Document of
The World Bank

Report No: ICR3523

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-44460, TF-92315, IDA-47920, TF-97260)

ON A

CREDIT

IN THE AMOUNT OF SDR 33.7 MILLION
(US$53 MILLION EQUIVALENT)

AN ADDITIONAL CREDIT
IN THE AMOUNT OF SDR 13.6 MILLION
(US$20 MILLION EQUIVALENT)

AND A

GLOBAL ENVIRONMENTAL FACILITY GRANT
IN THE AMOUNT OF US$4.5 MILLION

TO THE

REPUBLIC OF ZAMBIA

FOR AN

INCREASED ACCESS TO ELECTRICITY SERVICES PROJECT

January 30, 2016

Energy and Extractives Global Practice
Country Department AFCS1

CURRENCY EQUIVALENTS

(Exchange Rate Effective November 30, 2015)

Currency Unit = Zambian Kwacha (ZMW)
ZMW 1.00 = US$ 0.08
US$ 1.00 = ZMW 12.59

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

BP	Bank Procedures
CEC	Copperbelt Fluorescent Corporation
CFL	Compact Fluorescent Lamp
CO_2	Carbon Dioxide
DO	Development Objective
DSM	Demand-side Management
EE	Energy Efficiency
EIRR	Economic Internal Rate of Return
ERB	Energy Regulation Board
ESMF	Environmental and Social Management Framework
EU	European Union
FIRR	Financial Internal Rate of Return
FM	Financial Management
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEO	Global Environment Objective
GoZ	Government of Zambia
GPOBA	Global Partnership on Output-Based Aid
HH	Household
IAES	Increased Access to Electricity Services Project
IDA	International Development Association
IFR	Interim Financial Report
IP	Implementation Progress
IRR	Internal Rate of Return
ISR	Implementation Status and Results Report
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
M&E	Monitoring and Evaluation
MEWD	Ministry of Energy and Water Development
MoE	Ministry of Education
MoH	Ministry of Health
MW	Megawatt

NPV	Net Present Value
O&M	Operations and Maintenance
OP	Operational Policy
PAD	Project Appraisal Document
PDO	Project Development Objective
PREP	Priority Rural Electrification Project
PV	Photovoltaic
RAP	Resettlement Action Plan
REA	Rural Electrification Authority
REF	Rural Electrification Fund
SAPP	Southern Africa Power Pool
SHS	Solar Home Systems
SIDA	Swedish International Development Agency
SSMP	Sustainable Solar Market Packages
TA	Technical Assistance
WA	Withdrawal Applications
WTP	Willingness to Pay
ZESCO	ZESCO Limited
ZPPA	Zambia Public Procurement Authority

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ZAMBIA
Increased Access to Electricity Services Project

CONTENTS

DATA SHEET

A. Basic Information			
Country:	Zambia	Project Name:	Zm: Increased Access to Electricity Services
Project ID:	P077452,P076320	L/C/TF Number(s):	IDA-44460,IDA-47920,TF-92315,TF-97260,
ICR Date:	1/19/2016	ICR Type:	Core ICR
Lending Instrument:	SIL, SIL	Borrower:	GOVERNMENT OF ZAMBIA
Original Total Commitment:	USD 33.00M	Disbursed Amount:	USD 51.38M
Environmental Category: B		**Focal Area**: C	
Implementing Agencies: **Rural Electrification Authority (REA)** **Zambia Electric Supply Corporation Ltd. (ZESCO)**			
Co-financiers and Other External Partners: **Global Environment Facility, European Commission**			

B. Key Dates				
Zambia: Increased Access to Electricity Services - P077452				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	02/19/2004	Effectiveness:	02/19/2009	02/19/2009
Appraisal:	07/30/2007	Restructuring(s):		09/03/2010 08/14/2013
Approval:	05/20/2008	Mid-term Review:	04/30/2012	04/20/2012
		Closing:	12/31/2013	06/30/2015

Zambia: Increased Access to Electricity & ICT Services - GEF - P076320				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	02/19/2004	Effectiveness:	02/19/2009	02/19/2009
Appraisal:	07/30/2007	Restructuring(s):		
Approval:	05/20/2008	Mid-term Review:	03/05/2011	
		Closing:	12/31/2013	06/30/2015

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes	Moderately Satisfactory
GEO Outcomes	Moderately Satisfactory
Risk to Development Outcome	Moderate
Risk to GEO Outcome	Moderate
Bank Performance	Moderately Satisfactory
Borrower Performance	Moderately Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)			
Bank	**Ratings**	**Borrower**	**Ratings**
Quality at Entry	Moderately Unsatisfactory	Government:	Moderately Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
Overall Bank Performance	Moderately Satisfactory	Overall Borrower Performance	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Zambia: Increased Access to Electricity Services - P077452			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating:**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
DO rating before Closing/Inactive status	Moderately Satisfactory		

Zambia: Increased Access to Electricity & ICT Services - GEF - P076320			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating:**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
GEO rating before Closing/Inactive Status	Moderately Satisfactory		

D. Sector and Theme Codes		
Zambia: Increased Access to Electricity Services - P077452		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Energy efficiency in Heat and Power	32	26
Hydropower	18	2
Other Renewable Energy	18	6
Transmission and Distribution of Electricity	32	66
Theme Code (as % of total Bank financing)		
Infrastructure services for private sector development	100	100

Zambia: Increased Access to Electricity & ICT Services - GEF - P076320		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Central government administration	22	20
General finance sector	11	0
Other Renewable Energy	67	80
Theme Code (as % of total Bank financing)		
Climate change	40	30
Environmental policies and institutions	20	10
Infrastructure services for private sector development	20	20
Rural services and infrastructure	20	40

E. Bank Staff		
Zambia: Increased Access to Electricity Services - P077452		
Positions	**At ICR**	**At Approval**
Vice President:	Makhtar Diop	Obiageli Katryn Ezekwesili
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	Eugene D. McCarthy	

Zambia: Increased Access to Electricity & ICT Services - GEF - P076320		
Positions	**At ICR**	**At Approval**
Vice President:	Makhtar Diop	Obiageli Katryn Ezekwesili
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	Eugene D. McCarthy	

F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)
The objective of this project is to increase access to electricity services and improve efficiency and quality of the electricity distribution system in targeted areas.

Revised Project Development Objectives (as approved by original approving authority)

Global Environment Objectives (from Project Appraisal Document)
The project global environmental objective, in line with GEF Operational Program No. 6, is to remove barriers to renewable energy technologies to help mitigate greenhouse gas emissions.

Revised Global Environment Objectives (as approved by original approving authority)

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Household electricity connections provided under the project.			
Value (quantitative or Qualitative)	0.00	65,000	51,000	92,265
Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 181 percent of the revised target.			
Indicator 2 :	Number of households in urban areas provided with access to electricity under the project.			
Value (quantitative or Qualitative)	0.00	31,000	49,500	89,655
Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 181 percent of the revised target.			
Indicator 3 :	Number of households in rural areas provided with access to electricity under the project.			
Value (quantitative or Qualitative)	0.00	34,000	1,500	2,610
Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 174 percent of the revised target.			
Indicator 4 :	Number of households in rural areas provided with access to electricity under the project (grid extension).			
Value	0.00	18,000	1,000	47

(quantitative or Qualitative)				
Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Not achieved. 4.7 percent of the revised target reached due to delay in procurement and construction.			
Indicator 5 :	Number of households in rural areas provided with access to electricity under the project (Solar PV).			
Value (quantitative or Qualitative)	0	10,000	500	2,563
Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 513 percent of the revised target (1,134 solar home systems and 5,714 solar lanterns; four lanterns counted as equivalent of one solar home system).			
Indicator 6 :	Electricity losses per year in the project area (Percentage).			
Value (quantitative or Qualitative)	23	14	14	11
Date achieved	05/01/2008	12/31/2013	06/15/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 133 percent of the target.			
Indicator 7 :	Average interruption frequency per year in the project areas (times/year).			
Value (quantitative or Qualitative)	50	30	30	30
Date achieved	09/30/2010	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target fully achieved.			

(b) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Load reduction through demand side management (MW)			
Value (quantitative or Qualitative)	0.00	36	45	57
Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 127 percent of the revised target.			
Indicator 2 :	Reduced tones of CO_2 emissions. (Tones/year, Custom)			
Value (quantitative or	0.00	20,000	5,600	5,600

Qualitative)				
Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Revised target fully achieved.			

(c) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Direct project beneficiaries, of which Female (51 percent)			
Value (quantitative or Qualitative)	0.00	832,450	808,500	1056,190
Date achieved	09/30/2010	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 131 percent of the revised target. The composition of female beneficiaries was not monitored.			
Indicator 2 :	Distribution lines constructed/rehabilitated (km).			
Value (quantitative or Qualitative)	0.00	1,100	155	654.1
Date achieved	09/30/2010	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 422 percent of the revised target.			
Indicator 3 :	Distribution lines constructed (km)			
Value (quantitative or Qualitative)	0.00	800	140	654.1
Date achieved	09/30/2010	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 467 percent of the revised target.			
Indicator 4 :	Distribution lines rehabilitated (km)			
Value (quantitative or Qualitative)	0.00	300	15	15
Date achieved	09/30/2010	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Revised target fully achieved.			
Indicator 5 :	Number of CFLs installed by the project.			
Value (quantitative or Qualitative)	0.00	1,000,000	1,000,000	1,000,000

Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Revised target fully achieved.			

Indicator 6 :	Number of new community electricity connections under the project.			
Value (quantitative or Qualitative)	0.00	250	100	104
Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 104 percent of the revised target.			
Indicator 7 :	Number of new community electricity connections under the project (school).			
Value (quantitative or Qualitative)	0.00		83	100
Date achieved	09/30/2010	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 120 percent of the revised target.			
Indicator 8 :	Number of new community electricity connections under the project (hospitals)			
Value (quantitative or Qualitative)	0.00		17	4
Date achieved	09/30/2010	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Not achieved. 23.5 percent of revised target achieved.			
Indicator 9 :	% of ZESCO Unmetered customers (unmetered/ total)			
Value (quantitative or Qualitative)	39	12	12	2
Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 137 percent of the target.			
Indicator 10 :	REA: Total number of projects implemented (grid extension/ solar PV/ mini/hydro)			
Value (quantitative or Qualitative)	274	450	450	586
Date achieved	05/01/2008	12/31/2013	06/30/2015	06/30/2015
Comments (incl. % achievement)	Target exceeded, achieved 130 percent of the target.			

G. Ratings of Project Performance in ISRs

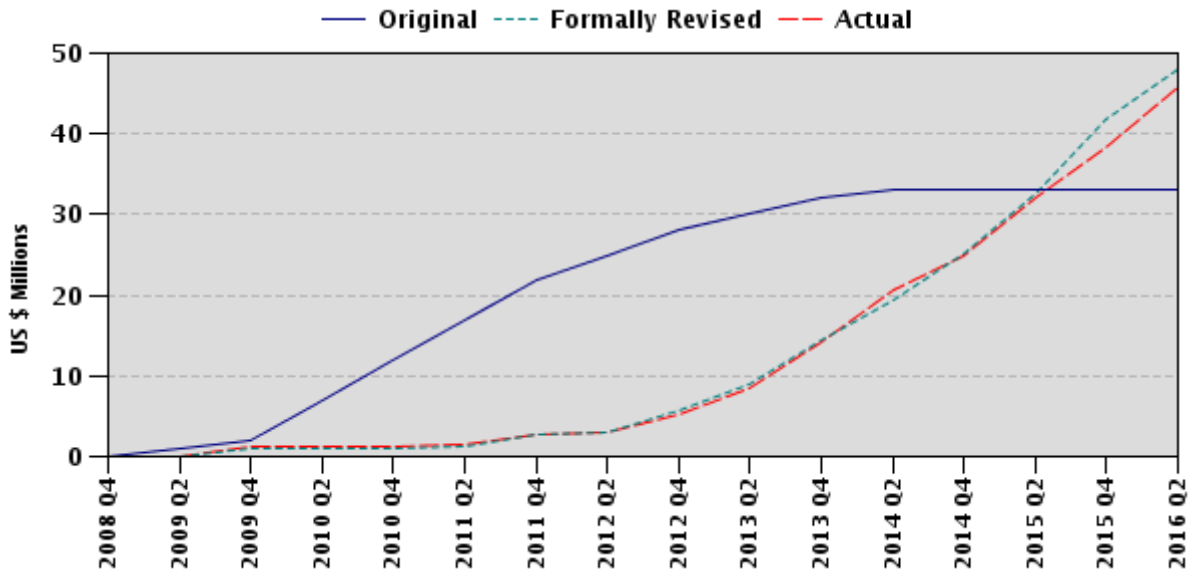
No.	Date ISR Archived	DO	GEO	IP	Actual Disbursements (USD millions)
					Project 1
1	12/24/2008	S	S	S	0.00
2	04/14/2009	S	S	S	0.00
3	12/19/2009	MS	MS	MS	1.00
4	06/28/2010	MS	MS	MS	1.08
5	03/27/2011	MS	MS	MS	2.37
6	12/03/2011	MS	MS	MS	2.75
7	06/30/2012	MS	MS	MS	5.07
8	04/12/2013	MS	MS	MS	9.35
9	11/11/2013	MS	MS	MS	17.40
10	07/07/2014	MS	MS	MS	23.50
11	04/01/2015	MS	MS	MS	31.87
12	07/09/2015	MS	MS	MS	36.64

H. Restructuring (if any)

Restructuring Date(s)	Board Approved		ISR Ratings at Restructuring			Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
	PDO Change	GEO Change	DO	GEO	IP	Project1	
09/03/2010			MS		MS	1.09	Improve implementation and scale-up project outcomes: Extension of closing date changes in key indicators, additional finance.
08/14/2013			MS		MS	13.89	Improve implementation: Extension of closing date, changes in key indicators

I. Disbursement Profile

P077452



1. Project Context, Development and Global Environment Objectives Design

1.1 Context at Appraisal

1. In 2008, when the Increased Access to Electricity Services Project (IAES) was submitted to the Board, Zambia was among the poorest countries in Africa, with approximately half of its population living on less than a dollar a day. Nevertheless, global economic trends were promising and world copper prices had rebounded from an extended decline to reach new record highs. The Highly Indebted Poor Countries completion and G8 debt relief agreements had also reduced Zambia's heavy debt burden. Even though exports were still dominated by copper and cobalt mining (73 percent), the remaining contributors to the country's exports (mainly agriculture, with some manufacturing and tourism) were outperforming mining in real terms. As a result, despite a number of adverse external shocks (e.g., drought, high oil prices, and fuel shortages due to oil refinery interruptions), the Zambian economy was beginning to turn around, with real GDP growth reaching 6 percent in 2006.

2. However, the electricity sector was facing problems and it was recognized that, if these were not overcome, the sector would impede future economic growth. Electricity sector challenges included frequent power shortages due to limited generation capacity, deteriorating financial performance of the country's main power utility, ZESCO Limited Ltd. (ZESCO), as a result of electricity tariffs being below the marginal cost of supply, low rates of access to electricity (20 percent), and the limited development of renewable energy resources beyond large hydropower generation. Expansion of the electricity network while increasing efficiency in the sector was also important for the country's Poverty Reduction Strategy.

3. The main sector institutions were the: (i) Ministry of Energy and Water Development (MEWD), which was responsible for sector policy, planning, and coordination; (ii) Energy Regulation Board (ERB), with a mandate covering the entire energy sector, and with responsibilities that included licensing, review and approval of power tariffs, and enforcement of quality and service standards; (iii) ZESCO, a vertically integrated, state-owned power utility; and (iv) Rural Electrification Authority (REA), a newly established institution with a mandate to administer and manage the Rural Electrification Fund (REF), develop plans for grid and off-grid rural electrification and monitor project implementation, and expand access to electricity in rural areas. In addition, a privately owned transmission company, Copperbelt Energy Corporation (CEC), supplied bulk electricity to the mining industry and accounted for more than 50 percent of ZESCO sales.

4. There had been no significant addition to the country's generation capacity since the early 1970s. During this period, however, electricity demand had steadily increased and had accelerated to an average of 4 percent per annum in the years prior to project appraisal. As a consequence, the electricity network began to experience power shortages and the country transitioned from a net exporter to a net importer of electricity within the Southern African Power Pool (SAPP). Deteriorating sector conditions were compounded by ZESCO's precarious financial situation due primarily to high system losses, high labor costs, and electricity tariffs being lower than the marginal cost of supply. As a result, there

were limited resources available for access expansion. Low electricity tariffs also increased the risk for private sector investment in the Zambian electricity sector.

5. In response to the weakening performance of the sector, the government embarked upon a series of measures aimed at addressing the situation. These included steps to: (i) improve the governance of ZESCO to enable it operate as a commercial entity; (ii) upgrade distribution lines to reduce losses; (iii) reduce ZESCO staff numbers and expand meter coverage; (iv) improve revenue collection; and (v) strengthen reliability of electricity supply. Overall, the government's goal for the sector was to establish a stable and predictable policy and regulatory framework, and a market structure capable of promoting competition, efficiency and private sector involvement.

6. Access to basic electricity services was very low in Zambia – only 20 percent overall, comprising 40 percent and 2 percent access rates for urban/peri-urban and rural areas, respectively. Low access constrained economic progress and diminished the quality of life for Zambia's poor. The government goal was to increase the overall electrification rate to 66 percent by 2030, comprising 90 percent and 50 percent access in urban and rural areas, respectively, and based on a Rural Electrification Master Plan that had been prepared with assistance from the Japan International Cooperation Agency (JICA).

7. Limited utilization of the country's renewable energy potential had taken place with the exception of some of the large hydro resources. This was mainly due to the lack of a policy and regulatory framework for renewable energy. At appraisal, the government was giving priority to the development of renewable energy sources in order for basic energy services to be provided to public facilities, such as schools and health centers, in off-grid areas of the country.

8. The government also adopted a sector wide syndication approach for rural electrification, with a view to mobilizing large amounts of donor resources and helping establish a long-term program. This involved close collaboration with three other cooperating partners – the European Union (EU), Japan Bank for International Cooperation (JBIC),[1] and Swedish International Development Agency (SIDA). In addition to co-financing this project, the EU also funded a rural electrification project that undertook works in the Mumbwa and Kaoma districts of Central and Western Province, respectively. JBIC (later JICA) has financed grid extension works in the rural areas of the Central, Eastern, Luapula, Southern, and Western provinces of Zambia. The scope of work also includes mini-hydro power stations at Mwinilunga and Mujila. Meanwhile, SIDA provided support for capacity building activities at REA as well as through the REF financed grid extensions and off-grid electrification.

[1]JBIC was financing a project similar to Increased Access to Electricity Services Project, but in a different geographical area of the country.

