Document of The World Bank Group

FOR OFFICIAL USE ONLY

Report No: 110675-ZM

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED IDA GUARANTEE IN THE AMOUNT OF UP TO US\$3.5 MILLION EQUIVALENT

TO THE REPUBLIC OF ZAMBIA

AND ON A

PROPOSED IFC FINANCING CONSISTING OF AN A-LOAN IN THE AMOUNT OF UP TO US\$15 MILLION, A SENIOR LOAN IN THE AMOUNT OF UP TO US\$15 MILLION FROM IFC ACTING AS IMPLEMENTING ENTITY OF THE IFC-CANADA CLIMATE CHANGE PROGRAM (IFC-CCCP), AND USD INTEREST RATE SWAPS REPRESENTING A LOAN EQUIVALENT EXPOSURE OF UP TO US\$3 MILLION TO BANGWEULU POWER COMPANY LIMITED

FOR THE

WEST LUNGA SCALING SOLAR ENERGY PROJECT

January 25, 2017

Extractives Global Practice Africa Region, World Bank

Infrastructure Department International Finance Corporation

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

CURRENCY EQUIVALENTS

(Exchange Rate Effective: December 31, 2016)

Currency Unit = Zambian Kwacha (ZMW) ZMW 9.92 = US\$ 1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AC	Alternating Current
CEC	Copperbelt Energy Corporation
CDP	Community Development Plan
CLO	Community Liaison Officer
CPS	Country Partnership Strategy
CSP	Concentrated Solar Power
DC	Direct Current
DMMU	Disaster Management and Mitigation Unit
DFIs	Development Finance Institutions
DSCR	Debt Service Coverage Ratio
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortization
EIRR	Economic Internal Rate of Return
EHS	Environmental Health and Safety
EGP	Enel Green Power
EMP	Environmental Management Plan
EROIC	Annual Economic Return on Invested Capital
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESRS	Environmental and Social Review Summary
EPC	Engineering, Procurement and Construction
ERB	Energy Regulation Board
ESMS	Environmental and Social Assessment and Management System
FASA	Financial Advisory Services Agreement
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GHI	Global Horizontal Irradiation
GRS	Grievance Redress Service
GRZ	Government of the Republic of Zambia
GSA	Government Support Agreement
GWh	Gigawatt Hour
HFO	Heavy Fuel Oil
HSE	Health, Safety and Environmental
IDA	International Development Association

IDC	Industrial Development Company
IFC	International Finance Corporation
IFC-CCCP	IFC-Canada Climate Change Program
IPP	Independent Power Producer
ISP	Implementation Support Plan
KGL	Kafue Gorge Lower
KPI	Key Performance Indicator
KWh	Kilowatt Hour
LC	Letter of Credit
NPV	Net Present Value
MIGA	Multilateral Investment Guarantee Agency
MFEZ	Multi Facility Economic Zone
MOF	Ministry of Finance
MOE	Ministry of Energy
MVA	Megavolt Amperes
MW	Megawatt
MWp	Megawatt peak (the installed DC power of solar PV panels)
O&M	Operation and Maintenance
OFC	Offshore Financial Center
OHS	Occupational Health and Safety
OPIC	Overseas Private Investment Corporation
PAD	Project Appraisal Document
PDO	Project Development Objective
PLA	Project Labor Agreement
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PS	Performance Standards
PV	Photovoltaic
RFP	Request for Proposals
ROIC	Annual Return on Invested Capital
SEP	Stakeholder Engagement Plan
SPV	Special Purpose Vehicle
SSA	Sub-Saharan Africa
TTL	Task Team Leader
VRE	Variable Renewable Energy
WBG	World Bank Group
WTP	Willingness to Pay
ZEMA	Zambia Environmental Management Agency
ZESCO	Zambia Electricity Supply Corporation Limited
ZMW	Zambian Kwacha

International Development Association (IDA)

Regional Vice President:	Makhtar Diop
Acting Country Director:	Ivan Velev
Senior Global Practice Director:	Riccardo Puliti
Global Practice Director:	Lucio Monari
Practice Manager:	Wendy Hughes
Practice Manager Guarantees:	Pankaj Gupta
Task Team Leaders:	Mirlan Aldayarov, Arnaud Braud

International Finance Corporation (IFC)

	1
Vice President:	Dimitris Tsitsiragos
Global Industry Director:	Bernard E. Sheahan
Regional Director:	Oumar Seydi
Regional Head of Industry:	Bertrand Heysch de la Borde
Global Industry Manager:	Sumeet Thakur
Country Managers:	Jumoke Jagun-Dokunmu, Saleem Karimjee
Transaction Manager:	Yasser Charafi
Regional Portfolio Manager:	Linda Munyengeterwa
Investment Officers:	Soumya Banerjee, Rory L. Jones, Nancy
	Wang, Imraan Solwa
Principal Counsel:	Helen Ibbotson

REPUBLIC OF ZAMBIA West Lunga Scaling Solar Energy Project (P157943)

TABLE OF CONTENTS

I.	STRATEGIC CONTEXT1
	A. Country Context
	B. Sectoral and Institutional Context
	C. Higher Level Objectives to which the Project Contributes
II.	PROJECT DEVELOPMENT OBJECTIVES7
	A. PDO
	B. Project Beneficiaries
	C. PDO Level Results Indicators
III.	PROJECT DESCRIPTION8
	A. World Bank Group Scaling Solar Program8
	B. Zambia's Scaling Solar Round 1 Background10
	C. Project Summary11
	D. World Bank Group Instruments11
	E. Project Costs and Financing12
	F. Expected Future Scaling Solar Projects in Zambia (for information purpose)13
	G. Rationale for IFC Blended Finance Involvement
	H. Lessons Learned and Reflected in the Project Design
IV.	IMPLEMENTATION16
	A. Institutional and Implementation Arrangements16
	B. Results Monitoring and Evaluation
	C. Sustainability
V.	KEY RISKS19
	A. Overall Risk Rating and Explanation of Key Risks
VI.	APPRAISAL SUMMARY21
	A. Economic and Financial Analysis
	B. Technical

(C. Financial Management	. 24
]	D. Procurement	. 24
]	E. Environment	. 25
]	F. Social	. 26
(G. World Bank Grievance Redress	. 26
Annex	1a: IDA Results Framework and Monitoring	28
Annex	1b: IFC Development Impact Indicators	29
Annex	2: Detailed Project Description	30
Annex	3: Implementation Arrangements	.40
Annex 4	4: Environmental and Social Review Summary	.45
Annex	5: Implementation Support Plan	60
Annex	6: Economic and Financial Analysis	62
Annex '	7: IDA Payment Guarantee Term Sheet	74
Annex	8: Ownership and Structure – Application of Offshore Financial Centers Policy	84
Annex	9: Statement of IFC's Committed and Outstanding Portfolio in Zambia	87

PAD DATA SHEET

Zambia

West Lunga Scaling Solar Energy Project

PROJECT APPRAISAL DOCUMENT

AFRICA

Basic Information							
Project ID		Environmental Assessment Category Team Leaders				eaders	
IDA: P157943 IFC: 38685		B - Partial Assessment		Mirlan A Arnaud I	Aldayarov Braud		
						IFC Inve Soumya Jones, N Solwa	estment Officers: Banerjee, Rory L. ancy Wang, Imraan
Lending Instrument	+			Fragile an	d/or Capacity	y Constra	ints []
Investment Project Financing, IFC A loan, IFC Blended Finance Senior Loan and IFC USD Interest Rate Swaps		Financial	Intermediarie	es []			
		Series of Projects []					
Project Implementation Start Date			Project Implementation End Date				
16-Feb-2017 15-Oct-2018			18				
Expected Effectiveness Date Expect			Expected	Closing Date	;		
15-Apr-2017	15-Oct-2018						
Expected IDA Guaran 15-Apr-2035	ntee Ex	piry Date:					
Joint IFC							
Yes							
Practice Managers		Senior Globa Director	al Practice	Country I	Director		Regional Vice President
Wendy Hugues Pankaj Gupta		Riccardo Puliti Ivan Velev			Makhtar Diop		
Global Industry Director	Region	al Director	Regional Head	Industry	Global Indu Manager	ıstry	Regional Portfolio Manager
Bernard E. Sheahan	Oumar	Seydi	Bertrand Borde	H. de la	Sumeet Tha	akur	Linda Munyengeterwa

Borrower: Republic o	f Zambia						
Responsible Agency:	Bangweulu	Power Co	ompany I	Limited			
Contact:	Cyril Perrir	1	Title:	Director			
Telephone No.:	+260 96 25	8 62 81	Email:	cyril.perr	in@neoe	n.com	
Responsible Governm	nent Agency	: ZESCO	Limited				
Contact:	Victor Mur	ndende	Title:	Managing	g Directo	r	
Telephone No.:	+260 211 3	61111	Email:	vmunden	de@zesc	o.co.zm	l
	Pr	oject Fin	ancing D	ata(in US\$, Mill	ions)		
[X] IFC	Loan	[]		IDA Grant	[X]		IDA Guarantee
[] Cree	dit	[]		Grant	[]		Other
Total Project Cost:	60.00			Total Bank Guar	antee:	3.50	
Financing Gap:	0.00			IFC A Loan: up IFC Blended Fin IFC USD Interes exposure of up to	to US\$15 ance Loa at Rate Sy o US\$3 n	5 million an: up to waps: lo nillion) US\$15 million an equivalent
Financing Source (es	stimate)						Amount
Estimated Private Equ	uity represer	nting 25%	of Projec	et Cost			15.00
Estimated Debt from Project Cost	Developmer	nt Finance	Instituti	ons representing '	75% of		45.00
			Instituti	onal Data			
Practice Area (Lead)						
Energy & Extractives							
Cross Cutting Areas Climate Change, Publ	lic Private P	artnership					
Private Capital Mob	oilized						
15 million							
Proposed Developm	ent Objectiv	ve(s)					
The project developm electricity generation	ent objectiv resources in	e is to incl Zambia.	rease sola	ar electricity gene	eration ca	pacity a	nd diversify

Systematic Operations Risk-Rating Tool (SORT)			
Risk Category	Rating		
1. Political and Governance	al		
2. Macroeconomic	2		
3. Sector Strategies and Policies	High		
4. Technical Design of Project or Program	Moderate	2	
5. Institutional Capacity for Implementation and Sustainability	Substanti	al	
6. Fiduciary	Moderate	e	
7. Environment and Social	Moderate	2	
8. Stakeholders	Moderate	2	
OVERALL	Substanti	al	
Compliance			
Policy			
Does the Project depart from the Country Partnership Strategy in conte other significant respects?	nt or in	Yes []	No [X]
·			
Does the Project require any waivers of Bank policies?	Yes []	No [X]	
Have these been approved by Bank management?	Yes []	No []	
Is approval for any policy waiver sought from the Board?	Yes []	No [X]	
Does the Project meet the Regional criteria for readiness for implement	Yes [X]	No []	
Safeguard Policies Triggered by the Project		Yes	No
PS 1. Assessment and Management of Environmental and Social Risks Impacts	and	X	
PS 2. Labor and Working Conditions		X	
PS 3. Resource Efficiency and Pollution Prevention	X		
PS 4. Community Health, Safety and Security			
PS 5. Land Acquisition and Involuntary Resettlement	X		
PS 6. Biodiversity Conservation and Sustainable Management of Livin Resources		X	
PS 7. Indigenous People			X
PS 8. Cultural Heritage			X

Legal Covenants				
Name		Recurrent	Due Date	Frequency
Description of Covenant				
Usual and customary condition included in the legal agreement	ns precedent and covenants for p its.	project financings	of this nature	will be
Conditions				
Source Of Fund	Name	Туре		
Description of Condition				
Usual and customary condition	ns to effectiveness for guarantee	operations in sup	port of projec	t financings
of this nature will be included	in the legal agreements. Please r	refer to Annex 7.		
			4	<u> </u>
Gender Tag Does the activity	plan to undertake any of the fol	lowing? Please se	lect Yes or No	o for each:
Gender analysis and/or consul	tation on gender related issues. N	No	• •	
Specific actions to address the gender gaps. No	distinct needs of women and gin	rls, or men and bo	ys, or positive	e impacts on
Mechanisms to facilitate moni	toring and/or evaluation of gend	er impacts. No		
	Team Composition	n		
Bank Staff				-
Name	Role	Title		Unit
Mirlan Aldayarov	Task Team Leader (ADM Responsible)	Senior Energy S	pecialist	GEE01
Arnaud Braud	Co-Task Team Leader (Financial Solutions)	Senior Infrastrue Specialist	cture Finance	GEEFS
Joseph Mwelwa Kapika	Energy sector specialist	Senior Energy S	specialist	GEE08
Anthony Molle	Legal (Guarantees)	Senior Counsel		LEGSG
Ximena Talero	Legal (Guarantees)	Adviser		LEGSG
Kenta Usui	Economic and Financial Analysis	Energy Speciali	st	GEE01
Arsh Sharma	Financial Analysis	Financial Analy	st	GEE08
Kabir Malik	Economic Analysis	Economist		GEE01
Sameer Shukla	Operations Adviser	Operations Adv	iser	GEE08
Reynold Duncan	Energy Adviser	Lead Energy Sp	ecialist	GEE08
Wedex Ilunga	Procurement	Senior Procuren	nent Specialis	t GGO01

Lingson Chikoti	Financial Management	Consultant	GGO13
Sanjay Srivastava	Environmental safeguards	Lead Environmental Specialist	GEN01
Mwansa Lukwesa	Environmental safeguards	Environmental Specialist	GEN01
Knut Opsal	Social safeguards	Lead Social Development Specialist	GSU07
Richard Everett	Social safeguards	Consultant	GSU07
IFC Staff			
Name	Role	Title	Unit
Soumya Banerjee	Team Leader	Principal Investment Officer	CNGFV
Rory L. Jones	Transaction Leader	Investment Officer	CNGPW
Nancy (Lu) Wang	Team Member	Associate Investment Officer	CNGS6
Imraan Solwa	Team Member	Investment Analyst	CNGS6
Niels J. Martens	Credit Officer	Chief Credit Officer	CCIRIC
Helen Ibbotson	Legal	Principal Counsel	CLEAF
Koro Nuri	Legal	Senior Counsel	CLENG
Roy Francis Kroese	Engineer	Principal Industry Specialist	CNGS6
Kruskaia Sierra-Escalante	Blended Finance Investment	Manager	CBFNP
Pranab Ghosh	Blended Finance Investment	Principal Investment Officer	CBFNP
Neelam Patel	Blended Finance Investment	Investment Officer	CBFNP
Eusoph Kanyenda	Insurance	Senior Insurance Officer	CIRIN
Liane Asta Lohde	Economist	Senior Economist	CNGSF
Justin Pooley	Environmental and Social	Principal Environmental Specialist	CESIG
Anne Olufunke Asaolu	Environmental and Social	Environmental and Social Development Specialist	CESI4
Elizabeth Calien Schroenn	Environmental and Social	Consultant	CESI4
Ndeye Fatou Diop	Treasury	Associate Financial Officer	CTCEM
Akua Opoku-Mensah	Treasury	Financial Officer	CTCEM
Evelyn Ndlangamandla, Setprumea So	Team Assistants	Program Assistant	CAFE4/ CNGS6

I. STRATEGIC CONTEXT

1. Zambia needs to diversify its electricity generation resources in order to prepare for climate variability. Zambia's current high dependence on hydropower generation (over 90 percent of total generation) makes the country's energy supply particularly vulnerable to climate change events in the form of reduced or delayed rainfalls, most recently experienced in 2015. Lack of rainfall in 2015 led to increased power outages, putting increasing pressure on Zambia's macroeconomic growth. The financial impact of those outages on the power sector financials has been equally important.

2. Due to its geographical position and relatively high solar irradiation through much of the year, Zambia has great potential for integrating solar energy into the electricity generation mix. Some off-grid solar projects have been already implemented successfully in the country. However, opportunities for large scale solar photo-voltaic (PV) development remain unexploited to date.

3. In line with the World Bank Group's Africa Climate Business Plan, which calls for accelerating climate-resilient and low-carbon development, the Government of the Republic of Zambia (GRZ) and the World Bank Group (WBG) recently embarked on a strategic partnership under the World Bank Group's Scaling Solar initiative. Scaling Solar brings together a suite of WBG services and instruments under a single engagement aimed at creating viable markets for grid-connected solar PV power plants and enabling governments and utilities to procure solar power transparently and at the lowest possible cost. The program was designed to ease replicability in similar countries while taking into account local specificities.

4. Zambia is the first country, in which the innovative WBG Scaling Solar program has been rolled out and this project is the first intervention submitted for approval under this program. The proposed project supports investments in solar PV and World Bank guarantees and IFC investments will be crowding in private sector investment, and leveraging mainstream and emerging renewable energy technologies.

A. Country Context

5. Zambia is a lower-middle-income country with close to 16 million inhabitants. Gross Domestic Product (GDP) was estimated at US\$20.1 billion in 2016, equating to a per capita income of around US\$1,307. Zambia has made significant socio-economic progress over the past two decades and achieved average growth of 7.4 percent between 2004 and 2014. However, in 2015 and 2016 growth slowed considerably to 2.9 percent in 2015 and 3.0 percent in 2016 as external headwinds and domestic pressures intensified.

6. The slowdown followed lower prices of copper (typically 77 percent of Zambia's exports) that fell by 50 percent from their 2011 peak. This has put downward pressure on revenues, widened the fiscal deficit, and reduced the value of exports, in turn opening up a trade deficit. In addition, Zambia experienced domestic pressures in the form of (i) repeated fiscal deficits (reducing confidence in the economy); (ii) reduced and delayed rainfall in 2015 (undermining agricultural incomes and lowering the water level in power regulating dam reservoirs); and (iii) increased power outages. Furthermore, the strengthening of the US dollar in 2015 put pressure on the

Zambian Kwacha that, combined with lower confidence, led to the local currency losing 41 percent of its value against the US dollar.

7. Close to the end of 2015 GRZ took monetary policy measures to contain the impact of ebbing confidence. These measures restored stability of the Kwacha, which appreciated by 11.2 percent in the first nine months of 2016, and helped curb annual inflation from its peak of 22.9 percent in February 2016 to 7.5 percent in December 2016. However, fiscal policy remained loose in 2016 and monetary policy has had to remain tight, maintaining the pressure on liquidity, putting pressure on the financial sector, and causing a drag on growth.

8. The August 2016 elections went in favor of the incumbent President and political party, with a full five-year term expected to be served, raising cautious optimism about the political space for reform in 2017 and over the medium-term. The new government has presented its economic recovery plan, "Zambia Plus," which provides a framework for restoring fiscal sustainability, closing the twin deficits (trade and fiscal), and ensuring that structural reforms are carried out to boost the non-copper economy. GRZ has requested the support of the World Bank, International Monetary Fund (IMF), and other partners to make it a success.

9. The economy is starting to recover and is expected to perform better in 2017. GDP growth is forecast to rise to 4.0 percent in 2017 and 4.2 percent in 2018. The forecasts are subject to upside and downside risks, but the return of investor confidence in the fourth quarter of 2016 (evidenced by over-subscribed bond auctions), bold measures by GRZ (including the removal of fuel subsidies), a rally in copper prices (between November 2016 and January 2017), and improved rainfall suggest that economic circumstances are improving.

10. The rapid and sustained growth achieved from the early 2000s to 2014 was insufficiently inclusive and, despite the economy doubling in size, poverty remains widespread. An estimated 57.3 percent of Zambians live in extreme poverty (below US\$1.9 per day, purchasing power parity terms), poverty is higher among women, and rural poverty at 74 percent is more than double the urban poverty rate of 35 percent. The benefits of growth have accrued mainly to those already above the poverty line, inequality has remained high, and efforts are needed not only to restore the economy to faster growth, but also to ensure planned pro-poor policies are implemented and more inclusive growth follows.

B. Sectoral and Institutional Context

11. Electricity is the second most important energy source in Zambia after wood fuel, providing 10 percent of the national energy supply. The installed generation capacity is currently 2,683 MW and the main source of electricity generation is hydropower, which represents approximately 90 percent of electricity production. The mining industry is the largest consumer category, accounting in 2015 for 52 percent of national electricity access rate is 32 percent. It is estimated that 47 percent of the population in urban and peri-urban areas, and only three percent in rural areas, have access to electricity. As part of the national strategy document, Vision 2030, GRZ has set ambitious electrification targets: 90 percent for urban and peri-urban areas, and 51 percent for rural areas by 2030. Poor reliability and quality of electricity supply combined with the lack of access to electricity services have an adverse impact on the national economy. This has

been exacerbated by the severe power shortages that began to be experienced in 2015 due to lower than expected rainfall, and which continue to persist.

12. Electricity supply in Zambia is predominantly the preserve of Zambia Electricity Supply Corporation Limited (ZESCO) Limited, a vertically integrated, state-owned company involved in the generation, transmission, and distribution of electricity. Other key players in the sector are the Copperbelt Energy Corporation (CEC), ZESCO's single largest customer, which supplies electricity to most of Zambia's copper mining industry, and the independent power producers (IPPs). Out of the total installed capacity (2,500 MW) 14 percent is provided by IPPs, namely Itezhi Tezhi Hydro Power Company (120 MW), Lunsemfwa Hydro Power Company (56 MW), Ndola Energy Company (50 MW) and Maamba Collieries (150 MW commercially operated out of total 300 MW). The Zambian electricity sector is overseen by the Ministry of Energy, which provides overall policy guidance. There is also an independent regulatory agency, the Energy Regulation Board (ERB), which is responsible for licensing, tariff setting, and quality of supply and service standards. ERB is mandated to regulate the sector in a transparent, effective, and efficient manner which safeguards the interests of all stakeholders, in line with the provisions of the 1995 Energy Regulation Act (amended in 2003).

13. The Industrial Development Corporation (IDC) was incorporated in 2014 as a company limited by shares under the Companies Act, is 100 percent owned by the Ministry of Finance (MoF) and is chaired by the President of the Republic of Zambia. IDC's role is to own and manage the assets of state owned enterprises previously held through direct MoF shareholding. It is expected that by so doing this will allow MoF and other line Ministries to focus on policy making while IDC operates the state owned enterprises following commercial principles. On August 24, 2015 MoF transferred its entire interest in ZESCO to IDC along with that in 33 other companies.

14. Electricity demand in Zambia has been growing at an average of four percent per year, commensurate with the average annual GDP growth of about 5.7 percent during the last decade. While installed capacity in Zambia has been higher than existing peak demand (Figure 1), over the last two years power generation has been below total energy demand (Figure 2) due to lower than expected rainfall. Although Zambia is endowed with significant hydropower resources, the building of power plants has been slow due to a prolonged period of excess capacity during the late 1970s through the 1990s, the lack of a comprehensive framework for the procurement of new generation capacity, and a sub-optimal financial environment. After the completion of the Kariba North Bank power station in 1977, the next new generation capacity was only commissioned in 2014 with the completion of the 360 MW Kariba North Bank Extension hydropower plant. In 2016 there were further additions of capacity with the 120 MW Itezhi-Tezhi hydro and 150 MW out of planned 300 MW Maamba Collieries coal-fired power plants being completed. These additions have however been insufficient to meet rising demand and hence the significant power shortages, that commenced in 2015 due to lower than expected rainfall, persist. This has forced ZESCO to introduce rolling black-outs that, at times, last longer than eight hours in order to manage an estimated annual deficit of 3,500 GWh in energy.

15. Zambia needs to diversify its electricity generation resources in order to prepare for climate variability. The dominance of hydropower generation in the country's generation mix makes it vulnerable to hydrology and climate variations, as proven by the ongoing energy shortage. A 2015 feasibility study for a regional power project shows three hydrology scenarios for Zambia

representing wet, dry, and average hydro production scenarios. In the wet hydrology scenario, power shortages are forecasted to continue through 2018 and in the dry hydrology scenario through 2020. Additionally, firm generation remains below demand, even beyond 2025.

16. The immediate fiscal impact of the power shortages has been significant. For the financial year ending December 2015, the cost of power imports was US\$59 million compared to US\$4 million for the previous year. In 2016, the cost of emergency power imports imposed additional costs on ZESCO and GRZ on the order of US\$340 million, i.e., 45 percent of ZESCO's FY15 revenues.



