	Merve Imren Yalcin	Ms.	Political Officer	meryal@um.dk	√	√
4	China	UNDP China	Niels Knudsen	Mr.	Assistant Country Director / Resident Representative A.I. UNDP DPRK and TL SSGDC UNDP China	niels.knudsen@undp.org	√	√
7	China	UNDP China	Peter Morling	Mr.	Programme Analyst	peter.morling@undp.org	√	√
8	China	UNDP China	Benjamin Moore	Mr.	Former Programme Analyst	benjamin.moore@one.un.org		√
9	China	China Normal University	张九天 Zhang Jiutian	Mr.	Professor	zhangjiutian@hotmail.com	√	√
10	China	ACCA21	张贤 Zhang Xian	Mr.	Deputy Director	zhangxian@acca21.org.cn		√
11	China	China Normal University	张璐 Zhang Lu	Ms.	Programme officer	xinghuoxili@163.com		√
12	China	ACCA21	刘笑宇 Liu Xiaoyu	Ms.	Project Coordinator	liuxy@acca21.org.cn	√	√
13	China	ACCA21	易冰星 Yi Bingxing	Ms.	Project Manager	yibx@acca21.org.cn		√
14	China	CAU	董仁杰 Dong Renjie	Mr.	Professor	rjdong@cau.edu.cn		√
15	China	ADB	沈一扬 Shen Yiyang	Mr.	Senior Advisor	tonyshen86@yahoo.com	√	√
16	China	ICSHP	董国锋 Dong Guofeng	Mr.	Deputy Division Chief	gfdong@icshp.org	√	√
17	China	CUMTB	樊静丽 Fan Jingli	Ms.	Associate Professor	fjlldq@163.com		√
18	China	CREIA	王卫权 Wang Weiquan	Mr.	Deputy Secretary General	wangweiquan@creia.net		√
19	China	Poly Solar	滕爱华 Teng Aihua	Ms.	总经理 General Manager	sy01@szshenyuan.com	√	√

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20	China	Poly Solar	姜灏 Jiang Hao	Mr.	副总经理 Vice General Manager	jianghaozi@126.com		√
21	China	Haier	聂维康 Nie Weikang	Mr.	海外大项目部	niewk.hys@haierhk.com		√
22	China	ACCA21	仲平 Ping Zhong	Mr.	Deputy Director	zhongp@acca21.org.cn		√
23	China	UNDP China	张卫东 Weidong Zhang	Mr	Programme Manager	weidong.zhang@undp.org		√
24	China	China Africa Advisory	Moritz Weigel	Mr.	Consultant	chinaafricaadvisory		√
25	China	UNDP China	Carsten Gerners	Mr.	Team Leader	Carsten.germer@gmail.com		√
26	Zambia	UNDP Zambia	Winnie Musonda	Ms.	Assistant Resident Representative / Environment Advisor	winnie.musonda@undp.org	√	√
27	Zambia	Ministry of Energy - Department of Energy	Harriet Zulu	Ms.	Acting Director of Department of Energy	luzuhat@yahoo.co.uk	√	√
28	Zambia	Ministry of Energy - Department of Energy	Leah Mtolo	Ms.	Project Manager (As of Dec 2018)	leah.mtolo@undp.org	√	√
29	Zambia	Ministry of Energy - Department of Energy	Lloyd Ngo	Mr.	Project Manager (2015-2018)	lloyd.ngo@undp.org	√	√
30	Zambia	Ministry of Energy - Department of Energy	Brian Mainza	Mr.	Senior Energy Officer	bsmainza@gmail.com	√	√
31	Zambia	Ministry of Energy - Department of Energy	Chila Chilombo	Ms.	Energy Officer	chilombo.chila@moe.gov.zm	√	√
32	Zambia	Ministry of Energy - Department of Energy	Mafayo Ziba	Mr.	Policy	mafayoziba@gmail.com	√	√
33	Zambia	Ministry of Energy - Department of Energy	Lukonde Kaunda	Ms.	Energy Economist	lookonday@gmail.com	√	√
34	Zambia	Chongwe Rural Health Centre	Dr. Kabungo	Mr.	Director of Chongwe clinics		√	
35	Zambia	Chongwe Rural Health Centre		Mr.	Planning officer		√	

