Document of
The World Bank

Report No: ICR2627

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-38280, IDA-45030, TF098148, TF099253)

ON A

CREDIT

IN THE AMOUNT OF SDR25.20 MILLION (US$35.65 MILLION EQUIVALENT) AND

AN ADDITIONAL FINANCING IN THE AMOUNT OF SDR21.60 MILLION (US$35.0 MILLION EQUIVALENT) AND

A GLOBAL ENVIRONMENTAL FACILITY GRANT
IN THE AMOUNT OF US$ 3.50 MILLION

AND A TRUST FUNDED ADDITIONAL FINANCING IN THE AMOUNT OF US$8.5 MILLION

TO THE

REPUBLIC OF MALI

FOR A

HOUSEHOLD ENERGY AND UNIVERSAL ACCESS PROJECT

March 28, 2013

Energy Team
Sustainable Development Department
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective March 25, 2013)

Currency Unit = C.F.A. Francs BCEAO
US$1.00 = 505 C.F.A. Francs BCEAO
US$ 1.00 = 0.66 SDR

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AFREA TF	Africa Renewable Energy Access Trust Fund
AMADER	Agence Malienne pour le Développement de l'Energie Domestique et d'Electrification Rurale
CAS	Country Assistance Strategy
CREE	Commission de Régulation d'Eau et d'Electricité
DNCPN	Direction Nationale de Contrôle des Pollutions et Nuisances
DNE	Direction Nationale de L'Energie
DNEF	Direction Nationale des Eaux et Forêts (from 2010)
DNCN	Direction Nationale de la Conservation de la Nature (until 2009)
EDM SA	Energie du Mali Société Anonyme
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESCO	Energy Service Company
ESMAP	Energy Sector Management Assistance Program
ESME TF	Trust Fund to support Energy SME in Sub-Saharan Africa
ESMF	Environment and Social Management Framework
ERR	External Rate of Return
FER	Fonds d'Electrification Rurale
FMR	Financial Management Report
FY	Fiscal Year
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEO	Global Environment Objective
GHG	Greenhouse Gas
GoM	Government of Mali
HEURA	Household Energy and Universal Access
ICT	Information and Communication Technologies
IDA	International Development Association
IFR	Interim Financial Reports
IRR	Internal Rate of Return
KfW	Kreditanstalt fuer Wiederaufbau
kW	Kilowatt
kWh	Kilowatt hour
LPG	Liquefied Petroleum Gas
MDG	Millennium Development Goals
MoEW	Ministry of Mines, Energy and Water Resources

MoF	Ministry of Finance
MW	Megawatt
NGO	Non-Governmental Organization
NPV	Net Present Value
OP	Operational Directive
RETs	Renewable Energy Technologies
RPF	Resettlement Policy Framework
PRSP	Poverty Reduction Strategy Paper
PV	Photovoltaic
RFP	Request for Proposal
SME	Small- and Medium-sized Enterprises
SOE	Statement of Expenditures
SREP	Program for Scaling Up Renewable Energy in Low Income Countries
TF	Trust Fund

Vice President:	Makhtar Diop
Country Director:	Ousmane Diagana
Sector Manager:	Meike van Ginneken
Project Team Leader:	Koffi Ekouevi
ICR Team Leader:	Fabrice Bertholet

MALI
Household Energy and Universal Access Project

CONTENTS

Data Sheet

A. Basic Information			
Country:	Mali	Project Name:	Household Energy and Universal Access Project
Project ID:	P073036,P076440	L/C/TF Number(s):	IDA-38280,IDA-45030,TF-52958
ICR Date:	03/28/2013	ICR Type:	Core ICR
Lending Instrument:	SIL,SIL	Borrower:	GOVERNMENT OF MALI
Original Total Commitment:	XDR 25.20M,USD 3.50M	Disbursed Amount:	XDR 43.41M,USD 2.52M
Environmental Category: B,C		**Focal Area**: C	
Implementing Agencies: AMADER			
Cofinanciers and Other External Partners:			

B. Key Dates

Household Energy and Universal Access Project - P073036

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	12/03/2002	Effectiveness:	10/13/2004	10/13/2004
Appraisal:	05/07/2003	Restructuring(s):		09/04/2008
Approval:	11/04/2003	Mid-term Review:	01/05/2011	05/02/2011
		Closing:	06/30/2009	06/30/2012

ML-GEF Household Energy (FY04) - P076440

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	12/03/2002	Effectiveness:		10/13/2004
Appraisal:	05/07/2003	Restructuring(s):		
Approval:	11/04/2003	Mid-term Review:	11/15/2006	11/29/2006
		Closing:	06/30/2009	06/30/2009

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes	Satisfactory
GEO Outcomes	Satisfactory
Risk to Development Outcome	Substantial
Risk to GEO Outcome	Substantial
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	Satisfactory	Government:	Moderately Satisfactory
Quality of Supervision:	Moderately Satisfactory	Implementing Agency/Agencies:	Satisfactory
Overall Bank Performance	Moderately Satisfactory	Overall Borrower Performance	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Household Energy and Universal Access Project - P073036			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating:**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
DO rating before Closing/Inactive status	Moderately Satisfactory		