17. In order for emergency imports to continue, and to ensure necessary investments in generation capacity that will prevent current power supply shortages from re-occurring, the financial situation of the Zambian power sector has to improve. Achieving this will require an upward revision of electricity tariffs. GRZ has recognized this and in December 2015 electricity tariffs for residential consumers were increased from an average of US¢5/kWh, one of the lowest in sub-Saharan Africa, to an average rate of US¢10.35/kWh. However, this was reversed in the same month due to public pressure. At prevailing tariffs, settling emergency import and IPP invoices presents a severe strain on ZESCO's financial position. GRZ has therefore agreed to meet the difference between ZESCO's costs and revenues under these contracts. Fulfilment of this agreement, by GRZ, has however not been timely, and as a result payment arrears have started to build up, putting at risk further supplies from contracted IPPs and emergency power suppliers. GRZ and ZESCO recognize the need to swiftly settle these arrears. To this end, GRZ launched the Zambia Plus economic recovery plan in November 2016 with the objective to restore fiscal sustainability and re-align fiscal slippages that occurred in 2016. A key part of this plan is overall GRZ arrears clearance which includes those attributable to the electricity sector.

18. With elections having taken place in August 2016, GRZ has also restated its objectives for the sector and, in the 2017 budget address, announced the intention to have electricity tariffs reach cost recovery by the end of calendar year 2017, while maintaining the life-line tariff to protect poorer households. As a first step towards this, GRZ is expected to implement an interim upward tariff adjustment in the first quarter of calendar year 2017. Furthermore, the ERB is carrying out a Cost of Service Study that is scheduled to be concluded by end of 2017 and which shall provide an objective basis for future tariff revisions.

19. As part of the tariff revision process, GRZ also intends to revise tariffs to the mining industry, which accounts for approximately half of total demand in the country. Mining tariffs are denominated in foreign currency and are not regulated by the ERB, but by means of long-term agreements. Under these agreements, tariffs range from US¢4.5/kWh to US¢7.0/kWh and, for some of the contracts with mines, do not cover the cost of power supply. GRZ is intent on ensuring that tariffs for all mining consumers are set at cost recovery levels and, to this end, has initiated discussions with mining companies and CEC which supplies the bulk of the mines. This was reflected in the 2017 budget whereby GRZ committed to continue its engagement with the mining industry to find appropriate solutions on the tariff issue.

20. In addition to raising tariffs to cost recovery levels, GRZ is intent on improving operational efficiency in the electricity sector. This was affirmed in the President's address to the National Assembly on September 30, 2016 and the 2017 budget address by the Minister of Finance on November 11, 2016. Specifically, GRZ plans to carry out a comprehensive sector review to identify efficiency gains including the optimum governance and operational structure for the sector. To achieve these objectives GRZ requested support from the WBG and other Cooperating Partners (CPs) active in the energy sector.

21. CPs meet regularly under the auspices of the energy sector cooperating partners group (CPG), which is co-chaired by the WBG. In order to further augment coordination and support to GRZ, the CPs signed a Declaration of Intent on Enhanced Cooperation on Energy (DoI) with GRZ in November 2016, during the Marrakech Climate Change Conference. This aims to provide a platform for strengthened policy dialogue and coordination with a view to accelerating the supply of clean energy and facilitating access to affordable, reliable, sustainable and modern energy services for Zambia. The DoI was signed by the European Union, France, Germany, Ireland, Italy, Japan, Sweden, United Kingdom, the United States of America, and the World Bank. Under the framework of the DoI, the CPs committed to provide technical assistance and capacity building, promote an improved enabling environment, promote mobilization of private sector and civil society through organization of business fora, industrial programs, and other interventions to inform and attract the private sector and financing institutions towards sustainable energy investments in Zambia.

22. The African Development Bank (AfDB) is preparing a budget support operation in the amount of US\$250 million to aid the GRZ in achieving its objectives for the electricity sector. Proposed prior actions under this operation include an interim tariff revision, completion of a variable renewable energy integration study by ZESCO, completion of a balance-sheet clean-up study of ZESCO and approval of an electricity supply industry (ESI) reform strategy and roadmap.

23. The World Bank has a long history of supporting GRZ in the energy sector. Under ongoing support to ZESCO, the World Bank is financing the upgrade of key domestic transmission links and distribution network upgrade and expansion. Furthermore, the World Bank finances a number of institutional capacity building activities and training efforts. One of the key elements of long-term planning – a Least Cost System Development Plan – is expected to be funded from one of the ongoing, World Bank-funded investment projects. In addition, the World Bank is supporting development of a renewable energy investment plan, under the Scaling up Renewable Energy Program (SREP), and is implementing a Renewable Energy Resource Mapping Project to ensure that GRZ has information on the extent and potential of the country's solar and wind resources.

24. Under the project preparation arrangement for Scaling Solar, IFC has been providing its advisory support to IDC and ZESCO that has included developing and tailoring the commercial agreements and advising on the procurement process for the solar PV power plants. The World Bank also plans to prepare a sector policy note to identify the sector's main challenges; assess the power sector governance and regulatory environment, institutional arrangements and capacity, sector operational and financial performance, and current and forecasted electricity demand and supply balance; develop forward-looking policy options and recommendations, and guide WBG engagement in the sector going forward.

25. Due to its geographical position and relatively high solar irradiation through much of the year, Zambia has substantial potential for integrating solar energy into the electricity generation mix. Some off-grid solar projects have already been implemented successfully in the country. However, opportunities for large scale solar photovoltaic (PV) development remain unexploited. Renewable electricity production could also contribute to replacing high cost emergency power that has had to be procured during the ongoing shortages and thereby reduce the financial strain on the sector. Due to the relatively shorter construction period, solar PV plants are one of the quickest ways of helping to overcome the current power deficits in a sustainable manner. In Zambia, large-scale solar PV plants will be highly complementary to existing and future hydropower plants through the conservation of water in the country's main reservoirs during periods of sunlight and utilizing this "banked" energy when the solar plants are unable to generate.

26. Zambia is the first country to decide to implement the new WBG Scaling Solar program.¹ Scaling Solar brings together a suite of WBG services and instruments under a single engagement aimed at creating viable markets for grid-connected solar PV power plants. It is an open, competitive, and transparent approach that facilitates the rapid development of privately-owned, utility-scale solar PV projects in sub-Saharan Africa. Section III (Project Description) and Annex 2 provide more details on the Scaling Solar program and its application in Zambia so far.

C. Higher Level Objectives to which the Project Contributes

27. The proposed project supports GRZ's policy objectives for the electricity sector as stated in the National Energy Policy. These include expanding generation and transmission capacity and increasing access and private sector participation. The project is aligned with the Sixth National Development Plan (SNDP). The SNDP recognizes that a secure and reliable supply of electricity is essential for accelerating and diversifying growth as well as enhancing economic development. The strategic focus of the energy sector in the SNDP is to ensure that adequate and reliable supply of energy is made available through development of appropriate infrastructure to support the development processes in the growth sectors of the economy, especially agriculture and manufacturing

28. The proposed project is aligned with the Zambia Country Partnership Strategy (CPS).² The FY13-16 CPS identified that critical infrastructure gaps in Zambia constrain the competiveness of its private sector. This project will increase Zambia's power generation capacity and will increase the reliability and security of power supply, which will reduce the current

¹ <u>http://www.scalingsolar.org</u>

² Report No: 75098-ZM.

infrastructure constraints that Zambia is facing. The IFC and the World Bank have also undertaken to coordinate support to GRZ for Public Private Partnerships (PPPs) in key areas through capacity building (institutional capacity for identification, appraisal and implementation of PPPs) and through implementation of actual PPP transactions.

29. The proposed operation contributes to the World Bank Group Africa Climate Business Plan, which calls for accelerating climate-resilient and low-carbon development. Low-carbon energy sources offer mitigation benefits associated with increasing the share of renewable energy while also providing the power needed to tackle the access challenge and improve resilience. By supporting investments in solar PV, crowding in private sector investment, and leveraging mainstream and emerging renewable energy technologies, the World Bank can contribute to improving one of the key drivers of security, productivity, job creation, and poverty reduction. The World Bank Group plans to support the uptake of solar power through technical work, financing, and policy dialogue and resource mobilization in order to enable one GW of grid-connected solar PV in Sub-Saharan Africa by 2023.

30. The proposed project will support the World Bank's goals of reducing poverty and promoting shared prosperity. The current power supply crisis in Zambia has affected the poor the most. As the mining and the manufacturing industry has reduced production, many jobs have been lost. Given the inadequate power supply, ZESCO has also reduced its pace of connecting new consumers, especially in rural areas. Installation of solar PV power plants will increase reliability. Overcoming the power deficit will not only allow the existing industry to operate at capacity, it will also allow new business to commence, supporting job creation and ensuring shared prosperity. The power sector can restart its electrification program, supporting access to electricity to rural and urban households and micro and small enterprises in rural areas, increasing productivity and income generation activities.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

31. The project development objective is to increase solar electricity generation capacity and diversify electricity generation resources in Zambia.

B. Project Beneficiaries

32. The direct project beneficiaries are (i) ZESCO, as the project will contribute to reducing costly emergency imports with competitively priced electricity from the solar PV power plants and optimize hydropower use; and (ii) the IPPs who will benefit from the IFC financing and from the IDA payment guarantee³. Lenders will also indirectly benefit from the guarantee. The ultimate beneficiaries will be the electricity consumers of Zambia as the new power plants will contribute to reducing load shedding. The project will also support GRZ in attracting private capital to

³ IDA loan guarantees were also offered and a specific term sheet attached to the February 15, 2016, Request for Proposals (RfP) for Round 1. In Round 1, no bidder chose to use the IDA loan guarantee. Therefore this IDA loan guarantee does not apply to the current approval requested for the Neoen/First Solar project. Subject to future management and Board approval, the intent is to offer IDA loan guarantees in future Scaling Solar projects, including Zambia's Round 2.

increase Zambia's electricity generation capacity with solar PV plants which diversify the generation mix and hedge against the risks of climatic and hydrological variability, thus increasing the reliability and security of electricity supply. Finally, the project introduces a structured framework for the transparent and competitive procurement of new generation with improved cost and technology benefits.

C. PDO Level Results Indicators

33. Progress towards achieving the PDO will be measured by the following indicators:

- (a) Generation capacity of energy constructed (MW) Core;
- (b) Solar PV plants constructed (number);
- (c) Reduction of greenhouse gas emissions (tCO2);
- (d) Share of installed solar PV generation capacity (%);
- (e) Private capital mobilized (million US\$) (Number) Core.

III. **PROJECT DESCRIPTION**

A. World Bank Group Scaling Solar Program

34. Scaling Solar brings together a suite of World Bank, International Finance Corporation (IFC), and Multilateral Investment Guarantee Agency (MIGA) services and instruments under a single engagement aimed at creating viable markets for grid connected solar PV power plants. It is an open, competitive, and transparent approach that facilitates the rapid development of privately-owned, utility-scale solar PV projects in sub-Saharan Africa. It is capable of rapid implementation, and offers a 'one-stop-shop' package of advisory services, contracts, financing, guarantees, and political risk insurance. This enables governments and utilities to procure solar power transparently and at the lowest possible cost. The program was designed to ease replicability in similar countries while taking into account local specificities (for instance site availability). Annex 2 provides further details.

35. As part of the Scaling Solar program's original design, IFC Advisory Services ("IFC Advisory") supports governments in preparing a competitive and transparent solar auction based on template documents and processes. Based on the bid package, IFC Investment Services ("IFC Investment"), World Bank, and MIGA then provide term sheets for financing, guarantees, and political risk insurance, respectively. Bidders can decide to use none, a combination, or all of these WBG instruments. Bidders that pass the technical and financial criteria are then ranked based on the offered tariff. The figure below shows the Scaling Solar structure.



Figure 3: Scaling Solar Structure – Key Entities Involved and Agreement 2

*A Shareholder Agreement is needed if there is more than one investor (consortium). For clarity, the figure does not show all agreements.

The objective of the Scaling Solar Program is to target markets with perceived high risk 36. for the private sector, playing a catalytic role in relatively more challenging markets. A typical Scaling Solar market would have the following characteristics: (a) single-buyer electricity supply industry structure; (b) low credit quality off-takers; (c) governments with limited institutional capacity; and (d) nonexistent, limited, or poor track record with Independent Power Producers (IPPs). In addition to Zambia, further deployment of the program is currently ongoing in several countries in Sub-Saharan Africa, including Ethiopia, Madagascar and Senegal and is now being considered in other regions (e.g. Asia, Middle East). Solar PV technology for large scale power generation solutions is now cost-competitive with other power generation solutions and has the added advantage of swift roll-out and relatively long life. In the challenging markets that the program targets, the contractual framework is designed to address the single buyer context with appropriate risk allocation and appropriate government support to back-stop credit risks. Standardized documentation makes it easier for governments to adopt the project framework and achieve speedy implementation. Scaling Solar aims to start delivering energy within a two-year timeframe from initial government engagement. The figure below shows the key steps and expected timeline for a Scaling Solar project. Annex 2 provides additional detail on the program.



Figure 4: Key Steps and Expected Timeline for Scaling Solar Project

B. Zambia's Scaling Solar Round 1 Background

37. In 2015, GRZ announced its interest in developing on-grid solar power projects and set the target of achieving 600 MW of solar generation. It further requested ZESCO to carry out a study of its transmission system to determine how much solar energy can be injected without compromising system integrity. The study is ongoing, but the initial findings indicate that the system may be able to absorb up to around 700 MW without the need for major system reinforcement before 2019. Beyond this threshold, substantial investments will be needed in the grid to manage the variable renewable energy. Given the ongoing crisis, in the immediate term, GRZ approved procurement of up to 300 MW without waiting for the final results and allocated 250 MW for urgent procurement by its investment vehicle, IDC, under the Scaling Solar program.

38. On August 13, 2015, IDC and IFC Advisory signed a Financial Advisory Services Agreement (FASA) to develop two solar PV plants with a total capacity of up to 100 MW using the Scaling Solar initiative ("Round 1"). IDC, supported by IFC Advisory, carried out the pre-feasibility work on the first two plants and tendered them out to select private sector developers using the Scaling Solar open and competitive procurement process. Forty-eight companies submitted a Request for Qualification including many internationally reputable firms, of which 11 were pre-qualified.⁴

39. The two winning bidders are (i) a consortium of Neoen SAS of France ("Neoen") and First Solar Inc. ("First Solar") of the United States of America (USA), with a bid of US¢6.015/kWh, the lowest tariff for solar energy in sub-Saharan Africa to date; and (ii) Enel Green Power with a bid of US¢7.839/kWh. Both tariffs are fixed over 25 years. Upon successful completion of this

⁴ EDF Energie Nouvelle, Scatec Solar, Access Eren, Mulilo Zambia Consortium, Enel Green Power, Globeleq, Engie, Neoen/First Solar, Shanghai Electric Power Avic, Consortium of Africa Infrastructure Fund/Old Mutual/Cobra, and Grupo T-Solar.

Round 1, GRZ plans to launch a Round 2. This document only seeks approval for support to the Neoen/First Solar project since this is currently the most advanced.

C. Project Summary

40. The project presented for World Bank and IFC approval through this PAD consists of the development, financing, construction, operation, and maintenance by the Bangweulu Power Company Limited (the "Project Company") of a new 47.5 MW AC (approximately 55 MWp) solar PV plant located in the Lusaka South Multi-Facility Economic Zone, 20 km south of Lusaka, Zambia (the "West Lunga Project" or the "Neoen/First Solar project"). The electricity generated from the project will be sold to the Zambian utility company ZESCO through a 25 year power purchase agreement (PPA).

41. Bangweulu Power Company Limited is a special purpose vehicle ("SPV") owned by Neoen SAS of France ("Neoen"), First Solar of the USA ("First Solar"), and Industrial Development Corporation ("IDC") of Zambia. Neoen is a leading French developer specializing in the development, financing, construction, and operation of renewable energy projects. Since its inception in 2008, Neoen has financed 864 MW of renewable energy power projects (solar, wind, biomass) across Africa, Europe, and Latin America. Solar represents the largest proportion of Neoen's existing portfolio, with 431 MW of projects in operation and 102 MW under construction. First Solar, is a global leader in PV manufacturing and a provider of supporting services (finance, construction, operation, maintenance, and end-of-life panel recycling) to utility-scale PV power plants. First Solar has developed, financed, engineered, constructed, and currently operates many of the world's largest grid-connected PV power plants. The company is publicly listed and traded on NASDAQ under the ticker "FSLR".

42. Neoen and First Solar signed their Shareholder Agreement with IDC on November 4, 2016, establishing Bangweulu Power Company Limited as an SPV incorporated in Zambia. The company is co-owned by Neoen, First Solar (Neoen and First Solar jointly investing through Zambian Sunlight One SAS, incorporated in France) and IDC with 55 percent, 25 percent and 20 percent shareholding respectively. The project is expected to reach financial close in April 2017.

D. World Bank Group Instruments

43. The project will be supported by several WBG instruments in favor of the project company, Bangweulu Power Company Limited. This includes an IDA guarantee of up to US\$3.5 million, an IFC A-Loan and Blended Finance Loan both of up to US\$15 million, and one or more USD interest rate swaps covering a notional amount representing up to 100 percent of the total debt to the Project Company. IFC Investment has signed a mandate with Neoen, the lead sponsor, to act as the Mandated Lead Arranger for the project's financing. For this first project, MIGA political risk insurance has not been requested.

IDA Guarantee

44. The proposed IDA guarantee for the Neoen/First Solar project consists of a payment guarantee of up to US\$3.5 million. The payment guarantee will backstop the security mechanism (i.e., Letter of Credit (LC)) in case of a draw that GRZ or ZESCO have not reimbursed after 12

months.⁵ ZESCO is in the process of selecting an LC bank through a transparent and competitive process. The indicative terms and conditions of the IDA guarantee are included in Annex 7 (*IDA Payment Guarantee Term Sheet*).

IFC Investments

45. The proposed IFC investment consists of (i) an A Loan of up to US\$15 million to the Project Company; (ii) a senior loan of up to US\$15 million to the Project Company from IFC acting as implementing entity of the IFC-Canada Climate Change Program; and (iii) one or more USD interest rate swaps to hedge the interest rate risk in respect of the senior debt comprising the Project financing in a notional amount of up to US\$45 million. These interest swaps would represent a Loan Equivalent Exposure (LEQ) to the Project Company of up to US\$3 million.

IFC Economic Capital

46. The economic capital exposure for the proposed IFC investment is up to US\$3.6 million. IFC economic capital exposure in Zambia as of November 30th, 2016 was US\$32 million. As of November 2016, IFC's nominal exposure to the sponsors was limited to First Solar with US\$42 million.

E. Project Costs and Financing

47. The project is to be financed on a limited recourse basis with a maximum debt to equity ratio of 75:25. The private sponsors will provide up to US\$15 million in equity/equity-like instruments in Bangweulu Power Company Limited. The Overseas Private Investment Corporation (OPIC) will provide the balance of the debt in an amount equal to IFC's A Loan. Table 1 below reflects indicative project costs, financing structure, and IDA guarantee for the Neoen/First Solar project.

Solar Power Plant Size	47.5 MW
Estimated Project Cost	60
Estimated Equity @ 25%	15
Estimated Debt @ 75%	45
of which Development Finance Institutions	45
of which Commercial Borrowing	-
Estimated Private Capital Mobilized	15
Estimated Payment Guarantee	3.5
Estimated Loan Guarantee	-
Estimated Total Guarantee Provided	3.5

Table 1.	Indicative	Project Cost	s. Financing	Structure.	and IDA	Guarantees	(US\$ Million)
			~,	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		o an antees	

⁵ Under the PPA, ZESCO is required to provide a security either via an escrow account or via an LC. GRZ has expressed preference for an LC given its lower cost. However, since the competitive recruitment of an LC bank is under way, the option of using an escrow account, and for the IDA guarantee to support it, is still a possibility.

F. Expected Future Scaling Solar Projects in Zambia (for information purpose)

48. As stated above, GRZ intends to continue scaling up solar generation capacity in Zambia utilizing the Scaling Solar initiative. GRZ has so far approved procurement of up to 250 MW for large-scale solar plants through IDC. Using the WBG Scaling Solar program, IDC in Round 1 has already awarded 47.5 MW (approx. 55 MWp) to Neoen/First Solar and 28.2 MW (approx. 33 MWp) to Enel. The payment guarantee for the second project of Round 1 with Enel is expected to be presented to the Board when the project has been appraised. The WBG also intends⁶ to support other Scaling Solar projects in Zambia in future rounds if IDA payment and/or loan guarantees, IFC financing, or MIGA insurance are requested by GRZ, private sponsors, and commercial lenders. As these projects are developed and appraised, they would be presented separately to the Board on an absence of objection basis.

49. The second project of Round 1 by Enel Green Power will consist of the development, financing, construction, operation, and maintenance of a new 28.2 MW solar PV plant located in the Lusaka South Multi-Facility Economic Zone next to the Neoen/First Solar project. Enel S.p.A. is Italy's largest power company and Europe's second largest utility by capacity with over 90 GW installed. Enel Green Power (EGP) was formed in 2008 as a result of the spin-off of Enel's renewable energy assets. At the end of 2015, EGP had over 10 GW of installed capacity worldwide. EGP and IDC signed their Shareholder Agreement on November 11, 2016. The project preparation requires additional time and will be submitted for Board approval as a separate operation, once pending issues are resolved and it has been fully appraised.

50. **Zambia's Scaling Solar Round 2.** GRZ has announced the extension of the Scaling Solar process for a Round 2 (capacity expected to be approximately 160 MW). ZESCO also has a longer term plan to procure 600 MW of utility scale solar PV plants. GRZ and IFC Advisory are at final stages of agreeing on a mandate for Round 2.

51. The table below shows indicative project costs, financing structure, IDA guarantees for the potential future projects.

	Round 1 (Enel)	Round 2
Solar Power Plant Size	28.2 MW	≈160 MW
Estimated Project Cost	40	230
Estimated Equity @ 25%	10	58
Estimated Debt @ 75%	30	173
of which Development Finance Institutions	30	115
of which Commercial Borrowing	-	58
Estimated Private Capital Mobilized	10	115
Estimated Payment Guarantee	3.0	15

Table 2. Indicative Costs, Financing Structures, and IDA Guarantees for Potential Future Scaling Solar Projects (US\$ Million)

⁶ Subject to requisite internal management and Board approvals.

Estimated Loan Guarantee	-	58
Estimated Total Guarantee Provided	3.0	72

52. **IDA Guarantees available for Scaling Solar in Zambia**. In Scaling Solar, the World Bank offers IDA payment guarantees and loan guarantees. For Round 1, IDA term sheets were prepared on the basis of the PPA and Government Support Agreement (GSA) produced by IFC Advisory and IDC and were stapled to the Request for Proposal (RFP) (see Annex 7), alongside the IFC financing and the MIGA insurance offers. In future rounds, IDA expects to also offer both options:

- (a) **IDA Payment Guarantees.** Under the PPA, ZESCO is required to provide payment security of an amount equivalent to six months of the IPP's revenues. The security could be either via an escrow account or via a Letter of Credit (LC). GRZ has expressed preference for the LC option given its lower commitment of capital and lower costs. To help ZESCO provide such security, GRZ has requested IDA to provide payment guarantees. Without IDA guarantees, ZESCO would not be able to find long term LCs and many sponsors and lenders, both Development Finance Institutions (DFIs) and commercial banks, would not be willing to participate. The IDA guarantee also reduces the cost to ZESCO of procuring these LCs and avoid the requirement for ZESCO to post a cash collateral. All the bidders who submitted an offer under Round 1 requested an IDA payment guarantee.
- (b) **IDA Loan Guarantees.** The loan guarantees are offered to commercial banks that would extend debt finance to the solar IPPs. This would leverage more private capital in Zambia and reduce IFC's (Investment) exposure to each power plant. Through the loan guarantee, the World Bank would backstop the IPP repayment risks to the commercial bank in case of the GRZ or ZESCO failing to meet their obligations. As a result, the commercial banks would be incentivized to lend to the project, provide longer tenors, and lower interest rates given the improved credit risk rating. As the first PV plants are developed and ZESCO demonstrates satisfactory performance as the electricity off-taker, IPPs are likely to finance the projects through more commercial debt that may require loan guarantee support. For Round 1, no bidder requested an IDA loan guarantee.