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36	Zambia	Solar Energy Centre of Excellence / University of Zambia	Prof Jain	Mr.		pjain@microlink.zm	√	
37	Zambia	Solar Energy Centre of Excellence / University of Zambia	Dr Haatwambo	Mr.		shatwamb@gmail.com	√	√
38	Zambia	Solar Energy Centre of Excellence / University of Zambia	Bellington Changwe	Mr.		bchangwe@unza.zm	√	√
39	Zambia	Kafue Gorge Training Centre	Eng . Kaela Keneddy Siame	Mr.	Director	siamek@kgrtc.org.zm	√	√
40	Zambia	Kafue Gorge Training Centre	Brian Makungo	Mr.	Head of training and consultancy	hbmmakungo@kgrtc.org.zm	√	√
41	Zambia	Kafue Gorge Training Centre	Dean Musukwa	Mr.	Consultant and researcher		√	
42	Zambia	Rural Electrification Authority	John Mwale	Mr.		JMwale@rea.org.zm	√	√
43	Zambia	Rural Electrification Authority	Suzyo Silavwe	Mr.		ssilavwe@rea.org.zm		√
44	Zambia	Muhanya Solar	Geoffrey Kaila	Mr.			√	
45	Zambia	ZESCO	Ziye Tembo	Mr.		Ziye.tembo@zesco.co.zm	√	√
46	Ghana	UNDP Ghana	Paolo Dalla Stella	Mr.	Head of Sustainable Development	paolo.d.stella@undp.org	√	√
47	Ghana	Energy Commision of Ghana	Eric Antwi-Agyei	Mr.	Project Manager	eric.antwi-agyei@undp.org	√	√
48	Ghana	UNDP Ghana	Louis Kuukpen	Mr.	Deputy RR	louis.kuukpen@undp.org	√	√
49	Ghana	Energy Commision of Ghana	Alfred O. Ahenkorah	Mr.	Executive Secretary	ahenkorah@gmail.com		√
50	Ghana	Energy Commision of Ghana	Kofi Agyarko	Mr.	Director, Renewable Energy, Energy Efficiency, & Climate Change	agyarkok@energycom.gov.gh	√	√

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51	Ghana	Energy Commision of Ghana	Eben Ashie	Mr.	Suggested replacement for Eric).	ebenashie@gmail.com		√
52	Ghana	Chinese Embassy in Ghana	Chai Zhingin	Mr.	Chinese Economic Councilor	gh@mofcom.gov.cn	√	√
53	Ghana	Ministry of Finance Representative	Gladys Gartey	Ms.	Ministry of Finance, Director	gladysghartey@yahoo.com		√
54	Ghana	Ministry of Power	Wisdom Kwasi Ahiataku Togobo	Mr.	Director renewable energy (in the PSC)	watogobo@gmail.com	√	√
55	Ghana	Ministry of Power	Seth Mahu Agbeve	Mr.	Directorate for RE	smagbeve@yahoo.com		√
56	Ghana	Private Enterprise Federation	Nana Osei bonsu	Mr.	Head of Private Enterprise Foundation	nanakoseibonsu69@gmail.com	√	√
57	Ghana	Private Enterprise Federation	Thomas Kankam Adjei	Mr.	Project Officer	tadjei@pef.org.gh	√	√
58	Ghana	Bui Power Authority	Alex Okae-Acheampong	Mr.	Manager, Tsatsadu mini-hydropower project	design.mgr@buipower.com	√	√
59	Ghana	Bui Power Authority	Maxmillian Acquah	Mr.	Manager / Project Manager	project.mgr@buipower.com	√	√
60	Ghana	University Farms	Eric Timpong	Mr.		etimpong-jones@ug.edu.gh		√
61	Ghana	Translight Solar (Priv sector)	Eric Nyanteh	Mr.	CEO	enyantehza@gmail.com	√	√
62	Ghana	Relief international (NGO)	Gloria Theresa Ilona Naa Korkoi	Ms.	Manager at Relief International -Cookstove promoter	gloria.addo@ri.org		√
63	Ghana	Trade works (solar)	Randy Sey	Mr.	Managing Director of TradeWorks	randysey@ghana.com	√	√
64	Ghana	Hilmit	Emmanuel Larbi	Mr.	Managing Director at HILIMIT	emmalarb@yahoo.com		√
65	Ghana	Tobinco Company Limited	Abubakari Abdul-Latif	Mr.	special aide to Executive Chairman	ea@tobincogroup.com	√	√
66	Ghana	Tobinco Company Limited	Enoch E. Aryee-Atta	Mr.	Group Managing Director	earyee-atta@tobincogroup.com	√	√
67	Ghana	CSIR	Dr. Gabriel Laryea	Mr.	Researcher	gabniilar@gmail.com	√	√

