

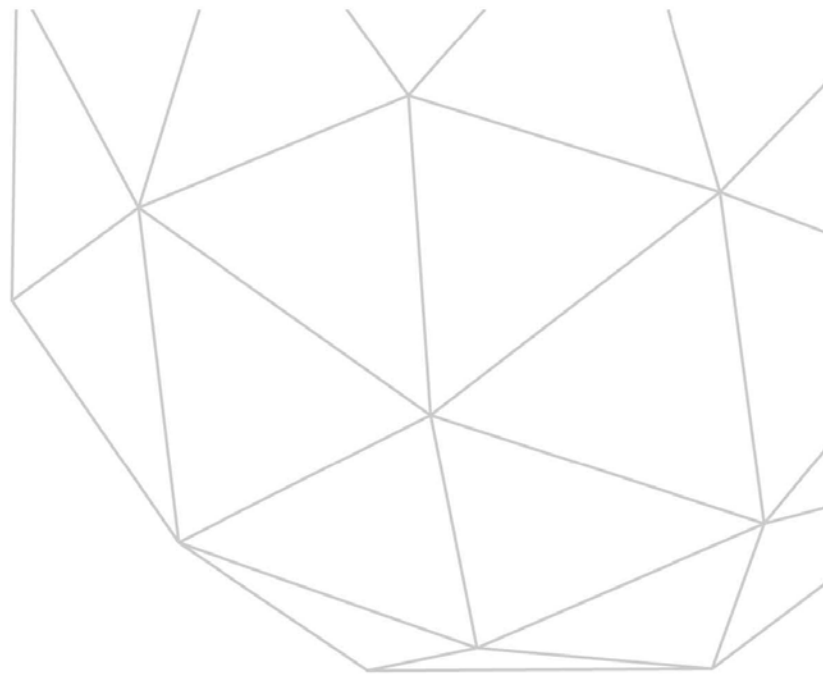
Funding Proposal

FP080: Zambia Renewable Energy Financing Framework

Zambia | African Development Bank | Decision B.19/12

16 March 2018





Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title: **Zambia Renewable Energy Financing Framework**

Country/Region: Zambia

Accredited Entity: African Development Bank

Date of Submission: November 13th 2017

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Note to accredited entities on the use of the funding proposal template

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:

“[FP]-[Agency Short Name]-[Date]-[Serial Number]”

A.1. Brief Project / Programme Information		
A.1.1. Project / programme title	Zambia Renewable Energy Financing Framework	
A.1.2. Project or programme	programme	
A.1.3. Country (ies) / region	Zambia	
A.1.4. National designated authority (ies)	Ministry of National Development Planning, Zambia	
A.1.5. Accredited entity	African Development Bank	
A.1.5.a. Access modality	<input type="checkbox"/> Direct <input checked="" type="checkbox"/> International	
A.1.6. Executing entity / beneficiary	Executing Entity: African Development Bank Beneficiary: Various renewable energy projects, regulators, local financial institutions in Zambia	
A.1.7. Project size category (Total investment, million USD)	<input type="checkbox"/> Micro (≤ 10) <input type="checkbox"/> Small ($10 < x \leq 50$) <input checked="" type="checkbox"/> Medium ($50 < x \leq 250$) <input type="checkbox"/> Large (> 250)	
A.1.8. Mitigation / adaptation focus	<input checked="" type="checkbox"/> Mitigation <input type="checkbox"/> Adaptation <input type="checkbox"/> Cross-cutting	
A.1.9. Date of submission	November 13 th , 2017	
A.1.10. Project contact details	Contact person, position	Ousseynou Nakoulima, Director for Renewable Energy and Energy Efficiency Namho Oh, Investment Officer
	Organization	African Development Bank
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	Mailing address	Avenue Joseph Anoma, 01 BP 1387 Abidjan 01, Côte d'Ivoire

A.1.11. Results areas (mark all that apply)	
Reduced emissions from:	
<input checked="" type="checkbox"/>	Energy access and power generation (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
<input type="checkbox"/>	Low emission transport (E.g. high-speed rail, rapid bus system, etc.)
<input type="checkbox"/>	Buildings, cities and industries and appliances (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
<input type="checkbox"/>	Forestry and land use (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)
Increased resilience of:	
<input type="checkbox"/>	Most vulnerable people and communities (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
<input type="checkbox"/>	Health and well-being, and food and water security (E.g. climate-resilient crops, efficient irrigation systems, etc.)
<input type="checkbox"/>	Infrastructure and built environment (E.g. sea walls, resilient road networks, etc.)
<input type="checkbox"/>	Ecosystem and ecosystem services (E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project / Programme Executive Summary

Please provide a brief description of the proposed project/programme, including the objectives and primary measurable benefits (see [investment criteria in section E](#)). The detailed description can be elaborated in [section C](#).

Energy generation in Zambia relies almost entirely on hydro power (nearly 90% of the total installed generation capacity of 2,826.9 MW) while the country's electrification rate stands at approximately 27.9%. Facing serious electricity supply deficit from recent droughts, the Government of the Republic of Zambia (GRZ) now actively seeks to improve conditions for private investment for power projects. This framework proposal will support the GRZ in its efforts to catalyze private investment in the renewable energy sector, and thereby accelerate the achievement of its electricity generation targets and the diversification of its energy mix. This will essentially reduce the country's reliance on the energy imports which has been an added fiscal pressure at the time of power crisis.

In view of the constraints that the country has faced in the energy sector, and to ensure sustainable and climate-friendly energy sector development, the GRZ has recently launched the Renewable Energy Feed-in-Tariff (REFiT) Strategy. The REFiT strategy provides a framework for deploying small- and medium-sized renewable energy projects of up to 20 MW with private sector involvement. The objective is to bring initially 200 megawatts (MW) of renewable energy onto the grid within the next three to five years, divided into 100 MW solar PV and 100 MW small-hydro power.

The "Global Energy Transfer Feed-in Tariffs" (GETFiT) Zambia program is designed by KfW to assist the GRZ in the implementation of the REFiT Strategy. A total 100 MW solar PV will be procured through a competitive two-stage auction process in the Phase I (to be launched in Q1 2018) while the second tender will call for small-hydro projects (scheduled in mid-2018). In support of the development and implementation of these projects ("GETFiT projects"), the AfDB proposes to provide debt financing to selected GETFiT projects and seeks co-financing by the Green Climate Fund, a pool of commercial banks, and the Zambian national pension fund managed by the National Pension Scheme Authority (NAPSA). The proposed AfDB-GCF financing envelope aims to provide USD 100 million of senior debt and standby loans (tenor extension instrument) to selected GETFiT projects, primarily targeting the first round 100MW solar PV projects and including a limited number of small-hydro (smaller than 20MW) projects from the subsequent tenders (up to 20% of the framework financing).

Lack of sufficient private financing and the short tenor (5-7 years from local commercial investors) have been pointed out as key barriers for RE project financing in many Sub-Saharan African countries including Zambia. This financing structure will create a sustainable market for private investment with strong local participation, supported by credit enhancement instruments to make the overall price and tenor competitive. Leveraging the potential of commercial players and local institutional investors for renewable energy project financing, this proposal presents a desirable and paradigm-shifting structure. A focus on small IPP projects under this program is expected to pave the way for the participation of local financiers and project developers.

In addition, technical assistance (TA) grants of up to USD 4 million, from the GCF and the AfDB, will be provided with an aim to develop the ecosystem and value chain for RE-based electrification in Zambia. The TA will have two components:

- 1) Assist the public sector (Ministry of Energy and Water Development, Rural Electrification Authority, etc.) to create enabling environment for private investments in the mini-grid and off-grid sector. Activities under this component will catalyze the market for decentralized energy solutions and directly contribute to national energy access, translating the experience of small-scale IPP (GETFiT projects) into RE-based rural electrification.
- 2) Build the capacity of selected local commercial banks, institutional investors, and the Zambian financial industry for its enhanced understanding on renewable energy and infrastructure financing, renewable energy project screening, due diligence, and monitoring. Participation of local investors to RE projects have been hindered by their limited capacity, little experience in the sector, and high risk perception. It is envisaged that local participation can be scaled up in the subsequent rounds of the GETFiT program as well as in other public RE tendering processes (including mini- and off-grid projects), building on the improved understanding and risk perception in the RE sector.

The proposed TA will promote small-scale, renewable and decentralized energy projects development that will fast-track the country's electrification efforts with a diversified mix. Further, small-scale renewables development and rural electrification together have the potential to reduce the population's dependence on charcoal and firewood, thereby reducing emissions from land use which is one of the major source of carbon emissions in Zambia.

A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	Q2 2018 (within 120 days of GCF Board approval)
Expected financial close (if applicable)	Q3 2018
Estimated implementation start and end date	Start: Q3 2018 End: Q2 2023
Project/programme lifespan	__23__ years _____ months

B.1. Description of Financial Elements of the Project / Programme

The Government of the Republic of Zambia (GRZ) aims at improving the conditions for renewable energy (RE) Independent Power Producer (IPPs) development and encouraging participation of private investors in the energy sector. The GETFiT (Global Energy Transfer Feed-in-Tariff) Zambia program, whose design has been supported by the KfW, aims to assist the GRZ in the implementation of its Renewable Energy Feed-in-Tariff (REFiT) Strategy officially launched in October 2017. The REFiT strategy has an overall goal of promoting diversification of the power sector by adding a portfolio of RE projects, thereby facilitating the achievement of the country's Nationally Determined Contributions (NDC) targets. The initial objective is to bring 200 megawatts (MW) of renewable energy onto the grid within the next 3-5 years, through the development of small- to medium-scale IPP projects between 1-20 MW. The REFiT strategy articulates that a REFiT tariff shall be issued for the hydropower projects while the non-hydro tariffs will be based on a competitive bidding. Accordingly, a total 100 MW solar PV will be procured through a competitive two-stage auction process during the Phase I (to be launched in Q1 2018 under the GETFiT program) while the second tender will call for small-hydro projects (scheduled in mid-2018). Successful bidders will sign a standardized Power Purchasing Agreement (PPA) with ZESCO, a state-owned utility, as well as an Implementation Agreement (IA) with the Ministry of Energy and Water Development and the Ministry of Finance of the GRZ. In addition the GETFiT program is supporting the GRZ to enhance sector regulations, licensing procedures and grid planning through technical assistance (TA) funded by KfW.

This framework targets to mobilize a financing package for upcoming RE IPP projects in Zambia identified under the GETFiT program, primarily for the first round 100MW solar PV (at least 80% of the framework). During the first phase, five to six small-scale (up to 20MW) solar PV projects will be selected through a competitive bidding process by Q2 2018 with the expected financial close by Q3 2018. It is targeted that most of them will be financed by the framework. The launch of the second phase will follow in mid-2018, which will procure total 100MW of small-hydro projects. The framework may finance a limited number of small-hydro projects from the second phase (i.e. up to 20% of the framework).

Lack of sufficient private financing and short tenor (5-7 years from local commercial investors) are pointed out as key barriers for RE project financing in many Sub-Saharan African countries including Zambia. Participation of local commercial investors to RE projects have been hindered by their limited capacity to source and assess RE projects, little experience in the sector, and high risk perception. Under this framework, the AfDB financing scheme will primarily bridge the financing gap for RE IPP projects in Zambia by providing adequate volume of finance with longer tenors. An important feature of the scheme is that it leverages a tenor extension instrument (standby loans) from the AfDB and the Green Climate Fund (GCF) to crowd-in participation from interested and credible commercial banks. The participation of commercial banks to the loans for each sub-project will be determined on the basis of their hard currency liquidity availability and the terms offered, while the final arrangement will be up to the decision of selected project sponsors. Further, the framework invites a local institutional investor (Zambian national pension fund) capable of offering long-term financing for development projects, which is paradigm-shifting in the context of the region. This financial structure is expected to 1) kick-start the market for private capital investment into the power sector and build a process whereby a similar scheme will be opened to eligible banks for subsequent rounds, and 2) enhance the country ownership as it paves the way for active participation from local financial institutions.

Under this scheme, it is proposed that the AfDB will provide senior debt and standby loans to finance each of the selected and interested IPPs (the AfDB exposure to be limited up to one-third (33.3%) of the total project cost – USD 50 million for the whole framework). The remaining debt will be financed by the GCF (through the AfDB as an Accredited Entity), a pool of commercial banks (backed by a standby loan) and the national pension fund managed by the Zambian National Pension Scheme Authority (NAPSA) (proposed). The GCF's participation will be pari passu with the AfDB, therefore its total exposure including standard loans and standby loans will be equally limited to one-third (33.3%) of the total project cost.

In addition, as a separate intervention, technical assistance (TA) grants of up to USD 4 million, from the GCF and the AfDB, will be provided 1) to assist the public sector (Ministry of Energy and Water Development, Rural Electrification Authority, etc.) to create enabling environment for private investments in the mini-grid and off-grid sector; and 2) to build the capacity of selected local financial institutions and the entire Zambian financial industry for its enhanced

understanding on renewable energy and infrastructure financing, renewable energy project screening, due diligence, and monitoring.

For the first component, the TA will strengthen the capacity of the Rural Electrification Authority (REA) and other relevant stakeholders for the RE sector development including off-grid (stand-alone solar home systems) and mini-grid. Off-grid and mini-grid present new opportunities with a high potential to transform the entire electricity market, however its growth needs to be boosted by appropriate planning and policy incentives. Accordingly, this TA component aims to create an investment environment and policy certainty upon which the private sector can actively participate¹.

The second component will support the entire financial industry in Zambia and selected local financial institutions, for them to build the requisite team, expertise and process that are needed to originate, appraise, finance, monitor and supervise RE projects. It is expected that the TA for capacity building for banks / financial institutions will complement their participation in the co-financing of projects with the AfDB, enabled by the standby loan facility, which will help them develop their renewable energy investment appraisal processes on the job.

Overall, this framework will complement the AfDB's long-standing support to the Zambian power sector (detail under the section C.4). In order to assist the GRZ's ongoing efforts toward the power sector reform, the AfDB is developing a sector budget support program under the Bank's sovereign operations window. A starting point is the Cost of Service Study, currently being undertaken with the support of the AfDB, which will set the benchmark for introducing a cost-reflective tariff once completed. These programs, running in parallel with the AfDB-GCF framework, will improve the off-taker's financial stability as well as the overall power sector efficiency, which will in turn reduce the off-taker risk for private power projects in Zambia.

a breakdown of cost estimates for total project costs and GCF financing by sub-component in local and foreign currency and a currency hedging mechanism:

For example, under the component of drilling activity for a geothermal exploration project, sub-components would include civil engineering works, drilling services, drilling equipment and inspection test.

Component	Amount (for entire project)	Currency	Amount (for entire project)	Local currency	GCF funding amount	Currency of disbursement to recipient
Component 1: Senior debt and standby loans to small-scale RE IPP projects	Up to 150	<u>million USD</u> (\$)			Up to 50 million	USD
Component 2: Technical assistance	4	<u>million USD</u> (\$)	2.5 million	USD
Total project financing	Up to 154	<u>million USD</u>			52.5 million	USD

** Please expand the table if needed.*

B.2. Project Financing Information

	Financial Instrument	Amount	Currency	Tenor	Pricing
(a) Total project financing	(a) = (b) + (c)	154	<u>million USD</u> (\$)		

¹ This TA component does not intend to provide direct financing to mini- and off-grid projects in Zambia. All TA being provided aimed at supporting the government agencies and/or regulators for policy development, and financial institutions operating in Zambia for capacity building.

(b) GCF financing to recipient	(i) Senior loans and Standby loans	50 (includes standby loan: up to 1)	<u>million USD</u> (\$)	15-18 years	Refer to the term sheet		
	(ii) Grants	2.5	<u>million USD</u> (\$)	N/A			
	* Please provide economic and financial justification in section F.1 for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in section E .						
Total requested (i+ii)		52.5	<u>million USD</u> (\$)				
€ Co-financing to recipient	Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing	Seniority
	<u>Senior Loans/ Standby loans</u>	50 (includes standby loan: up to 1)	<u>million USD</u> (\$)	AfDB	15-18 years	TBD	<u>senior</u>
	<u>Senior Loans</u>	12.5	<u>million USD</u> (\$)	NAPSA ² / Commercial Banks ³ / Other investors	15-18 years	TBD	<u>senior</u>
	<u>Equity</u>	37.5	<u>million USD</u> (\$)	Project sponsors	N/A	TBD	<u>junior</u>
	<u>Grant</u>	1.5	<u>million USD</u> (\$)	AfDB	N/A		<u>N/A</u>
	Lead financing institution: AfDB						
* Please provide a confirmation letter or a letter of commitment in section I issued by the co-financing institution.							
Standby loan facility will be provided in an event that commercial banks cannot extend the tenor beyond the year 5-7, as a tenor extension instrument. The repayment of the outstanding commercial bank loan at the end of its tenor shall either be rescheduled by the commercial lenders/banks or repaid as							

² Discussion with the Zambian National Pension Fund (NAPSA) is ongoing. The loan from NAPSA will be primarily in local currency (Zambian Kwacha) equivalent to the indicated USD amount.

³ On a cash basis the disbursement of commercial banks will be higher by USD 2 million, which will be covered by the standby loan facility. The tenor of commercial bank loans is expected to be 5-7 years.

scheduled by drawing down on the standby loan facility. The facility will be provided by the AfDB through its own resources and with an equal amount of GCF proceeds. Standby loans will be part of the overall AfDB and GCF exposure for the framework and for each sub-project. Standby loan facility will not cover the risk of a commercial bank tranche during their initial tenor.

B.3. Financial Markets Overview (if applicable)

How market price or expected commercial rate return was (non-concessional) determined? Please provide an overview of the size of total banking assets, debt capital markets and equity capital markets which could be tapped to finance the proposed project/programme. Please provide an overview of market rates (i.e. 1-year T-Bill, 5-year government bond, 5-year corporate bond (specify credit rating) and 5-year syndicate loan.

Loose fiscal policy that prevailed since 2013 has led to gradual tightening of monetary policy in order to maintain inflation at a single digit level and to limit excessive exchange rate volatility. The main instruments applied by the Bank of Zambia in 2016 include: increase the monetary policy rate from 12.5% to 15.5%; increase the commercial bank reserve requirements from 14 to 18%, and increase the overnight lending facility rate by 10% to 25.5% in order to reduce liquidity in the market and limit speculative exchange rate behavior. Although the policies implemented by the central bank have been effective, these have come with higher interest rates on lending and a cost to domestic credit expansion. At the same time, the governments' needs for budget funding have crowded out domestic private sector investment.

Treasury bills and government long-term bonds in December 2016 yielded between 20% and 25% depending on maturity. However recently, yields on Treasury Bills have started declining as there is increased liquidity in the market and inflation has returned to single digit. Long term bonds are still priced high (18-20% as of November 2017) which is an indication of long term uncertainties and high risk perception.

Affordability of financial services remains a key challenge to consumers and businesses. Average interest rates have exceeded 27.5% in 2016 up from 21.1% in 2015, but have started to decline in 2017 achieving 26.9%. In the current economic environment with high interest rates and increasing non-performing loans, some commercial banks have stopped providing consumer loans. SMEs also struggle to access finance. A 2013 study by Financial Sector Deepening Project reports that almost half of SMEs perceive access to credit either as being a severe or major obstacle to develop their business⁴. Although improving, banks are slow to develop an understanding of SME businesses and their needs.⁵

Provide examples or information on comparable transactions.

The Zambian electricity system is dominated by the public entity – Zambian Electricity Supply Corporation (ZESCO) – while IPPs play a minor role. ZESCO is a vertically integrated government owned electricity utility that supplies the bulk of electricity within Zambia. Apart from ZESCO, Copperbelt Energy Corporation (CEC) is an independent transmission and generation company that transmits and distributes electricity to mines throughout Zambia. Other IPPs who sell the electricity to ZESCO include Lunsemfwa Hydropower Company (LHP), Itezhi-Tezhi Power Company (ITPC) jointly owned by ZESCO and TATA, and Maamba Colliery who is currently the only coal based IPP.

Itezhi-Tezhi hydro IPP project: In 2012, the AfDB financed the Itezhi-Tezhi hydropower project through a non-sovereign loan to the project SPV and a public loan for the transmission line. The total project cost for the power plant is at USD 239.0 million, and in addition a standby facility of USD15.5 million was set up to cover any delays.

Scaling Solar: The Industrial Development Corporation (IDC), a state-owned investment holding company, has been mandated with overseeing all parastatals in 2015 of which ZESCO is the biggest asset. In 2015, the IDC has been directed to procure up to 600MW of grid-connected, utility-scale solar energy power under the Scaling Solar initiative with support from the World Bank Group to address the energy crisis in Zambia. Through the Round 1 of the program, Italy's Enel and a consortium of a French firm Neoen and US-based First Solar were selected in June 2016 to develop

⁴ University of Zambia and the Zambia Institute for Policy Analysis and Research, "Formal Bank Credit to Micro, Small and Medium Enterprises in Zambia: Lessons and Implications", 2013.

⁵ AfDB, OECD and UNDP, African Economic Outlook, 2017.

a 34MW (Ngonye1) and a 54MW (Bangweulu) solar PV projects respectively (with the tariff of USD 0.0602 and USD 0.0784 per kWh). The two projects are expected to reach financial close by Q4 2017-Q1 2018. A procurement process for the second round of the Scaling Solar (up to 400MW) is currently ongoing. For comparison, latest grid-connected renewable energy auctions in South Africa have seen prices fall to among the lowest in the world with solar PV prices as low as USD 0.064/kWh⁶.

As described, Zambia's history of renewable energy IPP projects is limited and transactions have been dominated by DFI financing. There is a clear barrier for commercial financial institutions, both local and international, to participate to renewable energy projects in Zambia, which seems to be an outcome of their lack of appetite, limited experience with investing in similar types of infrastructure projects, and their high cost of capital which makes them unattractive to project sponsors.

⁶ Eberhard, A. and Kåberger, T. "Renewable energy auctions in South Africa outshine feed-in tariffs", *Energy Science and Engineering*, 4, 3, pp190-193. 2016.

Please fill out applicable sub-sections and provide additional information if necessary, as these requirements may vary depending on the nature of the project / programme.

C.1. Strategic Context

Please describe relevant national, sub-national, regional, global, political, and/or economic factors that help to contextualize the proposal, including existing national and sector policies and strategies.

This section will lay out the overall economic, climate, and energy sector context of Zambia. It is elaborated how the GRZ has conceived the REFiT strategy as well as the GETFiT program as a means to support implementation of this strategy. Rationale for the framework to focus on the financing of the GETFiT program is outlined toward the end. (Section C.5. provides the detail of the GETFiT program in comparison with Scaling Solar in Zambia.)

Economic situation: Zambia has a population of 16.5 million and a GDP per capita stands at USD 1,178 (in 2016, current US dollar). Zambia's economy has been growing on average by 7.3% annually between 2000 and 2017 (real per capita growth is 4.2%)⁷, and as a result the country has been upgraded to a Lower Middle Income Country status in 2011 (World Bank classification). In recent years, however, the public debt level has risen as borrowings for filling fiscal gaps and financing public infrastructure investments has increased. The country's financial distress has been deepened by several additional factors: steep commodity price drop (Zambia is Africa's second-biggest copper producer); rising cost of the Eurobond finance, from 5% in 2012 to over 9% in 2015; and sharp depreciation of the Zambian currency (Kwacha) in 2015 increasing the level of external debt services in kwacha terms to an estimated 17% of domestic revenues in 2016. The country is now rated BB by the Standards and Poors, who however recently revised Zambia's economic outlook from negative to "positive with a stable outlook" (August 2017). Access to finance therefore remains limited and costly overall. The GRZ is in talks with the International Monetary Fund (IMF) to access a three-year credit facility for up to \$1.3 billion to help strengthen the foreign reserves.