Rationale for Bank Involvement

9. The Bank had been involved in Zambia's energy sector for over three decades. Both the Joint Assistance Strategy for Zambia, 2007-2010, and Country Assistance Strategy, 2008-2011, highlighted the energy sector as a priority area in the context of the country's development plans. In the years prior to appraisal, the Bank supported ZESCO in the rehabilitation of three hydropower plants and segments of the transmission and distribution network.

10. The rationale for the overall Bank involvement in the energy sector had four main objectives. *First*, to provide much needed financing to support the power sector investment program, aimed at expanding access and improving the quality and reliability of electricity supplies. *Second*, to build up the capacity of the newly established Rural Electrification Authority (REA) while strengthening ZESCO's operating and financial performance. *Third*, the Bank's continuing presence in the sector would provide a vehicle for further dialogue with the government, in partnership with the donor community, on institutional, regulatory, and policy issues affecting the sector's further development. *Fourth*, Bank involvement could help identify opportunities for an increased private sector presence.

1.2 Original Project Development Objectives (PDO) and Key Indicators (as approved)

11. The project development objective was to increase access to electricity services and improve the efficiency and quality of the electricity distribution system in targeted areas.

12. The original key outcome indicators were:

- Increased access to electricity services as measured by: (i) number of connections through grid and off-grid electrification; and (ii) increased access rate in terms of a larger share of population with access to electricity services;
- Improvement in ZESCO's operational efficiency in targeted investment areas as measured by a reduction in ZESCO's distribution losses in those areas;
- Improvement in service quality in targeted investment areas as measured by reduced unplanned outages in those areas; and
- Mitigation of the power crisis as measured by the number of compact fluorescent lamps (CFLs) installed.

1.3 Original Global Environment Objectives (GEO) and Key Indicators (as approved)

13. The project global environmental objective was to remove barriers to renewable energy technologies to help mitigate greenhouse gas emissions. The key outcome indicators were:

- Installed capacity of renewable energy systems; and

- Avoided carbon dioxide emissions.

1.4 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

14. The PDO remained unchanged throughout the project. However, key indicators in the results framework changed following two project restructurings in 2010 and 2013.

15. In 2010, the project was restructured in order to improve implementation and scale-up overall project outcomes. The restructuring made changes to the original project indicators and included an additional financing operation. The connection targets for urban and peri-urban households were increased while the target for rural connections was reduced. Also, the project indicator for *"reduced unplanned outages in targeted areas"* was replaced by the more widely recognized and easier to measure *"average interruption frequency per year in the project area"*, which is an integral part of System Average Interruption Frequency Index (SAIFI). With regard to the intermediate outcome indicators, more specific targets were introduced (e.g., kilometers of distribution lines; number of community connections resulting from grid extensions and from off-grid renewable energy sources).

16. In the 2013 restructuring, the household connections target was reduced from an original target of 65,000 to 51,000. Also, the urban connections target was increased while that for rural areas was reduced. The main reason for reducing the rural connections target was due to the dropping of the isolated grids/mini-hydro sub-component, which was found to be far more costly than originally estimated. With respect to the intermediate outcome indicators, the target for distribution line construction and rehabilitation was significantly reduced due to delays in the implementation of the grid intensification component. Finally, the target for community access expansion through schools and health centers was also reduced due to REA's limited capacity in procurement and the slow pace of implementation.

Project Development Objective (PDO) Indicators

Indicators	**Baseline**	**Original target**	**2010 target**	**2013 target**
Electricity access rate (%)	20%	24%	24%	Dropped
This indicator was dropped as national electrification rate is not within the control of the project				
Household (HH) electricity connections provided under the project	0	65,000 HH	54,400 HH	51,000 HH
This indicator is the sum of urban and rural household connections.				
Urban households with access to electricity	0	31,000 HH	42,000 HH	49,500 HH

Target increased by addition of connection subsidy program in 2010. The target was increased again in 2013 based on the success of the subsidy program.

Rural households with access to electricity	0	34,000 HH	12,400 HH	1,500 HH

This indicator is the sum of grid extension connections and isolated grids/mini-hydro connections.

- Through grid extension	0	18,000 HH	8,900 HH	1,000 HH

Target reduced in 2010 with the realization that initial target did not reflect the number of households in targeted areas. Target further reduced in 2013 due to significant delay in implementation.

- Through isolated grids/mini-hydro	0	6,000 HH	1,000 HH	Dropped

Target reduced in 2010 to accommodate significant implementation delay. The indicator was dropped in 2013 as the sub-component of isolated grids/mini-hydro has been dropped.

- Through renewable (solar PV)	0	10,000 HH	2,500 HH	500 HH

The target was reduced in 2010 and 2013 due to slow implementation of the project.

Reducing electricity losses from distribution	23%	14%	14%	14%

The target remained the same throughout the project.

Reduced unplanned outages in targeted areas	32 hours/ month/ customer	3 h/ month/ customer	Dropped	Dropped

This indicator was moved from component level to PDO level in 2010 restructuring in order to have an adequate measurement for quality of service provision. The indicator was also altered to the more widely used and recognized average interruption frequency as shown below.

Average interruption frequency in the project area	50 times/ year		30 times/ year	30 times/ year

Intermediate Outcome Indicators

Indicators	**Baseline**	**Original target**	**2010 target**	**2013 target**
Component 1 – ZESCO Efficiency				
Number of direct project beneficiary	0		832,450	808,500
The target was reduced to reflect reduced number of household connection to electricity.				
- % of female		51 percent	51 percent	51 percent
The target remained the same throughout the project, but was not systematically monitored.				
Distribution lines	0		1,100 km	155km
This indicator is the sum of constructed and rehabilitation distribution lines.				
- Constructed	0		800 km	140km
The target was reduced due to delay in implementing grid extension sub-component.				
- Rehabilitated	0		300 km	15km
The target was reduced because Lusaka Transmission and Distribution System Rehabilitation project took over distribution line rehabilitation.				
CFLs distributed/installed	0	1,000,000	1,000,000	1,000,000
The target remained the same throughout the project.				
Component 2 – REA Access Expansion				
Community connections (grid extension/renewables)	0	250 (renewables)	120/70	100
The target was reduced in 2010 to reflect slow implementation of the project. Sub-indicators on hospitals and schools were added.				
- Hospital	0		60/30	17
The target was introduced in 2010 restructuring, and overall target was reduced in 2013 to accommodate significant delay in implementation.				
- Schools	0		60/40	83
The target was introduced in 2010 restructuring, and overall target was reduced in 2013 to accommodate delay in implementation.				
Component 3 Technical Assistance				
- % of ZESCO unmetered customers	39 percent	12 percent	12 percent	12 percent
The target remained the same throughout the project.				

- Number of projects implemented (by REA)	0	30	450	450

The target was increased in 2010 to include non-IAES financed projects.

- Number of projects in the pipeline (by REA)	14	40	70	Dropped

The indicator was dropped in 2013 to simplify reporting practice by REA.

- Volume of grants for SSMPs approved	0		US$ 1,000,000	Dropped

The indicator was dropped in 2013 to simplify reporting practice by REA.

- Pre-feasibility studies for PREPs and SSMPs completed by REA	12		30	Dropped

The indicator was dropped in 2013 to simplify reporting practice by REA.

1.5 Revised GEO (as approved by original approving authority) and Key Indicators, and reasons/justification

17. The Global Environment Objective (GEO) remained unchanged throughout the project, but its indicators and targets changed as a result of the project restructuring in 2013, during which the isolated grids/mini-hydro sub-component of the project was dropped. This led to the source of CO_2 reduction being changed from the development of mini-hydros to the installation of CFLs and resulted in a much lower CO_2 reduction target. In addition, the target for renewable energy installation capacity was removed and a target for the load reduction, attributable to CFL distribution, was included.

Global Environment Objective (GEO) Indicators

Indicators	**Baseline**	**Original target**	**2010 target**	**2013 target**
Installed capacity of renewable energy systems	1.3 MW	5.3 MW	3 MW	Dropped
CO_2 reduced	0	20,000 tCo2	20,000 tCo2	5,600 tCO2
Load reduction	0		45 MW	45 MW

1.6 Main Beneficiaries

18. Direct project beneficiaries, as elaborated in the 2010 restructuring paper, were (i) people benefiting from household connections; and (ii) pupils, teachers, doctors, nurses, and business owners and employees etc. directly benefitting from community connections

to schools, health facilities or other community points in rural and urban areas. In addition, households receiving CFL lightning in their homes were also direct beneficiaries. The overall number of beneficiaries was monitored as a part of the result framework.

19. The project also contributed to the improvement of ZESCO's efficiency and quality of service in targeted areas to the benefit of existing on-grid households, although the number of beneficiaries in such cases was not monitored.

1.7 Original Components (as approved)

20. The project had three components and eight sub-components when the project was approved, as summarized below.

Component 1 - ZESCO Efficiency Improvement - implemented by ZESCO

21. **Sub-Component 1a - Reinforcement** (US$9 million): This component comprised the strengthening and upgrading of ZESCO's existing distribution networks in selected areas of Lusaka. Work was planned at four sites – Lusaka 132kV ring, Coventry Street substation, Roma substation, and Chisamba and Figtree substations.

22. **Sub-Component 1b - Intensification** (US$11 million): This component comprised the intensification of connections within the existing ZESCO network in both urban and peri-urban areas.

23. **Sub-Component 1c - Energy Efficiency and Demand Side Management** (US$2 million): This component supported ZESCO in procuring, marketing, and distributing one million CFLs for use in households.

Component 2 - Access Expansion - implemented by REA

24. **Sub-Component 2a - Grid Extension** (US$25 million): This component was to connect about 18,000 new customers in Northern, Central, and Eastern regions, as well as other rural areas. It included construction of 33 kV and 11 kV lines to enable connection of the project areas to the national grid, along with the installation of transformers, construction of low voltage distribution networks, and the provision of service connections.

25. **Sub-Component 2b - Isolated grids/mini-hydro systems** (US$14 million): This component supported the installation of one or two mini-hydro systems to provide electricity to about 6,000 new customers. Two business models were considered: (i) construction, by a private developer, of a mini-hydro power generation plant in Chikata that would feed electricity into the existing ZESCO isolated mini-grid network that was hitherto supplied by a diesel powered generator; and (ii) construction by private developers (supported by capital grants from REA upon meeting eligibility criteria) of stand-alone mini-grids, complete with generation and distribution facilities.

26. **Sub-Component 2c – Solar PV Systems** (US$9 million): This component was to fund about 10 "Sustainable Solar Market Packages (SSMP)" that would enable 250 public

institutions and 10,000 households in rural areas to have access to modern energy services. The SSMP was an integrated means of supplying, installing, and maintaining (for five years), on a semi-commercial basis, solar PV systems in public institutions (e.g., schools, health centers, and associated staff housing).

Component 3 – Technical Assistance (TA) (US$5.5 million) – implemented by ZESCO and REA

27. **Sub-Component 3a – TA to ZESCO:** This component, funded by an EU grant, aimed at assisting ZESCO in: (i) developing a Performance Improvement Plan for enhancing revenues and reducing costs; and (ii) the technical design of programs/projects in distribution system improvement, loss reduction, grid extension and in intensification.

28. **Sub-Component 3b – TA to REA:** This component comprised: (i) capacity building and project implementation support for REA, including preparation of the additional small hydro Priority Rural Electrification Project (PREP) sites and SSMPs; (ii) support to the Ministry of Energy and Water Development (MEWD), Energy Regulation Board (ERB), Ministry of Education (MoE), Ministry of Health (MoH) on energy sector strategies, multi-year cost recovery tariff frameworks, renewable energy policy, regulations, outreach, capacity building, and environmental management guidelines; and (iii) advisory services for matching grants, and training to private developers and local financial institutions. This sub-component was to be financed with Global Environment Facility (GEF) funds.

1.8 Revised Components

29. The changes emanating from the 2010 and 2013 restructurings that were undertaken to improve implementation, achieve results, and scale-up outcomes, are described below by component. The first restructuring in 2010 was both corrective and adaptive. It addressed key project design issues, e.g., reducing the unrealistic target for solar PV household installations and introducing an integrated approach to the supply, installation, and maintenance of the solar systems; it also adapted to emerging issues by introducing additional reinforcement sub-components and the connection fee subsidy program. The second restructuring in 2013 was of a corrective nature: it further reduced the rural connection targets while dropping the mini-hydro component from the project scope.

30. ***1a Reinforcement:*** Originally, the reinforcement component covered four sites – Lusaka 132 kV Ring, Coventry Street substation, Roma substation, and Chisamba and Figtree substations. In order to accelerate implementation, it was agreed with the Government of Zambia (GoZ) and ZESCO to convert some of the larger supply-and-install contracts to supply-only in order that ZESCO could procure materials more speedily and implement the activities on a fast track basis using several smaller local contractors. The 2010 restructuring also included the introduction of an “integrated approach” in Lusaka. This was targeted at specific sites and involved upgrading the network, increasing connections, metering customers, and improving revenue collection and customer service in a coordinated manner.

31. ***2b Isolated grids/mini-hydro:*** Implementation of this component was delayed due to REA's limited experience in promoting and packaging such projects, lack of adequate feasibility studies on potential sites, and the absence of a feed-in tariff and overall regulatory framework for mini-hydro grids. To improve implementation, it was agreed with the GoZ and REA that a transaction advisor would be hired to support the preparation and packaging of the mini-hydro projects for at least three sites. It was also agreed that ERB would be provided with the necessary technical assistance to develop the requisite feed-in tariff and capital subsidy grant framework to support mini-hydro grid development. However, following completion of engineering studies, the construction cost of the proposed mini-hydro developments turned out to be in excess of US$70 million, which was significantly higher than the US$5 million allocated for this subcomponent and also higher than international norms for similar sized hydro power development. The GoZ therefore requested cancellation of the mini-hydro component.

32. ***2c Solar PV:*** Based on the results of an assessment of the issues and options for sustainable solar PV market development in Zambia that was carried out by REA and the Bank team along with consultations with private sector companies involved in solar PV installations, the GoZ and the Bank agreed that the original target of 10,000 new household connections by 2013 was unattainable. In addition to the limited ability of rural households to pay for solar home systems, the specific communities that were expected to benefit had not been identified at entry and hence the potential number of household connections was substantially overestimated. As a result, the 2010 restructuring reduced the original target to 2,500 households while retaining the original number of schools and health facilities to be electrified at 250. In the 2013 restructuring, the households target was further reduced to 500. This was based on the experience gained from implementing SSMPs in the previous two years, which showed that the greatest demand for solar PV systems was from rural schools, health centers, and associated staff housing. It was therefore agreed with REA that the focus be shifted from individual households to these facilities.

Additional Financing (2010)

33. The additional financing, approved September 22, 2010, added two new components in response to the urgent need to reinforce the existing bulk supply point at Kanyama in Lusaka, eliminate the peak hour load-shedding in Livingstone, and reduce the burden of electricity connection fees for low-income families in electrified areas:

- *Construction of Kanyama Substation in Lusaka and Lusaka Road substation in Livingstone (US$ 12 million).* The Kanyama substation was intended to reduce the load at the nearby Coventry substation, which had been gutted by fire in June 2009, and bring safe and reliable power to Kanyama Township and surrounding areas. The Lusaka Road substation (located in Livingstone) aimed at mitigating the risk of distribution system failure and address overload and capacity difficulties that were being experienced in the Livingstone distribution network.

- *Connecting New Low Income Households to the Grid in Electrified Areas (US$10 million).* The connection fee subsidy program aimed at the provision of electricity grid

connections to households. It targeted the provision of electricity access to at least 30,000 low income households in peri-urban and rural areas.

34. The funding allocations over time are summarized in the table below (reallocations and cancellation of funds are discussed further below the table).

	Original Project 2008 (US$ Million)	**Restructuring and Additional Financing 2010 (US$ Million)**	**Restructuring 2013 (US$ Million)**
Original project			
1a Reinforcement	9.0	8.9	9.33
1b Intensification	11.0	10.21	10.21
1c Energy Efficiency/Demand Side Management	2.0	2.0	1.6
2a Grid extension	25.0	13.21	13.21
2b Mini grids	14.0	11.0	1.0
2c Solar PV	9.0	6.5	6.5
3a TA to ZESCO	3.5	2.33	2.33
3c TA to REA	2.0	2.0	2.0
Additional Financing			
Kanyama and Lusaka Road Livingstone substations		12.0	13.4
Connecting low income households		10.0	8.8
Total IDA (US$ million)	**75.5**	**78.15**	**68.38**

1.9 Other significant changes

Reallocation of Funds (overall)

35. In the 2013 restructuring, it was agreed to reallocate about US$1.834 million (IDA US$1.6 million and ZSESCO US$0.234 million) from unused funds to the grid reinforcement activities. In addition, in the 2013 restructuring, the mini-grids component was dropped, reducing the overall funding amount by US$10 million.

Expansion of connection subsidy coverage

36. During the 2013 restructuring, the coverage of the connection fee subsidy program was expanded. The program had originally targeted areas covered only under the grid extension component. However, it was later modified to include other geographical areas covered under the grid reinforcement and grid intensification sub-components, based on the following three criteria: (1) high-density residential area; (2) low-income; and (3) ability of the network in the area to accommodate new connections.

Closing date extension

37. The closing date of the project was extended once from December 31, 2013 to June 30, 2015.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

38. The Project Concept Note was reviewed in February 2004, and the project was approved by the Bank's Board in May 2008 and became effective in February 2009. At the time of project preparation, the GoZ was in dialogue with sector stakeholders on the establishment of the Rural Electrification Authority (REA) for the promotion of rural electrification in Zambia. As REA was expected to be the implementing agency for the project, preparation of the project was delayed until REA was established and operational, which took several years (thus the long delay between project concept and approval).

Project Preparation

39. The grid related aspects of the project were adequately prepared. Sites were selected based on the areas that had exhibited capacity constraints during the course of ZESCO operations. Some of these sites had also been identified during the earlier Lusaka Distribution Rehabilitation Project funded by the Bank in 1997. Furthermore, the Priority Rural Electrification Projects (PREPs) activity, conducted as part of project preparation, undertook pre-feasibility studies for six grid intensification and seven grid extension sites selected based on clearly set criteria. During preparation, it became apparent that the cost of grid reinforcement had been underestimated and therefore two of the planned sites were dropped. With respect to the distribution of one million CFLs, this was undertaken based on a distribution plan that ZESCO had prepared.

40. The mini-grids and solar PV systems components were not as well prepared as the grid related components. Although the client's demand for mini-grid and off-grid electrification was strong at entry, the specific mini-grid sites had not yet been identified and, consequently, their preparation could not progress. Similarly, preparation of the solar PV systems component had not gone beyond the conceptual stage. While the basic concept was to aggregate solar PV systems in schools, health centers, small rural businesses, and households, to help ensure commercial viability, the exact sites had not been identified and the overall market for household PV had not been fully assessed.