ML-GEF Household Energy (FY04) - P076440			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating:**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
GEO rating before Closing/Inactive Status	Moderately Satisfactory		

D. Sector and Theme Codes

Household Energy and Universal Access Project - P073036		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
General energy sector	50	
Other Renewable Energy	50	
Theme Code (as % of total Bank financing)		
Climate change	20	
Infrastructure services for private sector development	20	
Land administration and management	20	
Regulation and competition policy	20	
Rural services and infrastructure	20	

ML-GEF Household Energy (FY04) - P076440		
	Original	Actual
Sector Code (as % of total Bank financing)		
Other Renewable Energy	100	
Theme Code (as % of total Bank financing)		
Climate change	100	

E. Bank Staff

Household Energy and Universal Access Project - P073036		
Positions	**At ICR**	**At Approval**
Vice President:	Makhtar Diop	Callisto E. Madavo
Country Director:	Ousmane Diagana	A. David Craig
Sector Manager:	Meike van Ginneken	Yusupha B. Crookes
Project Team Leader:	Koffi Ekouevi	Koffi Ekouevi
ICR Team Leader:	Fabrice Karl Bertholet	
ICR Primary Author:	Maria Alexandra Planas	

ML-GEF Household Energy (FY04) - P076440		
Positions	**At ICR**	**At Approval**
Vice President:	Makhtar Diop	Callisto E. Madavo
Country Director:	Ousmane Diagana	A. David Craig
Sector Manager:	Meike van Ginneken	M. Ananda Covindassamy
Project Team Leader:	Koffi Ekouevi	Koffi Ekouevi
ICR Team Leader:	Fabrice Karl Bertholet	
ICR Primary Author:	Maria Alexandra Planas	

F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)
The development objectives are: (i) accelerating the use of modern energy in rural and peri-urban areas in order to increase productivity of small and medium enterprises, to enhance the quality and efficiency of health and education centers, and to improve living standards; (ii) promoting further community-based woodland management to reduce un-sustainable pressure on forest resources while simultaneously encouraging interfuel substitution and energy efficiency initiatives; and, (iii) strengthening energy sector reform processes and related institutions to create a favorable investment environment for increased private sector participation in decentralized energy services delivery in rural and peri-urban areas.

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

Global Environment Objectives (from Project Appraisal Document)
The global environmental objective is to initiate a program aimed at removing the barriers to adoption of renewable energy technologies (RETs) under GEF Operational Program 6 in order to reduce gross calculated greenhouse gas (GHG) emissions, primarily those of carbon dioxide (CO2).

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

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Number of Institutions with access to electricity services			
Value (quantitative or Qualitative)	0	1,312	1,275	1,295
Date achieved	10/06/2003	11/05/2003	09/30/2009	06/30/2012
Comments (incl. % achievement)	Target value revised at AF to account for actual progress with respect to project implementation and the incremental benefits expected from the AF; summarized indicator of schools, health centers, and other municipal institutions. Indicator reworded and target value further revised at the trust funded AF. See indicator 6 below.			
Indicator 2 :	Number of communities with installed multifunctional platforms			
Value (quantitative or Qualitative)	0	88	88	81
Date achieved	10/06/2003	11/05/2003	09/30/2009	06/30/2012
Comments (incl. % achievement)	Monitoring methodology further specified in modified Result's Framework: number of communities vs. number of clients. 92% achieved			
Indicator 3 :	Number of improved stoves purchased by households			
Value (quantitative or Qualitative)	642,293	1,091,261	NA	1,290,000
Date achieved	09/30/2009	09/30/2009		06/30/2012
Comments (incl. % achievement)	118% achieved.			
Indicator 4 :	Increase in rural and peri-urban access to modern energy services (Number of households with electricity access)			
Value (quantitative or Qualitative)	0	40,000	69,603	74,787
Date achieved	10/06/2003	11/05/2003	09/30/2009	06/30/2012

Comments (incl. % achievement)	Target value revised upward to account for additional financing; Monitoring methodology further specified: clients connected vs. households connected. Indicator reworded and target value further revised at the trust funded AF please see indicator 5 below.			
Indicator 5 :	Households connected to electricity (Number)			
Value (quantitative or Qualitative)	0	40,000	70,768	74,787
Date achieved	10/06/2003	11/05/2003	08/01/2011	06/30/2012
Comments (incl. % achievement)	Same indicator as indicator # 4 above. Renamed in Trust Funded Additional Financing Target value revised to account for trust funded AF. 105% achieved.			
Indicator 6 :	Public institutions connected to electricity (Number)			
Value (quantitative or Qualitative)	0	1,312	1,809	1,295
Date achieved	10/06/2003	11/05/2003	08/01/2011	06/30/2012
Comments (incl. % achievement)	Same indicator as #1 above. Target value revised to account for trust funded AF. 71% 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 :	Number of solar photovoltaic systems installed			
Value (quantitative or Qualitative)	0	11,736	NA	8,748
Date achieved	10/06/2003	11/05/2003		06/30/2009
Comments (incl. % achievement)	The GEF trust fund was closed in June 2009. 74% 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 :	Training undertaken by DNE, CREE, DNCN and AMADER			
Value (quantitative or Qualitative)	0	300 staff weeks	About 600 staff weeks of training undertaken by DNE, CREE,	648.2