Despite its elevated status as a Lower Middle Income Country, Zambia is still constrained on the economic and social front (ranked 139th in the Human Development Index)⁸. As described above, Zambia is facing an economic challenge with substantial public debt (60% of the GDP) and budget deficit (6.5% of the GDP, of which subsidies – primarily energy – contribute to 1.3%)⁹. This is closely intertwined with the problems of the energy sector: A recent power crisis caused huge payment burden from electricity imports, worsening the financial position of the state-owned utility (ZESCO). As the country's economy continues to grow and the living standard rises, increasing demand for electricity will add more pressure to the utility to expand the power supply base. When the country struggles with low electrification and low RE penetration, further complicated by financial and macroeconomic instability, measures in terms of investment and policy support are imperative in order to address the systematic weakness and unlock the potential of private-led energy generation. Eventually this will be critical to guide the country's development toward a low-carbon path rather than business-as-usual.

Climate change context¹⁰: The Zambia Nationally Determined Contributions (NDC) indicates that climate variability and change has become a major threat to sustainable development in Zambia. Zambia is experiencing climate-induced hazards such as drought and dry spells, seasonal and flash floods and extreme temperatures with an increasing frequency and intensity. This trend has adversely impacted food and water security, water quality, energy supply (from hydropower), and livelihoods of the people especially in rural communities. Recent climate trends based on records from 1960 to 2003 indicate that the mean annual temperature has increased by 1.3°C since 1960, showing an average increase rate of 0.34°C per decade. The Second National Communication to the UNFCCC¹¹ indicates that **Zambia has experienced a significant decline in seasonal rainfall between 1940 and 2000**. An average country-wide decline in rainfall of about 58 mm (6 percent) occurred in the period 1971-2000 compared to the period 1940-1970. The mean rainfall over Zambia has decreased by an average rate of 1.9 mm/month (2.3%) per decade since 1960.¹² Southern,

⁷ World Bank Data.

⁸ UNDP, Human Development Report, 2016.

⁹ IMF Country Report No.17/328, Zambia, 2017.

¹⁰ UNFCCC, Zambia's Nationally Determined Contributions (NDC).

¹¹ The Second National Communication to the UNFCCC, 2004.

¹² McSweeney, C. et al., UNDP Climate Change Country Profiles: Zambia, 2010.

Western, Central and North-Western Provinces have experienced significant declines in seasonal rainfall during this period.

A higher average temperature, an overall decrease in annual rainfall, and an increase in the frequency and intensity of heavy rainfall events during the rainy season are expected in the future¹³. An assessment of potential climate impacts shows that they will seriously undermine the livelihoods of Zambians and worsen the performance of key economic sectors including water, agriculture, forestry, wildlife, tourism, mining, energy, infrastructure and health. **In particular, potential decrease in rainfall will have a significant impact on the country's capacity to generate hydropower.**

In view of these challenges, Zambia has in the recent past developed various climate change-related policies, strategies, projects and programs. These include: Second National Communication to the United Nations Framework Convention On Climate Change (2004); National Policy on Environment (2007); National Climate Change Response Strategy (NCCRS, 2010); National Forestry Policy (2014); National Energy Policy (2008), National Agriculture Policy (2014); National Transport Policy (2002); National Strategy for Reducing Emissions from Deforestation and Forest Degradation (REDD+, 2015); Second National Biodiversity Strategy and Action Plan (NBSAP2) and National Adaptation Plan of Action on Climate Change (NAPA) (2007); Technology Needs Assessment (TNA, 2013); and Nationally Appropriate Mitigation Actions (NAMAs).

While there is no specific RE generation target indicated in the NDC, the NDC clearly expresses the GRZ's commitment for a transition toward renewable sources of energy (see Section C.2) and it is further supported by recently launched enabling policy framework and initiatives. REFIT Strategy, adopted in late 2017 by the GRZ, and various government-led programs to deploy RE on- and off-grid (e.g. Scaling Solar and GETFIT program) are clear examples (more details below).

Energy sector overview: The Ministry of Energy and Water Development is responsible for the overall energy policy and strategy, while the Energy Regulatory Board (ERB) governs the energy sector regulations including the licensing of Independent Power Producers (IPPs), the definition of petrol prices and electricity tariffs, the development of technical standards, investigation of customer complaints, arbitration of conflicts among sector stakeholders. The Zambian electricity system is dominated by the Zambian Electricity Supply Corporation (ZESCO), a vertically integrated government-owned electricity utility, while IPPs such as Copperbelt Energy Corporation (CEC) and Lunsemfwa Hydropower Company (LHPC), Itezhi-Tezhi Power Company (ITPC), Ndola Energy Company Limited (NECL), Maamba Colliery play a smaller role. In 2016, national installed capacity in Zambia amounted to 2,826.91 MW, of which 78.6% belong to the stated owned electricity company ZESCO (2,221 MW). The remaining share of 21.4% of IPPs (606MW) comprises a mine-mouth coal fired power plant by Maamba (with a 20 years PPA), an HFO plant by Ndola Energy, two hydropower plants operated by LHPC, a hydropower plant operated by ITPC (jointly owned by ZESCO and TATA), and the CEC who is an independent generation company that transmits and distributes electricity to mines throughout Zambia. Renewable energy IPPs amount to only 176 MW (all hydro), equal to 6.22% of total installed capacity in Zambia (Table 1 and Figure 1). As demonstrated from the recent power plants development, a pressure to increase the generation capacity has been mostly responded by building fossil fuel plants or another large hydro dam. The AfDB-GCF framework is therefore critical to shift the Zambian electricity market toward a truly diversified and low-carbon mix.

Another important player for energy access is the Rural Electrification Authority (REA), mandated with the implementation of the rural electrification programs and management of the rural electrification fund. The Industrial Development Corporation (IDC) has recently been mandated with overseeing all parastatals of which ZESCO is the biggest asset. IDC is also responsible for the tendering of solar-based generation under the Scaling Solar program. The Office for Promoting Private Power Investment (OPPPI) has a mandate of promoting private investment in the generation and transmission of electricity, and currently manages planning, procurement and awarding of large electricity projects (hydro and other technologies).

Power station	Type of plant	Owner	Installed capacity (MW)	%
Kafue Gorge	Hydro	ZESCO	990.00	
Kariba North	Hydro	ZESCO	720.00	
Kariba North extension	Hydro	ZESCO	360.00	
Victoria Falls	Hydro	ZESCO	108.00	
Lunzua River	Hydro	ZESCO	14.50	
Lusiwasi	Hydro	ZESCO	12.00	

¹³ USAID, Climate Change Adaptation in Zambia, 2012.



Chishimba Falls	Hydro	ZESCO	6.00	
Shiwang'andu	Hydro	ZESCO	1.00	
Itezhi-Tezhi	Hydro	IPP (ITPC)	120.00	
Mulungushi	Hydro	IPP (LHPC)	32.00	
Lunsemfwa	Hydro	IPP (LHPC)	24.00	
Zengamina	Hydro	IPP	0.75	
Total (Hydro)			2,388.25	84.48
Maamba Power Plant	Coal	IPP (Maamba)	300.00	
Total (Coal)			300.00	10.61
Bancroft-CEC	Diesel	IPP (CEC)	20.00	
Luano-CEC	Diesel	IPP (CEC)	40.00	
Luanshya-CEC	Diesel	IPP (CEC)	10.00	
Mufulira-CEC	Diesel	IPP (CEC)	10.00	
Kabompo	Diesel	ZESCO	2.00	
Zambezi	Diesel	ZESCO	1.90	
Mufumbwe	Diesel	ZESCO	0.80	
Luangwa	Diesel	ZESCO	2.60	
Lukulu	Diesel	ZESCO	0.50	
Chavuma	Diesel	ZESCO	0.80	
Total (Diesel)			88.60	3.13
Ndola	Heavy Fuel Oil	IPP (NECL)	50.00	
Total (HFO)			50.00	1.77
Samfya	Solar	Mini-grid	0.06	
Total (Solar)			0.06	0.00
GRAND TOTAL			2,826.91	100

Table 1. Major power plants installed and operating in Zambia¹⁴

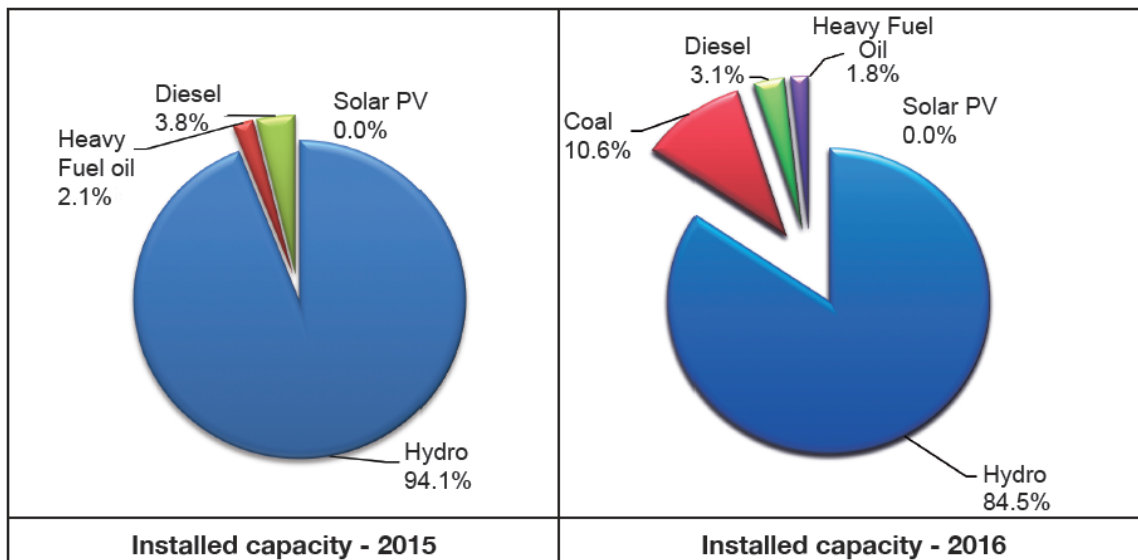


Figure 1. National installed power generation capacity by technology, 2015 – 2016¹⁵

¹⁴ Energy Regulation Board (ERB), Zambia Energy Sector Report 2016.

¹⁵ Ibid.

Trend in electricity generation¹⁶: In 2016, national electricity generation sent out reduced by 13.0 percent, to 11,696 GWh from 13,440 GWh recorded in 2015. The reduction in electricity generation was on account of the continued poor rainfall experienced during the 2014/2015 and 2015/2016 rainy seasons which resulted in low water levels. Figure 2 shows the trend in national electricity generation.

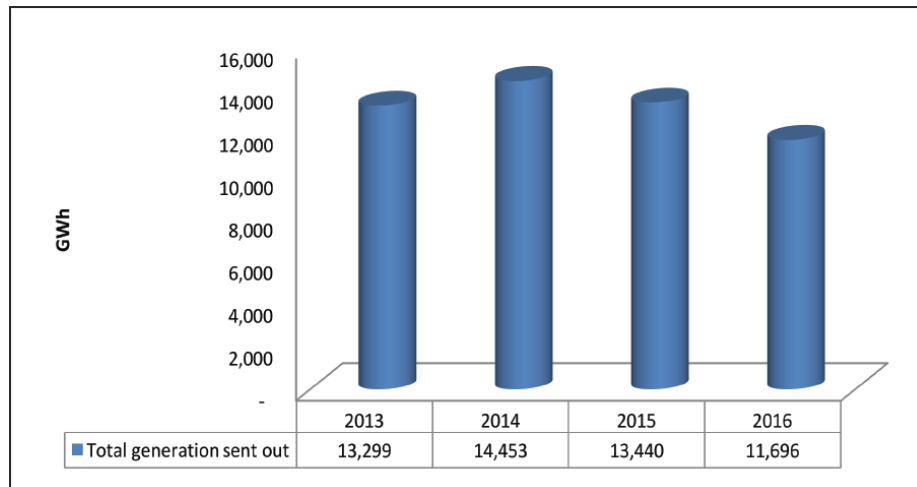


Figure 2. Trend in national electricity generation, 2013 – 2016

In 2016, ZESCO owned four (4) large hydropower plants; Kafue Gorge (990 MW), Kariba North Bank (720 MW), Kariba North Bank Extension (360 MW), and Victoria Falls (108 MW). Figure 3 shows the trend in electricity generation from ZESCO's large hydro power plants for the years 2010 to 2016.

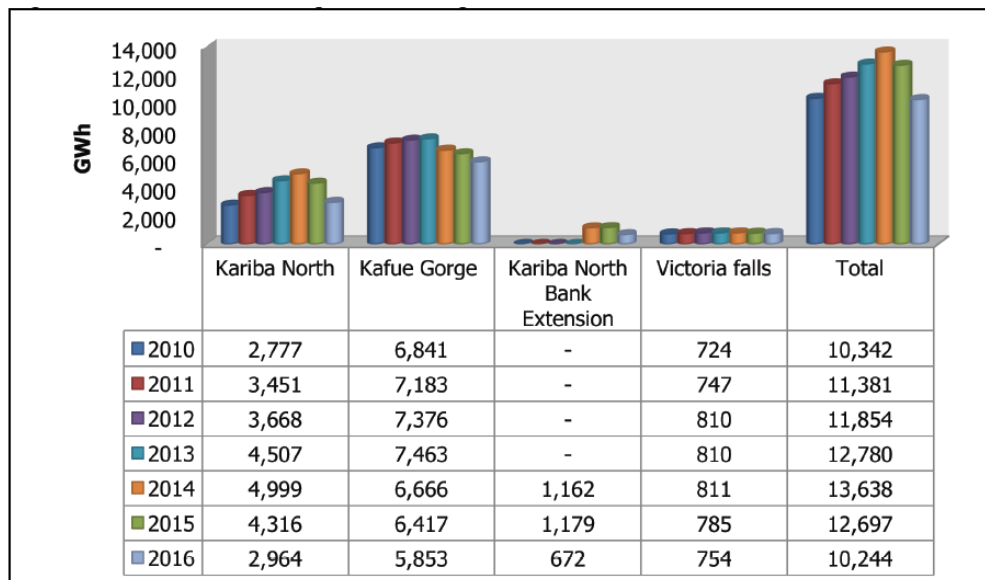


Figure 3. Trend in electricity generation, large hydropower plants owned by ZESCO, 2010 – 2016

Electricity generated from ZESCO's large hydropower plants declined significantly by 19.3 percent, to 10,244 GWh in 2016, from 12,697 GWh recorded in 2015. The decline in generation was on account of the continued poor rainfall experienced during the 2014/2015 and 2015/2016 rainy seasons which consequently resulted in low water levels in dams. As depicted in Figure 3, during the year under review, Kariba North Bank Extension and Kariba North Bank

¹⁶ Excerpt from Energy Regulation Board (ERB), Zambia Energy Sector Report 2016.

power plants recorded the highest decline in generation at 43 percent and 31.3 percent, respectively. Kafue Gorge and Victoria Falls power plants also recorded reductions in generation of 8.8 percent and 3.9 percent, respectively.

During the year 2016, total electricity generation from ZESCO's diesel power plants decreased by 14 percent, to 20.2 GWh in 2016 from 23.5 GWh recorded a year earlier. The decrease in generation was mainly attributed to the decommissioning of Mwinilunga diesel power plant in September 2016 following the connection of Mwinilunga District to the national electricity grid.

In 2016, the electricity supply industry in Zambia had five (5) IPPs that sell electricity to ZESCO, namely: Lunsemfwa Hydropower Company (LHPC), Ndola Energy Company Limited (NECL), Zengamina Power Limited (ZPL), Maamba Collieries Limited (MCL) and Itezhi-Tezhi Power Corporation (ITPC). Figure 4 shows the trend in electricity generation sent out by the IPPs for the period 2012 to 2016.

Electricity generation sent out from the power plants by the IPPs increased significantly by 119.0 percent to 1,310.7 GWh in 2016, from 598.4 GWh recorded in 2015. The increase in electricity generation from IPP's was on account of commissioning of two (2) power plants, namely: Maamba coal and Itezhi-Tezhi hydro. However, LHPC recorded significant reduction in generation of 43.7 percent, to 121.9 GWh in 2016 from 216.5 GWh recorded in 2015 on account of low water levels. NECL also recorded a reduction in generation of 14.8 percent in 2016 on account of the use of fuel that did not meet the required specifications resulting in a shutdown. ZPL recorded an increase of 10.5 percent due to increased demand. Figure 5 represents the share of IPPs in the Zambian electricity generation.

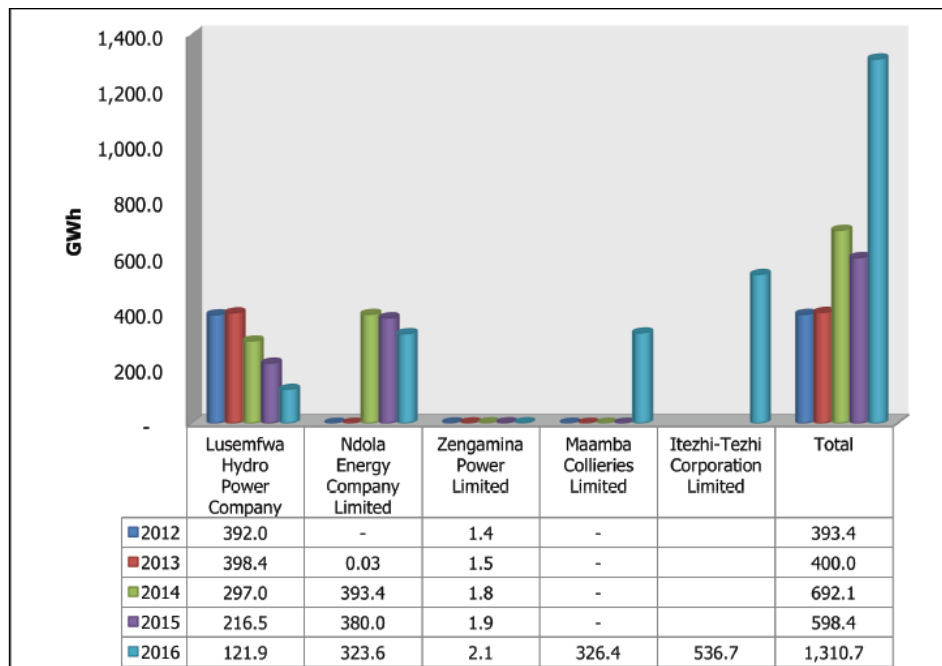


Figure 4. Trend in electricity generation sent out by IPPs, 2012 - 2016

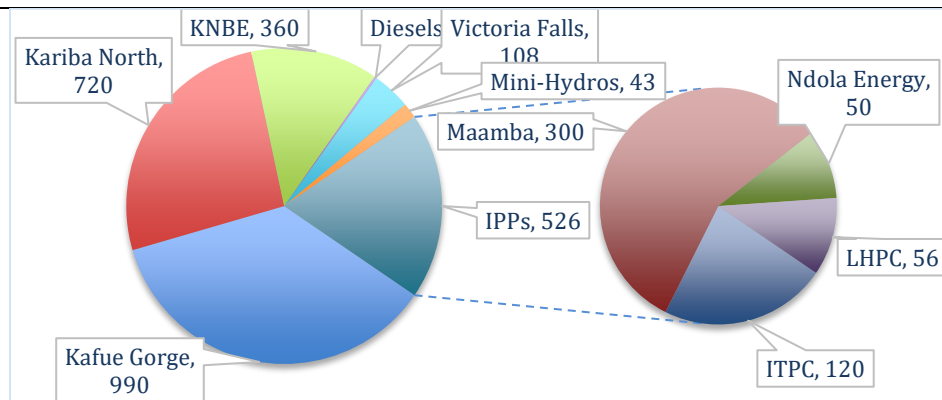


Figure 5. Share of IPPs in the Zambian energy sector¹⁷ (unit: MW)

In 2016, ZESCO exported and imported electricity through the Southern African Power Pool (SAPP) and bilateral markets. Figure 6 shows electricity exports and imports by ZESCO for the period 2010 to 2016. Figure 6 shows that ZESCO recorded a significant decrease in electricity exports of 32.5% percent, to 794.1 GWh in 2016 from 1,175.9 GWh in 2015. The decrease in exports was on account of a reduction in the utility's hydropower generation capacity. However, electricity imports increased exponentially by 178.3 percent to 2,184.9 GWh in 2016 from 785.2 GWh recorded in 2015. The reduction in the utility's generation capacity led to the increase in imports in 2016.

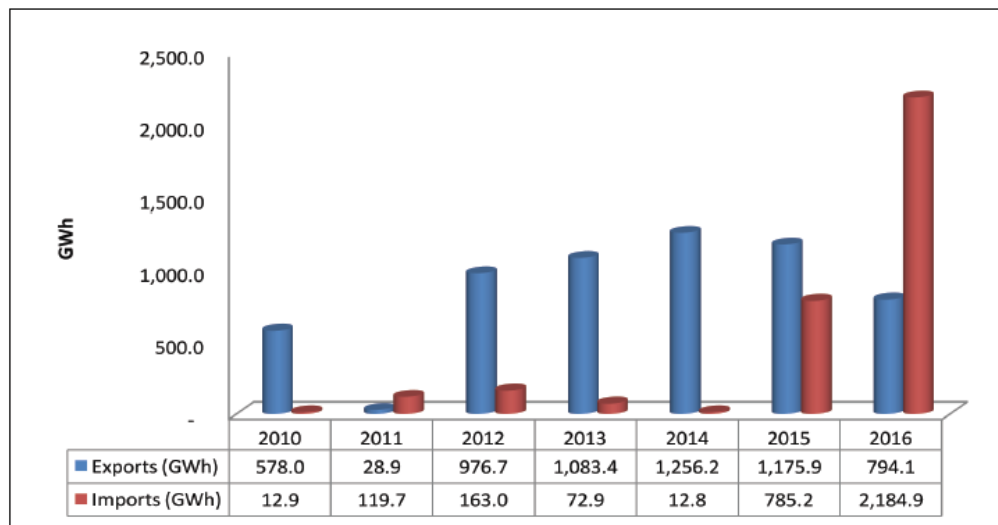


Figure 6. Electricity exports and imports by ZESCO, 2010 – 2016

Key energy sector challenges and constraints, which have deep implications to the social and economic development of Zambia, include: (a) inadequate power supply due to insufficient generation and transmission infrastructure - The electricity distribution network in the country is aged with obsolete equipment, the network is overloaded and unreliable, resulting in poor supply and service to customers. Lack of redundancies and spare capacity on the network means that a major failure from any single equipment has a potential to plunge the affected areas into prolonged outages; (b) lack of diversification in generation with hydropower accounting for nearly 90% of the generation capacity; (c) inefficiencies in the ZESCO operations coupled with a non-cost reflective tariff which resulted in a financially weak utility with deficits and increasing debt levels; (d) high level of electricity imports in order to mitigate the shortages arising from the drought conditions, exacerbating the fiscal condition of the country; and (e) weak institutional and regulatory capacity in the energy sector overall.

¹⁷ Presentation by Kachinga-Wankunda Phiri, ZESCO, 2016. (This excludes generation by the CEC.)

