

Document of
The World Bank

Report No: ICR00002382

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-38190 TF-52650)

ON A

CREDIT
IN THE AMOUNT OF SDR29.7 MILLION
(US\$40.26 MILLION EQUIVALENT)

AND A

GLOBAL ENVIRONMENTAL FACILITY GRANT
IN THE AMOUNT OF US\$3.09 MILLION

TO THE

REPUBLIC OF MOZAMBIQUE

FOR AN

ENERGY REFORM AND ACCESS PROJECT
IN SUPPORT OF THE FIRST PHASE OF THE
ENERGY REFORM AND ACCESS PROJECT

September 27, 2012

Africa Energy Group
Sustainable Development Department
Southern Africa Country Cluster II
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 30, 2011)

Currency Unit = Mozambican Metical (MZN)

US\$ 1.00 = MZN 26.500

US\$ 1.00 = Euro 0.772

US\$ 1.00 = XDR 0.651

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AC	Alternating Current
AfDB	African Development Bank
AfDF	African Development Fund
AMR	Automated Meter Reading
APL	Adaptable Program Lending
CAS / CPS	Country Assistance Strategy / Country Partnership Strategy
CNELEC	National Electricity Council
CREST	Commercial Reorientation of the Electricity Sector Toolkit (CREST)
DANIDA	Danish International Development Agency
DC	Direct Current
DCA	Development Credit Agreement
DNE	National Directorate for Energy
EDAP	Energy Development and Access Project
EdM	Electricidade de Moçambique (public electricity utility)
ENH	Empresa Nacional de Hidrocarbonetos de Moçambique
ERAP	Energy Reform and Access Project
ESIA	Environmental and Social Impact Assessment
FM	Financial Management
FUNAE	National Energy Fund
GA	Grant Agreement
GEF	Global Environmental Facility
GEO	Global Environmental Objective
GoM	Government of Mozambique
IBRD	International Bank for Reconstruction and Development
ICR	Implementation Completion and Results Report
IDA	International Development Association
IPP	Independent Power Producer
ITC	Independent Transmission Company
IT	Information Technology
LV	Low Voltage
ME	Ministry of Energy
MINED	Ministry of Education
MIREME	Ministry of Mineral Resource and Energy
MISAU	Ministry of Health
MPD	Ministry of Planning and Development
MV	Medium Voltage
NDF	Nordic Development Fund
NGO	Non-Governmental Organization
NORAD	Norwegian Agency for Development Cooperation

NPV	Net Present Value
O&M	Operation and Maintenance
OP	Operational Policy
PAD	Project Appraisal Document
PARP(A)	Plano de Acção para a Redução da Pobreza (Absoluta), Mozambican PRSP
PDO / PO	Project Development Objective
PIU	Project Implementation Unit
PRSP	Poverty Reduction Strategy Paper
PV	(Solar) Photovoltaic
SDR	Special Drawing Rights
STE	Sociedade de Transporte de Energia, Transmission Backbone
WB	World Bank

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Country Director:	Laurence C. Clarke
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Project Team Leader:	Rob Mills
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REPUBLIC OF MOZAMBIQUE
Energy Reform and Access Project

CONTENTS

Data Sheet	
A. Basic Information	
B. Key Dates	
C. Ratings Summary	
D. Sector and Theme Codes	
E. Bank Staff	
F. Results Framework Analysis	
G. Ratings of Project Performance in ISRs	
H. Restructuring	
I. Disbursement Graph	
1. Project Context, Development & Global Environment Objectives Design.....	1
2. Key Factors Affecting Implementation and Outcomes	13
3. Assessment of Outcomes	18
4. Assessment of Risk to Development Outcome & Global Environment Outcome ...	24
5. Assessment of Bank And Borrower Performance	24
6. Lessons Learned	26
7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners	27
Annex 1. Project Costs and Financing.....	29
Annex 2. Outputs by Component	31
Annex 3. Economic Analysis.....	36
Annex 4. Bank Lending and Implementation Support/Supervision Processes	38
Annex 5. Beneficiary Survey Results	40
Annex 6. Stakeholder Workshop Report and Results.....	40
Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR	41
Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders	43
Annex 9. List of Supporting Documents	46
Annex 10. Cancellation of the Component C Independent Grid Concession – Chronology of Events	47
Annex 11. Informal Summary Notes from ICR Mission, July 2012	49
Annex 12. Results from Questionnaire on Capacity Development	53
MAP	54

A. Basic Information			
Country:	Mozambique	Project Name:	Energy Reform and Access Project
Project ID:	P069183,P071942	L/C/TF Number(s):	IDA-38190,TF-52650
ICR Date:	09/28/2012	ICR Type:	Core ICR
Lending Instrument:	APL	Borrower:	GOVERNMENT OF MOZAMBIQUE
Original Total Commitment:	XDR 29.70M,USD 3.09M	Disbursed Amount:	XDR 28.02M,USD 3.07M
Environmental Category: B,B		Focal Area: C	
Implementing Agencies:			
Electricidade de Mozambique (Electricity of Mozambique)			
National Directorate of Energy (later: Ministry of Energy)			
Cofinanciers and Other External Partners:			
Nordic Development Fund			
African Development Fund			

B. Key Dates				
Energy Reform and Access Project - P069183				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	01/11/2001	Effectiveness:	03/30/2004	03/30/2004
Appraisal:	02/18/2003	Restructuring(s):	-	07/09/2007 12/29/2009
Approval:	08/19/2003	Mid-term Review:	02/19/2006	03/03/2006
		Closing:	12/31/2007	03/31/2011

Mozambique: Energy Reform and Access Program - P071942				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	01/11/2001	Effectiveness:	03/30/2004	03/30/2004
Appraisal:	02/18/2003	Restructuring(s):	-	07/09/2007 12/29/2009 03/30/2011
Approval:	09/02/2003	Mid-term Review:	02/19/2006	03/03/2006
		Closing:	12/31/2007	12/31/2011

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes	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 Satisfactory	Government:	Moderately Satisfactory
Quality of Supervision:	Moderately 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			
Energy Reform and Access Project - P069183			
Implementation Performance	Indicators	QAG Assessments (if any)	Rating:
Potential Problem Project at any time (Yes/No):	Yes	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA)	None
DO rating before Closing/Inactive status	Satisfactory		

Mozambique: Energy Reform and Access Program - P071942			
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		
Energy Reform and Access Project - P069183		
	Original	Actual
Sector Code (as % of total Bank financing)		
Central government administration	13	14
General education sector	1	1
Health	3	2
Power	76	78
Renewable energy	7	5
Theme Code (as % of total Bank financing)		
Climate change	13	13
Infrastructure services for private sector development	25	25
Regulation and competition policy	13	13
Rural services and infrastructure	25	25
Urban services and housing for the poor	24	24

Mozambique: Energy Reform and Access Program - P071942		
	Original	Actual
Sector Code (as % of total Bank financing)		
General education sector	6	6
Health	16	16
Renewable energy	78	78
Theme Code (as % of total Bank financing)		
Climate change	100	100

E. Bank Staff		
Energy Reform and Access Project - P069183		
Positions	At ICR	At Approval
Vice President:	Makhtar Diop	Callisto E. Madavo
Country Director:	Laurence C. Clarke	Darius Mans
Sector Manager:	Lucio Monari	Joel J. Maweni
Project Team Leader:	Rob Mills	Reynold Duncan
ICR Team Leader:	RobMills	
ICR Primary Author:	Reto Thoenen	

Mozambique: Energy Reform and Access Program - P071942		
Positions	At ICR	At Approval
Vice President:	Makhtar Diop	Callisto E. Madavo
Country Director:	Laurence C. Clarke	Darius Mans
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ICR Primary Author:	Reto Thoenen	

F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)

To: (a) accelerate, in a commercially viable manner, the use of electricity for economic growth and social services and thus improve the quality of life in un-served and under-served areas (peri-urban and rural); and (b) strengthen Mozambican capacity to increase access to modern energy.

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

Accelerating access to electricity in underserved areas in a sustainable and commercially viable manner

Global Environment Objectives (from Project Appraisal Document)

To initiate the process of eliminating the barriers that impede the development and use of renewable energy, in particular solar photovoltaic (PV) systems, and develop micro-hydro and other renewables' capacity.

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

Accelerating access to electricity in underserved areas in a sustainable and commercially viable manner

(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 :	Number of people provided with access to electricity by household connections			
Value (quantitative or Qualitative)	0	40,000	65,000	68,270
Date achieved	07/14/2003	12/31/2007	03/31/2011	07/31/2012
Comments (incl. % achievement)	The figure reported is for new connections in project areas at time of ICR writing. Since credit close, EdM has connected additional customers using project materials. At time of credit close there were 47,635 new connections in			

	the project areas.			
Indicator 2 :	Number of independent grid concessions awarded			
Value (quantitative or Qualitative)	0	at least 3	N/A	N/A
Date achieved	07/14/2003	12/31/2007		
Comments (incl. % achievement)	No independent grid concession operational at completion of the project. The indicator was dropped during second restructuring.			
Indicator 3 :	Private sector participation in EdM's distribution and supply business			
Value (quantitative or Qualitative)	Vertically integrated state owned utility	Unbundled sector: public owned trans-mission company	N/A	N/A
Date achieved	07/14/2003	12/31/2007		
Comments (incl. % achievement)	The indicator was dropped during the first restructuring.			
Indicator 4 :	EdM performance contract in place and at least one performance monitoring cycle including review by CNELEC has been completed.			
Value (quantitative or Qualitative)	Performance contract does not exist.	N/A	Indicator introduced	Performance contract in place and monitored
Date achieved			03/31/2011	07/31/2012
Comments (incl. % achievement)	CNELEC has carried out one performance monitoring cycle including public consultations on the performance of EdM.			
Indicator 5 :	EdM's Current Ratio is at least 1.3.			
Value (quantitative or Qualitative)	0.88	1.3	N/A	N/A
Date achieved	12/31/2001	12/31/2005		
Comments (incl. % achievement)	The indicator was dropped during the second restructuring. However, in 2011 EdM's Current Ratio was 1.4 (and hence compliant with the original indicator).			

(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 :	Number of institutional solar photovoltaic (PV) systems installed			
Value (quantitative or Qualitative)	0	300	400	311
Date achieved	07/14/2003	12/31/2007	12/31/2011	07/31/2012
Comments	The figure reported is for new systems in project areas at time of ICR writing.			

(incl. % achievement)	Since grant close, FUNAE connected some of remaining institutions using project materials. At the time of grant close there were 270 installed and accepted systems.			
Indicator 2 :	Number of residential solar PV systems installed			
Value (quantitative or Qualitative)	0	2,500	N/A	N/A
Date achieved	07/14/2003	12/31/2007		
Comments (incl. % achievement)	The activity was canceled during the second restructuring. However, 214 residential solar PV systems were installed under the 5 district pilots.			
Indicator 3 :	Number of independent grid systems awarded using renewable energy sources			
Value (quantitative or Qualitative)	0	1	N/A	N/A
Date achieved	07/14/2003	12/31/2007		
Comments (incl. % achievement)	No independent grid system awarded or operational at completion of the project. The indicator was dropped during first restructuring.			

(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 :	Reduced cost of average EdM grid connections			
Value (quantitative or Qualitative)	about \$ 2,000	< \$950	(Not revised)	\$778 for WB, \$764 for all three donors jointly
Date achieved	07/14/2003	12/31/2007	03/31/2011	07/31/2012
Comments (incl. % achievement)	Target met for project connections (which included grid extension).			
Indicator 2 :	CNELEC gives open, transparent and independent advice and recommendations on EdM performance and tariff issues to the Borrower's government so that stakeholders and the public are aware of CNELEC's views.			
Value (quantitative or Qualitative)	Mechanism does not exist	N/A	Indicator introduced	Partial
Date achieved			03/31/2011	07/31/2012
Comments (incl. % achievement)	Public consultations on technical and commercial quality of EdM held in 3 cities in 2010. CNELEC has provided advice and recommendation on EdM's performance to GoM. However, such advice and recommendations have not been published (rated at 20% achieved).			
Indicator 3 :	EdM's receivables are reduced to at least 60 days.			
Value (quantitative or Qualitative)	147	60	N/A	N/A

Qualitative)				
Date achieved	12/31/2001	12/31/2006		
Comments (incl. % achievement)	The indicator was dropped during the second restructuring. However, receivables have stood at 45 days (and hence compliant with the original indicator) since 2009.			
Indicator 4 :	Increase in revenue / kWh injected into the system by 5% in pilot district, compared to system wide average.			
Value (quantitative or Qualitative)	Pilot project does not exist.	N/A	Indicator introduced	No data available
Date achieved	07/14/2003		03/31/2011	07/31/2012
Comments (incl. % achievement)	EdM has not provided any data regarding this indicator (hence rated at 0% achieved).			

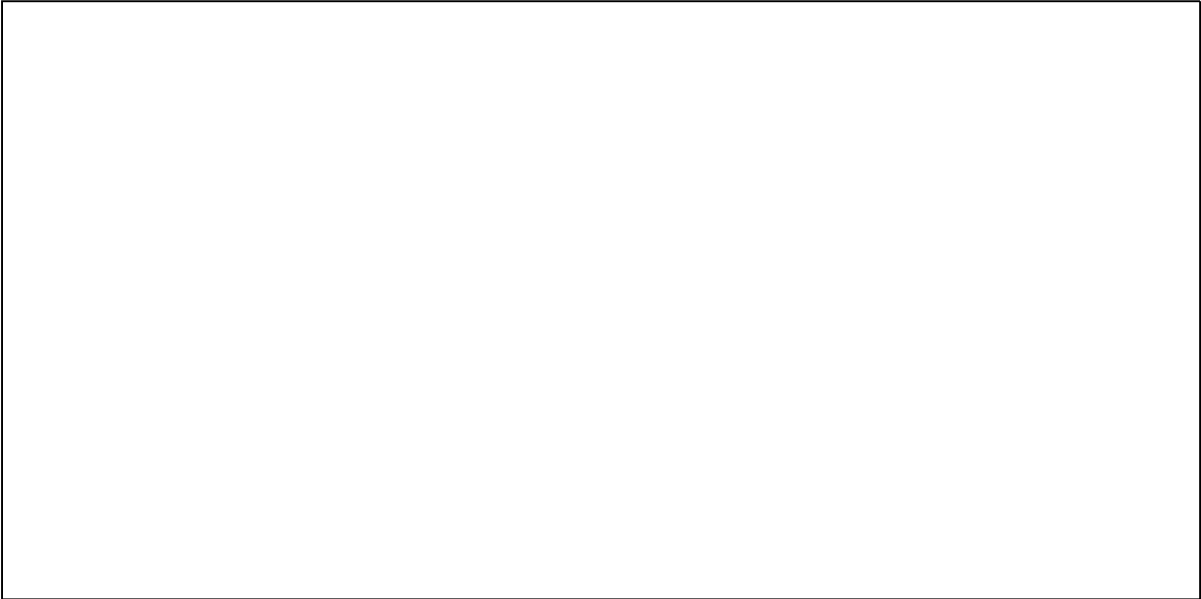
G. Ratings of Project Performance in ISRs

-						
No.	Date ISR Archived	DO	GEO	IP	Actual Disbursements (USD millions)	
					P069183	P071942
1	04/03/2004	S	S	S	0.00	0.00
2	12/15/2004	S	S	S	1.56	0.15
3	04/29/2005	S	S	S	1.81	0.15
4	12/21/2005	MS	MS	MS	3.10	0.19
5	05/16/2006	U	U	U	3.55	0.33
6	12/28/2006	U	U	U	4.55	0.64
7	06/25/2007	MU	MU	MU	7.27	0.86
8	12/11/2007	MU	MU	MU	8.26	0.97
9	05/19/2008	S	S	MS	12.27	1.60
10	10/16/2008	S	S	MS	18.51	1.67
11	06/02/2009	MS	MS	MS	29.28	1.72
12	12/15/2009	S	MS	MS	36.49	1.72
13	06/18/2010	S	MS	MS	39.29	1.72
14	02/13/2011	S	MS	MS	42.19	1.72

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	P069183	P071942	
07/09/2007	Y		MU		MU	7.27		Reallocation of credit; remove counterpart contribution for ME; extension of project closing date to December 31, 2009.
07/09/2007		Y		MU	MU		0.86	Adding a pilot activity in renewable energy; extension of the project closing to December 31, 2009.
12/29/2009	N		S		MS	36.60		Cancellation of Components C: extension of project closing date to March 31, 2011.
12/29/2009		N		MS	MS		1.72	Reallocate funds to additional 100 health clinics; extension of project closing date to March 31, 2011.
03/30/2011		N		MS	MS		1.72	Extension of closing date for GEF grant to December 31, 2011

I. Disbursement Profile
P069183



P071942



1. Project Context, Development & Global Environment Objectives Design

1.1 Context at Appraisal

General Context

1. Mozambique made tremendous strides in the years following the peace agreement of 1992. An economic reform program was implemented, with substantial support from external partners. The transition from war to peace and from a central planning system to a market economy had begun to reap results. Mozambique's economic growth rate had accelerated, achieving an average annual rate of economic growth of 8 percent from 1996 onwards. Heavily reliant on food aid at the end of the civil war, the country produced almost enough food to feed itself at the time of appraisal. As a result of solid economic growth, the poverty headcount index fell starting in 1997. However, Mozambique remained one of the poorest countries facing considerable social and economic challenges; infrastructure assets and services (energy, transport, water and sanitation, and telecom) were inadequate, and there were serious unmet education and health needs. In addition, new infections with HIV/AIDS were on the rise and the pandemic was threatening gains achieved in life expectancy and health provision. These challenges were reflected in Mozambique's Plano de Acção para a Redução da Pobreza Absoluta (PARPA) for 2001-2005, of April 2001 (Mozambique's first full PRSP) and in the World Bank's CAS of June 14, 2000.