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68	Ghana	Energy Commission	Fred	Mr.	Principal Programme Officer	fred.ken.appiah@gmail.com		√
69	Ghana	Energy Commission	Kwabena Otu-Danquah	Mr.	Former Diretor for RE &EE at Energy Commission - retired	K.a.otudanquah@gmail.com		√
70	Ghana	Kumasi Polytechnic	Edem C. Bensah	Mr.	Researcher, Consultant and Lecturer	edem.bensah@gmail.com		√
71	Ghana	TEC, KNUST	Francis Kemausuor	Mr.	Researcher, Consultant and Lecturer	kemausuor@gmail.com		√
72	Ghana	CREK, Kumasi Polytechnic	Edward Antwi	Mr.	Researcher, Consultant and Lecturer	oldsojagh@gmail.com		√
73	Ghana	CREK, Kumasi Polytechnic	Julius Ahiekpor	Mr.	Researcher, Consultant and Lecturer	juliusahiekpor@yahoo.co.uk		√

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III. Activity Gantt chart

Figure 4: Terminal Evaluation activity plan

Activities	May			June				July	
	15 - 19	20 - 26	27 - 2	3 - 9	10 - 16	17 - 23	24 - 30	1 - 7	8 - 14
Inception Phase									
Kick-off meeting with UNDP China									
Identify, collect and initial review of relevant project documentation									
Identify key stakeholders in China, Ghana and Zambia									
Identify key informants for interviews and online survey (initial list on ToR)									
Draft Inception Report (IR)		X							
Data collection and analysis phase									
Documentation review and desk research									
Design of interview questions									
Design online survey questionnaire and survey dissemination									
Interviews with key stakeholders in China									
Field missions to Ghana and Zambia (will include interviews with key stakeholders and site visits to selected project locations)									
Data analysis									
Project's progress assessment (revision of ToC, Logframe and other key project documents)									
Close out phase									
Draft evaluation report								X	
Receive and incorporate feedback on draft evaluation report									
Draft lessons learnt and recommendations report									X
Final Evaluation report									X
X = Deliverable									

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IV. List of documents reviewed