G. Rationale for IFC Blended Finance Involvement

53. Debt financing for the Project will include a concessional senior loan from IFC acting as implementing entity of the IFC-Canada Climate Change Program (IFC-CCCP). IFC-CCCP is funded by a CN\$291.55 million contribution from the Government of Canada, as part of Canada's FY2010 CN\$400 million commitment under the Copenhagen Accord. The IFC-CCCP loan is managed by the IFC Blended Finance Department in collaboration with the IFC Investment Services team managing the comprehensive financing package. Inclusion of the IFC-CCCP loan within the IFC stapled finance offering at the bidding stage of the auction enabled a lower tariff and hence improved affordability of power for end-users in Zambia.

54. The following Principles of IFC Blended Concessional Finance apply to the Project:

(a) Moving Beyond IFC Additionality: The terms of the blended finance loan will enable rapid deployment of competitively priced solar electricity, which in turn will (i) reduce Zambia's heavy dependence on hydropower, whose availability is vulnerable to climate change impacts; (ii) help address energy shortages in the country; and (iii) displace the use of expensive thermal power which is susceptible to fuel price and supply volatility.

(b) Minimizing Market Distortion: As the terms of the proposed concessional funds were offered to all qualified bidders participating in Scaling Solar in Zambia, the benefit of the embedded subsidy is designed to be passed through to power consumers in Zambia in the form of lower tariffs. Using a base case scenario, it is estimated that the IFC-CCCP loan reduces the final tariff by 13 percent.

(c) Leading to Sustainability: The Project will send a strong signal to other governments in the region on how to develop financially sustainable solar PV-based power through private sector investment and the WBG Scaling Solar Program. If the Project is successful, future PV projects in Zambia, including those being considered under Scaling Solar Zambia Round 2, would need lesser subsidy.

(d) Promoting Transparency: Approval to use concessional funds for this Project was received on December 13, 2016 through an independent process from IFC's Blended Finance Committee. The client is aware that the financing package includes a separate IFC-CCCP loan.

H. Lessons Learned and Reflected in the Project Design

55. In the course of project preparation, the team has reviewed experience of preparation and, more importantly, implementation of relevant guarantee operations from Africa and other regions.⁷ A challenge common to projects designed as a series of guarantees that are part of a broader program is that subsequent projects tend not to be properly identified and appraised at the time of approval of the series of guarantees. This has resulted in inefficiencies whereby substantial IDA allocations are committed but not utilized. The proposed operation covers only the first fully prepared and appraised project out of the indicative series and aims only to allocate the required commitments from the Bank. It is expected, however, that the second project under Zambia's Round 1 and potential projects from Round 2 shall be presented to the Board following appraisal of each project.

56. Preparation of a series of small projects has high transaction costs in developing and tailoring the required agreements. Under Scaling Solar, the approach is to utilize a standardized set of template documents that meet international standards, thus significantly reducing transaction costs. To prepare the template documents and processes for Scaling Solar, the WBG reviewed and built on many previous auction documentation and related analysis. Many stakeholders provided inputs and feedback including IFC, the World Bank, MIGA, reputable international law firms, and private developers. A comprehensive due diligence has been carried out to ensure that the documents meet international standards and that the risk allocation was balanced and appropriate for a solar project in an average sub-Saharan African country. Risk mitigation instruments, such

⁷ These include Uganda Renewable Energy Development Program, Nigeria Electricity and Gas Improvement Project (P106172), Uganda Private Power Generation (Bujagali) Project (P089659), Indonesia Infrastructure Guarantee Fund Project (P118916), and the Kenya Private Sector Power Generation Support Project (P122671).

as guarantees, help enable renewable energy IPPs reach successful financial close, helping to avoid the failure of many renewable projects to reach closure in sub-Saharan African countries where risk mitigation measures were not applied. IDA guarantees are provided in support of financially viable projects with clear development objectives, where IDA participation reduces the risk perceived by the private sector.

57. Global and African experience with IPPs indicates that competitive and transparent procurement process is one of the most important factors in achieving cheaper prices and more sustainable power generation.⁸ The experience so far demonstrated that competitive procurement provides clear price advantages. One of the frequently used arguments against competitive procurement is more complex and expensive process. The Scaling Solar program is considered the right instrument as it addresses this challenge by providing comprehensive support, with readily available documentation and a suite of financing tools.

58. A strong commitment from governments and presence of a champion is needed to build a successful program and increase renewable energy generation. International experience shows that transition towards a sustainable energy path requires governments to create enabling environments, plan effectively, and establish clear rules for all participants. One institution, in this case IDC so far, needs to take the lead and coordinate with other relevant institutions. However, due to political dynamics and competing interests, such coordination may become difficult.

59. Preparation of projects in developing countries is at times delayed due to limited exposure and experience of governments and sector entities in undertaking guarantee operations. Additional workload that such operations entail further stretches the available capacity. The availability of experienced advisors addresses these capacity constraints. In this operation, IFC Advisory has played this role and supported IDC and ZESCO through the process.

60. Guarantees constitute an efficient and leveraged use of limited IDA resources in light of limited donor financing for infrastructure investments compared to the large investment needs. The proposed IDA payment guarantee of US\$3.5 million is offered by using an allocation of less than US\$1 million from Zambia's IDA country envelope. The proposed IDA guarantee operation will leverage approximately US\$60 million in investments from development finance institutions and private project sponsors.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

61. The project will be implemented by **Bangweulu Power Company Limited**, an SPV incorporated under the laws of Zambia. The company is co-owned by Neoen, First Solar (Neoen and First Solar jointly investing through Zambian Sunlight One SAS, incorporated in France), and IDC with 55 percent, 25 percent, and 20 percent shareholdings respectively. The SPV is responsible for designing, financing, developing, commissioning, operating and maintaining the proposed solar PV plant. The SPV has an agreed contractual relationship with reputable companies for Engineering, Procurement, and Construction (EPC) and Operation and Maintenance (O&M).

⁸ World Bank Group, Independent Power Projects in Sub-Saharan Africa, Lessons from Five Key Countries, 2016, ISBN 978-1-4648-0801-2.

MoF, IDC, and ZESCO will be parties to various agreements described below, providing the enabling environment for the Project Company.

62. For the proposed project, the roles and responsibilities of the **MoF**, Ministry of Energy (**MoE**), **IDC**, and **ZESCO** are as follows:

(c) **MoF** shall on behalf of GRZ enter into a GSA with the SPV (defining in particular GRZ commitment to support implementation and eventual termination payments), an Indemnity Agreement with IDA (by which MoF commits to reimburse IDA in case of a call on the guarantee), and a Direct Agreement with the lenders to the SPV (defining how the lenders can interact with GRZ).

(d) **MoE** shall provide policy direction to IDC and ZESCO on the procurement of solar PV generation capacity and the MoE Permanent Secretary is a member of the ZESCO Board of Directors.

(e) **IDC** is responsible for conducting, on behalf of GRZ and as directed by the MoE, the competitive procurement of the solar PV power plant, in addition to co-sponsoring and retaining 20 percent interest in the SPV. IDC has appointed IFC Advisory as transaction advisor.

(f) **ZESCO** has entered into a PPA with the Project Company and under the terms of the PPA will procure an LC in favor of the SPV. The PPA defines the conditions of purchase of electricity by ZESCO, including the LC as a security against potential default in the settlement of PPA invoices. ZESCO had relevant staff assigned to review and finalize agreements under Scaling Solar.

63. The figure below shows the project implementation structure, including agreements to be signed by IDA (see further information in Annex 7).



Figure 5: Project Contractual Structure

B. Results Monitoring and Evaluation

64. Monitoring of project outcomes and result indicators will be undertaken by the Project Company. The Project Company will be responsible for preparing and submitting progress reports to IDA as required under the IDA Project Agreement, as well as those reports and materials to IFC required under the IFC Loan Agreement. Annex 1 presents the results frameworks for the project.

C. Sustainability

65. Private project sponsors are responsible for the long-term, efficient operation of the power plant under the 25-year PPA. Technical sustainability is based on the requirement that the PV plant is to be designed, constructed, installed, and commissioned according to the technical specifications and requirements set in the PPA, including the appropriate requirements of the Grid Code, the Technical Limits, good engineering and construction practices, and Prudent Utility Practice. Maintenance of PV plants is relatively less complex than the construction, and with an international credible and experienced O&M contractor, the risks to maintenance are considered low.

66. The financial sustainability of the project is exposed to a substantial country and off-taker risk. ZESCO has established solid operational capacity but has relatively limited track record of successful contract performance with IPPs. To mitigate the consequences of the energy deficit crisis, GRZ provides substantial fiscal liquidity support to ZESCO to cover the pricing difference

of expensive emergency supply and import. The Scaling Solar project brings significantly lower cost electricity, creating fiscal incentives for GRZ to support and nurture this and similar projects.

67. The Scaling Solar initiative has demonstrated the benefit of following a competitive, transparent and well-structured procurement process in comparison to unsolicited negotiated deals. GRZ had entered into several Memoranda of Understanding for unsolicited proposals to construct solar PV power plants in Zambia. Given the unstructured nature of these proposals, negotiating PPAs had been a long process. Under Scaling Solar, after appointing IFC Advisory as transaction advisor, IDC was able to carry out a full procurement process in nine months. In May 2016, IDC opened the financial proposals, unveiling remarkably low tariffs, at that time lowest in the region.

68. Very low tariffs obtained under the Scaling Solar program demonstrated the effect of having proper security mechanisms in place. There were a few other contributing elements to the low tariffs, including the willingness of developers to take risks in entering a new and promising market and thus accepting lower returns and important concessions GRZ committed to provide to developers, such as quick land allocation and access to electricity evacuation infrastructure. The project will contribute to partially reducing the cost of electricity supply in Zambia and making the sector more creditworthy and sustainable in the longer run. By supporting the development of these solar PV projects, the Scaling Solar program will support the GRZ strategy and contribute to the sustainability and transparency in the sector. While the program is designed so that most components can be easily replicated, obtaining similarly low tariffs in future rounds in Zambia and in other sub-Saharan African countries using the Scaling Solar program will depend on a range of factors, including for instance cost of equity and debt, availability of concessional financing, land with favorable solar irradiance for developers and transmission power evacuation infrastructure.

69. The project alone represents a relatively small addition to the existing system generation capacity and only marginally hedges the Zambian power system from the risks presented by low rainfall conditions and climate variability in general. However, it is still an important step towards diversifying the generation mix as it demonstrates the feasibility of privately-financed grid connected PV plants that can be quickly developed and financed, contributing to lowering the costs of supply. As the proposed series progresses, a more meaningful contribution to energy diversification is expected to be made. The World Bank is discussing with GRZ potential options of supporting further scale up that may include the development of a least cost power expansion plan to determine the optimum generation mix for meeting energy demand in the short to medium term and beyond. It may then bring different solutions beyond solar that may be needed to address the energy deficit situation in Zambia.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

70. The overall risk of the project is substantial. The risks are considered high for 'Sector Strategies and Policies', and substantial for 'Political and Governance', and 'Institutional Capacity'. The WBG teams will monitor these during implementation.

71. **Macroeconomic.** Macroeconomic risks to the project are considered moderate, but such changes in Zambia can be sudden given strong dependence on the commodity driven mining

sector. Reduction of mining sector production has an immediate impact on electricity demand and therefore the revenues and overall financial state of ZESCO, especially given that most of the tariffs for mining companies are denominated in US dollars. An increasing share of ZESCO's costs are in hard currency (given emergency imports), while revenues from customers other than the mining sector are in local currency. Depreciation of the Kwacha would reduce revenues in USD terms and increase the deficit to cover the costs of power imports. These risks, if they materialize, may negatively impact the power generation by the project and, hence, the project development objectives.

72. Sector Strategies and Policies. One of the key sector risks relates to ZESCO's financial situation. While ZESCO's financial situation is expected to marginally improve as a result of the project given its low cost compared to the cost of importing electricity, the situation will remain fragile. The risk that tariffs are not adjusted as necessary is high, although GRZ has expressed willingness to target cost-recovery tariffs in the medium term. Furthermore, while the cost recovery tariffs are targeted in the medium term, GRZ will need to continue providing financial support to cover the gap between the cost of supply and average tariff. The GRZ's intention to move to cost-recovery tariffs is expected to be supported by development partners through a series of development policy operations currently under preparation. Political decisions, such as the import of expensive emergency power with ZESCO bearing some of the burden, and GRZ not bearing its share of burden, are also a risk to ZESCO's financial situation and ability to pay the Project Company. The World Bank is expected to scale up its involvement through its continuous sector dialogue, other IDA-financed energy sector projects, and the monitoring of ZESCO's financial situation during the implementation of this project.⁹ The WBG plans to carry out a comprehensive sector assessment that would contribute to the GRZ's thinking on sector reforms by identifying the principal challenges that the Zambian power sector faces and outlining forwardlooking policy alternatives for GRZ to consider. These will be complemented by a number of parallel activities that are planned to be carried out by development partners, primarily the IMF and AfDB. The WBG agreed to coordinate its suggestions in reforms with GRZ and these partners to ensure these are aligned to be supported by the AfDB-funded energy policy support operation to be delivered in FY17. The ongoing AfDB-financed Cost of Supply Study is expected to produce early results in mid-2017 and will serve as a basis for tariff reforms and the development of a Medium Term Tariff Policy.

73. **Political and Governance**. IDC is a new institution, which has recently become the shareholder of ZESCO. This is a new arrangement and the relationship between IDC and ZESCO is evolving. While the roles of the MoE, IDC, and ZESCO have been defined as policy maker, shareholder, and operator, respectively, there is still a lack of clarity on the boundaries of these roles. Adding a layer of uncertainty, in November 2016 the ZESCO Board of Directors was dissolved and IDC is expected to appoint the new board, which would facilitate high level decision making. In late 2015 and early 2016 there was also some ambiguity on how GRZ would carry out large-scale solar PV procurement. While IDC had in August 2015 retained IFC Advisory to support the procurement of solar PV generation under the Scaling Solar initiative and procure the first two solar PV power plants, the MoE in November 2015 launched its own process in parallel for the procurement of 150 MW of solar PV plants with minimum capacity of 10 MW per plant. The initiation of two parallel procurements aimed at achieving similar outcomes by two different

⁹ Customary financial reporting covenants will be included in the Cooperation Agreement with ZESCO.

GRZ agencies reflected a lack of coordination. This was however resolved in July 2016 when the MoE issued a statement clarifying that IDC would be responsible for large-scale solar PV procurement with an additional 160 MW under Round 2 of Scaling Solar. Meanwhile, MoE would procure a total of 50 MW under the Renewable Energy Feed in Tariff (REFit) program inspired by KfW's GETFiT program.

74. **Institutional Capacity.** Institutional capacity is low overall given the limited previous exposure of the counterparts to complex contractual IPP structures required for project financing. However, the Project Company led by private sponsors is responsible for most of the project once implementation begins. In addition, WBG support will be provided through normal implementation support, monitoring, and supervision. As GRZ develops the Round 2 projects, it is expected that IFC Advisory support will continue for Round 1 projects as well, which will be critical in successfully developing and implementing the projects.

75. Climate and Disaster Risks. The climate and disaster risk screening identified that exposure to climate and geophysical hazards in the project location are likely to be moderate and limited to precipitation and associated rainfall and low for elevated temperatures, droughts and strong winds. The proposed solar PV projects will work more efficiently in an environment with high daily sun (hours and high temperatures). Considering the Southern African region, including Lusaka, has been experiencing droughts, such natural phenomena will work in favor of the project as the daily hours of cloud cover will be low. Apart from periodic droughts, Lusaka like many parts of Zambia experiences above normal rainfall in some seasons resulting in floods in unplanned areas and settlements. Heavy rainfall from November to March is likely to result in reduced power output from the solar panels and the same is true for future projections. Other non-physical components, such as energy regulation and policies, are likely to slightly reduce impacts by ensuring proven best practices are adopted in the project. Furthermore, feasibility studies and power plant designs, including capacity building, will further reduce the risks to the project as climate adaptation will be incorporated in the project design. From a developmental perspective, increased urbanization and lack of access to technologies locally to expand or implement a stringent maintenance regime for the PV power plant may slightly increase climate risks as the demand for power is likely to increase, although such risks can be largely mitigated by having a capable O&M contractor managing the operations and maintenance through a long term O&M contract.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

76. Economic analysis confirms the economic viability of the proposed solar PV plant by Neoen/First Solar. The project is estimated to generate 94 GWh of electricity per year on average over the project life (25 years), and benefits of this power generation can be measured through partially avoided cost of emergency electricity imports at USc12.9/KWh.¹⁰ It is also expected that 0.98 tCO2/MWh of greenhouse gas (GHG) emissions will be avoided with the social cost of carbon valued at US\$30/tCO2. Under these assumptions, the net present value (NPV) of the project is

¹⁰ On average, the cost of the emergency electricity power import is USc12.9/KWh. This is a conservative proxy of the willingness to pay (WTP) as it is based on the actual cost of purchase which is lower than theoretical WTP.

US\$91.5 million, and the economic internal rate of return (EIRR) is 22.3 percent (18.8 percent without the cost of carbon). These figures demonstrate robust economic returns. Sensitivity analysis of project completion delay and the use of a conservative discount rate have been undertaken and confirm that the project will be economically viable in any of the scenarios. Details are in Annex 6.

77. Public sector financing for the IDA guarantee is appropriate for this project. IPP investments in sub-Saharan African countries often result in high tariffs due to perceived risk of non-payment by the power utilities. IDA's presence via a guarantee mitigates this risk, thereby attracting investors (all bidders requested the payment guarantee) and helping obtain low tariffs from reputable developers, showing the Bank's value added. The Bank is uniquely positioned to support this operation through the WBG Scaling Solar program.

78. The financial analysis confirms the financial benefits of the proposed project to Zambia's electricity sector and for ZESCO's financial performance. For the former, the analysis compared costs of power procurement by solar and emergency imports, and assessed the size of financial gain by the project. The result shows that the project's financial NPV will be US\$33.4 million higher than that of the emergency import.¹¹ Details are in Annex 6.

79. ZESCO's financial performance had been improving up to 2014, but it became more challenging in 2015 when the power crisis unfolded. As a result, profit before tax declined substantially in 2015. However, given that ZESCO's mining revenues are denominated in foreign currencies, ZESCO revenues kept growing due to the depreciation of the Zambian Kwacha. GRZ also supported ZESCO in the form of loan-equity conversion and emergency import subsidy. Under the base case scenario, ZESCO's financial position will remain weak through 2017 and is expected to recover from 2018 onwards assuming better hydrology, operation of the Maamba Collieries coal power plant and Scaling Solar plants, and gradual increase of the tariff. Under a dry hydrology scenario, additional GRZ support and/or further tariff increase would be needed. Currently, Zambia's tariff level is one of the lowest in sub-Saharan Africa along with Sudan and Ethiopia. This indicates Zambia's margin to increase the tariff, while maintaining the affordability of electricity.

B. Technical

80. WBG assistance will support the development of a grid connected solar PV power plant. An Energy Sector Management Assistance Program funded activity for solar resource mapping in the country shows that the daily average Global Horizontal Irradiation (GHI) ranged from $4.81 - 6.60 \text{ kWh/m}^2$. For Lusaka, the daily average GHI range was $4.96 - 6.44 \text{kWh/m}^2$.

81. The introduction of significant amounts of variable renewable energy (VRE), such as solar PV, into a grid network can present operational challenges. The threshold for VRE installed capacity is typically significantly higher for hydropower systems with storage, as is the case in Zambia. The dominance of hydro with fast ramp-up/down of generation offers a strong

¹¹ The reliance on emergency power is assumed to continue until the 750 MW Kafue Gorge Lower (KGL) hydropower comes online. The KGL may be commissioned in 2023 but it could be delayed since the project has been in the pipeline for decades. Therefore, 50 percent of probability has been assigned to KGL commissioning in 2023 and 2028, respectively.

complementarity with solar PV power. There is an ongoing study to analyze the impact of solar PV power plants on the ZESCO transmission system and to determine the maximum and optimum solar generation capacity that can be integrated in ZESCO system over the study period (up to year 2022), without introducing major transmission reinforcements. The study also includes identification of potential points on the grid where this capacity should be connected. This study is analyzing connection of utility-scale PV plants (typical size around 50 MW) connected at main high voltage transmission substations in ZESCO network. The initial conclusions of the study are that up to around 700 MW of utility-scale PV plants can be connected to the ZESCO network without the need for major system reinforcements in year 2019, and up to around 1,000 MW in year 2022. With Zambia's installed capacity of about 2,600 MW, the 47.5 MW of this project is far from getting close to that limit. While the study is yet to be fully discussed and commissioned, ZESCO's own quick assessment had indicated that up to 300 MW could be accommodated on its network without further investment for evacuation or system operations reasons.

82. The proposed site was selected based on three main considerations. Firstly, ZESCO identified six towns/cities (Chipata, Kabwe, Kitwe, Lusaka, Mkushi, and Mongu) across its network which, based on its own high-level assessment, had daily load profiles most suitable for solar PV supply. Based on this initial identification, IDC indicated availability of potentially suitable land at the selected site, which was confirmed by an assessment by IFC Advisory. In addition, the site is located next to a 150 MVA Lusaka South Multi-Facility Economic Zone substation currently under construction, which provides efficient means and substantially reducing the costs of evacuation of the generated power. Finally, a desk study has been carried out to examine potential yield for a standardized PV crystalline silicon power plant across the six sites identified by ZESCO. It concluded that the five alternative sites will not have substantially higher yields and remain within plus or minus four percent of the estimated yield for the Multi-Facility Economic Zone site at a P50 level of probability.

83. The central concept on the technical side of the procurement was to ensure that only highly experienced bidders would be prequalified and that they would be incentivized to maximize the energy yield of the plants. Furthermore, to guarantee that the plants would be of suitably high quality, a demanding set of technical requirements was developed to cover the key elements of the plants and the experience of the main contractors. The technical requirements were set out in the RFP and the technical schedules in the PPA, which were incorporated into the RFP by reference. These requirements ensure high quality and suitability for the prevailing conditions at the site, while avoiding being overly prescriptive to give prequalified bidders the flexibility to innovate and propose technical configurations that offer an optimized solution in terms of energy charge, i.e. that IDC considers energy charge minimization to be more important than contracted capacity maximization. Bidders were free to propose the Contracted Capacity they considered appropriate, subject to a minimum of 33 MWp and maximum of 55 MWp.

84. The project will utilize thin film PV modules as the chosen technology with fixed tilt mounting structure. The thin film PV panels is a mature and tested PV technology requiring relatively lower O&M resources. An Independent Engineer will be jointly appointed by the SPV and ZESCO to ensure prudent practices are applied and requirements are met. The PV plant will be operating under a standing dispatch instruction to deliver all electrical energy generated by the PV plant. ZESCO is responsible for providing the evacuation facilities at the Lusaka South Multi-

Facility Economic Zone substation with 33kV busbar and works are well underway. All 33kV busbars are rated so as not to cause any physical limits on the PV plant or the grid system. The 33kV Gen Board busbar can easily carry the PV plant at maximum power output. The circuit breakers and all other 33kV switchgear at the PV plant are to be manufactured to the same standard as the 33kV circuit breakers at the Lusaka South Multi-Facility Economic Zone substation. The system voltage at the point of connection to the grid under normal and fault condition can vary between 29.7kV and 36.3kV (plus or minus five percent) and the PV plant should remain connected at all times with no technical limitations within these voltage limits.

85. As required by the Zambia Grid Code, the SPV will, at its own expense, install, test, and commission the metering system at the delivery point, which further will be transferred to ZESCO. The metering system will include the main meter and check meter, which should be able to measure at least energy and power (both active and reactive), current and voltage (in three phases), frequency and total harmonic distortion (THD).

86. Subsequent projects would require further assessments to optimize site locations in order to increase yields while taking into account the availability of land and proximity to and capacity of the national grid. More detailed grid analysis shall need to be undertaken in order to determine the impact of additional VRE on the network and the investments that may be required in transmission capacity and/or controls, to ensure sustainability and efficient system operations.