Sector Context

2. In 2002, only about 5% of Mozambican households (which corresponded to around 206,000 connections) had access to electricity, and over half of these were in the capital, Maputo, and its surrounding areas. Outside these main urban areas, electricity access was minimal, and there had been practically no increase in the preceding 25 years. Of the 128 "district capitals", over 50 were without electricity supply, or had intermittent supplies from diesel-fueled generating sets (gensets). All the provincial capitals plus Maputo, and most of the other 20 or so municipal capitals, were served by the national grid or isolated diesel-based grids. Even in these areas, supply reliability was low and cross-subsidies (from the Maputo area to the rest of the country) were heavy.
3. Expansion was slow, for instance, only 31,000 new customers were added between 1996 and 2000. Planned grid expansion was inadequately low, for example, 60,000¹ new household connections for the period of the Plano Quinquenal for 2000 to 2004. This compared to more than 100,000 new households that were estimated to be formed over the same period. The difficulty of EdM, the national utility, to raise the funds required to connect more customers and the high cost of electrification, were among the main reasons for the slow growth. The performance of EdM had shown some improvement after internal management contracting had begun in 1997. Energy losses had been reduced to around 21% from over 30% in 1998, sales per employee had increased from 4.75 MWh in 1998 to 5 MWh and the rate of return had become positive. However, EdM's performance in 2003 was not satisfactory. The ratio of payroll to operating expenses had increased from 18% to 24%, the level of receivables had deteriorated from 123 days to 147 days and its contribution to investment declined from over 50% to negative. Further, the level of capacity in energy sector institutions in general was low.
4. The PAD identified four primary challenges that the Mozambican energy sector faced:

¹ Reported in the English Version of the Plano Quinquenal: <http://www.imf.org/external/np/prsp/2000/moz/01/#ap-part4.c>

- a) low access to modern energy, in particular electricity, and the poor reliability and efficiency of its supply;
 - b) the adverse environmental, livelihood, and health impacts of traditional biofuels production and use;
 - c) inadequate promotion and management of low cost export-oriented energy projects; and
 - d) inadequate staff and developing institutions, such as the National Electricity Council (CNELEC) and the National Energy Fund (FUNAE).
5. During the years leading up to the preparation of ERAP the GoM, with the help of the World Bank and other donors, had taken some significant steps toward adopting a legislative and policy framework to reform the sector in order to meet these challenges. For instance, the 1997 Electricity Law allowed for private participation in business units created by unbundling EdM and for awarding concessions to the private sector to develop off-grid supplies. However, little implementation had occurred when the project went to Board in August 2003.
6. ERAP was conceived as a parallel co-financed project including financing from AfDB, NDF, and WB. From the WB side, it was further conceived as an APL with two phases. For the purpose of clarity, the AfDB-financed ERAP is called 'ERAP-AfDB', the NDF-financed ERAP is called 'ERAP-NDF', the WB-financed ERAP is called 'ERAP-WB' (which includes GEF financing and refers to APL-1 only), and the overall ERAP project including all financiers is called 'ERAP-joint'. However, the PAD's use of 'ERAP' (components, outputs, and indicators) sometimes refers to ERAP-WB and at other times refers to ERAP-joint, and context is required to make the distinction. This ICR reports on ERAP-WB (APL-1) whenever possible and clarifies when it refers to ERAP-joint. The inconsistent use of terminology, combined with the lack of consistency in other areas, make the PAD a difficult document to work with.

Rationale for World Bank and GEF Involvement

7. The authors of the PAD considered that one of the main comparative advantages of the World Bank to this project was to leverage experiences from a large number of countries across the globe in solving similar problems and hence its ability to function as a "knowledge bank". Much of the sector reform work preceding the ERAP, such as the preparation of 1997 electricity and petroleum laws, concessioning decrees and the national energy strategy, had been financed by the World Bank. Further the World Bank was considered to be in a good position to build selective cross-sectoral partnerships in the context of the Poverty Reduction Strategy Paper. Cross-sectoral activities were planned to be targeted at helping to meet the energy needs of rural health and educational facilities and improving the quality of social services delivery.
8. The project was designed to contribute to the CAS Pillar A: Increasing Economic Opportunities through Private Sector Led Growth, namely to the CAS goals of Developing Infrastructure, Strengthening the Private Sector Environment (and the Financial Sector), and promoting rural development and agriculture. It was aligned to the following sectoral targets of the Government's Poverty Reduction Strategy Paper (PARP): (a) to ensure that all district capitals and administrative posts are supplied with electricity; and (b) to expand the national grid to connect rural areas.
9. The rationale for GEF involvement as described in the PAD was that the impact of the GEF Grant would go beyond the activities financed by it. Previous to ERAP, there had been a number of donor-supported renewable energy activities in Mozambique. However, their impact had been generally limited to the individual projects supported. The PAD considered that the GEF's support would make it possible to develop a framework for a more programmatic approach, within which individual projects would be developed and renewable energy technologies deployed in social institution, namely rural schools and clinics.

10. The project design was consistent with the GEF Operational Program 6: *Promoting renewable energy by removing barriers and reducing implementation costs*. GEF support was designed to contribute to: (i) remove information and awareness barriers within Mozambique about solar P V systems; (ii) build up a commercial market and reduce the costs of renewable energy; and (iii) prepare a strategy for long-term development of renewable energy.

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

11. One of the areas where the PAD and other project documents lacked consistency is in the PDO. The original PDO differs in wording across different documents. The wording used below is the one in Section A.2 “Project development objective” of the PAD, which is the most comprehensive.² It is the wording used for **the assessment of the Achievement of the Project Development Objective before restructuring** (see section 3 below) The original development objectives³ were to:
- (a) *accelerate, in a commercially viable manner, the use of electricity for economic growth and social services and thus improve the quality of life in un-served and under-served areas (peri-urban and rural); and*
 - (b) *strengthen Mozambican capacity to increase access to modern energy.*
12. There is a lack of consistency in the key indicators as well. The wording used below is the one from the DCA. Only the indicators relating to the first phase of the program are reported. Note that the PDO indicators include the GEO indicators. The original **key indicators** were⁴:
- (i) The average cost of connecting each consumer is at most US\$ 950 by the end of the first phase of the Program.
 - (ii) 40,000 consumers⁵ are connected in the first phase of the Program.
 - (iii) 300 institutional solar photovoltaic (PV) systems are installed in the first phase of the Program.
 - (iv) 2,500 residential solar PV systems are installed in the first phase of the Program.

² There is also a slight difference in wording in Annex 1 and Annex 13 of the PAD.

³ For the record, the wordings used in other documents are indicated below:

- Development Credit Agreement:
 - (a) accelerate, in a commercially viable manner, the use of electricity for economic growth and social services and thus improve the quality of life in under-served areas of the Borrower’s territories (peri-urban and rural); and
 - (b) strengthen the Borrower’s capacity to increase access to modern energy.
- Project Paper of June 21, 2007:
 - (i) to accelerate the use of electricity for economic growth and improved quality of life in underserved areas in a commercially viable manner; and
 - (ii) to strengthen Mozambican capacity to expand the energy sector.

⁴ The wording in section A.4 “Key performance indicators” of the original PAD is as follows:

- (i) Increased direct access to electricity in peri-urban and rural areas, by providing reliable, affordable and sustainable electricity supply to an additional 1 million people (400,000 in the first phase, 1 million over the program) in rural and peri-urban areas of the country. This will increase direct access by about 20% in the first phase, in which most of the connections (about 80%) will be from the main grid.
- (ii) Private sector involvement in the power sector, measured by:
 - a) participation of the private sector in Electricidade de Mozambique’s (EdM’s) distribution and supply business by the end of the first phase of the program; and
 - b) the establishment of at least 3 isolated grid power supply businesses by the private sector.
- (iii) Improved performance of the power sector, measured by the operational and financial performance of EdM, in that it will be able to generate a surplus and raise private capital for access expansion, increase its customer base, and reduce the average cost of connection to at least US\$ 950 per customer.

⁵ The PAD mentions in section C.3 400,000 people and in Annex 1 40,000 new connections. This implicitly assumes an average household size of 10. The last reported household size by INE (www.ine.gov.mz) is 4.4 for 2007. More frequently, an average size of around 5 is used.

- (v) 3 independent grid concessions are awarded in the first phase of the Program, at least one of which will be based on a renewable energy source.
- (vi) Private sector participation in EdM's distribution and supply business is in place by the end of the first phase of the Program.

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

13. The GEO also lacks consistency. The version used below is the one in section A.3 "Global objective" of the PAD⁶ and is the most comprehensive with respect to the GEF Financing:

To initiate the process of eliminating the barriers that impede the development and use of renewable energy, in particular solar photovoltaic (PV) systems, and develop micro-hydro and other renewables' capacity.

It is worth noting, however, that the version reported in the Grant Agreement is different⁷. Because of these significant discrepancies, the version from the PAD (as stated above) and the version from the Grant Agreement (as stated in footnote 9) are used side by side for **the assessment of the Achievement of the GEO before restructuring** (see section 3 below)

14. Regarding the key indicators for the GEF financing, the wording used below is the one from the Grant Agreement. Only the indicators relating to the first phase of the program are reported. Note that the GEO indicators are a subset of the PDO indicators. The original **key indicators** for GEF were⁸:
- (i) 300 institutional solar photovoltaic (PV) systems are installed in the first phase of the Program
 - (ii) 2,500 residential solar PV systems are installed in the first phase of the Program.
 - (iii) At least one independent grid system based on a renewable energy source is awarded during the first phase of the Program

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

15. There were 2 restructurings of the IDA credit for the ERAP project: July 17, 2007 and December 30, 2009. Only the first restructuring changed the PDO. It restated the PDO to be more succinct. The **revised PDO**, which is the PDO used for **the assessment of the Achievement of the Project Development Objective after restructuring** (see section 3 below) reads:

*Accelerating access to electricity in underserved areas in a sustainable and commercially viable manner.*⁹

⁶ There is a slight difference in wording in Annex 1 and Annex 13 of the PAD.

⁷ In the original Trust Fund Grant Agreement the objective was stated as in the original DCA and as follows: (a) accelerate, in a commercially viable manner, the use of electricity for economic growth and social services and thus improve the quality of life in under-served areas of the Recipient's territories (peri-urban and rural); and (b) strengthen the Recipient's capacity to increase access to modern energy.

⁸ The wording in section A.4 "Key performance indicators" of the original PAD is as follows:

- (i) Increase in the numbers of viable solar PV distributors, other renewable energy businesses, such as micro-hydro, and institutional users of solar systems (300 in the first phase; 1,075 over the program) and individual users of solar systems (2,500 in the first phase; 8,500 over the program).
- (ii) Establishment of at least one isolated grid system based on a renewable energy source.

⁹ The wording used is the one of the Project Paper of June 21, 2007. The Amendment Letter of July 17, 2007 as well as the Project Paper of December 29, 2009 used the following wording: "to facilitate expanded access to electricity in underserved areas in a financial sustainable manner". The wording used in the main text and for the purpose of this report is the most comprehensive.

16. The comparison of the original and **revised key indicators** by restructuring is given in Table 1 below. Note that in the DCA and its amendments, the key indicators include the GEO indicators. For the purpose of this report, we have followed the ICR Data Sheet terminology and have mapped the *Key Indicators* (as reported in the project documents) to *PDO Indicators* and *Intermediate Outcome Indicators* respectively. The ICR terminology of *PDO Indicators* and *Intermediate Outcome Indicators* was not used in the PAD and the indicators have not been treated consistently. The ICR team has done this mapping according to the indicators used most consistently in a certain context and using best judgment.
17. Table 1 shows the original and revised key indicators that the ICR team has mapped, in line with the ICR Data Sheet terminology, as *PDO Indicators*:

Table 1: PDO Indicators and Changes (bold font indicates changes)¹⁰

Original PDO Indicators	PDO Indicators after first restructuring	PDO Indicators after second restructuring
40,000 consumers are connected in the first phase of the Program (ERAP-joint)	65,000 consumers are connected in the first phase of the Program (ERAP-joint)	65,000 consumers are connected in the first phase of the Program (ERAP-joint)
3 independent grid concessions are awarded in the first phase of the Program, at least one of which will be based on a renewable energy source	The independent grid concession for the Vilankulo, Inhassaro, Nova Mambone and Machanga areas is operating according to the concession agreements	<i>[indicator dropped / not applicable]</i>
Private sector participation in EdM's distribution and supply business is in place by the end of the first phase of the Program	<i>[indicator dropped / not applicable]</i>	<i>[indicator dropped / not applicable]</i>
300 institutional solar photovoltaic (PV) systems are installed in the first phase of the Program	300 institutional solar photovoltaic (PV) systems are installed in the first phase of the Program	400 institutional solar photovoltaic (PV) systems are installed in the first phase of the Program
2,500 residential solar PV systems are installed in the first phase of the Program	2,500 residential solar PV systems are installed in the first phase of the Program	<i>[indicator dropped / not applicable]</i>
N/A	EdM performance contract in place and at least one performance monitoring cycle including review by CNELEC has been completed	EdM performance contract in place and at least one performance monitoring cycle including review by CNELEC has been completed
EdM's Current Ratio is at least 1.3 from December 2004	EdM's Current Ratio is at least 1.3 from December 2004	<i>[indicator dropped / not applicable]</i>

Note: text marked in bold font indicates changes as a result of restructuring.

18. Table 2 shows the original and revised key indicators that the ICR team has mapped, in line with the ICR Data Sheet terminology, as *Intermediate Outcome Indicators*.

¹⁰ The ERAP (IDA) indicators include the GEO Indicators. The first PDO Indicator in Table 1 corresponds to an 'ERAP-joint' target.

Table 2: Intermediate Outcome Indicators and Changes (bold font indicates changes)¹¹

Original Intermediate Outcome Indicators	Intermediate Outcome Indicators after first restructuring	Intermediate Outcome Indicators after second restructuring
The average cost of connecting each consumer is at most US\$ 950 by the end of the first phase of the Program	The average cost of connecting each consumer is at most US\$ 950 by the end of the first phase of the Program	The average cost of connecting each consumer is at most US\$ 950 by the end of the first phase of the Program
N/A	CNELEC gives open, transparent and independent advice and recommendations on EdM performance and tariff issues to the Borrower's government so that stakeholders and the public are aware of CNELEC's views	CNELEC gives open, transparent and independent advice and recommendations on EdM performance and tariff issues to the Borrower's government so that stakeholders and the public are aware of CNELEC's views
EdM's receivables are reduced to at least 60 days by December 2005 and thereafter maintained at that level or lower	EdM's receivables are reduced to at least 60 days by December 2005 and thereafter maintained at that level or lower	<i>[indicator dropped / not applicable]</i>
N/A	N/A	Increase in revenue / kWh injected into the system by 5% in pilot district, compared to systemwide average (inflation adjusted)

Note: text marked in bold font indicates changes as a result of restructuring.

19. The **July 17, 2007 restructuring** (Board level) was an **adaptive restructuring**¹² responding to slow implementation progress (the PDO and GEO rating fell to *unsatisfactory* in May 2006) and the GoM's revised approach and strategy for the electricity sector and its reform. Beyond the change in the PDO and the key indicators, there were changes in the components, the allocation, and the triggers for APL-2 (for details see sections 1.8 and 1.9). As a consequence of the first restructuring and improved implementation progress the PDO and GEO ratings was assessed as *Satisfactory* in May 2008.
20. The **December 30, 2009 restructuring** (RVP approved) was both an **adaptive** and **opportunistic restructuring**.¹³ There were no changes to the PDO. In August 2007, GoM had canceled the Northern Inhambane Concession and abandoned the Independent Grid Concession Approach (see Annex 10 for a chronology of events). The restructuring cancelled Component C in its entirety (adaptive part of the restructuring). Further, the restructuring cancelled several activities of Component D financed by the Global Environment Facility (GEF), specifically some of the higher-risk, private sector-led activities in Component D financed by GEF (opportunistic part of the restructuring).
21. As a result of the above described changes and (for the IDA credit) higher than budget costs due to the sustained increase in prices of electrical equipment, the credit and grant proceeds were re-allocated and the Results Framework was revised. Further, the closing date of both the IDA credit and the GEF grant was extended to March 31, 2011. The total extension of the project closing date from the first and second restructurings combined was 39 months.

¹¹The first Intermediate Outcome Indicator corresponds to an ERAP-joint target.

¹² As defined in the ICR guidelines, an adaptive restructuring is one that retains or improves a project's relevance as external circumstances change.

¹³ As defined by the ICR guidelines, an opportunistic restructuring is one responding to growing knowledge of the development problems being tackled and of local conditions.

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

22. There were 3 restructurings of the GEF grant for the ERAP project: July 17, 2007, December 30, 2009, and March 30, 2011. The first two were part of the restructuring of the IDA credit, whereas the third was for the GEF grant alone. Only the first restructuring changed the GEO. The third restructuring was actually only an extension of the GEF grant closing date. The revised GEO¹⁴ was:

Accelerating access to electricity in underserved areas in a sustainable and commercially viable manner.