- China-Zambia South-South Cooperation on Renewable Energy Technology Transfer project document
- China-Ghana South-South Cooperation on Renewable Energy Technology Transfer project document
- 2014 Annual Project Report for Ghana and Zambia.
- 2015 Annual Project Report for China-Ghana
- 2015 Annual Project Report for China-Zambia
- 2016 Annual Project Report for China-Ghana
- 2016 Annual Project Report for China-Zambia
- 2017 Annual Project Report for China-Ghana
- 2017 Annual Project Report for China-Zambia
- 2018 Annual Project Report for China-Zambia (draft)
- 2015 – 2018 four year workplan for Zambia
- 2017 – 2018 workplan for Zambia
- 2019 workplan for China and Zambia
- BTOR and Mission reports for Ghana
- 2017, Visit Chinese companies to Ghana
- 2017, List of participants in the Match Making Event, Beijing
- 2016 – 2017 List of REMP Meetings in Ghana
- Photos_Tsastadu MHP Project
- 2016, Zambia China South to South Renewable Energy Technology Transfer Project
- 2016, Zambia China South to South Renewable Energy Technology Transfer Project Proceeding of the Phase I Capacity Building Training on Site Selection for Mini hydro
- 2016, Proceeding of the Phase II Capacity Building Training on Field Survey and Data Collection for construction of a Mini Hydro Power held at Chipota Falls in Serenje
- 2017, Report on the community engagement meetings for the construction of the Chipota falls mini-hydro power station under the Zambia-China South to South Renewable Energy Transfer project
- 2017, Review of energy policies and legislation for rural electrification using off grid technologies in Zambia
- 2017, Final draft report on validation meeting in support of review of energy policies and legislation for rural electrification using off grid technologies in zambia
- 2017, Capacity building workshop for parliamentarians and government officials in Zambia
- 2018, Willingness to pay for electricity surey South-South RETT project – Chipota Falls mini-hydro
- 2018 Environmental project brief for the proposed 200kw chipota mini hydro power station at chipota falls in serenje district
- 2018, Inception report on Renewable Energy strategy for Zambia
- Talking Notes on China Zambia South to South Cooperation on Renewable Energy Technology Transfer Project
- ICSHP Training Manuals

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V. Interview questions

The list of questions provided for each country's stakeholders is a long list of questions. Each interview was adapted according to the stakeholder's role and engagement in the project.

1) Interviews in Ghana

1. What is your overall assessment of the project?
2. In your opinion, is the Chinese case useful to increase Ghana's capacity on Renewable Energy Technology.
3. How does the project align with Ghana's national development goals and priorities for poverty reduction?
4. Are the outcomes defined in the project adequate for Ghana?
5. Can you list the key barriers that, in your opinion, are hindering technology transfer from China and use in Ghana?
6. Do you think the selected technologies (biogas, improved cook stoves, solar and wind power) under the project are appropriate?
   a. How were these technologies selected?
   b. Which ones would you change (remove or include instead)?
7. What is the role of the private sector?
8. How often do Project Steering Committee meetings take place?
9. How would you assess coordination among the PMUs in the project?
10. Have you participated in capacity building related to RET? In what areas?
    a. How were the areas for capacity building decided?
    b. What is your overall assessment of the capacity building provided by the project?
    c. What are the most successful aspects of capacity building provided so far? The least successful?
    d. Has the local context been taken into consideration in training sessions or materials?
11. What are the financing mechanisms identified to scale up RETT in Ghana?
    a. In your opinion, are these mechanisms likely to be sustainable beyond the duration of the project?
12. Have you participated in exchange visits to China or Chinese delegations to Ghana?
    a. How often do exchange activities take place?
13. Has China provided reports, models or other training materials? Have they been useful?
14. Have you participated in the web platform established to promote China-Ghana experience exchange?
15. What have been the key challenges faced to implement the workplans?
16. What have been the main challenges from a project management perspective?
17. How do these projects fit into UNDP's SSC strategy?
18. What is your overall assessment of these project?
19. What role has the coordination between UNDP country offices (or lack thereof) played in the project?
20. What, in your opinion, is the added value of designing these projects as trilateral projects instead of traditional bilateral projects?
21. Which would you say are the key success factors of these projects? And the least successful?
22. What could be done to strengthen sustainability?
23. Any other thoughts you would like to share on the projects?