Assessment of Project Design

41. The project PDO, "to increase access to electricity services and improve the efficiency and quality of the electricity distribution system in targeted areas," was realistic. However, the expansive scope - which included eight sub-components covering grid and off-grid works, CFL distribution, and capacity-building- increased the complexity of the project. The project GEO was also ambitious, given that Zambia had no prior institutional experience in developing its off-grid or mini grid renewable energy potential. Equally

ambitious was the financing and coordination responsibilities for the grid extension and number of consumers to be connected by ZESCO and the newly established REA.

Adequacy of government commitment

42. Although the project was approved in May 2008, it only became effective in February 2009 due to delays in fulfilling various effectiveness conditions that included the establishment of a project steering committee by the GoZ and the execution of subsidiary loan agreements between the GoZ and the implementing agencies. However, government commitment to the project did strengthen during implementation and enabled the two restructurings that the project underwent to improve implementation progress, scale-up outcomes, and help achieve the PDO.

Adequacy of Risk Assessment

43. At appraisal a number of risks were identified. Of these, ZESCO's financial sustainability due to inadequate tariffs, high costs, significant losses, and a history of under-investment was rated as *substantial* as was the weak institutional and implementation capacity of REA. Other identified risks were rated as *moderate*, which was also the rating for overall project risk. While the risk related to REA's capacity was correctly anticipated, the mitigation measures were inadequate. Also, the difficulties in attracting private sector developers for the mini-grid component were not recognized. Finally, ZESCO did not have a track record in expanding access. This consideration alone might have suggested that the risk to achieving the overall project objectives was 'substantial' rather than 'moderate'. Such a risk assessment of the project could have resulted in a simpler project design with fewer sub-components and a focus on either grid or off-grid works. Furthermore, capacity building measures might have been given more consideration to improve prospects for achieving the PDO at the outset rather than during implementation.

Quality at Entry

44. No Quality at Entry review was carried out by the Bank's Quality Assurance Group.

2.2 Implementation

45. Initially, implementation progress was slow. Implementation performance then improved after the first restructuring in 2010. Following the second restructuring and extension of closing date in 2013, the project completed the physical works for most project components. The project distributed the target number of CFL bulbs, provided electricity access to more than 90,000 households through grid and off-grid provisions, and provided capacity building activities to the Department of Energy, REA, and ZESCO staff. However, some grid extension and grid reinforcement works were only completed within six months of project closing in late 2015.

46. *Implementation Delays*: Slow implementation progress was attributable to various factors. Firstly, senior management changes at ZESCO in 2009 and 2010 delayed commencement of implementation. Secondly, the long lead times required for the turn-key procurement arrangements for the intensification and grid extension sub-components

pushed back progress. Thirdly, implementation of the SSMP model as initially designed proved to be problematic due to the low population density of rural Zambia as compared to other countries where the model had been applied. Also, the lack of an adequate regulatory and policy environment to support isolated grids and the REA's capacity limitations resulted in very slow progress on this sub-component. Further delays were caused by the GoZ decision to revoke the project's tax and duty exempt status, which slowed customs clearances for imported materials.

47. *Project restructuring*: The project underwent two restructurings – the restructuring in 2010 included additional financing, and the restructuring in 2013 extended the project closing date. The restructuring led to the alteration of procurement arrangements for the intensification and grid extension sub-components. The SSMP model was also redesigned based on an assessment that had revealed the limited demand for solar PV for rural households. As a result, this sub-component became focused on the off-grid electrification of rural public facilities and associated staff housing, which had the highest demand for this intervention. The isolated grids/mini-hydro sub-component was dropped due to slow progress and the higher than budgeted estimate for works[2] that resulted from a pre-feasibility conducted during implementation. Following the restructurings, implementation progress improved, resulting in most project sub-components being completed by project close.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

a) M&E design

48. The PDO was "*to increase access to electricity services and improve the efficiency and quality of the electricity distribution system in targeted areas.*" The following indicators were selected at appraisal: (i) improvements in operational efficiency of the electricity network; (ii) improvements in the quality of electricity service, in particular reductions in unplanned outages per year; (iii) progress made in the intensification of electricity service to new customers in peri-urban areas; (iv) the number of CFLs installed; (v) the number of new connections in both grid and off-grid areas; and (vi) the increased share of the population with access to electricity service resulting from the project. In general, the indicators were adequate to monitor progress towards the PDO and also reflected the complexity of the project with its grid and off-grid components, and both a rural and urban focus.

49. The GEO was "*to remove barriers to renewable energy technologies to help mitigate greenhouse gas emissions.*" Two standard indicators were used to measure progress towards the GEO: (i) generation capacity of renewable energy constructed under the project measured in MW; and (ii) CO_2 emissions avoided (measured in tons).

[2] At the 2010 restructuring, US$5million was allocated for the implementation of the mini-hydro works. However, the pre-feasibility estimate for these works was US$70 million, much higher than international norms for the development of similar sized hydro capacity.

50. ZESCO and REA were responsible for monitoring implementation progress and ensuring that the project objectives were achieved. Both implementing agencies prepared quarterly progress reports and submitted them to the government and the Bank. Overall, the performance of these two agencies in monitoring project progress was satisfactory.

b) M&E implementation

51. During implementation, some indicators were revised in order to more specifically measure each aspect of the PDO, reflect more accurately outcomes directly attributable to the project, be more realistic, and align with changes in the scope of the project and the Bank's core indicators. The final PDO level indicators were:

- Number of people in urban areas provided with access to electricity by household connections;
- Number of people in rural areas provided with access to electricity by household connections (by grid connection/off-grid renewable);
- Electricity losses per year in the project area (share of technical losses (%)/ share of non-technical losses (%));
- Average interruption frequency per year in the project areas (times/year).

52. The dropping of the isolated grids/mini hydro sub-component resulted in the GEO indicators being changed and the target for rural household connections being reduced. The renewable energy generation capacity indicator was replaced by *"Load reduction through demand side management (MW)."* Finally in regard to the *Gender Indicator*, the results framework in the PAD stated that 51 percent of beneficiaries should be women (as part of the project beneficiaries' intermediate indicator). However, ZESCO/REA only measured the number of connections and did not distinguish by the gender of the beneficiaries.

(c) M&E utilization

53. The M&E framework was used to inform project progress and aided project refinement during the course of implementation. The framework was also useful in determining the beneficiaries of the various project components and in distinguishing between urban and rural, and grid and off-grid.

2.4 Safeguard and Fiduciary Compliance

Safeguard compliance

54. The project was classified as environmental category B and triggered four safeguard policies. Environmental Assessment (OP/BP 4.01) and Involuntary Resettlement (OP/BP 4.12) were triggered due to investments in grid and off-grid extension; Safety of Dams (OP/BP 4.37) and Projects on International Waterways (OP/BP 7.50) due to anticipated investments in mini-hydro development under the off-grid component of the project. As part of project preparation, an Environmental and Social Management Framework (ESMF) was prepared.

55. The overall safeguards rating remained Satisfactory until 2014 when a resettlement issue was raised during the implementation of the Kanyama substation reinforcement. ZESCO's contractor proceeded to extend distribution lines in the proximity of Mwaboneka Market before an adequate Resettlement Action Plan (RAP) was in place. The Bank requested ZESCO to halt works and prepare a RAP. ZESCO subsequently prepared the RAP for the remainder of this distribution line. The Bank approved the RAP and appropriate compensation payments for the temporary shutdown of affected businesses were provided. Accordingly, the safeguard rating was downgraded to Moderately Satisfactory. However, by project closing this rating had been upgraded to Satisfactory.

Fiduciary compliance

56. Overall, financial management (FM) performance of the project was moderately satisfactory. ZESCO submitted its project reports on time whereas REA had difficulties in submitting project reports, audited financial statements, and withdrawal applications (WAs) on time and in reconciling its designated accounts. As a result of late submission of WAs, REA experienced cash flow problems during the course of the project. Because of REA's problems, the FM rating of the project was downgraded from satisfactory to moderately satisfactory in October 2014. In general, disbursements throughout implementation were slow. However, the project submitted its unaudited interim financial reports (IFRs) to document past expenditure on time and no major issues were identified.

Procurement

57. The procurement performance rating for the project overall was satisfactory. Both ZESCO and REA were able to undertake their procurement activities on time, despite an initial slow start and challenges with cost estimation which affected the potential contracts that could be funded. During the course of the project, REA enhanced procurement capacity through the creation and staffing of a Procurement and Supplies Unit. In addition, ZESCO seconded a full time procurement specialist to the Project Implementation Unit for the duration of the project. The technical and procurement specific staff of ZESCO and REA also underwent procurement and contract management training over the life of the project, which enhanced the institutional capacities of the two entities to undertake procurement and manage the contracts. The skills learnt over the project implementation proved useful in determining the use of appropriate bidding documents, and in designing and carrying out procurement on two other World Bank funded projects, namely, the Lusaka Transmission and Distribution Rehabilitation Project (P133184) and Kafue Town – Muzuma - Victoria Falls Regional Transmission Line Reinforcement Project (P124351).

2.5 Post-completion Operation/Next Phase

58. Most of the core activities, including grid intensification, reinforcement, and extension, fall under the respective mandates of ZESCO and REA. Some of the capacity and institutional improvements as a result of this project will therefore support ongoing activities in these areas and enhance the chances that the results of the project will be sustained over time. The connection subsidy program, introduced under the project, will

also continue under the Electricity Access for Low-income Households in Zambia Project (P146636), funded by Global Partnership for Output-Based Aid (GPOBA). ZESCO is also distributing additional CFLs, at its own cost, as part of a demand side management intervention.

59. The Increased Access to Electricity Services Project also contributed to the introduction of solar PV systems in Zambia. Furthermore, the project supported the stimulation of private sector participation in the sale, distribution and installation of solar PV home-systems and products.

60. REA's solar PVs installed under component 2c include a five year system maintenance which goes beyond the project's closing date. REA was informed before signing the contracts, the last of which was signed in February 2015, that these contracts would remain eligible for Bank financing until the project closing date. Beyond this, REA would have to fund the contracts from other sources. To ensure sustainability, the Bank had proposed that this program be integrated into REA's operations with the requisite budgetary provision.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

Relevance of objectives (PDO)

Rating: High

61. The project development objective was "to increase access to electricity services and improve efficiency and quality of the electricity distribution system in targeted areas". This objective continues to be of relevance in relation to national priorities. The energy sector goal in the Revised 6th National Development Plan 2013-2016 is "adequate and reliable supply of energy at the lowest economic, social and environmental cost." In order to achieve this goal, the government intends to "…increase rural and national access to electricity" from 4.25 percent and 26.25 percent in 2013 to 8 percent and 30 percent in 2016 for rural and urban households, respectively. The need to increase access to electricity is also stated in the Bank Country Partnership Strategy FY13-16. Meanwhile, in November 2015, the Central Statistical Office reported that national electricity access had reached 32 percent. This implies that a significant proportion of Zambian households still remain without access to electricity and consequently, further expansion of access and improvements in the efficiency of the distribution network continues to have high relevance in the country.

Relevance of objectives (GEO)

Rating: Substantial

62. The GEO was to "to remove barriers to renewable energy technologies to help mitigate greenhouse gas emissions". The GEO is in line with the United Nations

Framework Convention on Climate Change, as well as Zambia's national context of limited renewable energy capacity with the exception of large-scale hydropower.

Relevance of design and implementation (PDO)
Rating: Modest

63. The project design and implementation remained relevant and functional. All components under the project, namely *(i) investment in reinforcement* to strengthen the quality and reliability of electricity supply; (ii) *investment in access expansion* to extend electricity supply to both urban and rural areas; and (iii) *provision of technical assistance* to strengthen the institutional capacity of the two main implementing agencies, were closely linked to the project objective.

64. 61. Although all components were highly relevant to the project objective, the project had a very broad scope with a disparate number of sub-components. Project implementation would have been more efficient with a narrower scope. For the off-grid components, i.e., isolated grids and solar PV systems, background analysis at the appraisal stage was limited to describing the broad conceptual approach that would be followed. Notably, the cost of the isolated grid/mini-hydro sub-component was considerably underestimated. Similarly, for the solar PV systems, even though the target of 250 public institutions and 10,000 households was set, the specific communities that would benefit were not identified and the potential number of household connections was substantially overestimated. This led to a reduction of the households target to 2,500 during implementation as the chosen project sites did not have sufficient households to connect. This target was further reduced to 500 on account of implementation delays. The number of public institutions was reduced to 100.

65. While the project did help in stimulating private sector participation particularly in the sale, distribution, and installation of solar PV home systems and products, overall the interest of the private sector had not been adequately assessed at appraisal. For all components that involved the private sector, the project assumed that private capital would be available to support project implementation. The project appraisal assumed that US$11 million, approximately 15 percent of the total project cost, would come from private sponsors. However, there was no assessment of private sector appetite nor the policy and regulatory framework required to attract private investors. In addition, the institutional capacity of local entrepreneurs and/or local community organizations that were expected to become project sponsors was not examined.

66. Project implementation arrangements involved two main agencies: (i) ZESCO, the state-owned power utility, already experienced in expanding the grid network; and (ii) REA, established in 2006, which was at a formative stage and hence had limited experience in carrying out off-grid access investments. There was also a lack of readiness of some sub-components at project commencement, which contributed to slow implementation progress. However, this and the coordination between ZESCO and REA improved over time.

67. Despite these challenges, implementation accelerated gradually due to the timely restructurings and the provision of additional financing. The restructurings, which were well documented, allowed the project to adjust targets to more realistic levels and re-allocate funding as necessary. Also, the additional financing allowed the project to accommodate emerging needs, such as the Kanyama and Livingstone substation works and connection fee subsidies. These timely interventions ensured the realignment of the project towards the achievement of the PDO as illustrated by the number of households that gained access to grid electricity and solar PV home systems and products.

Relevance of design and implementation (GEO)
Rating: Modest

68. The original set of indicators (installed capacity of renewable energy systems and CO_2 reduced) indicate that the project was originally aiming to promote the use of isolated grid/mini-hydro systems and thereby avoid CO_2-intenstive diesel generation in off-grid rural areas. However, since isolated the mini/grid-hydro component was dropped in the second restructuring, the indicator relating to renewable energy system capacity was replaced by that of load reduction through CFL distribution. This change impacted the results chain, since CFL is not a renewable energy technology. In addition, despite the objective of removing barriers to renewable energy technologies, the project was not designed to directly address such barriers- for example, through enabling policies and tariffs.

3.2 Achievement of Project Development Objectives and Global Environment Objectives

Achievement of PDO
Rating: Substantial

Achievement of the PDO
69. The project PDO was *"to increase access to electricity services and improve efficiency and quality of the electricity distribution system in targeted areas"*. For the purposes of assessing the achievement of this objective it can be viewed as being comprised of three parts: (i) increasing access to electricity services; (ii) improving efficiency of the electricity distribution system in targeted areas; and (iii) improving quality of the electricity distribution system in targeted areas. These three parts are weighted equally to derive the sub-rating for the achievement of the PDO.

(i) Increasing access to electricity services
Rating: High
70. Overall, the project surpassed the target for increasing access to electricity, mainly due to accelerated implementation over the last three years of the project. Increased access was measured by the number of households that were provided with electricity connections under the project. Both rural and urban households were targeted. Four components, namely grid intensification, grid extension, solar PV, and connection fee subsidy, contributed to increasing access to electricity services. It had also been expected that rural

households supplied by isolated hydro mini-grids would contribute to increased access to electricity. This component of the project was however dropped at the 2013 restructuring.

Indicators	Baseline	Target[3]	Achieved	Achievement rate
Number of households in urban areas provided with access to electricity under the project	0	49,500	89,655	181%
Number of households in rural areas provided with access to electricity under the project	0	1,500	2,610	174%
Total	0	51,000	92,265	181%

71. The connections target was surpassed by a significant margin as shown in the table above. This outcome revealed the serious bottleneck that connection charges present to potential electricity consumers. Furthermore, surpassing of the target was also a reflection of improvements in implementation capacity within both ZESCO and REA over the project duration. The project would have registered an even greater number of new household electricity grid connections had the delays in implementing the grid extension sub-component been overcome. The off-grid electricity access that the project provided through solar PV systems also provided an important contribution towards increasing access and significantly surpassed the target of 500 systems distributed. Some 1,134 solar home systems and 5,714 solar lanterns were distributed, with fours lanterns counted as equivalent to one solar home system for the purpose of computing the project achievement.

(ii) Improving efficiency of the electricity distribution system in targeted areas

Rating: Substantial

72. The indicators for distribution system efficiency of the electricity distribution system were the percentage of distribution losses in the project areas. The grid reinforcement component and the Kanyama and Livingstone substation components that were included in the additional finance operation were intended to achieve this objective.

Indicators[4]	Baseline	Target	Achieved	Achievement rate
Reducing electricity losses from distribution	23%	14%	11%	133%

73. The project exceeded the distribution loss target by a significant 3 percent. This level of distribution losses is comparable with the better performing electricity utilities in

[3] Revised target after restructuring.

[4] The target areas were Kanyama, Livingstone and Figtree and Chibombo.

sub Saharan Africa and results in increased revenue for ZESCO through increased consumption by existing consumers or via additional connections.

(iii) Improving quality of the electricity distribution system in targeted areas

Rating: Substantial

74. The indicators for distribution system quality of the electricity distribution system were the average interruption frequency per year in the project areas. The grid reinforcement component and the Kanyama and Livingstone substation components that were included in the additional finance operation were intended to achieve this objective. Achievement of the target implies that electricity consumers in the targeted areas would experience less unplanned power interruptions than prior to project implementation.

Indicators[5]	**Baseline**	**Target**	**Achieved**	**Achievement rate**
Average interruption frequency per year in the project areas	50 times/ year	30 times/ year	30 times/ year	100%

75. The indicators show that, as compared to the baseline of 50 times per year, the project reduced the interruption frequency to 30 times per year. Hence, the second objective of "improving quality of electricity distribution system in targeted areas" was achieved (while this is a good achievement and met the target, the number of interruptions remains high and interruptions continue on a regular basis).

76. Based on the split evaluation methodology for restructured projects, the project outcomes have been assessed against the three phases of the operation: (i) project effectiveness to first restructuring, first restructuring – second restructuring, and second restructuring – project close). The result of the split evaluation indicates that the PDO has been substantially achieved.