23. The comparison of the original and **revised key indicators** by restructuring is given in the table below. Note that the GEO indicators are a subset of the PDO indicators.

Table 3: GEO Indicators and Changes (bold font indicates changes)

Original GEO Indicators	GEO Indicators after first restructuring ¹⁵	GEO Indicators after second restructuring
300 institutional solar photovoltaic (PV) systems are installed in the first phase of the Program	300 institutional solar photovoltaic (PV) systems are installed in the first phase of the Program	400 institutional solar photovoltaic (PV) systems are installed in the first phase of the Program
2,500 residential solar PV systems are installed in the first phase of the Program.	2,500 residential solar PV systems are installed in the first phase of the Program.	<i>[indicator dropped / not applicable]</i>
At least one independent grid system based on a renewable energy source is awarded during the first phase of the Program.	<i>[indicator dropped / not applicable]</i>	<i>[indicator dropped / not applicable]</i>

Note: text marked in bold font indicates changes as a result of restructuring.

24. The reasons and justification for the first two restructuring of the GEF Grant are the same as for the IDA credit and are described under section 1.4 above. The third restructuring of the GEF Grant only comprised an extension of the GEF Grant Closing Date to December 31, 2011 with a total cumulative extension of 4 years. It accommodated a delay in procurement for the electrification of 100 additional clinics, an activity added as part of the second restructuring. The procurement of this activity had experienced delays due to increased attention paid to quality issues during the procurement process. There were no changes in GEF Grant allocation or to the PDO.

1.6 Main Beneficiaries

25. The project targeted rural and peri-urban communities. The grid-based intensification component financed by IDA covered the provinces of Gaza, Inhambane and Maputo (including Maputo City). The planned component for the independent grid activities intended to cover the provinces of Cabo Delgado, Nampula, Inhambane, Tete, Zambezia and Maputo. However, no independent distribution grids were

¹⁴ The GEO was not explicitly revised in the Project Paper of June 21, 2007. However, it was revised in the Amendment Letter of July 17, 2007 which used the following wording: "to facilitate expanded access to electricity in underserved areas in a financial sustainable manner". The second and third Project Papers (of December 29, 2009 and March 30, 2011, respectively) reported the original GEO and considered it as the valid one. Because of these significant discrepancies and following section 1.3, the version of the PAD and the version of the Amendment Letter are used side by side for the assessment of the Achievement of the Global Objective after restructuring.

¹⁵ The Indicators for the GEF for the 2007 restructuring were changed in the Amendment Letter of July 17, 2007 in the section for the IDA credit. Formally, however, Schedule 6 of the GA was not changed in the Amendment Letter of July 17, 2007.

operational at the end of the projects (see section 1.4 for details of cancellation of Component C). The renewable energy component covered the provinces of Cabo Delgado, Gaza, Inhambane, Manica, Maputo, Nampula, Niassa, Sofala, Tete, and Zambezia (see Annex 2 for details).

26. Secondary Beneficiaries were the Ministry of Health and the Ministry of Education through financing of solar PV systems for schools and clinics and associated capacity building. Also, the private sector in the area of renewable energy systems could be considered a potential Secondary Beneficiary through the removal of barriers as stated in the GEO, through the opportunities for solar PV installation contracts, as well as through the TA windows under the GEF grant (as foreseen in the PAD but not implemented and later cancelled, as described above). There were no changes to the main or secondary beneficiaries during the restructurings.
27. The global benefit was stated as the displacement of about 440,000 tons of carbon dioxide over an 8-year life. The benefits of climate change mitigation are global; however, developing countries such as Mozambique and the poor are affected disproportionately by climate change.

1.7 Original Components (as approved)¹⁶

28. ERAP's co-financiers did not all support the same components. AfDB financed activities in Component A (before the first restructuring), Component B, Component C (before the first restructuring), Component E and Audit Services (AfDB Component F). NDF financed Component B with the "Supply and Installation of Distribution Networks, Package III" (in peri-urban areas south of Maputo) (EUR 9,427,715) and Component E with the "Assistance to Establish an Environmental Unit" and capacity building/training of staff in the Ministry of Energy (EUR 690,511). The description of the components below is for **ERAP-WB only**.
29. **Component A: Power Sector Reform** (Indicative total: US\$ 6.12 million; WB: US\$ 2.65 million) supported the unbundling of EdM and private sector participation in electricity distribution and supply. It had three subcomponents:
 30. *A.1: Separation of EdM into Business Units* was to finance technical advisory services to develop and implement an action plan for the separation of EdM into business centers, such as distribution, transmission and generation.
 31. *A.2: Private Sector participation* intended to finance technical advisory services in support of activities required for private sector participation in EdM's distribution and supply business.
 32. *A.3: Transmission Company* was to finance technical advisory services supporting the establishment of a separate, fully functional transmission company and system operator. It was to be funded through the AfDB.
33. **Component B: Grid-Based Peri-Urban Electrification** (Indicative total: US\$ 41.00 million; WB: US\$ 17.35 million) supported grid expansion in peri-urban and rural areas. It financed the following activities: 1) Technical advisory services for the development and mainstreaming of lower cost electrification standards and designs appropriate for rural and peri-urban areas; 2) Technical advisory services for the design, bid preparation and evaluation, construction, supervision and management of grid-based peri-urban electrification schemes; 3) Construction of about 500 kilometers of medium voltage lines, 1100 kilometers of low voltage lines and 240 distribution substations; 4) Acquisition of vehicles, tools and specialized equipment for the operation and maintenance of the extended

¹⁶ There is an inconsistency in the PAD in the project description. Under B.4. the description differs (only 4 Components) from C.1., Annex 2, and the DCA. The description of C.1., Annex 2, and the DCA is used.

distribution network and Project planning and management; 5) Construction of office facilities to address customer service needs arising from the extended distribution network.

34. **Component C: Independent Grid Rural Electrification** (Indicative total: US\$ 16.38 million; WB: US\$ 10.60 million) intended to support a few investments to test the viability of concession arrangements and competitive subsidy mechanisms. The implementation was envisaged to be carried out by private entities and supported through output based subsidies. Component C consisted of the following activities: 1) Support activities to provide electricity to rural areas through private sector concession arrangements and competitive subsidy mechanisms operated by FUNAE including the following schemes: Northern Inhambane Power System Concession and Mocimboa da Praia; 2) Technical advisory services for the preparation of privately operated isolated rural electrification schemes, other than those referred to above; 3) Carry out a study and dissemination of its recommendations to identify productive uses of electricity for income generation purposes with particular attention to women and young unemployed persons in rural areas.
35. **Component D: Renewable Energy and Cross-Sectoral Linkages** (Indicative total: US\$ 9.55 million; WB: US\$ 4.12 million; GEF: US\$ 3.09 million) intended to provide support for the following activities: (a) investments in renewable energy activities through a performance based co-financing grant facility managed by FUNAE; (b) Financing for the supply and installation of PV systems for 150 schools and 150 clinics; (c) Technical assistance program with the objective of creating a sustainable market for renewable energy systems by providing financing to key stakeholders or individuals working with renewable energy systems through a cost-shared and full-cost financing window for technical assistance.
36. **Component E: Institutional Development and Capacity Building** (Indicative total: US\$ 8.47 million; WB: US\$ 5.54 million) supported the establishment of new and strengthening of existing institution in the energy sector through trainings, hardware, and software. It was composed of the following sub-components:
 37. *E.1: Operationalization and Institutional Development of CNELEC as an independent electricity sector regulator*: (a) the provision of technical advisory services and training of CNELEC staff, acquisition of office hardware and software; (b) support in the transformation of CNELEC into an independent regulatory agency with responsibility for economic, technical and customer service regulation of the electricity sector; and (c) revisions to the Borrower's electricity legislation related to CNELEC's legal status and authority.
 38. *E.2: Support and Capacity Building for the Ministry*: (a) Training of staff of key energy institutions under the MIREME (later the Ministry of Energy) in management, energy planning, energy conservation, renewable energy, rural electrification, subsidy administration, regulation, and administration; (b) Implementation of an information technology strategy for MIREME's energy sector institutions; (c) Establishment of an environmental unit in National Directorate for Energy [DNE, later: Ministry of Energy], and provision of environmental management training to staff of the unit and other staff involved in the carrying out of the Project; (d) Support to the Borrower in preparing gas and other energy projects, through the provision of technical, legal and financial advisory services; (e) Strengthening the Borrower's Project coordination activities, through the provision of technical advisory services and acquisition of office equipment and vehicles; (f) Carrying out preparatory activities for the second phase of the Program, through the provision of technical advisory services.

1.8 Revised Components

39. The components (and their financing) were revised in the **first restructuring** as follows:
40. **Component A, Power Sector Reform**, aimed at unbundling EdM, creating a private market for distribution and generation and a separate transmission company. The first step, the separation of

accounts by business units in EdM was completed. However, in the period following Board approval of the project, it became increasingly clear that the results of similar reforms supported by the World Bank in other sub-Saharan countries were often unsatisfactory. New comparative research¹⁷ indicated that, in countries with small electricity systems that were not operated on a fully commercial basis, a reform agenda based on unbundling and privatizing vertically-integrated utilities was less relevant than in wealthier countries. As a result of this changing policy consensus, a new GoM strategy was put in place that no longer sought private participation in EdM. Instead, the focus moved to increasing the role and effectiveness of the nascent national electricity regulator (CNELEC), particularly in monitoring EdM. Within ERAP, this was reflected by increased resources for CNELEC's establishment and operation, as well as moving this support from Component E to A. The project description of this support was changed from establishing an *independent regulator* to a *strong and independent advisory regulator*¹⁸.

41. **Component B**, *Grid Based Peri-Urban Electrification*, was scaled up and an additional US\$ 11 million was allocated for an increased number of connections (see also changes in key indicators). Further, a new pilot on loss reduction and improved customer service as well as the provision of technical and management training for EdM staff was added.
42. **Component C**, *Independent Grid Rural Electrification*, was limited to the then ongoing concession of Northern Inhambane. No further concession seemed viable at the time.
43. Under **Component D** (Co-financed with GEF Grant), *Renewable Energy and Cross-Sectoral Linkages*, a new activity (a pilot village electrification scheme in five villages) was added. The initial response from the private sector for the output based funding to co-finance renewable energy investments was lower than anticipated. The new activity aimed at demonstrating an alternative delivery mechanism that may be attractive to the private sector.
44. **Component E**, *Institutional Development and Capacity Building*, was scaled-up reflecting increased training and capacity-building requirements for the newly established Ministry of Energy.
45. The **second restructuring** changed the components (and their financing) responding to: (i) the GoM's cancellation of the Northern Inhambane distribution concession (in August 2007) and hence abandonment of the Independent Grid Rural Electrification concession approach and (ii) low interest of the private sector in the proposed subsidy schemes for renewable energy supply.
46. The restructuring cancelled Component C in its entirety (adaptive part of the restructuring). Further, the restructuring cancelled several activities of Component D financed by the Global Environment Facility (GEF), specifically some of the higher-risk, private sector-led activities in Component D financed by GEF (opportunistic restructuring). These activities were the subsidies for PV products supplied by the private sector, the subsidies for grid-connected renewables, and the related TA services.
47. The table below provides a summary of the changes in allocation to the different components across the two restructurings.

¹⁷ See, for example, *Reforming Power Markets in Developing Countries: What Have We Learned?*, John Besant-Jones, September 2006.

¹⁸ The corresponding trigger was not formally revised. The original wording is also in line with the new description.

Table 4: Changes in Allocation to Main Components

Component	Allocations in US\$ million ¹⁹		
	PAD	1 st Restructuring	2 nd Restructuring
A Power Sector Reform	2.65	2.67	2.25
B Grid Electrification	17.35	29.21	33.29
C Independent Grids	10.60	2.22	0.02
D Renewable Energy and Cross-sectoral (IDA)	4.12	3.94	3.58
GEF	3.09	3.09	3.09
E Institutional Strengthening & Capacity Building	5.54	7.21	6.27
Unallocated & refunding PPF	3.87	2.70	1.58
Total (IDA)	44.13	47.95	46.99

1.9 Other significant changes

48. During the first restructuring, 2 of the 4 triggers for the APL-2 were changed as shown in Table 5 below. At the time when APL-2 (called Energy Development and Access Project, EDAP) went to Board, the triggers had not been met formally and EDAP sought a waiver from the Board for the completion of the two revised triggers.

Table 5: Changes in the triggers for APL-2 (GEF trigger in *italics*)

Original Trigger	Trigger after first restructuring
Operationalization of CNELEC and its transformation into a regulatory body	
Separation of EdM's core functions of Distribution, Transmission and Generation and implementation of a private participation option in EdM's Distribution business, with independent management control.	EdM performance contract in place and at least one performance monitoring cycle including review by CNELEC has been completed as per instructions issued by Minister of Energy in 2006. CNELEC gives advice and recommendations in an open and transparent manner so that the general public and stakeholders in the electricity sector are aware of CNELEC's views.
Successful completion of at least three independent grid concessions, one of which will be based on a renewable energy source, and another be bulk-supplied from the national grid.	Continued operation of the N. Inhambane Independent Grid Concession according to the concession agreement, and assessment of lessons learned.
<i>Successful sustainable operation of at least two solar PV dealers that have been supported under the first phase of the program.</i>	

49. The allocations of funds to the different disbursement categories were changed at the occasion of the restructurings as shown in Table 6 below.

¹⁹ Note: Changes in totals reflect changes in the US\$ - SDR exchange rate.

Table 6: Changes in Allocations by Disbursement Category

Category	Component	Allocations in SDR		
		PAD	1 st Restructuring	2 nd Restructuring
(1) Civil works	B	1,083,000	1,100,000	970,000
(2) Supply and Installation	B D	7,097,000 825,400	13,500,000 0	15,300,000 0
(3) Goods	B D A and E	368,500 73,700 626,400	1,400,000 400,000 500,000	1,100,000 480,000 650,000
(4) Consultants' Services	B C D A and E	1,695,000 884,400 221,100 4,650,600	2,700,000 300,000 300,000 3,500,000	3,600,000 15,000 510,000 3,200,000
(5) Training	A and E B	737,000 0	1,200,000 140,000	1,200,000 65,000
(6) Subprojects		8,290,900	2,600,000	1,250,000
(7) Refunding PPF		442,200	349,000	349,000
(8) Operating Costs	A, C, D, and E	0	356,000	360,000
(9) Unallocated		2,704,800	1,355,000	651,000
Total		29,700,000	29,700,000	29,700,000

50. The requirement for the provision of **Counterpart Funds** was dropped for the activities implemented by the (newly created) Ministry of Energy during the first restructuring. This was in response to major delays caused by the absence of budgeting for counterpart funds in the new Ministry.
51. The sector reform to be supported by the project as described in the PAD foresaw private sector participation in: EdM, distribution, generation, and in the provision of electricity beyond the national grid through isolated grids (conventional and renewable) and stand-alone solutions. As a result of GoM policy changes – which were in line with a general reappraisal of the optimal energy sector structure in sub-Saharan countries with small grid systems, as discussed above, and subsequently reflected in the first project restructuring – ERAP did not achieve any of the foreseen privatization outcomes. However, the project was instrumental in supporting the GoM's new sector policy that included private sector-led large scale generation and transmission projects. As an example, the existing hydropower plant at Cahora Bassa was concessioned in December 2008 through a private sector “non-recourse financing” transaction. Planned projects with private sector participation (ranging from minority private shareholdings to outright private ownership) are described in section 2.5 below (‘Post-Completion Operation’).
52. Finally, the *implementation and procurement* schedule were revised. The project closing date was extended by 24 months to December 31, 2009 and later to March 2011, as discussed above.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

53. The PAD (in itself and with respect to other project documents) lacks consistency in almost all the key areas (PDO, key indicators, and project components). It is not systematic on the distinction between the World Bank project and the broader parallel co-financed project. The fact that all the projects (financed by different donors) were called ERAP (ERAP-AfDB, ERAP-NDF, ERAP-WB, and ERAP-joint) might be part of the problem. The lack of consistency makes the PAD a difficult document to work with. This inconsistency complicated implementation for the borrower and task team and possibly caused differences of interpretation.
54. The PAD included a comprehensive background analysis of the challenges Mozambique faced in the energy sector. Much of the analysis is still valid to date. However, the main lessons learned from other projects turned out to be less relevant for Mozambique (including the issue of the applicability of unbundling and privatization within the sector). The PDO was in line with the CAS and PARPA at the time and with the current CPS and PARP. The meaning of the PDO as stated in the PAD is adequate and retains its pertinence (though the lack of consistency in the project documents causes some confusion). Regarding the original project design, while some elements were over-optimistic given the lack of success of energy sector reforms elsewhere (as discussed above), the overarching concepts of increased private sector participation in the sector were in line with the CAS and PARPA that were in place at the time, although not in line with the current CAS and PARPA. The restructurings hence responded to broader GoM policy changes that occurred during the project period and the restructured project design is in line with the current CPS and PARP. The PAD drew lessons from electrification experiences from other African countries as well as from Asia. The main lessons according to the PAD are set out below.
55. *Rural grid electrification* has rarely been successful in African countries when implemented directly by state-owned utilities and in the presence of a uniform tariff (implying cross-subsidies for rural consumers). Instead, the PAD proposed to use a commercially-oriented rural electrification approach, employing cost-based, regionally differentiated distribution tariffs. Subsidies were to be directed at expanding access, financing initial capital costs rather than consumption. The project intended to provide output-based capital subsidies.
56. *Low cost designs for grid electrification* can reduce the cost per connection significantly. The PAD proposed to use private sector expertise through supply and installation contracts to achieve these gains.
57. The PAD identified *independent grid electrification* as a novel means of extending electricity access through private sector participation. It noted though the limited experience to date with the approach.
58. *Electrification through solar PV systems* can help to extend access to electricity services to remote areas. The PAD noted the higher prices for such systems in the African market and discussed the modalities for provision of systems or services.
59. The principles derived from the lessons learnt and used for the project design are sound. However, in the project design, (and for the intended project period) the response and willingness of the international private sector (in distribution) and the capacity of the local private sector were overestimated. Some of the main constraints (affecting both the IDA credit and GEF grant financing), which led to GoM policy change as well as to the project restructurings, were limited private sector interest in the proposed activities and popular and political resistance to geographically differentiated tariffs. Further, utility-led grid expansion under a uniform tariff (including WB support via ERAP) has in fact achieved remarkable results in Mozambique. Low cost design has contributed to reduce cost of electrification. However, during the ICR mission it was noted that the technical design adopted by the

contractors in the project was still one of the more solid and expensive ones in the region. This suggests that there is further room for cost reduction.