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2) Interviews in Zambia

1. What is your overall assessment of the project?
2. In your opinion, has the local context been considered in selecting technologies and building capacity for transfer from China to Zambia?
3. How does the project align with Zambia's national development goals and priorities for poverty reduction and renewable energy?
4. Are the outcomes defined in the project adequate for Zambia?
5. Has the project contributed to reducing key barriers that are hindering technology transfer from China and use in Zambia?
6. Has the project contributed to strengthen the enabling environment for RET in Zambia? How? What is the stage on the Renewable Energy Strategy and the plan once it has been drafted?
7. What is the role of the private sector in the project?
8. How often do Project Steering Committee meetings take place?
9. Are the outcomes defined in the project adequate for Zambia?
10. What are the financing mechanisms identified and institutions involved for renewable energy technology transfer?
11. What is the role of the private sector in the project?
12. How would you assess coordination among the PMU in China and here?
13. Have you received capacity building related to RET? In what areas? Where?
    a. How were the areas for capacity building decided?
    b. What is your overall assessment of the capacity building provided by the project?
    c. What are the most successful aspects of capacity building provided so far? The least successful?
    d. Has the local context been taken into consideration in training sessions or materials?
14. Have you participated in delivering trainings in Zambia? To whom? What areas? What are the positive aspects of these trainings?
15. Have you participated in exchange visits to China or Chinese delegations to Zambia?
    b. How often do exchange activities take place? Assessment?
16. Has China provided reports, models or other training materials? Have they been useful?
17. What have been the key challenges faced to implement the workplans?
18. What have been the main challenges from a project management perspective?
19. How do these projects fit into UNDP's SSC strategy?
20. What is your overall assessment of this project?
21. What role has the coordination between UNDP country offices (or lack thereof) played in the project?
22. What, in your opinion, is the added value of designing these projects as trilateral projects instead of traditional bilateral projects?
23. Which would you say are the key success factors of these projects? And the least successful?
24. What could be done to ensure the sustainability of the project?
25. Any other thoughts you would like to share on the projects?

3) Interviews in China

1. Have you participated in the Ghana or the Zambia project or both?
2. How would you assess the model of the project (trilateral cooperation rather than traditional bilateral implementation)?

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3. Are there any mechanisms in place to ensure close communication with stakeholders (PMUs) in Ghana and Zambia?
4. How were the most relevant experiences and approaches from China selected for Ghana and Zambia (activity 3.1)?
5. In your opinion, has the local context been considered in selecting technologies and building capacity for transfer in Zambia and Ghana?
6. Can you describe how the process of technology transfer has been with Ghana and Zambia?
7. What are the main challenges in Renewable Energy Technology Transfer to Ghana? And Zambia?
8. Have you participated in field missions to Ghana or Zambia? How would you assess these missions?
9. Has an online web platform where all project relevant reports and document are shared been created? Link?
10. Has the Chinese Centre for South-South Cooperation within the Ministry of Science and Technology been created?
    a. Does the center have a defined mission, vision, strategy and workplans?
    b. If it hasn't, why not?
    c. What will happen at the end of the project with the South-South Centre and the online platform?
11. Have any training materials on South-South Cooperation and Renewable Energy Technologies been developed?
    a. Are they publicly available?
    b. Where they tailored for each context?
    c. Have they and how have they been shared with Ghana and Zambia?
12. Is the South-South Cooperation in these projects different from previous South-South cooperation you have participated in?
    a. In what way?
    b. How would you assess the South-South Cooperation component of the projects?
13. What is the role of the private sector in the project?
14. What is your overall assessment of the project?
15. What could be done to ensure the sustainability of the project?
16. Have you participated in any trainings in China under the projects?
17. Do you participate in the Renewable Energy Technology Transfer website / platform?
18. Which would you say are the key success factors of the project(s)? And the least successful?
19. What are the main challenges in Renewable Energy Technology Transfer to Ghana? And Zambia?
20. Have you participated in matchmaking events in China? In Ghana? In Zambia?
    a. Do you think these events are useful?
21. What Ghanian/ Zambian counterparts do you work with? Government, private sector?
    a. In what capacity?
    b. What have been the main challenges faced so far?
22. Have you built relations with any African companies under the framework of the project?
23. What are the main challenges you face when working with Ghanian counterparts
24. What could be done to strengthen sustainability of the project?
25. What is your overall assessment of these project?

