

Document of
The World Bank

Report No: ICR00002935

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-36850, TF-51249)

ON A

CREDIT
IN THE AMOUNT OF SDR 4.1 MILLION
(US\$5 MILLION EQUIVALENT)

AND A

GLOBAL ENVIRONMENTAL FACILITY GRANT
IN THE AMOUNT OF US\$2.0 MILLION

TO THE

REPUBLIC OF GUINEA

FOR A

DECENTRALIZED RURAL ELECTRIFICATION PROJECT

March 28, 2014

Energy Practice 2
Sustainable Development Department
Country Department AFCE2
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 24, 2013)

Currency Unit = Guinean Franc (GNF)

1 GNF = US\$0.00014

US\$1.00 = 7025 GNF

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AFD	<i>Agence Française de Développement</i> (French Agency for Development)
AfDB	African Development Bank
AGER	<i>Agence Guinéenne d'Électrification Rurale</i> (Rural Electrification Agency of Guinea)
BERD	<i>Bureau d'Électrification Rurale Décentralisée</i> (Decentralized Rural Electrification Office)
BICIGUI	<i>Banque Internationale pour le Commerce et l'Industrie-Guinée</i> (Guinea International Bank for Trade and Industry)
CDER	<i>Centre pour le Développement de l'Électrification Rurale</i> (Center for the Development of Rural Electrification)
CIGRE	<i>Conseil International des Grands Réseaux Electriques</i> (Council on Large Electric Systems)
CFL	Compact Fluorescent lamp
Club ER	<i>Club des Agences et Structures Nationales en charge de l'Électrification Rurale</i> (Club of National Agencies and Structures in charge of Rural Electrification)
CRG	<i>Crédit Rural de Guinée</i> (Guinea Rural Credit)
CP	<i>Comité de Pilotage</i> (Steering Committee)
DEF	<i>Direction des Eaux et Forêts</i> (Directorate for Water and Forestry)
DNE	<i>Direction Nationale de l'Énergie</i> (National Directorate of Energy)
DRE	Decentralized Rural Electrification
EDG	<i>Electricité de Guinée</i> (Company of Electricity of Guinea)
ENELGUI	<i>Entreprise Nationale d'Electricité de Guinée</i> (National Power Utility)
ERD	<i>Electricité Rurale Décentralisée</i> (Decentralized Rural Electricity)
ERR	Economic Rate of Return
ESMAP	Energy Sector Management Assistance Program
FERD	<i>Fonds pour l'Électrification Rurale Décentralisée</i> (Fund for Decentralized Rural Electrification)
GEF	Global Environmental Facility
GEO	Global Environment Objective
GHG	Greenhouse Gas
GNF	Guinean Franc
GoG	Government of Guinea
ICB	International Competitive Bidding

ICR	Implementation Completion Report
IDA	International Development Association
IRR	Internal Rate of Return
LIL	Learning and Innovation Loan
M&E	Monitoring and Evaluation
MHE	<i>Ministère de l'Hydraulique et de l'Énergie</i> (Ministry of Energy and Hydraulics)
MFI	Micro Finance Institution
NGO	Non-Governmental Organization
NPV	Net Present Value
O&M	Operations and Maintenance
PAD	Project Appraisal Document
PDES	Providers of Decentralized Electrification Services
PDO	Project Development Objective
PERD	<i>Programme d'Électrification Rurale Décentralisée</i> (Decentralized Rural Electricity Program)
RE	Renewable Energy
RETs	Renewable Energy Technologies
SHS	Solar Home System
SOGEL	<i>Société Guinéenne d'Électricité</i> (Electricity Company of Guinea)
STAP	Scientific and Technical Advisory Panel
UNDP	United Nations Development Program
VAT	Value Added Tax

Vice President:	Makhtar Diop
Country Director:	Ousmane Diagana
Sector Manager:	Meike van Ginneken
Project Team Leader:	Moez Cherif
ICR Co-Team Leaders:	Moez Cherif, David Vilar

REPUBLIC OF GUINEA
DECENTRALIZED RURAL ELECTRIFICATION PROJECT

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DATA SHEET

A. Basic Information			
Country:	Guinea	Project Name:	Decentralized Rural Electrification Project
Project ID:	P074288, P042055	L/C/TF Number(s):	IDA-36850, TF-51249
ICR Date:	3/28/2014	ICR Type:	Core ICR
Lending Instrument:	LIL, LIL	Borrower:	REPUBLIC OF GUINEA
Original Total Commitment:	XDR 4.10M,US\$2.00M	Disbursed Amount:	XDR 3.38M,US\$0.70M
Environmental Category: C, C		Focal Area: C	
Implementing Agencies: Bureau d'Electrification Rurale Décentralisée (BERD)			
Cofinanciers and Other External Partners:			

B. Key Dates				
Decentralized Rural Electrification Project - P074288				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	07/01/1999	Effectiveness:	06/27/2003	06/27/2003
Appraisal:	05/08/2000	Restructuring(s):		12/20/2006 5/19/2008 5/5/2013
Approval:	07/02/2002	Mid-term Review:		12/20/2005
		Closing:	12/31/2006	06/30/2013

DECENTRALIZED RURAL ELECTRIFICATION PROJECT - P042055				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:		Effectiveness:		06/06/2003
Appraisal:	05/08/2000	Restructuring(s):		12/20/2006 5/19/2008 5/5/2013
Approval:	07/02/2002	Mid-term Review:	10/24/2005	10/24/2005
		Closing:	12/31/2006	06/30/2013

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes	Moderately Satisfactory
GEO Outcomes	Unsatisfactory
Risk to Development Outcome	Low or Negligible
Risk to GEO Outcome	Low or Negligible
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 Unsatisfactory
Quality of Supervision:	Moderately Unsatisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
Overall Bank Performance	Moderately Satisfactory	Overall Borrower Performance	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Decentralized Rural Electrification Project - P074288			
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	Moderately Unsatisfactory		

DECENTRALIZED RURAL ELECTRIFICATION PROJECT - P042055			
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	Unsatisfactory		

D. Sector and Theme Codes		
Decentralized Rural Electrification Project - P074288		
	Original	Actual
Sector Code (as % of total Bank financing)		
General finance sector	30	30
Other Renewable Energy	70	70
Theme Code (as % of total Bank financing)		
Climate change	20	20
Other Financial Sector Development	20	20
Pollution management and environmental health	20	20
Rural services and infrastructure	40	40

DECENTRALIZED RURAL ELECTRIFICATION PROJECT - P042055		
	Original	Actual
Sector Code (as % of total Bank financing)		
Central government administration	10	10
General finance sector	10	10
Other Renewable Energy	70	70
Sub-national government administration	10	10
Theme Code (as % of total Bank financing)		
Climate change	33	33
Other Financial Sector Development	17	17
Pollution management and environmental health	17	17
Rural services and infrastructure	33	33

E. Bank Staff		
Decentralized Rural Electrification Project - P074288		
Positions	At ICR	At Approval
Vice President:	Makhtar Diop	Callisto E. Madavo
Country Director:	Ousmane Diagana	Aliou Mamadou Dia
Sector Manager:	Meike van Ginneken	M. Ananda Covindassamy
Project Team Leader:	Moez Cherif	Nourredine Bouzaher
ICR co-Team Leaders:	Moez Cherif David Vilar	
ICR Primary Author:	Fernando Lecaros	

DECENTRALIZED RURAL ELECTRIFICATION PROJECT - P042055		
Positions	At ICR	At Approval
Vice President:	Makhtar Diop	Callisto E. Madavo
Country Director:	Ousmane Diagana	Aliou Mamadou Dia
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ICR Primary Author:	Fernando Lecaros	

F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)

The project's development objective is to test institutional, financial and delivery mechanisms to promote better access to electricity in rural and peri-urban areas.

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

Not Applicable.

Global Environment Objectives (from Project Appraisal Document)

Promote the adoption of renewable energy technology by removing barriers and thus mitigate CO2 emissions.

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

Not Applicable.

(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 :	Whether the institutions and regulations put in place have worked reasonably well and contributed to the achievement of project objectives			
Value (Quantitative or Qualitative)	No institution nor regulations in place to promote better access in rural areas	(i) Decentralized Rural Electrification Bureau (BERD) and its steering committee have been established, are functional, and (ii) Law regulating		(i) BERD is functional and the steering committee is in place, and (ii) the law on rural electrification has

		the sector has been elaborated and submitted to Government.		been approved
Date achieved	07/02/2002	01/31/2012		09/30/2013
Comments (incl. % achievement)	Achieved			
Indicator 2 :	Individual loan collection rates, as a measure of the extent to which the project has been successful in establishing a sustainable delivery mechanism, do not fall below 75% at the end of the project			
Value (Quantitative or Qualitative)	no individual loan/grant available for decentralized rural electrification projects	Individual loan collection rates higher or equal to 75%.		Recovery ratio of 59%
Date achieved	07/02/2002	01/31/2012		09/30/2013
Comments (incl. % achievement)	Partially achieved			
Indicator 3 :	Decentralized rural electrification fund effectiveness			
Value (Quantitative or Qualitative)	no institution in place for decentralized rural electrification	(i) FERD is operational, has a sustainable source of funds (ii) 32 rural electrification conventions signed (iii) 20% of investment cost of diesel concessionaires provided by private operators (iv) 5% of invest. cost for renewable concessions provided by private operators		(i) FERD is operational and is operating with sustainable source of funds, (ii) 32 conventions have been signed, (iii) 18% of investment cost provided by private operators, and (iv) no renewable mini-concessions have been implemented.
Date achieved	07/02/2002	01/31/2012		09/30/2013
Comments (incl. % achievement)	Partially achieved			
Indicator 4 :	Increased access to electricity			
Value (Quantitative or Qualitative)	No rural household benefit from decentralized rural electrification services	(i) 30 electrified rural concessions, (ii) 86% access rate in electrified concessions, (iii) 5 rural concessions		(i) 26 electrified rural concessions are in place, (ii) 58% access rate,

		electrified using renewable energy (RE), and (iv) 12,000 rural connections established.		(iii) no rural concessions with RE, and (iv) 8,248 connections established
Date achieved	07/02/2002	01/31/2012		09/30/2013
Comments (incl. % achievement)	Partially achieved			

(b) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Avoided CO2 emissions target			
Value (quantitative or Qualitative)	0	30,000 tons CO2e		0
Date achieved	07/02/2002	01/31/2012		09/30/2013
Comments (incl. % achievement)	Not achieved			

(c) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Local consulting firms trained to develop renewable rural electrification projects			
Value (quantitative or Qualitative)	no training offered to local consulting firms or NGOs in that area	10 consulting firms trained		14 consulting firms trained
Date achieved	07/02/2002	01/31/2012		09/30/2013
Comments (incl. % achievement)	Target exceeded			
Indicator 2 :	30 Applications from entrepreneurs to BERD received and awaiting financing			
Value (quantitative or Qualitative)	No entrepreneurs involved in decentralized rural electrification	30 applications received		35 applications received
Date achieved	07/02/2002	01/31/2012		09/30/2013

Comments (incl. % achievement)	Achieved			
Indicator 3 :	Establishing long term Rural Electrification Agency (REA)			
Value (quantitative or Qualitative)	No Rural Electrification Agency	Rural Electrification Agency established by decree		REA in process of establishment.
Date achieved	07/02/2002	01/31/2012		09/30/2013
Comments (incl. % achievement)	Partially achieved, Rural Electrification Law passed in October 2013. Decree establishing AGER is currently under elaboration.			
Indicator 4 :	Average number of hours of daily electricity supply in rural concessions			
Value (quantitative or Qualitative)	0	5		4
Date achieved	07/02/2002	01/31/2012		09/30/2013
Comments (incl. % achievement)	Partially Achieved.			
Indicator 5 :	Number of pico-hydropower sites identified			
Value (quantitative or Qualitative)	0	15		49
Date achieved	07/02/2002	01/31/2012		09/30/2013
Comments (incl. % achievement)	Target exceeded			