To this end, the AfDB and the GRZ are currently preparing an energy sector budget support program. This proposed operation aims to support the GRZ's efforts to address the country's development challenges relating to the energy sector. This will be delivered through complementary structural, regulatory and governance reforms with an aim of improving efficiency, transparency and competition in the sector. A number of options are under review to reposition the power utility as a viable commercial entity. Under this process, regulatory environment will be strengthened through the enhancement of the regulator's role. In addition, the efficiency of public investment planning and financial management will be enhanced and legislations will be amended to cater for more private sector participation and competition. As the first step, the GRZ is currently undertaking a Cost of Service Study (financed by the AfDB) on which basis electricity tariffs will be gradually adjusted to be cost-reflective. The Study is expected to be finalized in early 2018. **Collective efforts by the government and ZESCO, supported by the AfDB, will improve the financial viability of the ZESCO operation which will eventually drive the electricity market attractive to investment.**

The unbalanced energy mix is one of the main sources for the country's climate vulnerability. Since June 2015, both climate change and the warm phase of the El Niño Southern Oscillation have caused the poor rainfall and subsequently low production from the dominant energy source of hydropower in the country. The Kariba North Bank Extension is currently redundant because of its low water levels and its capacities are not expected to be fully utilized in the near future. As such, the country suffered from the energy crisis during the drought, resulting in frequent and lasting load shedding as well as expensive importation of electricity from South Africa, Mozambique, and other countries.

Country's response: During the power crisis caused by declining hydropower generation, the country has filled its electricity deficit with a new coal power plant (Maamba 300MW plant), electricity imports from the SAPP (South Africa's Eskom and a gas-fired generator in Southern Mozambique) and a 100MW Turkish fuel oil power vessel as an emergency measure. As a long-term response, the Zambian government is committed to increase renewable alternative sources of energy as formulated in the Zambia Vision 2030 that has entered into force in 2006. Zambia has a significant amount of solar resources that remained largely untapped. National efforts to increase the share of renewable energy generation have grown fast, leading to the launch of the RE tendering processes through the implementation of the REFiT strategy (GETFiT program) and Scaling Solar (see Section C.5 for a detailed description of two programs).

In order to streamline the rules and procedures around the private sector-led small- and medium-scale RE generation, the Renewable Energy Feed-in-Tariff (REFiT) strategy has been launched in October 2017. The REFiT is expected to ultimately contribute to a diversified energy mix in order to enhance energy security. The followings are the specific measures and activities that will be undertaken under the REFiT strategy in the near term;

- a) Providing a 3-year REFiT generation allocation of initially 200 MW, divided into 100 MW hydropower and 100 MW non-hydropower,
- b) Providing for a 3-year REFiT micro-generation allocation of initially 5 MW, and
- c) Providing a platform for the second REFiT phase.

While there have been REFiT tariffs proposed for the different types of technologies, the REFiT strategy articulates that a tariff shall be issued for hydropower projects while non-hydro tariffs will be based on a competitive bidding in order to ensure the cost effectiveness. The GETFiT program will be implemented under the overall framework of the REFiT strategy.

At the same time, the GRZ is planning the development of the 1,600 MW Batoka Gorge Hydro-Electric Scheme together with the Government of Zimbabwe, through the Zambezi River Authority. This PPP project requires USD 4-6 billion raised in equal parts from both governments. A COD for the project cannot be projected at the moment.

Use of fossil fuel technologies for generation is still part of the government's agenda. After the installation of the Maamba coal power plant (300 MW), additional coal plants and heavy fuel oil plants are in the pipeline. The GRZ is also exploring the potential of biomass (waste-to-energy), geothermal, wind, and nuclear power although the proposals are not yet concrete at this stage.

Rationale for this Framework: Power generated from this AfDB-GCF framework (100 MW) will primarily mitigate the persistent power shortage in the country, reduce the electricity imports, and diversify the energy mix with RE generation. In a hydro-dominated electricity market such as Zambia, a pressure to increase the generation capacity is often responded by building fossil fuel plants (as observed in recent coal and HFO plants development) or another large hydro dam. This framework is a critical step to shift the Zambian electricity market toward a truly diversified and low-carbon mix, having other potential co-benefits like reducing emissions from land use.

The framework's focus on the implementation of the REFiT strategy (GETFiT program) than Scaling Solar or other projects is explained by a number of clear benefits (further description and comparison of two programs can be found under the section C.5):

- 1) Under the REFiT strategy, a concrete pipeline of 100 MW solar PV and additional 100 MW of small hydro projects will be developed (though the investment to small-hydro under this framework will be limited).
- 2) By promoting small- and medium-scale RE, the projects can be deployed easily within the grid absorptive capacity for intermittent sources of electricity (currently estimated to be 700-800 MW total).
- 3) Smaller projects pave the way for local participation, from local financiers and project developers, whereas large-scale projects are often dominated by international players.

As shown earlier, Zambia is continuously relying on the non-renewable sources of electricity to meet its demands in particular at the time of power deficit. The country has installed its first coal power plant, and imports from the SAPP or the power ships will only intensify the dependence on fossil fuel-based generation (see above the sub-section "country's response"). Relying on external sources of electricity is not sustainable in an economic point of view either. More coal plants in the country's generation pipeline clearly indicates that the use of fossil fuel may accelerate without a strong intervention to improve the viability of RE projects. Zambia is still yet to have a utility-scale solar power plants on-grid. As the country stands at the critical juncture of introducing diversified RE technologies into the electricity market, the AfDB-GCF framework will add significant value and enable the transition toward a sustainable energy system.

The framework will also play an important role in enhancing the electricity access in Zambia. This is primarily delivered with 100MW new generation capacity added to the grid from the project loans. The TA for the Rural Electrification Authority (REA) is expected to directly contribute to the improved energy access in rural and off-grid areas, through its targeted support for crowding-in private investment for rural electrification through mini-grid and solar home systems. With the second TA component for capacity building of local financial institutions, the AfDB-GCF framework enables in-country capacity to roll-out small size RE projects at scale, which will thereby support the decentralized energy development.

In terms of the framework's contribution to the GHGs emission reduction, it should be highlighted that the impact potential is twofold: 1) increased RE generation in the energy mix directly results in the avoided emission reduction (its potential captured under Section E.1.2), and 2) stable supply of electricity will curtail the use of charcoal and firewood for cooking. This in turn reduces the emission from deforestation and land use change, which is a major source of GHGs emission in Zambia (more data under Section C.2.)

C.2. Project / Programme Objective against Baseline

Describe the baseline scenario (i.e. emissions baseline, climate vulnerability baseline, key barriers, challenges and/or policies) and the outcomes and the impact that the project/programme will aim to achieve in improving the baseline scenario.

Baseline: In 2012, Zambia's GHGs emission level was 320.2 MtCO₂eq (million metric ton CO₂ equivalent), with emissions from Land Use Change and Forestry being the most significant source¹⁸. CO₂ emissions per capita have been slowly increasing since 2007 and reached 0.251 metric ton in 2013¹⁹. Including all sources of GHG emission makes Zambia one of the highest per-capita emitting countries in Sub-Saharan Africa²⁰. When counting the total amount of emission, Zambia is still placed higher than Nigeria (301 MtCO₂eq in 2012) who has the population more than 10 times bigger – this is a clearly alarming statistics that calls for an urgent action to reverse the trend. In Zambia, the majority of the emission comes from Land-Use Change and Forestry (LUCF) (61%), followed by energy (19%) and agriculture (17%)²¹. LUCF sector poses a big challenge to the country, with an annual deforestation rate of 1.5 per cent per year (250k-300k hectare per year). It is reported that around 70% of energy consumed in Zambia (including household fuel consumption) stems from firewood and charcoal, which is one of the major drivers of deforestation in the

¹⁸ USAID. Greenhouse gas emissions in Zambia. 2011.

¹⁹ World Bank, World Development Indicator.

²⁰ World Bank Data.

²¹ USAID. Greenhouse gas emissions in Zambia. 2011.

country²². The trend has been even aggravated by unreliable electricity supply, with households using electric cookstoves turning to charcoal in response to the frequent load shedding²³.

The Zambian energy market, heavily reliant on hydropower, is vulnerable to climate shocks. In 2015 and 2016, a heavy drought has forced the country to import energy from neighboring countries under the emergency power procurement plan (see above figure 2 and 3). Drought in 2015 has left the country facing a 985-megawatt power deficit at the peak of its crisis — almost half of its total generating capacity²⁴. Erratic climate conditions observed during this period caused the drop in water levels at the Kariba Lake reservoir three meters (10 feet) below levels recorded a year before. This means that the lake was at 12% of its full capacity compared to 50+% under normal circumstances. Recently, conventional fossil-fuel energy sources have been commissioned in an attempt to diversify the energy mix. In 2016, the first coal-fired power plant in Zambia (Maamba) started operation.

The situation may be repeated as climate change is shifting Zambia's water cycle. While total precipitation remains relatively consistent, rainfall intensity is projected to increase with longer dry periods between storms, according to a report by the Red Cross-Red Crescent Climate Center²⁵. Projections vary across models depending on the assumptions. However, the majority of climate models suggest 1) an annual temperature increase of 1.2-3.4°C above the 1970-1999 average by the 2060s and 1.6-5.5°C by the 2090s, and 2) an overall decrease in annual rainfall, and an increase in the frequency and intensity of heavy rainfall events during the rainy season²⁶.

It is worth to cite a scientific review on the potential impacts of climate change on water resources in southern Africa (covering Zambia)²⁷. According to this review, most scholars agree that the rainfall exhibits extreme variability in time and space over southern Africa even without climate change. While there is uncertainty on the magnitude of climate change impacts on rainfall, many models project that by 2050 the interior of southern Africa will experience decreased rainfall during the growing season. Additionally, many climate change models predict a 5-15% decrease in the growing season rainfall across southern African regions.

Actions proposed: Under the framework of the Nationally Determined Contributions (NDC) to the 2015 Climate Change Agreement, Zambia intends to reduce its CO₂eq emissions by 25% by 2030 compared to the baseline business-as-usual scenario through domestic efforts with limited international support, and by 47% with substantial international support. This equals to a total emissions reduction of 38 MtCO₂eq compared to the baseline in year 2030, which will require USD 50 billion by 2030. This will be achieved by implementing three streams of programs – sustainable forest management, sustainable agriculture, and renewable energy and energy efficiency, driven by the country's Climate Response Strategy and interlinked with sectoral development policies for energy, forestry, agriculture, water, town and country planning, sanitation, and transport.

For the renewable energy and energy efficiency sector interventions, Zambia aims to promote the switching from conventional and traditional energy sources to sustainable and renewable energy sources and practices, and foster the use of off-grid renewable energy technologies for rural electrification as decentralized systems²⁸. This will be implemented through the programs such as fuel switch initiatives (diesel/HFO to biodiesel, coal to biomass, from existing isolated diesel to mini-hydro), introduction of bio-fuels, off-grid renewable energy generation (solar PV and wind) to non-electrified rural areas, on-grid expansion program, and grid extension through inter-basin water transfer.

The AfDB-GCF framework directly contributes to the implementation of the country's prioritized mitigation programs, by fast-tracking the transition of the electricity generation away from conventional energy sources. This

²² Ministry of Energy and Water Development data

²³ Dlamini, C. et al., "Load shedding and charcoal use in Zambia: what are the implications on forest resources?", 2016.

²⁴ Reuters. www.reuters.com/article/zambia-electricity-idUSL5N11S4D120150922

²⁵ <http://www.circleofblue.org/2015/world/zambia-electricity-shortage-highlights-africas-hydropower-shortfalls/>

²⁶ USAID, Climate Change Adaptation in Zambia, 2012.

²⁷ Kusangaya. et al., "Impacts of Climate Change on Water Resources in Southern Africa: A Review", 2013.

²⁸ UNFCCC, Zambia's Nationally Determined Contributions (NDC).

framework will enable the financing of 100MW solar PV projects (with a possibility of financing small-hydro from the second round GETFiT within the limit of 20% of the framework) that will feed renewable energy to the Zambian grid, increasing the share of renewables in the energy mix. While the program targets small-scale energy projects, combined together it is expected to bridge the current electricity generation gap in the country and replace hydro or carbon intensive fossil-fuel projects with renewable energy sources. Renewable energy and solar projects are still new in the country where its first grid-scale solar PV projects under the Scaling Solar program are just reaching financial closures. By demonstrating another round of solar PV IPP projects to the Zambian market, the framework will help place the country's energy sector onto a sustainable pathway and nurture a market for continuous renewable energy investments. Further, diversification of the national energy mix with renewable energy sources will improve Zambia's climate resilience by reducing the reliance on hydropower. The TA components will contribute to the expansion of off-grid and mini-grid RE system in rural areas through targeted capacity building and institutional strengthening for crowding-in private investment. Overall the framework is expected to contribute to the implementation of the NDC by bringing positive impacts to the emission profile of the country.

C.3. Project / Programme Description

Describe the main activities and the planned measures of the project/programme according to each of its components. Provide information on how the activities are linked to objectives, outputs and outcomes that the project/programme intends to achieve. The objectives, outputs and outcomes should be consistent with the information reported in the logic framework in section H.

1) Senior debt and standby loans for independent power producer (IPP) projects:

- The GRZ aims at improving the conditions for renewable energy (RE) IPPs development. For promoting RE project development, the GRZ recently launched the REFiT strategy that outlines the overall framework for deploying small- and medium-sized (up to 20MW) RE projects. As a response, the GETFiT (Global Energy Transfer Feed-in-Tariff) program was designed to deploy up to 200MW of small-scale RE IPP projects, starting with the 100 MW solar PV procurement through a competitive two-stage auction and the tendering of small-hydro projects in the second round. The REFiT strategy articulates that a REFiT tariff shall be issued for the small hydropower projects while non-hydro tariffs will be based on a competitive bidding.
- This component offers a financing package to selected bidders of the GETFiT program meeting the structuring criteria. It is expected that four to six solar PV IPP projects as well as a limited number of small-hydro projects from the subsequent rounds (up to 20% of the framework) will be financed under this framework. For the solar PV competitive two-stage auction, it is proposed that the bids will be evaluated based on their technical quality as well as their financial offer (tariff). For the small-hydro projects, it is expected that the selection will be purely based on the technical quality and feasibility of the projects.
- Under this scheme, it is proposed that for each selected and interested sub-project:
 - The AfDB will provide senior debt and standby loans to the projects. The AfDB's total exposure will be limited to 33.3%.
 - The GCF will provide senior debt and standby loans to the projects on a pari passu basis with the AfDB. The GCF's total exposure will be limited to 33.3%. The AfDB, in its capacity as an Accredited Entity, will administer and invest GCF proceeds as the lender of record.
 - Commercial banks will provide hard currency senior debt, backed by the standby loan facility as a tenor extension instrument provided by the AfDB and GCF as part of their aforementioned assistance.
 - A local institutional investor (e.g. Zambia National Pension Fund – NAPSA) or other financial institutions will provide the remainder of senior debt.
- This financing structure will create a sustainable market for private investment with strong local participation, supported by credit enhancement instruments to make the overall price and tenor competitive. Leveraging the potential of commercial players and local institutional investors for renewable energy project financing, this proposal presents a desirable and paradigm-shifting structure. A focus on small IPP projects under this framework is expected to pave the way for the participation of local financiers and project developers while ensuring the grid stability.

2) Technical Assistance grants (USD 4 M)

- In addition to the provision of debt finance supporting small IPP project implementation, the proposed framework includes grant-financed Technical Assistance (TA) activities. The proposed TA, co-financed by the AfDB and the GCF, has two major components: (i) assistance to the public sector (Ministry of Energy and Water Development, Ministry of Finance, Rural Electrification Authority (REA), etc.) to support creating enabling environment for private investments in the mini-grid and off-grid sector, and (ii) capacity building within local financial institutions to support their RE projects origination, due diligence, and monitoring. All capacity building and training activities will include, as much as possible, women and disabled people in accordance with the gender action plan proposed.
- The design of the proposed TA activities has been informed by discussions with key public sector partners in Zambia (including the Ministry of Energy and Water Development and the REA) and financial institutions, as well as in coordination with other international partners active in Zambia's RE sector.
- **Gender Action Plan** will be implemented as an integrated part of the Technical Assistance. Details can be found in the Gender Assessment and Action Plan, submitted with the funding proposal.

i) TA Sub-Component 1: Accelerating the development of rural electrification through private-led mini- and off-grid deployment

Context

- The rural electrification rate in Zambia is approximately 4%. With a population density close to 22 people per km², rural electrification in Zambia is an enormous challenge. While the addition of several new small IPPs to the national grid will be instrumental for alleviating the country's energy deficit, extending rural grid access is often economically untenable. Similar to other countries in the region, it is likely that many rural areas will remain without access to the national grid for decades; and indeed, considerable numbers of rural households may not ever receive a grid connection.
- In this context, the GRZ is keenly aware of the importance of stand-alone off-grid energy systems and mini-grid solutions for rural electrification. Key institutions related to energy access and renewable energy also observe the dynamism of these sectors elsewhere on the African continent (i.e. in East Africa), and are anticipating a need to ensure the Zambian enabling environment is conducive to attracting local and foreign capital for these initiatives. Preparing for this investment is even more critical at the current moment; while experience with recent and novel approaches to rural electrification – i.e. stand-alone, off-grid solar home systems (SHS) and mini-grid solutions – has been limited in the country, this market situation is changing rapidly.

Proposed activities and expected outcomes

- Rural Electrification Authority (REA) is pivotal in transforming the electricity market by leveraging high potential of mini-grid and off-grid development. However this segment could only be boosted by appropriate planning and policy incentives. Accordingly, this TA sub-component aims to create an investment environment, streamlined regulations and policy certainty upon which the private sector can actively participate to the off-grid and mini-grid development. This will be delivered through (i) preparation of appropriate strategy, regulatory framework (clarity and efficiency of the permitting process), technical standards and guidelines; (ii) develop a GIS-based database of rural population and electrification status, (iii) conduct feasibility studies for selected sites; and (iv) develop a financial and commercial framework for private sector investment, including risk mitigation strategy, financial incentive framework and viable business models.
- Further, the capacity of the REA and other relevant public institutions (ERB, Ministry of Energy and Water Development, Zambian Revenue Authority, and Ministry of Finance) will be strengthened to operationalize the policy, regulation and financial framework for off-grid and mini-grid systems.
- The AfDB will collaborate with the REA to deliver outputs as follows:
 - Documents developed to clarify the rules of the game for mini-grid and off-grid
 - GIS-based database
 - Sites selected and feasibility reports cleared
 - Viable business models for mini-grids and off-grids
 - Improved and more transparent plans for the acceleration of rural electrification, and their testing and adoption

- Tariffs, operational scheme, and financial mechanisms for implementation of strategy
- Increased participation of women and disabled people in clean and renewable energy
- The TA facility will enable REA to make important improvements towards a strengthened enabling environment for private off-grid and mini-grid actors in Zambia. Greater availability of market information provided by REA, such as the proposed GIS data and energy demand data, will reduce the amount of early stage equity that developers will need to secure and spend on pre-feasibility work, stimulating both developer and investor interest in the sector. The availability of high-quality data sets would enable developers to fine tune business planning to market conditions, while lending credibility to the key assumptions underpinning operational expansion plans and revenue projections.
- Clarity of regulatory requirements and process flows, coordination of public sector stakeholders, and the ensuring of the uniform enforcement of regulations will reduce a major area of uncertainty and investor skepticism and encourage investment in the early stages of project development. Moreover, providing long-term clarity on key regulatory aspects (i.e. in the case of mini-grids, considerations for tariff negotiation, technical standards, and potential grid interconnection scenarios) will facilitate the raising of finance for project implementation. Finally, the implementation of a Gender Action Plan will ensure the participation of women and disabled persons in the off-grid and mini-grid sector.
- Altogether, these activities would enable the REA to quickly adapt to the changing Zambian off-grid and mini-grid market environment, and prepare to effectively execute its mandate of increasing access to electricity for the rural population of Zambia over the long-term.

Complementarity with ongoing mini- and off-grid initiatives

- **The mini- and off-grid sector support under this component are purely for the technical assistance and do not intend to provide direct financing to off-grid or mini-grid projects under development.** Instead, outputs from this TA (sites selected, feasibility studies, financial and operational schemes, etc.) are expected to directly catalyze this process and crowd-in private investors to rural electrification projects. The studies are expected to result into projects implemented by the private sector, in the context where some partners – mainly the EU, USAID, and DFID – have started developing pilot projects for proving viability of rural electrification business models. The idea of our technical assistance is to build on the work of these pilot projects and take them to the next step: scaling them up in an enabling environment with clearly defined regulations, resource studies and a supportive domestic financial system. Local financial institutions (commercial banks and pension fund), with experience gained from the GETFIT project financing and enhanced capacity built from our TA (sub-component 2), will play an active role in financing those projects.
- Figure 7 describes how the AfDB-GCF TA will complement other ongoing initiatives (see section C.5 for more detail) and contribute to the development of ecosystem and value chain for RE-based rural electrification in Zambia.

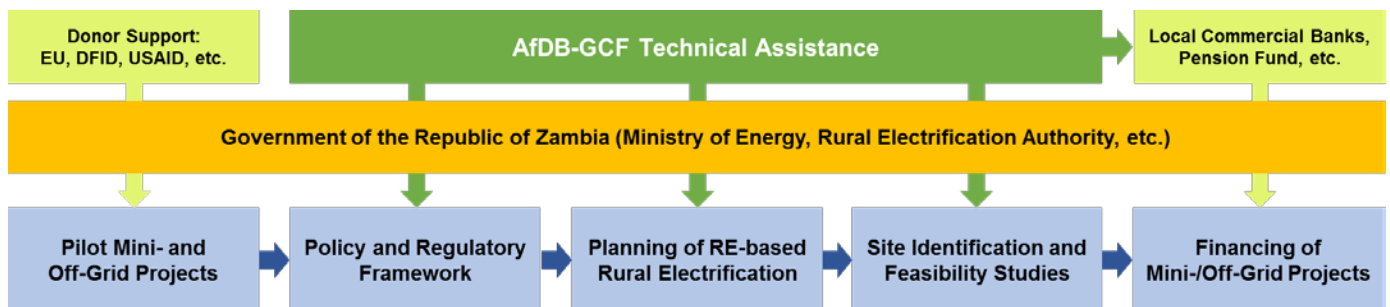


Figure 7. Development of ecosystem and value chain for RE-based rural electrification

- In 2017, the AfDB launched the Off-Grid Energy Access Fund, a USD 100 million blended finance debt fund designed to provide loans in local and hard currencies to off-grid energy companies. The AfDB is investing USD 30 million to this vehicle along with Calvert Impact Capital, Global Environment Facility and Nordic Development Fund.

ii) **TA Sub-Component 2: Enhancing local financial institutions' RE and project financing capabilities**

Context

- The AfDB, from its non-sovereign window, targets "investment-ready" projects for debt financing. In the current context, the proposed framework aims not only to catalyze private sector investment but also to promote local participation through (i) the involvement of local developers/investors, and (ii) the intervention of local financiers and investors. All these are to be achieved in an environment which is not yet conducive to private sector investment in renewable energy; hence the TA proposal to enhance the enabling environment to support the origination and preparation of bankable deals by local financial institutions and to build suitable capacity for the sustainability of the model after some external drivers of the framework (e.g. AfDB and GCF) are no longer there for future business. The timing for this specific TA component is additionally relevant, given the number of transactions that will be facilitated through the proposed framework.
- During the consultation process in Zambia, most of the local financial institutions expressed their limited knowledge, capacity and experience on renewable energies and project finance although they showed strong interest for these activities. Consequently, it is suggested that a suitable support for developing their expertise, resources and processes on these subjects would be necessary for them to participate into projects and realize their ambitions in the renewable energy sector. This has led to the proposal of a mix of activities including: coaching by proficient and experienced world-class experts for on-the-job learning; training sessions on specific themes; assistance on the recruitment of teams; and development of processes and procedures for selecting and approving financing for renewable energy projects.
- This sub-component will aim at building the capacity of the local financial sector for sourcing and financing renewable energy deals in the country. Beyond the renewable energy and project financing main aspects, this capacity development will also include a gender responsive climate finance module.