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VI. Online survey questionnaire

Nationality					
Gender	☐ Female	☐ Male	☐Prefer not to say.Ot	☐ her. Please specify:_____	
Age group	☐ 20 to 30 years old.	☐ 30 to 40 years old.	☐40 to 50 years old.	☐ Over 50 years old.	☐ Prefer not to say.
RETT country	☐ Ghana	☐ Zambia	☐ China	☐ More than one RETT country. Please specify:	
Institution					
Type of institution/ entity	☐ National government	☐ Sub-national government	☐ Research institution	☐ Multilateral agency	
	☐ Bilateral agency	☐ Private sector	☐ State owned enterprise (SoE)		
	☐ Community-Based Organization	☐ National NGO	☐ International NGO		
	☐ Other (please specify)_____				
What position do you hold in your institution?					
What is your role in the RETT project?	☐ Project Manager	☐ Coordinator/ Director	☐ In-country implementing partner	☐ Trainer	☐ Other. Specify: _____
How long have you been involved in the project?	☐ Less than 1 year	☐ Between 1 and 2 years	☐ Between 2 and 3 years	☐ Between 3 and 4 years	

1. Did you take part in the design of the project?

☐ Yes	☐ No

How would you assess the degree of engagement of the national institutions in your country during the project design phase?(Likert scale: 1 – no engagement at all / 5 full engagement)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

2. Do you think the analysis of risks in the design of the project was adequate? (Likert scale: 1 – not adequate at all / 5 very adequate)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

3. What other risks do you think should have been identified?

_____

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4. Do you think the identified activities under each output are relevant to achieve the outputs and outcomes of the project?(Likert scale: 1 – not adequate at all / 5 very adequate).

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

5. Have you received training and/ or training materials as part of your engagement in the project? You can mark more than one option.

☐ Received training	☐ Received training material	☐ None of the above

6. Who were these trainings or training materials provided by?

☐ ACCA 21	☐ The International Center on Small Hydro Power (ICSHP)	☐ Energy Commission in Ghana.	☐ Department of Energy in Zambia.	☐ Other (please specify_____)

7. What is your overall assessment of the training and materials provided?
(Likert scale: 1 – not useful at all / 5 very useful)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

8. Would you say training activities and materials were tailored to the local context?
(Likert scale: 1 – not tailored at all / 5 very well-tailored)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

9. In your opinion, has the project contributed to strengthen the enabling environment for renewable energies in your country? (Likert scale: 1 – not contributed at all / 5 highly contributed)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

10. For Zambia project: Has the project contributed to reducing the barriers to access renewable energies technology in rural areas? (Likert scale: 1 – not contributed at all / 5 highly contributed)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

11. For Zambia project: How has the project contributed to reduce the barriers to access renewable energies technology in rural areas?

_____

12. For Ghana project: Has the project contributed to increasing the access and use of renewable energies technology? (Likert scale: 1 – not contributed at all / 5 highly contributed)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

13. How has the project contributed to increase the access and use of renewable energies technology?

_____

14. What is your assessment of South-South Cooperation in the project (China-Ghana and/ or China-Zambia)? (Likert scale: 1 – not much south-south, similar to an OECD donor-led project / 5 very south-south)

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☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

15. What aspects of South-South cooperation could be strengthened?

_____

16. In your opinion, would the project have benefited from increased interaction and South-South Cooperation between Ghana and Zambia? (Likert scale: 1 – would not have been beneficial at all / 5 would have been very beneficial)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

17. How would you assess the role of UNDP in the project? (Likert scale:1 –Very negative / 5 Very positive).

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

18. Would you say this project is sensitive to gender balance and gender issues?
(Likert scale: 1 – not sensitive at all / 5 very sensitive)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

19. Please explain: What, if anything, has made this project more or less "gender sensitive" compared to other projects you have participated in and what would you change going forwards?

_____

20. Please explain: What aspects of this project have been most successful from your point of view?

_____

21. Please explain: What aspects of this project have been least successful from your point of view?

_____

22. What aspects of the project would you change if there was second phase of the RETT project?

_____

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