	Pre-restructuring	**First restructuring**	**2nd restructuring**	**Overall**
PDO Rating	Moderately Satisfactory	Moderately Satisfactory	Moderately Satisfactory	Moderately Satisfactory
Rating value	4	4	4	--
Weight (%)	2.1%	21.9%	76%	100%
Weighted value	0.084	0.876	3.04	4

77. Although the achievement by project indicators exceeded targets at project closing, grid extension works at Mangango and Mukonchi that would have enabled more rural grid

[5] The target areas were Kanyama, Livingstone and Figtree and Chibombo.

connections had not been completed. Furthermore, grid reinforcement works at the Fig-Tree and Chibombo substations, including the associated transmission line, remained outstanding. With respect to the efficiency and quality of electricity supply in the targeted areas, the annual frequency of outages reduced from 50 to 30, while distribution losses fell from 14 percent to 11 percent. However, all outstanding project works were completed within six months of project close.

Achievement of the GEO
Rating: Substantial

78. The GEO was *"to remove barriers to renewable energy technologies to help mitigate greenhouse gas emissions."* For the purposes of assessing the achievement of this objective it can be viewed as being comprised of two parts: (i) removing barriers to renewable energy technologies; and (ii) reducing greenhouse gas emissions. The achievement of the GEO is assessed based on the following indicators derived from both GEO and PDO.

Indicators[6]	**Baseline**	**Target**	**Achieved**	**Achievement rate**
Rural households with access to electricity through renewable (solar PV)	0 HH	500 HH	2,563 HH	513%
Community connections (grid extension/ renewables)[7]	0	100	104	104%
CO_2 reduced	0 tCO_2	5,600 tCO_2	12,005 tCO_2	214%

(i) Removing barriers to renewable energy technologies
Rating: Modest
79. The project had two sub-components associated with renewable energy technologies – isolated grid/mini-hydro, which was dropped at the second restructuring, and solar PV systems. A total of 2,563 households[8] and 104 public facilities were provided with solar PV systems reflecting a 513 percent and 104 percent achievement of the targets for these two categories, respectively. While the private sector is increasingly becoming active in marketing solar PV systems and other off-grid products in rural Zambia, barriers to renewable energy technologies, including relevant policies and investor confidence, continue in Zambia.

[6] GEO indicators also included load reduction, with a target of 45 MW; 57 MW load reduction was achieved.
[7] Although the indicator captures both connections by grid extension and solar PV, only connections by solar PV were reported.
[8] 1,134 solar home systems and 5,714 solar lanterns, with fours lanterns counted as equivalent of one solar home system.

(ii) Reducing greenhouse gases

Rating: High

80. Greenhouse gas reduction from the project was computed based on the basis of two assumptions: demand-side management through CFL distribution; and the use of off-grid solar products. For demand-side management the 2013 restructuring targeted 5,600 tCO_2 reduction through distribution of one million CFLs. Since the project successfully distributed one million CFLs, it is assumed that 5,600 tCO_2 was reduced. For off-grid solar, it is estimated that 6,405 tCO_2 was reduced. CO_2 reduction per unit of solar lamp has been derived from the Clean Development Mechanism methodology AMS-III.AR "Substituting fossil fuel based lighting with LED/CFL lighting systems". For household and institutional solar home systems, CO_2 reduction per unit is derived from the PAD estimates. Hence, a total of 12,005t of CO_2 was reduced as a result of the project.

3.3 Efficiency

Rating: Substantial

Economic efficiency

81. A re-evaluation of the economic and financial analysis revealed that the project remained economically viable, with a positive economic internal rate of return (EIRR) and net present value (NPV) as show in the table below.

Summary of economic analysis at Project Close

Components	**EIRR (%)**	**NPV (US$M)**
Grid reinforcement	40.9%	44,58
Grid access components (grid intensification, extension, and connection subsidy)	45.6%	83,68
Solar PV	15.2%	0.655

82. Grid reinforcement resulted in a higher EIRR and NPV than the appraisal estimate, as it takes into account the benefit of increased capacity of supply, which was not taken into account at the appraisal. Since power loads at reinforcement sites were reaching their maximum capacity, the reinforcement work, which more than doubled the transformer capacities, resulted in significant benefit of increased and more reliable electricity supply.

83. Grid access components (grid intensification, extension, and connection subsidy) resulted in a higher EIRR and NPV than at the appraisal estimate. This is attributable to two factors: (i) the original target of household connections was 65,000 but the project connected close to 90,000 households; and (ii) the original analysis assumed significant increases in tariff, but tariffs actually remained low. Low tariffs translated into low cost to be borne by electricity users.

84. Solar PV resulted in a lower EIRR and NPV than expected in the appraisal estimate. This is due to the fact that 10,000 solar home systems were planned to be installed at the appraisal stage but the actual number of installations was less than 3,000.

Financial Efficiency

85. A re-evaluation of the financial analysis also revealed that the project remained financially viable, with a positive financial internal rate of return (FIRR) and NPV as show in the table below

Summary of financial analysis

Components	**FIRR (%)**	**Financial NPV (US$M)**
Grid reinforcement	24.6%	17.28
Grid access components (grid intensification, extension and connection subsidy)	29.4%	77.9

86. Grid reinforcement resulted in a higher FIRR and NPV than at the appraisal estimate, as it takes into account the benefit of increased capacity of supply, which was not taken into account at appraisal.

87. Grid access components (grid intensification, extension, and connection subsidy) resulted in a higher FIRR and NPV than at the appraisal estimate. This is due to the fact that the original target of household connection was 65,000 but the project actually connected close to 90,000 households.

88. Overall, investments in all components resulted in a satisfactory economic and financial IRR and a positive NPV. Grid reinforcement and grid access components generated higher economic and financial IRRs and NPV than the appraisal estimates. Solar PV component resulted in lower economic IRR and NPV than the appraisal estimate, as the analysis at appraisal was based on expected targets that were later revised downward. Detailed analysis and methodology for the economic and financial analysis are provided in Annex 3.

3.4 Justification of Overall Outcome and Global Environment Outcome Rating

Overall Outcome Rating: Moderately Satisfactory

89. The project development objective was to *"to increase access to electricity services and improve efficiency and quality of the electricity distribution system in targeted areas."* The outcome rating takes into account considerations of relevance, efficiency of the investments, and progress made towards the different targets. Increasing access to electricity services continues to have high relevance for the country; however, shortcomings in the original design and implementation arrangements constrained what could be achieved, especially in expanding rural access. With regard to efficiency, this has been satisfactory across the investments undertaken. In regard to achievement of the main project indicators, the project's urban access connections target was exceeded, with an achievement rate of 181 percent. For rural areas, although the revised connection target was achieved, this was considerably less than the original target. Finally, despite improvements in reducing the average frequency of interruption, progress has been modest and interruptions continue on a regular basis. Over the last six months, the frequency of

interruptions has in fact registered a notable increase due to electricity supply shortages countrywide. Overall, there has been modest improvement in the reliability and efficiency of the distribution network in the project areas and limited progress in the expansion of access in rural areas. Despite significant urban access improvements, the PDO is rated Moderately Satisfactory overall.

GEO Rating: Moderately Satisfactory

90. The project achieved its load reduction and CO_2 avoidance targets. The barriers to off-grid solar products have been reduced, although general barriers to renewable energy technologies, including relevant policies and investor confidence, remain in Zambia. The GEO remained relevant, although load reduction through CFL distribution was inadequate as an indicator to measure either renewable energy technology barriers or CO_2 avoidance. Based on these considerations, the GEO outcome is rated Moderately Satisfactory.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

91. *Poverty Impact*: The connection subsidy component had a direct link to reducing poverty since it targeted low-income households whose living conditions are expected to improve with access to electricity. It should also be noted that about 90 percent of the household connections achieved under the project were in urban/peri-urban areas and, therefore, the project's main poverty impact is skewed towards the urban poor.

92. The project had a further impact through the provision of solar PV systems to the public facilities and associated staff housing of rural communities isolated from the main grid. The potential benefits include improved education and health outcomes promising an important social development impact on these communities. Private entrepreneurs are now showing interest in marketing solar products in rural Zambia. This demonstrates the potential of solar technology to become sustainable in Zambia. With government support, the pace of increasing electricity access through solar technology can be increased.

93. *Gender Aspects:* In regard to gender, the number of female beneficiaries from the investment was estimated at 51 percent. However, this was not explicitly measured due to the unavailability of disaggregated gender data since the ZESCO business information system was not configured to capture this data for new customers.

94. *Social development*: Access to electricity is positively correlated with social development. Furthermore, component 2, expanding electricity access, explicitly targeted rural schools and health facilities. Overall, some 104 public facilities, including schools and rural health centers, benefitted from the project.

(b) Institutional Change/Strengthening

95. ZESCO's and REA's institutional capacity was strengthened by the project. Through formal training and implementation experience, the project management

capabilities of ZESCO and REA were enhanced. Additional training opportunities also strengthened the technical and administrative capabilities of the Department of Energy, ZESCO, and REA. The training provided and staff trained under the project is detailed in Annex 5. Implementing agency staff also gained greater awareness of safeguards related issues by implementing the Bank's safeguards policies on the project.

96. The project also highlighted the significant barrier to access that the existing charge for a new electricity connection presents. Lastly, the project revealed the contribution to access that could be made through the provision of off-grid solar PV systems and products.

(c) Other Unintended Outcomes and Impacts (positive or negative)

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

97. No beneficiary surveys or stakeholder workshops were carried out.

4. Assessment of Risk to Development Outcome and Global Environment Outcome

Risk to Development Outcome

Rating: Moderate

98. The main risks to the development outcome are considered to be Moderate. Encouraging progress has been made over the past two years in expanding the grid and reducing technical losses in the urban network. The demonstrable impact of the project in increasing electricity access has helped the government attract additional resources from different development partners to support its electricity access agenda. After the closing of this project, ZESCO received funds from GPOBA to connect 22,000 households and 5,000 micro and small enterprises of the households target had already been reached by November 2015 revealing the institutionalization of consumer connection program that the project engendered.

99. The EU and European Investment Bank are also considering providing finance to ZESCO to increase urban and rural electricity access in Zambia. KfW has also offered EUR80 million to promote electricity access in ZESCO's southern division and indicated that the project design shall be similar to that of the consumer connections component of the Increased Access to Electricity Services Project. With such donor interest in supporting Zambia's electrification program, there is a strong likelihood that a significant proportion of the funding requirements will continue to be met. The financial sustainability of the sector is, however, a key risk that will continue prevail for as long as tariffs remain below the costs incurred in electricity service provision.

100. After the project closure, a significant risk to grid connected electricity supply has emerged. Zambia's electricity generation mix is dominated by hydropower that accounts for more than 90 percent of generation. However, due to lower than expected rainfall, the country's main electricity generation reservoirs were not adequately replenished during the 2014/15 rainfall season and, as a result, their water levels have been lower than normal. This has forced a reduction in electricity generation and consequently, the implementation of rolling black-outs (load-shedding) for a minimum of eight hours daily per household.

To alleviate the situation, the government is undertaking measures that include the import of emergency generation, diversification of the generation mix to include solar PV among other primary energy sources, and further demand side management through the distribution of more CFL bulbs.

Risk to Global Environment Outcome

Rating: Moderate

101. The risk to the GEO outcome is considered Moderate. The project has contributed to the emergence of off-grid solar products in Zambia, and the there is a strong evidence of market growth led by private sectors. The Lighting Africa Program is now considering Zambia as one of its program countries. The growth of the market will contribute to the avoidance of greenhouse gas emissions. On the other hand, barriers for other on-grid renewable energies, except for hydropower, remain.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

(b) Rating: Moderately Unsatisfactory

102. The decision to provide Bank financing for the project had a strong justification. The project objectives were closely aligned with the government's poverty alleviation strategy and supported the goals of economic growth, private sector investment, a more efficient power sector, and the provision of basic social services to isolated rural communities. These goals were also consistent with the Bank's own assistance strategy for Zambia. Project design focused on priority investment components needed to improve the operational efficiency of Zambia's power sector and attract private investment. However, implementation arrangements – which combined an experienced power utility, ZESCO, with newly established REA – were not adequately assessed.

103. Further shortcomings during preparation, which had an adverse impact on project implementation, included the fact that none of the investment components were ready for implementation at Board, which led to extensive implementation delays; this was especially true of the isolated grids/mini-hydro component, which had not been properly evaluated and was later cancelled. A lack of readiness at start-up had the effect of delaying project benefits to first time electricity consumers. It also delayed needed improvements in the operation and reliability of the country's electricity network. The decision to include both grid and off-grid investment in the overall design was, in retrospect, problematic in the absence of a policy and regulatory framework for rural electrification (despite good implementation of the off-grid investments in the final two years of the project). Taking into account the above considerations, Bank Performance during preparation is rated Moderately Unsatisfactory.

(b) Quality of Supervision

Rating: Satisfactory

104. The project was supervised on a regular basis throughout the entire seven year implementation period with some 12 Implementation Status and Results Reports (ISRs) prepared by regular missions from headquarters to the field, supported by the country office in Lusaka. To respond to the evolving situation during implementation, two restructurings were undertaken. The first restructuring, in September 2010, provided additional financing and introduced more realistic project indicators. The second restructuring, in May 2013, cancelled the mini-grid component and revised the results framework. Overall, the Bank was proactive in supporting ZESCO and REA in project implementation. Based on this, Bank performance during supervision is rated Satisfactory.

(c) Justification of Rating for Overall Bank Performance

Rating: Moderately Satisfactory

105. In general, the Bank provided adequate and pro-active supervision, which addressed effectively the shortcomings identified in the project scope and implementation arrangements, i.e., the combination of grid and off-grid elements in the project scope and having ZESCO and REA as joint implementing agencies. The Bank team remained engaged throughout the implementation of the project and was able to assess difficulties that arose, anticipate problems, and provide means for resolution that enabled progress towards the PDO. For these reasons, although project implementation progress at the beginning was slow, through active support, including two restructurings and the additional financing, the Bank team was able to work with counterparts to improve implementation progress. Overall, Bank performance is rated Moderately Satisfactory.

5.2 Borrower Performance

(a) Government Performance

Rating: Moderately Satisfactory

106. The GoZ strongly supported the project development objective of increasing access and improving the reliability of the existing network through further investment. However, this was not adequately reflected in initial project implementation. The project only became effective nine months after project approval. The project also did not start implementation till 2010. Nonetheless, following management changes at ZESCO, project implementation progress steadily improved. Furthermore, the GoZ exhibited increased commitment to the project and supported the two restructurings, including the additional financing operation, which ultimately led to improved progress towards meeting the PDO. Overall, government performance is rated as Moderately Satisfactory.

(b) Implementing Agencies' Performance

Rating: Moderately Satisfactory

107. The project had two implementing agencies: ZESCO, the main power utility, and REA, with responsibility for developing rural electrification plans and monitoring their implementation. Despite a slow start due to a lack of readiness of the efficiency improvement investments, ZESCO implemented most of the reinforcement and intensification investments well. However, works at Fig Tree, Chibombo, Mukonchi, and Mangango did not complete at project close. Overall, the work that ZESCO carried out reduced network losses and expanded urban access above the target levels. In addition, ZESCO administered the procurement of civil works and equipment adequately. ZESCO's performance is rated Moderately Satisfactory.

108. REA faced challenges in project implementation. It was affected by staff turnover, which adversely affected its already limited capacity. It also failed to advance preparation of the three mini-hydro developments, which were later abandoned. However, REA performance steadily improved, and it played an effective role in helping develop off-grid electricity supplies (based on solar PV systems). By the end of the project period, REA had connected more households than the agreed target. REA also installed solar PV systems in schools and health centers and exceeded the original target. REA's performance can be considered as Moderately Satisfactory.

109. Based on the above, overall implementing agency performance is rated Moderately Satisfactory.

(c) Justification of Rating for Overall Borrower Performance

Rating: Moderately Satisfactory

110. Overall Borrower performance is rated Moderately Satisfactory. Improvements in implementation during the final two years resulted in the main project targets being met or exceeded. ZESCO was also able to cover its operational costs during the project period.

6. Lessons Learned

(i) Need for a more selective project design

111. The project design needed more focus and prioritization. The initial design of the project was ambitious and complex, covering multiple grid and off-grid activities, demand-side management and capacity building. There were also coordination difficulties in the project implementing arrangements. For example, REA managed the funds for the grid extension and connection subsidy sub-components, while ZESCO undertook the actual physical works since these initially targeted rural areas that were with REA's mandate. This arrangement created the need for additional payment transactions and work verification, which delayed implementation. Focusing on one single implementing agency might have resulted in a better project design and improved the prospects for a more

efficient implementation of the project. Country monitoring and evaluation systems also need to be adapted to respond to the project results framework. For example, a provision should have been made in the ZESCO business information system to include the capture of gender data for new customer connections.

(ii) Appropriate Institutional Capacity and Implementation Arrangements

112. Given the complexity of the project design, successful implementation required that the implementing agencies had the necessary capacity and coordinated implementation arrangements between ZESCO and REA. This was not the case in the early stages of project implementation and delayed advancement towards the PDO. The team did however recognize this challenge and undertook measures to address it as part of the project restructurings. This lesson also implies that project preparation team should make realistic assessment on the capacity of the clients to implement diverse range of activities.

(iii) The value of timely restructuring

113. Despite the challenge of a complex project design, the project benefited considerably from the flexible and timely restructurings and additional financing. Modifying the results indicators so that they were more reflective of the situation on the ground placed the project on a more realistic track. Also, the connection subsidy program that was part of the additional financing played a crucial role in first achieving, and then exceeding, the household connection target and advancing the project towards achieving the PDO.

(iv) Importance of Readiness for Implementation

114. Project effectiveness was delayed by nine months after Board approval in 2008. Implementation only started after the first restructuring of the project in 2010. These are classic signs of approving projects which are not ready for implementation. The Bank should acknowledge that developing projects (particularly complex projects involving new implementation agencies) often takes a significant amount of time and approving projects when the borrower and implementing agencies are not ready results in slow implementation and disbursement and often requires restructuring and extensions of closing dates.

115. The mini-grid and off-grid components of the project were also clearly not ready for implementation due to the lack of the necessary background analysis at entry. If such analysis/assessment had been undertaken, the design of these components would have better reflected the country context and, hence, more realistic and achievable targets would have been established from the outset.

(vi) Effectiveness of Connections Subsidy Program

116. The connections subsidy program, which was part of the additional financing in 2010, played an important role to rapidly increase household connections. It reduced the connection fee by approximately 80 percent, and significantly increased connection uptake by urban and peri-urban customers. The subsidy program is now funded by GPOBA, and

customer demand remains high. The success of this component reaffirms that connection fees are a significant barrier to potential electricity users, and reducing this barrier can be a cost-effective way to increase household connections.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

117. The borrower's ICR is provided in Annex 6.

(b) Co-financiers

118. The European Commission (EC) observed that during the early stages of the project there were delays by the Bank in reporting on implementation progress. During the latter stages of the project the EC observed that the Bank was providing implementation progress reports in a timely manner.