G. Ratings of Project Performance in ISRs

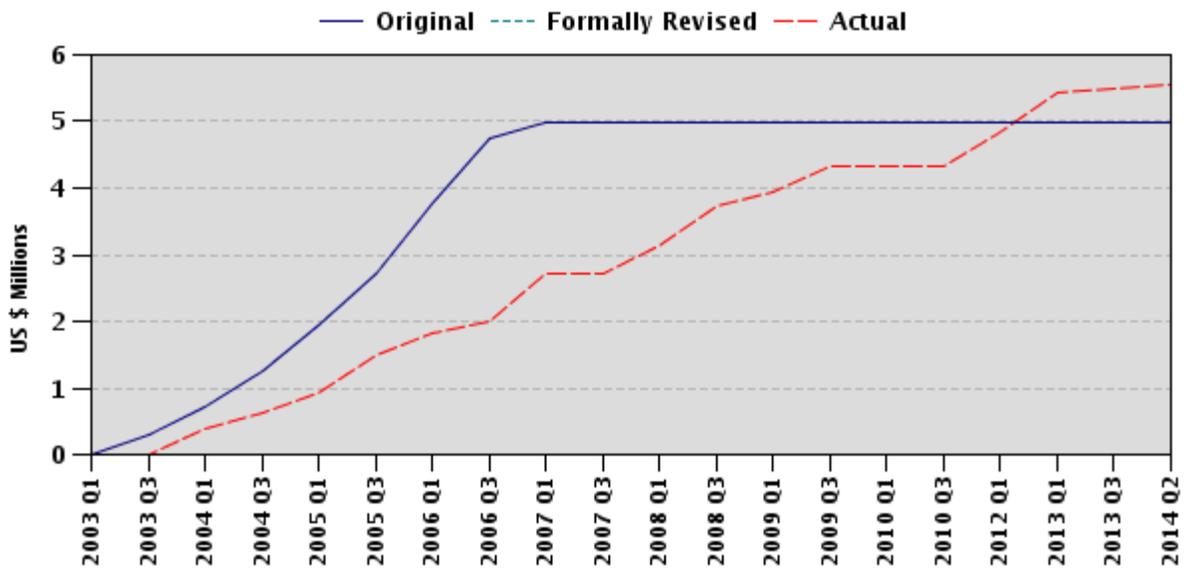
No.	Date ISR Archived	DO	GEO	IP	Actual Disbursements (US\$ millions)	
					Project 1	Project 2
1	12/13/2002	S	S	S	0.00	0.00
2	05/29/2003	S	S	S	0.00	0.00
3	12/02/2003	S	S	S	0.37	0.00
4	05/28/2004	S	S	S	0.63	0.00
5	06/30/2004	S	S	U	0.70	0.00
6	12/15/2004	S	S	S	1.01	0.00
7	06/28/2005	MU	MU	S	1.70	0.23
8	11/04/2005	MU	MU	S	1.90	0.23
9	03/21/2006	MS	MU	S	1.98	0.23
10	12/23/2006	S	MS	S	2.70	0.32
11	06/26/2007	MS	MS	MS	3.00	0.32
12	12/17/2007	S	MS	MS	3.54	0.34
13	05/31/2008	S	MS	MS	3.75	0.34
14	12/22/2008	S	MS	MS	4.30	0.34
15	06/10/2009	MS	MU	MU	4.30	0.34
16	12/22/2009	MS	U	MS	4.30	0.34
17	07/29/2011	MS	MU	MS	4.79	0.44
18	04/06/2012	MS	MU	MS	5.17	0.44
19	11/10/2012	MS	MS	MS	5.38	0.48
20	06/08/2013	MU	U	MU	5.74	0.73

H. Restructuring (if any)

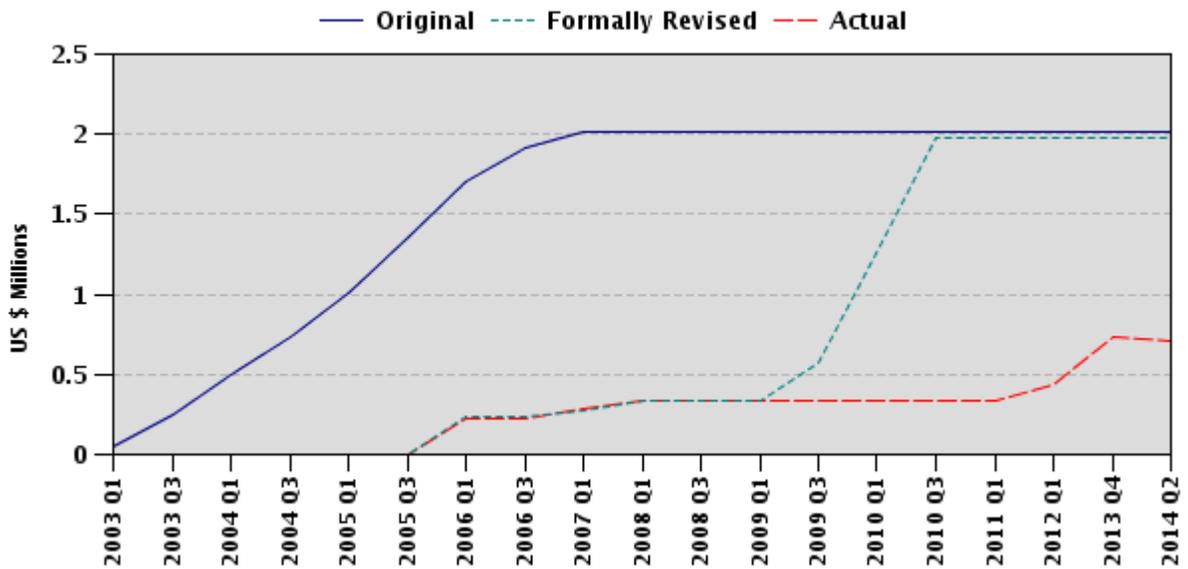
Restructuring Date(s)	Board Approved		ISR Ratings at Restructuring			Amount Disbursed at Restructuring in USD millions		Reason for Restructuring & Key Changes Made
	PDO Change	GEO Change	DO	GEO	IP	Project1	Project 2	
12/20/2006			MS		S	2.70		Extension of closing date due to delay in implementation
12/20/2006				MU	S		0.32	Extension of closing date due to delay in implementation
05/19/2008			S		MS	3.75		Extension of closing date due to delay in implementation
05/19/2008				MS	MS		0.34	Extension of closing date due to delay in implementation
05/05/2011			MS		MS	4.29		Extension of closing date further to Bank suspension of operations in 2009 and 2010 after a military coup
05/05/2011				U	MS		0.34	Extension of closing date further to Bank suspension of operations in 2009 and 2010 after a military coup

I. Disbursement Profile

P074288



P042055



1. Project Context, Development and Global Environment Objectives Design

1.1 Context at Appraisal

1. **Political context.** Guinea has had a history of authoritarian rule since independence. General Lansana Conte was in power for 24 years, from 1984 to 2008, initially through military seizure and subsequently (1993, 1998, and 2003) through elections. Upon his death in 2008, a military coup suspended the Constitution. After two years of turmoil, elections were held in 2010. Following the 2008 coup, the Bank suspended disbursements and only resumed them upon the return to civilian rule.

2. **Economy.** Guinea ranks as one of the poorest countries in the world (204th out of 213 countries in per capita income according to the World Bank Atlas). Its GNI per capita in 2002 was US\$330 and it increased to US\$460 in 2012 using the Atlas method (US\$790 and US\$980 in PPP terms, respectively). Its population at appraisal (2002) was around 8 million, which increased to around 11 million in 2012.

3. **Electricity sector.** Electric power facilities in Guinea consist of a number of separate unconnected systems. The power company, Électricité de Guinée (EDG), supplies the Capital, Conakry, and a number of smaller towns or prefectures. Mining companies and some large consumers generate electricity for their own use. In addition, there are a number of small diesel and run-of-the-river hydro stations in several towns whose operation is sporadic, inefficient and unreliable. The quality of urban electricity service is poor and consumption remains constrained by shortfalls in supply. At appraisal EDG had reverted to public sector management after being under an *affermage*¹ contract with SOGEL, a private operator. The contract failed in 2001 due to disagreements regarding tariff adjustments and cost recovery measures. The *affermage* contract was conceived to operate in urban areas and neglected the peri-urban and rural areas. Filling this gap was one of the drivers behind the project. With the assistance of ESMAP, the Government of Guinea (GoG) conducted several surveys to develop a framework for a decentralized electrification program. Taking into account the findings of the surveys, GoG adopted a new strategy for Decentralized Rural Electrification (DRE). This was reflected in a sector policy letter of February 1998 that called for: (i) establishing a regulatory framework for the DRE (applying to power plants with up to 250 kW of installed capacity), including the liberalization of tariffs on DRE delivery and services, and the elimination of import taxes and VAT on specific DRE equipment; (ii) creating a small rural electrification office, *Bureau d'Électrification Rurale Décentralisée* (BERD), for DRE planning; (iii) creating a financing mechanism (*Fonds pour l'Électrification Rurale Décentralisée*—FERD) to be managed by a local financial institution. In June 1998 the GoG promulgated the Law 97/012/AN, which allowed the financing, construction, management and operation of infrastructure assets by the private sector.

¹ An “*affermage*” contract is a type of management contract in which the contractor will be remunerated, based on the performance of the entity being managed.

4. **Access to electricity.** Less than 5 percent of the population has access to electricity; about 35 percent of urban households (the capital and large prefectures) and less than 1 percent in rural households. Rural households have no prospects of receiving electricity services from the national grid over the foreseeable future. In peri-urban areas, there are still thousands of potential consumers who are not connected to the grid for technical and/or financial reasons, who use batteries to run their TVs and lights. The reason for EDG not serving these potential rural and peri-urban clients is their small energy demand, their location far away from existing grids, and lack of resources for grid extension. Additionally, the cost of expanding power supply to the remote areas with low population densities is prohibitively high.

5. **Project concept.** The operation was conceived as a pilot project to apply lessons learned from the ESMAP Decentralized Rural Electrification Studies in several African countries (e.g. Ivory Coast, Guinea, Cameroon). The choice of instrument (Learning and Innovation Loan—LIL) reflects the exploratory nature of the project oriented towards testing and implementing approaches to rural electrification which combine private investment, community-based decentralized electrification schemes, and the promotion of renewable energy technologies (RETs).

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

6. The project development objective as stated in the Project Appraisal Document (PAD) is to test institutional, financial and delivery mechanisms to promote better access to electricity in rural and peri-urban areas. In support of that objective, the project seeks to:

- (a) Test institutions, regulations and delivery mechanisms to develop decentralized and affordable village electrification schemes; and
- (b) Test financial mechanisms to deliver increased access to electricity and mobilize private sector financing for energy projects in rural communities.

The PDO above is different from the one included in the Development Credit Agreement. The latter eliminates the concept of testing which is the essence of the LIL and adds other elements that are already encompassed in the PDO above and the GEO shown below.

7. The key indicators include: (a) whether the institutions and regulations put in place have worked reasonably well and contributed to the achievement of project objectives; (b) individual loan collection rates, as a measure of the extent to which the project has been successful in establishing a sustainable delivery mechanism, do not fall below 75% at the end of the project; (c) the decentralized electrification financing mechanism (FERD) is operational and has a sustainable source of government financing and financial support from donors; and (d) the necessary private sector financing has been mobilized to provide electricity to some 20,000 households by the end of the project.

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

8. **GEO objective:** Promote the adoption of renewable energy technology by removing barriers and thus mitigate CO2 emissions.

9. **Key indicators:** (a) increased share of renewable energy technology in electricity generation; (b) avoided CO₂ emissions of about 30,000 tons by the end of the project, as a result of photovoltaic and micro-hydro electricity use.

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

10. The PDO remained the same throughout the project. Key indicators were refined as indicated below and as documented in supervision mission aide-mémoires; however, no formal restructuring took place.

PDO Indicators		
Indicator Name	Baseline Value	End of Project Target Value
1. Whether the institutions and regulations put in place have worked reasonably well and contributed to the achievement of project objectives	No institution nor regulations in place to promote better access in rural areas	(i) Decentralized Rural Electrification Bureau (BERD) and its steering committee have been established, are functional, and (ii) Law regulating the sector has been elaborated and submitted to Government.
2. Individual loan collection rates, as a measure of the extent to which the project has been successful in establishing a sustainable delivery mechanism, do not fall below 75% at the end of the project	No individual loan/grant available for decentralized rural electrification projects	Individual loan collection rates higher or equal to 75%.
3. Decentralized rural electrification fund effectiveness	No financing mechanism in place for decentralized rural electrification	(i) FERD is operational, has a sustainable source of funds, (ii) 32 rural electrification conventions signed, (iii) 20% of investment cost of diesel mini-concessionaires provided by private operators, and (iv) 5% of investment cost for renewable mini-concessions provided by private operators.
4. Increased access to electricity	No rural households benefit from decentralized rural electrification services	(i) 30 electrified rural concessions, (ii) 86% access rate in electrified concessions, (iii) 5 rural concessions electrified using renewable energy, and (iv) 12,000 rural connections

		established.
Intermediate Results Indicators		
Local consulting firms trained to develop renewable rural electrification projects	No training offered to local consulting firms or NGOs in this area.	10 consulting firms trained
Applications from entrepreneurs to BERD received and awaiting financing.	No entrepreneurs involved in decentralized rural electrification	30 applications received.
Establishing long term Rural Electrification Agency	No Rural Electrification Agency	Rural Electrification Agency established
Average number of hours of daily electricity supply in rural concessions	0.0 hours	5 hours
Number of pico-hydropower sites identified		15 sites

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

11. The GEO remained the same throughout the project; however, as the project progressed, it became evident that the original key indicator of 30,000 tCO₂ avoided was too ambitious.