60. Government's commitment to the project was assessed positively. The commitment to the PDO remained strong throughout the project (as witnessed by APL-2 which is currently under implementation). What changed, and caused some of the implementation delays, were the means chosen to achieve the PDO. Apart from different governmental bodies, NGO and CSO representatives were consulted and a market assessment was carried out. The consultation was broad in particular for the renewable component. In hindsight, it appears that the question of equity and social cohesion regarding the uniform national tariff merited further attention and consultation.
61. The risks inherent in the project's design were recognised during project preparation. In particular, the components that were indeed problematic during implementation and were subsequently restructured (such as the independent grid electrification and the sector reform agenda, as well as the possible lack of interest of the private sector in the subsidy windows) were all identified and rated as *substantial risks* during preparation. That said, despite the fact that the riskiness of these activities was identified ex-ante, ambitious indicators and targets were nonetheless defined. In addition, insufficient risk mitigation measures were built into the project design in order to manage these inherent risks. This is not to state that the risks were inappropriate ones to take as part of the project, but rather that no risk-mitigation measures were foreseen at appraisal stage, resulting in the need to restructure the project when the risks were realized.

2.2 Implementation

62. The factors described above in section 2.1 gave rise to a conceptual gap between the project components and the new GoM strategy. This in turn led to a significant slowdown in implementation of project activities, accounting for a large share of the 39-month delay in project completion noted above. In its midterm review report, GoM outlined its new strategy for the sector and proposed changes to the project components. These were discussed during the midterm mission and resulted in the restructuring of July 2007. In particular, the restructuring reallocated funds from the components with private sector concessions in favor of main grid electrification. It retained the one operating concession of an independent grid and subsidy schemes for the private sector in PV and renewables. These components were subsequently dropped in the second restructuring of December 2009.
63. Project ratings adequately reflected performance. As a consequence of the situation described above, the PDO and GEO ratings fell to *unsatisfactory* in May 2006 and the project (IDA-financed part only) was flagged as a problem project. At the time of mid-term review, disbursements stood at around 15% and 22% for IDA and GEF respectively. As a consequence of the restructuring, project implementation and disbursement improved and the project left problem project status in April 2008 and in May of the same year the PDO and GEO ratings were upgraded to *satisfactory*. Table 7 below gives a graphic representation of the PDO and GEO ratings.

Table 7: PDO and GEO Ratings

PDO Rating												
HS												
S												
MS												
MU												
U												
	2005 H1	2005 H2	2006 H1	2006 H2	2007 H1	2007 H2	2008 H1	2008 H2	2009 H1	2009 H2	2010 H1	2011 H1

GEO Rating												
HS												
S												
MS												
MU												
U												
	2005 H1	2005 H2	2006 H1	2006 H2	2007 H1	2007 H2	2008 H1	2008 H2	2009 H1	2009 H2	2010 H1	2011 H1

64. As noted above, a large part of the overall delay of 39 months in project implementation occurred after effectiveness and up to the mid-term review and was linked to the change in GoM policy, rather than to factors within the control of the implementing agencies or the World Bank Further delays occurred after mid-term review and was linked to general implementation issues, including the GoM's decision to abolish external PIUs. This contributed to delays in the procurement process (given a relative lack of experience in WB procurement guidelines) and hence in the provision of No-Objections. Overall, these project delays were linked both to factors in the government's and implementing agencies' control (such as change in policy and provision of counterpart funds) as well as factors outside the control of the government and the implementing agencies (such as complexities linked to the design of the project and its co-financing). The project achieved some of its results by supporting various activities with potential mutual reinforcement effects and acting in coordination with other donors (for example, the economies of scale reached by donors financing parallel grid intensification contracts on the basis of similar low-cost design principles). The downside of this approach was delays in activities due to the increased complexity (such as differences in processes of the different financiers, and the interdependency of activities and financing). In the case of ERAP it seems that the drawbacks of parallel co-financing outweigh the benefits of the same.
65. Section 1.4 provides the rationale for the restructurings. Section 1.8 and Annex 2 describe in more detail the revised components and their outputs.

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

M&E design:

66. In the first restructuring the outcome indicators were modified and rendered more measurable with a focus on access to electricity and the viable operation of EdM. However, impact evaluation as listed in the reporting instruments did not happen. The two restructurings could have offered an opportunity to improve more aggressively the indicators and introduce outcome indicators which are clearly attributable to the project's objectives.
67. Component E (Institutional Development and Capacity Building) lacks performance indicators. The project provided substantial training opportunity to support the government to accelerate electrification in Mozambique. In addition to counting the number of trained people, it would have been beneficial to measure how much accumulated technical knowledge and management skill have been actually used to improve work during project implementation.

M&E implementation, Utilization:

68. Each time the project was restructured, the indicators were modified. This practice led to improvement of the project's Results Framework. However, due to the abolition of external PIUs, the Ministry faced in-house capacity shortfall in the area of M&E. The capacity problem impeded them from the implementation of a systematic M&E plan and from monitoring the progress at the project level. In addition, at the WB side, the improved result matrix unfortunately lacked a consistency in wording of outcome/ output indicators, and this might have caused confusion.
69. ME, EdM and FUNAE prepared their own progress reports as a results reporting instrument. Also, they used supervision reports from consultants. However, the productive use of monitoring information was relatively weak because of the lack of a systematic monitoring framework in each entity. It is hence difficult to capture the historical progress of implementation. Notwithstanding these drawbacks, it was good practice to introduce decentralization of activities which enables monitoring of implementation more easily on the ground. For example, FUNAE frequently communicates with provincial delegations which have up-to-date information. An integrated monitoring framework, making use of decentralization and efficient information channels, would have been a useful tool for implementation control at the component level. Such a framework would have enabled the WB task team to identify the critical issues that caused delays and allowed for a proactive approach to problem resolution.
70. In general, despite the lack of an integrated M&E system and the need for several restructurings with the associated modification of indicators and targets, the implementing agencies made an effort to improve project implementation. Taking the monitored results into consideration, they utilized what they learnt to further improve implementation of subsequent ERAP activities. For instance, FUNAE identified quality issues in the solar PV systems through monitoring and site visits. They then applied these observations to improve the next set of installations through enhanced quality management procedures with contractors.

2.4 Safeguards and Fiduciary Compliance

71. The project triggered OP 4.01, Environmental Assessment and OP 4.12, Involuntary Resettlement. An ESIA which included an RPF was prepared and finalized before the project went to board. Project supervision did not encounter any issues relating to safeguards compliance. Some possible concerns were identified in a preliminary social safeguards mission in early 2009. These concerns were thoroughly assessed and found to be without grounds during a full social safeguards review undertaken during the supervision mission of September 2009. Nevertheless, safeguard manuals and practices were reiterated with the implementing agency.
72. All the project implementing units of the project generally performed well in regard to fiduciary compliance, with no significant internal controls issues identified. They remained adequately staffed throughout the project, and submitted all the required quarterly un-audited reports, as well as annual audited reports. However, audit reports were generally submitted late mainly due to delayed procurement processes in contracting the auditors, resulting in the project FM performance being rated as Moderately Satisfactory.

2.5 Post-completion Operation/Next Phase

73. The challenges in the energy sector in Mozambique remain significant. At the end of 2011, grid electrification in Mozambique stood around 18%, compared to approximately 6% when the ERAP project was started. This corresponds to around 765,000 new connections by EdM during the project period, out of these; around 68,000 have been directly financed by ERAP-joint (or 9% of the new connections). Despite this significant progress in electrification, the PDO of ERAP remains relevant to

the sector and was used, almost unchanged, for the APL-2. The APL-2 PDO reads: *to increase access to electricity and modern energy services in peri-urban and rural areas in a sustainable and affordable manner*. ERAP was embedded in the GoM's sector strategy. It supported ongoing sector reform (component A); grid extension and capacity building at EdM (component B); private sector participation in the electricity sector (component C, eventually cancelled); renewable and off-grid energy solutions (component D); and capacity building, training and technical advisory services for sector institutions (component E). All components (except component C and A) are also part of the APL-2. Component A was merged with E as new sector institutions exist already and are supported through capacity building.

74. EdM's grid access expansion program is well established, currently connecting more than 100,000 consumers each year. Managing such rapid growth would be a considerable challenge for any company. Key areas to support and sustain growth have been identified and some of them are supported under the APL-2, including the implementation of an adequate integrated business management IT system (called SIGEM), revenue protection measures (including automated meter reading), loss reduction efforts, and capacity building. Attention should be paid to proper management of assets (e.g. distribution transformers must be protected and inaccessible to the public; right of way under electricity lines should be monitored and enforced), the financial and commercial health of the company, adequate tariffs, and commercial viability of grid extensions. Findings from the ICR field trip indicate that theft of energy at the household level is common, undermining EdM's revenue generation. A further and continuous challenge is to assure that management and technical capacity develop at least at the same pace as the company expands.
75. The Ministry of Energy is also well established and is discharging its functions. CNELEC was established with the intent to be a strong and independent advisory regulator that would provide public and transparent advice to the GoM. It was provided with an independent revenue source from the concession fees from the Cahora Bassa hydropower plant. According to CNELEC, this funding stream is not sufficient for proper functioning. To date, no publicly available document representing the opinion of CNELEC and proving public advice to GoM has been published. The development of CNELEC into a strong and independent (full or advisory) regulator does not seem assured at this time. Further support to CNELEC must consider the aspect of institutional strengthening in order to advance such a development. Currently, the electricity law is under review and the revised law might further clarify CNELEC's role and functioning.
76. Private sector participation in the power sector did not occur as planned in distribution and independent grid concessions. However, large scale generation and transmission projects are being developed with substantial private sector participation, reducing the public resources required for such projects. Currently, though owned by government, Cahora Bassa functions as an IPP. There is a number of planned projects with private sector participation (ranging from minority private shareholdings to outright private ownership) include the following power plants: Mphanda Nkuwa, Cahora Bassa North, Moatize, Benga, Ncondezi, and the gas-fired plants at Ressano Garcia, as well as the transmission backbone (STE) from Tete to Maputo. The technical, legal and financial advisory support to sector institutions under ERAP and EDAP (APL-2) has been and is important to make sure Mozambique negotiates and receives adequate benefits from such projects.
77. For renewable energy, private sector response to the originally proposed activities under the project has been limited. There is a nascent private market for very small PV systems that provide efficient energy services such as light (LED), cell phone charging, radio, and TV (unrelated to and independent from ERAP financed activities). The main difficulties faced seem to be linked to the general business environment (customs, transport costs, difficult access to working capital) rather than to sectoral issues. Hence, energy sector specific interventions in this area will not be very cost effective.

78. Through sustained procurement activities of FUNAE, there is now a local market in the supply and installation of larger PV systems. As noted above, renewable energy and cross sectoral support under ERAP has been focused on the provision of solar PV systems to schools and clinics. These systems bring energy services to remote locations supporting the delivery of education and health services. By acting as contractors or sub-contractors for the contracts for solar PV electrification of schools and clinics, it is likely that local capacity to install and maintain solar PV systems has been enhanced to some degree.
79. Maintenance of such systems has proven to be difficult and costly as systems are isolated and sometimes in remote areas. Both MISAU and MINED have established budget lines for maintenance and have recently signed maintenance contracts with a private sector firm. Sustainability of these systems will remain a challenge and should be monitored.
80. The seamless transmission to APL-2 has increased the sustainability of results and outcomes from ERAP. The following indicators can be used to monitor the results and outcomes of APL-2: (a) performance of EdM through current ratio, profit, total energy losses, and number of active customers (e.g. purchased electricity in the past 3 month); (b) private sector share in the electricity sector (by capacity, energy sold, turnover), (c) number of private sector firms selling PV systems (distinguished by selling mainly to government and private market); (d) number of functioning PV systems (e.g. providing reliably at least 80% of the intended energy services) for clinics or schools; (e) number of publicly available documents giving CNELEC advice and opinion to GoM; and (f) cost-covering tariff level.

3. Assessment of Outcomes

81. This ICR follows the methodology set out in Appendix B of the ICR Guidelines: "Rating The Outcome Of Projects With Formally Revised Objectives". The ICR Guidelines mandate the use of **three measures to assess outcomes**: (i) **Relevance of Objectives, Design and Implementation**, (ii) **Achievement of Project Development Objectives** (plus, in the case of ERAP, **Global Environment Objectives**), and (iii) **Efficiency**. Sections 3.1, 3.2 and 3.3 below consider each of these measures in turn. It should be noted that, again in line with ICR Guidelines, these three measures are sub-divided to consider the periods before and after project restructuring, with weights assigned according to the percentage of funds disbursed in the corresponding period.

3.1 Relevance of Objectives, Design and Implementation

82. The *objectives* (original and revised PDO and GEO) were relevant at the time of appraisal and in line with the priorities of the CAS and PARPA (see para 8). Both the PDO and GEO as stated in the PAD and the legal documents are adequate in their meaning (though lessened through the lack of consistency in the project documents) and retain their pertinence in respect with the current PARP, CPS and GEF priorities.²⁰ The original *design* was rather ambitious and somewhat complex for the country context. It was biased towards high risk activities. During *implementation*, the project's restructurings responded to the changes that occurred during the project and the restructured project design is in line

²⁰ As noted in paragraph 8, the project contributed to CAS Pillar A ('Increasing Economic Opportunities through Private Sector Led Growth'), namely to the CAS goals of Developing Infrastructure, Strengthening the Private Sector Environment (and the Financial Sector), and promoting rural development and agriculture. Further the project was aligned to the relevant sectoral targets of the Government's Poverty Reduction Strategy Paper (PARP): (a) to ensure that all district capitals and administrative posts are supplied with electricity; and (b) to expand the national grid to connect rural areas.

with the current CPS and PARP. Whereas the means to achieve the PDO changed significantly during the operation (which was reflected in the 2 restructurings and associated change in key indicators), the PDO itself remains valid and was pursued. Relevance of objectives is rated *High*, relevance of design is rated *Modest*, and relevance of implementation is rated *Substantial*.

3.2 Achievement of Project Development Objectives and Global Environment Objectives

Regarding the **Project Development Objectives**, the PDO following the restructuring can be subdivided into three aspects: (1) *increasing access to electricity* in a (2) *sustainable* and (3) *commercially-viable* manner. The approach used is one that incorporates both a quantitative assessment of the key indicators but also a broader qualitative assessment of the PDO. This approach takes into account the ICR team's assessment that the key indicators of the PDO do not, by themselves, reflect adequately the PDO in its different dimensions and its intended meaning as described in the PAD and Project Papers²¹. Further details on components and their outputs are provided in Annex 2.

83. The two tables below provide quantitative data to show that the project's principal targets were substantially achieved, particularly for those indicators that the team considers more important for the achievement of objectives, which are reflected in higher weightings.

Table 8: Achievement of Key Indicators (as per project structure pre-restructuring)

Key Indicator	Achievements	Weight	Degree Achieved
65,000 new connections (ERAP-joint)	68,270 ²² new connections	20%	100%
At least 3 independent grid concessions are awarded	No independent grid concession operational at the end of the project.	10%	0%
Private sector participation in EdM's distribution and supply business is in place	No private sector participation in EdM at the end of the project	10%	0%
PV systems for 400 schools and clinics	311 ²³ installed and accepted	20%	78%
2,500 residential solar PV systems are installed	Component canceled. 214 residential systems installed under pilot activity.	10%	0%
EdM's Current Ratio is at least 1.3	1.4 in 2011	10%	100%
Cost of new connection less than US\$ 950	US\$ 764 for ERAP-joint and US\$ 778 for ERAP-WB	10%	100%
EdM's receivables are reduced to at least 60	Receivables at 45 days since 2009.	10%	100%

Table 9: Achievement of Key Indicators (as per project structure post-restructuring)

Key Indicator	Achievements	Weight	Degree Achieved
65,000 new connections (ERAP-joint)	68,270 new connections	20%	100%
PV systems for 400 schools and clinics	311 installed and accepted	20%	78%
EdM performance contract in place	EdM performance contract in place	20%	100%

²¹ Appendix A of ICR Guidelines: Harmonized Rating Criteria" states: "For evaluation purposes, an operation's objectives encompass both the PDOs stated in board documents and key associated outcome targets". As the key associated outcome targets do not measure properly the PDO in its different dimensions, a qualitative assessment was included, in addition to the quantitative assessment of the key indicators.