(c) Other partners and stakeholders
(e.g. NGOs/private sector/civil society)

N/A

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Zambia: Increased Access to Electricity Services - P077452				
Components	**Appraisal Estimate (USD millions)**	**Estimate at 2013 restructuring**	**Actual/Latest Estimate (USD millions)**	**Percentage of Appraisal (at 2013 restructuring)**
1a Reinforcement	7.2	9.3	8.1	87%
1b Intensification	8.8	10.2	6.8	67%
1c EE/DSM	1.6	1.6	1.8	114%
2a Grid extension	20.0	13.2	11.1	84%
2b Mini grids	11.2	1.0	0.8	80%
2c Solar PV	7.2	6.5	4.4	68%
3a TA-ZESCO	5.5	2.3	0.7	32%
3b TA- REA		2.0	0.9	46%
AF1 Kanyama and Livingstone substation		13.4	9.8	73%
AF2 Connecting low income households		8.8	6.6	75%
(Designated Accounts)			0.2	
Total Baseline Cost	**61.5**	**68.3**		
Physical Contingencies	7.6			
Price Contingencies	7.6			
Total Project Costs	76.7	68.3	51.3	
PPF	0.00	0.00	0.00	
Front-end fee IBRD	0.00	0.00	0.00	
Total Financing Required	**76.7**	**68.3**	**51.38**	

(Data as of December 1, 2015)

(b) Financing

P077452 - Zambia: Increased Access to Electricity Services					
Source of Funds	**Type of Financing**	**Appraisal Estimate (USD millions)**	**Estimate at 2013 restructuring**	**Actual/Latest Estimate (USD millions)**	**Percentage of Appraisal (at 2013 restructuring**
Borrower		12.0	4.0	N/A	0%
EC: European Commission		15.0	11.65	8.7	74%
International Development Association (IDA)		33.0	48.0	39.9	83%

Global Environment Facility		4.5	4.5	2.7	60%
Project Sponsors		11.0	0.0	0.0	0.0%
Total		75.5	68.15	51.3	75%

(Data as of December 1, 2015)

Annex 2. Outputs by Component

Sub-Component 1a Reinforcement
Additional Finance - Construction of Kanyama Substation in Lusaka
Additional Finance - Construction of Lusaka Road Substation in Livingstone

Reinforcement work was implemented in three sites.

Reinforcement sites	Output
Lusaka 123 KV Ring	Implemented under Lusaka Transmission and Distribution Rehabilitation Project
Coventry substation	Dropped
Roma substation	Dropped
Figtree-Chibombo substation	Completed with delay; 88-132/33kV substation and 88-132kV transmission line between Figtree and Chibombo
Kanyama substation	Completed; 22/11kV, 2x25MVA
Livingstone substation	Completed; 66/11kV 2x20MVA

Sub-Component 1b Intensification

	Project Site	**Distribution Lines (in km)**	**Connected Customers @30th June '15**
Central	Makululu	23.1	942
Central	Foxdale	12.5	18
Central	Chelstone Extension	21.7	380
Central	Kabanana	11.5	1668
Copperbelt	Kabushi (Ndola)	17.3	1421
Copperbelt	Chipulukusu (Ndola)	36.6	1138
Copperbelt	New Kawama (Kitwe)	13.8	620
Lusaka	Kanyama	21	1740
Lusaka	Misisi	15	120
Lusaka	Garden	21	370
	TOTAL	**293.5**	**8,417**

Sub-Component 1c Energy Efficiency and Demand Side Management

One million CFLs were procured and distributed, reducing 57MW of peak load.

Sub-Component 2a Grid Extension

	Project Site	Distribution Lines (in km)	Connected Customers @ 30th June'15	Status @ 30th June 2015
Northern	Lukulu – Mpika	18.5	4	Completed
Northern	Ipusukilo Mission- Luwingu	18.1	20	Completed
Northern	Lukulu Farm Block –Kasama	51	23	Completed
Central	Mukonchi Farm Block – Kabwe	177	Nil	Ongoing
Central	Mangango Mission – Kaoma	96	Nil	Ongoing
	TOTALS	**360.6**	**47**	

Sub-Component 2b Isolated Grids/mini-hydro systems

This sub component was dropped due to unexpectedly high cost.

Sub-Component 2c Solar PV Systems

SSMP Site	**Number PV systems verified by REA**		**Total Systems Verified by REA**
	Solar Lanterns	**Solar Kits**	
Kalomo B1&B2	4,140	1,005	5,145
Isoka	600	43	643
Lukulu	974	86	1,060
Total	**5,714**	**1,134**	**6,848**

Sub-Component 3a TA to ZESCO

Various trainings were implemented, including the following courses.

- ICT-Based Financial Management
- ICT-Based Financial Management and Disbursement
- Energy Industry EPC Contracts course
- Energy Industry EPC Contracts course
- Planning, Budgeting and Rolling Forecasts
- Attending the balanced scorecard certification course
- Contract Drafting, Negotiations Skills and procurement
- Best Practices in Human Resource Management
- Modernized Human Resource Management
- Risk Management
- Overhead lines
- Environmental Management
- Substation Engineering

Sub-Component 3b TA to REA

Various trainings were implemented, and 35 REA staff received trainings.

Additional Finance - Connecting new low income households to the Grid in electrified areas

Connection subsidy was provided to 81,000 low-income households, exceeding the target of 51,000. The subsidy reduced connection fee from US$150 (ZMW769.00) for a standard connection to US$30 (ZMW150.00).

Annex 3. Economic and Financial Analysis

Economic Analysis

The economic analysis covers i) reinforcement (including reinforcement components under additional finance), ii) grid intensification, grid extension and connection subsidy, and iii) solar PV. It does not cover isolated grid/mini-hydro because it was dropped. Demand-side management components (CFL distribution) is not covered either because it was not analyzed in the PAD. The analysis focuses on the consumer surplus arising to electricity users.

Common assumptions used in the analysis are the following:

- O&M cost: 1.2 percent of investment cost
- Payments of electricity users: 0.05 US$/kWh, computed based on ZESCO annual report 2011/2012 sales data.
- Willingness to Pay (WTP) of grid electricity users: 0.125 US$/kWh, based on IAES additional finance paper.
- Cost of power: 0.015 US$/kWh, as used in the appraisal.
- Discount rate: 10 percent was assumed, as in the appraisal.
- The actual disbursement figure provided by ZESCO (including ZESCO's own contribution) is used.
- The project was exempt from taxation, hence the taxation is not deducted from disbursement figure

i) Reinforcement

The reinforcement component aimed to reinforce ZESCO's distribution networks by adding, replacing and upgrading distribution lines, transformers and substations. The expected benefit was increased access to electricity services through reduced outages in the targeted areas and reduced technical distribution loss. The work was implemented in three sites – Kanyama, Livingstone and Figtree/Chibombo.

Cost: The cost side consisted of investment cost, operations and maintenance (O&M) cost, and payments by electricity users.

Benefit: The benefit includes increased electricity services through i) reduced outages, ii) reduced technical distribution losses, and iii) increased capacity of substations and transformers. The increased quantity of electricity services in kWh is calculated based on pre-project electricity consumption in the targeted areas, reduced hours of outage, percentage of reduced distribution, and conservative estimate of increased supply capacity. The benefit is the product of increased quantity of electricity consumption and willingness to pay (WTP) of electricity users.

The key assumptions include the following.

- Operation years: 15 years, as per the PAD
- Electricity sales to the targeted areas: due to the unavailability of time-series data, electricity sales to Kanyama and Livingstone are estimated based in 2009 sales data (512 GWh per year). Figtree/Chibombo is not included due to data unavailability.

- Technical distribution loss was reduced from 23 percent to 14 percent, as reported by ZESCO.
- Annual outage hours were reduced from 50 hours to 20 hours, as reported by ZESCO.
- 25 percent increase in the electricity sales is assumed as the result of increased supply capacity.

The analysis showed economic IRR of 40.9 percent and NPV of US$44,578,474. This is a conservative estimate, since i) the benefit does not include reinforcement work in Figtree/Chibombo area, and ii) it assumes only 25 percent increase in electricity supply capacity, while in fact the transformer capacities in Kanyama and Livingstone more than doubled.

ii) Grid Intensification, extension and connection subsidy

Grid intensification, extension and connection subsidy program are jointly analyzed, as they shared the same objective of increasing access to electricity services through on-grid connection. The intensification component aimed to intensify connections within ZESCO grids. The component covered 10 sites across Central region, Copperbelt region and Lusaka. Connection subsidy program was applied in all of these areas and also beyond. Grid extension component involved construction of distribution lines and installation of transformers in areas where no grids existed.

Cost: The cost side consisted of investment cost, O&M cost, connection subsidies, customer contributions to connection fees, and payment of electricity users.

Benefit: The benefit side was increased access to electricity services by newly connected customers. It was computed based on the users' WTP, average electricity consumption per household, and total connections made.

The key assumptions include the following.

- Operation years: 20 years, as per the PAD
- Average household electricity consumption: Based on ZESCO's data, 300 kWh per month (3600 kWh per year) is assumed as a typical electricity consumption of a household.
- 85,961 connections made in total.

The analysis showed economic IRR of 45.6 percent and NPV of $83,681,639.

iii) Solar PV

Solar PV component aimed to supply, install and maintain solar PV systems to schools, rural health centers and private households in rural areas.

Cost: the cost side was the value of the contract given to the contractors, including procurement of equipment, installation and maintenance.

Benefit: The benefit side was electricity access to households and public facilities. The benefit was computed by the number of households/facilities with new access to electricity and WTP of public facilities and solar home systems (SHS). Distribution of 4 lanterns was converted to 1 SHS.

- Operation years: 10 years, as per the PAD
- WTP of public facilities: US$37 per facility per month. Provided in the appraisal as the WTP for high-capacity PV users.
- WTP of solar home system users: US$24 per household per month. Provided in the appraisal as the WTP for low-capacity PV users.
- PV distribution: 361 public facilities, 1134 SHS and 5714 solar lanterns (lanterns are converted as 1428.5 SHS)

The analysis showed economic IRR of 15.2 percent and NPV of US$655,119.

Summary of economic analysis

Components	Economic IRR (%)	Economic NPV (US$)
Grid reinforcement	40.9%	44,578,474
Grid access components (grid intensification, extension and connection subsidy)	45.6%	83,681,639
Solar PV	15.2%	655,119

Grid reinforcement resulted in higher EIRR and NPV than at the appraisal estimate, as it takes into account the benefit of increased capacity of supply, which was not taken into account at the appraisal. Since power loads at reinforcement sites were reaching their maximum capacity, the reinforcement work, which more than doubled the transformer capacities, resulted in significant benefit of increased and more reliable electricity supply.

Grid access components (grid intensification, extension and connection subsidy) resulted in higher EIRR and NPV than at the appraisal estimate (US$73,000,000). This is attributable to two factors; i) the original target of household connection was 65,000, but the project connected close to 90,000 households, ii) the original analysis assumed significant increase in tariff, but the tariff actually remained low. Low tariff translated into low cost to be borne by electricity users.

Solar PV resulted in lower EIRR and NPV than expected in the appraisal estimate. This is because, 10,000 SHS were planned to be installed at the appraisal stage, but the actual number of installation achieved was less than 3,000.

Financial Analysis

Financial analysis covers i) reinforcement (including reinforcement components under additional finance) and ii) grid intensification, grid extension and connection subsidy. Solar PV is not included as it was implemented by REA, which is not a revenue generating entity.

Analysis on demand-side management is not undertaken either. The analysis focuses on ZESCO as the revenue generating entity of the project.

i) Reinforcement

Cost: The cost side consisted of project, investment cost, O&M cost and cost of power.

Revenue: Revenue was increased sales of electricity, computed by increased amount of electricity sales and average residential tariff. Increased amount of electricity sales is estimated as in the economic analysis.

The analysis showed an FIRR of 24.6 percent and NPV of US$17,280,126.

ii) Grid Intensification, extension & connection subsidy

Cost: The cost side consisted of project investment cost, O&M cost and cost of power.

Revenue: Revenue is the additional electricity sales by newly connected customers. This was computed based on average household electricity consumption, average residential and commercial tariff, and connected customers.

Key assumptions were the following.

- Operation years: 20 years, as per the appraisal
- Average household electricity consumption: based on ZESCO's data, 300 kWh per month (3600 kWh per year) is assumed as a typical electricity consumption of a household.
- 85,961 connections made in total

Analysis showed and IRR of 45.1 percent and NPV of US$77,980,567

Summary of financial analysis

Components	Financial IRR (%)	Financial NPV (US$)
Grid reinforcement	24.6%	17,280,126
Grid access components (grid intensification, extension and connection subsidy)	45.1%	77,980,567

Grid reinforcement resulted in higher FIRR and NPV than at the appraisal estimate, as it takes in to the account the benefit of increased capacity of supply, which was not taken into account at the appraisal.

Grid access components (grid intensification, extension and connection subsidy) resulted in higher FIRR and NPV than at the appraisal estimate (US$16,391,826). This is because the original target of household connection was 65,000, but the project actually connected close to 90,000 households.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Arun P. Sanghvi	Lead Energy Specialist	AFTEG	Team leader
Malcolm Cosgrove-Davies	Lead Energy Specialist	AFTEG	Team leader
Xiaodong Wang	Senior Energy Specialist	AFTEG	Team leader
Raihan Elahi	Senior Financial Analyst	SASEI	
Wedex Ilunga	Procurement specialist	AFTPC	
Anil Cabraal	Lead Energy Specialist	EWDEN	
Raynold Duncan	Lead Energy Specialist	AFTEG	
Samuel O'Brien-Kumi	Senior Energy Specialist	AFTEG	
Marcus Wishart	Water Resource Specialist	AFTWR	
Chrisantha Ratnayake	Senior Power Engineer	AFTEG	
Baruany Elijah Luhanga	Power Engineer	AFTEG	
Helena Mamle Koffi	Procurement Analyst		
Fenwick Chitalu	Financial Management Specialist	AFTFM	
Suzanne Morris	Senior Financial Officer	LOAFC	
Nicolette K. Dewitt	Lead Counsel	LEGOP	
Jonathan Pavluk	Senior Counsel	LEGAF	
Marjorie Mpundu	Counsel	LEGAF	
Paul Martin	Senior Environmental Specialist	AFTSD	
Gordon Appleby	Social Impacts Specialist	AFTS1	
Anta Loum Lo	Language Program Assistant	AFTEG	
Supervision/ICR			
Bobak Rezaian	Senior Energy Specialist	AFTEG	Team Leader
Marjorie Mpundu	Counsel	LEGAF	
Suzanne Morris	Senior Finance Officer	CTRFC	
Jutta Kern	Monitoring and Evaluation Specialist	AFTRL	
Lungiswa Thandiwe Gxaba	Senior Environmental Specialist	AFTEN	
Richard H. Hosier	Senior Environmental specialist	ENVGC	
Fenwick Chitalu	Financial Management Specialist	AFTFM	
Andrey Gurevich	Financial Analyst	AFTEG	
Hiroshi Sumiyoshi	Senior Operations Officer	AFTEG	
Ahmad Slaibi	Young Professional	AFTEG	
Vonjy M. Rakotondramanana	Energy Specialist	AFTEG	
Bernadette T. Milunga	Team assistant	AFMZM	

Raihan Elahi	Senior Energy Specialist	GEEDR	Team Leader
Andrey Gurevich	Senior Investment Officer	CMGMF	
Wedex Ilunga	Procurement Specialist	GGODR	
Helena Mamle Kofi	Procurement Analyst	AFTG1 - HIS	
Hiroshi Sumiyoshi	Senior Operations Officer	AFTG1 - HIS	
Marcus J. Wishart	Sr Water Resources Spec.	GWADR	
Paul Baringanire	Senior Energy Specialist	GEEDR	
Ravindra Anil Cabraal	Consultant	GEEDR	
Wedex Ilunga	Senior Procurement Specialist	GGODR	
Lingson Chikoti	Financial Management Specialist	GGO25	
Francesca Fusaro	Renewable Energy Specialist	GEEDR	
Joseph Mwelwa Kapika	Senior Energy Specialist	GEEDR	
Kisa Mfalila	Environmental Specialist	GENDR	
Kristine Schwebach	Safeguards Specialist	GSURR	
Lien Thi Bich Nguyen	Program Assistant	GEEDR	
Sipiwe Janet Chihame	Program Assistant	AFCS3	
Stephen Mugendi Mukaindo	Counsel	LEGAM	

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY03	10.90	41,500.85
FY04	17.33	94,131.24
FY05	14.91	115,428.34
FY06	20.76	87,558.06
FY07	16.54	59,950.87
FY08	20.70	173,254.98
FY09	8.86	37,142.95
Total:	**110**	**608,967.29**
Supervision/ICR		
FY09	20.63	117,677.75
FY10	47.77	233,028.20
FY11	31.75	58,859.81
FY12	26.51	131,475.15
FY13	25.2	150,286.73

FY14	44.7	209,641.16
FY15	22.89	100,211.15
FY16	8.97	49,303.53
Total:	**228.42**	**1,050,483.48**

Annex 5: Training of DoE, ZESCO and REA Staff

Department of Energy

NO	NAME	COURSE ATTENDED	INSTITUTION	COUNTRY
1	Basilio Mwansa	Electronic Records Management	Info World	Uganda
2	Brian Sinkala Mainza	Monitoring and Evaluation of Energy Projects	Global Management Training	Cape town South Africa
3	Ngosa Mbolela	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
4	Mafayo Ziba	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
5	Biness Lukwesa	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
6	Mandona Luhila	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
7	Chola Chipampa	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
8	Harriet Zulu	Monitoring and Evaluation of Energy Projects	Global Management Training	Cape town South Africa
9	Jeff Chanda	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
10	Florence K. Sikute	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
11	William Masocha	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
12	Beatrice Mukala	Website Development	Global Management Training	Cape town South Africa
13	Aggrey Siuluta	GIS standard	Global Management Training	Cape town South Africa

14	Agnelli Kafuwe	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
15	Arnold Simwaba	Strategic Leadership	Uhuru Institute of Management	Cape town South Africa
16	Misheck Mubuyaeta	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
17	Sozi Chikoko	Monitoring and Evaluation for Executive Secretaries	Uhuru Institute of Management	Cape town South Africa
18	Lawrence Musalila	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
19	Annie Chandipo	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
20	Lloyd Chinjenge	Monitoring and Evaluation of Energy Projects	Uhuru Institute of Management	Cape town South Africa
21	Gretchen Mushinge	Supply Chain Management in Energy Sector	Uhuru Institute of Management	Cape town South Africa