1.6 Main Beneficiaries

12. The main beneficiaries of the project identified in the PAD include:
- (a) The primary target group, which comprises rural households and rural firms (whose business is generated because of electricity availability);
 - (b) Electricity providers and investors, who develop the electricity supply business; and
 - (c) Microfinance institutions (MFIs) and the commercial bank in charge of channeling resources to beneficiaries, who benefit from the business of financing electrification schemes.

Additionally, at a more general but significant level, beneficiaries include villages that will reap economic, social, and environmental benefits as well as the country at large.

1.7 Original Components (as approved)

13. The project was designed with three components:

(a) **Capacity Building.** This component consists of technical assistance oriented towards:

- The implementing agency, BERD, in the monitoring, evaluation, dissemination and replication of activities, as well as the definition of priority areas, the evaluation of Decentralized Rural Electrification (DRE) proposals, and the coordination, supervision, and monitoring of the execution of DRE projects;
- Private providers in the identification and setting up of electricity service delivery under concession arrangements, and training in installation and maintenance of equipment; and
- Village associations, to encourage them in organizing service delivery through an operator.

(b) **Financing Mechanism and Implementation of the DRE program.** This component consists of setting up a rural electrification fund, FERD, to respond to the lack of long-term credit and the high up-front cost of rural electrification systems; it would be used to: (i) cover the operational cost of managing the BERD, (ii) provide loans to promoters of RE projects, and (iii) provide grants to promoters of RE projects.

(c) **Project coordination and management.** This component supports and strengthens the operation and the capacity of BERD to coordinate, supervise, and monitor the execution of the project with qualified staff; it includes training and the acquisition of vehicles and equipment.

1.8 Revised Components

14. The components did not change.

1.9 Other significant changes

15. The project has benefitted from three closing date extensions (for a total of six and one half years) from the original closing date of December 31, 2006 to June 30, 2008, then to December 31, 2009 and finally to June 30, 2013, further to the Bank suspension of operations in 2009 and 2010 after a military coup.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

16. The project was prepared based upon studies supported by ESMAP regarding the possibilities for rural electrification in several African countries. It also incorporated

lessons learned from other Bank projects in Guinea (the Power II Project), Sri Lanka (energy service delivery), Indonesia (solar home systems), and China (renewable energy).

17. The design recognized the limited capacity of human resources in Guinea, and allocated funds for capacity building that were oriented to the major stakeholders, including BERD staff and potential entrepreneurs, in order to ensure capable management of the supported sub-projects.

18. One of the main axes of action in the Government's strategy for the power sector was to promote decentralized electricity supply as well as mobilize private sector financing to invest in the electricity sector. Based on this strategy the Government showed its commitment during the preparation of this project by adopting a new strategy for DRE, creating the BERD for DRE planning, and establishing a financing mechanism, the FERD. Moreover, the Government also committed to cofinance US\$1.1 million; the disbursements were delayed and the Government finally only contributed US\$0.78 million.

19. The proposed financing mechanism was new in the country so a phased approach was considered. Promoting attractive rural investments was also a risk because of lack of previous evidence of profitability and sustainability; subsidizing capital costs, limiting the technology options to only the mature and commercially available ones, the creation of a steering committee with public and private institutions, as well as a specific regulatory framework, were designed to lower this perception of risk.

20. **How the project was supposed to work.** The conceptual implementation of the project at the field level can be summarized as follows:

- (a) A potential investor/operator expresses interest in putting in place an electricity production and distribution facility in a village lacking power and applies to BERD, the Government Bureau for Decentralized Rural Electrification; in most cases this is a person from the region who is interested in the business itself, as well as providing a service to improve the general welfare of the village.
- (b) BERD provides technical support and training regarding the setup and operation of the proposed facility, including basic feasibility analyses and design.
- (c) If the proposed project passes the feasibility tests, the investor/operator is awarded a concession contract by the MHE to supply electricity within a defined service area, thereby legalizing its operation.
- (d) Based on the design of the project, the investor/operator provides his equity contribution, which is deposited in the commercial bank supporting the project; the investor/operator receives a loan and a subsidy channeled through the commercial bank managing the funds on behalf of the FERD.

- (e) The BERD then provides support for procurement of equipment and works required to setup the project; the funds are disbursed directly by FERD to the suppliers and contractors involved in setting up the facility.
- (f) Once the facility is in place, including connections to clients, the operator provides electricity service on an agreed schedule, and collects payments from clients.
- (g) The operator pays back the loan during a ten-year period and the resources are made available to other projects. This particular phase of the project, i.e. the operation of the financing facility as a revolving fund, is yet to be agreed with the Government.

21. The GEF component was designed following the same methodology as stated below but with focus on RE technologies by a higher subsidy of the investment cost.

2.2 Implementation

22. **Commercial arrangements** In June 2003, the BERD entered into an agreement with a commercial bank (BICIGUI) to channel IDA and GEF funds to the private operators as loans and grants. The agreement with the commercial bank required extensive negotiations and was a major factor in the delayed effectiveness of the project. The initial concept was that the commercial bank would disburse the grants and loans, and that it would take on the risk of the latter; this was not acceptable to the commercial bank. Finally, an agreement was reached whereby the commercial bank would manage the funds for a fee. With the approval of the agreement, effectiveness was achieved in June, 2003, 11 months after Board approval.

23. The commercial arrangement proved to have flaws during implementation, as the commercial bank's fee was not tied to its performance. It was set at 4 percent of outstanding loans to sub-project operators. The commercial bank was incentivized to lend as much money as possible, but had no incentive to recover the repayments from the operators.

24. **Implementation: preparatory phase.** The project posed a major challenge to service a little-known market through an, as yet, unproved approach, involving actors with little technical expertise, and financing, putting in place and operating commercially very small electricity systems. Consequently, BERD initiated a first preparatory phase including an extensive training program, putting in place custom tools to evaluate projects proposed by private sector entrepreneurs, and instructing local consulting firms in designing, dimensioning, evaluating, and preparing business plans for the scale of assets envisaged in the program. This was achieved through seminars, workshops, study trips, and hands-on practice to gain familiarization with IT resources through technical assistance.

25. BERD also undertook the dissemination of information regarding the project in order to stimulate interest among potential entrepreneurs. This took place through

regional workshops advertised in the newspapers and local radio stations. The result was a positive response from several interested parties, who were in general either associated with, or originated from, the communities they were interested in electrifying. With a few exceptions, most of the candidates had a limited level of education and sketchy knowledge regarding the technology and possibilities for electrification of their communities. Many of the applicants were attracted by the subsidy and loan components of the project, but balked at providing their share of equity, and, as a result, they dropped out of the program. During this initial phase, training of potential investors/operators took place through on-site visits and talks, as well as sessions held at the BERD headquarters.

26. **Implementation phase.** From mid-2003, it took about two years to put in place the procedures and software for evaluating and designing projects. The first eight projects were processed in 2005. The mid-term review, conducted during three missions in July, October, and December 2005, noted that the project had entered a phase of effective implementation, with around thirty identified candidate operators. These expectations materialized partially in the following four years (2006–2009), which saw the approval of 3, 5, 10, and 6 applications, respectively each year, for a total of 32 in the whole period (2005-2009) at project closure a total of 35 applications were received. The first five projects became operational in early 2007.

27. In January 2009, the Bank suspended payments due to the December 2008 coup, and the project was put on hold until late 2010; activities were reinitiated in early 2011. During this 2 year hiatus, the BERD continued to operate (twelve projects were put in service in 2010) but the processing of ongoing operations was halted. During the 2011–2013 final phase, three new applications were processed.

28. At project closure, 35 applications had been processed, of which 32 resulted in signed agreements. 26 of the micro-grids are currently operating and 3 are still under construction (including the pico-hydro project). For the remaining three signed agreements activities never took off.

29. **The failure to execute renewable energy projects:** Under the GEF, no RET subprojects were put in service. Because the project was demand-driven, the high upfront cost of RETs discouraged local investors in developing electricity supplies with these technologies. One pico-hydro project (Bofossou) was supported but construction was not completed before the project closure and the developer is looking for alternative sources of finance to complete construction. There was also an effort to support the development of PV projects; a proposal was received and the BERD supported the developer but procurement issues led to delays and the project closed before the delivery of any PV equipment. Due to the low level of implementation of RET subprojects, only US\$427,000 of the GEF funds were disbursed from the initial amount of US\$2 million (the funds financed the development of methodologies for RET project evaluation, training, study trips, as well as a portion of the investment costs of the Bofossou pico hydro). The undisbursed GEF funds were not reallocated to other projects. Even though the GEF grant agreement does not explicitly forbid supporting non-RET projects, GEF

funds are not intended to be used to support projects, such as diesel generation, which do not reduce GHG emissions.

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

30. One shortcoming of project implementation was the delay in establishing the M&E arrangements. This is essential for a LIL, which is an instrument to promote learning. The client was therefore unable to measure the multiple effects of rural electrification through the proposed approach. Monitoring and evaluation design and implementation was recognized in the PAD as an important dimension of the project with regard to the sustainability and replicability of rural electrification projects. Independent consultants were expected to undertake two performance reviews to evaluate the implementation experience. The responsibility for monitoring and evaluation was assigned to the BERD, with the support of consultants. The areas to be covered included the economic, financial, technical, social, and environmental dimensions.

31. However, the actual monitoring activity only took place at a late stage in the implementation of the project with the assignment of a member of the professional staff responsible for executing it. Given that this operation is a LIL where new approaches are being tested, M&E is of primary importance and interest, in order to assess multiple consequences of the proposed RE strategy, such as the effect on households, on community relations, and on village economics. Moreover, the quality of the indicators defined in the PAD was poor as some of them were difficult to measure. Over the project period, the indicators were refined informally as between the Bank team and the client, however no formal modifications were made.

2.4 Safeguard and Fiduciary Compliance

32. **Safeguards.** The project did not trigger any safeguard policies. However, on the environmental front the project included training, both for consulting firms and for operators, in best practices regarding project design and operation (e.g. disposal of waste oil and used batteries and filters, evaluation of RET projects). Project studies also included social aspects (e.g. through surveys of potential users) in order to evaluate the potential impact on target communities and the affordability of the service to be offered to them.

33. **Procurement.** Procurement included two large categories: services and equipment for the implementing agency, the BERD, which required Bank no objection, and services, equipment, and works by the private sector operators, which were not subject to Bank oversight. Regarding the first category, the BERD's direct expenses other than personnel included contracting for technical assistance (including auditing services) and supplies (including vehicles); these were procured mostly through local shopping or local bidding; one large technical assistance contract was procured through ICB. Regarding the second category, the BERD supervised and escorted the private operators for procuring project requirements and prepared a procedure to be followed by the operators, with different approaches according to whether the operator had an interest as a supplier to the project, and the instructions for competitive bidding and/or

shortlisting. The BERD drew up a roster of proven local suppliers, which were invited to participate or submit bids. The BERD also assisted in choosing least cost design alternatives. In two special cases, which involved international bidding (PV equipment and mini hydro equipment), BERD assisted the operators by executing the procurement on their behalf, subject to Bank procedures. The BERD's performance in procurement aspects was constructive and instrumental in putting the sub-projects into service.

34. **Financial management.** Throughout project implementation, the financial management arrangements were implemented adequately. The audits of the implementing agency and project financial statements were submitted regularly, albeit with some delays in a few instances. Project audits did not highlight any major irregularity. Counterpart financing received from the Government was 30% below the budgeted amount, and was delayed.