²² The number is at the time of writing of the ICR. At project close, there were 47,635 new connections for ERAP-joint and 19,243 for ERAP-WB.

²³ The number is at the time of writing of the ICR. At project close, there were 270 systems installed and accepted.

Key Indicator	Achievements	Weight	Degree Achieved
cost of new connection less than US\$ 950	US\$ 764 for ERAP-joint and US\$ 778 for ERAP-WB	10%	100%
CNELEC gives open and transparent advice to GoM	report submitted and advice provided to ME but not open, transparent, nor public	20%	20%
Improved revenue in EdM pilot area	no data forthcoming	10%	0%

84. From a qualitative perspective, the project contributed to the GoM's effort to accelerate electrification of the country, thus achieving its main objective of *increasing access to electricity*. This is witnessed by large increase in electrification rates. At the end of 2011, grid electrification in Mozambique stood at around 18%, compared to approximately 6% when the ERAP project was started. This corresponds to around 765,000 new connections by EdM during the project period; out of these, around 68,000 (PDO Indicator 1) have been directly linked to ERAP-joint (or 9% of the new connections during the period). In addition to the connections directly linked to ERAP-joint, the project supported capacity development and standardized electrification approach at EdM. In terms of *commercial viability* and *sustainability*, these interventions reduced the cost of electrification per household from around US\$ 2,000 to US\$ 764 for ERAP-joint and contributed to faster rollout of grid connections more broadly by EdM. The project contributed to strengthening the capacity in the energy sector as witnessed by the increased private sector participation in the electricity sector and the establishment of new sector institutions as described in more detail in section 2.5. ERAP assisted to catalyze increased donor support for the sector. Energy sector institutions were supported in key areas and during crucial moments of their development.
85. The quantitative analysis of the indicators in the project's Results Framework plus the additional qualitative analysis of the PDO suggest that there are only minor shortcomings to the achievement of the **PDO after restructuring**, rating it *Satisfactory*.
86. Achievement of the PDO **before restructuring** is rated *Moderately Unsatisfactory*. The more detailed description of the PDO in the PAD and the associated key indicators clarify that the original PDO was closely linked to unbundling and privatizing the distribution business of EdM and broader private sector engagement in independent distribution concessions. Neither of these happened in the ways envisaged in the PAD.
87. Regarding the **Global Environment Objective**, a similar method incorporating both a quantitative assessment of the key indicators plus a broader qualitative assessment is also used for the rating of the **achievement of the GEO**. This approach takes into account the ICR team's assessment that the key indicators do not reflect adequately the GEO in its different dimensions.
88. The **GEO** rating considers the PAD PDO and the PAD GEO before the restructuring and the revised PDO and the PAD GEO after the restructuring (see section 1.3 and 1.5 for the wording of these objectives). The reason that this ICR report considers these four objectives is that the legal documents and board documents reported different GEOs. (Specifically, while the PAD contained a GEO, the original GEF Grant Agreement instead used the text of the PAD PDO as the GEO. After restructuring, the Project Paper used the PAD GEO and the Amendment to the Grant Agreement the revised PDO²⁴.) In other words, given the lack of consistency on the GEO between the various project documents, this ICR report uses all of the reported objectives.

²⁴ See also section 1.3 and 1.5 for details.

89. The two tables below use quantitative data to assess project performance using the key indicators (as described in section 1.5). The indicator that the team considers more important for the achievement of the GEO is reflected in a higher weighting.

Table 10: Key Indicators and Achievements for GEO (as per project structure before Restructuring)

Key Indicator	Achievements	Weight	Rating
At least 1 independent grid concessions based on renewables is awarded	No independent grid concession operational at the end of the project.	25%	0%
PV systems for 400 schools and clinics	311 ²⁵ installed and accepted	50%	78%
2,500 residential solar PV systems are installed	Component canceled. 214 residential systems installed under pilot activity.	25%	0%

Table 11: Key Indicators and Achievements for GEO (as per project structure after Restructuring)

Key Indicator	Achievements	Weight	Rating
PV systems for 400 schools and clinics	311 installed and accepted	100%	78%

90. From a qualitative perspective, the project contributed both to the revised GEO and to the original GEO. As described in section 2.5 the market for solar systems has progressed, in particular for large systems for which barriers have been removed considerably. The same is not true at the moment for small systems aimed at households. Firms trying to commercialize small systems face considerable difficulties; many of which are outside the energy sector (see section 2.5 for more details). ERAP assisted to catalyze increased donor support for renewables and supported FUNAE, a key player in this area. The qualitative assessment indicates that, after the restructuring, there are minor shortcomings for the GEO based on the revised PDO (as used in the amended Grant Agreement) and moderate to significant shortcomings regarding the removal of barriers for renewables as stated in the PAD GEO (as used in the restructuring Project Paper). Barriers have been removed for large solar PV systems; however despite the removal of these barriers, small solar PV systems and other renewables still face considerable difficulties in other areas.
91. The quantitative analysis of the GEF-related parts of project's Results Framework plus the additional qualitative analysis lead to a rating of achievement of the **GEO after restructuring** of ***Moderately Satisfactory***.
92. The GEO rating **before restructuring** is ***Unsatisfactory***. The more detailed description of the GEO in the PAD and the associated key indicators clarify that the original GEO was closely linked to a broader private sector engagement in and the establishment of at least one independent distribution concessions. Neither of these has happened in the ways envisaged in the PAD.
93. Finally, the ratings pre and post restructuring are weighted as a function of the degree of disbursement achieved at the time of the first restructuring. This weighted average is summarised for the PDO and GEO rating respectively in Table 13: Overall Outcome and Table 14 below.

3.3 Efficiency

94. The economic analysis of the project is detailed in Annex 3. The PAD calculated a NPV at 10% and 12% discount rates (with 12% as the standard case) as well as the IRR. This is summarized as 'Scenario 1' in the table below. The NPV and the IRR were then re-estimated under two further scenarios. In

²⁵ The number is at the time of writing of the ICR. At project close, there were 270 systems installed and accepted.

Scenario 2, the same assumptions as in the PAD are used but with actual results data (where available). In Scenario 3, revised and updated assumptions are used, as well as the actual results data (where available). The differences are reported in Table 12 below. The numbers in Scenarios 2 and 3 include, following the practice of the PAD and for ease of comparison, the full grid expansion-related disbursement under Component B (i.e. including the costs of engineering consultancy services for the connections). Following the calculations in the PAD, the estimates use ERAP-joint investment and connection numbers. The analysis is carried out over a 20 year horizon.

Table 12: Results from Economic Analysis

	Original PAD (Scenario 1)	PAD assumptions but actual data (Scenario 2)	Revised assumptions and actual data (Scenario 3)
NPV in US\$ million at 10%	25	9.6	30.2
NPV US\$ million at 12%	17	4.9	21.0
NPV US\$ million at 15%	N/A	0.4	11.7
IRR	22.7%	15.3%	24.6%

95. The revised estimates under the PAD assumptions (i.e. scenario 2) provide an IRR of 15.3% and a NPV of US\$ 4.9 million at 12%. The lower numbers compared to the PAD are due to the delay in the start of electrification, rather than results data being lower than expected.²⁶ As noted above, the main cause of delays was the change in GoM's energy sector policy, which led to a significant slowdown in project implementation prior to project restructuring. The revised estimates with updated assumptions (i.e. scenario 3) produce results that are above the ones in the PAD. This is due to the fact that higher oil prices increases the benefits under scenario 3 (through increased consumer surplus from switching from kerosene/gen-sets to electricity). The results based on actual results data and up-to-date assumptions indicate that the project is able to surpass the economic benefits initially anticipated.
96. Based on the economic analysis alone (using scenario 3), the efficiency would be rated High. However, the economic analysis only covers around 70% of disbursements. For the Electricity Sector Toolkit activity (CREST) which was added during the first restructuring an economic analysis could not be carried out for two reasons: 1) there is no reference scenario in the PAD and 2) data that would have allowed for such analysis was requested from the implementing agencies but not provided by the time of writing of the ICR. The indications obtained from EdM are that CREST activities produced considerable benefits and are continued in other areas under different financing (including in EDAP APL-2).
97. In order to assess capacity development activities, a questionnaire was distributed to the staff of the ME, EdM, FUNAE, CNELEC. 21 questionnaires were returned and analyzed. The responses indicate, that, by and large, capacity development plans exist, that the activities financed under the project were in that plan, that the skills acquired during the activities were used on the job, and that such skills were also mostly useful beyond the project. For details, please see Annex 12.
98. Given the good results from the economic analysis, the positive indications for the CREST Pilot activity, and the encouraging feedback in the capacity building questionnaires, but considering difficulties linked to the CREST assessment and to the assessment of capacity building activities, the **efficiency** is rated *Substantial*.

²⁶ Due to the relatively high discount rates (10% and 12%) used in standard World Bank economic analyses, delays in project implementation mean that economic benefits are significantly discounted, as they occur further in the future than originally expected. It should not be inferred from a relatively low NPV that the benefits have not been realized at all – merely that they occurred with a delay.

3.4 Justification of Overall Outcome and Global Environment Outcome Rating

99. The **Overall Outcome** is rated *Satisfactory* and the **Global Environmental Outcome** is rated *Moderately Satisfactory*. Disaggregating further, the Overall Outcome was rated Moderately Unsatisfactory before restructuring and Satisfactory after restructuring; the Global Environmental Outcome was rated Unsatisfactory before the restructuring and Satisfactory after the restructuring.
100. These overall ratings are based on the assessment of the three measures of outcomes, as assessed and described above in sections 3.1 to 3.3 above: (i) **Relevance of Objectives** (rated as *High*), of **Design** (rated as *Modest*) and of **Implementation** (rated as *Substantial*); (ii) the **Achievement of Project Development Objectives** (*Satisfactory*) and **Global Environment Objective** (*Moderately Satisfactory*); and (iii) **Efficiency** (*Substantial*).
101. Table 13 and Table 14 below translates the ratings from the sections above into numbers, using the ratings methodology in the ICR guidelines for restructured projects with PDO/GEO changes (in particular Appendix B). For the PDO, this results in a weighted average of 4.7, hence leading to the overall rating of Satisfactory. For the GEO, this results in a weighted average of 4.34, hence leading to the overall rating of Moderately Satisfactory.

Table 13: Overall Outcome

	% of disbursement at 1 st restructuring (= weight for restructuring)	Overall rating
Rating before 1st restructuring	0.15	3
Rating after 1st restructuring	0.85	5
Total		4.7

Table 14: Global Environmental Outcome

	% of disbursement at 1 st restructuring (= weight for restructuring)	Overall rating
Rating before 1st restructuring	0.22	2
Rating after 1st restructuring	0.78	5
Total		4.34

3.5 Overarching Themes, Other Outcomes and Impacts

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

102. During the site visits of the ICR mission, it was found that in a number of places electric water pumps (for household consumption or for the supply of a small distribution system) had been installed after the arrival of grid electricity (on average after 2 to 3 years)²⁷. The impact on poverty and social development of reliable and clean drinking water is well documented. In addition, water fetching is carried out by women and girls. The availability of water in the vicinity of the house relieves women and girls of an arduous task. In one of the households visited that used a water pump, women had to walk 3km in order to access water before the arrival of electricity. In very limited instances electricity

²⁷ For full details on the regulatory framework of private water provision in Mozambique see the WB projects supporting the sector.

is also used for cooking replacing wood, charcoal and petroleum and hence avoiding the well-documented negative effects of indoor air pollution on women and children.

103. Water provision, shops, informal restaurants ('barracas'), and food conservation (fridges and freezers) were the few productive uses of electricity encountered during the ICR field trip. For both the sustainability of electrification in general, and the project in particular, the development of productive uses will be critical. Further, theft of energy is a problem for sustainability and creates a feeling of injustice for paying customers.

(b) Institutional Change/Strengthening

104. Covered under the discussion of design and outcome of the project.

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

105. Covered under the sections and component where they arose.

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

106. None.

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

Rating: Moderate

107. The project is well anchored in the Mozambican context and corresponds to GoM's sector strategy as evidenced by the ongoing implementation of the APL-2 with similar PDO and components (including renewable and cross-sector investments). In addition, the consistency of support that APL-2 provides in terms of investments, capacity building, and sector dialogue is mitigating the risks to the outcomes of ERAP APL-1. These sector-specific risks include the financial sustainability of EdM and its household electrification effort, continued maintenance of institutional solar PV systems (including periodic replacement of batteries), and assertion of CNELEC in its role as a strong and independent (either as 'full' or advisory regulator). Non sector-specific risks include social stability and acceptance of cost covering tariffs; government commitment to sector development; governance in general; sustained economic growth in Mozambique; performance of the global economy; climate change; and the occurrence of natural disasters.

5. Assessment of Bank And Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: Moderately Satisfactory

108. During preparation, relevant sector issues were identified and solutions elaborated in consultation with the Borrower and local stakeholders and reflected in the PAD. The identified issues and associated objectives were relevant. The components proposed were ambitious with an overall substantial risk. However, the PAD (in itself and with respect to other project documents) lacks consistency in almost all the key areas (PDO, key indicators, and project components). Further, there is not any systematic distinction between the World Bank project (ERAP-WB) and the parallel co-financed project (ERAP-joint).

109. The design adequately considered social development needs, poverty alleviation, and environmental and social aspects. The project design included arrangements for monitoring and evaluation, implementation support, risk mitigation, and stakeholder involvement. More could have been done in the area of gender sensitiveness and assessment of private sector interest. The project was complex with a substantial number of components and activities and proposed management mechanisms.
110. The quality of the analysis and the proposed activities would have merited a *Satisfactory* rating. However, the issues relating to consistency in project documents and complexity of the project pulled the overall rating down to the reported *Moderately Satisfactory*.

(b) Quality of Supervision

Rating: Moderately Satisfactory

111. The supervision process balanced the need for compliance with rules, safeguards, and project goals with the focus on development impacts. Safeguards and fiduciary requirements were monitored carefully and adhered to. Project reporting was done with candor reflecting project issues in description and ratings promptly. In some of the (substantial risk) activities there were sizable delays during the procurement process partially attributable to delays in WB response. Some of the proposed mechanisms were not fully implemented, such as the proposed project indicator monitoring at the ME as noted in section 2.3. Due to the complex design that included a large number of components and activities and co-financing arrangements necessitating coordination, supervision resources were stretched.²⁸
112. Supervision responded well to challenges such as the change in sector strategy and failure of high risk activities. This was reflected in thoroughly prepared restructurings that had a high degree of government ownership. However, issues arising could have been identified more proactively and addressed at earlier stages. Such a course of action would have reduced project delays. At the end of the project, transition was assured through the timely preparation of APL-2 and continued engagement in the sector.

(c) Justification of Rating for Overall Bank Performance

Rating: Moderately Satisfactory

113. Overall Bank Performance is rated Moderately Satisfactory due to inconsistency issues in project documents described under (a) above, and shortcomings in the identification of opportunities and resolution of threats as described under (b) above.

5.2 Borrower Performance

(a) Government Performance

Rating: Moderately Satisfactory

114. The Government's performance assessment includes activities carried out by the Ministry of Energy (former DNE), FUNAE, and CNELEC. Under ERAP, only EdM was a formal implementing agency. The government displayed commitment and ownership to the development objective and the project. In general, the environment is supportive to the sector development. Challenges remain in the

²⁸ Supervision resources required vary across projects: ceteris paribus, simple, single activity projects require less supervision resources than complex, multi-activity project or project involving donor coordination. The standard resource allocation for supervision based on the financing volume is not adequate and does not provide sufficient resources for complex projects.

area of cost covering electricity tariffs, financial viability of EdM's electrification program, the environment for small electricity producers (a framework for selling into the grid and associated feed-in right and tariffs), and the assertion of a strong and independent regulator.

115. During the project, government's implementation capacity has been supported. ME considers the mainstreaming of PIUs as a major factor in enhancing government's project management capacity and ensuring orderly transition at the end of the project. Appointment and training of key staff was supported through the project and increased readiness for implementation for APL-2. Government responded to arising implementation issues. Project reports and audits were generally provided in good order, although there were some instances of significant delays. Required counterpart funding (up to the first restructuring) caused delays in implementation. Monitoring and Evaluation has been insufficient and remained a challenge throughout the project.

(b) Implementing Agency or Agencies Performance

Rating: Moderately Satisfactory

116. EdM is committed to its ambitious electrification program, to which the project contributed, and to the PDO. Its project implementation unit assured continuity of counterparts and the appointment of key staff. EdM has responded swiftly to arising implementation issues and has responded to them head on. It has provided unaudited statements in good order. However, issues with the timely provision and the quality of its corporate annual audited financial reports (i.e. at entity level) remained throughout the project. Steps to address the root causes for these issues are supported under the APL-2. Monitoring and Evaluation has been insufficient and remained a challenge throughout the project. Project outputs are mainstreamed into EdM's general management of its assets. Their sustainability is linked to the general financial and management capacity of EdM (see section 2.5 for further information).