Rural Electrification Authority

S/N	NAME	POSITION	COURSE PROGRAMME	DURATION OF COURSE	TRAINING PLACE
1	Nason Musonda	Power Distribution Dev. Officer	Advanced Certificate in Project Management	14 days 6 April to 20 April 2014	Institute of Management Training, Cape Town, South Africa
2	Leah Banda		Advanced Certificate in Project Management	14 days 6 April to 20 April 2014	Institute of Management Training, Cape Town, South Africa
3	Faith Chilufya	Assistant Administration Officer	Office Management and Administration Skills	14 days 28 May to 11 June 2014	Institute of Management Training, Cape Town, South Africa
4	Thandiwe Malupande Dube	A/Personal Assistant	Management Development	14 days	Institute of Management

			Programme for Personal Assistants	28 May to 11 June 2014	Training, Cape Town, South Africa
5	Jacqueline Musonda	Director-Support Services	Strategic Management for Senior Managers (Incorporating Fundraising and Funds Management Techniques)	14 days 28 May to 11 June 2014	Institute of Management Training, Cape Town, South Africa
6	Victor Mapani	Director-Technical Services	Strategic Skills for Senior Managers	14 days 18 January to 1 February 2014	Globe Management Training Institute (GMT)-Cape Town, South Africa
7	Besa Chimbaka	Economist	Economic Modeling & Financial Forecasting	14 days 18 January to 1 February 2014	GMT-Cape Town, South Africa
8	Laura Inonge Malao	Legal Counsel	Arbitration and Labour Relation Management	14 days 18 January to 1 February 2014	Uhuru Institute of Management Training, Cape Town, South Africa
9	Namakau Malembo	Receptionist	Front Desk Management	14 days 18 January to 1 February 2014	Uhuru Institute of Management Training, Cape Town, South Africa
10	Justin Mukosa	Manager-Corporate Affairs	Corporate Public Relations Management	14 days 8 February to 22 February 2014	Uhuru Institute of Management Training, Cape Town, South Africa
11	Christopher Chisense	Senior Environmental Officer	Advanced Certificate in Project Management	14 days 8 February to 22 February 2014	Uhuru Institute of Management Training, Cape Town, South Africa
12	Newton Ndhlovu	Provincial Rural Electrification Officer	Advanced Certificate in Project Management	14 days 8 February to 22 February 2014	Uhuru Institute of Management Training, Cape Town, South Africa
13	Brighton M. Chishimba	Human Resources & Administration Officer	HRM (strategy & Policy)	14 days From 21 September to 7 October 2013	Cape Town, South Africa

14	Andrew Chilala	Monitoring & Evaluation Officer	Monitoring and Evaluation of Energy Projects	14 days From 21 September to 7 October 2013	Cape Town, South Africa
15	Olga Mamonwa	Provincial Rural Electrification Officer	Advanced Certificate in Project Management	14 days From 21 September to 7 October 2013	Cape Town, South Africa
16	Naomie Sidono	Community Mobilization Officer	Stakeholders Engagement and Management Course	14 days From 21 September to 7 October 2013	Cape Town, South Africa
17	Chriscent Sialyainda	Records Management Officer	Electronic Records Management	14 days 6 October to 20 October 2013	Cape Town, South Africa
18	Choolwe Kasamu	Corporate Affairs Officer	Corporate Communication & Professional Writing for Publicity Practitioners	14 days 6 October to 20 October 2013	Cape Town, South Africa
19	Felix Nyirongo	Stores Officer	Management of Stores and Inventory	14 days 6 October to 20 October 2013	Cape Town, South Africa
20	Bruce Chilufya	Assistant Accountant	Managing and Accounting Public Funds	14 days 27 October to 10 November 2013	Cape Town, South Africa
21	Wazingwa Mugala	Provincial Rural Electrification Officer	Advanced Certificate in Project Management	14 days 27 October to 10 November 2013	Cape Town, South Africa
22	David Lungu	Monitoring & Evaluation Specialist	Result-Based Monitoring and Evaluation (World Bank)	14 days 27 October to 10 November 2013	Cape Town, South Africa
23	Maxwell Z. Phiri	Director-HRA	Function of Human Resources	14 days 8 February to 22 February 2014	Cape Town, South Africa
24	Patrick Mubanga	Senior Power Distribution Dev. Officer	Advanced Certificate in Project Management	14 days 28 May to 11 June 2014	Institute of Management Training, Cape Town, South Africa

25	Felix Munsaka	Manager Procurement & Supplies	Public Procurement Programme	14 days From 12/10/2014-25/10/2014	Globe Management Training, Cape Town, South Africa
26	Katasha Ponya	Corporate Affairs Officer	Public Relations Protocol	14 days From 16/11/2014-29/11/2014	Globe Management Training, Cape Town, South Africa
27.	Eugene Kafupi	Office Assistant	Records and information Management	14th April -28th April 2015	Peniel Conferencing and Management
28.	Limbikani Mwanza	Driver/Messenger	Transport and Logistics Management	14th April - 28th April 2015	Peniel Conferencing and Management
29.	Bright Chifulo	Systems Administrator	Certified Information Systems Security Professionals	19th April – 2nd May 2015	Peniel Conferencing and Management
30.	Lavender Malama	Provincial Rural Electrification Officer	Project Management	14th April -28th April 2015	Uhuru Institute of Management Training
31.	Moses Sakala	Procurement Officer	Procurement and Contracts Management, Monitoring and Controls	14th April -28th April 2015	Global Management Training
32.	Haggai Muto'nga	Accountant	Donor Funding Management and Financial control	26th April – 9th May 2015	Sterling Africa Training and Consultancy
33.	Joseph Ntanda	Senior Accountant	Financial Modelling, Financial forecasting and Analysis	19th April – 3nd May 2015	Sterling Africa Training and Consultancy
34.	Siulapwa Lupupa	Surveyor	Project Management	19th April – 3rd May 2015	Uhuru Institute of Management Training
35.	Geoffrey Musonda	Chief Executive Officer	Leadership	4th July, 2015 – 11th July, 2015	RIPA – London, United Kingdom

ZESCO Limited

Name	**Course**	**Dates**	**Location**
Joackim Mwanza	PM 1	1-5 Oct, 2012	KGRTC
Kennedy Chomba	PM 1	1-5 Oct, 2012	KGRTC
Percy Kaela	PM 1	1-5 Oct, 2012	KGRTC
Richard Chinyengo	PM 1	1-5 Oct, 2012	KGRTC
Kennedy Bwalya	PM 1	1-5 Oct, 2012	KGRTC

Justine Kamungoma	PM 1	1-5 Oct, 2012	KGRTC
Vincent Sakeni	PM 1	1-5 Oct, 2012	KGRTC
Shezippie Nzovu	PM 1	1-5 Oct, 2012	KGRTC
Fidelis Ngalande	PM 1	1-5 Oct, 2012	KGRTC
Fainos Dube	PM 1	1-5 Oct, 2012	KGRTC
Moses Mweetwa	PM 1	1-5 Oct, 2012	KGRTC
Terence Tambatamba	PM 1	1-5 Oct, 2012	KGRTC
Isaac Chisanga	PM 1	1-5 Oct, 2012	KGRTC
Bright Sepiso	PM 1	1-5 Oct, 2012	KGRTC
Simon Sakala	PM 1	1-5 Oct, 2012	KGRTC
Nelson Milanzi	PM 1	1-5 Oct, 2012	KGRTC
Vincent Muchindu	PM 1	1-5 Oct, 2012	KGRTC
Lemmy Mweene	PM 1	1-5 Oct, 2012	KGRTC
Stephen Chipili	PM 1	1-5 Oct, 2012	KGRTC
Thomas Sinkamba	PM 1	1-5 Oct, 2012	KGRTC
Billy Nsotaulwa	PM 1	1-5 Oct, 2012	KGRTC
Mchokoliso Tembo	PM 1	1-5 Oct, 2012	KGRTC
Wakina Nchamba	PM 1	1-5 Oct, 2012	KGRTC
Davy Mambwe	PM 1	1-5 Oct, 2012	KGRTC
Lottie Gondwe	PM 1	1-5 Oct, 2012	KGRTC
Friday Mukupa	PM 1	1-5 Oct, 2012	KGRTC
Godfrey Sikazwe	PM 1	1-5 Oct, 2012	KGRTC
Alex Mbumba	PM 1	1-5 Oct, 2012	KGRTC
Moses Mubanga	PM 1	1-5 Oct, 2012	KGRTC
Ms. Temwani Chirwa	PM 2	10-14 Oct, 2012	KGRTC
Mr. Lovedale Mbewe	PM 2	10-14 Oct, 2012	KGRTC
Mr. Kalima Leon	PM 2	10-14 Oct, 2012	KGRTC
Mrs. Deophine Mulenga Luswili	PM 2	10-14 Oct, 2012	KGRTC
Leornard Mpundu	PM 2	10-14 Oct, 2012	KGRTC
Mr. Fiztpatrick Kapepe	PM 2	10-14 Oct, 2012	KGRTC
Mr. Chrispin Singoyi	PM 2	10-14 Oct, 2012	KGRTC
Mr. Prince Matambo	PM 2	10-14 Oct, 2012	KGRTC
Mayase Maipambe	PM 2	10-14 Oct, 2012	KGRTC
Sara Kasiya	PM 2	10-14 Oct, 2012	KGRTC
Mrs. Tina Sampa	PM 2	10-14 Oct, 2012	KGRTC
Josephe Chilongo	PM 2	10-14 Oct, 2012	KGRTC
Daniel Mvula	PM 2	10-14 Oct, 2012	KGRTC
Mr. Mwendaweli Chrispin	PM 2	10-14 Oct, 2012	KGRTC
Mr. Abel Chavula	PM 2	10-14 Oct, 2012	KGRTC
Mr. Readlay Makaliki	PM 2	10-14 Oct, 2012	KGRTC
Mr. Edgar Habeene	PM 2	10-14 Oct, 2012	KGRTC
Mr. Moses Nundwe	PM 2	10-14 Oct, 2012	KGRTC
Mr. Happy Mubanga Nkunde	PM 2	10-14 Oct, 2012	KGRTC

Mr. Savior Kampamba	PM 2	10-14 Oct, 2012	KGRTC
Mr. Wilcliff Chipeta	PM 2	10-14 Oct, 2012	KGRTC
Mr. Simon Muwowo	PM 2	10-14 Oct, 2012	KGRTC
Mr. Greenson Bwalya	PM 2	10-14 Oct, 2012	KGRTC
Mr. Dobvious Habuzila	PM 2	10-14 Oct, 2012	KGRTC
Mr. Kelvin Kamwale	PM 2	10-14 Oct, 2012	KGRTC
Mr. Chiyombwe Chiyombwe	PM 2	10-14 Oct, 2012	KGRTC
Dennis Kapoya	M&E	29 Oct-2 Nov, 2012	KGRTC
Chrispin Kahongo	M&E	29 Oct-2 Nov, 2012	KGRTC
Shezipie Nzovu	M&E	29 Oct-2 Nov, 2012	KGRTC
Zingani Sakala	M&E	29 Oct-2 Nov, 2012	KGRTC
Lillian Sinyangwe	M&E	29 Oct-2 Nov, 2012	KGRTC
Alex Mbumba	M&E	29 Oct-2 Nov, 2012	KGRTC
Fidelis Ngalande	M&E	29 Oct-2 Nov, 2012	KGRTC
Happy Mubanga	M&E	29 Oct-2 Nov, 2012	KGRTC
Readlay Mkaliki	M&E	29 Oct-2 Nov, 2012	KGRTC
Masoka Daka	M&E	29 Oct-2 Nov, 2012	KGRTC
Justine Kamungoma	M&E	29 Oct-2 Nov, 2012	KGRTC
Vincent Muchindu	M&E	29 Oct-2 Nov, 2012	KGRTC
Brighton Kombe	M&E	29 Oct-2 Nov, 2012	KGRTC
Edward Mutumba	M&E	29 Oct-2 Nov, 2012	KGRTC
Mathew Phiri	M&E	29 Oct-2 Nov, 2012	KGRTC
Katongo Yamba	M&E	29 Oct-2 Nov, 2012	KGRTC
Frank Mushaukwa	M&E	29 Oct-2 Nov, 2012	KGRTC
Robinson Kabwe	M&E	29 Oct-2 Nov, 2012	KGRTC
Thomas Nyirenda	M&E	29 Oct-2 Nov, 2012	KGRTC
Henry Mumba	M&E	29 Oct-2 Nov, 2012	KGRTC
Gregory Mubanga	M&E	29 Oct-2 Nov, 2012	KGRTC
Dereck Chileshe	M&E	29 Oct-2 Nov, 2012	KGRTC
Eric Phiri	M&E	29 Oct-2 Nov, 2012	KGRTC
Temwani Chirwa	M&E	29 Oct-2 Nov, 2012	KGRTC
Vincent Sakeni	EM	10 -14 Dec, 2012	KGRTC
Lioko Sitali	EM	10 -14 Dec, 2012	KGRTC
Savior Kampamba	EM	10 -14 Dec, 2012	KGRTC
George Zulu	EM	10 -14 Dec, 2012	KGRTC
Justin Changala	EM	10 -14 Dec, 2012	KGRTC
Lovedale Mbewe	EM	10 -14 Dec, 2012	KGRTC
Kabamba Mbewe	EM	10 -14 Dec, 2012	KGRTC
Milika Chande	EM	10 -14 Dec, 2012	KGRTC
Chaali Kalebuka	EM	10 -14 Dec, 2012	KGRTC
Zingani Sakala	EM	10 -14 Dec, 2012	KGRTC
Mumpanshya Bowa	EM	10 -14 Dec, 2012	KGRTC

Mathews Mkandawire	EM	10 -14 Dec, 2012	KGRTC
Kennedy Chomba	EM	10 -14 Dec, 2012	KGRTC
Edgar Habeene	EM	10 -14 Dec, 2012	KGRTC
Sarah Ngulube	EM	10 -14 Dec, 2012	KGRTC
Stella Kayope	EM	10 -14 Dec, 2012	KGRTC
Doreen M. C. Machona	EM	10 -14 Dec, 2012	KGRTC
Masiliso Mwiya	EM	10 -14 Dec, 2012	KGRTC
Tito Tembo	EM	10 -14 Dec, 2012	KGRTC
Francisca Maluke	EM	10 -14 Dec, 2012	KGRTC
Mwelwa N. Sata	EM	10 -14 Dec, 2012	KGRTC
Gladys Phiri	EM	10 -14 Dec, 2012	KGRTC
Martin Siame	EM	10 -14 Dec, 2012	KGRTC
Moses Mubanga	EM	10 -14 Dec, 2012	KGRTC
Simon Chashika	EM	10 -14 Dec, 2012	KGRTC
Victor Chisha	EM	10 -14 Dec, 2012	KGRTC
Francis Musonda	EM	10 -14 Dec, 2012	KGRTC
Duncan Lungu	EM	10 -14 Dec, 2012	KGRTC

Namwila Mfula	FM	11 - 15 Jan, 2013	Cresta Hotel
Helen Mukoboto	FM	11 - 15 Jan, 2013	Cresta Hotel
George Zulu	FM	11 - 15 Jan, 2013	Cresta Hotel
Christopher Phiri	FM	11 - 15 Jan, 2013	Cresta Hotel
Austin Mudenda	FM	11 - 15 Jan, 2013	Cresta Hotel
Chrispin L. Kahongo	FM	11 - 15 Jan, 2013	Cresta Hotel
Collins Mumba	FM	11 - 15 Jan, 2013	Cresta Hotel
Anna Lungu	FM	11 - 15 Jan, 2013	Cresta Hotel
Bornface Mwila	FM	11 - 15 Jan, 2013	Cresta Hotel
Chipili Banda	FM	11 - 15 Jan, 2013	Cresta Hotel
Victor Palangwa	FM	11 - 15 Jan, 2013	Cresta Hotel
Regina Chabala	FM	11 - 15 Jan, 2013	Cresta Hotel
Naarah Sinyangwe	FM	11 - 15 Jan, 2013	Cresta Hotel
Beatrice Kambo	FM	11 - 15 Jan, 2013	Cresta Hotel
Lillian Sinyangwe	FM	11 - 15 Jan, 2013	Cresta Hotel
Mchokoliso Tembo	FM	11 - 15 Jan, 2013	Cresta Hotel
Christabel Kangwa Mutale	FM	11 - 15 Jan, 2013	Cresta Hotel
Emmanuel M. Phiri	FM	11 - 15 Jan, 2013	Cresta Hotel
Gregory Mubanga	FM	11 - 15 Jan, 2013	Cresta Hotel
Kasaula Milambo	FM	11 - 15 Jan, 2013	Cresta Hotel
Temwani Chirwa	FM	11 - 15 Jan, 2013	Cresta Hotel
Mannaseh Phiri	FM	11 - 15 Jan, 2013	Cresta Hotel
Vivien Chiholyonga	FM	11 - 15 Jan, 2013	Cresta Hotel
Evarista L. M. Banda	FM	11 - 15 Jan, 2013	Cresta Hotel
Bupe Simwawa	FM	11 - 15 Jan, 2013	Cresta Hotel

George Muyunda	FM	11 - 15 Jan, 2013	Cresta Hotel
Chibeza Mbulo	FM	11 - 15 Jan, 2013	Cresta Hotel
Lovedale Mbewe	FM	11 - 15 Jan, 2013	Cresta Hotel

Paul Mutale	PPPs	21 - 25 Feb, 2013	KGRTC
Masoka Daka	PPPs	21 - 25 Feb, 2013	KGRTC
Justin Kamungoma	PPPs	21 - 25 Feb, 2013	KGRTC
Chrispin Singoyi	PPPs	21 - 25 Feb, 2013	KGRTC
Namwila Mfula	PPPs	21 - 25 Feb, 2013	KGRTC
Ackson Mwale	PPPs	21 - 25 Feb, 2013	KGRTC
Chaali Kalebuka	PPPs	21 - 25 Feb, 2013	KGRTC
Tryson Kasempa	PPPs	21 - 25 Feb, 2013	KGRTC
Fred Mushili	PPPs	21 - 25 Feb, 2013	KGRTC
Helen Mukoboto	PPPs	21 - 25 Feb, 2013	KGRTC
Elida Mufuzi	PPPs	21 - 25 Feb, 2013	KGRTC
Susuki Wina	PPPs	21 - 25 Feb, 2013	KGRTC
Namakau Muchana	PPPs	21 - 25 Feb, 2013	KGRTC
Mchokoliso Tembo	PPPs	21 - 25 Feb, 2013	KGRTC
Lovedale Mbewe	PPPs	21 - 25 Feb, 2013	KGRTC
Beatrice Malonda	PPPs	21 - 25 Feb, 2013	KGRTC
Henry Lukali	PPPs	21 - 25 Feb, 2013	KGRTC
Shezzipie Ndhlovu	PPPs	21 - 25 Feb, 2013	KGRTC
Ricky Simfukwe	PPPs	21 - 25 Feb, 2013	KGRTC
Tito Tembo	PPPs	21 - 25 Feb, 2013	KGRTC
Bonje Muyunda	PPPs	21 - 25 Feb, 2013	KGRTC
Kandi Shikabi	PPPs	21 - 25 Feb, 2013	KGRTC
Regina Chabala	PPPs	21 - 25 Feb, 2013	KGRTC
Saviour Kampamba	PPPs	21 - 25 Feb, 2013	KGRTC
David Zimba	PPPs	21 - 25 Feb, 2013	KGRTC
Vivian K. Chiholyonga	PPPs	21 - 25 Feb, 2013	KGRTC