Proposed activities and expected outcomes

- The activities will support selected local financial institutions (FIs) (commercial banks and institutional investors – pension fund) in Zambia to build the requisite team, expertise and process that are needed to originate, appraise, finance and supervise renewable energy projects; and building the overall capacity of the Zambian financial industry for its enhanced understanding on renewable energy and infrastructure financing. A number of commercial banks have shown strong commitment towards RE by expressing its strategic positioning to include such deals in its portfolio and by initiating its accreditation process by the GCF. However, market consultations indicated that only few Zambian banks have experience in infrastructure or RE financing, with extremely limited exposure to the project financing structure.
- As a response, an embedded team of highly experienced international advisors will be recruited to constitute the sustainable energy financing team by being a nucleus around which the team will be formed. They will be embedded for a period of 18 months when they will simultaneously originate deals, develop the procedures, guidelines and manual related to the sustainable energy business and coach/train the local staff on site with the objective of reaching full autonomy after the 18-month period. These coaches will ensure that local staffs recruited in the team gain the necessary skills and experience through training and participation to business operations in the first 18 months. Local staffs could be a mix of new recruits – with specific skills and/or background – and existing personnel to be re-trained and dedicated to the program. Participating banks will have "skin in the game", by bearing the salaries of training participants and other administrative costs. The institutional commitment will be part of the selection criteria of participating FIs, which will also increase the sustainability of the operation.
- The technical assistance will include:
 - Credit policy and risk management support aimed at strengthening the participating bank's RE IPPs credit assessment, monitoring and portfolio systems; and increasing the transparency, speed and volume of RE IPP transactions;
 - Product and marketing alignment with target IPPs;
 - Training on social and environmental assessment and monitoring.

In parallel, it must be stressed that such programs require significant management effort. Participating FIs are expected to introduce the measures for the retention of the team whose capacity is to be built and consolidated, so as to ensure these efforts will translate into tangible operational capacity for advancing the RE agenda.

- At the end of the program, the strong capacity that will have been built within the local FIs to support their RE deal origination, due diligence, and project monitoring will serve to sustain the sector development in the long run.

C.4. Background Information on Project / Programme Sponsor (Executing Entity)

Describe the quality of the management team, overall strategy and financial profile of the Sponsor (Executing Entity) and how it will support the project/programme in terms of equity investment, management, operations, production and marketing.

Institutional background: Established in 1964, the African Development Bank (AfDB) is the premier pan-African development institution, promoting economic growth and social progress across the continent. There are 80 member states, including 54 in Africa (Regional Member Countries). The Bank's development agenda is delivering the financial and technical support for transformative projects that will significantly reduce poverty through inclusive and sustainable economic growth. In order to sharply focus the objectives of the Ten Year Strategy (2013 – 2022) and ensure greater developmental impact, five major areas (High 5s) have been identified, namely: energy, agro-business, industrialization, integration and improving the quality of life for the people of Africa.

The Vice Presidency for 'Power, Energy, Climate and Green Growth' (PEVP) is a Sector Complex focusing on the Bank's Ten Years Strategy and one of the High 5s priority of "Light up and Power Africa". In order to translate this strategic goal into concrete actions, the AfDB launched the "New Deal on Energy for Africa" strategy which is built on five inter-related and mutually reinforcing principles: (i) raising aspirations to solve Africa's energy challenges; (ii) establishing a transformative partnership on energy for Africa; (iii) mobilizing domestic and international capital for innovative financing in Africa's energy sector; (iv) supporting African governments in strengthening energy policy, regulation and sector governance; and (v) increasing African Development Bank's investments in energy and climate financing²⁹.

New Deal on Energy for Africa: The AfDB's energy strategy, central to implementing the New Deal, focuses on seven areas, which are: (i) setting up an enabling policy environment, (ii) transforming utility companies for success, (iii) dramatically increasing the number of bankable energy projects, (iv) increasing the funding pool to deliver new projects, (v) supporting 'bottom of the pyramid' energy access programs, particularly for women, (vi) accelerating major regional projects to drive integration and (vii) rolling out waves of country-wide energy 'transformations'. The Bank will implement these priorities through a series of flagship programs such as: IPP procurement, power utility transformation, an early stage project support facility and related catalytic programs, mobile payment initiatives, and a regional project acceleration program. The goal of this priority area is to help the continent achieve universal electricity access by 2025 with a strong focus on encouraging clean and renewable energy solutions. This will require providing 160 GW of new capacity, 130 million new on-grid connections, 75 million new off-grid connections and providing 150 million households with access to clean cooking solutions. To achieve these goals it is estimated that the investment needed will range between US \$60 billion and US \$90 billion per year. The Bank will invest US \$12 billion of its own resources in the energy sector over the next five years (figure 8).

²⁹ AfDB, New Deal on Energy for Africa strategy, 2016.

	From current energy situation in Africa		To universal access in 2025	
Population, M	1 174	x1.3	1 499	
GDP, \$ bn	2 175	x1.7	3 742	
Electrification rate, %	43%	x2.3	97%	
Households connected, M	87	x3.6	292	+130 M new on-grid connections
Grid	83	x2.6	213	
Off-grid	4	x20	79	+75 M new off-grid connections
Grid capacity, GW	170	x1.9	332	+160 GW of new capacity
Consumption kWh/capita	613	x1.5	941	
Households using clean cooking, M	70	x3.1	220	+150 M with clean cooking solutions

1 Assuming 100% urban electrification and 95% rural electrification 2 Out of 234m households in 2015 and 300m households in 2025

Figure 8. Targets under the AfDB's New Deal on Energy for Africa

Under this strategic framework, the PEVP complex's objectives are (i) to develop enabling sector policy and strategy; (ii) to provide deep sector technical expertise to the regions by gathering pool of experienced individuals who can be consulted for their expertise on complicated transactions; (iii) to develop new financing instruments; and (iv) to act as spokesperson to represent the Bank with external stakeholders on all aspects of "Light Up and Power Africa". The AfDB-GCF framework will be executed by the PEVP complex of the AfDB, following the Bank's established rules and procedures for the project and financial management. The Climate Change and Green Growth Department under the PEVP complex is in charge of the Bank's climate change strategy and climate finance programs (figure 9).

An implementation team for this framework will be constituted within the AfDB, and be in charge of the due diligence and execution of individual sub-projects as well as the management of the overall framework. The team will be mobilized from a pool of experts from the Zambia field office, the regional office for Southern Africa, and the PEVP complex at headquarter. This implementation mechanism will ensure a speedy and seamless execution of the framework.

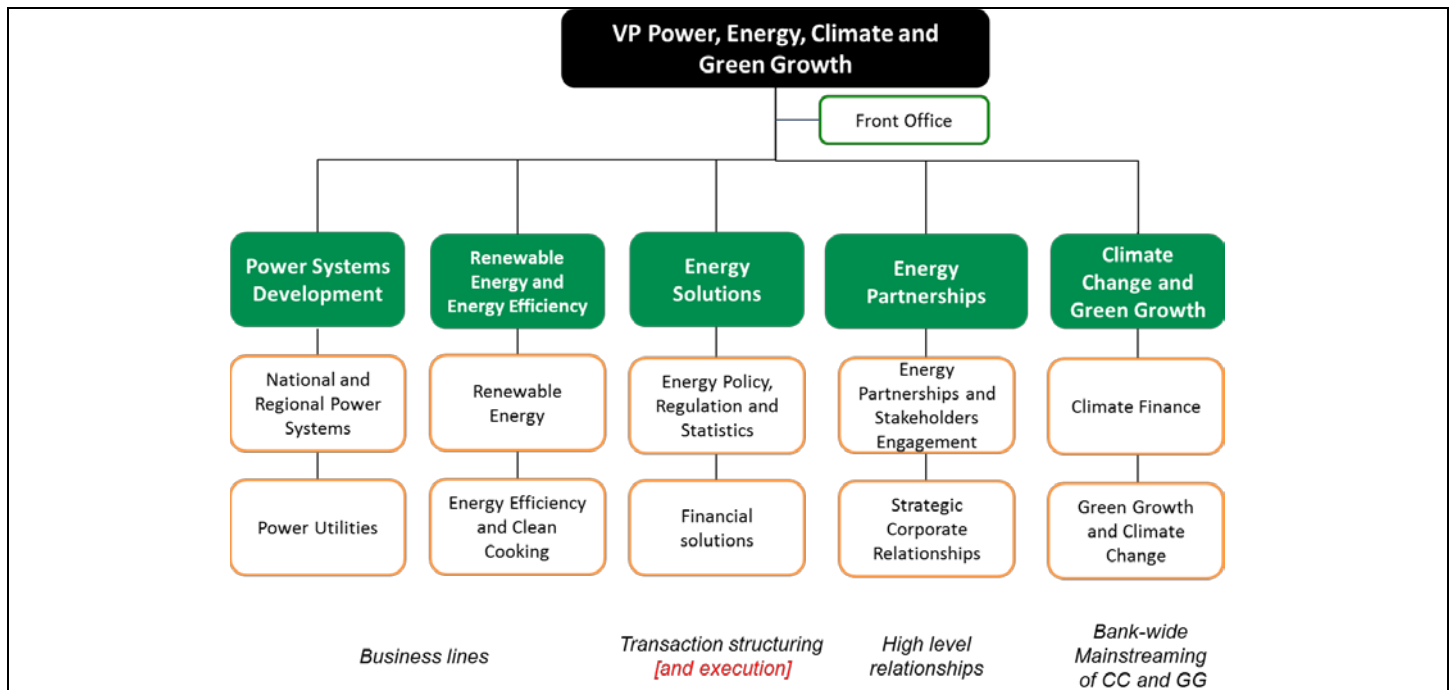


Figure 9. PEVP organizational structure

AfDB RE and climate investments overview and project examples (2011-2017): Over the last 7 years (2011-2017), the AfDB has invested around UA³⁰ 1.25 billion from its own resources in support of renewable energy (in addition to ~UA 390 M in co-financing channeled by the Bank). Operations are ranging from project preparation to infrastructure investment notably through the use of various Bank instruments – loan, grant, line of credit, partial risk/credit guarantee and equity. Bank’s investment in RE (excluding early stage project preparation support) will contribute towards ~3.4 GW in additional RE generation capacity (of which ~1.4 GW from hydro, ~900 MW from wind, ~900 MW from solar, ~100 MW from geothermal and ~70 MW from biomass). Further, under its climate finance mobilization efforts, the AfDB is committed to increasing its annual climate financing to reach \$5 billion a year by 2020 – 40% of its total new investments by 2020. This will be implemented by the "Africa Thriving and Resilient: The Bank Group’s Second Climate Change Action Plan, 2016-2020 (CCAP2)" approved by the Board of Directors in 2017. The strategic vision of CCAP2 is to enable the achievement of ‘low-carbon and climate-resilient’ development in Africa with four Pillars: Mitigation, Adaptation, Climate Finance and a Cross Cutting Pillar that addresses technology transfer, capacity development, institutional reforms as well as other cross-cutting activities that will create of the enabling environment for its successful implementation. The AfDB’s climate finance portfolio 2011-2016 included 323 projects with climate mitigation and/or adaptation benefits based on the joint MDB climate finance tracking methodology. This portfolio is dominated by mitigation project 67%; the CCAP2 will aim to raise adaptation finance to reach parity with mitigation.

As the Figure 10 shows, the AfDB Commitment to RE has grown from UA 424 M in 2007-11 to above UA 800 M in 2012-16. The share of RE in power generation investments raised from 14% to 64% during the two periods. Among the Bank’s 4.6GW RE power generation commitments between 2011-2017, hydro accounts for 1.9GW, followed by solar CSP (1.5GW), solar PV (600MW), wind (550MW), and biomass (75MW). The AfDB has been associated with the landmark RE transactions in the continent, in Morocco, South Africa, Egypt, Kenya, and other countries (details provided in the Section E.5.2). **In 2017, the AfDB has achieved 100% investment in green energy projects** (power generation projects with a cumulative 1,400 megawatts exclusively from renewables).

³⁰ Unit of Account, equivalent to the IMF's Special Drawing Right.

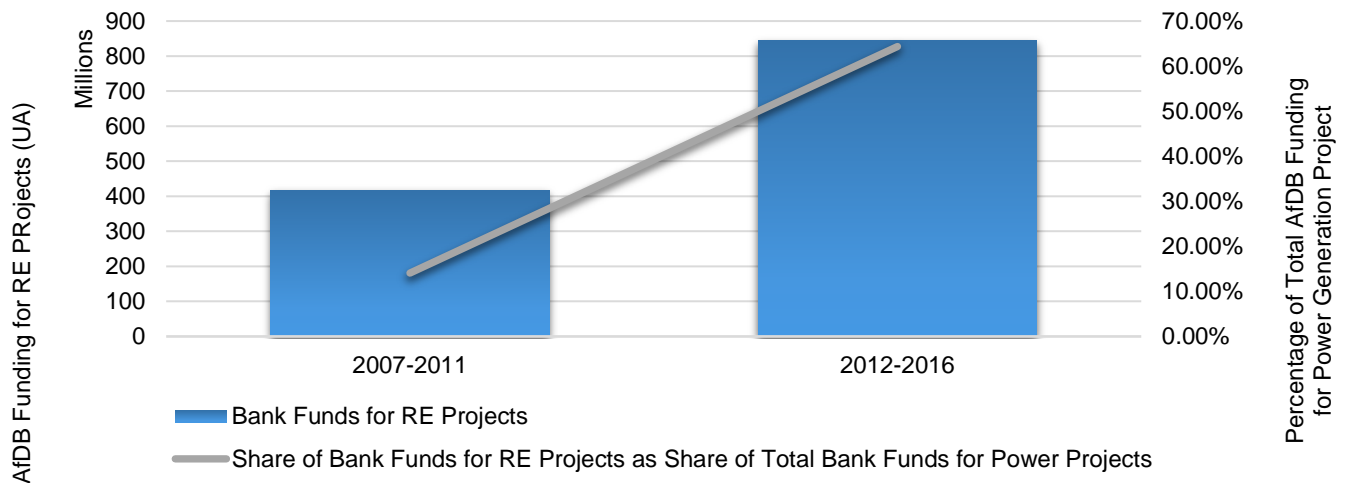


Figure 10. Share of Renewable Energy projects in the AfDB power generation investments

The Sustainable Energy Fund for Africa (SEFA), a multi-donor platform embedded in the Renewable Energy and Energy Efficiency Department, is the AfDB's dedicated TA facility aimed at unlocking private investments in renewable energy and energy efficiency. SEFA supports nascent private sector RE projects through early stage involvement in project development and by creating enabling environment. Financing options available through SEFA include project preparation grants, equity investments and enabling environment grants. In 2016, SEFA approved 3 project preparation grants, 6 equity investments and 4 enabling environment grants for a total amount of 16.4 million dollars. Following its fifth year of operations, SEFA has cumulatively committed over USD 55 million of its USD 95 million capitalization across 32 projects in 18 countries, including six multinational projects.

AfDB's energy sector involvement in Zambia:

The Bank has been involved in several activities in Zambia over the past few years.

- The 120 MW Itezhi-Tezhi Hydro Power Plant is situated at the existing Itezhi Tezhi dam on the Kafue River in Zambia. The plant is developed by a joint venture SPV equally owned by ZESCO and a private sponsor. The SPV has a 25-year concession and a 25-year off take agreement with ZESCO. The Bank has provided a mix of financing: the public sector funds (around USD 50 million) contributed to financing half of ZESCO's equity participation in the SPV, technical assistance to ZESCO, as well as co-financing the 276 km transmission line to evacuate the power, while the AfDB private sector funds provided a USD 38 million senior debt to the SPV.
- Short Term Assessment of Supply Demand Situation in Zambia (2015 – 2020): In May 2016, the Bank prepared a Short Term Supply Demand Assessment Report for the Government of Zambia. This was based on the information provided by the GRZ, ZESCO, IDC and Copperbelt Energy Corporation. The report summarized the short term capacity/energy balances from 2015 to 2020 with the steps the Government had taken to procure additional capacity to meet the supply gap, which has been created due to a shortage in generation capacity and worsened due to continuous poor rainfall years resulting in very low dam level to support power generation. The report makes some short term recommendations on the steps that the GRZ needs to take.
- Electricity Cost of Service study (ongoing): The objective of the study is to provide a basis for setting consumer electricity tariffs to promote efficiency of electricity supply and consumption, and to ensure financial viability of the electricity sector, while taking into account social and equity considerations in the pricing of electricity to poor households. To achieve the above objective, the study will:
 - Determine the long-term least cost generation, transmission, distribution and supply programs to meet the forecast electricity demand in Zambia over the medium to long-term;
 - Estimate the long-run marginal cost of generation, the average incremental cost of transmission, and average incremental cost of distribution and supply;
 - Determine the economic cost of supply by voltage level, from generation to the supply level;
 - Design economic-based tariffs for that reflect economic cost of service to each consumer category;
 - Determine the appropriate structure and level of the social life-line tariff, and level of subsidy;

- Propose a comprehensive strategy, including a time-based program, for transition from the existing financial to economic-based tariffs, and for addressing the subsidy; and
- Prepare a communications strategy for use of ERB for the dissemination of the study results and recommendations to all stakeholders.
- Energy Sector Budget Support (proposed): The proposed operation – energy sector budget support – aims to support the GRZ’s efforts to address the country’s development challenges relating to the energy sector through complementary structural, regulatory and governance reforms to improve efficiency, transparency and competition in the sector. It focuses on three components:
 - Component 1: Enhancing financial sustainability and resilience of the power sector
 - Component 2: Enhancing the institutional and regulatory framework and the sector governance
 - Component 3: Consolidating fiscal performance and public finance management

AfDB’s non-energy sector involvement in Zambia:

- Line of Credit to ZANACO (2008)
- Line of Credit and TA to Development Bank of Zambia (2016, USD 50 million)
- Strengthening Climate Resilience in the Kafue Basin

C.5. Market Overview (if applicable)

Describe the market for the product(s) or services including the historical data and forecasts.

(Please also refer to the Section C.1.)

Zambia’s electricity generation has been dominated by hydropower, which is reported to have about 6,000MW of unexploited potential still³¹. While the Zambezi River is the major source of Zambia’s hydropower resources, a potential for small-hydro from other parts of the country remains largely untapped. Zambia is well-endowed with other renewable energy potential as well. For solar, Zambia receives an average 2,000-3,000 hours of sunshine per year and an average irradiation of 5.5 kWh/m²/day (figure 11).

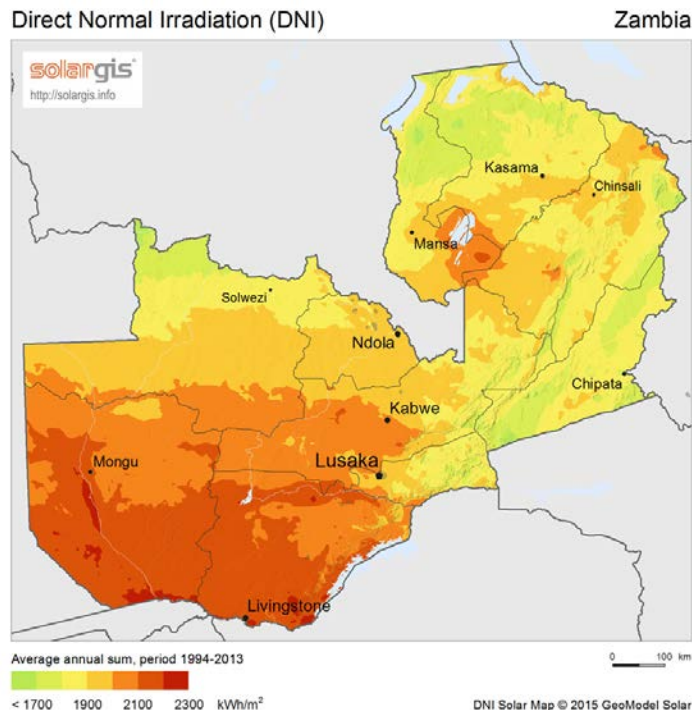


Figure 11. Solar irradiation in Zambia (kWh/m²)³²

³¹ Zambia Development Agency, Energy Sector Profile, 2014.

³² GeoModel Solar.

Zambia has an electrification rate of approximately 27.9% (World Bank 2014), which is well below the average of the Southern African region. Access to electricity in urban areas is below 50% and rural electrification rates stand at below 5% (3.8% as of 2014 according to the World Bank and SE4ALL data). If more citizens are to be connected to the national grid, national energy demand would be several times higher than current demand estimations. Zambia has a total installed generation capacity of 2,826.91 MW, of which nearly 90% comes from hydropower stations while the remainder is mainly diesel and coal based. Due to recent droughts and overdrawing of water from the Kariba Dam (figure 2 and 3), Zambia faced serious power shortages since 2015 and it had to import 2,184.9 GWh of emergency energy from the region in 2016 (more data included in Section C.1). These shortages had a serious impact on the economy as the load shedding exacerbates up to 8 hours a day, due to the deficit of up to 980MW during peak hours. The current generation capacity may be sufficient during normal rainy seasons, but with an electricity demand growth of 4.5% per annum, additional generation capacity has to be developed to meet rising demand.

The major electricity consumer is the mining sector who is taking 54.5% of the electricity, followed by the domestic sector (31.2%), finance and properties (4.6%), manufacturing (4.3%), agriculture (2.1%) and others³³ (figure 12). In 2016, total energy consumption amounted to 10,857.5 GWh which equals to 547 kWh per capita. This is a reduction by 5.2 percent from 11,449.9 GWh in 2015, which is mainly caused by the slowdown in mining activity and outages for non-mining customers. Different scenarios estimate that the energy demand in 2020 will increase by between 16,584 and 17,257 GWh. High share of the mining sector in national electricity consumption can be explained by the economy's heavy dependence on the mining industry which accounts for 13.4% of value-added to the economy in 2015³⁴.

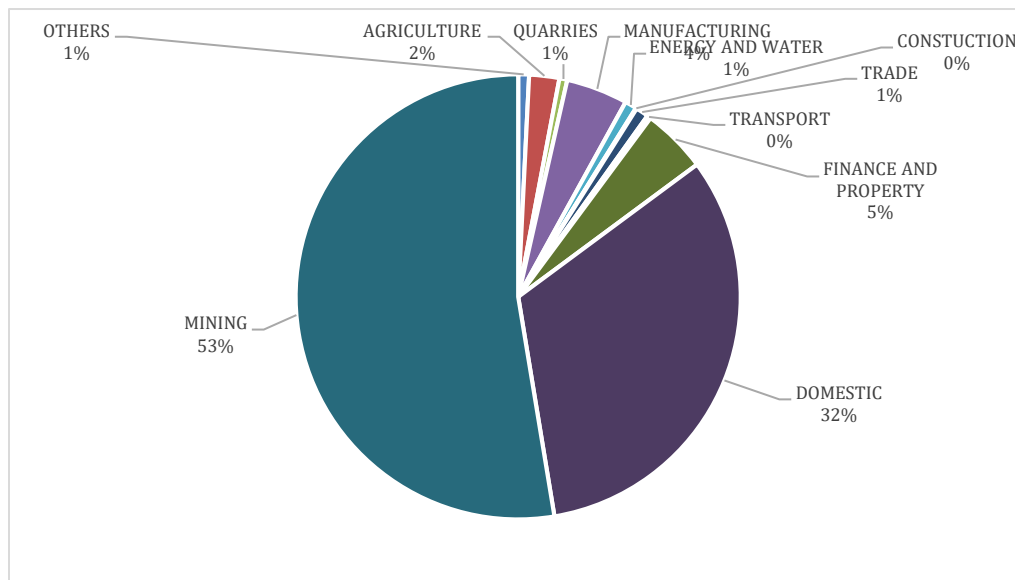


Figure 12. Electricity consumption by sector, January–September 2016³⁵

Plans to meet rising electricity demand includes additional hydropower installations, improvement and expansion of existing hydropower installations, addition of solar PV farms, thermal generation (coal and heavy fuel oil) and improving efficiency in the utility operations through the transformation of ZESCO. Coal and other fossil fuel plants are on the country's pipeline as they provide an option to diversify from hydro while ensuring reliable baseload capacity. Despite installation of new coal plants, the transition towards sustainable energy market has kick-started with the recent launch of utility-scale solar PV projects such as Scaling Solar (600MW over three rounds of auction). Further, the REFIT strategy provides a regulatory framework for small- and medium-scaled RE generation (up to 20MW), which targets to add 200MW within the next three years.