2.5 Post-completion Operation/Next Phase

35. **Operation and maintenance of subprojects financed through FERD.** Operation and maintenance of the small diesel plants and their associated network financed by the project do not require any specialized skills and basic maintenance includes well-understood procedures for avoiding motor breakdown. The networks, with simple designs, do not require any special arrangements to keep them functioning. Project operators were trained through BERD's workshops. Projects visited and project operators that were interviewed during the ICR mission showed a thorough understanding of the procedures required to keep the services running. The economic and financial analysis in Annex 3 confirms that the projects are financially viable from the point of view of the investors and are likely to be sustainable at least until the useful life of equipment currently in place.

36. **Sustaining the institutional capacity.** One of the objectives of the project consists of putting in place a sustainable rural electrification agency for implementing, with the support of donors, a more extensive electrification program, which would build upon the experience gained with the project. The approval of the Rural Electrification Law in October 2013 by the National Assembly, is an important first step. The AGER is being established, but at this early stage, it is difficult to assess its sustainability.

37. **Sustaining the FERD.** The financial sustainability of the RE fund is low. To maintain DRE's momentum, it is essential to maintain the availability of FERD resources. Sustaining the FERD can be accomplished with resources from the repayment of loans, and fresh funds from alternative sources. When the project was designed, the destination of funds recovered from repayments of loans was not taken into account. The logical design for sustaining the FERD would be to recycle the repaid funds into new projects, thereby creating a revolving fund for a portion of its loans. The PAD does not mention this concept; in fact, the BICIGUI-Government subsidiary agreement mentions the recovery of funds in connection with the repayment by GOG of the IDA loan. The PAD conceived FERD as being fed with fresh resources from Government and donors, which makes sense, given the success in co-opting private sector entrepreneurs into providing RE services. Consequently, sustaining the FERD will require improving its current

management arrangements: (a) renegotiate the subsidiary agreement with BICIGUI to provide an incentive to recover loan payments from operators, thereby improving the fund's sustainability; (b) revise the FERD rules in order to allow recycling repaid funds to new projects (revolving fund); and (c) develop and implement a plan to disburse fresh resources from Government and donors into the FERD.

38. **Recovering the loans.** The principal issue regarding the sustainability of the decentralized electrification concept sponsored by the project lies in the poor recovery ratio (only around 59%) of outstanding loan obligations. Currently, BICIGUI is responsible for loan recovery of obligations, which extend until 2023, but this will require covering the bank's fees, and BERD does not have the corresponding resources. This requires a prompt solution within the scope of a renegotiation of the BICIGUI agreement, possibly with IDA support.

3. Assessment of Outcomes

39. To assess project outcomes it is necessary to recall that the project was conceived as a LIL. Implicit in this choice are factors involving uncertainty and risk, as evidenced by the Bank's definition of a LIL: "LILs are loans of US\$5 million or less, financing *small, experimental, risky and/or time-sensitive* projects in order to pilot *promising* initiatives and build consensus around them, or experiment with an approach in order to develop locally based models prior to a larger-scale intervention. LILs are predominantly used in sectors or situations in which behavioral change and stakeholder attitudes are critical to progress, and where 'prescriptive' approaches might not work well"; it further adds: "A LIL focuses on experimentation, learning and piloting in search of possible developmental solutions, prior to potential larger-scale operations."

40. The final outcomes which ultimately provide the frame of reference for rating the project consist of benefits to consumers including, among others, extended leisure and study hours from improved lighting, savings from reducing kerosene purchases, avoided indoor pollution by eliminating smoke from lamps, and communications benefits derived from facilities such as TV, radio, and cell phone charging. These benefits are quantified and analyzed more closely in Annex 3, where it is shown that the DRE approach is well justified from an economic standpoint.

3.1 Relevance of Objectives, Design and Implementation

Rating: High

41. **Objectives.** Electrification is essential for Guinea's priorities given that its economic strategy includes developing programs with high export potential (tourism, trade, crafts) engaging the private sector. The project's objectives of testing institutions and mechanisms for the private sector to deliver electrification to off-grid communities is

fully coherent with the goals adopted jointly by the country and by the Bank through the CPS for underpinning economic growth².

42. **Design.** Orienting the project towards rural areas is consistent with seeking to reduce the disparities between urban and rural areas, as geographic location is the primary determinant of poverty in Guinea. Designing the project based upon engaging the private sector is a realistic approach for introducing electricity to areas where coverage is practically nil and where extending the main grid is neither economical nor feasible due to the lack of resources. The detailed design was conceived as a small scale but realistic application of procedures and principles to achieve the PDO objective of testing a private sector led approach to rural electrification in order to gain insight into its advantages, drawbacks, and limitations, all of which are relevant for further large scale reproduction.

43. **Implementation.** Putting in place the project was relevant: it responded to the objectives and design and managed to attract interest from entrepreneurs. Project management focused on helping the entrepreneurs to put in place a service which would be economically designed and well-managed, providing the level of service associated with a very basic setup which would nevertheless be relevant to the communities involved. Insofar as the sub-projects are economically successful (with ERR of 60%), they provide a showcase for replication in different villages.

3.2 Achievement of Project Development Objectives and Global Environment Objectives

Overall Rating: Moderately Unsatisfactory

Achievement of Project Development Objectives

44. The project achieved its PDO (for the IDA LIL) as a pilot project to demonstrate the opportunities and limitations for advancing RE to promote access to electricity in rural and peri-urban areas, where connecting to the grid is not economically feasible. The PDO consists of (a) Testing institutions, regulations and delivery mechanisms to develop decentralized and affordable village electrification schemes; and (b) Testing financial mechanisms to deliver increased access to electricity and mobilize private sector financing for energy projects in rural communities.

45. **Outputs and outcomes.** Given the scope of a LIL, the specific numerical key indicators should be considered as guideposts for project outputs, rather than measures of success, and must be evaluated in terms of the information they provide as a guide to future efforts using a similar approach.

46. Based partly on the results, the PDO achievement can be qualified as follows:

² The Bank's 2014–2017 Country Partnership Strategy (CPS) for Guinea dated September 4, 2013, was endorsed in October 2013.

47. ***Whether the institutions and regulations put in place have worked reasonably well and contributed to the achievement of project objective:*** The regulations through which the projects are operating have proven to be successful in providing the legal assurance for decentralized projects to be financially sustainable, as evidenced by the continued operation of all sub-projects. The BERD and its steering committee are functional and have proved that they are capable of supporting rural electrification projects following the original concept as demonstrated by the execution of 26 rural electrification projects which are in service. The National Assembly adopted the rural electrification law for the sector in October 2013 but the decrees of application were not yet developed, for example to transform the BERD into a permanent Rural Electrification Agency. It can be concluded that the organization and institutions developed through the project have been working well.

48. ***Individual loan collection rates, as a measure of sustainability, do not fall below 75% at project end:*** This is an important weakness of the project. Loan collection rates at the end of the project were on the order of 59%. This indicates that the financial mechanism for recovering the loans to project operators/investors has important weaknesses in its design and cannot sustain a revolving fund for further electrification using the proposed decentralized procedure.

49. ***The decentralized rural electrification fund financing mechanism (FERD) is effective.*** Regarding the financial vehicle for channeling funds to entrepreneurs, the project shows that the “subsidy plus loan” concept is effective in sparking private sector interest for developing and managing off-grid projects in villages. The project facilitated the testing of the management of the financial scheme, and it evidenced as a major obstacle the need to address effective mechanisms to recover a satisfactory percentage of outstanding financial obligations, without which the concept behind the project is impracticable. The results at project close are as follows:

- (a) *FERD is operational and has a sustainable source of funds:* the Government had agreed to provide support through Budget allocations, but its contribution during project execution was only 71% of the level expected when the project was designed. Donors can be expected to support the Fund, but they should be complementary resources. The fund could function as a revolving fund but this is still under discussion with the Government.
- (b) *32 rural electrification conventions signed.* 26 projects were financed and are operational; three other projects were approved and are underway—including a pico-hydro project—which require further financing from sources other than those of the project. This represents a 90% achievement rate (29/32), which can be qualified as satisfactory; it also supports the feasibility hypothesis regarding the proposed approach.

- (c) *20% of investment cost of diesel mini-concessions provided by private operators.* Private providers contributed 18% of total investment cost (84% achievement of the target).
- (d) *5% of investment cost for renewable mini-concessions provided by private operators.* Given the absence of renewable projects, this indicator was not achieved. However, one pico hydro (Bofossou) was partially funded by the project but was not completed before project closure; for this project, the private entrepreneur provided 5.1% of the cost.

50. ***Increased access to electricity.*** Household electrification is achieved when the electricity service uses modern lighting (like CFL) to replace non-electrical lighting (like kerosene lamps or candles). When compared to alternative solutions based on kerosene or batteries, electricity delivered to end users is affordable despite a high price per kWh. Project areas of intervention (rural concessions) are non-electrified villages, therefore with no access rate to electrification. The results at project close are as follows:

- (a) *30 electrified rural concessions:* 26 projects are operating at the end of project. Three more are underway.
- (b) *86% access rate in electrified concessions.* The access rate achieved in electrified concessions is currently 58%. It is lower than the target because business plans overestimated poor people's ability to pay for electricity and underestimated the cost of electrification in rural areas where houses are quite spread-out.
- (c) *5 rural concessions electrified using renewable energy.* At the end of the project there were no electrified concessions using renewable energy. This result is considered a significant shortcoming of the GEF project, given the expectation at appraisal that 'the Project would have demonstrated RETs to be a viable business opportunity'.
- (d) *12,000 rural connections established.* The sponsored projects have 14,116 available connections, of which 8,248 are being used; the balance is expected to be completed within the next two years.

51. Two intermediate results indicators are worth mentioning: 14 consulting firms, compared with a target of 10 were trained; and 35 applications were received from entrepreneurs and are awaiting financing, as compared with a target of 30.

52. Based upon these considerations, the project achieved its PDO as a pilot project to test a risky approach and to demonstrate its possibilities and limitations for advancing RE in an economically poor country in areas where connecting to the grid is not economically feasible.

53. The achievement of the PDO for the IDA LIL is rated as **Moderately Satisfactory**, which takes into account that some indicators are partially achieved.

54. This rating is higher than the rating in the last ISR. When the ICR team examined the indicators of the project, some of them had increased from the date of the last ISR (i.e. 32 rural electrification concessions signed instead of 30, 26 rural concessions implemented instead of 22, 58% of access rate instead of 56% and 14,116 connections instead of 8,800). The majority of the target values were substantially achieved; therefore, the achievement of the PDO merited a better rating.

Achievement of GEO objectives

55. GEO objectives consisted of:

- (a) *Removing barriers to the adoption of RETs.* Regarding the reduction of barriers to RETs, (i) the training sessions conducted through the project included instruction on RETs, and (ii) the project facilitated the identification of 49 pico-hydro sites, which could be developed in the future.
- (b) *Reduction of GHG emissions.* The revised key indicators consisted of an increased share of RET in electricity and a reduction of 5800 tCO₂. At project closure no RETs associated with the project had been put in service and no GHG emissions had been reduced.

56. The two GEO objectives were complementary, as removing barriers to the adoption of RETs (by providing long term financing) was expected to lead to putting in place RET projects and hence reducing GHG emissions. As a part of the LIL, the project allowed for testing the financial mechanism to develop RET projects as well as identifying reasons for failing to put any in place. Nevertheless, the achievement of GEO objectives was practically nil.

57. Based on the major shortcomings described above, the achievement of the GEO objective is rated as **unsatisfactory**.

58. Combining the ratings of the achievement of the PDO and the GEO, and giving more weight to the PDO rating (due to the larger size of the IDA financing), the achievement of the overall Project Development Objectives is rated as **Moderately Unsatisfactory**.

3.3 Efficiency

Rating: Highly Satisfactory

59. **The DRE approach is well justified economically.** The economic Net Present Value of the project is US\$6 million and the economic Rate of Return (ERR) is estimated to be 60%. This compares favorably with the ERR estimated in the PAD of about 7.75%.

This large difference can be explained because the ICR used a different methodology from the PAD; the latter was done using the so-called incremental cost approach, which was developed by GEF to evaluate RET projects, and it did not account for consumer surplus (indeed, the PAD states that “the project benefits will be somewhat understated”). The ICR methodology takes into account consumer surplus, and the high economic return is a result of the very large benefits from the replacement of traditional lighting through kerosene lanterns as well as the willingness to pay for new services, such as television, which are possible through electricity supply. From the standpoint of quality of the service, a kerosene lamp only produces around 10% of CFL luminance. Moreover, regarding the costs, monthly kerosene charges are three times CFL consumption.