C. Financial Management

87. Since the proposed project consists of an IDA guarantee, there are no disbursements anticipated. Hence the fiduciary role of ensuring that funds are used for intended purposes as in Investment Project Financing (IPF) is minimal. For the payment guarantees, ZESCO will be procuring an LC from a commercial bank and the payment guarantees will cover the LC repayment by GRZ and ZESCO to that commercial bank, in case of a draw on the LC. Bangweulu Power Company Limited, an SPV, will be the primary responsible party for managing the finances of the project. It will install and maintain adequate financial management systems, including the system of accounting, reporting, auditing, and internal controls, and relevantly qualified staff. The annual financial statements will be prepared in accordance with internationally accepted accounting principles. In addition, they will be audited in accordance with international auditing standards.

88. ZESCO has managed successfully various Bank-funded projects, including the Improved Access to Electricity Services Project (P077452), which closed in June 2015. Ongoing projects include the Lusaka Transmission and Distribution Rehabilitation Project (P133184), and the Regional Transmission Line Reinforcement Project (P124351), both with adequate financial management arrangements in place. Therefore, the residual financial management risk rating has been assessed as low.

D. Procurement

89. Given that the project is for an IDA guarantee and had a Project Concept Note review prior to July 1, 2016, Clause 3.18 "Procurement under Loans and Payment Obligations Guaranteed by

the Bank" of the Guidelines¹² and its principles of "economy and efficiency" apply. The goods and related works and or non-consulting services shall be procured with due attention to economy and efficiency in accordance with procedures which meet the requirements of paragraph 1.5 of the mentioned Bank guidelines. The project involves the identification and sourcing of solar PV power plant investors through a competitive process.

90. The project was procured as part of an open bidding process. IFC, a member of the WBG, through IFC Advisory division, was the transaction advisor to GRZ on this process and ensured high standards of transparency and competitiveness. The Bank team reviewed the bid documentation prepared and found that the competitive and transparent process, in addition to the low prices obtained, meet the economy and efficiency criteria. Annex 3 further describes the process followed.

E. Environment

91. The Performance Standards¹³ for environmental and social safeguards management were applied to the project. This is a Category B project according to IFC's Policy on Environmental and Social Sustainability. The proposed investment is expected to have limited environmental and social impacts, which are site-specific, temporary, and none is expected to be significant. Those impacts can be avoided or mitigated by adhering to applicable performance standards, procedures, guidelines, and design criteria. The categorization is consistent with categorization of other similar projects within this sub-sector. The main environmental, social, occupational health and safety risks identified for this project relate to the management of solid and liquid wastes, dust during construction, the capacity of the EPC/O&M contractor (Sterling & Wilson) to manage social, environmental, and safety performance and engage with project stakeholders; assurance fair, safe, and healthy working conditions for all workers during construction and operations; and management of community health and safety. The winning bidders will also finance a Community Development Plan. IFC and the World Bank will jointly monitor the application of Performance Standards.

92. During project preparation, five of the eight Performance Standards (PS) were confirmed to be applicable to the project. The two PS relevant to environmental aspects are: PS1 Assessment and Management of Environmental and Social Risks and Impacts and PS3 Resource Efficiency and Pollution Prevention. At the national level, the project falls within the 2nd Schedule of the Zambia Environmental Management Agency (ZEMA) EIA regulations of 1997, and accordingly IDC has developed an Environmental and Social Impact Assessment (ESIA)/Environmental and Social Management Plan (ESMP) and submitted it to ZEMA for approval before commencement of works, which in turn has been transferred to the Project Company. The Project Company will be responsible for compliance with and implementation of the ESIA and ESMP. ZEMA will disclose and issue an environmental approval (decision letter).

93. The construction phase will involve earth works and compaction and will result in loss of vegetation cover. The operation phase will have minimal environmental impacts, but the

 ¹² "Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers", dated January 2011 and revised in July 2014 under Section III other methods of procurement.
 ¹³ For IDA, OP/BP 4.03 World Bank Performance Standards for Private Sector Activities are applied to this guarantee project and will be relying on the environmental and social due diligence work carried out by IFC for this project.
maintenance and cleaning of solar panels and waste generated will require compliance with PS3. The cleaning of solar panels will be done with water and this requires the efficient utilization of the resource. The ESIA/ESMP has taken this into consideration to ensure that identified negative impacts are mitigated and the positive impacts are enhanced to ensure overall environmental and social benefits from the project. The details of the due diligence are described in Annex 3.

F. Social

94. The Performance Standards relevant to social aspects that are triggered are: PS1 -Assessment and Management of Environmental and Social Risks and Impacts, PS 2 - Labor and working conditions, PS 3 - Resource Efficiency and Pollution Prevention, PS 4 - Community Health, Safety, and Security, and PS 5 - Land Acquisition and Involuntary Resettlement. This is a Category B project according to IFC's Policy on Environmental and Social Sustainability. The proposed investment is expected to have limited impacts that are site-specific and temporary. Those impacts can be avoided or mitigated by adhering to applicable performance standards, procedures, guidelines, and design criteria. The due diligence also concluded that it is not feasible for the project sponsors to mitigate government managed resettlement impacts associated with the entire 2100 ha Lusaka South Multi-Facility Economic Zone (the Project site represents only 2.5 percent of this area) in which 24 local and international companies have been approved, and some have started to operate. As such, the company is committed to addressing impacts from the historic resettlement on a best efforts basis by offering community-level benefits such as improved social services, access to credit and/or livelihood improvement measures through a Community Development Plan (see further details in Annex 4).

95. The appraisal considered the environmental and social management planning process and documentation for the project and gaps, if any, between these and IFC's requirements. Where necessary, corrective measures, intended to close these gaps within a reasonable period of time, are identified. Through the implementation of these measures, the project is expected to be designed and operated in accordance with Performance Standards objectives. A complete Environmental and Social Review Summary (ESRS) with detailed action plan is reflected in Annex 4 and was disclosed on the WBG IFC website (https://disclosures.ifc.org/#/landing) on January 13, 2017 and, further, on January 25, 2017 on the World Bank website at http://documents.worldbank.org/curated/en/648331485322045501/Zambia-West-Lunga-Scaling-Solar-Energy-Project.

G. World Bank Grievance Redress

96. Communities and individuals who believe that they are adversely affected by a World Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's

corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

Annex 1a: IDA Results Framework and Monitoring

REPUBLIC OF ZAMBIA: West Lunga Scaling Solar Energy Project

				Data Collection and Reporting		Reporting
Project Outcome Indicators	Baseline	YR1	YR2	Frequency	Data Collection	Responsibility for
				and Reports	Instruments	Data Collection
Indicator I – Corporate Result Indicator Generation capacity of energy constructed (MW)	0	0	47.5	Semi-Annual	Quarterly Reports	IPP / ZESCO / IDC
Indicator 2 Number of solar PV plants constructed	0	0	1	Semi-Annual	Quarterly Reports	IPP / ZESCO / IDC
Indicator 3 Reduction of GHG emissions (tCO2)	0	0	97,000	Semi-Annual	Quarterly Reports	IPP / IDC
Indicator 4 Share of installed solar PV generation capacity (%).	0%	0%	1.7%	Semi-Annual	Quarterly Reports	IPP/ZESCO/IDC
Indicator 5 Private capital mobilized (US\$)	0	0	15	Semi-Annual	Quarterly Reports	IPP / IDC
Intermediate Outcome Indicators						
Solar energy generation capacity awarded (MW)	0	47.5	47.5	Semi-Annual	Quarterly Reports	IPP / ZESCO / IDC
Renewable energy generation capacity constructed – Solar (MW)	0	0	47.5	Semi-Annual	Quarterly Reports	IPP / ZESCO / IDC
Renewable energy generated annually (GWh)	0	0	100	Semi-Annual	Quarterly Reports	IPP / ZESCO / IDC
Physical implementation progress (%)	0	70%	100%	Semi-Annual	Quarterly Reports	IPP / IDC
Commissioning test completed (Y/N)	0	N	Y	Semi-Annual	Quarterly Reports	IPP / IDC

Annex 1b: IFC Development Impact Indicators REPUBLIC OF ZAMBIA: West Lunga Scaling Solar Energy Project

The project will track the following development impact indicators for the Project within IFC's DOTS system (Development Outcome Tracking System):

[Detailed	Impact Indicators	Target and Year
	Impact		
F ••••	Description		
Financial	Returns to all	Annual Return on	Annual US\$ ROIC to exceed Annual US\$
Performance	providers	(ROIC)	wacc over the file of the investment.
	Project	Project completion on	Project to be completed within budget of
	Completion	time and within budget	approximately US\$60 million which includes
	e emprenen		contingency allocations and additional
			completion support; to reach Commercial
			Operations within 1 year from Financial
			Close.
Economic	Returns to	Annual Economic	Annual US\$ EROIC to exceed annual US\$
Performance	capital	Return on Invested	WACC over the life of the Project.
	providers and to	Capital (EROIC)	
	Bower	GWh produced/war	04 GWh/year on average over the project life
	produced	O wii produced/year	(25 years) which corresponds to
	produced		approximately 72,205 residential individuals
			reached.
	Employees: Job	Construction jobs	• 200 jobs created (145 local) during
	creation	 Permanent operational 	construction (at peak) – subject to review of
		jobs	EPC Contractor staffing plan.
			• 45 incremental permanent jobs.
			expected (44 local) during the project
			operations phase (starting from
			review of $\Omega \& M$ Contractor staffing plan
E&S	Environmental	Occupational injury	• The plan is to maintain zero injuries.
Performance	Sustainability	frequency per million	• 97,000 tonnes CO2/year
		man-hours	Emissions avoided when operating.
		 Tonnes of CO2 	• Estimated water consumption of 20 to 25
		avoided	m3/day per day during construction and 15
		• Water consumption &	m3/week during operations.
D C			
Private Sector	Demonstration	the Zambia power	Several additional IPP developments are expected to be financed in Zambia benefiting
Development		market	from Scaling Solar's Round 1 contractual
		Emergence of	framework, process and project execution as a
		tendering processes for	reference point, including an anticipated
		PV projects in other	Scaling Solar Round 2 to follow the Project's
		countries in Sub-	successful construction and operation.
		Saharan Africa	Tendering process for PV projects in Senegal,
			Ethiopia to follow

Annex 2: Detailed Project Description REPUBLIC OF ZAMBIA: West Lunga Scaling Solar Energy Project

World Bank Group Scaling Solar Program

1. This project is the first based on a new WBG solution called Scaling Solar (<u>http://www.scalingsolar.org/</u>). Scaling Solar brings together a suite of WBG services and instruments under a single engagement aimed at creating viable markets for grid connected solar PV power plants. It is an open, competitive, and transparent approach that facilitates the rapid development of privately-owned, utility-scale solar PV projects in sub-Saharan Africa. It is capable of rapid implementation support, and offers a 'one-stop-shop' package of advisory services, contracts, financing, guarantees, and insurance. This enables governments and utilities to procure solar power transparently and at the lowest possible cost.

2. As part of Scaling Solar, the IFC drafted a set of template documents (mainly a PPA and GSA) in consultation with the World Bank and MIGA. The set of documents was designed to offer a fair and balanced risk allocation between the government and the private parties, and as such be bankable (unlike many other tentative renewable projects in sub-Saharan Africa), and directly implementable.¹⁴ The documents are designed to be final and not to be negotiated after award, providing substantial gain in time.

3. As part of Scaling Solar's original design, IFC Advisory supports governments in preparing a competitive and transparent solar auction based on template documents and processes. Based on the bid package, IFC Investment, World Bank, and MIGA provide term sheets for financing, guarantees, and political risk insurance, respectively. Bidders can decide to use none, a combination, or all of these WBG instruments. Bidders that pass the technical and financial criteria are then ranked based on the offered tariff. The figure below shows the Scaling Solar structure with the key entities and agreements.

¹⁴ IFC Advisory (representing the interests of governments) and IFC Investment (representing the interests of private parties) led the drafting with the assistance of reputable international law firms. They continued improving the drafting after collecting comments from various parties, including the World Bank Africa Energy and Financial Solutions teams, MIGA, private parties, and an independent review from two other reputable international legal firms. The World Bank carried out its own internal due diligence and also had its own independent review of the risk allocation by another reputable international legal firm. This gave the World Bank comfort that the PPA and GSA provide a fair and balanced risk allocation.



Figure 2.1: Scaling Solar Structure – Key Entities Involved and Agreements

*A Shareholder Agreement is needed if there is more than one investor (consortium). For clarity, the figure does not show all agreements.

4. The Scaling Solar target market has the following characteristics: (a) single-buyer electricity supply industry structure; (b) low credit quality off-takers; (c) governments with limited institutional capacity; and (d) nonexistent, limited, or poor track record with IPPs. Zambia exhibits some of these characteristics and is the first country in which the Scaling Solar solution is being applied with further deployment planned for Ethiopia, Madagascar, and Senegal. Solar PV is fast becoming competitive with the added advantage of swift roll-out and relatively long life. In the challenging markets that the program targets, the contractual framework is designed to address the single buyer context with appropriate risk allocation and appropriate government support to backstop credit risks. Standardized documentation makes it easier for governments to adopt the project framework and achieve speedy implementation. Scaling Solar aims to start delivering energy within a two-year timeframe from initial government engagement. The figure below shows the key steps and expected timeline for a Scaling Solar project.



Figure 2.2: Key Steps and Expected Timeline for Scaling Solar Project

5. **Zambia is the first country implementing the WBG Scaling Solar initiative globally**. Given the size of the investment required and the important role to be played by the private sector, leveraging the comparative advantages of the different parts of the WBG—including IFC Advisory and Investment Services and MIGA insurance—to attract private sector participation is critical. The WBG Scaling Solar initiative combines strengths and instruments from all entities.

Scaling Solar Round 1 in Zambia

6. Zambia's IDC and IFC Advisory signed a FASA on August 13, 2015 to develop two solar PV plants of up to 50 MW each using the Scaling Solar initiative. The Phase I site at the Multi-Facility Economic Zone (MFEZ) was selected based on three main considerations. Firstly, ZESCO identified six towns/cities (Chipata, Kabwe, Kitwe, Lusaka, Mkushi, and Mongu) across its network which, based on its own high-level assessment, had daily load profiles that were most suitable for solar PV supply. Based on this initial identification, IDC indicated its ready access to potentially suitable land at the MFEZ site. An assessment of the site conducted by IFC Advisory found it to be suitable and in addition, a 150 MVA substation currently under construction nearby, provides efficient means for evacuation of the power to be generated at the two plants. Lastly, IFC Advisory on behalf of the GRZ conducted a desktop study to examine the potential yield for a standardized PV crystalline silicon power plant across the six sites identified by ZESCO. This showed that the five other alternative sites will not have substantially higher yields and remain within plus or minus four percent of the estimated yield for the MFEZ site at a P50 level of probability.

7. IDC, supported by IFC Advisory, carried out the initial pre-feasibility work on the first two plants, tendered them out to select private sector developers, using the open and competitive procurement process that forms the basis of Scaling Solar. Forty-eight companies submitted a Request for Qualification including many international reputable firms. Of these, IDC pre-

qualified eleven¹⁵. Seven finally submitted offers and the lowest price offered was US¢6.015/kWh (fixed over 25 years). IDC awarded the bid in May 2016, only nine months after the mandate signature. The figure below shows the timeline.



From Aug 2015

Studies including technical, legal, and regulatory

8. The two winning bidders are (i) a consortium of Neoen/First Solar (US¢6.015/kWh, the lowest tariff for solar energy in sub-Saharan Africa to date; and (ii) Enel Green Power (US¢7.839/kWh).

¹⁵ EDF Energie Nouvelle, Scatec Solar, Access Eren, Mulilo Zambia Consortium, Enel Green Power, Globeleq, Engie, Neoen/First Solar, Shanghai Electric Power Avic, Consortium of Africa Infrastructure Fund/Old Mutual/Cobra, and Grupo T-Solar.



Figure 2.4: Comparison of Tariff and Time to Market in Solar PV in sub-Saharan Africa (data as of January 2017)

Sub-Saharan Solar PV: Comparisons of Tariff and Time to Market

Note: Time to market for South Africa's Renewable Energy Independent Power Producer Procurement Program Round 4 (South Africa R4 above) considers cumulative time elapsed from start of procurement for Round 1 of the same program (South Africa R1 above).

Project Summary

9. The project presented for Bank and IFC's approval through this PAD consists of the development, financing, construction, operation, and maintenance of a new 47.5 MW AC (approximately 55 MWp) solar PV plant located in the Lusaka South Multi-Facility Economic Zone, 20 kilometers south of Lusaka, Zambia (the "West Lunga Project" or the "Neoen/First solar project"). The electricity generated from the project will be sold to the Zambian utility company ZESCO through a 25 year PPA.

The project is sponsored by Neoen SAS of France ("Neoen"), First Solar of USA ("First 10. Solar"), and IDC of Zambia. Neoen is a leading French developer specializing in the development, financing, construction, and operation of renewable energy projects. Since its inception in 2008, Neoen has financed 864 MW of renewable energy power projects (solar, wind, biomass) across Africa, Europe, and Latin America. Solar represents the largest proportion of Neoen's existing portfolio with 431 MW of projects in operation and 102 MW under construction. First Solar is a leading PV manufacturer in the United States of America (USA) and a provider of supporting services (finance, construction, operation, maintenance, and end-of-life panel recycling) to utilityscale PV power plants. First Solar has developed, financed, engineered, constructed and currently operates many of the world's largest grid-connected PV power plants. First Solar is publicly listed and traded on NASDAQ.

11. Neoen/First Solar – through their common holding Zambian Sunlight One, SAS – signed their Shareholder Agreement with IDC on November 4, 2016, establishing the Project Company called Bangweulu Power Company Limited, as a special purpose vehicle incorporated in Zambia. The company is co-owned by Neoen, First Solar and IDC with 55 percent, 25 percent, and 20 percent shareholding, respectively. The project expects to reach financial close in April 2017.

World Bank Group Instruments

12. The project will be supported by several WBG instruments in favor of the project company, Bangweulu Power Company Limited. This includes an IDA guarantee of up to US\$3.5 million, an IFC A-Loan and Blended Finance Loan both of up to US\$15 million, and one or more USD interest rate swaps covering a notional amount representing up to 100 percent of the total debt to the Project Company. IFC Investment has signed a mandate with Neoen, the lead sponsor, to act as the Mandated Lead Arranger for the project's financing. For this first project, MIGA political risk insurance has not been requested.

IDA Guarantee

13. The proposed IDA guarantee for the Neoen/First Solar project consists of a payment guarantee of up to US\$3.5 million. The payment guarantee will backstop the security mechanism (i.e., Letter of Credit) in case of a draw that GRZ or ZESCO have not reimbursed after 12 months. ZESCO is in the process of selecting an LC bank through a transparent and competitive process. The indicative terms and conditions of the IDA guarantee are included in Annex 7 (*IDA Payment Guarantee Term Sheet*).

14. ZESCO prepared an RFP and (with support from the Bank team and legal counsel) and LC documentation, and launched a competitive process to recruit the LC bank that will provide the LC to the two first winning bidders. The RFP was sent to about 10 reputable commercial banks and ZESCO issued the final version on November 28, 2016. Following the bids submissions, ZESCO is evaluating and selecting one LC bank. The IDA payment guarantee will backstop the LC bank in case of a draw that GRZ or ZESCO have not reimbursed after 12 months.

IFC Investments

15. The proposed IFC investment consists of (i) an A Loan of up to US\$15 million to the Project Company; (ii) a senior loan of up to US\$15 million to the Project Company from IFC acting as implementing entity of the IFC-Canada Climate Change Program; and (iii) one or more USD interest rate swaps to hedge the interest rate risk in respect of the senior debt comprising the Project financing in a notional amount of up to US\$45 million. These interest swaps would represent a Loan Equivalent Exposure (LEQ) to the Project Company of up to US\$3 million.

IFC Economic Capital

16. The economic capital exposure for the proposed IFC investment is up to US\$3.6 million. IFC economic capital exposure in Zambia as of November 30th, 2016 was US\$32 million. As of November 2016, IFC's nominal exposure to the sponsors was limited to First Solar with US\$42 million.

Project Costs and Financing

17. The project is to be financed on a limited recourse basis with a maximum debt to equity ratio of 75:25. The sponsors will provide at least US\$15 million in equity/equity-like instruments in Bangweulu Power Company Limited. The Overseas Private Investment Corporation (OPIC) will provide the rest of the debt in volume equal to IFC's A Loan. The table below reflects indicative project costs, financing structure, and IDA guarantee for the Neoen/First Solar project.

Solar Power Plant Size	47.5 MW
Estimated Project Cost	60
Estimated Equity @ 25%	15
Estimated Debt @ 75%	45
of which Development Finance Institutions	45
of which Commercial Borrowing	-
Estimated Private Capital Mobilized	15
Estimated Payment Guarantee	3.5
Estimated Loan Guarantee	-
Estimated Total Guarantee Provided	3.5

Table 2.1. Indicative Project Costs,	s, Financing Structure, and IDA Guarantee	s (US\$
	Million)	

Expected Future Scaling Solar Projects in Zambia (for information purpose)

18. As stated above, GRZ intends to continue scaling up solar generation capacity in Zambia utilizing the Scaling Solar initiative. GRZ has so far approved procurement of up to 250 MW for procurement or large scale solar plants through IDC. Using the WBG Scaling Solar program, IDC in Round 1 has already awarded 47.5 MW to Neoen/First Solar and 28.2 MW to Enel. The payment guarantee for the second project of Round 1 with Enel will be presented to the Board when the project has been appraised. The WBG also intends¹⁶ to support other Scaling Solar projects in Zambia in future rounds if IDA payment and/or loan guarantees, IFC financing, or MIGA guarantees are requested by GRZ, private sponsors and commercial lenders. As these projects are developed and appraised, they would be presented separately to the Board on an absence of objection basis.

19. The second project of Round 1 by Enel Green Power will consist of the development, financing, construction, operation, and maintenance of a new 28.2 MW solar PV located in the Lusaka South MFEZ next to the Neoen/First Solar project. The electricity generated from the project will also be sold to ZESCO through a 25 year PPA.

20. Enel S.p.A. is Italy's largest power company and Europe's second largest utility by capacity with over 90 GW installed. The company is an integrated player, active in the power and gas sectors and owns one of the world's largest portfolios of Renewable Energy assets through its renewables division and former subsidiary EGP (merger and delisting took place at end of March

¹⁶ Subject to requisite internal management and Board approvals.

2016). The Italian state retains 25 percent ownership in Enel, which saw sales of US\$73.1 billion in 2015 with EBITDA of US\$12.9 billion and Debt:Equity of under 1.5:1. Enel Green Power (EGP) was formed in 2008 as a result of the spin-off of Enel's renewable energy assets. EGP has now rejoined Enel through a strategic restructuring in which EGP has been delisted and restored to Enel full ownership. At the end of 2015, EGP had over 10GW of installed capacity worldwide with a trending focus on emerging markets. EGP joins Enel's wider portfolio of conventional RE assets (e.g. large hydro) that together compose some 41 percent of the group's total installed capacity.

21. EGP and IDC signed their Shareholder Agreement on November 11, 2016. However, the project requires additional time and will be presented for approval to the Board separately, once fully appraised.

22. Scaling Solar Round 2. GRZ has announced the extension of the Scaling Solar process for a Round 2 (capacity expected to be approximately 160 MW). ZESCO also has a longer term plan to procure 600 MW of utility scale solar PV plants. GRZ and IFC Advisory are finalizing a mandate for Round 2. The table below shows indicative project costs, financing structure, IDA guarantees for the current project proposed for approval (Neoen/First solar), and other future projects

	Round 1 (Enel)	Round 2
Solar Power Plant Size	28.2 MW	≈160 MW
Estimated Project Cost	40	230
Estimated Equity @ 25%	10	58
Estimated Debt @ 75%	30	173
of which Development Finance Institutions	30	115
of which Commercial Borrowing	-	58
Estimated Private Capital Mobilized	10	115
Estimated Payment Guarantee	3.0	15
Estimated Loan Guarantee	-	58
Estimated Total Guarantee Provided	3.0	72

Table 2.2. Indicative Costs, Financing Structures, and IDA Guarantees for PotentialFuture Projects (US\$ Million)

23. **IDA Guarantees offered in Scaling Solar**. In Scaling Solar, the World Bank offers IDA payment guarantees and loan guarantees. For Round 1, IDA term sheets were prepared on the basis of the PPA and Government Support Agreement (GSA) produced by IFC Advisory and IDC and were stapled to the Request for Proposal (RFP) (see Annex 7), alongside the IFC financing and MIGA insurance offers. In future rounds, IDA expects to also offer both options:

(a) **IDA Payment Guarantees.** Under the PPA, ZESCO is required to provide payment security of an amount equivalent to six months of the IPP's revenues. The security could be either via an escrow account or via a Letter of Credit (LC). GRZ has expressed preference for the LC option given its lower commitment of capital and lower costs. To help ZESCO provide such security, GRZ has requested IDA to provide payment

guarantees. Without IDA guarantees, ZESCO would not be able to find long term LCs and many sponsors and lenders, both Development Finance Institutions (DFIs) and commercial banks, would not be willing to participate. The IDA guarantee also reduces the cost to ZESCO of procuring these LCs and avoid the requirement for ZESCO to post a cash collateral. All the bidders who submitted an offer under Round 1 requested an IDA payment guarantee.