(c) Justification of Rating for Overall Borrower Performance

Rating: Moderately Satisfactory

117. Overall Borrower Performance is rated Moderately Satisfactory due to moderate shortcomings in the government's and implementing agency's performance as described under (a) and (b) above.

6. Lessons Learned

118. While reading this report and looking at the project and the impressive developments in the Mozambican energy sector, Deng Xiaoping's now-famous phrase of "Crossing the river by feeling the stones" might come to the reader's mind. When faced with complex situations it is more important to be steadfast in the goals and adapt the means as one goes along than the opposite. It is impossible to apprehend all issues and plan for all contingencies at inception. This leads to the first lesson learned: a key factor of success of a project in a complex and dynamic environment is flexibility in its design and/or repeated and flexible adaptive restructuring during implementation. Repeated and flexible adaptive restructuring was used during ERAP's implementation. More flexibility in design is to be recommended.
119. One strong lesson emerging – and one which is reflected in the poor ratings for the project before it was restructured – is the need to avoid overestimating the likely private sector interest in the opportunities that the project offered. On paper, the project offered clear financial incentives to participate in rural electrification, either as private sector concessionaires in Component C, or by taking advantage of the performance-based co-financing grant facility in Component D. (Annex 2 provides further details). However, in practice, financial incentives alone were insufficient to attract

private sector investors, either international or local, to commit capital and capacity to an untested operating environment. The perceived riskiness of the broader investment environment needs to be factored in to an assessment of likely private sector response to financial incentives. These risks encompass, inter alia, the legal framework in the event of contract dispute, business licensing requirements and the capacity of Government to award and regulate concessions in a transparent and even-handed fashion. These risks are particularly to the fore in smaller distribution activities in rural areas with a widely-dispersed customer base (and, conversely, apply less to larger, single-site generation projects where Government has had more success). This lesson regarding the reluctance of the private sector to engage in rural electrification schemes has been seen elsewhere. For example, in Cameroon there was a similar lack of private sector interest in undertaking such distribution schemes, exacerbated by a lack of sector institutional capacity to implement the complex processes required to finalise concessions. As with Mozambique, the Cameroon government decided, following early lack of private sector interest and a review of similar schemes in other countries, to undertake rural electrification through a simpler public sector approach delivered by its public agencies. The underlying lesson here is to avoid making simplistic assumptions during project preparation that financial incentives alone will stimulate private sector participation in rural electrification activities.

120. In projects that support innovative risk-taking approaches, output or outcome indicators are less informative and useful for project-tracking. These indicators are unlikely to be met (or, alternatively, to be largely surpassed in a positive realization) and might actually discourage the desired risk-taking. Indicators tracking the risk-taking behavior through implemented activities (that is, input-oriented indicators such as number of trials adopted or, for example under ERAP, number of grid concessions awarded) provide a fairer picture of the project's success.
121. Project implementation demonstrated that coordination with co-financiers can add complexity and be time-intensive for the task team hence risks slowing down implementation. Examples from this project included differences in operational processes of the different financiers (such disbursement procedures), difficulties in scheduling co-ordinated supervision missions and interdependency of activities and financing (such as the reliance of all donors on a single project auditor, where delays were experienced). Weighting the advantages and drawbacks of coordination and co-financing when designing a project will support an informed decision on whether and to what degree to engage into a joint implementation and co-financing approach. In the case of ERAP, there is a case that the drawbacks of parallel co-financing outweigh the benefits of the same.

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

(a) Borrower/implementing agencies

122. **Ministry of Energy:** The comments received (see Annex 7) have been used to revise the report, where appropriate.

(b) Cofinanciers

123. **AfDB: Comment number 1** touches on the subject of the acceptance of differential electricity tariffs. A willingness-to-pay study had been carried out while preparing ERAP. It indicated that people are willing to pay above the then-prevalent tariff levels for electricity. Implementation revealed that willingness-to-pay was not the only factor affecting financial sustainability of the project. It is by no means certain that further studies would have identified this problem. **Comment number 2** regarding ambitious indicators for high risk activities is treated in the lesson learnt on “projects supporting innovative risk-taking approaches”. Risk taking activities, by definition, will most likely

produce more extreme results. In case of success of such an activity, the indicator target most likely would have appeared modest. Hence the lesson that outcome indicators might not be best for high risk activities. **Comment number 3** asks if joint supervision could mitigate the drawbacks of joint projects and help increase the quality of supervision. The material reviewed for this report does not suggest such an outcome to be likely. **Comment number 4** is similar to comment number 3 of NDF and is answered below. **Comment number 6** asks what measures have been taken by GoM to promote PV systems. GoM has been undertaking a number of activities promoting renewable energy. The referred statement of the report identifies areas beyond the energy sector to be the most limiting ones for fast expansion of renewable energy. **Comments number 5 and 7** are sound points but aim beyond the scope of the report.

124. **NDF: Comments number 1, 2 and 4** have been used to revise the report. The **theft of electricity** observed (comment number 3) during the ICR mission is mostly done bypassing pre-paid meters. A technical remedy to this would be to use split meters. A management side remedy would be stringent controls that disconnect and penalize customers that have tampered with their meters. In one area visited by the AfDB consultant, such an effective management is practiced. The **displacement of CO2** (comment number 5) has not been estimated by the ICR as there has been no actual data in this regard. The recalculation would only be based on assumptions.

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

125. None.

Annex 1. Project Costs and Financing

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

Energy Reform and Access Project - P069183			
Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Power Sector Reform	2.65	2.25	84.91
Grid Electrification	17.35	33.29	191.87
Independent Grids	10.60	0.02	0.20
Renewable Energy and Cross-sectoral	4.12	3.58	86.89
Institutional Strengthening & Capacity Building	5.54	6.27	113.18
Total Baseline Cost	40.26	45.41	112.79
Physical Contingencies	2.97	1.58	53.20
Price Contingencies	0.90		
Total Project Costs	44.13	46.99	106.48
PPF	0.00	0.00	
Front-end fee IBRD	0.00	0.00	
Total Financing Required	44.13	46.99	106.48
Mozambique: Energy Reform and Access Program - P071942			
Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Renewable Energy and Cross-sectoral	3.09	3.07	99.35
Total Baseline Cost	3.09	3.07	99.35
Physical Contingencies	0.00	0.00	
Price Contingencies	0.00	0.00	
Total Project Costs	3.09	3.07	99.35
PPF	0.00	0.00	
Front-end fee IBRD	0.00	0.00	
Total Financing Required	3.09	3.07	99.35

(b) Financing

P069183 - Energy Reform and Access Project				
Source of Funds	Type of Financing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
African Development Fund		15.19	15.11	99.46
Borrower		8.48	6.50	76.65
Global Environment Facility (GEF)		3.09	3.07	99.35
International Development Association (IDA)		40.26	42.98	106.76
Nordic Development Fund (NDF)		9.07	13.11	144.57
Foreign Private Commercial Sources (unidentified)		7.40	0.00	0.00
P071942 - Mozambique: Energy Reform and Access Program				
Source of Funds	Type of	Appraisal	Actual/Latest	Percentage of

	Financing	Estimate (USD millions)	Estimate (USD millions)	Appraisal
Global Environment Facility (GEF)		3.09	3.07	99.35

Annex 2. Outputs by Component

ERAP was a parallel co-financed project including financing from AfDB, NDF, and WB. For the purpose of clarity, the AfDB financed ERAP is called ERAP-AfDB, the NDF financed ERAP is called ERAP-NDF, the WB financed ERAP is called ERAP-WB (including GEF), and, the ERAP including all financiers is called ERAP-joint. The PAD sometimes referred to ERAP (components, outputs, and indicators) meaning ERAP-WB and sometimes meaning ERAP-joint. This annex reports on ERAP-WB whenever possible and clarifies when it refers to ERAP-joint.

Component A: Power Sector Reform

Under this component, the operationalization of CENELC was supported by providing financing for:

- Vehicles; office equipment (furniture, IT equipment, copy machine) and materials; running costs; and rent for office space
- Staff salaries
- Consultancy services such as Evaluation of the performance and efficiency of EDM, tariffs calculation methodology, and a resident advisor to CNELEC

The table below provides a summary of the (planned) project outputs before and after restructuring.

Table 15: Project Outputs of Component A

PAD	Revised (first and second restructuring)	Output at the end of the project
Separation of EdM into Business Units	Canceled in 1 st restructuring	
Private Sector participation in EdM	Canceled in 1 st restructuring	
Establishment of an Independent Transmission Company (ITC)	Canceled in 1 st restructuring	
Originally in Component E: Establishment of CNELEC as independent regulator	Moved from Component E to A in 1 st restructuring: Operationalizing a Strong and Independent Advisory Regulator	CNELEC established. Public consultations on technical and commercial quality of EdM held in 3 cities. Reports and Advice provided to ME (not public) ²⁹

Component B: Grid-Based Peri-Urban Electrification

This component supported EdM's effort to extend the grid in peri-urban and rural areas in the Provinces of Gaza, Inhambane, Maputo, and Maputo City in the following localities: , Momemo, Bairro dos Pescadores, Mapulango, Cumbeza Zona de Eucaliptos, Faixa Quartel ,Luis Cabral, Gwava, Zintava, Malhazine Norte, Cumbeza Sul de Mali Marracuene, Costa do Sol, Zimpeto, Aldeia de Nhancutse, Aldeia de Mucotwene, Aldeia Samora Machel, Conguiana, Macucune Sector 2, Macucune Sector 3, Muele Bairro Novo, Maxixe Sarene, Maxixe Mabil, Bairro Cocane 2, Marengo 1&2, Matengane 2, Zona Alta Artes e Oficios, Matsolo, Acordos de Lusaka, Xilengue, Chihalho, Tsoveca, Nhiwane, and Maciene. It provided financing for:

- Supply and installation for: grid extension; pre-paid metering; and automated meter reading (AMR)
- Construction of 9 commercial offices and provision of equipment such as furniture and IT equipment

²⁹ CNELEC reports the provision of reports and advice to ME. Such reports and advice was not public and transparent. The latest document available on the CNELEC homepage (www.cnelec.org.mz) is from June 2011. The latest published activity plan is for 2010 (as of July 28, 2012).

- Vehicles for operation and maintenance of networks
- Consultancy services such as the design and supervision of grid extension; design and supervision for CREST; environmental screening; and EdM Financial Model

At the time of writing of the ICR 68,270³⁰ new customers had been connected in the areas covered by the ERAP-joint. These figures seem small in the context of EdM's electrification effort. At the time of appraisal in 2003 EdM counted 245,859 customers. By project close in 2011, its customer base had extended to 1,010,780. This corresponds to over 750,000 new connections, or 7.5 times the target set in the PAD for the two phases combined of the 8 year program (2003 to 2011). Using an average household size of 5, about 3.8 million people gained access to electricity. This is more than 3.5 times more than the 1 million considered in the PAD for the two phases combined. However small the direct contribution to new connections was under ERAP, the project substantially contributed to the achievement of these high numbers, through the standardized low-cost designs adopted and the installation of medium-voltage 'backbones' and transformer infrastructure that consequently was used by EdM to connect additional customers.

The average cost of a new connection was US\$ 764 for ERAP-joint and US\$ 778 for ERAP-WB. During the ICR field trip it was noted that all the distribution transformers visited were adequately protected by a fence. However, the padlocks on the door of the fencing were missing in most of the visited sites. This is on the one hand a social safeguards concern through the unauthorized operation of potentially dangerous equipment. This unauthorized operation is on the other hand a concern of the protection and proper management of EdM (and project) property as transformers can be damaged through faulty manipulation or draining and theft of transformer oil (as occurring in some neighboring countries). On one site, the surge protection of a transformer had been bypassed leaving the equipment unprotected to events such as lightning strike.

The table below provides a summary of the (planned) project outputs before and after restructuring.

Table 16: Project Outputs of Component B

PAD	Revisions (first and second restructuring)	Output at the end of the project
Technical advisory services for development and mainstreaming of lower cost electrification standards and designs	None	Completed
Technical advisory services for the design, bid preparation and evaluation, construction, supervision and management of electrification schemes	None	Completed
Construction of about 500 kilometers of MV lines, 1100 kilometers of LV lines and 240 distribution substations ³¹ for ERAP-joint (figures ERAP-WB in parenthesis)	None	LV: 1,996 km (615 km) MW: 373.7 km (106 km) Transformers: 374 (182)
40,000 connections in the first phase of the program for ERAP-joint (figures for ERAP-WB in parenthesis)	Revised in 1 st restructuring to 65,000 for ERAP-joint	68,270 (32,536) ³²
Acquisition of vehicles, tools and specialized equipment for the operation and maintenance	None	Completed

³⁰ At project close, there were 47,635 new connections for ERAP-joint and 19,243 for ERAP-WB.

³¹ In the project's context of grid intensification and extension distribution substation is assumed to refer to distribution transformer.

³² The number is at the time of writing of the ICR. At project close, there were 47,635 new connections for ERAP-joint and 19,243 for ERAP-WB.

PAD	Revisions (first and second restructuring)	Output at the end of the project
Construction of office facilities to address customer service needs from grid extension	None	9 offices (container and conventional) completed

Component C: Independent Grid Rural Electrification

The independent grid electrification component was rated as carrying a substantial risk. In particular the PAD identified the risks that the private sector and financial institutions are not interested in participating and that cost-based tariffs are not acceptable. These risks materialized during the implementation and led to the downsizing of the component (first restructuring) and finally cancelation of the component (second restructuring). The table below provides a summary of the (planned) project outputs before and after restructuring.

Table 17: Project Outputs of Component C

PAD	Revised (first and second restructuring)	Output at the end of the project
Private sector concession arrangements including Northern Inhambane and Mocimboa da Praia	1 st restructuring: private sector concession arrangements for Northern Inhambane Canceled in 2 nd restructuring	No independent grid concession operational at completion of the project. However, GoM has licensed 1 IPP and was in the process of licensing further IPPs and an ITC (see also section 1.9).
Preparation of other privately operated isolated rural electrification	Canceled in 1 st restructuring	Idem above
Study to identify productive uses of electricity	Component C canceled in 2 nd restructuring	Completed in July 2008. No implementation of recommendations.

Component D: Renewable Energy and Cross-Sectoral Linkages

Solar PV systems were installed in clinics and schools in the following Provinces: Cabo Delgado, Gaza, Inhambane, Manica, Maputo, Nampula, Niassa, Sofala, Tete, and Zambezia. The 5 district electrification pilot provided solar PV systems in the following localities:

Manica Province: Mavonde and Mungari

Tete Province: Muze, Malowera, and Vila Mualadzi.

The main issues encountered in this component related to three areas: (i) quality of the initial installations including components, (ii) difficult and costly maintenance due to the remoteness of the systems, and (iii) theft and vandalism.

Under (i) the most frequent problem was the low quality of the 12V CFLs provided in many of the initial installations. As 12V CFLs are almost not available in the Mozambican market, the replacement was difficult and costly. This problem has been addressed through the procurement of high quality CFLs and the provision of spare bulbs to the beneficiary institutions. Further, under later installations, the lack of a 12V CFL market was circumvented by the use of inverters and 230V AC CFLs.

Under (ii), it is positive to note that currently MINED, MISAU and FUNAE have maintenance contracts with private sector firms for their respective installations. First results indicate that around 25% to 30% of the systems need repairing or replacement of one of the main components (solar panel, charge controller, batteries, or wiring).

Regarding the problem of theft and vandalism (point (iii)) first results indicate that around 5% to 15% of the systems suffer from theft and vandalism, with schools considerably more affected than clinics. Here, it

has been suggested by MINED that close involvement of the local community could help to improve the situation. The sites visited during the ICR field trip confirmed the above issues and findings.

The table below provides a summary of the (planned) project outputs before and after restructuring.

Table 18: Project Outputs of Component D

PAD	Revised (first and second restructuring)	Output at the end of the project
Investments in renewable energy activities through a performance based co-financing grant facility	Canceled in 2 nd restructuring	None, due to low (or non-existing) response from the private sector.
Supply and installation of PV systems for 150 schools and 150 clinics	100 clinics added in 2 nd restructuring	311 ³³ systems installed and approved by the supervision consultant at the time of the writing of the ICR. Originally some quality issues encountered that have been resolved. Maintenance, theft, and vandalism of the systems and its components remain a challenge.
Technical assistance program for creation of sustainable market for renewable energy systems	Canceled in 2 nd restructuring	None, due to low (or non-existing) response from the private sector.
	Pilot PV electrification of 5 villages in 5 districts added in 1 st restructuring	214 residential solar PV systems installed under pilot. 2 villages electrified and installations approved by the supervision consultant. In 3 villages systems were installed but have not been approved at the time of the ICR.

Component E: Institutional Development and Capacity Building

Under this component, the newly created Ministry of Energy was supported in the following areas:

- Vehicles and IT equipment
- Technical staff such as Financial Manager; Procurement Specialist; Project Coordinator; Project Financial Manager; Accountant Officer; Accountant Assistant; Procurement Officer ; Procurement Assistant; and Financial and Legal Advisor for ENH
- Consultancy services such as a Gas Market Study; Commercial Options for Structuring Transmission Backbone Company Study; Financial Benefits of Generation Projects Study, Training and Workshop; Transaction Advisor for Large Scale Power Generation; and a Study on Options for the Review of Electricity Law

For the ICR, staff of all four institutions benefiting from capacity building support (CNELEC, EdM, FUNAE, and ME) were asked to fill in a questionnaire regarding their view of the capacity building support under the project. 21 (partially) completed questionnaires were received. The answers received indicate that the support corresponded to capacity needs as 84% of the activities supported were in the capacity development plan of the respective institution and 100% of respondents reported that they use the new skills in their daily work. 83% reported that the skills acquired during the capacity development activities were not project specific but served them in the general work as well. Some respondents noted that the trainings are important for the development of their respective institutions and that the WB should continue its support in capacity building. For a more details on the answer to the questionnaire, see Annex 11.