³³ Energy Regulation Board (ERB), Zambia Energy Sector Report, 2016.

³⁴ Analyse Africa, Country Report 2017 Zambia: By the numbers.

³⁵ Ibid.

RE IPP development in Zambia

Project	Technology	Capacity	Status	Sponsor	Est. USD million	COD
Scaling Solar Round 1	Solar	45	PPA signed	Neoen/First Solar	55	2018
	Solar	34	PPA signed	ENEL Green Power	40	2018
GETFiT Round 1	Solar	100	PPA and IA negotiation/ Tendering	To be selected	150	2019
GETFiT Round 2	Small-hydro	100	PPA and IA negotiation	To be selected	150	2019 (TBD)
Scaling Solar Round 2	Solar	300-400	Tendering	To be selected	500-600	2019 (TBD)

Table 2. Recent RE (non-hydro) IPP development in Zambia

IPP projects are emerging as a viable solution to address power supply deficit in Zambia, while those harnessing RE technologies are still new in the market. Currently two major programs – Scaling Solar and GETFiT program – are facilitating the development of RE IPPs at various capacity in Zambia.

- Scaling Solar:** In July 2015, Zambia's Industrial Development Corporation (IDC) signed an agreement with the International Finance Corporation (IFC) to explore development of large-scale solar projects through Scaling Solar, in response to severe power crisis that swept the country in 2015. The first round of auction aimed at developing 100 MW of solar power projects. The World Bank and the IFC supported the tendering process and offers a package of financing and risk guarantees to the selected projects. Of the 11 prequalified bidders, the two winners with the lowest offered tariffs (Neoen/First Solar and Enel Green Power, at USD 0.0602/kWh and USD 0.0784/kWh respectively) have been awarded a 25-year Power Purchase Agreement in early 2017. Two projects selected under the first round tendering are expected to reach financial closures in Q4 2017. Under the second round of the Scaling Solar program, the IDC is currently tendering a total of 300-400 MW for solar PV concessions (two to four projects). Twelve (12) pre-qualified bidders have been identified in May 2017 and are awaiting a RfP to be issued.
- GETFiT program:** The Global Energy Transfer Feed-in-Tariff (GETFiT) program, whose design is supported by the KfW, is the main pipeline where the AfDB and GCF are expected to participate to. As opposed to Scaling Solar, whose pipeline consists of large-scale solar projects, the GETFiT aims to fast-track the generation of small-scale (smaller than 20MW) RE under the framework of the Renewable Energy Feed-in-Tariff (REFiT) strategy (approved by the cabinet in July 2017, and launched in October 2017). The objective is to bring initially 200 MW of renewable energy onto the grid within the next three to five years, divided into 100 MW solar PV and 100 MW small-hydropower. A total 100 MW solar PV will be procured through a competitive two-stage auction process in the Phase I (to be launched in Q1 2018) while the second tender will call for small-hydro projects (mid-2018). While the program is entitled "feed-in-tariff", the tariff for non-hydro projects will be determined through competitive bidding as specified in the government's REFiT strategy.

Grid stability issues associated with intermittent solar PV and wind based generation can be contained within the 15-20% tolerance margin of the aggregate mix. At the current level of 2,800~ MW installed capacity in Zambia, this gives a tolerance of around 600 MW of solar PV and wind. This appears manageable with the current pipeline of energy projects in Zambia where there would also be increasing installed capacity from other non-intermittent sources such as hydro, coal and biomass/biogas. Further, continuous investments in generation, transmission and distribution are planned by the GRZ which will result in an enhanced capacity of the grid to absorb intermittent RE sources.

Off-grid and mini-grid market

Historical experience with off-grid and mini-grid solutions in Zambia: The GRZ and market actors in Zambia had built initial experience with solar home system (SHS) as early as twenty years ago. This was through internationally-supported market development initiatives in the 1990s and early 2000s (i.e. through a SIDA-supported ESCO program as well as the Zambia Social Investment Fund). However, given the high cost of technologies of the time and a lack of business model precedents, the expansion of local SHS implementation capacity and market activity as a result of these programs was limited. Similarly to activities in the stand alone off-grid solar market, the GRZ has had limited exposure to private investment in mini-grid solutions. While ZESCO operates several diesel-based mini-grids throughout the country, there has only been a handful of privately built and operated mini-grids in the country. These include the 750kW Zengamina hydropower plant in Northwestern Province, a recently commissioned 30kW solar PV mini-grid in Eastern Province, and a handful of smaller solar PV and hydro-based mini-grid activities; a majority of which have been developed through charitable activity with limited ambition to scale.

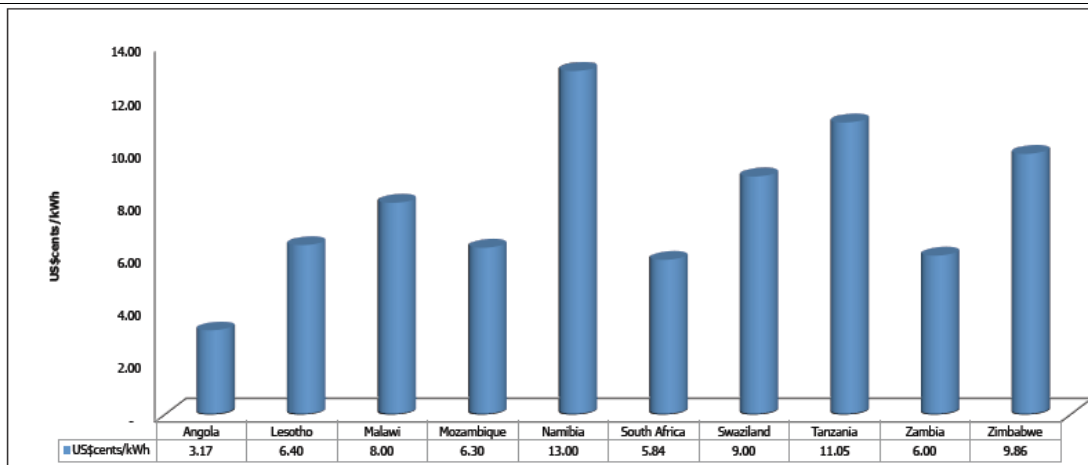
Current stage of market development: Recent years have seen a proliferation of solar portable lamps, including both branded and off-brand solutions readily available throughout the country. Several recent internationally supported initiatives have resulted in the development and market entries of established SHS solutions providers, and has also yielded an increasingly active and emerging mini-grid sector. In the past three years, international programs have provided substantial grant and concessional financing to early stage enterprises. Several mini-grid developers, both local and international, are in active conversation with the REA, ERB, and other authorities to enable commercially scalable investment activities.

Key challenges to be addressed: Within this strongly dynamic market environment, the Ministry of Energy and Water Development and REA are stepping up efforts to address the current pace of market development, and the ability to ensure that Zambia's enabling environment remains conducive for additional investment in the sector over the long-term. Beyond initial market building phases, finance for off-grid and mini-grid initiatives are typically sourced from a range of impact-oriented investors, including angel investors, family offices, foundations, DFIs, and other impact investment funds. Increasingly, more traditional clean technology venture capital and private equity investment funds are engaging with the off-grid and mini-grid sector. Despite the increasing amounts of capital flowing to this sector, many of these institutions may never have placed a previous investment in Zambia.

The majority of financing for off-grid and mini-grid solutions to date has been catalytic in nature, and supported by international and public finance to enable the implementation of initial country operations and market testing activities. However, once enterprises begin to scale, both local and international finance will be required. Local and international providers of both equity and debt will seek to ensure that an appropriately aligned investment climate exists, and that there is a minimization of regulatory and political risks for potential investees. This increases the need to demonstrate the strength and readiness of Zambia's enabling environment for off-grid and mini-grid investments.

Provide pricing structures, price controls, subsidies available and government involvement (if any).

Electricity tariffs: Different tariffs are applied to the different groups of consumers in Zambia: in particular the mining industry pays lower prices compared to the rest of the country. Recent imports of electricity over 2015 and 2016 to tackle the acute electricity crisis have worsened the financial health of the sector. The average unit cost of imported energy in 2016 was USD 0.13/kWh and the price of local energy generation was around USD 0.10/kWh, while the retail price is USD 0.06/kWh. The difference has been covered by ZESCO causing a heavy fiscal burden on the Treasury, resulting in the monthly arrears of USD 20-30 million. The GRZ is therefore committed to adjusting tariffs to be cost-reflective. The Cost-of-Service study currently being conducted with the AfDB financial support is one important step to introduce more transparency in the electricity sector, which in turn will help enforce the movement toward the cost-reflective tariffs. Zambia's consumer tariff level is on a lower side when compared to neighboring countries in Southern Africa (figure 13), again highlighting the tariff gap in the country



Source: Regional Electricity Regulatory Association ¹⁰

Figure 13. SADC average electricity tariffs (in US Cents/kWh) as at June, 2016³⁶

In May 2017, The Energy Regulation Board (ERB) has decided to increase the electricity tariffs from ZESCO by an average of 75 percent. In its application, ZESCO increased non-mining electricity tariffs in two phases starting with 50 percent on 1st May and a further 25 percent in September 2017. However, mining companies are excluded from this tariff increment due to the prevailing bilateral Power Purchase Agreements (PPAs). Negotiations with mining houses is nearing a conclusion that will raise their tariffs. These measures will help reduce the pressure on the fiscal deficit in the medium term.

C.6. Regulation, Taxation and Insurance (if applicable)

Provide details of government licenses or permits required for implementing and operating the project/programme, the issuing authority, and the date of issue or expected date of issue.

Regulatory regime: Under the Electricity Act, the Ministry of Energy and Water Development is responsible for the policy stewardship of the sector, which includes energy policy review and development. Under its supervision, the Energy Regulation Board (ERB) has the mandate to determine the electricity tariffs for customers, following the Electricity Act, Cap 433 and the Energy Regulation Act, Cap 436 1995 of the Laws of Zambia. The ERB takes into account the consumption volume, regularity of demand, the time when electricity is required, the production cost, and other circumstances approved to determine the tariffs. The GRZ has recently approved the REFIT strategy which provides a regulatory framework for small- and medium-size RE projects.

Permits, licenses and land: Necessary permitting and licensing procedures from the ERB will be facilitated by the GETFIT program with the support from the GRZ for all the selected pipeline projects. Project developers will acquire and pay for any ownership and/or lease of land, wayleave, right of way, easement or other interest in land which it may require for the construction, operations and maintenance of the project. The acquisition of land will follow the prevailing law in Zambia.

Currency regime: The Zambian Kwacha (ZMW) is not pegged to any other currency and freely convertible. The projects to be funded by the framework will require hard currency financing in USD as the capital expenditures of IPPs typically involve importing equipment and services paid in hard currency. PPAs with ZESCO are signed in the USD term, and require that all payments shall be made in US Dollars.

³⁶ Energy Regulation Board (ERB), Zambia Energy Sector Report 2016.

As a multilateral development institution the AfDB enjoys a preferred creditor status which gives preferential access to foreign currency in case the country is imposing any restrictions in regard to the foreign currency conversion. In-country consultations have confirmed that the currency conversion risk is low in Zambia as there is a stable supply of hard currency in the country injected from the mining industry.

Privileges and Immunities: Chapter VII of the Agreement Establishing the African Development Bank describes the agreements among the AfDB's member countries with regard to the status, immunities, exemptions and privileges. This includes immunity of the Bank's assets and archives, freedom of assets from restriction, privilege for communications, and exemption from taxation. The GCF resources will enjoy an equal treatment with the AfDB resources in terms of privileges and immunities. The parties acknowledge that the Accredited Entity's privileges and immunities bestowed upon it by the Agreement Establishing the African Development Bank are applicable to the GCF Proceeds and Other GCF Funds held in trust and/or disbursed by the Accredited Entity for implementation of the Funded Activity under this Agreement.

Tax regime: The GRZ offers a range of economic incentives to encourage investment into the renewable energy, including fiscal incentives (tax incentives that include income tax, value-added tax, and customs duty incentives), non-fiscal incentives (risk cost sharing, support of land acquisition, etc.) and a capital-smart subsidy (for projects developed under the Rural Electrification Authority). Investment incentives in the form of government revenue foregone (e.g. tax exemption and reduction on dividends, import duty, VAT, general corporate taxes) are available at differing levels depending on the amounts invested, qualification such as micro or small, and priority sectors³⁷. Under the Statutory Instrument No 32. of 2008 (the Customs and Excise Act) and the Statutory Instrument No 33. of 2008 (the Value Added Tax Act), solar equipments (panel, battery, inverter, etc.) are exempted from the customs duty and the VAT.

Insurance: The AfDB, as a lender of record, will ensure that the sub-projects are adequately insured as per standard industry practices.

C.7. Institutional / Implementation Arrangements

Please describe in detail the governance structure of the project/programme, including but not limited to the organization structure, roles and responsibilities of the project/programme management unit, steering committee, executing entities and so on, as well as the flow of funds structure. Also describe which of these structures are already in place and which are still pending. For the pending ones, please specify the requirements to establish them. Describe construction and supervision methodology with key contractual agreements. Describe operational arrangements with key contractual agreements following the completion of construction. If applicable, provide the credit analysis of key counterparties of key contractual agreements and/or structural mitigants to cover the counterparty risks.

The AfDB will be responsible for the overall oversight of the framework implementation and will report to GCF per the terms to be agreed under the Accreditation Master Agreement (AMA) and the Funded Activity Agreement (FAA). For each sub-project financed under the framework (senior debt and standby loans), there will be on one hand a Common Term Agreement (CTA) between the borrower, the AfDB and commercial lenders/banks and on the other hand individual facility agreements between the borrower and each of these lenders. The AfDB will be the sole signatory to the CTA, on behalf of the GCF, in its capacity as an Accredited Entity of the GCF, and in its own right.

For managing the GCF resources, a special Trust Fund will be set-up within the AfDB as a stand-alone facility and the Bank's role will be to administer the funds. Under this scheme, the AfDB will be a direct lender to the projects in its capacity as an Accredited Entity. Details of the GCF Trust Fund management will be shared in due course. Figure 14 shows the overall implementation structure of the framework and the flow of funds.

³⁷ Walimwipi, H., "Investment Incentives for Renewable Energy in Southern Africa: Case study of Zambia", 2012.

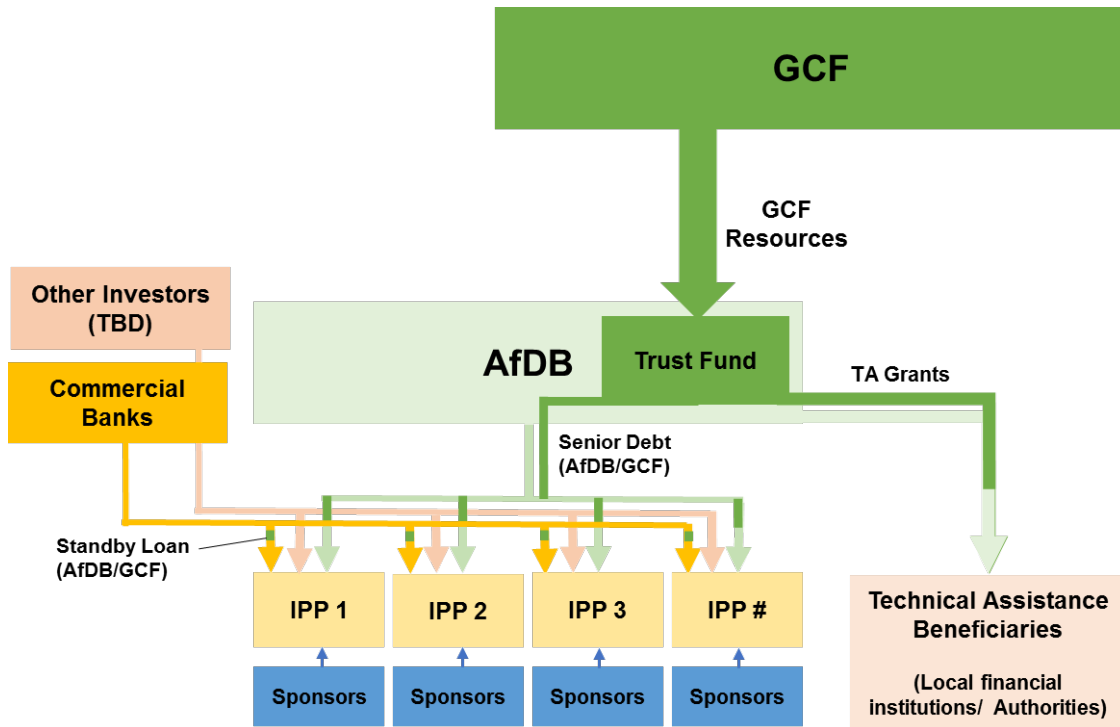
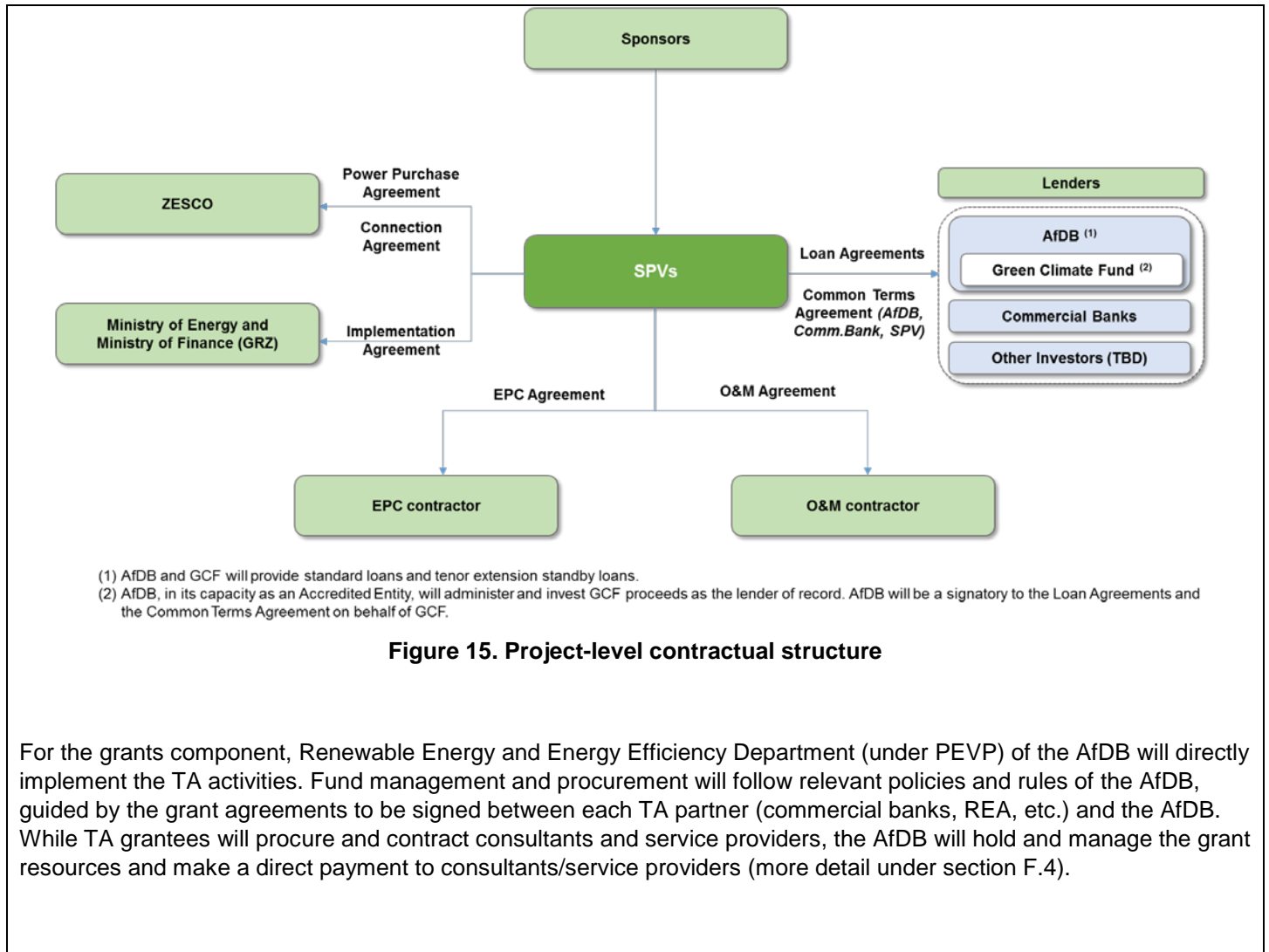


Figure 14. Overall structure of the AfDB-GCF framework and the flow of funds

Implementation of the IPP project financing will involve the signing of

- Power Purchase Agreement (PPA) between selected borrowers and ZESCO,
- Grid Connection Agreement between selected borrowers and ZESCO, and
- Implementation Agreement between borrowers and the GRZ represented by the Ministry of Energy and Water Development and the Ministry of Finance.

Figure 15 describes the contractual structure for each sub-project. The AfDB will apply its credit evaluation, due diligence and approval procedures in appraising potential clients, and only those sub-projects qualified under the AfDB's internal criteria will be eligible for investment under this framework.



C.8. Timetable of Project/Programme Implementation³⁸

Please provide a project/programme implementation timetable in [section I \(Annexes\)](#). The table below is for illustrative purposes. If the table format below is used, please refer to the activities as numbered in Section H. In the case of outputs, please mark when all the required activities will be completed.

	2018				2019				2020				2021				2022				2023				
TASK	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	
Component 1. Debt financing (senior loans and standby loans) for independent power producers (IPPs) projects																									
GCF Board Approval	x																								
AfDB Board Approval (GETFiT Round 1 and 2)		x	x						x	x															
Financial Close (GETFiT Round 1 and 2)			x	x							x	x													
Construction (GETFiT Round 1 and 2)				x	x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x			
Commercial Operation Starting Date (GETFiT Round 1 and 2)								x	x												x	x			
Component 2. Technical Assistance grants																									
GCF Board Approval	x																								
AfDB Board Approval		x	x																						
1) Accelerating the development of rural electrification through private-led mini- and off-grid deployment			x	x	x	x	x	x	x	x	x	x	x	x	x	x									
2) Enhancing local financial institutions' RE			x	x	x	x	x	x	x	x															

³⁸ In addition to this timetable, financial and operational reporting schedule will be specified in the term sheet.

D.1. Value Added for GCF Involvement

Please specify why the GCF involvement is critical for the project/programme, in consideration of other alternatives.

NDC implementation: Zambia demonstrated its commitment to the Paris multilateral negotiation process by submitting the NDC on September 29, 2015. Implementation of the NDC with concessional financial resources from international mechanisms such as the GCF will boost the scale of net reduction in carbon emissions compared to the baseline scenario from 20 MtCO₂eq to 38 MtCO₂eq (for year 2030), almost doubling the reduction potential. As part of the NDC implementation activities, Zambia is switching energy generation from hydro or fossil-based energy sources to renewable energy sources. Zambia is also pursuing diversified and decentralized energy systems such as off-grid renewable energy for rural electrification. Increased energy access will build the resilience of Zambian communities by providing reliable energy infrastructure for climate-smart agriculture and other productive activities. This framework is therefore intended to support the strategic implementation of the NDC in Zambia, and the involvement from the GCF will be essential to realize the expected outcomes that align with the Paris Agreement and with the Zambia's seventh National Development plans–2017 - 2021⁴⁰.