(b) **IDA Loan Guarantees.** The loan guarantees are offered to commercial banks that would extend debt finance to the solar IPPs. This would leverage more private capital in Zambia and reduce IFC's (Investment) exposure to each power plant. Through the loan guarantee, the World Bank would backstop the IPP repayment risks to the commercial bank in case of the GRZ or ZESCO failing to meet their obligations. As a result, the commercial banks would be incentivized to lend to the project, provide longer tenors, and lower interest rates given the improved credit risk rating. As the first PV plants are developed and ZESCO demonstrates satisfactory performance as the electricity offtaker, IPPs are likely to finance the projects through more commercial debt that may require loan guarantee support. For Round 1, no bidder requested an IDA loan guarantee.

Private Sector Participation in the Power sector

24. Private sector investment and operation is allowed in the Zambia power sector, following the liberalization of the electricity supply industry in 1995. The largest private enterprise in the country's power sector is the Copperbelt Energy Corporation (CEC), a transmission and distribution company that supplies electricity to mining operations on the Copperbelt Province (mining operations in the remainder of the country are supplied directly by ZESCO). The electricity supply industry also includes IPPs that account for 14 percent of installed generation capacity (see table below).

Plant	Primary Fuel	Installed Capacity (MW)
ZESCO		
Kafue Gorge		1080
Kariba North Bank		720
Victoria Falls	Hydro	108
Kariba North Bank Extension		360
Mini-hydros		39
Total ZESCO		2,307
Independent Power Producers		
Lunsemfwa Hydropower Corp.	Hydro	56
Ndola Energy Company	Heavy Fuel Oil	50
Itezhi – Tezhi Power Company	Hydro	120
Maamba Collieries Limited	Coal	150*
Total IPPs		376
Country Total		2,683

 Table 2.3. Installed Generation Capacity

*Note: Maamba Collieries is currently operational at an installed capacity of 150MW, with a further 150MW expected to reach Commercial Operation Date in 2017

25. The project alone represents a relatively small addition to the existing system generation capacity and only marginally hedges the Zambian power system from the risks presented by low rainfall conditions and climate variability in general. However, it is still an important step towards diversifying the generation mix as it demonstrates the feasibility of privately-financed grid connected PV plants that can be quickly developed and financed, contributing to lowering the costs of supply. As the proposed series progresses, a more meaningful contribution to energy diversification is expected to be made. The World Bank is discussing with GRZ potential options of supporting further scale up that may include the development of a least cost power expansion plan to determine the optimum generation mix for meeting energy demand in the short to medium term and beyond. It may then bring different solutions beyond solar that may be needed to address the energy deficit situation in Zambia.

Annex 3: Implementation Arrangements

REPUBLIC OF ZAMBIA: West Lunga Scaling Solar Energy Project

Project Institutional and Implementation Arrangements

1. The project will be implemented by a private Project Company called **Bangweulu Power Company Limited**, an SPV incorporated in Zambia. The company is co-owned by Neoen, First Solar, and IDC with 55 percent, 25 percent, and 20 percent shareholding, respectively. The SPV will be responsible for designing, financing, developing, commissioning, and the operation and maintenance of the proposed plant. IDC and the state owned utility, ZESCO, will be parties to various agreements, providing the enabling environment for the Project Company.

2. IDC, incorporated in 2014, is an investment company wholly owned by GRZ through shareholding held by the MoF. IDC was established to provide strengthened operational oversight of GRZ's state-owned enterprise portfolio and by so doing allow government line ministries to focus on policy development and implementation. Consequently, in August 2015 MoF transferred its shareholding in ZESCO to IDC. For the power sector, the MoE is responsible for policy and in July 2016 issued a directive that in the medium term all grid-scale solar PV, outside a separate program supporting the development of up-to 50 MW of renewable energy capacity, would be competitively procured by the IDC with MoE support using Scaling Solar. While IDC does not have experience in the competitive procurement of power generation or the implementation of World Bank financed projects, the company has appointed IFC Advisory as transaction advisor to provide support in accordance with Scaling Solar. Furthermore, relevant staff in ZESCO have been assigned to review and finalize the necessary agreements.

3. For the proposed project, the roles and responsibilities of **MoF**, **MoE**, **IDC**, and **ZESCO** are as follows: (i) **MoF** shall on behalf of GRZ enter into a GSA with the SPV, Bangweulu Power Company Limited, an Indemnity Agreement with IDA, and a Direct Agreement with the lenders to the SPV; (ii) **MoE** shall provide policy direction to **IDC** and **ZESCO** on the procurement of solar PV generation capacity and the **MoE** Permanent Secretary is a member of the **ZESCO** Board of Directors; (iii) **IDC** is responsible for conducting, on behalf of GRZ and as directed by the MoE, the competitive procurement of the solar PV power plant. In addition, **IDC** is co-sponsor and will retain 20 percent interest in the SPV; and **ZESCO** shall enter into a PPA with the SPV and procure an LC in favor of the SPV as security against potential default in the settlement of PPA invoices.

4. The figure below shows the project implementation structure, including IDC and ZESCO's roles. It also shows the key agreements to be signed by the World Bank (see further information in the term sheets in Annex 7):

(a) Indemnity Agreement between GRZ (through the MoF) and IDA;

(b) Project Agreement between the Project Company and IDA;

(c) Guarantee Agreement between the LC bank to be selected and IDA;

(d) Reimbursement and Credit Agreement among the LC Bank to be selected, ZESCO, and GRZ (through the MoF); and

(e) Cooperation Agreement between ZESCO and IDA.



Figure 3.1. Project Implementation Structure

Financial Management, Disbursements and Procurement

Financial Management

5. As the proposed project is an IDA guarantee no disbursements are anticipated, hence the fiduciary role of ensuring that funds are used for intended purposes as in investment lending operations is minimal. Bangweulu Power Company Limited will be the primary responsible party for managing the finances of the project. It will install and maintain adequate financial management systems, including the system of accounting, reporting, auditing, and internal controls, and relevantly qualified staff. The annual financial statements will be prepared in accordance with internationally accepted accounting principles. In addition, they will be audited in accordance with international auditing standards.

6. ZESCO will be procuring an LC from a commercial bank and an IDA guarantee will cover the LC repayment by GRZ and ZESCO to that commercial bank, in case the LC is drawn. Hence, Financial Management arrangements of ZESCO have been reviewed. ZESCO has managed various projects, including the Increased Access to Electricity Supply Project that closed in June 2015 and two ongoing projects, the Lusaka Transmission and Distribution Rehabilitation Project and the Regional Transmission Line Reinforcement Project, all with adequate financial management arrangements in place. The main strengths are that ZESCO has adequate and qualified staff to carry out the project's accounting functions; and there are adequate arrangements for audit oversight by independent external and internal auditors.

7. ZESCO's financial management system strength can be summarized as follows:

a) ZESCO has adequately qualified and experienced accounting personnel, most of whom have been trained in World Bank financial management guidelines;

b) ZESCO has budgeting arrangements in place to monitor its budget, so that variances between actual and budgeted amounts are explained, and steps are taken to correct adverse variances;

c) ZESCO has an Internal Audit unit that has qualified and experienced Internal Auditors;

d) There are adequate arrangements for audit oversight by independent external auditors; and these are significant financial management strengths for the project; and

e) ZESCO has adequate accounting software (Sun system) to ensure timely and accurate reporting. There is also a Financial Management Manual that guides management in day-to-day financial management operations.

8. The weakness is that although ZESCO is a limited liability company, it is a governmentowned institution as its holding company, IDC is wholly-owned by the GRZ, therefore there can be government interference in financial management of ZESCO. The overall conclusion of the financial management assessment is that ZESCO, which will be the implementing entity, satisfies the Bank's OP/BP 10.00 financial management minimum requirements. The residual financial management risk rating has been assessed as low.

Disbursements

9. Since the proposed project consists of an IDA payment guarantee, there are no disbursements anticipated. Hence, the fiduciary role of ensuring that funds are used for intended purposes is minimal. However, for the guarantee supporting the payment guarantees/LCs to be issued on behalf of ZESCO, ZESCO will be opening a LC facility with a commercial bank and an IDA payment guarantee will cover the LC repayment by GRZ and ZESCO to that commercial bank, in case of an LC draw.

Procurement

10. Given that the project is for an IDA guarantee and had a Project Concept Note review prior to July 1, 2016, Clause 3.18 "Procurement under Loans and Payment Obligations Guaranteed by the Bank" of the Guidelines¹⁷ and its principles of "economy and efficiency" apply. The goods and related works and or non-consulting services shall be procured with due attention to economy and efficiency in accordance with procedures which meet the requirements of paragraph 1.5 of the mentioned World Bank guidelines. The project involves the identification and sourcing of solar PV power plant investors through a competitive process. The project was procured as part of an

¹⁷ "Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers", dated January 2011 and revised in July 2014 under Section III other methods of procurement.

open bidding process. The World Bank team reviewed the bid documentation prepared and found that the competitive and transparent process, in addition to the low prices obtained, meet the economy and efficiency criteria.

11. IFC Advisory, a member of the WBG, was the transaction advisor to GRZ on this process and ensured high standards of transparency and competitiveness. The Request for Qualifications was published widely in October 2015, with clear selection criteria, and IFC Advisory responded to potential bidders' questions in a transparent manner. Of the 48 firms that responded, IDC, with support from IFC Advisory, selected 11 in November 2015. On February 15, 2016, IDC issued the Request for Proposals (RFP) with clear selection criteria and attached documentation (PPA, GSA, and Shareholders Agreement). The World Bank team reviewed all documents before the issuance in particular to ensure adherence to the World Bank's policies and principles of economy and efficiency. IDC and IFC Advisory organized a bidders' conference and allowed bidders to submit questions or proposed changes to the documentation. Responses were shared with all bidders along with the final revised documents. Seven bidders submitted final offers. On May 27, 2016, IDC opened the financial proposals and in early June, following a review period of ten working days as per Zambian regulations, awarded the projects to the two lowest bidders who had met the technical and financial criteria. This process meets the economy and efficiency criteria.

12. The capacity of the IDC itself to carry out this sort of procurement is reinforced by the fact that ZESCO, the subsidiary of the IDC, was involved. ZESCO has in recent years implemented three Bank funded projects (one project closed in 2015 and two ongoing projects). For these projects, the Bank carried out a Procurement Risk Assessment and identified Risk Mitigation of ZESCO's capacity to implement procurement under Bank funded projects. The risk was identified as moderate as ZESCO has many suitably qualified and experienced procurement staff.

Monitoring and Evaluation

13. The SPV will be responsible for project progress and overall monitoring of project outcomes and results indicators. Data for monitoring will be shared by the SPV through regular progress reports to IDC and ZESCO. IDA will monitor and supervise through the submission of reports by the SPV under the Project Agreement and the submission of relevant reports by IDC and ZESCO under the Cooperation Agreement with ZESCO as well as through field visits when required. Annex 1 presents the project's results framework that defines specific outcomes and results to be monitored under this project.

14. Evaluation of results indicators will be part of regular Bank supervision missions. The midterm review will thoroughly review project implementation and the indicators. The guarantees will be monitored through regular supervision until closing date and then via corporate monitoring until the expiry of the guarantee. In addition, there will be notification and reporting requirements by the SPV, the LC Bank, ZESCO, and GRZ, respectively, under the Project Agreement, Guarantee Agreement, and Indemnity Agreement. For example, the LC bank will have to report a draw under the letter of credit. This will allow the World Bank to know when issues arise related to the project and to intervene adequately early on.

Role of Partners

15. The European Commission's Directorate General for International Cooperation and Development (DG DEVCO) covered the costs of the legal and technical consultants procured by IDC with the support of IFC Advisory. The Ministry of Foreign Affairs of the Government of the Netherlands through the Netherlands – IFC Partnership Program covered IFC Advisory staff costs and travel plus the costs related to other consultants (e.g., tax and insurance). The United States Agency for International Development through their Power Africa initiative covered the cost of the success fee payable to IFC Advisory by the successful developer/IDC. This payment represented a de facto capex contribution to the project. Debt financing for the Project will include a concessional senior loan from IFC acting as implementing entity of the IFC-Canada Climate Change Program (IFC-CCCP). IFC-CCCP is funded by a CN\$291.55 million contribution from the Government of Canada, as part of Canada's FY2010 CN\$400 million commitment under the Copenhagen Accord. The IFC-CCCP loan is managed by the IFC Blended Finance Department in collaboration with the IFC Investment Services team managing the comprehensive financing package. Inclusion of the IFC-CCCP loan within the IFC stapled finance offering at the bidding stage of the auction enabled a lower tariff and hence improved affordability of power for end-users in Zambia.

Annex 4: Environmental and Social Review Summary REPUBLIC OF ZAMBIA: West Lunga Scaling Solar Energy Project

This Environmental and Social Review Summary (ESRS) is prepared and distributed in advance of the World Bank and IFC Joint Board of Directors' consideration of the proposed transaction. Its purpose is to enhance the transparency of WBG's activities, and this document should not be construed as presuming the outcome of the Board of Director's decision. Board dates are estimates only. Any documentation which is attached to this ESRS has been prepared by the project sponsor and authorization has been given for public release. The ESRS was disclosed on the WBG IFC website (<u>https://disclosures.ifc.org/#/landing</u>) on January 13, 2017.

Project Description:

As part of the World Bank Group (WBG) Scaling Solar program, Neoen SAS in consortium with First Solar ("the Sponsors") has been awarded the contract to finance, construct and operate a 55 MWp solar photovoltaic (PV) power plant ("the project") at the Lusaka South Multi-Facility Economic Zone (LS-MFEZ) in Zambia. The Sponsors incorporated together with IDC (the Industrial Development Corporation, an investment company owned by the Government of the Republic of Zambia) a special purpose vehicle dedicated to the project ("the Company", or "Bangweulu Power Company Limited"). Neoen, the main sponsor of the project, is an independent power producer, generating electricity from renewable sources (solar, wind or biomass). Neoen develops, finances, builds and operates power plants and is active in France, Portugal, Australia, Mexico, Egypt, Mozambique, Jamaica, Zambia, Jordan and El Salvador. With a current operating base of 759 MW, Neoen seeks to achieve installed power of over 1,000MW by 2017. The Zambia PV power plant to be built under the WBG's Scaling Solar program will operate on a 25 year Power Purchase Agreement (PPA) signed with ZESCO, the integrated electricity utility company of Zambia. The total project cost is estimated at US\$60 million. The World Bank (WB) is providing a payment guarantee and IFC's proposed investment consists of an A loan of up to \$15 million.

The power plant covering a maximum footprint area of about 52 hectares will require about 460,000 thin film modules from First Solar and 12 transformers. The proposed PV system will be connected to the grid and the electrical energy will be evacuated through the Lusaka South MFEZ substation, via a 33kV underground cable. The underground cable will be financed, implemented and commissioned by the company, and then handed over to ZESCO.

The project site is situated within the LS MFEZ about 15 km to the South and East of the Lusaka Central Business District. The site is bordered by the Lusaka National Park to the South and some agricultural holdings to the East.

The company has assigned Sterling & Wilson as the engineering, procurement and construction (EPC) contractor as well as the operations and maintenance (O&M) contractor. The construction phase is expected to take eight months; commissioning is expected to be in November 2017 with plant take-over expected in December 2017. In order to be flexible on the planning and to accommodate changes in the project schedules, the notice to proceed with the works (NTP) date is used as a timing reference.

Overview of WB and IFC's Scope of Review:

WB and IFC's review included the following activities: (i) site visits in April, August and September 2016; (ii) review of available project documents and environmental assessment reports and Neoen's Health, Safety Environmental Management Plan (HSEMP); (iii) review of Mphande socio-economic survey reports; (iv) meetings with key officers of Neoen, the Zambian Industrial Development Corporation (IDC) and the Zambia Disaster Management and Mitigation Unit (DMMU) as well as members of the affected communities and the local administrative authorities – Acting District Commissioner and Permanent Secretary of the Kafue District.

Identified Applicable Performance Standards:

While all Performance Standards are applicable to this investment, WB and IFC's environmental and social due diligence indicates that the investment will have impacts, which must be managed in a manner consistent with the following Performance Standards:

- PS 1 Assessment and Management of Environmental and Social Risks and Impacts
- PS 2 Labor and working conditions
- PS 3 Resource Efficiency and Pollution Prevention
- PS 4 Community Health, Safety and Security
- PS 5 Land Acquisition & Involuntary Resettlement

PS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources is not considered applicable for this project as the area has been modified through agricultural use and other human activities and the biodiversity assessment undertaken reports that no flora or fauna of conservation value were identified in the project area.

PS7 - Indigenous Peoples and PS8 - Cultural Heritage have also not been identified as being applicable to this project as there are no known groups of indigenous persons in the project area and no items of cultural heritage were suspected or identified in the project area.

If WB guarantee and/or IFC's investment proceeds, WB and/or IFC will periodically review the project's ongoing compliance with the Performance Standards.

Environmental and Social Categorization and Rationale:

This is a Category B project according to IFC's Policy on Environmental and Social Sustainability. The proposed investment is expected to have limited environmental and social impacts, which are site-specific, temporary and none is expected to be significant. Those impacts can be avoided or mitigated by adhering to applicable performance standards, procedures, guidelines and design criteria as described in the following sections. This categorization is consistent with categorization of other similar projects within this sub-sector.

The main environmental, social, occupational health and safety risks identified for this project

relate to the management of solid and liquid wastes; dust during construction, the capacity of the EPC/O&M contractor (Sterling & Wilson) to manage their social, environmental and safety performance and engage with project stakeholders; assurance of fair, safe and healthy working conditions for all workers during construction and operations; and management of community health and safety.

Environmental and Social Mitigation Measures

WB and IFC's appraisal considered the environmental and social management planning process and documentation for the project and gaps, if any, between these and WBG requirements. Where necessary, corrective measures, intended to close these gaps within a reasonable period of time, are summarized in the paragraphs that follow and (if applicable) in an agreed Environmental and Social Action Plan (ESAP). Through the implementation of these measures, the project is expected to be designed and operated in accordance with the Performance Standards objectives.

PS 1 - Assessment and Management of Environmental and Social Risks and Impacts

WB and IFC's assessment considered documentation of Neoen's management of its environmental, safety and health performance; compliance with Zambian permitting requirements; and stakeholder engagement and disclosure of information about the project and its operations.

Environmental and Social Assessment and Management System: As this is a greenfield project, the Company currently has no specific ESMS in place for the construction or operation of the project. For its international operations, the company has a generic ESMS, which the EPC contractor for each specific project will review, update, and adopt for the project. Aspects related to the identification and management of environmental and social impacts are described in the paragraphs below. In order to manage the environmental and social risks, and impacts associated with the construction and operation of the project, as indicated in ESAP action item 1, Sterling & Wilson, as the EPC and O&M contractor, will develop and implement an ESMS suitable to the scale of the project and which meets the requirements of applicable Zambian laws and WB and IFC Performance Standards. The ESMS will include policies, plans, manuals and procedures aligned with ISO 14001. The ESMS will incorporate the Environmental Management Plan (EMP) developed for the project as well as the aspects related to construction covered in the WBG General Environmental Health and Safety (EHS) Guidelines.

<u>Policy</u>: Neoen has corporate Health, Safety and Environment Policy, which describe the company's commitment to the protection of the environment and people and the safety of its employees. The policy requires compliance with applicable laws and relevant health, safety, and environmental standards. The corporate policy applies to all aspects of its operations – construction, operation and maintenance; and is communicated to employees and other stakeholders.

<u>Identification of Risks and Impacts</u>: In line with the Zambian environmental regulations, an Environmental and Social Impact Assessment (ESIA) was conducted for the project as required by the Zambian Environmental Management Agency (ZEMA). An EMP was prepared alongside the ESIA and submitted to ZEMA for an environmental authorization. The ESIA was conducted

by Knight Piesold Consulting and ZEMA is currently reviewing the ESIA reports. It is noted that although the environmental authorization has not been issued yet, the ESIA covered the relevant local environmental and social regulations and the key aspects of the WBG Performance Standards relevant to the project. The ESIA covered the project design, construction, operations and decommissioning. The ESIA addressed project alternatives; identification and assessment of environmental and social risks and impacts; and measures to avoid, mitigate or offset the impacts identified. The potential impacts identified and assessed include air quality; biodiversity; hydrology and water quality; occupational health and safety (OHS); waste; noise; traffic and visual impacts; and geology and topography. The ESIA also included a socio-economic baseline and impact assessment of the communities around the project site. The project EMP identified measures to minimize the impacts associated with the project.

<u>Management Programs</u>: Project-specific management programs are developed as applicable for all Sterling & Wilson projects. The health, safety, environmental and social requirements for the construction phase have been identified in the company's EPC contract. As indicated above, for the Scaling Solar project, Sterling & Wilson will develop and implement a management system and will integrate the project EMP into the system. The ESMS and the associated documents will cover the construction phase and will be updated to cover the operations phase.

<u>Organizational Capacity and Competency</u>: Sterling & Wilson will appoint a Health, Safety and Environmental (HSE) Officer to oversee the implementation of the ESMS and the associated procedures for the construction phase of the project and will ensure monitoring during operation. This is covered under ESAP action item 2. In addition, Sterling & Wilson will ensure that its subcontractors appoint HSE personnel for the construction phase. Bangweulu Power Company Limited will also appoint a Community Liaison Officer (CLO) who will be responsible for overseeing the interaction with the affected communities and other stakeholders, through the CDP.

<u>Emergency Preparedness and Response</u>: The company will ensure that Sterling & Wilson develops and implements an Emergency Preparedness and Response Plan. The plan will identify emergency scenarios for both construction and operations phase, including – fires, explosions, medical emergencies, accidents, spills, property damage and extreme weather conditions. All emergency procedures and communication protocols will be documented in the plan.

<u>Monitoring and Review</u>: During construction and operations, all parameters that require monitoring in line with local regulations will be monitored, as defined in the project EMP. Periodic safety, health and environment audits/inspections will be conducted by the company ; and monitoring data and reports will be provided to the local authorities as required.

As covered in ESAP action item 1 for this project, for the operations phase, the company will define key performance indicators (KPIs) in order to monitor HSE parameters such as lost-time incidence frequency rate, accident free days, water consumption, wastewater parameters and air emissions. In addition, the HSE Officer will define an integrated HSE report to cover key HSE KPIs and present it to senior management for review. The HSE KPIs will include: compliance with legal and regulatory requirements; HSE management system progress report; water consumption; solid and liquid waste management; safety statistics, including leading and lagging indicators; community complaints and community engagement activities.

PS 2 – Labor and Working Conditions

During the construction phase, it is expected that the total workforce on the project will be up to approximately 200. It is also expected that a substantial number of workers will be recruited from the local community within 10 to 25 km of the project site. There will be no workers' accommodation erected for the project; workers from the nearby communities will be transported to and from the project site. When fully operational, the company is expected to have seven full time professional technical employees for operations and maintenance as well as thirty seven unskilled personnel, third-party security and workers for cleaning and grounds-keeping.

<u>Human Resources Policies and Procedures</u>: During the construction phase, workers will be subject to a Project Labor Agreement (PLA) to be instituted by Sterling & Wilson. The PLA will incorporate information such as working hours, standard contracts, minimum wage requirements and security requirements, and will also be applicable to all sub-contractors. As indicated in the ESAP action item 4, Sterling & Wilson will ensure that the PLA as well as the HR Procedures for the operations phase meet the requirements of this Performance Standard as well as applicable Zambian labor laws.