60. **The sub-projects are financially justified for the private sector operator, but they require subsidies.** Considering the capital costs and O&M costs of the operators and the sales and tariffs charged to the consumers, as well as the PERD subsidies, the NPV financial return to operators is US\$61,000 and the rate of return is 14% in a timeframe from 2006 to 2020. Without the subsidies the NPV and the rate of return are both negative (minus US\$1million and minus 2%, respectively). This is not surprising given the relatively high cost of rural electrification, irrespective of the technology used.

3.4 Justification of Overall Outcome and Global Environment Outcome Rating **Rating: Moderately Unsatisfactory.**

61. Despite the high relevance of the objectives, design and implementation and the highly satisfactory efficiency for the project, the moderately unsatisfactory achievement of the PDO and GEO combined leads to an overall outcome rating of **Moderately Unsatisfactory**.

3.5 Overarching Themes, Other Outcomes and Impacts

Poverty Impacts, Gender Aspects, and Social Development

62. sub-projects that have been put into service have had significant social and poverty-related impacts by improving living conditions for users. Visible benefits include improved leisure hours, access to communications services, refrigeration in small shops, and community activities through shared facilities such as the so-called video clubs, as well as powering equipment of health facilities. This is an important contribution to the Government’s poverty reduction strategy, particularly in rural areas, where it is most visible. Gender issues were not reflected during the preparation stage, nor was the gender impact monitored during the major part of the implementation of the original project.

Institutional Change/Strengthening

63. The project has provided the basis for strengthening the rural electrification activities under the MHE, including the approval of the Rural Electrification Law. With the project’s resources, the BERD has been able to put in place a qualified team which is

more prepared for managing donor resources, once the Rural Electrification Agency is established.

Other Unintended Outcomes and Impacts (positive or negative)

Not Applicable.

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

Not Applicable.

**4. Assessment of Risk to Development Outcome and Global Environment Outcome
Rating: Moderate**

64. The different activities of the project present the following risk profiles which cumulatively are assessed as moderate:

- (a) On the learning front, there is a substantial appropriation of knowledge at the level of the BERD concerning the challenges and pitfalls of rural electrification and the means to address them, and the capacity thereby acquired can be conserved by judicious governance. Losing this knowledge could come about through a return to political instability; however, Guinea's prospects in this regard appear to be improved.
- (b) The financial mechanism which has been put in place through the FERD is likely to be more successful when reforms to improve its sustainability are put in place, including support from other donors and GoG.
- (c) The risk associated with investments in electrification sub-projects is low, given the diversification among multiple small companies. Whereas some of them may fail for different reasons, such as mismanagement, most are being managed with private sector criteria by trained operators and, as a group, and are unlikely to fail.
- (d) Related to GEO, the decreasing cost of RETs and the first experiences in RE rural electrification in the region provides better prospects for the implementation of new RE projects. However, there is still a need to partially subsidize upfront costs and the difficulty of obtaining such subsidies makes this risk moderate.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: Moderately Satisfactory

65. The project addressed a critical issue in terms of its strategic relevance for the economic development of Guinea. Electricity supply had been addressed previously in the context of the national power company (including a brief period of privatization) but addressing access, particularly in rural areas, required an innovative approach. Moreover, the operation was conceived as a pilot project to apply lessons learned from the ESMAP

Decentralized Rural Electrification Studies in several African countries. The choice of the LIL instrument correctly reflected the need to test a decentralized approach to access to electricity in rural areas which combined private investment, community-based decentralized electrification schemes before a more comprehensive effort was attempted.

66. The project tested the appropriateness of RETs for rural electrification, an alternative that had been promoted in other Bank projects, given their small scale and the possibility of installation in non-interconnected areas, together with their possible environmental impact. The project concept for pico hydro development lends itself to a decentralized approach but, for photovoltaic energy, it is not as straightforward since it involves the high cost of SHS installation.

67. Project preparation also took into account the social impact that rural electrification would have on communities lacking electricity service. Implementation arrangements were designed to fit the decentralized concept, including the identification of the commercial bank to manage the electrification fund.

68. Although monitoring and evaluation arrangements were designed and the specific dimensions to be supervised were well identified, the results framework was poorly defined and thus was difficult to measure properly. Additionally, while project risks were identified during preparation, including the risk of low recovery of loans, in retrospect the proposed mitigating measures were not bold enough.

69. Based on the foregoing, Bank performance during identification, preparation and appraisal of the project is rated **Moderately Satisfactory**.

(b) Quality of Supervision

Rating: Moderately Unsatisfactory

70. The Bank undertook 11 supervision missions during project implementation period. Following effectiveness (June 2003), the first mission took place in October 2004, during which a workshop was held with the project staff to determine the strategies and procedures needed to attract operators. Given the complexities associated with this previously untested approach, earlier support by the Bank would have allowed the project to move ahead more rapidly. Subsequent missions, including the mid-term review undertaken in 2005, should have noted the poor progress being made by the RET projects and proposed alternative approaches, including restructuring this component of the project to respond to the lack of progress.

71. During the 2009-2011 political hiatus, project supervision decreased. The lack of progress of the RET component was only discussed with the GoG after 2011, when there was little time left to complete the single pico hydro project. At an earlier stage, the Bank team should have revisited the PV component and adapted it to the then present circumstances with a view to improving implementation.

72. As it is well documented in the supervision aide-memoires, key indicators were refined to better assess the reality on the ground. However, no formal modifications of the results indicators took place, even though two closing date extensions were granted. Similarly, the client pointed out that one of the obstacles to implementation was associated with the low thresholds for establishing the procurement method and although this was recognized by both BERD and the Bank, the thresholds remained unchanged throughout the project.

73. The Bank provided regular performance reporting and supervised project execution closely. However, there was a delay in establishing a monitoring and evaluation in place at BERD until late in the project and the Bank team did not emphasize it from the beginning of the project. Moreover, the client indicated that the Bank's interventions, such as no-objections, were considerably slow.

74. Based on the strong technical supervision and some shortcomings in M&E supervision and no earlier actions on renewable energy, the Bank's supervision quality is rated as **Moderately Unsatisfactory**.

(c) Justification of Rating for Overall Bank Performance

Rating: Moderately Satisfactory

75. The rating reflects both the preparation and supervision ratings.

5.2 Borrower Performance

(a) Government Performance

Rating: Moderately Unsatisfactory.

76. The Government supported the project and maintained the agency's staff even during the political upheaval and Bank suspension period. Regarding key legislation associated with the project, the approval of the Rural Electrification Law and the establishment of the Rural Electrification Agency faced serious delays. However, the Government did not consider the pilot nature of the project which implied scaling up the intervention to a nation-wide level, making FERD sustainable and transforming BERD into a permanent Agency for Rural Electrification. Currently there are no prospects to replicate the approach in the country.

77. The Government's planned financial participation in the project was US\$1.1 million, however, the government's counterpart financing amounted to only US\$0.78 million at project close.

78. Finally, the economic environment of the project, which was important for project success, was characterized by high inflation which impacted the project negatively, particularly for sub-projects executed between 2006 and 2008. In addition, reduced taxes and import tariffs needed to support the project were granted with significant delays, due to disputes with customs authorities.

79. Given the above mentioned significant shortcomings, the Government's performance is rated **Moderately Unsatisfactory**.

(b) Implementing Agency or Agencies Performance

Rating: Moderately Satisfactory

80. The BERD was committed to project execution and was strongly involved in all aspects of implementation. Fiduciary responsibilities were discharged according to the rules set out in the Credit Agreement. In particular, the BERD's performance in procurement aspects was constructive and instrumental in putting the sub-projects into service. However, there were delays in project implementation as a result of the exploratory nature of the project. Although the project implementation period was 10 years (albeit with a 2-year interruption due to political reasons), the outcomes of the PDO were almost achieved and BERD succeeded in creating and establishing all the procedures for project implementation. The GEO objectives were not met, but the lack of experience on RET in rural areas in the country, the small scale of the systems and the high capital costs of RET, made the implementation of this component very challenging and resolving those challenges was not always within the full control of the BERD.

81. However, monitoring and evaluation procedures were also implemented late in the project and lacked coverage of social outcomes of electrification, which would provide valuable data for project continuation. Moreover, the BERD did not succeed in making the FERD sustainable.

82. Overall, the commitment of BERD to the learning objectives of the project was strong and the shortcomings in performance noted above were often outside of its direct control. The implementing agency performance is therefore rated **Moderately Satisfactory**.

(c) Justification of Rating for Overall Borrower Performance

Rating: Moderately Satisfactory

83. Considering that the shortcomings from the Borrower's side had limited impact on the PDO achievement, which was accomplished mainly thanks to the dedication and continued work of the BERD, the shortcomings are considered minor and, therefore, the overall performance of the Borrower is judged to be **Moderately Satisfactory**.

6. Lessons Learned

84. The project provides several lessons that can provide useful guidance in preparing similar operations.

Lessons specific to LIL Operations

85. LIL projects are designed and prepared with a degree of uncertainty in some aspects, including the choice of approach, technology, and financing. During the

preparation phase allowance should be made for these characteristics; in particular, the project team should be on the lookout for those aspects that require on-course adjustment. Examples from the PERD include: the low collection rate, which should have been a red light signaling the need to examine the commercial bank incentives; and the lack of RET interest, which suggested the need for an alternative approach. Also, the transformation of FERD into a revolving fund could have been addressed well before project closure. The mid-term review would have been an appropriate moment for addressing these issues.

86. During project execution of a LIL, the learning component is the most important goal. Consequently, a LIL should have a well-designed M&E framework, with regular reporting, in order to internalize the learning experience of the project, with a view to applying this experience in similar contexts, either within the country or elsewhere.

87. The M&E of an electrification-oriented LIL should not be limited just to the technical aspects of the project, but should also try to assess ultimate outcomes in terms of the social and economic consequences within the beneficiary communities. As a consequence, M&E budgetary provisions should be committed during project preparation and the M&E results should be closely monitored during supervision.

2. Lessons specific to Rural Electrification and RET Operations

88. Implementation of RETs should take into account their high capital costs, together with the greater demands and risks on operators. As a result, PV projects would not appear to be well suited to a decentralized approach where small private operators undertake electrification at the village level. Other models, such as the dealer model or the *concessioning* of services to a large enterprise, may have better prospects of success because more experience and resources can be provided by larger firms, as evidenced by the satisfactory implementation of other Bank-supported projects in poor countries (e.g. Nicaragua and Bolivia).

89. The PERD is a good example of blending equity, loans, and subsidies to achieve effective electrification in remote rural areas. The actual proportions of these inputs must be adapted to specific circumstances. During PERD execution it came to light that the proportion of loan plus subsidy required was higher than initially estimated, and this would have signaled the need to track loan payback rates more closely to ensure sustainability of the approach.

90. An innovative pricing approach contributed to the success of the sub-projects financed through the FERD. Rather than rely on traditional metering, the sub-project concessionaires were able to charge for their services on the basis of tangible benefits (i.e. per lamp outlet, per TV outlet etc.); although this is not an orthodox approach (and can be criticized from a strict economic viewpoint), it is better adapted to commercializing electricity supply in a rural community where the notion of “purchasing kWh” might be too abstract and viewed with suspicion.

91. Projects in which private financial institutions are expected to play a significant role during implementation should include a detailed assessment with potential interested commercial banks about the conditions under which they are expected to perform,

aligning the incentives of the institutions with those of the project. Specifically, the fees for the commercial bank and their relation with loan recovery should be identified and agreed, at least in regard to key aspects, during preparation. In future similar operations, an incentive related to loan recovery should be established and prioritized in the contract with the commercial bank.

92. Project preparation should include realistic expectations with respect to physical objectives and their implementation times. The PERD was too optimistic in this respect (e.g. it had a goal of 5000 SHS in 50 villages). Realistic financial schemes related to RETs in rural areas should always be part of the analysis.

93. Critical assumptions with respect to sustainability should be validated during project preparation through consultations. In the case of PERD, the assumption concerns the prospects for repayment of loans in rural settings and the procedures for mitigating this risk.

94. In recent years, the RET ‘learning curve’ has been high, costs have been reduced dramatically, and several examples in Sub-Saharan Africa have become a reality. As financing schemes have started to prove successful and an enabling environment is created, a similar approach could be replicated in Guinea but focusing on RETs. However, as these technologies are not yet commonly used, more preparatory work would need to be carried out.

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

(a) Borrower/implementing agencies

Borrower provided input to the ICR, in the form of collected data and its own completion report (summarized in Annex 5) but did not comment on the draft ICR.

(b) Cofinanciers

Not Applicable.

(c) Other partners and stakeholders

Not Applicable.