Barriers to RE investment: RE projects usually have a long-term investment horizon of over 10 years and as such require long-term financing. The RE investment scene in Zambia and other sub-Saharan African countries have been dominated by the Development Finance Institutions (DFIs) with little space of participation from commercial and local financial players. Commercial banks are not able to provide long-term credit for RE projects partly because they depend largely on short-term deposits for loan transactions. This mismatch of using short-term deposits for long-term loans and the financing constraints it presents to the sponsors/developers of RE projects will persist without availability of long-term credit facility. Further, the cost of financing from local commercial banks is high thus they cannot compete with other sources of financing from sponsor's point of view. This crowds out private investment from the RE sector. Still, maintaining the status quo cannot bring a transformative change that is required for dramatically increasing access to energy in Zambia with stable and sustainable energy sources. Zambia needs to tap into an innovative approach to crowd-in diverse sources of financing for RE project investment, both on-grid and off-grid.

Value added for GCF involvement

1) RE project loans and standby loans (tenor extension instrument): Involvement of the GCF will enable a financing scheme that will offer long-term and reasonably priced loans to upcoming RE projects, which will at the same time open up the market for participation of local private financiers and institutional investors. The focus of this financing envelope is on small- and medium-size (up to 20MW) RE IPP projects developed under the framework of the REFIT strategy. Total 200MW of small- and medium-size RE projects will be deployed for the next couple of years and these projects need a financial package that can fill the volume gap at affordable price. Without the GCF participation, it is difficult to realize the proposed scheme that accommodates private sector participation in the RE market, which in fact is pivotal to the implementation of NDC-related RE activities in Zambia. Standby loan facility is proposed to enable the participation of commercial banks who are not capable of making long-term investment into RE projects. The framework participation by the AfDB and GCF will give confidence to commercial banks and the pension fund, incentivizing their participation to the projects. While commercial banks and local institutional investors (pension fund) are welcomed to join the debt financing, their presumably high cost will have a negative impact on the tariffs and affect the bankability of the projects. Needs-based concessional financing from the GCF will compensate the elevated cost from the participation of commercial banks and the pension fund, making sure that the all-in price offered to the projects is affordable.

2) Technical Assistance (TA) grants: The intervention also has several components that will require grants from GCF. For example, RE IPPs financing by local financial institutions has never been tested in Zambia and commercial banks in the country are new to the business concept. This necessitates significant technical assistance for the local financial industry, to build the capacity of institutions to integrate RE finance into its core operations and portfolios and to be able to originate, appraise, execute and manage RE investment transactions. High quality standards in due diligence supported by the AfDB and the GCF will ensure the placement of strong environmental and social standards from the outset. In addition, nascent off-grid and mini-grid market in Zambia require a comprehensive capacity building in particular on the regulator's side, in order to put in place reliable and conducive regulatory environments for private players. The TA provided under this

framework will complement other ongoing initiatives in Zambia by building up mechanisms to sustain and scale-up beyond a localized, pilot approach.

As the country seeks to upscale private investment in rural electrification, the GCF involvement will add value by unlocking the potential of private-led RE financing with strong local participation, which will come with high demonstration effect and possible replication in other countries and regions.

D.2. Exit Strategy

Please explain how the project/programme sustainability will be ensured in the long run, after the project/programme is implemented with support from the GCF and other sources, taking into consideration the long-term financial viability demonstrated in [E.6.3](#). This should include a description of strategies for longer term maintenance of physical assets (if applicable).

For individual sub-projects, the loans (both standard loans and standby loans) will be paid back according to the repayment schedule. For the entire sector, accelerating private sector involvement in RE delivery pioneered by this framework will enable market transformation that is required for the paradigm shift.

For the TA grants, the capacity development component targeting local financial institutions, REA, and other stakeholders in the financial and energy sectors will ensure that the intended outcomes are sustained even after the program period by putting in place capable staffs and institutional mechanisms. The interventions are also designed to align with other relevant initiatives in Zambia and to mutually support the sustainability of their respective outcomes. All these elements will contribute toward building a national system and market environment where private-led RE financing can stably thrive.

⁴⁰ The impact of climate change will cost Zambia approximately 0.4 percent of its annual economic growth as analyzed in the national development plan.

In this section, the accredited entity is expected to provide a brief description of the expected performance of the proposed project/programme against each of the Fund's six investment criteria. Activity-specific sub-criteria and indicative assessment factors, which can be found in the Fund's [Investment Framework](#), should be addressed where relevant and applicable. This section should tie into any request for concessionality made in [section B.2](#).

E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation / adaptation impact potential

Specify the mitigation and/or adaptation impact, taking into account the relevant and applicable sub-criteria and assessment factors in the Fund's [investment framework](#). When applicable, specify the degree to which the project/programme avoids lock-in of long-lived, high emission or climate-vulnerable infrastructure.

The AfDB-GCF framework is expected to deliver 100 MW of power (4-6 small-scale solar PV IPPs and a limited number of small hydro projects – less than 20% of the program – under the GETFiT program) thereby reducing the deficit in Zambia with sustainable energy sources than fossil fuel-based generation currently used to bridge the gap. Deployment of additional generation capacity, coupled with the TA to promote mini- and off-grid investment, will in turn contribute to the increased energy access by people excluded from the grid. The diversification of the energy mix will improve the resilience of the energy system in Zambia against climate variability (100MW equals to ~3.5% of the total national capacity). In the Zambian market where the use of solar and other RE technologies is still new (no utility-scale solar plants installed yet), and where the concept of private-led energy project financing is yet emerging, this framework has an important role to play to unlock the full potential by demonstrating a viable model. Zambia is one of the highest GHGs emitter in Sub-Saharan Africa (320.2 MtCO₂eq. in 2012) and as such this intervention is timely and the expected climate change mitigation impact is high. The framework will result in the reduction of carbon emission in Zambia up to 3.99 MtCO₂ equivalent over its 25 years lifetime.

The framework will also increase the flow of commercial capital financing toward the RE market, and assist building origination and due diligence capacities across the local financial sector and enforce strong environmental and social standards. Through the envisaged demonstration effect and performance track-record, the sector would be able to gradually rely on local financial institutions to play a major role in harnessing sustainable energy opportunities in the country. The proposed participation by the national pension fund (National Pension Scheme Authority – NAPSA) to the RE financing is groundbreaking, not only in the Sub-Saharan African context but across the global RE sector. This will demonstrate how pension funds and institutional investors can contribute to the national development agenda by joining the RE project financing, and set the bar for the community.

E.1.2. Key impact potential indicator

Provide specific numerical values for the indicators below.

GCF core indicators	<i>Expected tonnes of carbon dioxide equivalent (t CO₂ eq) to be reduced or avoided</i>	<i>Annual</i>	159,677.28 tCO ₂ eq
		<i>Lifetime</i>	3,991,932 tCO ₂ eq
	<i>Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);</i>	<i>Total</i>	At least 298,000 people indirectly benefited from low-emission electricity coming on-grid
		<i>Percentage (%)</i>	At least 1.8% (out of 16.5 million ⁴¹)

⁴¹ World Bank data, 2016.

<p>Other relevant indicators</p>	<ul style="list-style-type: none"> Expected increase in the number of small and medium power suppliers, and installed effective capacity: 4-6 solar PV IPPs and 0-2 small hydro IPPs (total additional generation capacity of 100 MW) Proportion of low-emission power supply in a jurisdiction or market: 3.5% non-hydro RE in the national energy mix Institutional and regulatory systems that improve incentives for low emission planning and development and their effective implementation: At least three off- and mini-grid projects financed by private investors following the TA support <p>[Output Level]</p> <ul style="list-style-type: none"> Jobs created: 500 during the construction, 50 during the operation Local financial institutions involved in the RE financing: 3-4 financial institutions participation Number of capacity building events: 6
<p>Describe the detailed methodology used for calculating the indicators above.</p> <p><u>GHG accounting methodology:</u> AfDB GHG accounting tool based on the CDM methodology ACM0002, “Consolidated baseline methodology for grid-connected electricity from renewable sources” (version 17)</p> <p><u>GHG accounting assumptions and calculation (assuming five 20MW Solar PV projects):</u></p> <ul style="list-style-type: none"> Capacity factor: 0.186 ⁴² Total project RE generation: 20MW x 18.6% x 24h x 365 days/year x 5 projects = 162,936 MWh/year Emission reduction calculation formula: $\text{Emission reductions (ER)} = \text{Baseline Emissions (BE)} - \text{Project Emissions (PE)}$ Since project activity uses solar energy, PE= zero, therefore (ER) = BE. <ul style="list-style-type: none"> BE = Electricity generated (net) produced and fed into the grid per year as a result of the project (MWh/year) multiplied by Grid Emission factor (tCO₂/MWh) Grid Emission factor: 0.98tCO₂/MWh (based on the standardized baseline for the Southern Africa Power pool which includes Zambia⁴³) Therefore total emission reduction (ER) per year: 162,936 x 0.98 = 159,677.28tCO₂ eq/year Lifetime of the sub-projects is 25 years (PPA period) Total emission reduction (ER) over the lifetime of the projects: $159,677.28 \text{ tCO}_2 \text{ eq} \times 25 \text{ years} = 3,991,932 \text{ tCO}_2 \text{ eq}$ <p>For the GHG accounting of a small hydro project, a range of capacity factor has been difficult to estimate (studies suggest 30-70%) without the knowledge of individual sub-projects.</p> <p><u>Expected total number of beneficiaries:</u> Per capita electricity consumption in Zambia is 547 kWh in 2016. 162,936 MWh/year generation divided by the per capita consumption produces 297,872 (rounded up to 298,000). This number may be updated when the consumption level changes over time.</p>	

⁴² World Bank, Solar Resource Mapping in Zambia, 2014.

⁴³ Grid emission factor for Zambia is not readily available. The calculation will be regularly updated whenever precise and latest data is obtained.

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

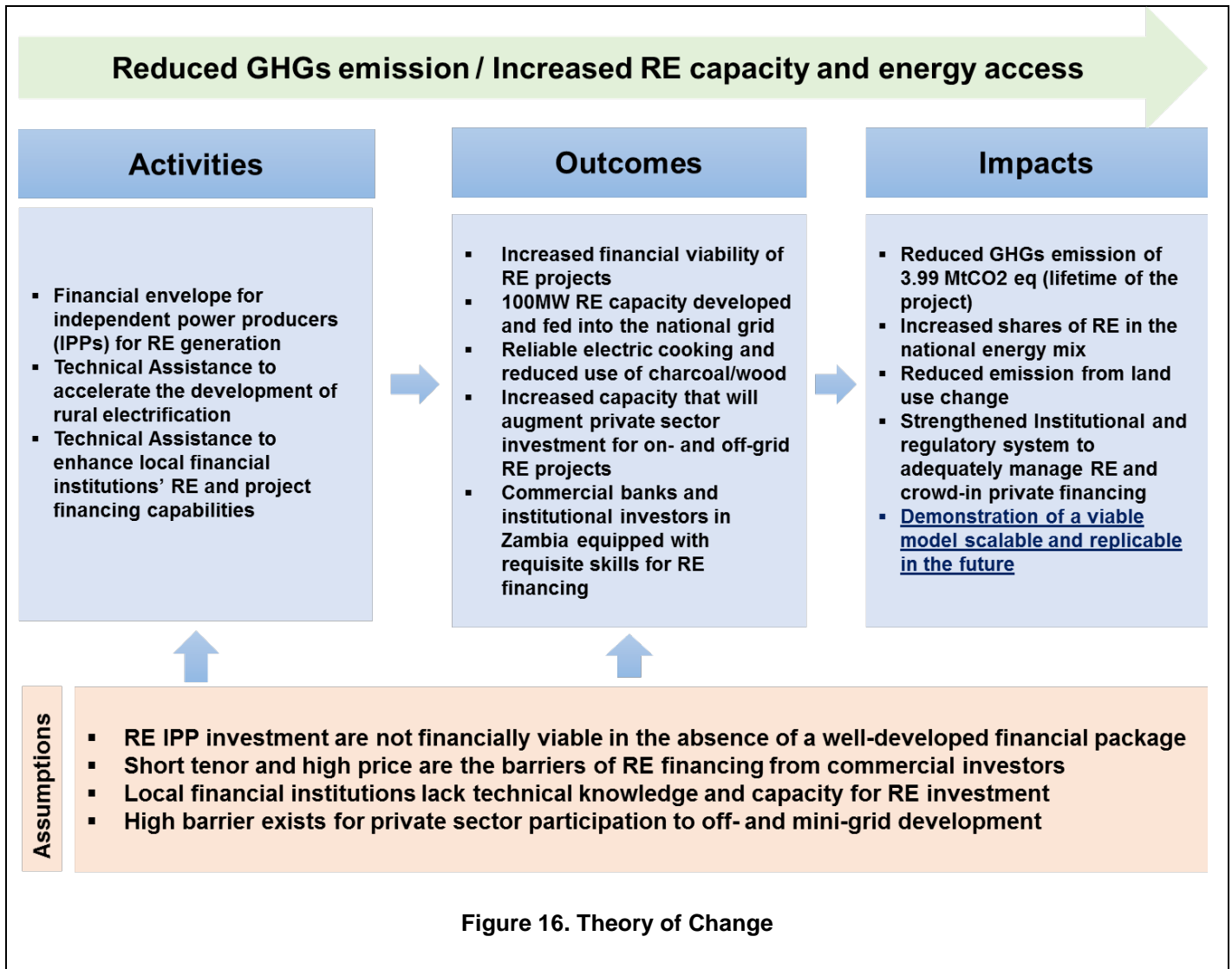
E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

Describe how the proposed project/programme's expected contributions to global low-carbon and/or climate-resilient development pathways could be scaled-up and replicated including a description of the steps necessary to accomplish it.

The AfDB-GCF framework provides senior debt and standby loans (tenor extension instrument) to up to 100MW of RE IPPs to support their financial closures, a comprehensive and innovative financing package that can be replicated in Zambia and other countries. The framework will be a **test bed for** a RE financing model that crowds in local commercial and institutional investors, whose long-term and competitively-priced financing is enabled by the GCF instruments. In Zambia where the readiness of commercial banks for RE project financing is still low, this model creates an **avenue for them to enter into the market and get hands-on experience** in every stage of the RE IPP financing. As described above, this process will be further supplemented with the proposed TA grants facility under this framework. By doing so, commercial banks in Zambia will have the **opportunity to build their own institutional** capacity and accumulate performance track record. In the following rounds of GETFiT program and other public RE tendering processes (including mini- and off-grid projects), those financial institutions with strengthened capacities will be able to actively participate to play a significant role in the RE market. Once the local financial sector is opened up and banks gain expertise, in the long run there will be a sustainable RE financing market in Zambia without the GCF, AfDB or other DFIs.

Apart from the **participation of local commercial banks** which triggers a tremendous paradigm shift potential, bridging the financial gap in terms of volume and tenor itself should be noted as a significant impact to the Zambian energy market. Current Zambia's financial and energy sector outlook is not very conducive for IPP financing and this may create a negative cycle whereby a challenge and delay in financial closures of IPPs exacerbate the crisis which in turn further hampers the RE IPP development. Given the ambitious RE generation targets of Zambia as specified in the NDC and other strategies, such systematic failure must be avoided and the GCF involvement can make a critical contribution.

This experience will be **scalable** across Zambia and replicable in other countries in Africa, as it is expected to showcase a viable model for all upcoming RE IPP projects across the continent. The TA component has a high leveraging impact with its objective to unlock the potential of private-led decentralized RE deployment, thus the scope and impact of the framework is scalable even without increasing the total cost of direct investment. This will essentially accelerate the GHGs emission reduction thereby contribute to national and global low-carbon development pathways.



E.2.2. Potential for knowledge and learning

Describe how the project/programme contributes to the creation or strengthening of knowledge, collective learning processes, or institutions.

The framework will generate knowledge that will inform the design and implementation of similar RE programs across the country and in the region. An innovative small-scale IPP financing structure that leverages international financial institutions, local commercial banks and institutional investors will have a high demonstration effect and set the bar for replication. Together with learnings from the TA component, lessons learned from the IPP financing will be distilled and shared systematically through the AfDB and GCF knowledge network. Primarily this will involve the knowledge sharing within Zambia, inviting all the relevant stakeholders in the energy, financial and climate change sector.

During the implementation of the framework, knowledge will be generated and embedded within the institutions that are responsible or have critical roles to play for scaling-up sustainable energy generation and distribution in Zambia. Capacity building under the TA component will ensure that financial institutions, regulators and authorities (REA, Ministry, ZESCO, etc.) are better equipped to integrate RE into the national energy system.

The AfDB has a plan to scale up this model in other countries where needs are identified. In the continent with limited overall experience of RE IPP development and low participation of commercial investors into RE financing, this framework is critical to build a commercially viable model for future AfDB engagement in the sector. The experience in Zambia will demonstrate what works and what does not work – the knowledge that scarcely exists in the Sub-Saharan African context. The AfDB is determined to play a role of knowledge broker, to ensure that the ambitious goals under the New Deal on Energy for Africa can be attained with continuous learning and scaling-up.

E.2.3. Contribution to the creation of an enabling environment

Describe how proposed measures will create conditions that are conducive to effective and sustained participation of private and public sector actors in low-carbon and/or resilient development that go beyond the program. Describe how the proposal contributes to innovation, market development and transformation. Examples include:

- *Introducing and demonstrating a new market or a new technology in a country or a region*
- *Using innovative funding scheme such as initial public offerings and/or bond markets for projects/programme*

Zambia has made a significant progress in improving policies for energy access and energy efficiency, but inadequate investment environment for the RE has slowed the progress at the project level. This framework will improve this gap and create an enabling environment for the RE investment, enabling the scale necessary to bring the energy sector and the economy as a whole onto a lower-carbon development path.

Innovativeness: Solar is still a new technology in Zambia. The REFiT policy has been recently launched by the GRZ and is yet to be tested in the market. Hence there is a strong need to enhance the readiness of the Zambian RE sector players for them to make use of the FiT as intended by the policy makers. The framework is aimed at building a conducive environment for vibrant RE project investment in Zambia by systematically rolling-out the FiT scheme at scale. The program introduces and builds a paradigm-shifting RE IPP financing mechanism in Zambia with an innovative funding scheme of commercial bank's participation backed by a tenor extension instrument (standby loans). As such, the AfDB-GCF framework demonstrates a new business model to the country and initiates a RE financing market driven by commercial banks and the local institutional investors.

Sustainability of outcomes and results beyond completion of the intervention: This framework is partnered with the AfDB public power sector support, which will improve the overall operational efficiency, viability and sustainability of the sector. Further, adequate implementation of the Rural Electrification Master Plan (REMP) would aim to increase rural electrification to 51% by 2030 from the current less than 6 percent. Achieving this will require a large volume of financing in the energy generation and distribution. In the long-term, private sector participation at scale is necessary to bridge the gap in financing, skills, and technologies in achieving this ambitious rural electrification target. The proposed framework directly contributes to this process by building the necessary institutional and policy capacity among the public sector actors to facilitate the private sector participation to off-grid and mini-grid based rural electrification.

Through the capacity building TA component, this framework also provides the opportunity for selected local financial institutions to speed up its learning and capacity enhancement in RE financing. It will help them build the requisite team, expertise and process that are needed to originate, appraise, finance and supervise renewable energy projects. This is going to be the first step in enabling the participation of local commercial investors in the RE IPP financing. Likewise, the process of running this IPP program itself will build the capacity of public entities, project developers (including local players) and investors to comfortably replicate the scheme in the future.

For each sub-project, long-term contractual arrangement (25 years PPA) will ensure long-term impact.

Mobilization of other relevant actors: The framework, through its two components (IPP financing and TA), mobilize the participation and collaboration from a diverse and comprehensive range of actors in the country's energy, climate and financial sectors. This includes the public authorities, RE project companies and industry players, investors, financial institutions, pension fund, civil society groups, researchers and sector experts, and development partners including DFIs.

Market development and transformation: As described above, the framework contributes to the creation and development of RE IPP financing market with local financiers' participation.

E.2.4. Contribution to regulatory framework and policies

Describe how the project/programme strengthens the national / local regulatory or legal frameworks to systematically drive investment in low-emission technologies or activities, promote development of additional low-emission policies, and/or improve climate-responsive planning and development.

The National Energy Policy (2008) seeks to expand generation and transmission capacity in the grid, promote private sector participation, and increase the accessibility to electricity. The Policy includes a set of specific objectives to address barriers to Renewable Energy Technologies (RETs) and Sources such as (i) ensuring availability of data and information on market demand, and resource assessment; (ii) strengthening institutional framework through capacity building, research and development of RETs; (iii) promotion, development and deployment of RETs and strengthening the gender gap and improving women participation in RE market; and (iv) promoting research on available technologies and encourage pilot projects. The Seventh National Development Plan (SNDP) (2017-2021) provides additional perspective with respect to the development of RE in the country. This strategy aims at promoting the development and use of renewable and alternative energy sources, such as solar, wind, biomass, geothermal and nuclear as a way of diversifying the energy mix and improving supply. Promoting the development and use of RE technology systems, including the implementation of a feed-in tariff and bidding system attractive for private investment into RE, is outlined as the priority actions.

The framework will operate under these policy frameworks and help the country gain experiences in translating the policies into practices, contributing to the fine-tuning of their operational modalities. The envisaged supports delivered through the GETFiT program, along with the AfDB-GCF support, include streamlining of permitting and licensing processes; development and introduction of the standardized PPA and other framework documents. All these components will help strengthen the regulatory frameworks that have been in place already but still nascent in its applications. In parallel, the TA component of the framework aims to strengthen the regulatory framework, procedures and capacities for private-financed rural electrification with off-grid solar home systems and mini-grid models. This will involve the improvement of planning, transparency, management systems for the acceleration of rural electrification, grid extensions, upgrades/expansions of off-grid isolated systems; and the development of detailed access plans with associated business models and financing schemes, among other activities (see the Section C.3).

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

The framework is expected to deliver wider environmental and socio-economic benefits on top of adding RE generation capacity to the grid and diversifying the energy mix in the country. Such wide-ranging benefits will make sure that the framework contributes to the accomplishment of the National Development Plan as well as the United Nations Sustainable Development Goals (SDGs).

- The country's concentration on hydro plants will be reduced with solar PV, which will mitigate social and environmental impacts from large hydro constructions. Zambia has a number of large hydro plants in the pipeline including the 1,600MW Batoka Gorge project. Although the potential of hydropower will still have to be harnessed in short-term to medium-term to meet the country's rising demand, scaling-up of solar power can fast-track the transition. In case hydro projects are financed under this framework, only small-size projects (smaller than 20MW) with limited environmental and social impacts will be selected.
- Job creation during the construction and operations: Among other development impacts, this program will contribute to the economy by creating about 500 green jobs during the construction phase ranging from highly skilled (field technicians, operators, corporate staff, etc.) to unskilled labor work (support and service), and additional ~50 jobs for operations and maintenance. This will be a starting point of building the national ecosystem of technicians and skilled experts in RE technologies.
- Increased, stable, and affordable energy access, both on-grid (from this framework's direct IPP financing) and off- and mini-grid (supported via the TA component), will bring about a positive impact to the sustainable growth of the country. By facilitating the supply of energy in off-grid areas, marginalized communities will benefit from the productive use of energy and their quality of lives can be significantly improved with higher energy security.
- The framework has a particular focus on local participation – financiers, project developers and other industry players. By opening up the market to local players, the framework will boost the local capacity of energy and financial industries.
- Reduced reliance on fossil-fuel based generation, in particular under emergency situation, will lead to the cleaner air quality by reducing the emission of pollutants including GHGs. This will have additional positive health impact to the population.
- Stable supply of electricity in both urban and rural areas will reduce the dependency on charcoal and firewood for cooking, contributing to the reduction of deforestation and associated carbon emissions.
- Activities targeting women's participation and training as part of the TA will make sure that the program is gender-sensitive and the benefits are shared among men and women. More information can be found in the Gender Assessment and Action Plan.