Monica Mwape	4 - 17 Nov, 2012	ICT-Based Financial Management	Kenya
Leah Yamba	4 - 17 Nov, 2012	ICT-Based Financial Management	Kenya
Fred Mushili	4 - 17 Nov, 2012	ICT-Based Financial Management	Kenya
Laston Mbunda	4 - 17 Nov, 2012	ICT-Based Financial Management	Kenya
Fitzpatrick Kapepe	4 - 17 Nov, 2012	ICT-Based Financial Management	Kenya
Sarah Kasiya	4 - 17 Nov, 2012	ICT-Based Financial Management	Kenya

Kennedy Sichone	29th to 31st Aug, 2012	ICT-Based Financial Management and Disbursement	Kenya
Julius Kampamba	29th to 31st Aug, 2012	ICT-Based Financial Management and Disbursement	Kenya
Francis Namakanda	29th to 31st Aug, 2012	ICT-Based Financial Management and Disbursement	Kenya
Leornard Mpundu	29th to 31st Aug, 2012	ICT-Based Financial Management and Disbursement	Kenya
Readlay Makaliki	21 -23 Jan, 2013	Energy Industry EPC Contracts course	South Africa
Chrispin Kahongo	21 -23 Jan, 2013	Energy Industry EPC Contracts course	South Africa
David Tembwe	21 -23 Jan, 2013	Energy Industry EPC Contracts course	South Africa
Mutema Chella	21 -23 Jan, 2013	Energy Industry EPC Contracts course	South Africa
Nancy Chileshe Sikazwe	21 -23 Jan, 2013	Energy Industry EPC Contracts course	South Africa
McRobby Chiwale	21 -23 Jan, 2013	Energy Industry EPC Contracts course	South Africa
Matthews Ndlovu	21 -23 Jan, 2013	Energy Industry EPC Contracts course	South Africa
Chiti Mulenga	21 -23 Jan, 2013	Energy Industry EPC Contracts course	South Africa
Godfrey Mwenda	21 -23 Jan, 2013	Energy Industry EPC Contracts course	South Africa
Florida Kanyanti Kapandula Lingela	21 -23 Jan, 2013	Energy Industry EPC Contracts course	South Africa
Morecome Mumba	28th Jan, 2013 to 2nd Feb, 2013	ROI Methodology Certification	South Africa
Ngoza C. Nkwabilo	28th Jan, 2013 to 2nd Feb, 2013	ROI Methodology Certification	South Africa
Rhoda Kunda Mwale	28th Jan, 2013 to 2nd Feb, 2013	ROI Methodology Certification	South Africa
Florence Mbwili Mutale	28th Jan, 2013 to 2nd Feb, 2013	ROI Methodology Certification	South Africa
Josephine Muwezwa	28th Jan, 2013 to 2nd Feb, 2013	ROI Methodology Certification	South Africa
Deophine Luswili	18 to 20 February, 2013	Planning, Budgeting and Rolling Forecasts	South Africa
Matthews Wilson Lungu	18th to 20th February, 2013	Planning, Budgeting and Rolling Forecasts	South Africa
Philip Wampata	18th to 20th February, 2013	Planning, Budgeting and Rolling Forecasts	South Africa
Fitzpatrick Kapepe	18th to 20th February, 2013	Planning, Budgeting and Rolling Forecasts	South Africa

Jeremiah Nyondo	18th to 20th February, 2013	Planning, Budgeting and Rolling Forecasts	South Africa
George Mike Chabu	18th to 20th February, 2013	Planning, Budgeting and Rolling Forecasts	South Africa
Thomas Sinkamba	16 - 23 February, 2013	Witnessing FAT for Lusaka Road Substation	India
Wazziah Phiri	7-15May, 2015	Attending the balanced scorecard certification course	Kenya
Bessie Banda	7-15May, 2015	Attending the balanced scorecard certification course	Kenya
Chileshe Luputa	7-15May, 2015	Attending the balanced scorecard certification course	Kenya
Beauty Phiri	7-15May, 2015	Attending the balanced scorecard certification course	Kenya
Dambile Kambemba	7-15May, 2015	Attending the balanced scorecard certification course	Kenya
Lazarous Chulu	7-15May, 2015	Attending the balanced scorecard certification course	Kenya
Wilbroad Chanda	8 - 19 June 2015	Contract Drafting, Negotiations Skills and procurement	Namibia
Taulino Banda	8 - 19 June 2015	Contract Drafting, Negotiations Skills and procurement	Namibia
Mayase Maipambe	8 - 19 June 2015	Contract Drafting, Negotiations Skills and procurement	Namibia
Vivienne Lesa	8 - 19 June 2015	Contract Drafting, Negotiations Skills and procurement	Namibia
Laston Mbunda	8 - 19 June 2015	Contract Drafting, Negotiations Skills and procurement	Namibia
Sara Kasiya	8 - 19 June 2015	Contract Drafting, Negotiations Skills and procurement	Namibia
Namwiinga Ngándu	15 - 19 June 2015	Best Practices in Human Resource Management	Swaziland
Cassandra M Simulyamana	15 - 19 June 2015	Best Practices in Human Resource Management	Swaziland
Jean C Sakala	15 - 19 June 2015	Best Practices in Human Resource Management	Swaziland
Milimo R Malambo	15 - 19 June 2015	Best Practices in Human Resource Management	Swaziland
Joster Choombe	22 - 26 June, 2015	Modernised Human Resource Management	Swaziland
Isaac Chisanga	22 - 26 June, 2015	Modernised Human Resource Management	Swaziland
Tina Sampa	22 - 26 June, 2015	Modernised Human Resource Management	Swaziland

Valerian Samulela	22 - 26 June, 2015	Modernised Human Resource Management	Swaziland
Francis Namakanda	18 - 21 May 2015	Risk Management	South Africa
Nshimwenamo Mulenga	18 - 21 May 2015	Risk Management	South Africa
Elijah Chabu	18 - 21 May 2015	Risk Management	South Africa
Caroline Banda	18 - 21 May 2015	Risk Management	South Africa
Daniel Mvula	18 - 21 May 2015	Risk Management	South Africa
Kennedy Sichone	18 - 21 May 2015	Risk Management	South Africa
Borniface Mutale	25-29 May, 2015	Overhead lines	South Africa
Abbyson Bwembya	25-29 May, 2015	Overhead lines	South Africa
Bowa Mumpanshya	25-29 May, 2015	Overhead lines	South Africa
Charles Khombe	25-29 May, 2015	Overhead lines	South Africa
Lewis Chileshe	25-29 May, 2015	Overhead lines	South Africa
John M Chirwa	25-29 May, 2015	Overhead lines	South Africa
Cecilia Kasonde	25-29 May, 2015	Overhead lines	South Africa
Stephen Chipili	25-29 May, 2015	Overhead lines	South Africa
George Muyunda	25-29 May, 2015	Overhead lines	South Africa
Bonje M Muyunda	1-15 May, 2015	Environmental Management	Swaziland
Providence Sepeti	1-15 May, 2015	Environmental Management	Swaziland
John M. Chirwa	1-15 May, 2015	Environmental Management	Swaziland
Jonas Nyondo	18-22 May, 2015	Substation Engineering	South Africa
Martin Chikwa	18-22 May, 2015	Substation Engineering	South Africa
Ned Mutambo	18-22 May, 2015	Substation Engineering	South Africa
George Muyunda	18-22 May, 2015	Substation Engineering	South Africa
Bright Mwaipopo	18-22 May, 2015	Substation Engineering	South Africa
Jeremiah Mtonga	18-22 May, 2015	Substation Engineering	South Africa
Haswell Mwamengo	18-22 May, 2015	Substation Engineering	South Africa
Alex Mbunda	18-22 May, 2015	Substation Engineering	South Africa

Annex 6. Summary of Borrower's ICR and/or Comments on Draft ICR

1. Project Background

1. The Increased Access to Electricity Services (IAES) Project is a World Bank funded electrification project implemented in Zambia by ZESCO Ltd and Rural Electrification Authority (REA), on behalf of Government as Implementing Agencies. The Government signed credit agreements with the Bank to facilitate the funding of the project.

2. The project was conceived in May 2008 and became effective on 19th February 2009. It was originally scheduled to close on 31st Dec 2013 but was extended to 30th June 2015 to ensure successful completion of all project components. The project was structured into three main segments, namely, **Efficiency Improvement** (comprising Intensifications, Reinforcements and Energy Efficiency-EE); **Access Expansion** (Grid Extension to rural areas, Mini-hydro-power development for isolated grids and Sustainable Solar Market Packages (SSMP)); **Technical Assistance** and capacity building for all stakeholders including the Implementing Agencies - ZESCO and REA.

3. The objective of the project was to accelerate customer connections and increase electricity access rate which at the time of inception, stood at 21 percent of the national population. The increase in electrification was to be achieved through construction of new lines (Grid Extensions) in rural parts of the country; increased construction and connections of customers in areas with existing networks (Intensifications); selected network expansions to the existing system (Reinforcements) and the provision of solar systems under the Sustainable Solar Market Packages (SSMP) component.

The implementation of the Grid Extension Project Component was to be coordinated by ZESCO, leading in the designs, specifications of technical requirements, supervision and implementation while the Rural Electrification Authority (REA) was to be Funds Manager for the Grid Extension components as well as a leading implementing agency for SSMP.

4. The project was conceived to address the bottlenecks identified as hindrance to customer connectivity, namely: - inaccessibility to the power grid in most areas; limited capacity of existing network and lack of adequate internal funds to facilitate expansion programs. Furthermore, the project also focused at improving power supply capacity as a result of generation shortages and Energy Efficiency component which involved distributing of **Compact Florescent Lamps (CFL's)** to residential customers.

5. **Additional Financing**. Because of customers' perception of high connection fees and the need to help low income communities access electricity services, the project added another portfolio for subsidized connection fee under the **Connection Fee Subsidy Framework**. This had to come under $10m Additional Financing from the Bank. It was envisaged that under the program, 51,000 connections would be made. Note is hereby made that under the same Additional Financing, another US$10m was mobilized for reinforcement works at Kanyama and Livingstone's Lusaka Rd to bring the total additional financing to $20m.

6. The whole project concept was consistent with the framework laid down in the Poverty Reduction Strategy Paper (PRSP) and Country Assistance Strategy (CAS) of 2008, which sought to increase access to electricity as one way of contributing to poverty reduction.

7. The original cost was estimated at US$75.5m but with additional funding of US$ 20m, the project had to undergo additional project appraisal which was then documented in the additional Project Appraisal Document (PAD).

2. Scope of the Project

8. The project was designed to benefit rural communities that had no access to electricity through construction of Grid Extension Lines and installation of Transformers to facilitate connectivity. Furthermore, the project was also intended to construct additional lines and transformers in peri-urban areas which already had existing networks. Approximately 610km of Distribution Lines and 200 transformers were to be installed under the Grid Extensions and Intensifications programs in the following areas:

- *Kanyama, Garden and Misisi (in Lusaka)*
- *Chipulukusu, New Kawama and Chibolya (Copperbelt)*
- *Lukulu (Mpika), Lukulu Farming Block (Kasama), Ipusukilo Mission (Luwingu),*
- *Makululu (Kabwe), Chelston Extension, Vorna Valley (later Foxdale-Chamba Valley, Kabanana).*
- *Mukonchi Farm Block (Kabwe) and Mangango Mission (in Kaoma)*

9. REA held interviews on 3rd October 2014 to shortlist a candidate for the position of Supervising Engineer (SE) under the IAES Grid Extension component. The overall objective of the SE was to effectively supervise all grid extension projects on behalf of REA.

10. Note that due to pressure to get connected, Vorna Valley residents could not wait for the project's logistics of construction but pressurized internal ZESCO functionary to carry out connections. The scope for Vorna Valley was thus shifted to and spread in Foxdale and Kabanana areas of Lusaka.

11. **The Lusaka 132kV Ring** circuit design was to be reviewed under Reinforcement Component. In addition the construction of Lusaka Rd 66/11kV Substation in Livingstone and Kanyama 33/11kV Substation in Lusaka would be carried out under the same component. Others to be constructed were the Figtree-Chisamba 88-132/33kV works and the reinforcement of Coventry and Roma 132/33/11kV Substations.

12. **On Demand Side Management** under Energy Efficiency, one million Compact Florescent lamps (CFL's) were to be procured and distributed to residential customers to encourage efficient use of energy and help mitigate power crisis by cutting demand by an

approximated 50MW. This would result in providing relief to the constrained power generation capacity.

13. **The isolated grids and mini hydro** development activities were intended to supply electricity to remote communities and to help replace existing diesel generation power stations. Three (3) sites were identified for further assessments and these included Chikata Falls in Kabompo District, Zengamina II and Kasanjiku Falls in Mwinilunga District of North-Western Province.

14. **Sustainable Solar Market Packages (SSMP) Project I&II** was to be implemented by REA with an aim to supply, install and maintain Solar PV Systems to schools, rural health centers and private households in project target areas where the grid would not be extended within the next five (5) years. The SSMP Project Component provided output-based performance grants aimed at buying down the upfront cost of Solar Photovoltaic (PV) systems being supplied to private households by the Contractor under the SSMP phase 1 Projects which are located in Kalomo, Isoka and Lukulu Districts. The main purpose of this project was to surmount the barrier of higher maintenance costs of Solar Photovoltaic (PV) systems and its smaller household market segment exacerbated by low affordability.

15. **Technical Assistance (TA) Component** was designed to support capacity building of stakeholders and assist ZESCO and REA in developing a Performance Improvement Plan which was based on the Institutional Performance Appraisal Framework. It was also intended to develop Technical Designs for optimization of distribution systems and preparation for future improvement works. Further, the TA was to address framework and master plan for the mini-hydro power development in Zambia. However, this could not be implemented due to short time-frame of implementation.

16. Under the **Connection Fee Subsidy Framework**, 51,000 customers from the project areas and other identified *low-income communities* were earmarked for connections by allowing them to pay only **US$30** (ZMW150.00) out of the required standard fee of **US$150** (ZMW769.00). This would be achieved by providing a service drop cable and prepaid energy meter for a standard connection and would include a ready-board for an enhanced connection. The framework would also support advance procurement of materials such as poles, cables and distribution transformers to facilitate connections in the said selected areas.

3. Project Schedule

17. The Increased Access to Electricity Services (IAES) Project was conceived on 20thMay 2008 and became effective on 19thFeb 2009. It was originally scheduled to close on 31st Dec 2013 but was extended to 30th June 2015 to ensure successful completion of all project components.The Project started as a five year (2008 – 2013) intervention to increase the electrification rate in Zambia; raise the efficiency and quality of ZESCO's electricity distribution system and promote the use of renewable energy technologies. The Government of the Republic of Zambia secured funding from the World Bank, the Global

Environment Fund and the European Union amounting to US$ 5.5 million. However, most of the activities started to be implemented in 2011 which implied that the completion period of the project shifted forward to 2015.

4. Project Status

4.1 Awarded Contracts

18. In the course of the project implementation, a number of works and supply contracts amounting to just over US$ 55m were signed and awarded to various contractors. About eleven (11) Engineering, Procurement & Construction **(EPC)** or **Turn-key contracts** were awarded. In addition, Three (3) groups of **Supply Contracts,** namely for Figtree/Chibombo Power Transformers; Compact Florescent Lamps and varied materials under Subsidy Framework were awarded. For design and supervision, various **Consultants** were engaged to provide services to grouped project activities in *Grid Extensions & Intensifications*; *Reinforcement* and for *Surveys*. In addition, two (2) contractors were engaged to carry out the SSMP Implementation.

19. Due to limitation in funds, some project components could not be undertaken in the manner they were designed even after the provision of additional funding of about USD20m. The intended works on the 132kV Lusaka Ring for instance ended just at the Engineering Designs by the Consultant (under Reinforcement) for future preparations only. It can be noted here that this resulted in a Design Review Report that enabled the initiation of another project – The Lusaka Transmission & Distribution Rehabilitation Project (**LTDRP**) currently underway in ZESCO. Equally, works to reinforce Coventry and Roma substations lapsed for the same reason. Mopped up funds were restructured to focus on the Figtree-Chisamba reinforcement works which saw an introduction of 62km of 88-132kV Transmission Line to be constructed from Figtree to Chibombo, the location of a new bulk 88/33kV Substation.

4.2 Reinforcement Works

4.2.1 Construction of Lusaka Rd Substation in Livingstone

20. The construction of Lusaka Rd 66/11kV, 2x20MVA Substation was undertaken from 25/07/2012 to 31/12/2014 and was completed at a total cost of US$ 4.2m. The substation is currently in use with a few feeder bays for spare. So far, the substation has resolved some of the loading challenges in Livingstone and has also improved the security and reliability of supply in the area.

4.2.2 Construction of Kanyama Substation in Lusaka

21. The installation of Kanyama 33/11kV, 2x25MVA Substation was undertaken between 01/07/2012 and 31/10/2014 and was completed at a total cost of US$ 3.6m. The substation is in operation and has equally resolved supply quality challenges in the Kanyama Area and Mumbwa Rd Industrial Area of Lusaka. New buildings such as

Shopping Malls have already taken advantage of power capacity improvements and have been built around the area.

4.2.3 Construction Works in Figtree/Chibombo

22. As alluded to earlier, the remaining funds under Reinforcement were mobilized to undertake Figtree-Chibombo works. Here the works were divided into two contracts, namely; *Refurbishment/Upgrading of Figtree and Construction of Chibombo 88-132/33kV Substation* as one contract and the *construction of the 88-132kV kV line* to be initially powered on 88kV, as another contract. The contracts were given to different contractors to run concurrently. There was also a third contract but this involved the *supply and delivery of power transformers* separately for the two sites, due to inherent procurement long lead times.