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in US\$ Million equivalent)

Decentralized Rural Electrification Project - P074288 and P042055			
Components	Appraisal Estimate (US\$ millions)	Actual/Latest Estimate (US\$ millions)	Percentage of Appraisal
1. Capacity Building	2.20	1.40	64%
2. FERD	11.30	2.21	20%
3. Project Coordination &Mgt	1.55	2.56	165%
PPF	0.15	0.15	100%
Total Baseline Cost	15.20	6.32	42%
Physical Contingencies	0.80	0	
Price Contingencies	1.00	0.50	
Total Project Costs	17.00	6.82	40%
PPF	0.00		
Front-end fee IBRD	0.00		
Total Financing Required	17.00	6.82	40%

(b) Financing

Decentralized Rural Electrification Project - P074288 and P042055				
Source of Funds	Type of Financing	Appraisal Estimate (US\$ millions)	Actual/Latest (US\$ millions)	Percentage of Appraisal
Borrower		1.10	0.76	69%
International Development Association (IDA)		5.00	5.32	106%
Global Environment Facility (GEF)		2.00	0.43	22%
Local Sources of Borrowing Country		8.90	0.62	7%
Total		17.00	7.13	42%

Annex 2. Outputs by Component

Component	Outputs (PAD)	Outputs Achieved
1. Capacity Building	<p>Technical Assistance provided to BERD in monitoring, evaluation, dissemination, and replication of activities</p>	<p>a. BERD staff training:</p> <p>35 seminars instructing personnel on procedures and software related to their functions.</p> <p>Seven workshops, which included an exchange of experiences among RE experts, two of which were organized in Conakry.</p> <p>Three study trips (Paris CIGRE, Morocco CDER, Burkina Faso CLUB-ER)</p> <p>Hands-on training provided by developers of software: use of software for project evaluation, use of Visual Basic, use of geographic system, five sessions on the use of design tools for pico-diesel, pico-hydro and PV.</p> <p>b. Training for BERD partners (private operators, consultants, FERD staff):</p> <p>Operators: Seven sessions of training were held related to small enterprise management and their operation in a rural setting. Regarding the teams associated with the operators, training was also provided, principally on-site when visiting the projects; the subjects encompassed management, maintenance and follow-up of production equipment.</p> <p>Consultants: 11 consultants to support the operators for feasibility studies were trained in the use of software and financial modeling of business plans. Specific training in small hydro was also provided.</p> <p>FERD staff: two information/training sessions were organized to train the staff in the processing of applications and the financial indicators to be used.</p> <p>A total of 74 information/training sessions were organized by BERD.</p>
2. Financing mechanism and Implementation of the Decentralized Rural Electrification Program	<p>Financing mechanism for the PDES is setup</p> <p>Sustainable replicable schemes for the provision of electricity services at the community</p>	<p>The FERD was setup and is being managed by BICIGUI, a commercial bank.</p> <p>35 applications were processed from the second half of 2005 to project closure in 2013. 26 operators are functioning and providing rural electricity service. Investments in the different RE projects amounted to around US\$3.1 million, of which US\$2.6 million were</p>

	<p>level are implemented.</p> <p>The new regulatory framework for the decentralized electrification sub-sector is in place.</p> <p>A learning and evaluation system is established to draw lessons from the project.</p>	<p>provided by the FERD and US\$0.5 million was provided by the operators/investors.</p> <p>Rural Electrification Law was adopted by the National Assembly in October 2013</p> <p>M&E organization was implemented late in project cycle</p>
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Annex 3. Economic and Financial Analysis

Economic analysis

There is a very low rate of rural electrification in Guinea (around 5 percent), with most rural households meeting their lighting and small power needs with kerosene and dry cell batteries. The following benefits result from the availability of electricity in a home: (a) improvements in lighting quality and quantity extend the working day and allow for income-generating activities after dark, and lead to better conditions under which children can read and study, (b) access to radio and television, (c) reduction of indoor pollution, contributing to improved health, and (d) access to refrigeration (small refrigerators) with food conservation benefits.

User data. The levels of service were classified by the BERD as follows:

Table A3-1

Service Levels	CFLs	TV outlets	Refrigeration Outlets	Percentage users (approx.)
S0	1	0	0	35%
S1	1	1	0	25%
S2	2	0	0	10%
S3	2	1	0	7%
S4	2	0	1	5%
S5	3	0	0	4%
S6	3	1	0	4%
S7	3	0	1	2%
S8	4	0	0	5%
S9	4	0	1	2%

This classification reflects the way the service is marketed. Rural concessionaires bill by the type of use (i.e. they don't measure and bill electricity consumption directly). The overwhelming use of electricity corresponds to lighting needs, with some outlets for TV use or minor appliances. Electricity service in communities powered by diesel units provides between 4 and 5 hours of power a day (typically from 7pm to 11:30pm). Refrigeration outlets correspond to commercial users (store owners) who use electricity to cool drinks.

The analysis was based on data from 28 subprojects, whose characteristics are summarized in Table A3-2.

Table A3-2 Subproject Characteristics

N°	Project	Capacity (kVA)	Available Connections	Actual Connections	Investment (US\$)	Cost per Available Connection (US\$)	Cost per Actual Connection (US\$)	MONTHLY TARIFFS (US\$)		
								Lamp	TV outlet	Fridge outlet
Pico-diesel										
1	Kolaboui	83	575	442	84,090	146	190	2.17	3.25	6.51
2	Maréla	40	411	316	48,366	118	153	4.34	n/a	8.68
3	Koumbia	60	588	269	62,060	106	231	2.17	n/a	14.47
4	Gouécké	60	817	373	68,410	84	183	4.34	7.23	13.02
5	Tougnifili	60	550	250	78,754	143	315	2.89	5.79	8.68
6	Timbi Tounni	60	469	262	80,457	172	307	2.17	5.06	7.23
7	Saraya	45	242	193	47,016	194	244	2.17	4.34	6.51
8	Banankoro	250	750	501	173,516	231	346	5.06	n/a	13.74
9	D. Touma	50	332	247	59,470	179	241	2.17	7.23	9.40
10	Bankalan	40	226	175	51,818	229	296	3.62	n/a	7.23
11	Koundian	60	502	405	89,332	178	221	4.34	6.51	8.68
12	Banko	50	403	180	79,870	198	444	2.17	3.62	6.51
13	Kpao	30	358	150	48,775	136	325	4.34	n/a	5.79
14	Dounet	30	250	200	42,767	171	214	2.17	3.62	6.51
15	Senko	160	800	530	161,611	202	305	4.34	7.23	13.02
16	Goyala	20	127	127	40,739	321	321	2.17	2.89	5.79
17	Léro	80	651	470	89,415	137	190	3.62	n/a	12.30
18	Kakoni	60	505	303	81,477	161	269	2.17	n/a	10.13
19	Cisséla	30	263	185	67,620	257	366	2.17	3.62	6.51
20	Soulouta	30	422	253	50,038	119	198	4.34	n/a	6.51
21	Diécké	180	1909	420	185,631	97	442	4.34	n/a	13.02
22	Boola	60	517	310	85,231	165	275	2.60	9.40	14.47
23	Kouroukoro	50	360	216	67,952	189	315	2.17	3.62	6.51
24	Dialakoro	40	480	240	60,982	127	254	2.17	3.62	6.51
25	Kalexé	45	465	260	79,782	172	307	2.17	3.47	6.94
26	Daralabé	20	154	86	39,034	253	454	3.04	5.06	8.68
27	Kambaya	20	192	107	43,646	227	408	2.60	5.06	8.68
28	Koundianakor	30	373	209	69,550	186	333	2.6	n/a	7.2
Total			13691	7679	2,137,406	156	278			

Characteristics of the project based on Table A3-2 are shown in Table A3-3:

Table A3-3 Main Project Features

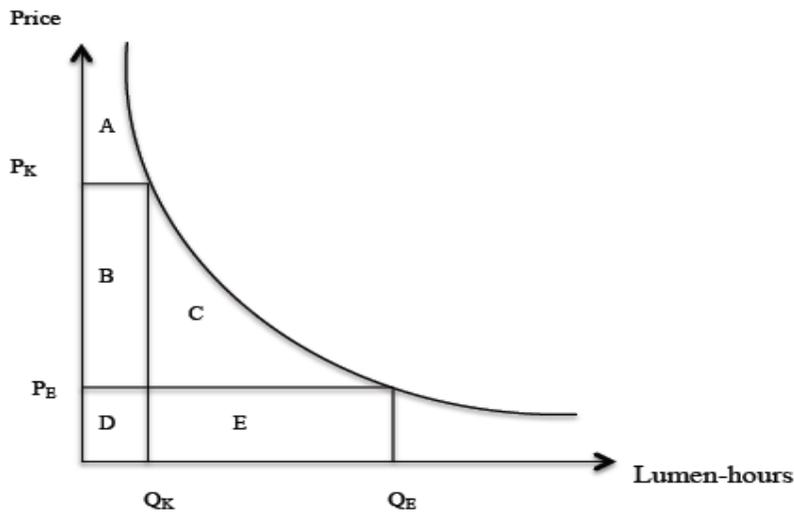
	Average	Max	Min	Median
Cost per available Connection (US\$)	156	321	84	172
Cost per achieved connection (US\$)	278	454	153	301
Tariff per lamp per month (US\$)	3.32	5.06	2.17	2.60
Tariff per TV outlet per month (US\$)	5.44	9.40	2.89	4.70
Tariff per fridge outlet per month (US\$)	10.04	14.47	5.79	7.96

Lighting benefits. Expenditures on kerosene amount to a cost of around 44 liters per year per lamp, at a price of US\$1.50 per liter, in addition to the purchase price of the lamp. Dry cell batteries are used to power radios, and can cost around US\$4 to US\$5 per month. Electricity brings about important qualitative changes; for example, a 15 W

compact fluorescent lamp (CFL) produces around 800 lumens, while a kerosene lamp will produce only around 60-70 lumens at best³. In terms of useful illumination (measured in terms of lux, i.e. lumens per square meter), the CFL produces 122 lux, while the kerosene lamp provides only 10 lux.

Consequently, economic benefits associated with better lighting derive from two sources: (a) savings from the substitution of kerosene and batteries by lower cost power, and (b) the benefits of additional consumption derived from the higher illumination provided by electricity. Figure A3-1 illustrates the benefits as represented by a consumer demand function.

Figure A3-1 Demand Function for Lighting



In Figure A-1, (P_K, Q_K) is the initial point of consumption (based on kerosene), and (P_E, Q_E) is the final point of consumption, based on electricity. Areas $A+B+D$ represent total (gross) surplus in the initial situation, where $B+D$ is the cost of kerosene and dry cell batteries; the net surplus is therefore area A . At the final point of consumption, gross surplus increases to $(A+B+C+D+E)$; areas $D+E$ are the costs of supply with electricity, and areas $B+C$ yield the net consumer surplus gain to beneficiaries.

Communications benefits. Lighting benefits can be estimated with some degree of assurance, as there exists a quantifiable alternative (kerosene lamps); no such information is available for benefits such as watching TV (hearing the radio has the associated cost of dry cell batteries). Also, consuming TV is a one-off experience, i.e. there is no continuum of consumption. The benefits of TV availability have been estimated from willingness to pay studies in developed countries. For example, in the UK a survey commissioned by the Radio Communications Agency in 2000 (later Ofcom) assessed the

³Mills, Evan. Technical and Economic Performance Analysis of Kerosene Lamps and Alternative Approaches to Illumination in Developing Countries, Lawrence Berkeley National Laboratory, June 2003.

willingness to pay (WTP) for radio and TV⁴. It found a willingness to pay on the order of £10 per month per household (around US\$15 per month). At the time, income in the UK for poor households was on the order of US\$12,000/year⁵. They would be willing to pay up to around 1.5% of disposable income for TV. Although extrapolating this value to another country, such as Guinea, is debatable, it would represent a WTP of around US\$37/year based on an average income of US\$490/year and a household size of 5.

The economic analysis was performed based on the following estimations:

- Benefits: gross consumer surplus of lighting and TV viewing;
- Costs: investment costs in village electrification projects, fuel costs, administrative costs, and operations and maintenance costs;
- Available connections utilized in their entirety by 2020.

Table A3-4 summarizes the costs and benefits over the period 2007–2020. These figures yield the following indicators:

Net Present Value: US\$6.0 million Internal Rate of Return: 60%, corresponding to the most conservative estimation of consumer surplus.