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

N/A

E.4.2. Financial, economic, social and institutional needs

Describe how the project/programme addresses the following needs:

- *Economic and social development level of the country and the affected population*

Zambia is a resource-rich, landlocked, lower-middle-income country located in Southern Africa, with a population of close to 17 million. In 2016, gross domestic product (GDP) of the country was USD 19.7 billion, equating to a per capita income of around USD 1,178 (World Bank 2016). Zambia has made significant socioeconomic progress over the past two decades and achieved the average growth of 7.4 percent between 2004 and 2014. However, since mid-2015, external headwinds and domestic pressures intensified and economic growth slowed considerably to 2.9 percent in 2015. Access to electricity in Zambia is estimated at 28% of the total population, comprising approximately 62% of the urban population and 4% of the rural population. Approximately 500,000 urban households and 1.8 million rural households currently do not have access to electricity. The GRZ maintains an

official target of achieving 51% rural electricity access by 2030. Current installed generation capacity is about 2,827 MW and the main source of electricity generation is hydropower, which represents nearly 90 percent of electricity production.

In recognition of the needs to fill the national energy deficit and improve the electricity access, this framework will support RE-based electricity generation as well as smaller-scale electrical distribution networks such as green mini-grids and off-grid solar home systems. The projects financed under the framework will help address the current energy deficit caused by a climate variability of hydro resources, creating a significant impact on the overall economic and social development of the country. Stable and extended electricity supply will in turn empower the economic growth, social development and industrialization.

- *Absence of alternative sources of financing (e.g. fiscal or balance of payment gap that prevents from addressing the needs of the country; and lack of depth and history in the local capital market)*

Zambia is going through an economic challenge with a high level of public debt, impacting the health of the public utility (ZESCO) as its indebtedness deepens consequently. Crowding-in commercial financing for the IPP projects are challenging under this circumstance and it is unlikely that the situation will be reversed in the near future. In light of this background, sources of financing are limited in the Zambian market with only a few DFIs having an appetite to make an investment. The framework's innovative financing scheme is designed to address this specific bottleneck and will aim to attract alternative sources of financing to the RE market.

- *Need for strengthening institutions and implementation capacity*

The electricity supply industry in Zambia is dominated by the vertically integrated utility company ZESCO who owns and operates over 90 percent of the generation, transmission, and distribution assets in the country and supplies electricity to all grid-connected consumers, with the exception of some of mining consumers. Electricity consumption by the mining industry accounts for over 50 percent of total consumption. The electricity sector faces numerous challenges and its poor reliability and quality of supply, combined with low access to electricity services, have a significant, adverse impact on the national economy. In response to power shortages, firms are forced to invest in self-generation which presents significant additional cost especially for smaller firms⁴⁴.

The electricity sector is overseen by the Ministry of Energy and Water Development who provides policy guidance. The independent Energy Regulation Board (ERB) is responsible for licensing, tariff setting, and quality of supply and service standards for all segments of the energy sector (including fuel and electricity) in accordance with the provisions of the 1995 Energy Regulation Act as amended in 2003. The Rural Electrification Authority (REA) is responsible for electrification in rural areas and manages the Rural Electrification Fund (REF).

The overall institutional capacities need to be stepped up to better manage the electricity supply and demand, to diversify the energy mix and reduce the fiscal burden of generation, and to dramatically increase investment into rural electrification by introducing off- and mini-grid solutions. The TA components under this framework is in support of this process, complementing the AfDB's proposed sector-wide support to Zambia (energy sector public budget support which envisages a comprehensive sector reform toward a cost-reflective and efficient system).

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

⁴⁴ Foster V., and J. Steinbuck. 2009. "When do Firms Generate? Evidence on In-house Electricity Supply in Africa". *Energy Economics*, 32: 505–51

Please describe how the project/programme contributes to country's identified priorities for low-emission and climate-resilient development, and the degree to which the activity is supported by a country's enabling policy and institutional framework, or includes policy or institutional changes.

This framework is fully consistent with the GRZ climate priorities as described in the NDC⁴⁵ to the COP21 Paris agreement on Climate Change where the scale-up of renewable energy is indicated as a key contributor to the conditional target of reducing emission by 47% by 2030 compared to the business-as-usual scenario. The total budget for implementation is estimated at USD 50 billion by the year 2030, out of which USD 35 billion is expected to come from external sources while USD 15 billion will be mobilized from domestic sources. This indicates an urgent needs to mobilize external financing, such as the GCF, to accelerate their climate actions. (See also the Section C.2.)

Also it contributes to realize the National Policy on Climate Change, the National Energy Policy, and the Seventh National Development Plan by supporting the development of low carbon and climate resilient pathway. The framework's focus on the GETFiT program directly targets to support the roll-out of the REFiT strategy. Last but not least, no-objection received from the NDA for the funding proposal demonstrates its full alignment with the national agenda.

E.5.2. Capacity of accredited entities and executing entities to deliver

Please describe experience and track record of the accredited entity and executing entities with respect to the activities that they are expected to undertake in the proposed project/programme.

The African Development Bank (AfDB) has an extensive experience in financing RE projects in Sub-Saharan Africa. While the summary of the AfDB's energy sector involvement both in the continent and in Zambia is provided in Section C.4, below are some of the key highlights of recent RE financing led by the AfDB:

- The Ouarzazate Concentrated Solar Power (CSP) Complex in Morocco for which the AfDB has committed EUR 134 million as well as USD 219 million from the Clean Investment Funds (CIF) for the two phases respectively in 2012 and 2014, aims to produce 500 MW of solar power. The 160 MW first phase was inaugurated in 2016 while the second phase of 350 MW is under construction – which will make Ouarzazate one of the largest solar complexes in the world.
- Three Solar PV IPPs in Egypt with a total installed capacity of 50 MW each for which the Bank has approved UA 34 million from its own resources and UA 5 million mobilized from the Global Environment Facility (GEF) in 2017, in support to the implementation of the government's Feed-in-Tariff (FiT) Program. Its due diligence and approval has followed a framework approach, a model to be replicated under the Zambia RE financing framework. The program was first conceived by the Bank in late 2016 and the three projects were approved by the Bank's Board of Directors in September 2017.
- The initial development of Kenya's Menengai geothermal steam field for which the AfDB has committed around UA 80 million as well as USD 25 million from the CIF in 2011, has the potential to produce steam for around 105 MW of generating capacity. Building on this support, Kenya has selected the first group of the IPPs in the Menengai field that are working towards financial close by 2018. The Bank is continuing to support this by providing partial risk guarantees (PRGs) to backstop the obligations of the state-owned entities vis-à-vis the IPPs. The PRG program of USD 12.7 million was approved by the Bank in 2014.
- The 100 MW Sere Wind Farm that was developed by South Africa's national utility, for which the AfDB has provided USD 45 million as well as USD 50 million from the CIF through its sovereign lending window, commenced operation in 2016.
- The 100 MW Xina concentrated solar IPP in South Africa – that has a storage component to help meet peak demand in the evening – is now in commercial operation. In 2014, the AfDB has approved a senior loan of USD 100 million along with a senior loan of USD 41.5 million from the CIF.

⁴⁵ UNFCCC, Zambia Nationally Determined Contributions.

- The 120 MW Itezhi-Tezhi Hydro Power Plant is situated at the existing Itezhi Tezhi dam on the Kafue River in Zambia. The plant is developed by a joint venture SPV equally owned by ZESCO and a private sponsor. The SPV has a 25-year concession and a 25-year off take agreement with ZESCO. The Bank has provided a mix of financing: the public sector funds (around USD 50 million) contributed to financing half of ZESCO's equity participation in the SPV, technical assistance to ZESCO, as well as co-financing of the 276 km transmission line to evacuate the power, while the Bank's private sector funds provided a USD 38 million senior debt to the SPV.
- The 42 MW Achwa 2 IPP is a run-of-river hydro power plant in Uganda that will have an annual output of 162 GWh. The Uganda Electricity Transmission Company Limited will purchase the power under a 40-year PPA. In 2016, the AfDB has approved a senior loan of up to USD 20 million towards the investment cost of USD 110 million.
- The 33 MW Segou Solar IPP is Mali's first utility-scale solar project. The plant will generate 52.7 GWh annually (~10% of the country's current generation) which will be bought by Mali's national utility under the aegis of a 25-year PPA. In 2016, the AfDB has approved a senior loan of USD 8.5 million along with a senior loan of USD 25 million from the Climate Investment Funds (CIF) towards the investment requirement of approximately USD 52 million.
- The AfDB has approved the financing package of USD 100 million, comprising USD 50 million equity and USD 50 million convertible senior loan, to the Facility for Energy Inclusion (FEI) in late 2016. FEI is positioned as a global facility with two distinctive windows managed by two separate fund managers: (i) the On-Grid window (USD 400 million), and (ii) the Off-Grid Window (USD 100 million). Fund raising and pipeline building activities will continue over the next months.

The AfDB's power sector support to its regional member countries is far-reaching, with a concrete track-record of sovereign projects for improved energy access, transmission and distribution infrastructure, power sector reform and capacity building. Some of the examples that can be highlighted include:

- Kenya Last Mile Connectivity Program: The project aims at extension of the low voltage network to reach around 1.2 million people. The total project cost is estimated at UA 108.6 million, out of which the Bank is contributing UA 95 million (~USD 130 million). The population located in rural areas, low income groups as well as small businesses will particularly benefit from this project.
- Burkina Faso - The Electrification Project for Semi-Urban Areas of Ouagadougou and Bobo-Dioulasso: The project aims to restructure and expand the medium and low-voltage distribution networks in the country's two largest towns and establish 17,500 connections to households. The project also comprises several activities intended to strengthen SONABEL's operational capacity. The total project cost is UA 37.76 million. The project will be co-financed by the Bank (72%), SONABEL (15%) and the GoBF (13%).
- Lesotho - Electricity Supply Project (UA 10.85 million loan/grant): The project is approved in 2009 and the Implementation has completed in 2014. Project Completion Report was approved in 2016. The project helped increase the country's power supply and its reliability, as well as increase electricity access with the rehabilitation of the 2 MW Mantsonyane mini-hydropower station, installation of 200 individual home solar systems, and reinforcement and expansion of the distribution network to additional 6,230 consumers.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

Please provide a full description of the steps taken to ensure country ownership, including the engagement with NDAs on the funding proposal and the no-objection letter. Please also specify the multi-stakeholder engagement plan and the consultations that were conducted when this proposal was developed.

The country ownership is ensured by close collaboration with the NDA and key sector stakeholders in Zambia during the preparatory stage. The proposal has been developed with extensive consultation with the government (Ministry of National Development Planning – NDA, Ministry of Energy and Water Development and Ministry of Finance, ZESCO, Rural Electrification Authority, etc.), project developers, investors, commercial banks, national pension fund (NAPSA), development partners and other relevant partners in the country over the past months. Since the inception

of the preparatory process, three project preparation missions were undertaken in May, June, and November 2017 which included discussions with a wide range of experts and stakeholders. The engagement has been continued by the AfDB field office in Lusaka with support from the team in Headquarters. Stakeholder consultations for the IPP project development further extends to the national process undertaken during the design of the REFiT strategy as well as the GETFiT program as a means to implement the REFiT. The completed funding proposal was formally submitted and presented to the NDA Technical Committee on the first week of November, to receive official feedback and seek their no-objection decision. **(No-objection letter from the NDA is attached to this proposal.)** Further consultations will be organized in due course in order to fine-tune the implementation arrangement and other necessary details of the program, under the leadership of the NDA and the line Ministries.

The ESMF and the Gender Action Plan attached to this funding proposal provides a specific guideline for gender-sensitive stakeholder engagement at the sub-project level.

In addition, country ownership is augmented by the design of the program where Zambian local institutions will be capacitated to play a key role in the RE IPP development. RE IPP projects in Zambia have been driven by international project developers and financial institutions by far with limited local participation. The proposed financing structure will make sure that local financial institutions step up to be the leading players in the RE market. Technical assistance will be oriented toward the development of local capacity for RE and climate project financing. In the long run this will pave the way for Zambia to take full ownership of the RE development in the country.

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

Describe how the financial structure is adequate and reasonable in order to achieve the proposal's objectives, including addressing existing bottlenecks and/or barriers; providing the least concessionality; and without crowding out private and other public investment.

Please describe the efficiency and effectiveness, taking into account the total project financing and the mitigation/adaptation impact that the project/programme aims to achieve, and explain how this compares to an appropriate benchmark. For mitigation, please make a reference to [E.6.5 \(core indicator for the cost per tCO₂eq\)](#).

The framework ensures cost-effectiveness and efficiency by introducing an adequate financial structure that is designed to meet multiple needs – blended financing will be offered at a reasonable cost and a long tenor (supported by a tenor extension standby loan) to ensure that the tariff is acceptable. Instead of crowding out private and other public investment, this scheme creates a structure where commercial banks can participate to the IPP financing. While operating under the principle of minimum concessionality, the GCF's concessional financing in terms of pricing is critical for the entire structure to be financially viable, since the participation of commercial banks and the national pension fund (proposed) will inevitably raise the all-in cost of financing to the projects. The GCF's offer will be a key enabler of the market transformation, and as local financiers learn from the experience, the RE financing market will gain efficiency and move toward an adequate price equilibrium point.

The analysis shows that the framework overall will be able to produce 162,936 MWh/year of renewable electricity and is estimated to contribute to approximately 159,677.28 tCO₂eq of annual avoided emissions, which results in around 3.99 MtCO₂eq of total emission reduction over the lifetime of the projects (25 years). The cost-efficiency of this framework is high, as the analysis on emission reduction potentials at the project level shows: One tonne of CO₂ equivalent emissions reduction can be achieved with the GCF contribution of USD 12.53 (section E.6.5).

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

Please provide the co-financing ratio (total amount of co-financing divided by the Fund's investment in the project/programme) and/or the potential to catalyze indirect/long-term low emission investment.

Please make a reference to [E.6.5 \(core indicator for the expected volume of finance to be leveraged\)](#).

The framework will support the development of RE projects totaling up to USD 150 million (i.e. estimated total investment cost under this framework including 4-6 solar PV sub-projects and possibly 0-2 small-hydro projects). The projects are expected to have an equity of 25% and be financed with a leverage of 75%, corresponding to the maximum total debt financing needs of approximately USD 112.5 million. The AfDB will contribute up to 33.3% of the total project cost in the form of senior debt and standby loans (up to USD 50 million). The GCF will also contribute up to 33.3% of the total project cost, by senior debt and standby loan, pari passu with the AfDB. Provision of liquidity to project companies at a reasonable price and tenor extension support for commercial banks will have a strong catalyzing impact for the entire pipeline projects under the GETFiT program. In addition, the proposed financing structure aims to leverage a long-term financing of the national pension fund (NAPSA) and enable their participation to the infrastructure projects with high development impacts.

The co-financing ratio is 2x (GCF providing one third of the project cost). A relatively low co-financing ratio needs to be understood in consideration of the unique challenge of the Zambian RE market, where private sector co-financing for IPP project is almost non-existent. Regarding the TA component, the total estimated budget for the various assignments will be up to USD 4 million which will be co-financed by the GCF and AfDB in the ratio of 2.5:1.5.

E.6.3. Financial viability

Please specify the expected economic and financial rate of return with and without the Fund's support, based on the analysis conducted in [F.1](#).

Please describe financial viability in the long run beyond the Fund intervention. Please describe the GCF's financial exit strategy in case of private sector operations (e.g. IPOs, trade sales, etc.).

A preliminary financial model was produced to analyze the impact of the GCF's funding on the project's DSCR and IRR. The terms presently reflected in the model are based on the base case of P90 solar radiation and energy yield assessment for the DSCR analysis, which means that the estimates will be met or exceeded 90% of the time on an annual basis. It is also assumed that commercial banks will not be able to extend the tenor to match the project's maturity, thus necessitating the use of standby loans. With the GCF funding included, the financial model presents a convincing financial case for the project. Without GCF, the tariff will need to increase to maintain the minimum DSCR and keep the equity IRR at a minimum acceptable level in the market. Given that the current market conditions in Zambia are not favorable and that commercial banks are risk adverse, the GCF's participation will be critical to bring commercial investors onboard. As local commercial banks obtain sufficient knowledge about RE and project finance through the framework, a sustainable financing market could be created for private sector investment in RE sector in the long run.

The financial viability of sub-projects is also backed by a 25 year PPA that is longer than the tenor, creating a tail of at least 5 years. This will be attractive to a wider pool of lenders.

E.6.4. Application of best practices

Please explain how best available technologies and practices are considered and applied. If applicable, specify the innovations/modifications/adjustments that are made based on industry best practices.

The AfDB will ensure to apply the best available technologies – competitive bidding will ensure the use of most efficient and advanced industry technologies and practices. In such way, the implementation of the framework will bring the best international practices as well as well-adjusted technologies to the RE sector in Zambia. These best practices include the assessments of financially and technically feasible technologies as well as the high-standard procurement principles which will also bring desirable environmental and social benefits. A thorough assessment process will enable a comparison between the proposed projects and good international practices.

E.6.5. Key efficiency and effectiveness indicators

<i>GCF core indicators</i>	Estimated cost per t CO ₂ eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)	
	<p>(a) Total project financing</p> <p>(b) Requested GCF amount</p> <p>(c) Expected lifetime emission reductions overtime</p> <p>(d) Estimated cost per tCO₂eq (d = a / c)</p> <p>(e) Estimated GCF cost per tCO₂eq removed (e = b / c)</p> <p><i>Describe the detailed methodology used for calculating the indicators (d) and (e) above.</i></p> <p>Assumptions:</p> <ul style="list-style-type: none"> - 100MW capacity (all solar PV assumed) - 162,936 MWh/year delivered capacity - 25 years operational lifetime - Zambia Grid emission factor: 0.98 tCO₂/Mwh (standardized baseline for Southern Africa Power pool) <p>Detailed calculation can be found under Section E.1.2.</p> <p>The program's cost of mitigation (cost per t CO₂eq) is similar with other comparable projects financed by the AfDB.</p>	<p>USD 150 million</p> <p>USD 50 million</p> <p>3,991,932 tCO₂eq</p> <p>USD 37.58 / tCO₂eq</p> <p>USD 12.53 / tCO₂eq</p>
Expected co-financing ratio		1:2
Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)		N/A

** The information can be drawn from the project/programme appraisal document.*

F.1. Economic and Financial Analysis

Please provide the narrative and rationale for the detailed economic and financial analysis (including the financial model, taking into consideration the information provided in [section E.6.3](#)). Based on the above analysis, please provide economic and financial justification (both qualitative and quantitative) for the concessionality that GCF provides, with a reference to the financial structure proposed in section B.2.

Apart from constrained hard currency liquidity, commercial banks in Zambia have limited experience in the energy sector which requires long term financing and extended knowledge about project finance. One of the main objectives of the framework is to crowd-in the private sector investment from commercial banks into the renewable energy sector by providing a tenor extension instrument that can remove the barrier for commercial banks' participation. The proposed financing structure will reduce the risk premium that the commercial banks would have potentially charged to the RE projects by allowing a de-risked repayment profile as well as flexibility to their tenor.

The finance structure will assist the projects in achieving a lower weighted average electricity tariff at acceptable debt servicing ratios. In view of this target, concessional GCF loan offers will allow the projects to bring the tariff down to a sustainable level through the creation of more competitive pricing and longer loan tenors.

The financial analysis is made on a base case scenario pertaining to the financing and operation of a 20 MW_{AC} greenfield solar PV IPP under the GETFiT program conditions. The related financial model and its analysis is shared with the secretariat.

F.2. Technical Evaluation

Please provide an assessment from the technical perspective. If a particular technological solution has been chosen, describe why it is the most appropriate for this project/programme.

The pipeline projects are solar PV (and limited number of small hydro as necessitated) generation plants smaller than 20MW capacity. This is to tap into vast solar resources available across the country⁴⁶, which makes it a more cost-efficient option than other RE technologies. Technical quality and compliance with the technical specifications will be an important part of the evaluation criteria during the selection and due diligence process, with detailed technical assessment to be conducted for each selected sub-project.

F.3. Environmental, Social Assessment, including Gender Considerations

Describe the main outcome of the environment and social impact assessment. Specify the Environmental and Social Management Plan, and how the project/programme will avoid or mitigate negative impacts at each stage (e.g. preparation, implementation and operation), in accordance with the Fund's Environmental and Social Safeguard (ESS) standard. Also describe how the gender aspect is considered in accordance with the Fund's Gender Policy and Action Plan.

The Environment and Social Management Framework (ESMF) and the Gender Assessment and Action Plan documents are attached to this Funding Proposal.

⁴⁶ World Bank, ESMAP Solar Resources Mapping in Zambia, 2014.

Under this framework, the preparation of ESS studies will have to adhere to Zambian laws and regulations as well as the ESS policies, guidelines, and standards of the AfDB. **For this proposal, only the sub-projects at the category B level (according to the GCF criteria) will be considered.** Category B projects involve activities with potential mild adverse environmental and social risks and impacts that, individually or cumulatively, are few, generally site-specific, largely reversible and readily addressed through mitigation measures.

Environmental and Social Management Framework (ESMF)

Since specific locations of investments will be determined during project design under this framework, an Environmental and Social Management Framework (ESMF) has been prepared that defines the environmental and social (E&S) planning, review, and clearing processes in compliance with national and AfDB safeguard guidelines. The ESMF will ensure that energy is produced and utilized in an environmentally sound manner; and provide a corporate environmental and social safeguard policy framework, institutional arrangements and capacity available to identify and mitigate potential safeguard issues and impacts of RE projects. Through its Energy Sector Strategy, the GRZ is fully committed to support, actively participate in international efforts, and cooperate with international organizations that seek to ensure sustainable delivery of energy to mitigate negative environmental impacts. By adopting mechanisms and procedures defined by the GRZ and the AfDB, the ESMF will specify the following procedures:

- (i) Environmental and Social Impact Assessment (ESIA) to identify key environmental and social impacts and corrective measures for each sub-project once exact intervention locations are known.
- (ii) Environmental and Social Management Plan (ESMP) to translate the ESIA into coordinated activities at local level, with detailed checklists and mitigation measures in order to address expected environmental and social impacts.
- (iii) Resettlement Policy Framework (RPF) followed by Resettlement Action Plans (RAP), to present legal and institutional framework, eligibility criteria, methodology for asset valuations and mechanisms for stakeholder consultations and grievance redress.

Stakeholder consultations.

The ESMF contains detailed checklists and generic mitigation measures to ensure that potential impacts are addressed in the E&S assessments and sub-project management plans. In preparing the required detailed E&S studies (e.g., ESIA, ESMP, and RAP), the sub-project operators must ensure that participatory stakeholder consultations take place as required by the E&S policies, guidelines, and standards of the AfDB. Participatory consultations will be held with all stakeholders (including ministerial officials, representatives of local governments, the private sector and associations of civil society, including women associations) in order to:

- provide adequate information about the nature, timing, and scope of the relevant project impacts and mitigation measures;
- highlight gender issues (in order to improve women's access to lower-cost and cleaner energy); and
- guide E&S study development.

Responsibilities

Projects operators will be responsible, in compliance with national law and regulations and the AfDB safeguard policies, guidelines and standards, for conducting the required detailed E&S studies (e.g., ESIA, ESMP, and RAP), obtaining clearances and licenses from relevant authorities, organizing stakeholder consultations, implementing all required mitigation measures, and conducting monitoring activities.

The detailed E&S studies must be submitted to both the National Authority in charge and the AfDB for review and approval. The authority's approval is based on the Zambian laws and regulations, while that of the AfDB is based on the AfDB's E&S policies, guidelines, and standards. The authority in charge of environment will be responsible for the

review and clearance of ESIA's and ESMP's for sub-projects. It provides a one-stop clearance process by involving all other key governmental agencies in the approval process.