<u>Workers' Organization</u>: Due to the stage of the project, there is no indication as to the number of unionized employees expected to be involved in the construction phase. It is noted however that the PLA will be between Sterling & Wilson, the sub-contractors and the relevant unions as may be applicable to the project. During operations, Sterling & Wilson will allow freedom of association in line with the requirements of this Performance Standard.

<u>Non-discrimination and Equal Opportunity</u>: the company and Sterling & Wilson are committed to the principles of employment equity, equal opportunities and empowerment, regardless of gender, race, color or creed. As part of the PLA and HR Policies and Procedures for the operations, Sterling & Wilson will develop and implement a formal policy on non-discrimination and equal opportunity to cover all aspects of the Scaling Solar project.

<u>Grievance Mechanism</u>: As indicated in the labor requirements for the EPC contract, a worker grievance mechanism will be in place during the construction phase. For the operations phase, Sterling & Wilson will ensure the HR procedures incorporate an adequate grievance mechanism procedure.

<u>Occupational Health and Safety</u>: As this is a greenfield project, Sterling & Wilson as the EPC and O&M contractor, will develop appropriate OHS procedures for the construction and operations phase which are consistent with the requirements of this Performance Standard and local Zambian Laws including the Occupational Health and Safety Act and Construction Regulations. This has been included as action item 5 of the ESAP for this project. KPIs for this project will include OHS indicators which will be documented as part of the project improvement process. Sterling & Wilson will provide appropriate protective equipment for all its staff and project workers and provide the required training to ensure that staff and project workers work in a safe manner. Sterling & Wilson will also ensure that sub-contractors provide appropriate protective equipment and training and also comply with all the requirements of local Zambian Laws and this Performance Standard.

Workers Engaged by Third Parties: It is expected that during the construction and operational phases Sterling & Wilson will make use of service providers for security and maintenance roles. As set forth in the ESAP action item 6, Sterling & Wilson will develop and implement a procedure to ensure contractors' labor and working conditions comply with the requirements of this Performance Standard and Zambian Laws, including consideration for grievance mechanisms for third party workers and fair working conditions.

PS 3 – Resource Efficiency and Pollution Prevention

Potential pollution issues during the project's construction phase will be those typically associated with construction sites such as dust, noise, oil spills and traffic. All these impacts are limited and temporary and will be mitigated with standard mitigations measures which are included in the EMP. During operations, the main issues relate to water use and management, waste management, and visual impacts. Potential nuisance impacts during the construction and operations phases to the broader community are expected to be limited. It is noted that pollution impacts associated with solar PVs are not as significant as other solar power generation projects; these impacts are briefly described in the paragraphs below and can be largely mitigated through effective implementation of the EMP associated with this project. Where required, additional measures have been included in the ESAP for this project as indicated below.

<u>Energy and Material Efficiency</u>: The highest amount of resources and materials will be consumed during the construction phase. Energy for the construction project will be supplied by diesel/petrol generators. During operations, the energy supply will be drawn from the energy generated by the project.

<u>Water</u>: During the construction phase, water will be required for road construction, dust suppression, drinking water and domestic purposes. It is estimated that approximately 20,000 liters of water will be required per day during the construction phase. Given that the project involves PV rather than CSP technology, water consumption will be limited during operations; water will only be required for cleaning and domestic purposes. It is estimated that 15,000 liters of water will be required per week. Water for the project will be sourced locally from the LZ-MFEZ who will obtain the water abstraction authorization from the municipality.

<u>Greenhouse Gas (GHG) Emissions</u>: As this is a solar project, the GHG emissions associated with the operations phase of the project are minimal. The GHG emissions associated with the combustion of fossil fuels for power generation and transportation during construction will be limited and temporary. Therefore, the project will not be required to quantify and report the CO2-equivalent emissions as required under this Performance Standard.

<u>Pollution Prevention</u>: During the construction phase, air emissions from the project will primarily be dust/particulates from land clearing and earth works as well as particulate matter, nitrogen oxides (NOx), carbon monoxide (CO) and sulfur dioxide (SO2) from the combustion of fuels. The air quality assessment in the ESIA indicates that there will be temporary negligible impacts on sensitive receptors (residential areas). Measures to minimize these impacts have been identified in the project EMP.

Noise pollution is expected from the project during construction and operations. The baseline noise assessment conducted during the ESIA indicated that there were no major noise-emitting sources and no sensitive receptors within 500m of the project site. Noise attenuation analysis in the ESIA revealed that beyond 500m, noise from the project site during construction will on the average be 50dB or less. Measures to minimize noise impacts have been identified in the project EMP. Available data on noise generation by PV plants during operations indicates noise at source could be up to 60dB. With attenuation, noise impacts are expected to be minimal.

<u>Solid Waste Management</u>: Construction waste such as domestic waste, inert waste (rubble, spoil) recyclables (plastics, paper, metals.) and small quantities oil-contaminated rags will be sorted on site and collected by a licensed waste collector for recycling and disposal as appropriate. General waste generation during operations is expected to be minimal; the waste will be disposed of by a licensed waste contractor. Wastes from the solar panels during maintenance will be collected and recycled/disposed of appropriately. As part of the procedures for the ESMS, a Waste Management Plan will be developed and implemented by Sterling & Wilson; this has been included in the ESAP as action item 7 for this project.

<u>Hazardous Materials Management</u>: Chemicals to be used during construction and operation of the power plant may include herbicides for weed control and cleaning chemicals used for cleaning the solar panels. These chemicals will be stored in small quantities on site and the measures identified in the EMP will be implemented to minimize any impacts. Other hazardous materials include fuels and lubricating oils. Petrol/diesel for generators will be stored in above-ground storage tanks fitted with containment bunds.

PS 4 – Community Health, Safety and Security

Community Health and Safety: The project is not expected to lead to significant safety and health impacts on the community. Increased traffic associated with the project, in particular during the construction phase, may pose some safety risks to the community. It is estimated that approximately 600 trips will be required to transport equipment to the site. In addition, daily traffic will include the transport of personnel to and from the site. During the operations phase, the site will be fenced and public access to the solar plant will be prevented. In addition, the LS-MFEZ is an area with controlled security access involving armed Zambia Police Force personnel and unarmed private security personnel. Traffic impacts will be greatly reduced as vehicles will only be required to transport employees to work on a daily basis. If required, infrastructure for routine maintenance and upgrading phases will also be transported to site by road. The implementation of measures identified in the EMP is expected to reduce any potential impacts due to traffic associated with the project.

<u>Hazardous Materials Management and Safety</u>: The project will require the use of limited quantities of hazardous materials such as cleaning chemicals, herbicides, fuels and oils. As discussed under Performance Standard 3, the quantities are limited and the materials will be managed in a suitable manner to avoid community exposure to these materials.

Security Personnel: Site security will be managed by a private security firm who will provide

trained unarmed security personnel. Sterling & Wilson will assess the risks posed by its security arrangements to communities near the project site and ensure that the security contractor operates in a manner which meets the requirements of this Performance Standard. In making such arrangements, The company and its EPC contractor will be guided by the principles or proportionality and good international practice in relation to hiring, rules of conduct, training, equipping and monitoring of such workers, and by applicable Zambian law. The EPC contractor will make reasonable enquiries to ensure that security provider staff are not implicated in past abuses and will train them in appropriate conduct toward workers and affected communities. The project grievance mechanism (described below) will be available to communities should issues arise between them and security personnel.

PS 5 – Land Acquisition and Involuntary Resettlement

The 52 hectare project site represents 2.5 % of the overall 2100 hectare Lusaka South Multi Facility Economic Zone (LS MFEZ), which is managed by the Zambia Development Agency (ZDA). This MFEZ industrial zone was established in 2010 with the purpose of promoting economic development in Zambia. Since its inception it has been open to expressions of interest for project development from both local and international firms. To date 24 companies have received approval to operate within the LS MFEZ site and a number of these have already begun operations there. A Zambian parastatal company, the Industrial Development Corporation (IDC), is involved both in LS MFEZ development and – as a shareholder - in the project company to be financed.

The project site is located in the south east corner of the zone and was identified by GoZ in late 2015 / early 2016 as part of studies into the feasibility of the Scaling Solar concept in Zambia. It was awarded to the company in June 2016 'clear and unencumbered' of human use and habitation. Subsequent World Bank Group (WBG) due diligence found that the establishment of the LS MFEZ involved two phases of government-managed resettlement – the first in 2012/13 and a second, subsequent clearing of further claimants (allegedly opportunistic settlers) in 2015. Although the planning of both phases of Government managed resettlement pre-dates the project concept and is therefore not directly attributable to the project to be financed, a summary of the government processes is provided below in order to frame the social mitigation measures committed to by the client, outlined below and in the ESAP.

The LS MFEZ site was identified in 2007/8 via a Japanese International Cooperation Agency (JICA) led program. The site was part of the GoZ owned Lusaka South Forest Reserve, in which vegetation clearing and cropping were prohibited. Nevertheless, by 2009 an estimated 100 'informal farming and squatting' households were identified across the site, and by 2012 this number had risen to 962 households (around 5100 persons), 247 of whom were living there and the remainder (715 households) using it to varying degrees for farming purposes. As per Zambian law, these households were classified as illegal users and could have been evicted, though some had been living on the site for long periods of time. Following consultations involving JICA, GoZ and various other institutional and community stakeholders, the 247 households living on the site were considered eligible for compensation and resettlement under Zambia's National Resettlement Policy, whilst the 715 households using the site for farming purposes only were not.

Resettlement was planned and implemented by Zambia's Disaster Management and Mitigation Unit (DMMU). The 247 eligible households were offered two options for resettlement: i) physical resettlement to alternative land identified by the Government, with assistance or ii) compensation in cash, with no further assistance. Of these, 32 households elected to be physically resettled to various alternative sites in October 2013: 15 households moved to Kanchibiya Resettlement Scheme in Mpika District; 15 households to Milambo Resettlement Scheme in Milenge District and 2 households to Dongwe Resettlement Scheme in Lukula District. Most of these sites are located far away (up to 700 km) from the LS MFEZ area. The resettled households were given new land plots ranging from 5-25 ha in size, temporary housing, a relief package of food to last three months, cash compensation and farming inputs to kick-start their agricultural activities; they were also provided with temporary housing whilst establishing new homes, and with agricultural extension services. The remaining 215 eligible households elected cash compensation, which was paid in October 2013. A further 20 households later claimed they had been mistakenly excluded from the process, and were also physically resettled to Kanchibiya Resettlement Scheme and provided with land and the same relief packages and assistance as per those originally resettled. This process appears to have been implemented in line with prevailing GoZ resettlement laws and regulations.

A year later, in 2014, 295 additional persons who had allegedly moved onto the LS MFEZ site following the resettlement described above, appealed to DMMU to be resettled. DMMU rejected their claims, which were regarded as opportunistic. These households needed to be removed from the LS MFEZ site in order for development to proceed, however, and were eventually referred to the Office of the District Commissioner which agreed to include them in a resettlement scheme at a new relocation site 30 km away at Mphande. This second group was eventually moved to the proposed resettlement area in November 2015, following delays in the de-gazetting process. As of November 2016 these households were still in temporary accommodation and waiting for land to be allocated for housing and farming purposes. There is a lack of social services at this site, including no water supply, sanitation or education facilities. Discussions with the relevant authorities indicate that land has now been allocated for a planned housing scheme and that plots are in the process of being surveyed and distributed to the affected persons. Security, education and other services are also planned for these households, under the 2017 budget allocated by GoZ. As discussed further below, this second phase of resettlement was not associated with the Company's site.

In general, impacts of legacy Government managed resettlement from large industrial parks is challenging, if not impossible, for individual private sector clients to individually mitigate. In these scenarios, government agencies acquire a much larger area of land than the plot which is allocated to the client, making it difficult (especially in the absence of a social baseline or resettlement planning study) to verify and/or to complement deficiencies in past government managed mitigation efforts. In this case, Neoen was identified as winning bidder for this project after resettlement took place and was not in a position to influence or supplement the resettlement planning or implementation phases as envisaged under the Government managed resettlement sections of PS 5. As such, it is not considered feasible for the company, which occupies just 2.5% of the MFEZ, to mitigate government managed resettlement impacts associated with the entire 2100 ha Lusaka South MFEZ in which 24 local and international companies have been approved, and some have started to operate.

Instead, historic satellite imagery as sourced and analyzed by the WBG has been assessed in order to better understand legacy social impacts directly associated with the Company project site. Detailed analysis of time-sequenced imagery shows that about 5 households (10 structures) were living and farming on the site in 2012 when the DMMU-managed census was undertaken, and that, just prior to actual relocation a year later, this number had increased to approximately 35 households (70 structures). It also clearly shows that the site was completely cleared in 2013 and not subsequently re-inhabited, i.e. no households from the site were involved in the second (2014-2015 Mphande Forest) phase of MFEZ-wide resettlement. Therefore it has been agreed that any mitigation measures will, where possible, focus on those households economically and/or physically displaced from the Company project site in 2012/13 and located in the vicinity of the Neoen project site boundaries. Those households involved in the Mphande Forest (second phase) resettlement from the broader MFEZ area are not included.

PS 5 requirements in relation to planning and implementation of Government managed resettlement are not considered to be feasible in this type of industrial zone legacy situation and, in the absence of specific social information associated with the project site, individually targeted mitigation measures are impractical and unlikely to succeed. However, in recognition that legacy Government managed resettlement may have led to residual social risks in the project's area of influence, the company is committed to addressing such impacts on a best efforts basis by offering community-level benefits such as improved social services, access to credit and/or livelihood improvement measures (as per attached ESAP). This will be achieved via development and implementation of a targeted Community Development Plan, the funding of which (0.5% of annual project revenue) has been contractually allocated on an annual basis in the client's contract.

The CDP aims to mitigate the potential risk of loss of 'social license to operate' resulting from past government managed resettlement from the project site. As noted above, the CDP will target those households displaced from the project site in 2012/13, and the communities in which they currently reside, near the project site. This is likely to encompass those who were physically displaced and opted for cash compensation (and who remained in the project area), and those who were economically displaced but not considered eligible for compensation in the first phase of Government resettlement from the LS-MFEZ. It will exclude the few households who opted for relocation to distant (300 - 700 km away) resettlement sites, as a) community-level benefits cannot be practically extended to these households; and b) they cannot impact the project's social license to operate in the way that those living in the project area can. The CDP will be independently monitored to ensure effectiveness in terms of mitigating potential social impacts and bringing further development impacts to the affected communities.

Stakeholder Engagement:

The communities considered affected by the project and who were included in the stakeholder engagement and consultation activities processes, include those located relatively near to the project site, adjacent to the MFEZ; and those who were resettled as part of the Government –led resettlement scheme associated with the MFEZ as a whole (as described above).

Those located adjacent to the MFEZ include residents of Shantumbu Villages (about 450 households, about 5-7 km to the South and Southwest of the project site); and Mahopo Village (370 households, around 9km from the project site). Shantumbu Village is relatively unsophisticated and characterized mainly by subsistence farming and a lack of social amenities. Villages from this area used to use the MFEZ area for farming, grazing and access to natural resources. Mahopo Village is more formalized, with most people involved in formal employment and with more improved social amenities. There are not likely to be direct impacts on this village besides a source of potential labour for the project. Leopards Hills, Chalala and New Kasama residential areas are relatively sophisticated suburban and commercial farming areas which are located on and around Leopards Hill Road, one of the main roads leading to the project site. They would therefore likely be most impacted by construction traffic associated with the project. The nearest residential houses are located about 2 km North of the project site while the nearest agricultural holdings in New Kasama are located within a kilometer of the site, on the eastern side of the site. The communities affected by the MFEZ Government-led resettlement include Kanchibiya in Mpika District (around 700km from the MFEZ); Milambo in Milenge District (over 700km from the MFEZ) and Dongwe in Kaoma District (450km from the project site). These were the households affected by the original DMMU resettlement. The Mphande Forest Resettlement Area (over 30km from the project site) includes those households included in the second resettlement scheme.

Initial stakeholder consultations were conducted in October 2015 by WSP - Parsons Brinkerhoff consultants as part of the pre-ESIA consultations. The institutional stakeholders consulted were drawn from key project implementing agencies, which included Lusaka South Multi-Facility Economic Zone Management, ZESCO Management, ZEMA Management and IDC Management.

As part of the project ESIA process, public consultations were undertaken at ESIA Scoping meetings held on 11th and 12th March 2016 at Nakatindi Hall (Lusaka Civic Centre) and Cooperative College Conference Hall respectively. The stakeholders were invited to attend scoping meetings by way of written invitation letters and by placing public notices for the meetings in publicly and privately owned print media. These included the Zambia Daily Mail (public) and the Post Newspaper (private). The objective of the meeting was to inform all interested and affected parties of the project, and provide them with answers to any questions they had. Over 200 people attended the meetings from the affected communities. The main issues raised in the meeting were related to community benefits of the project. Another round of public meetings was similarly undertaken the 8th and 9th July with in addition the presence of the Project Company.

Further, more focused consultation meetings, in which IFC participated, were held on 25 and 26 August at the Shantumbu and Mphande communities respectively. The meeting was attended by IDC, Knight Piesold and representatives of the affected communities from the Mphande resettlement. The main issues raised in this meeting were around the project's social responsibilities in the area, compensation for loss of assets and access to land, allocation of replacement land, and some technical questions around the operation of the solar panels. As noted above, compensation and identification of replacement land at Mphande are now known to be unrelated to this project and are being dealt with by the relevant Zambian agencies.

Ongoing informal consultation with authorities and village representatives has been undertaken by

the Knight Piesold social specialist. As indicated in ESAP action item 3, the project will develop a stakeholder engagement plan (SEP) including a program for consultation with those affected, particularly those directly affected by the DMMU-led historic government-managed land acquisition process, and those who are most directly affected by the project. The SEP will be designed and implemented prior to construction, during construction and to a lesser degree, during operations. As indicated under Performance Standard 1, a project CLO will be recruited to be present in the local area and receive grievances as part of a broader project grievance mechanism that will allow for grievances to be addressed in a timely and effective manner.

Broad Community Support:

BCS – Not Applicable BCS – Assessed BCS – In Progress

Environmental and Social Action Plan:

	Action Item	Deliverable	Deadline
Perf	ormance Standard 1: Environmental and Soc	cial Assessment and M	anagement System
1	The company will design and implement an Environmental and Social Management System for the construction and operations phase consistent with WBG IFC Performance Standard requirements. The System will define roles and responsibilities, and other necessary elements (manual of procedures) to enable all operations to comply with Zambian laws and regulations and WBG IFC Performance Standards. Amongst other elements, the management system will include a policy, an updated ESMP, an emergency preparedness and response plan, an emission monitoring program, HSE KPIs as well as an external grievance mechanism.	Provide the ESMS for WB/IFC/OPIC review	Financial Close Date (Estimated April 2017)
2	Organizational Capacity: The company will provide additional detail on the capacity within its organization to implement and enforce the Environmental and Social requirements and shall appoint qualified individuals to implement the management system, including the appointment of a Health Safety Environment Officer and a Community Liaison Officer.	Submit adequate evidence of appointments and qualification to WB/IFC/ OPIC	Financial Close Date (Estimated March 2017)
3	Stakeholder Engagement Plan: The company will develop and implement a Stakeholder Engagement Plan for the project, including an accessible and effective community grievance mechanism.	a) Provide WB/IFC/OPIC with the draft of the Stakeholder Engagement Plan b) Provide evidence of dissemination of the procedure in relevant public communication at each facility.	Financial Close Date (Estimated March 2017)
Perf	ormance Standard 2: Labour and Working (Conditions	
4	Human Resources Policies and Procedures: The company will provide for World Bank/IFC/OPIC review an occupational Health and Safety Plan (OHS). The Plan will	a) Provide the project labour Agreement for WB/IFC/OPIC	a) Financial Close Date (Estimated March 2017)

	develop and implement a Project Labor Agreement for the construction phase and Human Resource Policies and Procedures for the operations phase which meet Zambian regulations and the requirements of Performance Standard 2. The documents will include a worker grievance mechanism and non-discrimination policies.	review and approval. b) Provide adequate evidence of HR policy and procedures incorporation into management systems, the disclosure process to employees and full implementation.	 b) Financial Close Date (Estimated March 2017)
5	Occupational Health and Safety: The company will develop and implement Occupational Health and Safety (OHS) policies and procedures. The policies and procedures will include identification of managers/persons responsible for OHS performance, on-going training, and a mechanism for reviewing deviations from procedures and improving performance both during construction and operational phase. The procedures will also include the management of contractor OHS matters	Present to WB/IFC the OHS management system procedure, including action plan and implementation schedule	a) Financial Close Date (Estimated March 2017)
6	Third Party Workers: The company will develop and implement a contractor management procedure to ensure that key PS 2 provisions such as written working conditions, OHS protections and a grievance mechanism are passed through to contractors and that the company provides active oversight of the implementation of these provisions.	Provide a Contractor Management Procedure including oversight responsibilities	
Perf	ormance Standard 3: Pollution Prevention a	nd Abatement	
7	Waste Management Procedure: The company will develop a Waste Management Procedure for the construction and operations phase which meets the requirements of Performance Standard 3 and which includes details of intermediate waste management procedures until such time as the MFEZ centralized waste management facilities are in operation.	Submit waste Management procedure for WB/IFC/OPIC review	Financial Close Date (Estimated March 2017)
	The company will recycle all panels at the end of their useful life unless otherwise approved.	Plan if an alternative to recycling is to be	Financial Close Date + 3 months

		proposed	(Estimated
			June 2017)
Perf	ormance Standard 5: Land Acquisition and 1	Involuntary Resettlen	ient
8	The company will address residual social	Submit CDP to	Financial Close
	risks related to the 2013 resettlement from	WB/IFC/OPIC for	Date + 4 months
	the project site on a best efforts basis, by	review	(Estimated July
	offering community level benefits such as		2017)
	improved social services, access to credit		
	and/or livelihood improvement measures.		
	This will be achieved via design and		
	implementation of a Community		
	Development Plan that targets households		
	displaced from the project site in 2012/13 by		
	the DMMU-led process that still reside in the		
	project area, and the communities in which		
	they currently reside. Independent		
	monitoring of the CDP will be		
	commissioned by the company.		

Local Access of Project Documentation:

Contact Person: Cyril Perrin, Project Manager Company Name: Neoen Address: JAT V-1,14 andar, Rua dos Desportistas-833 - Maputo - Mozambique Email: cyril.perrin@neoen.com Phone: +258 84 055 37 29/ +260 96 25 86 281 / +351 910 236 527 Facsimile:

Please note project documentation will be available on site once the base camp is operational. Until then, please find below the administrative address in Zambia:

Company Name: Bangweulu Power Company Limited Address: Building 3, Acacia Park, Stand No. 22768, Thabo Mbeki Road, P.O.Box 39371 – Lusaka - Zambia

Annex 5: Implementation Support Plan

REPUBLIC OF ZAMBIA: West Lunga Scaling Solar Energy Project

Strategy and Approach for Implementation Support

1. The Implementation Support Plan (ISP) described in the table below explains how the team proposes to supervise and monitor the projects, risks, and indicators mentioned in this PAD.

Implementation Support Plan

2. The expertise required for the ISP includes: energy sector, financial, guarantee/commercial, legal guarantee, environmental and social performance standards, power engineering and monitoring and evaluation expertise. The responsibility for this support lies with the regional TTL and the Guarantee co-TTL with support from other experts. The main focus in terms of support during implementation is summarized in the Table 7 below.