The high rate of return can be explained by the substitution savings associated with CFLs providing lighting benefits: the use of kerosene lanterns has a cost of around US\$124 per year for two lanterns, which can be replaced by one CFL. A 15W CFL operating 4.5 hours per day consumes just around 25kWh per year; a diesel unit will consume around 0.4L per kWh, i.e. 10L per year per CFL. At a cost of around US\$1.30 per liter, the running cost associated with one CFL is around US\$13. This yields a margin of about US\$110 to pay for capital costs of production, administration and O&M. The investment costs of small diesel units plus the associated minigrids averaged about US\$1200/kVA or around US\$1300/kW; even with the very low load factors of the project (about 500 hours per year), the capital cost per kWh is only around US\$0.34, and the associated capital cost per CFL would amount to around US\$8.50, for a total of US\$22 including O&M and a net benefit of around US\$100 per CFL.

Financial analysis

This analysis concentrates on the returns to the entrepreneurs based upon the sales and tariffs charged to the consumers. Table A3-5 summarizes the financial results for the investors based on an average weighted tariff of US\$3.30 per month per CFL outlet, US\$5.44 per TV outlet, and US\$9.97 per power outlet.

⁴ Aegis Systems, *Survey to Determine the Consumer's Surplus Accruing to Radio Listeners and TV Viewers*, Final Report, prepared for the Radio Communications Agency of the Department of Trade and Industry, October 2000.

⁵ Joseph Rowntree Foundation

These cash flows yield a NPV of US\$61,000 and an IRR of 14%. Considering that the values are expressed in constant dollars, the financial results can be considered acceptable, as long as the operators can fully connect the clients to the available outlets by 2020. The financial viability for the entrepreneurs is also subject to the availability of subsidies. Without the PERD subsidies, the financial NPV is negative (minus US\$1 million) and the IRR is negative too (-2%).

Table A3-4 Cost and Benefit Summary

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CFLs		2570	3470	4640	10152	10880	11459	12594	14197	16297	18560	20497	20776	21202	21961
Gross Surplus		\$421,911	\$569,728	\$761,701	\$1,666,642	\$1,786,188	\$1,881,233	\$2,067,552	\$2,330,876	\$2,675,513	\$3,047,075	\$3,365,056	\$3,410,828	\$3,480,833	\$3,605,494
TV Outlets		580	783	1047	2290	2455	2585	2841	3203	3677	4187	4624	4687	4783	4955
Gross Surplus		1,452	2,968	3,729	4,741	5,819	6,652	7,126	8,514	9,638	10,930	12,098	12,734	13,284	13,832
Total Surplus		\$443,363	\$598,696	\$800,430	\$1,751,384	\$1,877,008	\$1,976,885	\$2,172,678	\$2,449,391	\$2,811,551	\$3,202,004	\$3,536,154	\$3,584,253	\$3,657,817	\$3,788,817
Investment Cost	401,661	400,621	271,839	831,274	0	0	0	232,011	0	0	0	0	0	0	0
Cumulative Investment	401,661	802,282	1,074,121	1,905,395	1,905,395	1,905,395	1,905,395	2,137,406	2,137,406	2,137,406	2,137,406	2,137,406	2,137,406	2,137,406	2,137,406
Fuel Cost		6,487	103,284	38,086	2,140	23,812	41,043	74,820	22,557	85,035	52,394	10,040	18,338	31,029	53,628
Maintenance		4,068	2,224	7,162	7,162	7,162	7,162	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122
Admin Cost		80,000	100,000	120,000	240,000	240,000	240,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000
Total Cost	401,661	581,176	507,347	1,146,522	599,302	620,974	638,204	950,953	766,679	829,157	896,517	954,162	962,460	975,151	997,751
Net Benefit	-401,661	-137,813	91,349	-346,092	1,152,081	1,256,034	1,338,680	1,221,724	1,682,711	1,982,393	2,305,488	2,581,991	2,621,793	2,682,666	2,791,066

Table A3-5 Financial Results for Investors/Operators

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CFLs		2570	3470	4640	10152	10880	11459	12594	14197	16297	18560	20497	20776	21202	21961
TV Outlets		580	783	1047	2290	2455	2585	2841	3203	3677	4187	4624	4687	4783	4955
Power Outlets		141	190	255	557	597	629	691	779	894	1019	1125	1140	1164	1205
Income:															
CFLs		1,724	3,363	4,836	10,832	11,306	12,570	13,984	15,619	17,473	19,346	21,324	22,360	23,328	24,294
TV Outlets		7,850	11,111	15,333	34,515	36,240	38,766	42,481	47,104	52,021	57,354	63,188	65,987	68,267	71,450
Power Outlets		6,871	9,278	12,458	28,644	31,424	33,225	36,275	40,305	44,986	49,844	54,559	59,389	63,188	66,473
Total Income		156,445	211,255	282,439	617,991	662,319	719,561	796,649	884,289	982,081	1,089,856	1,197,763	1,264,735	1,290,693	1,336,918
Investment Cost	401,661	400,621	271,839	831,274	0	0	0	232,011	0	0	0	0	0	0	0
Cumulative Investment	401,661	802,282	1,074,121	1,905,395	1,905,395	1,905,395	1,905,395	2,137,406	2,137,406	2,137,406	2,137,406	2,137,406	2,137,406	2,137,406	2,137,406
Subsidy	250,234	205,148	782,341	215,822	0	0	0	69,134	0	0	0	0	0	0	0
Fuel Cost		76,487	103,284	138,086	302,140	323,812	341,043	374,820	422,557	485,035	552,394	610,040	618,338	631,029	653,628
Maintenance		24,068	32,224	57,162	57,162	57,162	57,162	64,122	64,122	64,122	64,122	64,122	64,122	64,122	64,122
Admin Cost		80,000	100,000	120,000	240,000	240,000	240,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000
Total Cost	151,426	376,028	-274,994	930,700	599,302	620,974	638,204	881,819	766,679	829,157	896,517	954,162	962,460	975,151	997,751
Net Income	-151,426	-219,583	486,249	-648,261	18,689	41,345	59,357	-115,171	97,610	162,923	233,339	293,601	302,275	315,542	339,167

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility / Specialty
Lending			
Alpha Amadou Bah	Procurement Specialist	AFTPC	
Racky Dia Camara	Program Assistant	AFMGN	
Siobhan McInerney-Lankford	Senior Counsel	LEGAM	
Thierno Hamidou Diallo	Disbursement Assistant	AFMGN	
Moez Cherif	Senior Energy Economist	AFTG2	
Papa Aynina Diop		CTRLA	
Bassem Abou Nehme	E T Consultant	AFTG2	
Celestin Adjalou Niamien	Sr. Financial Management Specialist	AFTMW	
Supervision/ICR			
Moez Cherif	Sr. Energy Economist	AFTG2	
David Vilar	Energy Specialist	AFTG2	
Fernando Lecaros	Consultant	AFTG2	
Celestin Niamien	Sr. Financial Management Specialist	AFTMW	
Paul Martin	Sector Leader	AFTSN	
Anthony Molle	Sr. Counsel	LEGSO	
Alpha Amadou Bah	Procurement Specialist	AFTPE	
Bella Lelouma Diallo	Sr. Financial Management Specialist	AFTMW	
Chandrasekar Govindarajalu	Senior Energy Specialist	CSASB	
Henri A. Aka	Operations Officer	SASHN	
M. Ananda Covindassamy	Consultant	CNGPW	
Racky Dia Camara	Program Assistant	AFMGN	
Raima Oyenyin	Sr. Program Assistant	AFTG1	
Thierno Hamidou Diallo	Disbursement Assistant	AFMGN	
Zie Ibrahima Coulibaly	Senior Infrastructure Specialist	AFTU2	

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	US\$ Thousands (including travel and consultant costs)
Lending		
FY01	0	8.87569
FY02	1.95	9.86324
Total:	1.95	18.74
Supervision/ICR		
FY03	4.03	23.61242
FY04	11.07	11.53947
FY05	27.48	74.53529
FY06	14.57	35.12339
FY07	11.27	42.5296
FY08	17.52	81.00154
FY09	13.2	49.03923
FY10	4	16.33347
FY11	0	0
FY12	0.36	4.93749
FY13	8.98	49.94815
FY14	2.86	24.52479
Total:	115.34	413.12

Annex 5. Summary of Borrower's ICR and/or Comments on Draft ICR

This is a summary of the “*Rapport d’Achèvement du Projet d’Électrification Rurale Décentralisée*” prepared by BERD and dated October 2013.

Project Objectives. These include: training project participants in “learning by doing” by implementing micro-concessions at the village scale; lifting barriers to developing RE for village electrification; and providing sustainability to the functions of BERD through a permanent RE agency (AGER).

Project Components. The project includes three components: training, establishing a financial mechanism, and project coordination and management.

Project Startup. Reaching project effectiveness required a substantial amount of activity starting in 2002. The 11-month delay between the signature of the credit agreement in July 2002 and effectiveness in June 2003 can be explained as follows: (a) Project ratification by the National Assembly in November 2002; (b) Promulgation of the ratification law in December 2002; (c) Gazetting in March 2003; (d) Preparing legal opinions by the Supreme Court in relation to the Credit Agreement and the GEF grant, the Subsidiary Agreement, and the Project Agreement; (e) Putting in place the Project Information and Management System; (f) Signature of the Subsidiary Agreement with BICIGUI (which took the longest).

Component 1: Training and Capacity Development. This component included three main activities: identification of potential RE partners, support for private operators, and training of RE participants. Identification of potential partners included the organization of a database, including: 35 private RE operators, 31 candidates, 31 consulting organizations (4 foreign), 94 suppliers/installers, 62 civil works companies, and information on equipment prices. This activity permitted a characterization of potential operators, by where they were domiciled (most of them proceeded from the targeted communities), by their level of instruction, and by their corporate organization.

Support for private operators was centered on executing feasibility studies, preparing the financing and concession applications, following up on the applications, as well as assisting with procurement, on-site control of project execution, and training for the management teams. 43 feasibility studies were executed, 35 applications were processed, of which 30 were approved and financed.

The training of RE participants included: instruction for BERD staff through seminars, workshops, hands-on instruction with software developed for the project, trips to visit similar projects and conferences. The training for RE partners was centered on the management of RE enterprises and was conducted through seven training sessions. Consulting firms were trained, particularly on the operation of small hydro plants. Finally, the FERD agents were trained over two sessions on procedures for screening and processing financial applications.

Component 2: Financial Mechanism. The FERD put in place a procedure for processing applications which included requirements such as a business plan, a concession agreement, and guarantees. Applications were processed through: the BERD, which assessed the technical and economic viability of the project; the BICIGUI, which

36 assessed the financial viability and the loan guarantees; the API which authorized fiscal advantages, and the MEH which awarded the concession.

Thirty-five applications were processed for a projected cost of 17.1 billion GNF (around US\$4.1), 4 million of which FERD would provide 4.6 billion GNF (US\$1.1 million) in loans and 9.2 billion GNF (US\$2.1 million) in subsidies. Initially, the financing mechanism was expected to consist of a 20% contribution by the developers, 30% subsidy and 50% loans; initial cost overruns had to be financed through public funds to avoid paralyzing the sub-projects, and as a result 16% of financing was contributed by the operators for the first 12 sub-projects; subsequently a closer follow-up by BERD led to 21% financing by the operators for the last 17 sub-projects. The final real disbursements corresponded to 12.1 billion GNF invested (US\$3.1 million) of which FERD contributed 10.1 billion GNF (US\$2.6 million).

Loans were initially made at 20% interest in GNF, corresponding to the base banking rate (17.6% on average) and an additional 0.5% margin. The loans had a grace period for payment of principal of two years, during which time the operators had to pay interest and a 10-year term of loan payment.

The first loans were agreed in 2005 and led to problems, due to delays in execution, which took up to two years in getting resolved. During this period large interest payments accumulated before electricity sales could take off in the villages and, as a result, operators started to lag in their loan obligations. Some of the reasons behind this include the slow materialization of connections by potential clients and management weaknesses in several operating companies.

The BERD addressed the problem in 2009 through: a restructuring of the loans to FERD in order to align payments more closely with operating characteristics of the projects; a closer monitoring of project execution, and following up with the operators to improve their commercial operation and their respect for financing obligations. The measures taken by the BERD included the annulment of unpaid interest for the first 17 projects which had accumulated unpayable balances, a fixed 10% interest rate and a reduction of loan participation in project development from 50% to 30%, with a corresponding increase in the subsidy component from 30% to 50%. These measures were disseminated through a symposium organized in November 2011.