³³ 270 systems were installed and approved by the supervision consultant by the end of the project

The table below provides a summary of the (planned) project outputs before and after restructuring.

Table 19: Project Outputs of Component E

PAD	Revised (first and second restructuring)	Output at the end of the project
Operationalization and Institutional Development of CNELEC	Moved to Component A in 1 st restructuring	See Component A
Support and Capacity Building for the Ministry	Scaled up in 1 st restructuring reflecting training and capacity building needs of new Ministry of Energy	(a) Training of staff in the ME (b) Implementation of an information technology strategy for the ME (c) Establishment of an environmental unit in the ME (d) Support for large energy projects through technical, legal and financial advisory services (e) Support in various areas through advisory services

Annex 3. Economic Analysis

The economic analysis here only covers component B, grid extension which corresponds to around 70% of disbursements. Component C was canceled and with no operational concession and only marginal disbursements from the project. The other components are difficult to quantify and a qualitative analysis is presented in the main text. The Commercial Reorientation of the Electricity Sector Toolkit (CREST) was added during the first restructuring and an economic analysis has not been carried out for two reasons: 1) there is no reference scenario in the PAD and 2) data that would have allowed for such analysis was requested but not provided up to the writing of the ICR.

The PAD calculated a NPV at 10% and 12% (with 12% as the standard case) as well as the IRR. This is summarized as ‘Scenario 1’ in the table below. The NPV and the IRR were then re-estimated under two further scenarios. In Scenario 2, the same assumptions as in the PAD are used but with actual results data (where available). In Scenario 3, revised and updated assumptions are used, as well as the actual results data (where available). The differences are reported in the table below. The numbers in Scenarios 2 and 3 include, following the practice of the PAD and for ease of comparison, the full grid extension related disbursement under Component B (i.e. including the costs of engineering consultancy services for the connections).

Table 20: NPV and IRR in the PAD and the ICR

	Original PAD (scenario 1)	PAD assumptions but actual data (scenario 2)	Revised assumptions and actual data (scenario 3)
NPV in US\$ million at 10%	25	9.6	30.2
NPV US\$ million at 12%	17	4.9	21.0
NPV US\$ million at 15%		0.4	11.7
IRR	22.7%	15.3%	24.6%

The estimates use ERAP-joint investment and connection numbers. The cost for EdM of additional connections in the project areas (drop down and meter) is estimated at US\$ 100. The analysis is carried out over 20 year horizon making the following further assumptions.

Table 21 Assumptions for the economic analysis in the PAD and the ICR

Assumption	Original (Scenario 1 and 2)	Updated (Scenario 3)
Losses	12%	20%
O&M costs	2% of cumulative investment (1 year lagged) plus US\$ 6.2 in the year of connection	3% of cumulative investment (1 year lagged)
Average benefit per kWh served (as defined in the PAD)	US\$c 13 / kWh	US\$c 20.6 / kWh
Average consumption per customer	increase from 114 kWh/month to 140 kWh/month	increase from 100 kWh/month to 138 kWh/month
Cost of Energy Supply	increase from US\$ 0.01 to US\$ 0.02 per kWh	increase from US\$ 0.015 to US\$ 0.034 per kWh
Oil per barrel	US\$ 21	US\$ 80

The revised estimates with updated assumptions (scenario 3) produce results above the ones in the PAD. This is due to the fact that higher oil prices increases the benefits under scenario 3 (through increased consumer surplus from switching from petroleum/gen sets to electricity). This effect is diminished by assumed higher O&M costs, energy supply costs, and losses, as well as a lower average consumption of electricity. Under the changed circumstances, the result indicates that the project is able to reap economic benefits slightly bigger than initially anticipated.

The financial return from the project for EdM (with the current data) is around zero (at the current exchange rate). This highlights the importance of loss reduction (including combating theft of energy), periodic tariff review and adjustment, and the promotion of productive uses in newly electrified areas. The financial sustainability of EdM is paramount to the sustainability of the project outcomes in general. Under the current circumstances, this implies that electrification efforts should be done with 0% interest rate loans at most or under grant financing.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Reynold Duncan	Senior Power Engineer	AFTEG	Team Leader
Helena Kofi	Procurement Analyst	AFTEG	
Johannes Exel	Renewable Energy Business Specialist Consultant	AFTEG	
Lily Wong Chun Sen	Program Assistant	AFTEG	
Paivi Koljonen	Senior Energy Economist	AFTEG	
Trine Refsbaek	Cross-sectoral Consultant	AFTEG	
Yuriko Sakairi	Senior Economist	AFTEG	
Edeltraut Gilgan-Hunt	Environmental Specialist	AFTES	
Joao Tinga	Financial Management Analyst	AFTFM	
Marius Koen	Senior Financial Management Specialist	AFTFM	
Tesfaalem Gabreiyesus	Senior Procurement Specialist	AFTPC	
Julius Wilberg	Financial Analyst	Consultant	
Ranjit Lamech	Senior Energy Specialist	ECSIE	
Nelson de Franco	Lead Power Engineer	LCSFE	
Elizabeth Adu	Chief Counsel	LEGAf	
Muthoni Kaniaru	Counsel	LEGAf	
Jose Janeiro	Senior Finance Officer	LOAG2	
Marie-Ange Saraka-Yao	Senior Financial Officer	PFG	
Alan Townsend	Senior Private Sector Development Specialist	PSAPP	

Supervision/ICR

Wendy Hughes	Senior Energy Specialist	AFTEG	Team Leader
Rob Mills	Senior Economist	AFTEG	Team Leader
Reto Thoenen	Energy Specialist	AFTEG	Team Leader
Adelia N. Chebeia Suurna	Program Assistant	AFCS2	
Maika Watanuki	Junior Professional Officer	AFCS2	
Maria Isabel Nhassengo-Massingue	Procurement Assistant	AFCS2	
Salma Chande	Program Assistant	AFCS2	
Cheikh A. T. Sagna	Senior Social Development Specialist	AFTCS	
Reynold Duncan	Program Coordinator	AFTEG	
Bernard W. Tenenbaum	Consultant	AFTEG	
Helena Mamle Kofi	Consultant	AFTEG	
Prasad V. S. N. Tallapragada	Consultant	AFTEG	
Rahmoune Essalhi	Procurement Assistant	AFTEG	
Ralph Ake Karhammar	Consultant	AFTEG	

Elvis Teodoro Bernado Langa	Financial Management Analyst	AFTME	
Joao Tinga	Financial Management Analyst	AFTME	
Jonathan Nyamukapa	Sr Financial Management Specialist	AFTME	
Antonio L. Chamuco	Senior Procurement Specialist	AFTPE	
Mohamed Arbi Ben-Achour	Consultant	AFTSG	
Edeltraut Gilgan-Hunt	Consultant	AFTTR	
Robert A. Robelus	Consultant	AFTTR	
Theresa Marissa J. Gamulo	Procurement Analyst	AFTU	
Reinaldo Goncalves Mendonca	Consultant	MNSED	
Pedro Antmann	Senior Energy Specialist	SEGEN	

(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		
FY00		0.13
FY01	21	83.90
FY02	28	128.04
FY03	46	193.41
FY04	7	29.25
Total:	102	434.74
Supervision/ICR		
FY04	14	55.54
FY05	29	165.92
FY06	44	210.59
FY07	24	114.29
FY08	37	160.51
FY09	41	152.92
FY10	22	165.54
FY11	18	113.04
FY12		
Total:	229	1138.35

Annex 5. Beneficiary Survey Results

None

Annex 6. Stakeholder Workshop Report and Results

None

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

No project completion report has been produced by the Borrower.

Borrower comments to ERAP Draft ICR

Page 1

ICR text:

Mozambique made tremendous strides in the years following the peace agreement that ended a devastating civil war in 1992.

Comment from the Borrower:

I don't think that the civil war is relevant here even because that was not really a civil [war] that was destabilization. Having said I would suggest to refer the period instead of the war.

ICR text:

An economic reform program was implemented, with substantial support from external partners. The transition from war to peace and from a central planning system to a market economy had begun to reap results.

Comment from the Borrower:

Again I think this judgment about the economic policy may not [be] appropriate here

ICR text:

All the provincial capitals plus Maputo, and most of the other 20 or so municipal capitals, were served by the national grid or isolated diesel-based grids.

Comment from the Borrower:

I am afraid that the intention is to give the idea that until ERAP the[re] were no much [electrification] but this is no true. In 2005 the last provincial capital Lichinga was connected to the grid and in 2002 two or 3 were not connected.

Page 2

ICR text:

During the years leading up to the preparation of ERAP the GoM, with the help of the World Bank and other donors, had taken some significant steps toward adopting a legislative and policy framework to reform the sector in order to meet these challenges. For instance, the 1997 Electricity Law allowed for private participation s.

Comment from the Borrower:

How the WB helped because ERAP was still in preparation?

ICR text:

Much of the sector reform work preceding the ERAP, such as the preparation of 1997 electricity and petroleum laws concessioning decrees and the national energy strategy, had been financed by the World Bank.

Comments from the Borrower:

The support mentioned was before ERAP.

The petroleum sector had and still have support from Norway not WB.

Page 7

ICR text:

The July 17, 2007 restructuring (Board level) was an adaptive restructuring responding to slow implementation progress (the PDO and GEO rating fell to *unsatisfactory* in May 2006) and the GoM's revised approach and strategy for the electricity sector and its reform. Beyond the change in the PDO and the key indicators, there were changes in the components, the allocation, and the triggers for APL-2 (for details see sections 1.8 and 1.9). As a consequence of the first restructuring and improved implementation progress the PDO and GEO ratings was assessed as *Satisfactory* in May 2008

Comment from the Borrower:

I am not sure about this because the reason for ERAP to be categorized as unsatisfactory was linked to the reform approach that was initially defined that way the triggers had to reviewed. Another key factor was the counterparts funds which we explained very well during our discussions during the ICR mission.

Page 17**ICR text:**

A large part of the overall delay in implementation occurred after effectiveness and up to the mid-term review and was linked to the change in GoM policy. Further delays occurred after mid-term review and was linked to general implementation issues, including delays in the procurement process and hence in the provision of No-Objections.

Comment from the Borrower:

Please reformulate this sentence: the delay in effectiveness [itself] affected the project implement[ation,] then [in]addition to that mention the other reasons.

Page 19**ICR text:**

The challenges in the energy sector in Mozambique remain significant. At the end of 2011, grid electrification in Mozambique stood around 18%, compared to approximately 6% when the ERAP project was started.

Comment from the Borrower:

22%

Page 20**ICR text:**

Private sector participation in the power sector did not occur as planned in distribution and independent grid concessions. However, large scale generation and transmission projects are being developed with substantial private sector participation, reducing the public resources required for such projects. Currently, though owned by government, Cahora Bassa functions as an IPP. There is a number of planned projects with private sector participation (ranging from minority private shareholdings to outright private ownership) include the following power plants: Mphanda Nkuwa, Cahora Bassa North, Moatize, Benga, Ncondezi, and the gas-fired plants at Ressano Garcia, as well as the transmission backbone (STE) from Tete to Maputo.

Comment from the Borrower:

This real fact should be developed in the sense to provide a good context of the Mozambique economic and social context and may the tariff challenge because in my view these are the [main] reasons behind private sector participation.

Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

AfDB comments to ERAP Draft ICR

Uniform national tariffs (p. 16)

The ICR mentions that consultation was broad, in particular for the renewable component. The report also notes, that, in hindsight, the question of equity and social cohesion regarding the uniform national tariff could have merited further attention and consultation.

In the light of the above, would a tariff formulation and structuring study have been useful as part of the capacity building and reform support of the project?

Quality of project design and of indicators (p. 16, 21, 28)

The report notes that: “The risks of the project were assessed adequately. In particular, the components that later were restructured such as the independent grid electrification and the sector reform agenda, as well as the possible lack of interest of the private sector were all identified and rated as substantial risks. However, despite such risks, ambitious indicators and targets were defined.” (p. 16)

There is an indication that the project tried to use lessons learnt elsewhere. Would these lessons learnt not have been useful to set achievable and better indicators?

The report mentions that the original design was good, albeit rather ambitious and somewhat complex for the country context. (p. 21)

Indeed the project was too complex and this seriously affected implementation efficiency and speed. A project with few components and few targets might have been better.

In the section “Lessons Learned” the report notes that when faced with complex situations it is more important to be steadfast in the goals and adapt the means as one goes along than the opposite. (p. 28)

Indeed an excellent approach, however I don’t know how much MDBs are flexible to fully accommodate this. Although the AfDB has some flexibility, the tendency is to make major adjustments at midterm review. Further care must also be taken to ensure changes do not result in too much variation from the original goal and objectives.

Joint supervision (p. 17, 26)

The report states that: “The project achieved some of its results by supporting various activities with potential mutual reinforcement effects and acting in coordination with other donors. The downside of this approach was delays in activities due to the increased complexity (such as differences in processes of the different financiers, interdependency of activities and financing).” (p. 17)

Would joint supervision be a way to try and reduce this challenge?

(b) Quality of Supervision, rated Moderately Satisfactory (p. 26):

Would joint supervision have helped (based on peer pressure from the involved MDBs)?

Theft of electricity (p. 19)

The report mentions that findings from the ICR field trip indicate that theft of energy at the household level is common, undermining EdM’s revenue generation.

Suggestions on how this could be curbed would be useful for increased sustainability.

Capacity at EdM (p. 19)

The report states that a further and continuous challenge is to assure that management and technical capacity develop at least at the same pace as the company expands.

Mozambique has SADC’s largest hydropower potential, could something be done at the regional level to increase capacity of EdM?

Barriers to entry for small solar PV systems (p. 20)

The report notes with respect to entry barriers faced by small solar PV systems that: “The main difficulties faced seem to be linked to the general business environment (customs, transport costs, difficult access to

working capital) rather than to sectoral issues. Hence, energy sector specific interventions in this area will not be very cost effective.”

In any country where PV and most renewables have worked, there was significant government intervention in terms of either supportive, policy and regulatory framework, deliberate subsidies, incentives of some sort and for developing countries serious efforts at capacity building for back up and managing the technology. What was the situation in Mozambique?

Productive use of electricity (p. 25, 26, 28)

The ICR records that: “Water provision, shops, informal restaurants (‘barracas’), and food conservation (fridges and freezers) were the few productive uses of electricity encountered during the ICR field trip. For both the sustainability of electrification in general, and the project in particular, the development of productive uses will be critical. Further, theft of energy is a problem for sustainability and creates a feeling of injustice for paying customers.” (p. 25)

It may be useful to indicate some of the potential areas where electricity could be targeted for productive uses.

The report mentions that: “More could have been done in the area of gender sensitiveness and assessment of private sector interest. The project was complex with a substantial number of components and activities and proposed management mechanisms.” (p. 26)

A useful aspect would have been an effort by either government or the utility to create some demand, for instance link the rural electrification to some irrigation projects etc.

Regarding the promotion of productive uses of electricity to help increase financial sustainability as referred to on p. 28, it might be useful to provide some indication of the areas that are amenable to promotion of productive uses.

NDF comments to ERAP Draft ICR

Thanks for sharing the report with NDF. The draft report looks good and it seems to be a solid and comprehensive report that describes well the development, implementation and results of the ERAP Project. NDF furthermore appreciates the attempt to document the results and impact of the capacity building activities, which were co-financed by NDF.

NDF funding and its allocation

The ICR mentions (p. 2) that the project had financing from several donors (WB, AfDB and NDF), but does not specify where each donor provided support. The NDF support focused on Component 2: Grid Intensification; and Component 4: Institutional strengthening and capacity building. Specifically NDF financed the following sub-components “Supply and Installation of Distribution Networks, Package III” (in peri-urban areas south of Maputo) (EUR 9,427,715); and assistance to establish an environmental unit and capacity building/training of staff in the Ministry of Energy (EUR 690,511). Perhaps you could consider mentioning in the report where NDF and other donors allocated their funding (to what components).

The costs of individual connections (p. 22)

There is no description of how the price of individual connections is calculated. Whether this is the price that individual consumers will have to pay to EdM to get connected or whether this is the costs of establishing the grid connections and the number of consumers these connections will serve?

If we use the costs divided by new connections the NDF support provided 23.500 new connections through a contract price of EUR 9,427,715 or about USD 11,807,600. This leads to a price of USD 502 per new connection. The target for this contract was to provide 28,000 new connections which would have been at an average price of USD 422.

Theft of electricity

The report mentions that this is a persistent problem. What happened to the pre-paid and automatic meters plus other remedies that should have helped reduce the loss of electricity?

Access to electricity

According to the WB the access to electricity (% of population) in Mozambique was 11.7% in 2009. Perhaps the report could highlight the contribution of ERAP to increasing the access to electricity from 7% in 2003 to 11.7% in 2009. There is still a long way to go but ERAP has made a significant contribution.