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First twelve months	Effectiveness, financial closure, selection of L/C bank, safeguards, construction progress, political developments.	Sector Safeguards Guarantee/ Commercial Financial Legal Engineer Country team	US\$200,000	N/A
Months 12-24	Review of progress in construction and generation by the IPPs; review of sector technical and financial performance; safeguards. Review progress of the sector and the IPPs. Review status of completion against indicators and PDO.	Sector Guarantee/ Commercial Financial Legal Safeguards Environment Social M & E	US\$100,000	<i>N/A</i>
Through end of guarantee effectiveness period	Ongoing supervision and monitoring of legal covenants and risks that could lead to a possible call on any of the signed IDA guarantees.	Sector Guarantee/ Commercial Financial Legal	US\$50,000 per year, including US\$30,000 of staff cost and US\$20,000 of travel (one trip of two staff per year).	N/A

Table 5.1. Implementation Support Plan

Table 5.2. Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Team Leader	7-10 weeks per year	3 per year	To be adjusted
Energy Specialist	7-10 weeks per year	Located in Zambia	annually
Guarantee Specialist, co-TTL	7-10 weeks per year	2-3 per year	depending
Legal Specialist	6-8 weeks per year	Depending on needs	on available
Financial Analyst	4-5 weeks per year	2 per year	supervision budget
Power Engineer	2-3 weeks per year	1 per year	
Social	3-4 weeks per year	Local staff	
Environmental	2-3 weeks per year	Local staff	
Monitoring	1-2 weeks per year	1 per year	
Procurement	1-2 weeks per year	Local staff	
Financial Management	1-2 weeks per year	Local staff	
Annex 6: Economic and Financial Analysis

A. Economic Analysis for Bangweulu Power Company Limited solar PV (47.5 MW AC)

1. The economic analysis assessed the economic viability of the 47.5 MW solar PV power plant to be covered under the IDA payment guarantee. NPV and EIRR are used as the indicators of economic viability. The assumptions include the following:

(a) **Cost**: the capital cost is estimated to be about US\$59 million or US\$1.26 million per MW capacity according to the winning bid. This investment cost includes EPC, financing cost, and development cost. The cost of incremental use of power transmission and distribution facilities is not considered as these facilities are already available at the project site.

(b) **Benefit**: The project will reduce ongoing load-shedding and improve the availability of electricity. The PV plants are assumed to operate at a capacity factor of 20 percent, and generate 94 GWh of electricity per year on average. The benefit of this additional power generation is measured through avoided cost of emergency electricity imports. Below is the summary of Zambia's emergency power imports according to ZESCO's 2016 budget and subsequent updates.

Company	Fuel	Capacity (MW)	Quantity (GWh)	Tariff (USD/kWh)	Cost (million USD)
EDM	Hybrid	150	871.4	0.14	122.0
Aggreko	LNG/HFO	40	350.0	0.19	66.0
ESKOM	Hybrid	150	1,314.0	0.08	105.1
Karpowership	HFO	100	872.7	0.17	146.8
Total		440	3,408.1		439.9
Average Cost				0.129	

Table 6.1: Summary of Zambia's Emergency Power Imports

2. On average, the cost of the emergency electricity power import is 12.9 USc/KWh. This is a conservative proxy of the willingness to pay (WTP) as it is based on the actual cost of purchase which is lower than theoretical level of WTP.

3. The project will also avoid GHG emissions associated with emergency power import, totaling on an average 97,000 tCO₂ of GHG per year as compared to the use of MWh from the emergency power import. This avoidance will continue for six years till at least 2023 when Kafue Gorge Lower hydroelectric plant may become operational and eliminate emergency power import. Per the Bank's latest economic analysis guidance note, a discount rate of sixe percent and the social cost of carbon at US\$30/tCO₂ are used. Key assumptions used in this analysis are summarized in the table below.

General	
Project lifetime	25 years starting 2017
Discount rate	6%
Cost	
Capital cost	US\$58.8 million
O&M cost	US\$1.05 million per year for 25 years
Finance Cost	US\$2.1 million spread over 25 years
Benefit	
WTP	US\$0.129/kWh
PV capacity	47.5 MW AC (55 MWp DC)
Capacity Factor	20% (generating 94 GWh/year)
GHG Grid Emission Factor	0.98 tCO ₂ /MWh
Social cost of carbon	US\$30/tCO ₂

Table 6.2: Key Assumptions Used for Economic Analysis

4. With these assumptions, the NPV of the project is US\$91.5 million, and the EIRR is 22.3 percent (18.8 percent without the cost of carbon). These figures demonstrate robust economic returns of the program.

Sensitivity Analysis

5. Sensitivity analysis has been undertaken with two scenarios: (i) the solar PV plant is commissioned one year later; and (ii) a conservative discount rate of 10 percent is used. The results of the sensitivity analysis are summarized below.

Scenarios	NPV (US\$ million)	EIRR (%)
i) 1 year delay	81.4	18.2%
ii) 10% discount rate	49.6	22.3%

6. Under all scenarios, NPVs are positive and EIRRs are above hurdle rate of six percent. Hence the project is economically viable.

Economic Analysis for Six Solar PV Plants (235.7 MW)

7. Economic viability for a series of IDA guarantees has also been assessed. The analysis assumes two solar PV plants will be built through Round 1 auction and four more plants through Round 2. Costs associated to Round 1 plants are derived from the actual bid evaluation report, whereas costs associated to Round 2 plants are assumed based on Round 1 results. Detailed assumptions are illustrated in Table 6.4.

Table 6.4: Key Assumptions for Economic Analysis of Series of Solar Plants

General						
PV Capacity and PPA	- West Lunga Project: 47.5MW, 2018-2042					
period	- Mosi-oa-Tunya plant: 28.2 MW, 2018-2042					
_	- Round 2 plants: 4 X 40MW, 2020-2044					
Discount rate	6%					
Cost						
Capital cost	- West Lunga Project: about US\$59 million (based on BER)					
	- Mosi-oa-Tunya plant: US\$43.4 million (according to BER)					
	- Four plants under Round 2 auction: US\$55.5 million (based					
	on per MW cost of Round 1)					
O&M cost - West Lunga Plant: US\$1.05 million per year						
	- Mosi-oa-Tunya plant: US\$1.05 million per year					
	- Four plants under Round 2 auction: US\$1.05 million per year					
Finance cost	- US\$1.67 million spread over 25 years (3% of capital cost					
	assumed)					
Benefit						
WTP	US\$0.129/KWh					
PV Capacity Factor	20%					
GHG Grid Emission	0.98 tCO ₂ /MWh					
Factor						
Social cost of carbon	US\$30/tCO ₂					

8. With these assumptions, the NPV of the program is US\$375.7 million, and EIRR is 18.1 percent. These figures demonstrate robust economic returns.

9. Public sector financing for the IDA guarantee is appropriate for this project. IPP investments in sub-Saharan African countries often result in high tariffs due to perceived risk of non-payment by the power utilities. IDA's presence via a guarantee mitigates this risk, thereby attracting investors (all bidders requested the payment guarantee) and helping obtain low tariffs from reputable developers, showing the Bank's value added. The Bank is uniquely positioned to support this operation through the WBG Scaling Solar.

B. Financial Analysis

Financial Impact of the Project on Zambia's Electricity Sector

10. Financial analysis was undertaken to assess the financial benefits of the proposed West Lunga Scaling Solar Energy Project, as well as a series of guarantees to Zambia's electricity sector. Given that the Scaling Solar program invites commercial bidders in a transparent and competitive manner, each PV plant project is assumed to be financially viable to the bidders at their bid-price. A more important question is whether procuring such PV power makes better financial sense for Zambia's electricity sector when compared to alternatives.

11. To assess the financial implication of the project on the sector, comparative analysis of levelized cost of procuring power with and without the project has been undertaken. With the project, 47.5 MW will come online in 2017 and operate for 25 years following the PPA. The tariff that ZESCO pays (as the off-taker) is $US \notin 6.015$ /kWh, based on the bidding result. The cost is not indexed to inflation and remains constant.

12. Without the project, ZESCO will need to procure equivalent amount of power through emergency import, as no other generation capacity can be built in the short term except for those already under construction. ZESCO could theoretically choose to continue major load shedding without additional emergency power import, but this option has prohibitively higher cost for the Zambian economy. The reliance on emergency power will continue until the 750 MW Kafue Gorge Lower (KGL) hydropower comes online and eliminate power shortage. The KGL may be commissioned in 2023 but it could be delayed since the project has been in the pipeline for decades. Therefore, 50 percent of probability has been assigned to KGL commissioning in 2023 and 2028 respectively. The cost of emergency power is USD\$0.129/kWh based on the figure of current contracts. This tariff is also assumed to remain fixed over the period of 2018-2022 for simplicity, although the actual tariff could change as the PPA contracts are renewed and the global fuel market price changes.

13. With these assumptions, The NPV addition of the project has been assessed using a six percent discount rate. The result shows that the West Lunga Project alone will allow the sector to gain US\$31.7 million as compared to the use of emergency power purchase. With a series of guarantees, the financial NPV gain will be US\$114.4 million.

	NPV gain (US\$ million)
West Lunga Project	33.4
Series of Guarantees	114.4

Table 6.5:	Additional	financial NP	V by the	Project	and Series of	of Guarantees
1 4010 0.01	1 Iuditional	IIII and the interest of the second s	, by the	IIOJECE	and Series (Ji Guarances

Sector financial analysis

14. This section provides an assessment of ZESCO's current and future financial performance. ZESCO is a vertically integrated electricity utility company, wholly owned by the GRZ. The GRZ appoints the ZESCO Board of Directors and provides guidance through the ERB and National Energy Policy. The sole source of revenues for SPVs established under the Scaling Solar program will be sales to ZESCO. Hence ZESCO's financial viability is key to determine the risk of projects to be covered under the guarantee.

Key factors affecting ZESCO's financial performance

- 15. ZESCO's financial performance is affected by some key factors, including;
 - **Dominance of depreciated hydropower.** Over 90 percent of annual power generation comes from hydropower sources. Victoria Falls, Kafue Gorge Upper, and Kariba North Bank are the three largest dams built in 1938, 1972, and 1976, respectively. Generation costs from these hydroelectric plants are generally low thanks to fully depreciated assets

and limited operating cost. However, as hydropower assets age, maintenance cost may increase. There is a planned Bank-financed rehabilitation of the Kariba North Bank dam to improve the dam safety.

- Mining sector as the anchor customer. Copper mining is a major pillar of the Zambian economy and constitutes over 77 percent of the country's export. Approximately half of ZESCO's generated power is sold to the mining sector, primarily through the Copperbelt Energy Corporation (CEC). Hence mining sector is by far the largest customer segment for ZESCO. Global copper price significantly affects the production of mining sector and ZESCO's sale of power to the sector. Mining firms pay ZESCO in US dollars mitigating ZESCO's exposure to currency risk.
- Severe power shortage. Since June 2015, Zambia has faced severe power shortage, resulting in load shedding of up to eight hours a day in most of the country. This is the result of combination of growing power demand, historical underinvestment in power generation, and recently low level of rainfall. To cope with this power shortage, Zambia is currently importing emergency power from EDM (Mozambique), Aggreko, Karpowership (both emergency power suppliers), and ESKOM (South Africa). This emergency power import is significantly more costly than the average sales tariff by ZESCO.
- Non cost-reflective tariff. Average electricity tariff in Zambia is approximately US\$0.05/KWh, one of the lowest in sub-Saharan Africa. There has been regular increase in retail price to residential, commercial, and industrial customers. The retail tariff was temporarily increased by approximately 100 percent in December 2015 in response to the power crisis, but soon was reversed due to the public pressure. Furthermore, there is an ongoing litigation around the increased electricity tariff to mining firms, which purchase half of ZESCO's power sales. Overall, progress towards cost-reflecting tariff has been limited.
- **Depreciation of Kwacha.** Partly as the result of falling copper price, Kwacha, Zambia's currency, has depreciated by approximately 50 percent from January 2015 to December 2016. This has negative impact on US\$-denominated debt obligation of ZESCO. However, the overall impact of Kwacha depreciation on ZESCO's financial performance is positive thanks to significant US\$-denominated revenue from mining sector.

Historical Financial Performance of ZESCO

16. The table below presents a summary of financial statements in recent years.

	In Kwacha million			In USD million		
Income statement	2013	2014	2015	2013	2014	2015
Revenues	2,362.4	4,317.7	6,425.7	443.6	724.3	745.0
Cost of Sales	-775.2	-1,400.5	-2,385.4	-145.6	-234.9	-276.6
Gross Profit	1,587.2	2,917.2	4,040.3	298.1	489.4	468.4
Operating income/expense	-1,231.6	-2,470.8	-3,750.6	-231.3	-414.5	-434.8

Table 6.6: Summary of ZESCO's Financial Performance

Exchange loss and gains	-79.8	175.9	-220.1	-15.0	29.5	-25.5
Interest Expense	-16.2	-49.6	-50.0	-3.0	-8.3	-5.8
Profit before tax	259.6	572.6	19.6	48.7	96.1	2.3
Tax	188.5	-249.4	848.9	35.4	-41.8	98.4
Profit	448.1	323.3	868.5	84.1	54.2	100.7
Balance Sheet						
Total assets	12,495.0	16,217.0	23,769.8	2,346.5	2,720.5	2,755.8
Current liabilities	1,896.0	2,718.0	4,995.9	356.1	456.0	579.2
Non-current liabilities	6,725.0	9,279.0	12,490.0	1,262.9	1,556.6	1,448.0
Total equity	3,874.0	4,221.0	6,283.5	727.5	708.1	728.5
Cash flow statements						
Cash flow from operations	-144.0	1,455.0	2,626.9	-27.0	244.1	304.6
Cash flow from investment	-1,230.0	-3,070.0	-4,482.9	-231.0	-515.0	-519.7
Cash flow from finance	847.0	1,786.0	2,454.7	159.1	299.6	284.6
Net change in cash	-526.0	171.0	598.7	-98.8	28.7	69.4

Note: 2013 figure is 9-months figures due to change in accounting period. As original financial statements are in Kwacha, they have been converted to US\$ using exchange rates used in each financial statement.

17. **Revenues**: ZESCO's electricity sales have been steadily increasing. Tariff remained unchanged throughout 2013-2015. Increase of revenues in 2015 in Kwacha is a result of depreciated kwacha, which significantly increased the value of US\$-denominated revenue from mining customers.

18. **Cost of sales**: ZESCO's cost of sales has been relatively low (roughly 40 percent of the revenue), thanks to hydropower assets with low operational cost. However, cost of sales increased significantly in 2015 due to power shortage and introduction of emergency power imports. Given these power imports are denominated in US\$, the cost increase is more significant in Kwacha terms than US\$ terms. Staffing cost is not included in this item but in operating expenses.

19. **Operating income/expenses**: The largest item in the operating expenses is staff remuneration. Staff remuneration constituted 20-30 percent of the operating expenses, and it is the largest operational expense except for emergency power imports. A World Bank study also found that ZESCO's staffing ratio is one of the highest in power utilities in sub-Saharan Africa.¹⁸

20. **Profit**: ZESCO has consistently recorded profit in past years largely thanks to depreciated low-cost hydropower generation. Close to universal implementation of prepaid metering system also contributed to record profit. ZESCO also gained significantly from the recent depreciation of Zambian Kwacha.

¹⁸ Trimble et al.(2016) *Financial Viability of Electricity Sectors in Sub-Saharan Africa: Quasi-Fiscal Deficits and Hidden Costs.* World Bank Policy Research Working Paper 7788.

21. Liabilities: Loans constitute about 60 percent of ZESCO's total liabilities. Balance of borrowing at the end of 2015 was approximately US\$1 billion. The largest lenders were China Exim Bank and Industrial and Commercial Bank of China, which together accounted for 58 percent of ZESCO's borrowings. Current liabilities increased significantly in 2015 in Kwacha terms due to the depreciation of Kwacha which nominally increased US\$-denominated liabilities.

22. **GRZ support**: GRZ has provided a significant support to maintain ZESCO's financial health. In 2015, GRZ converted ZMW 1.1 billion (US\$156 million) from on-lent loans to equity. The GRZ also partially subsidizes the cost of emergency power import. The cost of import not recovered through ZESCO's sales will be paid off by GRZ.

Projected Financial Performance of ZESCO

23. The financial prospect of ZESCO is challenging. Although ZESCO's financial performance appears to be improving in recent years, this is largely attributed to the depreciation of Kwacha as well as generous support from the GRZ in the form of loan-equity conversion and emergency import subsidy. ZESCO will also face the peak of debt service obligations in 2016-2018, and is required to make necessary investments/purchase to meet electricity demand. ZESCO's financial performance has been forecasted based on the assumptions described below.

24. **Demand**: Zambia's power demand will continue to grow. Demand from industrial and commercial users will grow at 2.0 to 2.5 percent. Demand from residential sector will grow at 5 percent given planned expansion of electricity access to households.

25. **Supply forecast**: New generation capacity will be added to meet the ongoing power deficit and growing demand. The near-term additions up to 2025 are listed below. Before new generation capacity comes online, ZESCO will need to keep relying on costly emergency power (US\$0.129/KWh on average). The GRZ pays off the cost of import not recovered through sales. The costly emergency imports will decline and eventually diminish if, and as, new generation capacity comes online (notably Maamba coal plant and solar PV plants) and hydrology of existing dam reservoirs recover.

Commission	Plant	Fuel	Capacity	Ownership
2016	Maamba 1	Coal	150 MW	IPP
2017	Maamba 2	Coal	150 MW	IPP
2017	Scaling Solar 1	Solar	76 MW	IPP
2019	Scaling Solar 2	Solar	160 MW	IPP
2021	Lusiwasi Lower	Hydro	86 MW	ZESCO
2023	Kafue Gorge Lower	Hydro	750 MW	IPP
2025	Kalungwishi	Hydro	210 MW	IPP

Table 6.7. Major Planned Additional Generation Capacity in Zambia





26. **Investments**: ZESCO is planning investments totaling US\$3.3 billion covering generation, transmission, and distribution up to 2030. Approximately US\$244 million is for generation, US\$2,065 million for transmission, and US\$1,489 million for distribution (based on latest available information). The exact cost, timing, and modality (e.g., equity/debt ratio) will keep evolving.

27. **Macroeconomic conditions**: Zambia went through significant depreciation of its currency, the Kwacha (ZMW). Partly due to currency depreciation, the inflation rate of 2016 Q1 was over 20 percent. In general, ZMW depreciation increases accounting revenue for ZESCO in ZMW terms since significant portion of ZESCO's revenue is denominated in USD. However it also increases debt services obligations which are mostly denominated in USD. It is assumed that the ZMW will continue to depreciate against USD at the pace of two to four percent. Copper price, which affects power demand from mining sector and overall economy of Zambia, is an important factor which has not yet stabilized. For the analysis, power consumption of the mining sector is assumed to remain constant in 2017 and 2018, and grow at two percent thereafter.

28. **Financial performance of ZESCO** is projected under several scenarios: (i) base case; (ii) low hydrology; and (iii) no tariff increase. The underlying assumptions are illustrated below.

Scenarios	Tariff assumption			
i) Base Case Scenario	20% lower than average capacity factor for 2016-2017	Retail tariff increases 13% annually toward 2020		
ii) Low Hydrology Scenario	20% lower than average capacity factor for prolonged period of time	Same as base case		
iii) No Tariff Increase Scenario	Same as base case	No increase over years		

 Table 6.8. Scenarios Employed for Projecting ZESCO's Financial Performance

i) Base case scenario:

29. Under the base case scenario, the following assumptions are made: (i) Tariff: the retail tariff for residential, commercial, and industrial customers will increase from current level of 5 cents/kWh in 2016 to 8.3 cents/KWh in 2020, which is equivalent to 13 percent increase annually. Bulk supply tariff with CEC and mining firms is assumed to increase with US inflation and eventually synchronize with average retail tariffs from 2022. (ii) Hydrology: in the base scenario, it is assumed that hydropower generation for 2016-2017 will have 20 percent lower capacity factor than typical average year, and then recover to the normal level from 2018.

30. Available debt service coverage and cash balance up to 2020 have been assessed. In general, ZESCO will face a cash challenge up to 2017. The debt service coverage ratio (DSCR) will remain below one until 2018, but the current ratio will remain positive. Cash balance will be minimized in 2016, but will increase over time.

31. Approximately US\$177 million (depending on the size of ZESCO's foreign debt obligation of each year) has to be kept in an escrow account for debt service, hence the actual cash at ZESCO's disposal is negative until 2017. Once this escrow threshold is broken, either bank overdrafting or GRZ support is required to top-up the escrow account.

Year	2016	2017	2018	2019	2020	2021- 2025
Debt Service Coverage Ratio (DSCR)	1.17	0.73	1.98	1.90	2.24	2.97
Current Ratio	1.27	1.08	1.53	1.85	1.82	1.81
Cash balance before escrow (US\$ million)	155	169	365	483	458	466
Cash balance after escrow (US\$ million)	(22)	(7)	189	307	281	289

Table 6.9: ZESCO's Projected Financial Performance (base scenario)



Figure 6.2: ZESCO's Profit and Loss Breakdown and Cash Balance

Source: IFC (2016) Rain, Reform, Reenergize: Taking Stock of Zambia's Power Shortage

32. Overall, ZESCO's financial position will be weak through 2017, but is projected to recover from 2018. This recovery is driven by better hydrology, operation of Maamba coal power plant (150 MW in 2016, and another 150 MW in 2017), and Scaling Solar power plants, and significant increase of average tariff by the order of 13 percent annual increase. Sensitivity analysis on hydrological scenario and tariff increase is provided below.

ii) Low hydrology scenario

33. Given Zambia's dependence on hydropower generation, hydrology is a critical factor influencing ZESCO' financial performance. In the low-hydrology scenario, the hydrology will continue to be low with 20 percent less capacity than in a normal year for a prolonged period of time. Under this low-hydrology scenario, the financial performance is projected as follows.

Year	2016	2017	2018	2019	2020	2021- 2025
Debt Service Coverage Ratio (DSCR)	1.17	0.73	1.19	1.45	1.57	1.50
Current Ratio	1.27	1.08	1.17	1.33	0.99	0.58
Cash balance before escrow (US\$ million)	155	169	180	161	52	(463.83)
Cash balance after escrow (US\$ million)	(22)	(7)	4	(15)	(125)	(640)

Table 6 10. ZESCO's	Projected	Financial P	erformance	(low hyd	rology	case)
TADIE 0.10. LESCO S	Trojecteu	r mancial 1	er for mance	(10% 11yu	luugy	casej

34. Under this scenario, DSCR will remain positive, except in 2017 where GRZ support is assumed. Cash balance after escrow will start deteriorating in 2020, as the bank interest charge for bank overdraft from 2019 starts growing. Hence the current ratio will start deteriorating in 2020 due to increasing burden of transmission investments and interest charges from bank overdrafts to

fill the cash shortage. Under this scenario, additional GRZ support and/or further tariff increase will be needed to cover the loss. The figure may be different if GRZ provides financial support to avoid bank overdrafts, but this may be a challenge as GRZ is in a fiscally constrained position.

iii) No tariff increase scenario

35. Under the no real tariff increase scenario, tariff increases are only indexed to Zambia's inflation. The projected financial performance is summarized below.

Year	2016	2017	2018	2019	2020	2021-2025
Debt Service Coverage Ratio (DSCR)	1.17	0.38	1.21	1.09	1.09	(0.03)
Current Ratio	1.27	0.92	1.01	0.97	0.69	0.24
Cash balance before escrow (US\$ million)	155	111	109	33	(187)	(2,204.19)
Cash balance after escrow (US\$ million)	(22)	(66)	(68)	(144)	(364)	(2,381)

 Table 6.11: ZESCO's Projected Financial Performance (no tariff increase case)

36. Under this scenario, cash after escrow will be consistently low. The figure gets particularly alarming from 2020 when cash shortfall is filled by bank overdrafts and its interest charges increase. Under this scenario, ZESCO will be financially unsustainable without GRZ support.

Conclusion

37. ZESCO's financial prospect is challenging. In addition to ongoing GRZ support for emergency power import, GRZ support or bank overdraft is likely to be required. If the hydrology recovers in 2018 and the tariff increased around 13 percent annually from 2017 to 2020, then ZESCO would have sufficient cash to pay its operational cost, debts, and interest charges. However, either persistent low hydrology or not increasing its tariff will put ZESCO's financial performance to unsustainable level. From the policy perspective, the most important policy action will be to steadily increase the electricity tariff. Currently, Zambia's tariff level is one of the lowest in sub-Saharan Africa along with Sudan and Ethiopia (see figure below). This indicates Zambia has margins to increase the tariff, while maintaining the affordability of electricity.

38. Zambia's electricity demand can no longer be met by fully depreciated low-cost hydroelectric plants. In the short-run, there will be cost associated with emergency power imports. In the long run, ZESCO's additional generation capacity will be driven by more power purchases from IPPs. To cover the increased operational cost, increase of the electricity tariff will be critically important.