Physical results are summarized according to the number of electrified areas, the number of available connections, and the connection costs. 29 subprojects were financed and executed. These 29 subprojects resulted in 14,116 available connections, of which 8,248 were utilized, i.e. an average connection rate of 58.4%. Connection costs varied as follows: 350,000–600,000 GNF (US\$90–154) for 5 subprojects, 600,000–1,000,000 GNF (US\$154–256) for 16 subprojects, and 1,000–1,800,000 GNF (US\$256–461) for seven subprojects.

Component 3: Coordination and Management. Activities of this component can be organized into six major categories: human resources, finance, procurement, communication with stakeholders, auditing, and project management and supervision.

At initiation, BERD personnel included 14 staff, supported by consultants that provide technical assistance through a contract that expired at the end of 2007, through an

international resident expert with point-wise assistance from short-term experts. When the contract expired, the expert's functions were taken over by one of the two BERD project engineers. At the end of the project, BERD staff numbered 11 persons, a reduction that was agreed with the TTL.

Total project expenditures amounted to US\$6.51 million, broken down into US\$5.32 million from IDA, US\$0.43 million from GEF, and US\$0.76 million from Government. At project closure, undisbursed funds amounted to US\$0.48 million on the IDA credit (from a 2007 allocation of US\$6.04 million) and US\$1.27 million from GEF. With respect to the original allocations, the principal changes concern the coordination and management component due to successive project extensions, from US\$0.44 million in 2002 to US\$1.22 million in 2007; actual disbursements for coordination and management of the project amounted to US\$1.95 million. Counterpart funds from the Government, initially budgeted at 2.2 billion GNF (US\$1.1 million), fell short by 626 million GNF (around US\$0.16 million).

Procurement for goods was performed through NCB (for vehicles) and through National Shopping, due to the small amounts involved. For consulting services, ICB was performed for technical assistance and individual consultants. Short-listing was performed for the selection of the firm in charge of recruiting BERD personnel, the auditing firm and the firms in charge of supervision of sub-projects and accounting assistance to operators. It is worth mentioning that one of the project's difficulties was associated with the low ceilings for establishing the procurement method; although this was recognized by both BERD and the Bank, they remained unchanged throughout the project.

Procurement practices followed by the subproject operators complied with those in use by the private sector (if found acceptable by the Bank). Given the modest amounts involved in goods and services procured by the project operators, shopping through quotations was the rule. This procedure was validated during a Bank mission, which considered it effective and transparent. To assist operators developing RET projects two ICB procedures were executed by BERD on their behalf. Four PV projects were supported by seeking the delivery of equipment through a joint ICB procedure that finally didn't succeed due to misrepresentations on the part of the winner of the award. The other RET project concerned a pico hydro project, for which the procurement conducted by BERD was truncated due to project termination.

Communication with stakeholders included several initiatives: (a) project promotion - through workshops, radio and TV programs, newspaper publications, information dissemination through printed advertising (e.g. calendars and agendas), and a quarterly BERD bulletin; and (b) direct communications with - potential developers, the Private Sector National Council and user associations, informal business people, collective associations, and oil product distributors.

Project auditing took place on an annual basis from the preparatory phase until 2009. The audits examined the IDA and GEF special account, project expenses, the utilization of counterpart funds, and recommendations for internal controls. No anomalies were detected, but several suggestions for improving internal controls were taken into account.

Three fiduciary missions took place to validate the accounting information and management systems as well as the procurement processes.

Project management and supervision took place through six Bank supervision missions, together with three videoconferences and two follow-up teleconferences. A mid-term review took place through three missions in 2005, which proposed restructuring the project to allocate funds for supporting EDG, the national electricity company, which wasn't approved. Project extensions were agreed, initially from June 30, 2006 to June 30, 2008 and subsequently to 31 December 2009; after reinitiating the project in mid-2011, the closing date was extended to June 30, 2013.

Project issues and constraints. These are classified as management constraints and associated with achieving the performance indicators. Management constraints include: (a) Mobilization of funds by the operators, which was one of the main causes of delays in execution, given that it was a prior condition for any disbursement by FERD; (b) Commercial bank commitment, which can be traced back to the initial negotiation in which BICIGUI insisted on a fixed remuneration rather than one associated with the results of its mandate; (c) Delays and amounts in the mobilization of counterpart Government funds, which impacted the project's margin of maneuver; (d) The economic and monetary environment, associated with high inflation and a devaluation of the Guinean Franc, which led to frequent budget adjustments, in addition to periods when public funds (including those of the project) were frozen due to limits on public expenditures set by the IMF and World Bank; (e) Delays in obtaining the exemption of import duties; (f) The procurement ceiling, set at US\$5,000, which required all operations above this amount to be approved by the Bank; and (g) Delays and uncertainty associated with the possible restructuring of the project in 2005 that finally didn't go through.

Limitations in achieving the project performance indicators include: (a) Weak commitment of certain operators, which resulted in poor planning and operational problems, together with budget overruns; (b) Delays in client commitment to connect to the mini grids, which impacted most of the subprojects (the connection rate achieved at closure was 58%); (c) Delays in client payments which have impacted negatively on the financial results of several operators; (d) Low consumption of electricity for productive uses which has led to a sub-utilization of the facilities and a consequent financial vulnerability of the operators; (e) Increases of fuel prices, which have led to higher electricity prices and have had a negative impact on demand for subproject services; and (f) The interruption of disbursements by the Bank, which paralyzed the project, together with the difficulty in reinitiating the project in mid-2011.

Project perspectives. At the institutional level, the objective consists of putting in place the Rural Electrification Agency (AGER) as a successor of BERD; this should be accomplished in the short term with the support of the EU and should facilitate execution of a rural electrification strategy by internalizing the lessons learnt through the project. It should also allow the financing of future rural projects by mobilizing funds from donors.

Some lessons learned for developing future projects include technical adjustments, contracting conditions, and management improvements. With regard to 'technical' lessons, the following are worth noting: (a) adjusting demand expectations during project preparation to the 'capacity to pay' of future users; (b) improving the treatment of wood

poles to avoid rotting and insect penetration; (c) insistence on realistic projections for the preparation of business plans; (d) greater concentration on socio-economic studies during preparation; (e) regular surveys of the norms adopted in order to reflect materials available in the marketplace; and (f) reinforcing the inspection of procured goods and equipment, works, and execution according to plans.

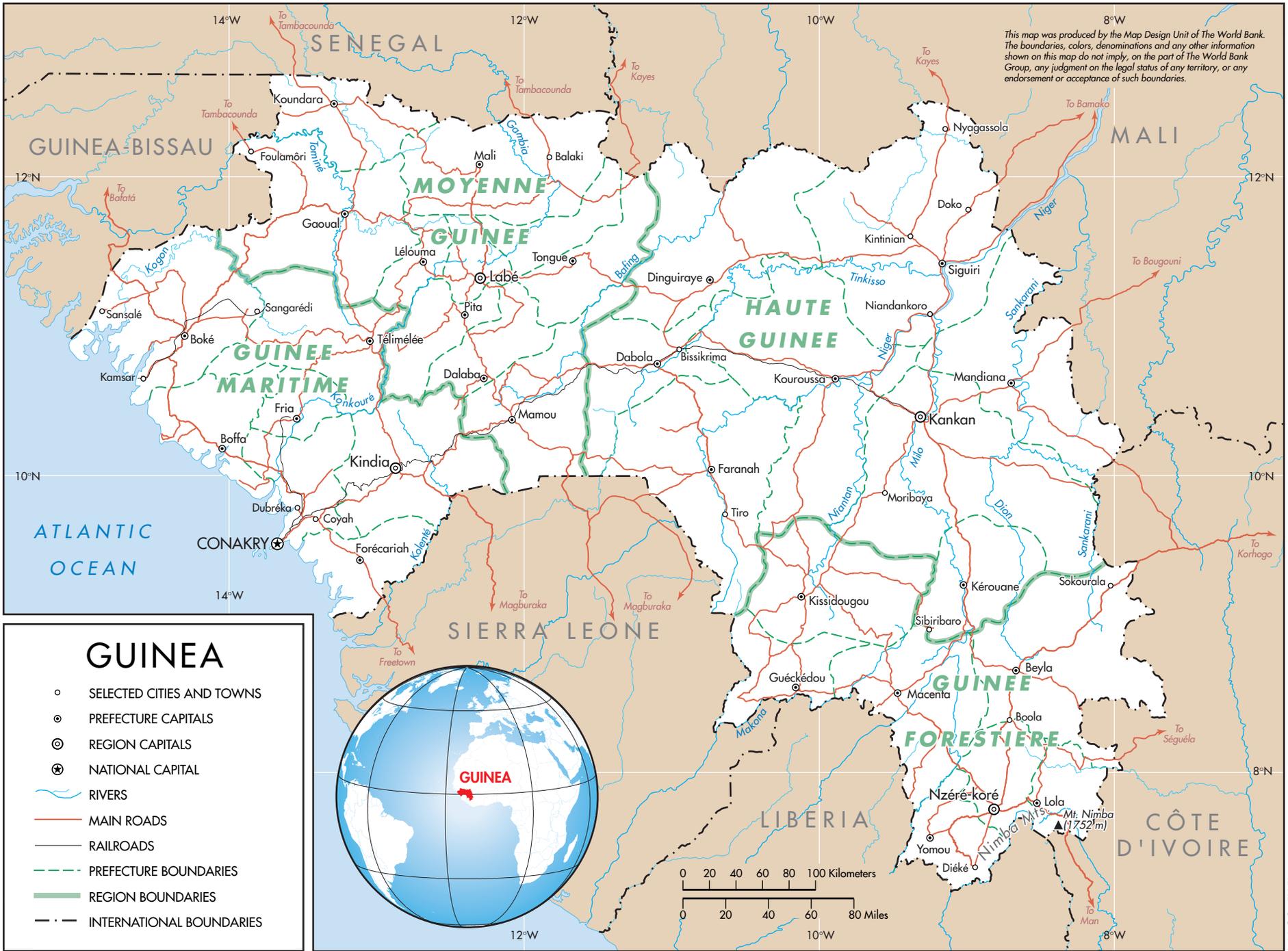
With regard to relationships with suppliers, the lessons learned include: (a) setting after-sales realistic conditions in the supply contracts of generating sets; (b) seeking training of operator technicians with suppliers; (c) limiting suppliers of generating sets to those having technical installations in Guinea, and a capability of mobilizing technical teams on site. With respect to system management, (a) obligation of operators to present BERD with their management team in order to evaluate their expertise and to eventually provide training, at least one month before the in service date; (b) requiring operators to follow strictly the rules set out with their FERD contracts, including the advance prepayment and depositing all of their income from electricity service into the local CRG account; (c) requiring and insisting on the production of monthly reports by the operators; (d) seeking community support for sustaining the service; and (e) engaging local authorities in assuring the connections and recovering billings, thereby creating economies of scale and an eventual reduction of tariffs.

Certain improvements are already being put in place as a result of the experience of project implementation, such as: (a) introducing sensitivity analyses into the feasibility studies; (b) closer follow-up of the commercial and financial management by the BERD; (c) promotion of productive uses of electricity through artisanal activities in electrified communities; (d) motivating micro finance institutions to support RE projects, notably by financing equipment for productive uses of electricity; (e) seeking the support of oil companies to facilitate the supply of fuel for the generating sets; and (f) facilitating the exchange of practices and experiences among operators.

The BERD received a copy of the draft ICR but did not provide any comments.

Annex 6. List of Supporting Documents

1. ICR Guidelines (August 2006, last updated on October 5, 2011)
2. DREP PAD (April 22, 2002)
3. Development Credit Agreement (July 2002)
4. GEF Trust Fund Grant Agreement (July 2002)
5. Project Agreement (IDA/BICIGUI, July 2002)
6. FERD Management Agreement (GOG/BICIGUI, June 2003)
7. Rapport d’Achèvement du Projet d’Électrification Rurale Décentralisée (October 2013)
8. ISRs
9. Supervision Aide Memoires
10. Guinea CPS (September 2013)
11. Restructuring Paper (September 2005)
12. Poverty Reduction Strategy Paper PRSP (March 2013)
13. L’Expérience d’Électrification Rurale Décentralisée en Guinée, Nava Touré (Octobre 2013)
14. Rural Electrification Law (October 2013)



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GUINEA

- SELECTED CITIES AND TOWNS
- ⊙ PREFECTURE CAPITALS
- ⊕ REGION CAPITALS
- ⊗ NATIONAL CAPITAL
- RIVERS
- MAIN ROADS
- RAILROADS
- PREFECTURE BOUNDARIES
- REGION BOUNDARIES
- INTERNATIONAL BOUNDARIES