23. Figtree and Chibombo substation works had a contract amount of US$5.99m while that of the 62km, 88-132kV line in-between cost US$6.0m. The supply of power transformers cost $1.2m

24. Both of these works contracts were scheduled to be completed by 30thJune 2015 but slightly went over by a few months. A combination of factors resulted in delayed completion of the contracts, the major one having been a change in the tax policy midway into project implementation. Having been originally exempt from tax, the project was taken aback when there was sudden insistence on the tax to be paid. This generally affected material flow as tax funds were being sourced and/or resolved. The other reason was the need to install two section tension towers, not originally in the scope, on the existing 88kV line before any landing Gantries could be erected at Figtree. This had to be resolved but not without delay. The contractor appointed to do the line had their in-house operational issues with subcontractors that too slowed down the pace of works.

25. The installation and commissioning works, as at compilation of this report, had been completed pending switching on procedures by the System Operations – the National Control Centre (NCC). Test commissioning reports, schematic and single line diagrams had all been submitted for review in line with the new Grid Code.

26. Completion of Figtree-Chibombo works will resolve long standing low-voltage problems in the Chisamba Farming Area. It will also reinforce supplies at Landles and Keembe 33/11kV Substations respectively and reduce pressure at Chisamba Substation and relieve Figtree. This will result in improved power quality in the affected areas that include, Mwachisompola Hospital and allow the newly created district of Chisamba carry on with its developmental construction unrestricted.

4.3 Intensification Works

4.3.1 Central Region, Copperbelt and Lusaka Intensifications

27. This involved construction of more distribution lines and installation of transformers in areas with already existing network. The following works were done in the given regional sites from 19th Feb 2013 to 30th April 2015.

Table 4.3.1: Intensification Works

	Project Site	Distribution Lines (in km)	200kVA, 11/0.4kV Distribution Transformers	Others, eg. 33/11kV Substation	Connected Customers @30th June '15	Status@ 30th June 2015
Central Region:						
1	Makululu	23.1	11	2.5MVA	942	Completed
2	Foxdale	12.5	08		18	Completed
3	Chelstone Extension	21.7	15		380	Completed
4	Kabanana	11.5	09		1668	Completed
		68.8	**43**		**3008**	
Copperbelt Region:						
1	Kabushi (Ndola)	17.3	22		1421	Completed
2	Chipulukusu (Ndola)	36.6	19		1138	Completed
3	New Kawama (Kitwe)	13.8	06		620	Completed
		67.7	**27**		**3179**	
Lusaka – Integrated Approach						
1	Kanyama	21	06		1740	Completed
2	Misisi	15	11		120	Completed
3	Garden	21	14		370	Completed
		57	**31**		**2230**	
	TOTALS	**293.5**	**121**	**1**	**8,417**	

As shown in the table above, the works were completed and an initial 8,417 number of customers (total) were connected in the three (3) project regions as at June 2015 with a total cost of **US$2.55m, US$3.08m** and **US$1.82m** respectively. Despite the projecting coming to an end, connecting of customers still continued.

4.4 Grid Extension works

4.4.1 Northern and Central Region Grid Extensions

28. This involved construction of distribution lines and installation of transformers in areas which previously had no networks at all. The following works were done in given locations, spanning from 30th June 2013 to 30th June 2015.

Table: 4.4.1 Grid Ext Works

	Project Site	Distribution Lines (in km)	200kVA, 11/0.4kV Distribution Transformers	Others, eg. 33/11kV Substation	Connected Customers @ 30th June'15	Status @ 30th June 2015
Northern Region:						
1	Lukulu – Mpika	18.5	4		4	Completed
2	Ipusukilo Mission-Luwingu	18.1	5		20	Completed
3	Lukulu Farm Block – Kasama	51	23		23	Completed
		87.6	**32**		**47**	
Central Region:						
1	Mukonchi Farm Block – Kabwe	177	24	2x1MVA; 1x5MVA	Nil	Snags & Commissioning underway
2	Mangango Mission – Kaoma	96	18	1x2.5MVA	Nil	Snags & Commissioning underway
		273	**42**		**Nil**	
	TOTALS	**360.6**	**74**	**4**	**47**	

29. As indicated works were completed and an initial 47 number of customers connected as at June 2015 with 970 potential settlers yet to be connected. The total cumulative cost was **US$2.57m** and **US$8.11m** for North and Central Grid Extension respectively. Connecting customers continued.

4.5 Mini Hydro

30. The feasibility study and detailed engineering designs for Zengamina II was finalised while the review of the draft feasibility study reports for the proposed Chikata Falls and Kasanjiku Hydropower Stations was also concluded and feedback provided to the Consultant, SMEC, to submit the final reports to REA which has since been done.

4.6 Technical Assistance

31. The capacity building programme under the IAES project facilitated the training of stakeholder staff in several fields. Officers were trained in various fields such as project management, monitoring and evaluation (M&E), strategic management among others**.** Thus, a total number of 35 members of staff from REA underwent training in various fields from September 2013 to 30th June 2015, with several others from ZESCO and DoE.

4.7 Sustainable Solar Market Packages (SSMP) Phase I & II

32. Sustainable Solar Market Packages (SSMP) Project was among the project components under the IAES Project that the REA was implementing with an aim to supply, install and maintain Solar PV Systems to schools, rural health centers and private households in project target areas where the grid would not be extended within a five (5) year period. The SSMP Project Component provided output-based performance grants aimed at buying down the upfront cost of Solar Photovoltaic (PV) systems being supplied to private households by the Contractor under the SSMP phase I Projects which are located in Kalomo, Isoka and Lukulu Districts. The main purpose of this project was to surmount the barrier of higher maintenance costs of Solar Photovoltaic (PV) systems and its smaller household market segment exacerbated by low affordability.

33. The SSMP projects were being implemented by the contractor, Communication and Accessories Int. (CAA) of Germany with assistance from the local sub-contractor, Village Power. The contractor was mandated to first install Solar PV Systems at eligible public schools and rural health centres as well as associated staff houses. The contractor was also expected to sell lanterns and solar home kits of different watt sizes to private households at a subsidised fee and thereafter claim the balance from REA which was paid upon verification of the sales of the systems to the private households. According to the contract, the contractor was expected to sell these systems to private households in designated project areas for a period of three (3) years and provide maintenance services for a period of five (5) years.

34. The Contractor, Communications and Accessories Int. GmBH (CAA), contracted under the first (1st) phase implementation of three (3) SSMP sites in Kalomo District of Southern Province, Lukulu District of Western Province and Isoka District of Muchinga Province submitted periodic invoices for Sales and Maintenance claims to REA and requested for verification and approval of payment.

35. REA conducted sales verification for private household for the three (3) SSMP sites in Kalomo, Lukulu and Isoka districts under the first (1st) of SSMP. The contractor sold 6,848 Photo Voltaic (PV) Systems out of the minimum target of 4,700 systems to be sold to private households Kalomo, Lukulu and Isoka SSMP sites as indicated in Table 4.

Table 4: Number of PV Systems sold to private households and verified by REA

SSMP Site	Target	Number of PV Systems sold (as invoiced by Contractor)		Number PV systems verified by REA		Total Systems Verified by REA
		Lanterns	Kits	Lanterns	Kits	
Kalomo B1&B2	2100	4,140	1,011	4,140	1,005	5,145
Isoka	1200	600	43	600	43	643
Lukulu	1400	1,038	75	974	86	1,060
Total	**4700**	**5,778**	**1,129**	**5,714**	**1,134**	**6,848**

36. REA also undertook maintenance verification visits for the three (3) sites in Lukulu, Isoka and Kalomo districts under the first (1st) of SSMP. Generally, the sampled Solar Home Systems (SHS) were generally in good condition as maintenance was being undertaken by the Contractor, CAA.

37. The Contractor, Trans Africa Supply and Services Limited (TASS) of Uganda submitted invoice claims for the procurement of materials for undertaking works for the second (2nd) phase of SSMP in Lundazi District (Lot 1), Chama District (Lot 2) and Mwinilunga District (Lot 4). Payment was withheld since the Contractor had not renewed the guarantee. A letter was written and sent to Uganda. The second contractor, Kantech for the second (2nd) phase of SSMP under Lot 3 in Zambezi District did not submit invoice claims for any procurement that could have been done.

4.9 Demand Side Management (DSM)

38. On the Demand Side, the project encouraged efficient use of energy in order to cut demand and save an estimated 45MW capacity through provision of one million energy saver lamps called **Compact Florescent Lamps (CFL).** From the one (1) million CFLs procured under this project component, costing **US$ 1.35m**, three (03) lamps were initially exchanged with incandescent bulbs from each beneficiary residential customer. This was later revised to six (06) to improve impact of energy saving per household. At the end of this exercise, **57MW** of capacity was saved much to the satisfaction of all stakeholders. For this reason, the exercise was adopted by **DSM Department** of ZESCO and continued as an internal function. As at 30thJune 2015, over 2 million CFLs had been procured internally and the process of their distribution continued.

4.10 Connection Fee Subsidy Component

39. To encourage residential customers in low income communities to apply for new electricity connections, connection-fees were reduced from US$150 (ZMW769.00) for a standard connection to US$30 (ZMW150.00). The difference was the 80 percent subsidy sponsored by the project through this **Connection Fee Subsidy Framework**. Out of the target of 51,000 connections, over **81,000** customer connections were done as at 30th June 2015. The cumulative cost of this project component was US$9.5m and run from 1st June 2012 to 30th Sept 2014 but was allowed to continue up to 30th June 2015 because of the great benefits derived.

5. PROJECT EXPENDITURE & DISBURSEMENT

A summary of project cost and disbursements is given below:-

Table 5a: Cost & Disbursements by Component

No.	Project component (Works, Consultancy etc.)	Total Project component Cost (USD)	Total disbursement @30th June 2015 in (USD)
1	Grid Extension works	**12,642,527.38**	**11,157,566.29**
2	Mini Hydro for isolated grids	**6,000,000.00**	**175,824.01**
3	Sustainable Solar Market Packages (SSMP)	**6,500,000.00**	**3,683,241.84**
4	Connection Fee Subsidy (CFS)	**10,000,000.00**	**12,845,410.04**
5	Technical Assistance REA/ZESCO	**1,783,584.45**	**1,783,584.45**
6	Intensification	**7,166,180.81**	**6,832,334.35**
7	Reinforcement Works	**22,971,807.34**	**19,447,472.75**
8	Energy Efficiency -CFL Distribution	**1,500,000.00**	**1,503,116.45**
9	Surveys	**660,127.07**	**660,127.07**
	Total	**69,224,227.05**	**58,088,677.25**

It is noted that more payments were still being done as they were already invoiced by 30th June 2015.

6. Challenges Encountered During Project Execution

40. During the course of project implementation, there was policy shift on tax for project goods coming from outside the country, originally meant to be tax exempt. This put undue pressure on the finances and affected flow of goods as taxes were being resolved.

Demurrages were incurred at the borders as a result, for the same reason, coupled with constant blockage of the Tax Payer Identification Number (TPIN) for ZESCO.

41. The project, in its initial stages, experienced a number of delays in the procurement processes as No Objections were not given timely by the Zambia Public Procurement Authority (ZPPA) until January 2013 when ZPPA decentralized Public Procurement. However, delays were also encountered from the requirement to submit draft contracts to the Attorney General's (AG) office for clearance before signing with the supplier/contractor. In some cases contracts were pending at the AG's office for months before being cleared. This challenge continues though there are efforts by various stakeholders including the World Bank to resolve capacity at the AG's Office.

42. The project encountered a situation of awarding some contracts to contractors with good credentials on paper but whose model of operation with their subcontractors caused delays in the project implementation. Perhaps it would be prudent in future to carry out a comprehensive due diligence of such contractors to establish physical evidence of works indeed done by them and conduct actual interviews with organizations with whom they have done business. This would especially be applicable to large contracts where timely completion is of the essence.

7. Environmental & Social Issues

43. The Environmental and Social Impact Assessment for all project sites were conducted in accordance with Zambia Environmental Management Agency (ZEMA) procedures and in congruence with World Bank policies and guidelines. ZESCO's Environmental & Social Unit (ESU), having adequate capacity, conducted the assessments that were reviewed by ZEMA, an autonomous government authority. However, even with the Bank Safeguard policies being followed, there is need to employ sustainable ways to prevent future encroachment of way-leaves, which has become a general challenge in infrastructure development.

8. Project Outcomes

44. The project's Results Framework was used for monitoring key project indicators as shown in the Annex. The outcomes of the project have largely been positive. The overall objective of the project –being increased access to electricity, has seen the set-target connections achieved in almost all project areas. The number of customers connected on subsidized fees surpassed all expectations too.

45. On the constructed network, over 650km of distribution lines (33, 11 and 0.4kV) have been done with about 195 transformers installed. The distribution transformers, together with other power transformers (the 2x1MVA, 2x2.5MVA and a 5MVA) introduced expanded capacity of approximately 50MVA.

46. There are three (3) bulk substations constructed (Kanyama, Livingstone and Chibombo) with one (1) rehabilitated and upgraded at Figtree. In addition, a 62km Transmission line between Figtree and Chibombo had to be constructed.

47. The contractor, under the SSMP phase 1, sold 6,848 Photo Voltaic (PV) Systems out of the minimum target of 4,700 systems which were to be sold to private households Kalomo, Lukulu and Isoka SSMP sites. This implies that more beneficiaries were reached and the impact of solar systems on social indicators on health and education will be significant.

48. On demand side management, there was remarkable load reduction of 57MW recorded as a result of CFL distribution exercise from the one million lamps sponsored under the project. This has contributed in mitigating impact of the national power crisis.

9. Lessons Learnt

9.1 Risk Assessments

49. Adequate *Risk Assessment & Management* was needed to mitigate issues such as position shift in tax and procurement policies; availability of project funds; performance of contractors and subcontractors alike, etc that the project experienced during implementation.

9.2 Capacity Building

50. Proper management of projects calls for prior understanding of the particular project concept and having insights of all knowledge areas of its project management. Therefore *Capacity Building* prior to project implementation would be one lesson learnt under this project where the same could have been given more attention.

9.3 Payment Method

51. The situation of signing contracts between ZESCO, as the Implementing Agency and various Contractors and/or Consultants but the latter being paid by REA, another Government Agency, was not easily comprehended as this was considered a risky undertaking.

9.4 Project Structural Design

52. The project design for REA, even after restructuring, still presented various challenges on its roles and functions. While ZESCO operates as an autonomous commercial entity, REA is a statutory body whose mandate is to meet the electricity needs of the rural population through provision of requisite infrastructure.

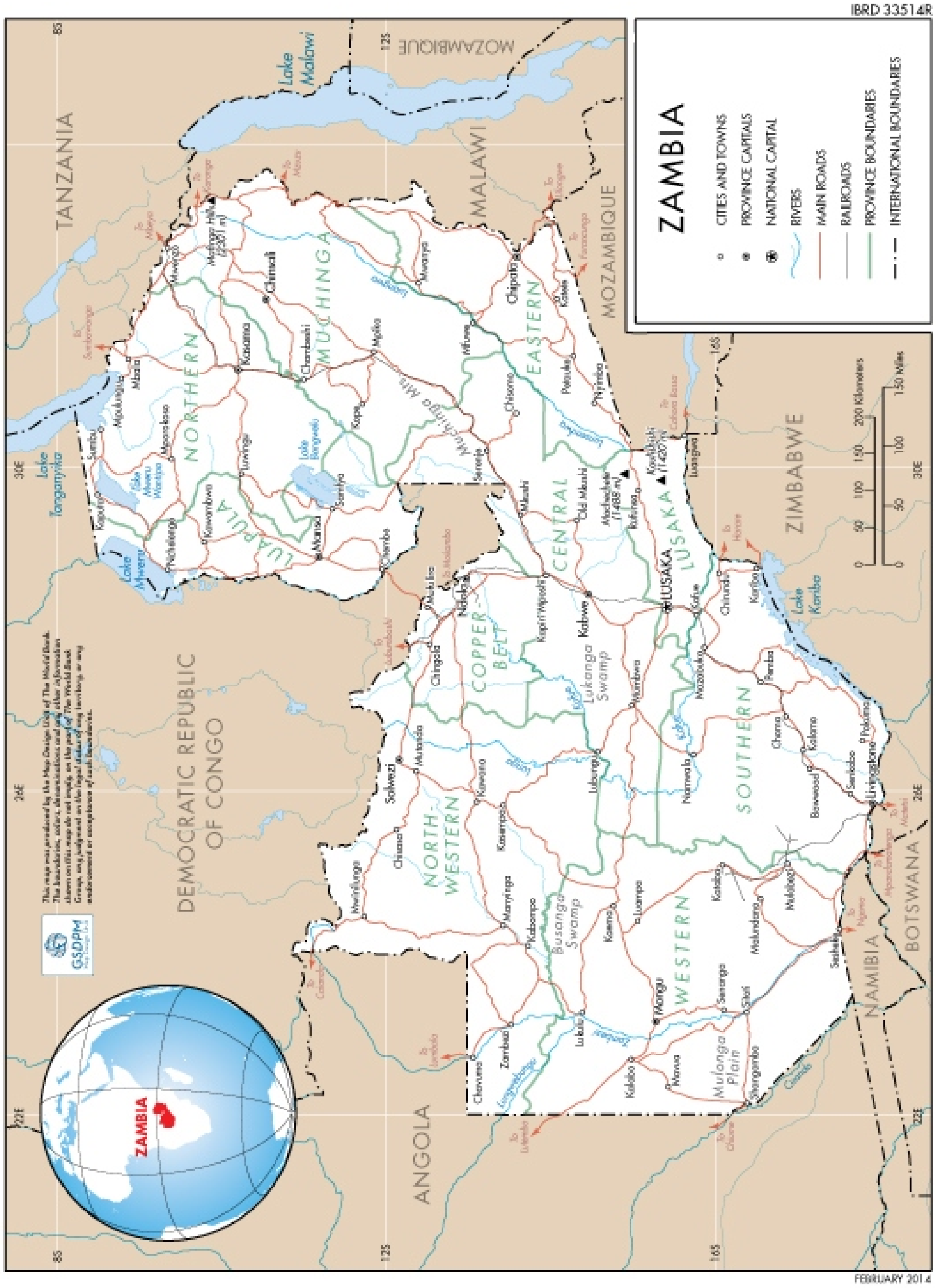
9.5 Contract Management

53. Adequate supervision of contractors and close monitoring of consultants should be integral to contract management and its implementation. There should be adequate clauses in the contracts to mitigate non-performance by some contractors to minimize risks.

9.6 Defining Criteria for Low Cost Communities

54. The Connection Fee Subsidy (CFS) did not distinguish the targeted communities from rural and urban customers to an extent that more urban communities benefited than rural communities, something that did not add much to the REA mandate, other than that of effecting payments. The low cost criterion was not easily understood.

MAP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