Figure 6.3: Total Cost and Tariff Revenue per kWh Billed in 2014 U.S. dollars

Constant 2014 US\$ per kWh sold, excluding VAT

Source: Trimble et al.(2016) Financial Viability of Electricity Sectors in Sub-Saharan Africa; Quasi-Fiscal Deficits and Hidden Costs. World Bank Policy Research Working Paper 7788

Annex 7: IDA Payment Guarantee Term Sheet

SUMMARY OF INDICATIVE TERMS AND CONDITIONS OF THE PROPOSED IDA PAYMENT GUARANTEE

This term sheet contains a summary of indicative terms and conditions of a proposed guarantee ("Guarantee") by the International Development Association ("IDA") for discussion purposes only and does not constitute an offer to provide a Guarantee. The provision of a Guarantee is subject, inter alia, to satisfactory appraisal by IDA of the West Lunga Project ("Project"), compliance with all applicable policies of the World Bank, including those related to environmental and social safeguards, review and acceptance of the ownership, management, financing structure, and project/transaction documentation by IDA, and the approval of the management and Executive Directors of IDA in their sole discretion. This term sheet is based on the signed versions of the agreements (Power Purchase Agreement and Government Support Agreement), and is designed to support obligations in such documents.

TERMS SPECIFIC TO A PAYMENT GUARANTEE IN SUPPORT OF A LETTER OF
CREDIT (LC) ¹⁹

	LETTER OF CREDIT ("LC")
LC Applicants:	The "Purchaser" under a Power Purchase Agreement ("PPA") and the "Government" under the Government Support Agreement ("GSA", and together with the PPA, the "Relevant Project Documents"), each entered into with the Seller.
LC Beneficiary:	The "Seller" under the Relevant Project Documents.
LC Bank:	A commercial bank acceptable to IDA, LC Applicants and the LC Beneficiary, and which is an "Acceptable Bank" (as defined in PPA). ²⁰
Maximum LC Amount:	The maximum amount available for draw under the LC shall be an amount to be agreed between the LC Beneficiary and LC Applicants (and acceptable to IDA) and in no event shall exceed US\$3.5 million.
LC Effective Date:	A date to be agreed between the LC Applicants and LC Beneficiary (and acceptable to IDA), which is expected to be the "Effective Date" as defined in the PPA.

¹⁹ As per article 13 of the PPA, the Liquidity Support Mechanism could either be an escrow account or a letter of credit. If IDA is backing either of these arrangements, the underlying agreements will need to be in form and substance acceptable to IDA.

²⁰ If justified, the LC Bank could act as agent for a syndicate of commercial banks, subject to agency terms and conditions that are acceptable to IDA, LC Applicants and the LC Beneficiary.

LC Validity Period:	Term to be determined and expected to be at least equal to the tenor of senior debt for the Project.
LC features:	A letter of credit issued in favor of, and acceptable to, the LC Beneficiary by the LC Bank at the request of the LC Applicants to backstop certain payment obligations of the LC Applicants under the Relevant Project Documents.
	Any amounts drawn by the LC Beneficiary under the LC that are repaid to the LC Bank within the LC Reimbursement Period (as defined below) would be reinstated.
	The obligation of the LC Applicants to repay the LC Bank amounts drawn under the LC would be guaranteed by IDA.
	Any amount paid by IDA to the LC Bank under the Guarantee would be deducted from the Maximum Guaranteed Amount, and thus from the Maximum LC Amount, and those amounts would not be reinstated.
Permitted Drawdown under LC:	Purchaser's failure to make a payment pursuant to articles 12.3.3 and 13.6.1 of the PPA when due and payable; and
	If the PPA is terminated, the Government's failure to make the termination payment under the terms of the GSA, <i>provided</i> that (i) such payment is undisputed or if such payment is disputed, such dispute has been finally resolved; and (ii) such termination payment obligation is due as a result of the occurrence of certain events to be agreed between the LC Applicants and the LC Beneficiary (and acceptable to IDA).
LC Fees:	A fee acceptable to IDA, the LC Applicants and LC Beneficiary and payable to the LC Bank by either the LC Beneficiary or the LC Applicants. ²¹
LC REIMBU	JRSEMENT AND CREDIT AGREEMENT
Borrower:	LC Applicants ²²
Lender:	LC Bank
LC Reimbursement Period:	Following a draw under the LC by the LC Beneficiary, LC Applicants would be obligated to repay the LC Bank the amount drawn under the LC together with accrued interest

²¹ Note that the PPA allows for the LC Beneficiary to pay LC Fees directly to LC Bank and charge back such LC Fees to Purchaser.

 $^{^{22}}$ The Government has an obligation to replenish any draws pursuant to article 5.2 of the GSA in addition to its obligation to pay any termination amount. As such, under the Reimbursement and Credit Agreement the Government would act as co-Borrower.

	thereon within a period of twelve (12) months ("Reimbursement Period") from the date of each draw pursuant to a Reimbursement and Credit Agreement to be concluded between LC Applicants and the LC Bank.
	In the event of a timely repayment, the LC will be reinstated by the amount of such repayment.
	In the event of a non-payment on the due date, the LC Bank would have the right to call on the Guarantee for principal amounts plus accrued interest due by the LC Applicants under the Reimbursement and Credit Agreement.
Principal amount of the LC Bank Credit:	Amounts drawn down under the LC not to exceed the Maximum LC Amount.
Interest Rate on the LC Bank Credit:	An appropriate spread above LIBOR agreed by the LC Bank, the LC Applicants and acceptable to IDA.
	GUARANTEE AGREEMENT
Guarantor:	IDA
Guaranteed Beneficiary:	LC Bank
Guarantee:	IDA would backstop the obligations of the LC Applicants under the Reimbursement and Credit Agreement to the extent that said obligations result from Permitted Drawdown under the LC and the LC Applicants have failed to replenish the LC.
Maximum Guaranteed Amount:	The Maximum Guaranteed Principal plus Maximum Guaranteed Interest as below. Any amount paid by IDA to the LC Bank under the Guarantee would be deducted from the Maximum Guaranteed Amount and would not be reinstated.
Maximum Guaranteed Principal:	The Maximum LC Amount, not to exceed 180 days' revenue of the winning bidder's Energy Charge.
Maximum Guaranteed Interest:	Scheduled interest due and payable on the amounts drawn under the LC. IDA may cover compound interest but IDA will not cover penalty interest, default interest or charges of similar nature.
Maximum Guarantee Period:	LC Validity Period plus 14 months.

Exclusions, Limitation/Suspension and Termination Events:	Standard exclusion, limitation/suspension and termination events for transactions of this nature.
Substitution of Guarantee:	If IDA exercises remedies against the LC Bank under the Guarantee Agreement for reasons attributable to the LC Bank, then IDA may enter into a new Guarantee Agreement with a substitute LC Bank ²³ in substantially the same terms and conditions as the Guarantee Agreement and for the remaining term of the Maximum Guarantee Period.
Effectiveness of the Guarantee:	a) Firm commitment for sufficient financing to complete
Subregation	 the construction of the Project, including satisfactory contribution of equity; b) Execution, delivery and effectiveness of all Project and financing agreements, in form and substance satisfactory to IDA, including the Indemnity Agreement and the Project Agreement; c) Delivery of all relevant host country environmental approvals required for the operation of the Project, and compliance with all applicable World Bank requirements relating to environmental and social safeguards, including the World Bank Performance Standards and Sanctionable Practices; d) Effectiveness of all required insurance (to include IDA as an additional insured on third-party liability insurance); e) Satisfaction of all conditions precedent under the Financing Documents, save for any condition that requires the effectiveness of the IDA Guarantee Agreement to have occurred; f) Provision of satisfactory legal opinions; and g) Payment in full of the Up-Front Fees (if invoiced) and the first installment of the Guarantee Fee.
Subrogation:	If and to the extent IDA makes any payment under the Guarantee, IDA will be subrogated immediately to the extent of such unreimbursed payment to the LC Bank's rights under the Reimbursement and Credit Agreement.

²³ That is, a commercial bank acceptable to IDA, LC Applicants and the LC Beneficiary, and which is an "Acceptable Bank" (as defined in PPA).

Note: Under the Power Purchase Agreement (PPA), ZESCO is required to provide a security either via an escrow account or via a Letter of Credit (LC). GRZ has expressed preference for the LC option given its lower commitment of capital and, hence, substantially lower costs. However, since the competitive recruitment of a LC bank is under way, the option of using an escrow account, and for the IDA payment guarantee to support it, is still a possibility.

TERMS SPECIFIC TO A PAYMENT GUARANTEE IN SUPPORT OF AN ESCROW ACCOUNT²⁴

ESCROW LETTER		
Parties:	 (a) The "Purchaser" under a Power Purchase Agreement ("PPA"); (b) the "Government" (the Government, together with the Purchaser, the "Obligors") under the Government Support Agreement ("GSA"), and together with the PPA, the "Relevant Project Documents"); (c) the "Seller" under each Relevant Project Document ("Escrow Account Beneficiary"); and (d) the Escrow Agent. 	
Escrow Agent:	A commercial bank acceptable to IDA, the Obligors and the Escrow Account Beneficiary.	
Escrow Effective Date:	A date to be agreed between the Obligors and Escrow Account Beneficiary (and acceptable to IDA), which is expected to be the "Effective Date" as defined in the PPA.	
Permitted Drawdown:	Purchaser's failure to make a payment pursuant to articles 12.3.3 and 13.6 of the PPA when due and payable; or If the PPA is terminated, the Government's failure to make the termination payment under the terms of the GSA, <i>provided</i> that (i) such payment is undisputed or if such payment is disputed, such dispute has been finally resolved; and (ii) such termination payment is due as a result of the occurrence of certain events to be agreed between the Purchaser, the Government, and the Escrow Account Beneficiary (and acceptable to IDA).	

²⁴ Per article 13 of the PPA, the Liquidity Support Mechanism could either be an escrow account or a letter of credit. If IDA is backing either of these arrangements, the agreements will need to be acceptable to IDA in substance and form.

Escrow Account fees:	A fee acceptable to IDA, the Obligors and the Seller and payable to the Escrow Agent by either the Seller or the Obligors. ²⁵	
	GUARANTEE AGREEMENT	
Guarantor:	IDA	
Escrow Account Beneficiary:	The "Seller" under the Relevant Project Documents	
Guarantee:	IDA would backstop the obligation of the Obligors to replenish the Escrow Account provided:	
	 (i) such obligation is due as a result of a Permitted Drawdown; and (ii) the Obligors have failed to replenish the Escrow Account in an amount corresponding to such Permitted Drawdown within twelve (12) months thereof. IDA would pay directly into the Escrow Account. 	
Maximum Guaranteed Amount:	USD [X] million representing a portion of the amount in the escrow account.	
Maximum Guarantee Period:	Term to be determined.	
Exclusions, Limitation/Suspension and Termination Events:	Standard exclusion, limitation/suspension and termination events for transactions of this nature.	
Conditions Precedent to the Effectiveness of the Guarantee:	 Usual and customary conditions for financing of this type, including but not limited to the following: a) Firm commitment for sufficient financing to complete the construction of the Project, including satisfactory contribution of equity; b) Execution, delivery and effectiveness of all Project and financing agreements, in form and substance satisfactory to IDA, including the Indemnity Agreement and the Project Agreement; c) Delivery of all relevant host country environmental approvals required for the operation of the Project, and compliance with all applicable World Bank requirements relating to environmental and social 	

²⁵ Note that the PPA allows for the Seller to pay Escrow Account fees directly and charge back to Purchaser such Escrow Account fees.

	 safeguards, including the World Bank Performance Standards and Sanctionable Practices; d) Effectiveness of all required insurance (to include IDA as an additional insured on third-party liability insurance); e) Satisfaction of all conditions precedent under the Financing Documents, save for any condition that requires the effectiveness of the IDA Guarantee Agreement to have occurred; f) Provision of satisfactory legal opinions; and g) Payment in full of the Up-Front Fees (if invoiced) and the first installment of the Guarantee Fee.
Subrogation:	If and to the extent IDA makes any payment under the Guarantee, IDA will be subrogated immediately to the extent of such unreimbursed payment to the Escrow Account Beneficiary's rights under the PPA.
Governing Law:	English law or New York Law.

TERMS COMMON TO A PAYMENT GUARANTEE IN SUPPORT OF A LETTER OF CREDIT OR IN SUPPORT OF AN ESCROW ACCOUNT

INDEMNITY AGREEMENT								
Parties:	IDA and the Republic of Zambia ("Zambia").							
Indemnity:	Zambia will reimburse and indemnify IDA on demand, or as IDA may otherwise direct, for all payments under the Guarantee and all losses, damages, costs and expenses incurred by IDA relating or arising from the Guarantee.							
Covenants:	Usual and customary covenants included in agreements between member countries and IDA.							
Remedies:	If Zambia breaches any of its obligations under the Indemnity Agreement, IDA may suspend or cancel, in whole or in part, the rights of Zambia to make withdrawals under any other loan agreement with IDA, or any IDA loan to a third party guaranteed by Zambia, and may declare the outstanding principal and interest of any such loan to be due and payable immediately. A breach by Zambia under the Indemnity Agreement will not, however, forgive any guarantee obligations of IDA under the Guarantee.							

Governing Law:	The Indemnity Agreement will follow the usual legal regime and include dispute settlement provisions customary for agreements between member countries and IDA								
PROJECT AGREEMENT									
Parties:	IDA and [LC or Escrow Account] Beneficiary								
Representations and Warranties:	The [LC or Escrow Account] Beneficiary will represent, among other standard and project specific provisions, that as of the effective date of the Guarantee: (i) it is in compliance with applicable environmental laws and the applicable World Bank's guidelines, environmental and social safeguard policies and other applicable requirements; and (ii) neither it (including its direct and indirect shareholder and any other relevant project participants), nor any of its affiliates has engaged in any Sanctionable Practice ²⁶ in connection with the Project.								
Covenants:	 The [LC or Escrow Account] Beneficiary will covenant, among other things, that it will: a) comply with applicable laws, including environmental laws, and the applicable World Bank environmental and social safeguard policies under the World Bank Performance Standards; b) provide annual audited financial statements and other reports; c) provide access to the project site and documentation on reasonable notice; d) not engage in any Sanctionable Practice in connection with the Project; and e) obtain IDA's consent prior to agreeing to any change to any material Project related transaction document to which it is a party which would materially affect the rights or obligations of IDA under the Guarantee Agreement. 								

²⁶ "Sanctionable Practices" include corrupt, fraudulent, collusive, coercive, or obstructive practices.

Guarantee Fees (recurring) ²⁷ :	75 bps per annum, payable semi-annually in advance by the [LC or Escrow Account] ²⁸ Beneficiary, on any committed and outstanding IDA financial exposure under the Guarantee, i.e. on the Maximum Guaranteed Principal in the case of an LC and on the Maximum Guarantee Amount in the case of an escrow account. The Guarantee would lapse in the event of nonpayment of any installment of the relevant Guarantee Fee.									
Upfront Fees ²⁹ :	 (a) An Initiation Fee of 15 bps of the Maximum Guaranteed Amount³⁰ (but not less than US\$100,000) payable by the [LC or Escrow Account] Beneficiary. 									
	 (b) Processing Fee of 50 bps³¹ of the Maximum Guaranteed Amount³² payable by the [LC or Escrow Account] Beneficiary. 									
	(c) Reimbursement of IDA outside legal counsel expenses by the [LC or Escrow Account] Beneficiary.									
Governing Law:	English law or New York Law.									
COOPERATION AGREEMENT										
Parties:	IDA and Purchaser.									
Covenants:	Purchaser will covenant, among other things, that it:									
	a) will comply with all its obligations under the transaction documents;									
	b) will obtain IDA's consent prior to agreeing to any change to any transaction document which would materially affect the rights or obligations of IDA under the Guarantee Agreement or any other transaction document;									
	c) will provide certain notices to IDA;									
	d) will take all action necessary on its part, in accordance with and as required by the terms of the project-related									

²⁷FY16 pricing. All fees will be updated based on the pricing applicable at the time of approval by IDA's board of directors.

²⁸ For the avoidance of doubt, all Guarantee fees (i) are separate from LC fees or Escrow Account fees; (ii) are payable by the LC or Escrow Account beneficiary, as the case may be; and (iii) under the PPA are not charged back to the Purchaser.

²⁹FY16 pricing. All fees will be updated based on the pricing applicable at the time of approval by IDA's board of directors.

³⁰ Only in case of the IDA Guarantee covering the LC, this fee shall be calculated on the Maximum LC Amount.

³¹ IDA may charge more if higher than usual internal costs are incurred during preparation.

³² Only in case of the IDA Guarantee covering the LC, this fee shall be calculated on the Maximum LC Amount.

agreements to which it is a party, to enable the [LC or Escrow Account] Beneficiary to perform all of the [LC or Escrow Account] Beneficiary's obligations under the Project Agreement, and other relevant transaction document; and
e) will cooperate with IDA and furnish to IDA all such information related to such matters as IDA shall reasonably request; and promptly inform IDA of any condition which interferes with, or threatens to interfere with, such matters.

Annex 8: Ownership and Structure – Application of Offshore Financial Centers Policy

1. Investment Structure. The Project Company, Bangweulu Power Company Limited, is domiciled in the Republic of Zambia. The organizational chart (Figure 8.1) illustrates the ownership structure of the Project Company.



Figure 8.1: Ownership Structure of the Project Company

* Figures in brackets indicate indirect ownership in the Project Company.

Note: (1) Capénergie II Fund is a private equity fund managed by Omnes Capital, a French-based fund manager. No investors in the fund owns more than 10% of the Project Company.

(2) First Solar Inc. is a publicly listed company with highly diversified shareholding structure. There are no institutional or individual shareholders that own more than 10% of the Project Company.

(a)Zambian Sunlight One S.A.S (incorporated in France) owns 80% of the Project Company. The entities and individuals that indirectly own more than 10% in the Project Company through Zambian Sunlight One S.A.S are:

(i) NEOEN Investissement S.A.S (incorporated in France), which owns 68.75% of Zambian Sunlight One S.A.S, thus indirectly owns 55% of the Project Company. NEOEN Investissement S.A.S is 100% owned by NEOEN S.A.S (incorporated in France).

(ii) Impala S.A.S (incorporated in France), a French diversified industry company, owns 56.08% of NEOEN S.A.S, thus indirectly owns 30.8% of the Project Company.

(iii) Jacques Veyrat, a French national and a reputable French businessman, owns 100% of Impala S.A.S, thus indirectly owns 30.8% of the Project Company.

(iv) Capénergie II Fund (incorporated in France), a private equity fund managed by French-based fund manager Omnes Capital, owns 23.84% of NEOEN S.A.S, thus indirectly owns 13.2% of the Project Company.

(v) First Solar Egypt Holdco One. LLC (incorporated in the United States) owns 31.25% of Zambian Sunlight One S.A.S, thus indirectly owns 25% of the Project Company.

(vi) First Solar Fe Holdings Pte. Ltd. (incorporated in Singapore) owns 100% of First Solar Egypt Holdco One. LLC, thus indirectly owns 25% of the Project Company.

(vii) First Solar Fe Holdings Pte. Ltd. is a 100% subsidiary of First Solar Inc. (incorporated in the United States). The latter is a publicly-listed entity with its shares traded on NASDAQ. As a publicly listed company, First Solar Inc. publishes its audited financial statements and annual reports and is subject to the listing requirements of the Securities and Exchange Commission of the United States.

(b)West Lunga Power Company Limited (incorporated in the Republic of Zambia) owns 20% of the Project Company. The entities that indirectly own more than 10% in the Project Company through West Lunga Power Company Limited are:

(i) The Industrial Development Corporation Limited of Zambia (incorporated in the Republic Zambia) ("IDC") owns 100% of West Lunga Power Company Limited, thus indirectly owns 20% of the Project Company. IDC is 100% owned by the government of the Republic of Zambia.

2. **Integrity Due Diligence**. IFC has been satisfied with its integrity due diligence on all relevant persons involved in the transaction in line with IFC's Integrity Due Diligence guidelines. An additional due diligence following the publication of the Panama Papers was completed, which did not indicate any concerns for the Project.

3. **Use of intermediate jurisdictions**. The project team conducted due diligence on the use of each intermediate jurisdiction in the structure and confirmed with the client that:

(a)France was chosen as an intermediate jurisdiction in this project in order to minimize administrative costs by incorporating in the same jurisdiction as the majority shareholders, and to take advantage of the tax treaty between France and the Republic of Zambia.

(b)Singapore was chosen as an intermediate jurisdiction in this project because of the administrative efficiencies, various favorable tax treatment (low corporate tax rate, zero dividend and capital gain tax, lower personal income tax), and strong rule of law.

4. **Taxation.** The revenues of the Project will be subject to tax in the Republic of Zambia. Distributions of dividends will not be subject to withholding tax by the Republic of Zambia because Zambian Sunlight One S.A.S, a French entity, is exempt from withholding tax on dividends received from the Project Company, a Zambian entity, according to the non-double taxation treaty between France and Zambia.

5. **WBG Policy on Tax Transparency**. This proposed investment was subject to the policy on the use of intermediate jurisdictions in WBG operations approved by the Board (IFC/R2014-0206), and was found to be acceptable.

6. Under the policy, IFC first performed its standard transactional due diligence, with emphasis on the business and tax planning rationale for the structure. Based upon the information available to IFC and the analysis conducted, IFC is satisfied that, from a transactional stand point, the structure was put in place for legitimate reasons.

7. Next, after examination of the status of France and Singapore vis-à-vis the Peer Review Process of the Global Forum on Transparency and Exchange of Information for Tax Purposes, France and Singapore were found to be eligible Intermediate Jurisdictions for this project.

- (a) France underwent a combined Phase 1-Phase 2 review for which there is a Peer Review Report published on November 22, 2013. Based on the findings in the Peer Review Report, France was assigned a Phase 2 rating of "Compliant". Therefore France is an eligible Intermediate Jurisdiction for the purpose of the Offshore Financial Centers (OFC) Policy.
- (b)Singapore underwent Phase 1 review and based on the Peer Review Report dated June 1, 2011, received a positive assessment. Subsequently it underwent Phase 2 review and based on the Peer Review Report dated November 22, 2013, received a rating of "Largely Compliant". Therefore Singapore is an eligible Intermediate Jurisdiction for the purpose of the OFC policy.

Annex 9: Statement of IFC's Committed and Outstanding Portfolio in Zambia

MIS	International Finance Corporation	Report Run Date: 01/17/2017
	Statement of IFC's Committed and Outstanding Portfolio	
	Amounts in US Dollar Millions	
	Accounting Date as of : 01/31/2017	Page 1
Region(s):Sub-Saharan Africa		

Country(s) : Zambia

Commitment	Institution	LN	LN	ET	QL + QE	GT	RM	ALL	ALL	LN	ET	QL + QE	GT	RM	ALL	ALL
Fiscal Year	Short Name	Cmtd - IFC	Repayment - IFC	Cmtd - Part	Out - IFC	Out - Part										
2013/ 2011/ 2016	Access Zambia	0	0	0.29	0	0	0	0.29	0	0	0.29	0	0	0	0.29	0.00
2014	Bayport Zambia	6.05	0	0	0	0	0	6.05	0	6.05	0	0	0	0	6.05	0.00
1993/ 1975/ 1990	Century Pack	0	0.88	0.05	0	0	0	0.05	0	0	0	0	0	0	0	0.00
2015	Chayton Africa	0	0	20.00	0	0	0	20.00	0	0	20.00	0	0	0	20.00	0.00
1993/ 1976	DBZ	0	0	0.00	0	0	0	0.00	0	0	0	0	0	0	0	0.00
1982/ 1993/ 1990	Ethanol Zambia	0	0	0.00	0	0	0	0.00	0	0	0	0	0	0	0	0.00
2016	FNB Zambia	25.00	0	0	0	0	0	25.00	0	0	0	0	0	0	0	0.00
1993/ 1990/ 1985	Mpongwe	0	0	0.08	0	0	0	0.08	0	0	0	0	0	0	0	0.00
2010	ZANACO	5.00	20.00	0	0	0	0	5.00	0	5.00	0	0	0	0	5.00	0.00
2010/ 2012	Zambeef	19.60	13.23	0	0	0	0	19.60	0	19.60	0	0	0	0	19.60	0.00
2017	<u>Zoona</u>	0	0	6.00	0	0	0	6.00	0	0	3.00	0	0	0	3.00	0.00
Total Portfolio		55.64	34.10	26.43	0	0	0	82.07	0	30.64	23.29	0	0	0	53.93	0.00



FEBRUARY 20

) 33514R