Climate change mitigation

Page 9 states that - according to the original PAD - the global benefit of the project would be the displacement of about 440,000 tons of carbon dioxide over an 8-year life. Considering the fact that the results in some cases went above the planned target it could perhaps be useful to recalculate the direct and indirect CO2 emission reductions produced by the project.

Helsinki 31 August 2012

Aage Jorgensen

Annex 9. List of Supporting Documents

1. Project Appraisal Document: Mozambique: Energy Reform and Access Project (in Support of the First Phase of the Energy Reform and Access Program), dated July 14, 2002. Report No: 26296-Moz
2. Project Paper: Mozambique: Energy Reform and Access Project, dated June 21, 2007. Report No: 40191
3. Project Paper: Mozambique: Energy Reform and Access Project, dated December 29, 2009.
4. Project Paper: Mozambique: Energy Reform and Access Project, dated March 29, 2011.
5. Development Credit Agreement: Mozambique: Energy Reform and Access Project, dated October 07, 2003. Conformed Copy: C3819-Moz
6. Trust Fund Agreement: Mozambique: Energy Reform and Access Project: Global Environment Facility (TF 052650 MOZ), dated October 7, 2003
7. Project Agreement: Mozambique: Energy Reform and Access Project, dated October 7, 2003. Conformed Copy: C3819
8. Amendment Letter: Mozambique: Energy Reform and Access Project: Restructuring of the Project - Extension of Closing Date and Amendments to (i) the Development Credit Agreement (Credit No. 3819 MOZ); (ii) the Project Agreement (Credit No. 3819 MOZ); and (iii) Global Environment Facility Trust Fund Grant Agreement (TF 052650 MOZ), dated July 17, 2007
9. Amendment Letter: Mozambique: Energy Reform and Access Project: Amendments to (i) the Development Credit Agreement (Credit No. 3819 MOZ); (ii) the Project Agreement (Credit No. 3819 MOZ); and (iii) Global Environment Facility Trust Fund Grant Agreement (TF 052650 MOZ), dated December 30, 2009
10. Amendment Letter: Energy Reform and Access Project (P071942): Extension of Closing Date Trust Fund Grant Agreement (TF 052650 MOZ), dated March 30, 2011
11. Project Mid Term Report, date January 07, 2006
12. Midterm Review Issues Note, dated February 17, 2006
13. Aide Memoires, Back-to-Office Reports, and Implementation Status Reports
14. Project Progress Reports
15. Project Audit reports and Interim Financial reports
16. Integrated Safeguards Data Sheet: Mozambique: Energy Reform and Access Project, dated June 13, 2007. Report No:40168
17. Environmental and Social Impact Assessment: Mozambique: Energy Reform and Access Project, dated January, 2003. Report No: E692
18. Resettlement Policy Framework: Mozambique: Energy Reform and Access Project, dated November, 2002. Report No: RP134
19. Country Assistance Strategy: Mozambique, dated June 14, 2000. Report No. 20521-Moz
20. Country Assistance Strategy: Mozambique, dated October 20, 2003. Report No. 26747-Moz
21. Country Partnership Strategy FY 12-15: Mozambique, dated February 8, 2012. Report No. 66813-Moz

Annex 10. Cancellation of the Component C Independent Grid Concession – Chronology of Events

- August 8, 2007: the Minister of Energy issued a “Despacho” (“Order”) that this concession contract is cancelled on the basis of material breaches of the terms of the Concession Contract and current legislation.
- August 9: the Director of Electrical Energy at the Ministry of Energy wrote to ENMO informing them that the Concession has been cancelled.
- August 13: ENMO responded to the Minister of Energy, copying the World Bank, (i) issuing “Notification of Dispute” as per the Concession contract calling on the Government to enter into good faith discussions within 30 days; (ii) providing details of why they are disputing that ENMO has committed violations of a nature as to justify revocation of the concession; (iii) expressing their view that the real reason for the cancellation is "to circumvent ENMO's generation exclusivity" in that area in order to make way for a new JV company to build a 600+MW gas-fired power plant at Temane gas field, which falls within ENMO's concession area.
- August 17: AES, an international power firm, wrote to the Director of Energy requesting clarification: (i) ENMO is included as a potential partner in the AES bid for the Moatize 1,000MW coal-fired power plant concession and ENMO's departure from Mozambique could affect AES' bid; (ii) Development Bank of Southern Africa, a regional development finance institution, has been included in the AES project finance consortium – but DBSA is a lender to ENMO for the cancelled concession and this might affect DBSA's appetite for financing the Moatize project; (iii) concern that the precedent of revoking concession licenses will make it more difficult to secure attractive financing for Moatize and other generation projects.
- August 17: ENMO wrote to the Minister of Energy saying that trucks had been impounded and some employees' passports confiscated.
- August 20: Rural Maintenance (South African member of ENMO and majority shareholder) wrote to WB formally requesting our intervention to prevent “victimization” of ENMO. This is on the basis that the original tender document referred to this concession as part of the Energy Reform and Access project financed by the WB.
- September 11: WB wrote to Minister of Energy to highlight the importance of following due process and requesting clarification of the Government's position on the concession, given that the WB credit has financing allocated for the OBA subsidy related to this concession. WB also response to Rural Maintenance confirming the WB's interest in an appropriate resolution, given the relevance to the WB's efforts to support the Government in promoting electrification.
- October: Ministry of Energy and ENMO agreed to meet in early November to agree on a process for evaluating the situation and reaching agreement on a settlement.
- November 6: ENMO wrote to the Minister of Energy to notify the Government that ENMO would be ceasing operations with effect November 6, due to: (i) expiration of the ENMO trading license without renewal by Ministry of Energy and (ii) DBSA, has invoked the provisions of the account pledge agreement that was signed between ENMO and DBSA to the effect that ENMO's bank accounts are frozen and ENMO can no longer draw funds from or operate its bank accounts. The letter stated

ENMO's intention to shut down the power generation plant and, in the presence of the local police, to remove specific items of equipment so that the machines could not be restarted by unauthorized persons.

- November 6: ENMO wrote to Minister of Finance complaining of harassment of ENMO staff in their attempt to implement the Cessation of Operations Procedure.
- November 7: Director of Energy wrote to ENMO informing ENMO that the Ministry of Energy would immediately request EdM to take over operations to safeguard provision of electricity supply and requested ENMO's cooperation.
- Despite some difficulties and disagreements during the transition process, Ministry of Energy and ENMO / Rural Maintenance and their respective legal representatives have agreed on a hand-over process to be overseen by an Integration Committee. In addition, following some lengthy delays, a process for the selection and appointment of mutually acceptable independent auditors to conduct due diligence on the concession and calculate any compensation payable has finally been agreed. As of August 2012, the due diligence report had not yet been made available to the World Bank.

Annex 11. Informal Summary Notes from ICR Mission, July 2012

Main points from field visit

- FUNAE
- Schools (Escolas de Chécua e Josina Machel, Distrito da Manhiça, Província de Maputo (50 schools & clinics)):
 - Electrification is welcome and appreciated
 - Allowed for adult alphabetization
 - (lack of) usage of the systems by schools after alphabetization (e.g. nocturnal English classes for community as reported in one of the schools. The activity was stopped due to vandalism.)
 - Vandalism
 - Manuals not on site (but provided by the contractor during installation of the systems)
 - Reporting mechanism in case any problems found (school director or someone responsible at school level → district service of education)
- Clinics (Tuane e Mangol, Distrito de Bilene, Província de Gaza (100 additional clinics)):
 - Electrification is welcome and appreciated.
 - System new and in good order (because of recently installed, there could be no vandalism yet).
 - Night watch by community member in turn (in Tuane)
 - FUNAE applied lessons learned in previous experience (50 schools & clinics) to this intervention, i.e. lamp reflector, AC system.
 - Uniform reporting system in case any problems found (firstly, report to the director of District → MISAU)
 - There is regular visits by MISAU
 - No user manuals provided
 - 24 hours use, especially because of refrigerators

Issues in common for solar PV system: 1) there is no one who has been trained well to handle maintenance; 2) when people faced problems (broken parts, vandalism), they couldn't not repair the system / find the same product in the close market to substitute.

- EdM (Costal de Sol, Guave, Mapulango, Momemo, Xilengue, Chihalho, Tsoveca and Nhiwane):
 - The quality of workmanship is good.
 - The design is above regional standard (size of poles, etc.)
 - There are many household that don't pay for electricity, bypassing the meter) (theft)
 - EdM has replaced 2 phase transformers with 3 phase transformers because of increased demand from the users (i.e. needs from tourism industry)
 - Typical usage (in order of importance): light (inside and outside), charging cell phones, radio, TV, fridges, freezer, ironing, (cooking)
 - Productive use (in order of importance): water pumping, little shops and restaurants (for tourists), (chicken farming)
 - gap in productive uses
 - Impact: 1) reduced living cost (less fuel dependence); 2) reduced burden of women (no need to collect fire wood, fetch water); 3) gave people chance to have future plan with income generating opportunity (as productive use)

Summary of the views heard and discussions of these views regarding: key factors affecting implementation and outcomes of ERAP negatively

- Counterpart funds

- No-objections are obtained with too much delay (FUNAE and CNELEC)
- PIU as existed during the first years of ERAP (ME), no knowledge transfer on the Bank project management to the ME staffs
- Delays in the beginning of the project (e.g. effectiveness)
- Long delays from project idea (preparation) to the start of works. Some areas were already electrified when the project arrived.
- List from line ministries (in particular education) was not up to date. This caused delays.
- Not harmonized donor procedures (MPD)
- Coordination with other donors delayed the project and caused problems (e.g. project audit).
- AfDB disbursement was not flexible and fast enough
- ERAP was a reform program, bringing international experience of the Bank, the Bank could have come up with better ideas for MZ specific context in this type of reform (ME)

Key factors affecting implementation and outcomes of ERAP positively

- No-objections by WB given without delays (EdM, Ministry of Energy)
- Separate packages for separate donors helped to speed up the process (EdM)
- Good project design, flexibility to include changes when needed such as more MV lines
- WB disbursement was swift (the national system used in EDAP is much slower) (EdM)

Assessment of Development Outcomes of ERAP

- General positive
- Project helped EdM to increase the pace of connections substantially
- ERAP has helped EDM beyond the project scope
- ERAP financed infrastructure (MV lines, transformers, LV lines) (all donors) enabled up to 120k new connections. In some areas, transformers now reach their limit as demand has grown significantly in the electrified areas.
- Electricity quality is in general good.
- Positive impact of electrification on the general economic activity
- Project build capacity in the Ministry of Energy and FUNAE
- CNELEC established and got functional
- ERAP has affected the way MinEd handles maintenance of solar PV systems and possibly also of the buildings (Incentivized other ministries for introduction of solar PV system and even more for its importance of maintenance).
- Adult literacy through night classes in electrified schools
- Project inspired MinEd to electrify with PV systems boarding schools
- Retention and motivation of staff at remote locations is better when they have electricity
- Project catalysed donor coordination (through initial difficulties and differences of opinions among donors)
- 70% of pv systems are ok. 30% with mayor problems. Quality of 12 V DC lamps is a serious problem.
- Most ERAP first phase lanterns supplied by FUNAE are broken.
- Solar PV private sector (5 to 6 firms) was developed in Mozambique also due to ERAP. It includes supply and installation and maintenance.
 - Institutional system incite private to buy own small system (copy effect)
 - Private market (= not procurement by government entity) for pico-systems, solar water heater and water pumping.
 - Nascent local PV sector is more able to compete on smaller contracts (i.e. up to USD 500k) and if local preference is applied.
 - Need to introduce feed-in tariffs to promote large solar PV investment

Risks to Development Outcomes of ERAP

- Continued assistance of WB (MinEd, ME, CNELEC) (lack of would be a risk). EDAP has reduced this risk significantly.
- Quality and maintenance of PV systems:
 - Quality and durability of solar lanterns and 12 DC bulbs.
 - Missing designation and training of school level staff for small maintenance. However, training was done at provincial (including school) level during installation of the systems. The rotation of trained people to other schools created a problem in schools where the systems was installed.
 - Delay of maintenance contract. When systems are not maintained vandalism occurs more frequently.
- Theft and vandalism.
- In the absence of a feed-in tariff, solar PV sector (with the exception of pico-systems, solar water heater and water pumping) depends on public procurement (mostly FUNAE).
- The financing of the replacement of batteries (around 40% of system cost) by line ministries.
- Overuse of pv systems (phones, tv, radio,).
- For CNELEC: Financial sustainability and GoM commitment to the new institution (policy change).

WB's performance during the project

- In general good
- no-objections took too long (FUNAE and CNELEC)
- WB is flexible with no objections, in disbursement the WB is also good (ME, EdM)
- MinEd: WB (and FUNAE) insisted the MinEd stays involved
- WB is communicative, cooperative, which helped them with the solution to problems
- Country office has sufficient staff in the areas of disbursement, procurement, and FM staff
- WB showed openness and flexibility to adapt to changes and requests (EdM)

Borrower's (ME, EdM, FUNAE, MPD, ...) performance

- Good
- MinEd: FUNAE (and WB) insisted the MinEd stays involved
- FUNAE always invites MISAU & MINED for the solar PV related capacity building opportunity

Lessons learnt from ERAP

- Consultancies must be structured so that they transmit knowledge. Wage differential of long term consultants and regular Ministry staff creates tension when they do similar jobs.
- Permanent training and capacity building is important.
 - Criteria for site selection of pv systems must include readiness of site for system, need for system, remoteness, time to arrival of EdM grid, willingness to pay (for village schemes)
- Continuous involvement by line ministries from project start.
- Local population must be involved from the beginning and have benefits from it (e.g. system for night classes, water pumping, ...).
- FUNAE now cross-checks the list of sites provided by the line ministries by visiting each indicated school/clinic to see if the site is appropriate for receiving a pv system.
- Member of institution on site should be capacitated for small maintenance.
- PV panels should not be located on the ground (danger of theft and vandalism)
- Systems and equipment should be protected physically (e.g. in a room that can be locked)
- When using fast moving components that are not in the market (like 12V DC bulbs), special care must be given to assure the availability of spare parts.
- In-house maintenance by line ministries is important. It builds sustained maintenance capacity. It allows for line ministries to follow the project more easily.
- At the beginning of the project sustainability issues must be stressed and looked at intensively (provision for financial resources in budget and for maintenance through technical staff).

- Management of safeguard issues.
- Management of contractors and oversight of the works needs to be stronger
- In order to ensure the quality of the equipment (system, lamps etc), introduced the certificate of products.
- ERAP delivered effective support because it supported different components
- Suggested areas of support: support
 - Support productive use of electricity (NORAD has an on-going program)
 - Support the creation of feed in tariffs
 - Support investment analysis on whether Grid or Off-grid is more efficient to invest in specific sites

Annex 12. Results from Questionnaire on Capacity Development

The questionnaire was distributed to staff of CNELEC, EdM, FUNAE, and ME. In total 21 (partially) completed questionnaires were received, 1 from CNELEC, 5 from EdM, 11 from FUNAE, and 4 from ME. The results are reported as percentage of respondents to each question.

Table 22: Summary of Results from Capacity Development Questionnaire

Organisation	Capacity development plan exists	Capacity development attended in plan	Skills acquired used	Skill acquired are project specific	Systems to track capacity development exists
CNELEC	100.0%	60.0%	100.0%	0.0%	100.0%
EdM	100.0%	83.3%	100.0%	0.0%	100.0%
FUNAE	100.0%	100.0%	100.0%	30.0%	100.0%
ME	100.0%	65.0%	100.0%	0.0%	0.0%
Total	100.0%	83.6%	100.0%	16.7%	84.6%

All respondents participated in at least one training, whereas 55% worked “hand-in-hand” with a consultant based in the organization. The respondents had participated in **trainings in the following areas**: Accounting; Audit and Internal Audit; Database Management; Engineering; Environmental Management; Financial Management; Monitoring and Evaluation ; Procurement; Project Management; Quality Management; Risk Management; and Rural Electrification.

They had **participated in following courses**: Accelerated Penetration of Cost Effective Renewable Energy; Advanced Electricity and Water Utilities; Assuring Quality of WB Operations in Africa; Audit – New selection tools and techniques for improving the audit process; Audit Management; Contract Management and Disbursement Monitoring; Development Planning and Environmental Management; Energy Information System and Database; Energy Policy and Management; Environmental Management; Financial Management of Donor Funded Projects; How to Treat Complaints and Client Satisfaction Analysis; International Training Program on Utility Regulation Strategy; Management of Non-Conformities and the Root Cause Analysis; Managing Reform and Regulation in the Electricity Sector; Monitoring and Evaluation for Projects; Organizational Development; Performance Indicators; Procurement of Goods and Selection of Consultants; Project Management; Regulating Quality of Service, Planning, Compliance Monitoring, and Enforcement; Requirements and Internal Audit (ISO 14001:2004); Risk Management and Audit based in Risk; Rural Electrification; and Structuring PPP Projects.

The capacity development activities **achieved the following within the respondents’ organizations**: better communication with energy stakeholders; increased performance of staff and the organization; improved knowledge and understanding of regulation; improved quality and environmental management system; improved staff skills; increased probability of achieving the objectives of the organization; and shortened response time for feedback from project colleagues.

MAP OF MOZAMBIQUE