Gender Considerations

The gender assessment provides a summary of the gender equality situation in Zambia with a specific focus on women's financial inclusion in the energy sector. The assessment identifies potential entry points to promote women's participation as business leaders and owners in renewable and clean energy, and proposes a series of actions that will ensure the participation of women into the framework's TA activities. **The gender action plan is an integrated part of the TA component.**

F.4. Financial Management and Procurement

Describe the project/programme's financial management and procurement, including financial accounting, disbursement methods and auditing.

Due Diligence

The AfDB team responsible for project origination will carry out due diligence and assessments of financing proposals for each sub-project. The origination team's findings and recommendations undergo a rigorous internal review process before they are cleared by Senior Management to be presented to the Bank's Board of Directors for approval. This includes various interdepartmental committee reviews.

The AfDB will, through its Anti-Corruption and Integrity department, provide Integrity Due Diligence (IDD) for the project operations through a structured, systematic analysis to identify, assess, mitigate, manage and monitor potential loss from integrity risks and riskier exposure. This is to ensure that funds are used for their intended purposes and with due attention to considerations of economy, efficiency and competitive trade. The Bank will use the following assessment criteria to safeguard its investment. (See also the Bank's IDD Policy for further information.)

- Identification of beneficial ownership
- Assessment of civil and regulatory backgrounds
- Identification of sanctioned persons and entities
- Identification of Politically Exposed Persons (PEPs) and other high risk relationship

Corporate financial transactions are closely monitored through the MDB harmonized treatments of corporate groups and also through the bank's established guidelines on anti-fraud, anti-corruption and anti-money laundering policies (AMLCFT). The AfDB continues to ensure that its financing operations and investments are not used for illegal or tax-evasion purposes. In addition, measures are currently in place to address the issue of tax havens and the accompanying risks.

The AfDB will be primarily responsible for the deal selection and implementation of sub-projects under this framework, not other participating financial institutions. The AfDB will lead standard KYC due diligence process including anti-money laundering and other evaluations of sponsors. This principle will be equally applied in the identification of beneficiaries of the TA activities. For the procurement of TA service providers, while the beneficiary organizations are responsible for the procurement, the AfDB will be closely supervising the process and its outcome (described in more detail below).

Financial Management

For the senior loans and standby loans, financial management will follow the AfDB's "Guidelines for Financial Management and Financial Analysis of Projects", which describes and explains the Banks' policies, procedures and approaches to the financial management and analysis of projects and programs that the Bank finances.

The implementation of the grants will follow the AfDB's financial management system, which covers budget planning and implementation, procurement, financial statement preparation and reporting, as well as audit. The AfDB will conduct an assessment of financial management of the executing agencies (if relevant) during the final appraisal. The purpose of this assessment is to evaluate the executing agencies' accounting systems and internal control systems and verify that their standards are adequate for effective project implementation. However under this framework, it is expected that the AfDB will be directly responsible for financial management of grants without making a transfer to the beneficiaries.

Disbursement

Loans: The borrower is entitled to request disbursements of funds from the AfDB, for amounts spent or planned to be spent for the purposes set out in the financing agreement between the two parties, subject to fulfilment of conditions outlined in the financing agreement. Except with the AfDB's consent, no disbursements shall be made (a) on account of expenditures procured in violation of the Bank's Procurement Rules; or (b) to finance expenditures incurred prior the date of the financing agreement other than those that are expressly permitted. Requests for disbursement shall be made promptly and in conformity with the Bank's disbursement rules and procedures.

TA grants: The direct payment methods will be used. The Bank will directly pay the consultants and service providers against the terms that will be negotiated in the agreement between them and the beneficiaries.

Supervision and Portfolio Management

The AfDB is responsible for fulfilling the reporting obligations to the donors. Reporting is based on the progress of indicators included in the Results Measurement Framework. The AfDB management will ensure that the project portfolio are diligently managed, through close dialogue with clients and periodic monitoring and evaluation. The objective is to enhance the prospects of: (a) delivering expected development outcomes; (b) minimizing harmful environmental and social impacts over the course of projects' economic life; and (c) meeting debt repayment obligations for the loans. At least, bi-annual supervision missions will be organized to review implementation progress and performance of the activities under the framework.

Procurement

To ensure that financing is applied in ways that adequately secure the AfDB's mandate while maximizing development effectiveness, the Bank encourages and promotes sound, fair, transparent and well performing procurement systems. The Bank Group's "**Procurement Policy for Bank Group Funded Operations**" (dated August 2015) applies to the framework. This Policy sets out the principles that apply to Borrowers' procurement of goods, works and acquisition of consulting services financed in whole or in part by the Bank. It is supplemented by three additional documents: (i) Methodology for Implementation of the Procurement Policy of the African Development Bank (Methodology); (ii) Operations Procurement Manual for the African Development Bank (OPM); and (iii) Procurement Toolkit for the African Development Bank (Toolkit). Collectively, the Policy, the Methodology, the OPM and the Toolkit are referred to as the "Procurement Framework".

For the grants component, it is the responsibility of the beneficiaries (government agencies or financial institutions) to procure necessary services. The selection and engagement of consultants and the procurement of services shall be carried out in accordance with the Bank's applicable policies, rules and procedures. The contracts will be signed between the beneficiaries and the services providers whereas the fund will be released from the AfDB upon each payment request.

Audit

The framework will be subject to the AfDB's normal internal audit policies, meaning it will be audited annually by external auditors. The utilization of the Bank's and the GCF resources will be subject to audit by an independent external auditor acceptable to the Bank every year and at the completion of the activity for which support has been provided. Beneficiaries of externally executed grants shall recruit an auditor for these as per the terms of the grant agreement to be signed. The cost of audit services shall be incorporated into the cost estimates for each approved project/activity.

G.1. Risk Assessment Summary

Please provide a summary of main risk factors. Detailed description of risk factors and mitigation measures can be elaborated in G.2.

Several sector-wide risks pose modest risks to the implementation of the framework, however this will be managed through preventive measures and complementary AfDB programs such as the proposed energy sector budget support. Identified risks include:

1. Regulations around the REFIT policy
2. Off-taker (ZESCO) financial stability
3. Grid absorptive capacity and connection risk
4. Environmental and social risk (site-specific)
5. Construction risk
6. Operation and technology risk
7. Foreign exchange risk

G.2. Risk Factors and Mitigation Measures

Please describe financial, technical and operational, social and environmental and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures.

Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring
Regulations around the REFIT strategy	Other	Medium (5.1-20% of project value)	Low

Mitigation Measure(s)

The REFIT strategy has been recently approved by the cabinet of the GRZ and is clearly identified as a central component of the overall electricity sector reform in Zambia. In light of this, short- to medium-term regulatory stability around the REFIT regime can be ensured. As this framework will generate valuable lessons for the REFIT policy implementation, this rather presents an opportunity to strengthen and stabilize the regulatory framework.

Selected Risk Factor 2

Description	Risk category	Level of impact	Probability of risk occurring
Off-taker (ZESCO) financial stability	Financial	High (>20% of project value)	High

Mitigation Measure(s)

Overall energy sector reform is underway to improve the financial position of ZESCO, which will be backed by the sector budget support proposed by the AfDB. For each sub-project financed under this framework, well-structured Power Purchasing Agreement (PPA) and Implementation Agreement will be the primary guards to protect the investors.

Selected Risk Factor 3			
Description	Risk category	Level of impact	Probability of risk occurring
Grid absorptive capacity and connection risk	Technical and operational	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
As part of the sub-project selection, it is proposed that only projects located less than 10 km to the grid interconnection point will be eligible for the program and the grid connection will be part of the project cost. It shall remain the sole responsibility of the project company to ensure that the plant is interconnected and fully evacuated to the ZESCO grid. In case justified, the GETFiT program will utilize its resources set-aside to support the grid interconnection (funded by the KfW separately from this financing framework). The risk of limited grid capacity to absorb intermittent RE sources is mitigated by a relatively small size of the total project pipeline (100MW) as well as the investment plan by the government to improve the overall generation and transmission capacity.			
Selected Risk Factor 4			
Description	Risk category	Level of impact	Probability of risk occurring
Environmental and social risk (site-specific)	Social and environmental	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
The ESMF for the program has been developed and submitted. All sub-projects will be assessed according to the relevant AfDB policies, and an environmental and social action plan (ESAP) will be developed during the implementation of each sub-project. The project-level ESAP will be an integral part of the required agreement with the project developers. The AfDB will only finance the projects classified under the category B or below, and apply its highest standards in the screening and managing of E&S related issues. The framework targets only small-scale projects and the sites will be multi-location, which will reduce the overall E&S risk.			
Selected Risk Factor 5			
Description	Risk category	Level of impact	Probability of risk occurring
Construction risk	Technical and operational	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
Project-specific construction risk (completion and cost overrun) will be mitigated by a thorough due diligence process led by the AfDB technical and financial experts, and by ensuring robust EPC contracts.			
Selected Risk Factor 6			
Description	Risk category	Level of impact	Probability of risk occurring
Operation and technology risk	Technical and operational	Medium (5.1-20% of project value)	Low

Mitigation Measure(s)			
Project-specific operation risk will be mitigated by a thorough due diligence process led by the AfDB technical and financial experts and by ensuring robust O&M contracts. Resource risk (e.g. insufficient irradiation for solar PV projects) will be mitigated by ensuring high-standard technological studies in place.			
Selected Risk Factor 7			
Description	Risk category	Level of impact	Probability of risk occurring
Foreign exchange risk	Financial	Low (<5% of project value)	Low
Mitigation Measure(s)			
PPAs with ZESCO are signed in the USD term and ZESCO is expected to make payment in USD. The country has a stable supply of hard currency injected from the miners. Further, the AfDB enjoys a preferred creditor status which gives preferential access to foreign currency in case the country is imposing any restrictions in regard to the foreign currency conversion.			
Other Potential Risks in the Horizon			
<p><i>Please describe other potential issues which will be monitored as “emerging risks” during the life of the projects (i.e., issues that have not yet raised to the level of “risk factor” but which will need monitoring). This could include issues related to external stakeholders such as project beneficiaries or the pool of potential contractors.</i></p> <p>Final approval of financing for individual sub-projects is subject to the AfDB’s project-specific risk screening.</p> <p>The AfDB will put in place an implementation team for the framework, to be in charge of due diligence and execution of individual sub-projects. The team will mobilize staffs and energy financing experts from the Zambia field office, the regional office for Southern Africa, and the PEVP complex at headquarter. This mechanism will ensure a speedy and seamless execution of the framework.</p>			

* Please expand this sub-section when needed to address all potential material and relevant risks.

H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's [Performance Measurement Framework](#) under the [Results Management Framework](#).

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level⁴⁷

Paradigm shift objectives

<p><i>Shift to low-emission sustainable development pathways</i></p>	<p>The AfDB-GCF framework aims to deliver 100 MW of power thereby reducing the deficit in Zambia with sustainable energy sources than fossil fuel-based generation currently used to bridge the gap. Deployment of additional generation capacity, coupled with the TA to promote off-grid investment, will contribute to the increased energy access by people excluded from the grid. The diversification of the energy mix will improve the resilience of the energy system in Zambia against climate variability. In the Zambian market where the use of solar and other RE technologies is still new, and where the concept of private-led energy project financing is yet emerging, this framework has an important role to play by demonstrating a viable model for small-scale RE IPP financing.</p> <p>Zambia is one of the highest GHGs emitter in Sub-Saharan Africa and as such this intervention is timely and the expected climate change mitigation impact is high. Given the ambitious RE generation targets of Zambia as specified in the NDC, the framework is expected to make a critical contribution in fast-tracking Zambia's transition toward a low-emission sustainable development pathway. Further, stable supply of electricity will curtail the use of charcoal and firewood for cooking, reducing emission from deforestation and land use change which is a major source of GHGs emission in Zambia.</p> <p>The framework will be a test bed for a RE financing model that crowds in local commercial banks and institutional investors, supported by dedicated TA for the local financial sector. By doing so, local financial institutions will gain the opportunity to build their own institutional capacity and accumulate performance track record. Through the envisaged demonstration effect, the sector would be able to gradually rely on local financial institutions for harnessing sustainable energy opportunities. The proposed participation by the national pension fund (NAPSA) will demonstrate how pension funds and institutional investors can contribute to the national development agenda by joining the RE project financing, and set the bar for the community. Strengthening conditions for private investment into the off-grid and mini-grid market is additional game-changer to boost decentralized energy solutions across the country. This paradigm-shifting experience will be scalable across Zambia and replicable in other countries in Africa.</p>
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⁴⁷ Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement): http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable) ⁴⁸	Final	
Fund-level impacts						
<i>M1.0 Reduced emissions through increased low-emission energy access and power generation</i>	<i>Tonnes of carbon dioxide equivalent (tCO₂eq) reduced as a result of Fund-funded projects/ programmes</i>	Program report (mid-term and final)	0	2 million tCO ₂ eq	3.99 million tCO ₂ eq (25 years)	Successful completion of the plant construction
	<i>Financing leveraged through the facilities</i>	Regular reporting from AfDB to GCF as agreed in the AMA	0	Total funding USD 75m	Total funding USD 150m	Full disbursement of the approved financing
	<i>Cost per tCO₂eq decreased for achieved projects</i>		0	USD 37.58 tCO ₂ eq	USD 37.58 tCO ₂ eq	

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Project/programme outcomes	Outcomes that contribute to Fund-level impacts					
M6.0 Increased number of small, medium and large low-emission power suppliers	<i>6.1 Proportion of low-emission power supply in a jurisdiction or market</i>	Reports from the project sponsors; regular reporting from AfDB to GCF as agreed in the AMA	Non-hydro RE sources less than 1% of the national energy mix	Non-hydro RE sources less than 2% of the national energy mix	3.5% non-hydro RE in the national energy mix (~100MW)	The regulatory environment and financial outlooks for the IPP project development is improving.
	<i>6.2 Number of households, and individuals (males and females) with improved access to low-emission energy sources</i>		0	150,000 people indirectly benefit	At least 298,000 people indirectly benefit ⁴⁹	
	<i>6.3 MWs of low emission energy capacity installed,</i>		0		100 MW solar PV	

⁴⁸ While it is expected that 80% of the financing will be committed to the Round One, a possible implementation delay has been taken into account and the achievement of 50% of the final targets at the mid-point is assumed.

⁴⁹ Geographical and gender disaggregation is difficult as this is an indirect outcome from on-grid plants.

	<i>generated and/or rehabilitated as a result of GCF support</i>			50MW solar PV installed	and small-hydro installed	
M5.0 Strengthened institutional and regulatory systems	<i>5.1 Institutional and regulatory systems that improve incentives for low emission planning and development and their effective implementation</i>	Reports from the TA recipients; regular reporting from AfDB to GCF as agreed in the AMA	Scarce off- and mini-grid private investment	One off- and mini-grid projects financed by private investors	At least three (3) off- and mini-grid projects financed by private investors, following the TA	REA and other agencies' strong ownership and support for the implementation
Project/programme outputs	Outputs that contribute to outcomes					
1. IPP financing: senior loans and standby loans (tenor extension instrument)						
RE IPP projects financed, and plants installed and operational	Number of IPP projects financed Jobs created ⁵⁰ Local institutions involved into private sector RE financing	AfDB monitoring	0 0 0	3 solar projects 500 (construction) National Pension Fund and 1 local bank participate	4-6 solar and 0-2 small hydro ⁵¹ ~50 (O&M) 3-4 FIs participate	Commercial banks interests and capabilities for the RE financing
2. Technical assistance: grants						
1) Accelerating the development of rural electrification through private-led mini- and off-grid deployment						
Documents developed to clarify the rules of the game for mini-grid and off-grid	Strategy, regulatory framework, standards and guidelines produced	AfDB monitoring	0	N/A	1 (all produced)	The REA and other relevant public institutions are ready for the activities

⁵⁰ Considering the current market condition in Zambia, it is difficult to come up with gender-specific targets for job creation during the construction and O&M. However, gender-disaggregated data for this indicator will be reported.

⁵¹ Financing of small-hydro is subject to the outcome of the Round One financing and will be limited to up to 20% of the framework.

	Capacity building training conducted		0	N/A	At least 1 training	No major external (economic, social, technological, etc.) issues that will have an adverse impact for mini-grid and off-grid interventions
GIS-based database developed	Database created		0	N/A	1 (created)	
Site selected and feasibility reports cleared	Site selected, and feasibility reports produced and cleared		0	N/A	1 (cleared)	
Viable business models for mini-grids and off-grid developed	Financial & commercial framework and risk mitigation strategy produced		0	N/A	1 (produced)	
Improved and more transparent plans the acceleration of rural electrification developed, tested and adopted	Detailed rural energy access plans developed and adopted		0	N/A	1 (developed and adopted)	
Tariffs, operational scheme, and financial mechanisms ready for implementation of strategy	Tariffs, operational scheme, and financial mechanisms produced		0	N/A	1 (all produced)	
Participation of women and disabled people in clean and renewable energy increased	Number of women who join the Zambia network of women in energy		0	50	100	
	Number of women and disabled trained on RE technologies and business development related to renewable energy transactions		0	10	30	
2. Technical assistance: grant 2) Enhancing local financial institutions' RE and project financing capabilities:						
All tools and processes in place strengthening the participating bank's RE IPPs credit assessment, monitoring and portfolio systems, and increasing the transparency, speed and volume of RE IPP transactions.	Number of financial institutions benefited and their institutional capacity built	AfDB Monitoring	0	1	At least 2	Zambian financial institutions committed for RE and climate financing and related capacity building
Increased capacities of financial institutions in Zambia on gender responsive climate finance	% of financial institutions in Zambia implementing Gender responsive programs by 2020 Number of staff in financial institutions		0%	20%	50%	
			0	10	20	

	<p>trained on gender responsive climate finance</p> <p>Number of knowledge products on gender responsive climate financing developed</p>		0	1	3	
Activities	Description	Inputs	Description			
<p>1. Direct IPP financing (senior debt and standby loans)</p> <ul style="list-style-type: none"> Procurement of IPP projects Due diligence Financial closure 	<p>Senior debt and standby loans (tenor extension instrument) for small-scale (up to 20MW each) RE IPP projects. While the majority of the projects will be solar PV, a limited number of small hydro (maximum 20% of the framework) may be financed.</p>	<p>AfDB and GCF: senior debt and standby loans/ Commercial banks and NAPSA (proposed): senior debt</p>	<p>The activities and inputs will follow the cases of other IPP projects financed by the AfDB.</p>			
<p>2.1. Accelerating the development of rural electrification: Developing enabling environment for private investments in the off-grid/mini-grid sector</p> <ul style="list-style-type: none"> Improvement of planning, transparency, management systems Development of detailed access plans, with associated business models and financing schemes Geospatial and demographic data collection and analysis Associated institution building support Design and implementation of financial frameworks 	<p>This sub-component will aim at improving the enabling environment for private sector participation in the deployment of off-grid and mini-grids in Zambia, through (i) preparation of appropriate strategy, regulatory framework, technical standards and guidelines; (ii) develop a GIS-based database of rural population and electrification status, (iii) conduct feasibility studies for selected sites; and (iv) develop a financial and commercial framework for private sector investment, including risk mitigation strategy, financial incentive framework and viable business models.</p> <p>Further, the capacity of the REA and other relevant public institutions (ERB, Ministry of Energy and Water Development, and Ministry of Finance) will be strengthened to operationalize the policy, regulation and financial framework for off-grid and mini-grid systems and to develop customized strategies to suit Zambia's conditions.</p>	<p>Expert consultancy, other goods and services as required</p>				
<p>2.2. Building local financial institutions capacity for RE projects origination, due diligence, and monitoring</p> <ul style="list-style-type: none"> Credit policy and risk management support Product and marketing alignment with target IPPs 	<p>An embedded team of highly experienced international advisors will be recruited to constitute the sustainable energy financing team by being the nucleus around which the team will be formed. They will be embedded for a period of 18 months when they will simultaneously originate deals, develop the procedures, guidelines and manual related to the</p>					

<ul style="list-style-type: none"> • Training on social and environmental assessment and monitoring 	<p>sustainable energy business and coach/train the local staff on site with the objective of reaching full autonomy after the 18-month period. These coaches will ensure that local staff recruited in the team gain the necessary skills and experience through training and participation to business operations in the first 18 months.</p>		
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H.2. Arrangements for Monitoring, Reporting and Evaluation

Besides the arrangements (e.g. semi-annual performance reports) laid out in AMA, please provide project/programme specific institutional setting and implementation arrangements for monitoring and reporting and evaluation. Please indicate how the interim/mid-term and final evaluations will be organized, including the timing.

Please provide methodologies for monitoring and reporting of the key outcomes of the project/programme.

Monitoring of the project

All projects financed under the proposed framework will be monitored by the AfDB's Portfolio Management team as per the relevant internal policies and procedures. The AfDB – as the accredited executing agency – will be responsible for direct monitoring of implementation conditions and reporting periodically to the GCF under the terms to be agreed between the AfDB and GCF. All IPP projects financed under the proposed framework will comply with the AfDB appraisal, approval, monitoring and supervision standards and procedures involving representatives or all relevant teams (engineers, lawyers, project finance specialists, procurement experts, E&S specialists, climate finance officers, financial management officers, supervision and monitoring specialists). The implementation and monitoring of each stage of the project will be guided and managed by the AfDB project lifecycle management framework⁵². The key task managers, who will perform due diligence, implementation monitoring, risk monitoring and mitigation, will be located in the relevant teams in the headquarters, Southern Africa regional hub and the country office in Lusaka.

Reporting

- 1) Reporting of project companies to AfDB will be in line with the standard loan agreement, and the AfDB will conduct a biannual supervision.
- 2) Reporting of TA implementation from beneficiaries to AfDB will be in line with the standard grant agreements, and quarterly progress reports will be submitted by TA beneficiaries to the AfDB on the agreed activities.
- 3) Reporting of AfDB to GCF: The AfDB will comply with the relevant GCF policies (as specified under the AMA) in reporting and evaluation arrangements for this framework. The AfDB will provide the annual performance report (APR) to the GCF during the five-year implementation period. In addition, during the sub-loan lifetime, semi-annual activity report on the status of the GCF-financed individual sub-projects will be provided. For the TA component, reports from the beneficiaries will be consolidated by the AfDB for reporting to the GCF. In addition, following the arrangement under the AMA and the FAA, inception report, mid-term and final evaluation reports, and financial information reports (semi-annually throughout the life of the loan) will be submitted.

Evaluation

The evaluation arrangements for this framework will comply with the related AfDB and GCF policies. Both the independent mid-term and final evaluation will be carried out by the AfDB's independent evaluation unit (IDEV). The

⁵² <https://www.afdb.org/en/projects-and-operations/project-cycle/>

work of the AfDB's independent evaluation work is guided by internationally accepted principles for the evaluation of development assistance, in particular, the Organization for Economic Co-operation and Development's Development Assistance Committee (OECD DAC) evaluation guiding principles and the good-practice standards issued by the Multilateral Development Banks' Evaluation Cooperation Group (ECG).

I. Supporting Documents for Funding Proposal

- NDA No-objection Letter
- Feasibility Study (Market Study)
- Integrated Financial Model that provides sensitivity analysis of critical elements (xls format, if applicable)
- Confirmation letter or letter of commitment for co-financing commitment (If applicable)
- Project/Programme Confirmation/Term Sheet (including cost/budget breakdown, disbursement schedule, etc.) – see *the Accreditation Master Agreement, Annex I*
- Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan (If applicable)
- Appraisal Report or Due Diligence Report with recommendations (If applicable)
- Evaluation Report of the baseline project (If applicable)
- Map indicating the location of the project/programme
- Timetable of project/programme implementation

** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*