			DNCN	
Date achieved	10/06/2003	11/05/2003	09/30/2009	06/30/2012
Comments (incl. % achievement)	Target value revised to account for Additional Financing. 108% achieved.			
Indicator 2 :	Number of private operators providing energy services			
Value (quantitative or Qualitative)	0	10	125	83
Date achieved	10/06/2003	11/05/2003	09/30/2009	06/30/2012
Comments (incl. % achievement)	Target value revised to account for Additional Financing; monitoring further specified: operators established vs. operators in process of signing new financing. 66% achieved.			
Indicator 3 :	Number of hectares under woodfuel management program			
Value (quantitative or Qualitative)	0	1,410,817	1,410,817	1,140,000
Date achieved	10/06/2003	11/05/2003	09/30/2009	06/30/2012
Comments (incl. % achievement)	80% achieved.			
Indicator 4 :	Number of low consumption lamps purchased by households and institutions			
Value (quantitative or Qualitative)	274,386	N/A	454,386	1,300,000
Date achieved	09/30/2009		09/30/2009	06/30/2012
Comments (incl. % achievement)	New indicator added in the Additional Financing 286% achieved.			
Indicator 5 :	Solar photovoltaic systems installed (Number)			
Value (quantitative or Qualitative)	7,795	N/A	7,810	8,598
Date achieved	12/31/2009		08/01/2011	06/30/2012
Comments (incl. % achievement)	Baseline from the results achieved under the GEF grant. 110% achieved.			
Indicator 6 :	Generation capacity of off-grid renewable energy technologies constructed (kW)			
Value (quantitative or Qualitative)	94	N/A	900	1,459
Date achieved	12/31/2009		08/01/2011	06/30/2012
Comments (incl. % achievement)	New Indicator. Includes Solar home systems and hybrid solar-diesel. 162% achieved.			
Indicator 7 :	Direct project beneficiaries (Number), of which female (%)-Direct project beneficiaries are estimated as follows: number of household electricity connections times an average 6 beneficiaries/household. 50% of beneficiaries are estimated to be			

	female.			
Value (quantitative or Qualitative)	248,832 50% women		424,608 50% women	445,872
Date achieved	12/31/2009		08/01/2011	06/30/2012
Comments (incl. % achievement)	New Indicator. 105% achieved.			
Indicator 8 :	Business electricity connections (Number)			
Value (quantitative or Qualitative)	252		475	7,586
Date achieved	12/31/2009		08/01/2011	06/30/2012
Comments (incl. % achievement)	New Indicator. 1590% achieved.			

G. Ratings of Project Performance in ISRs

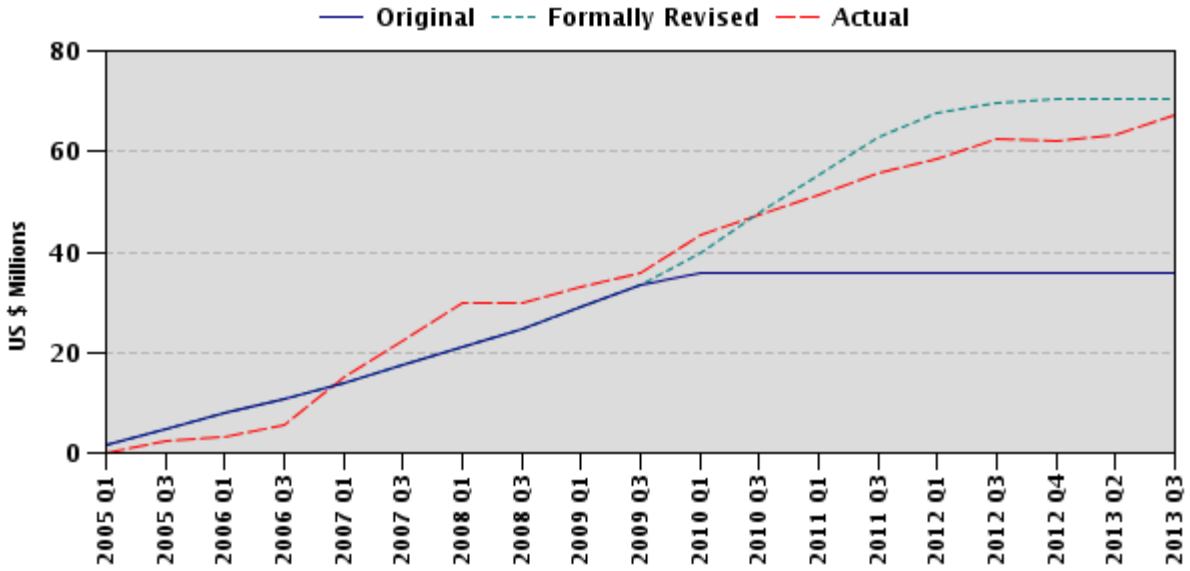
No.	Date ISR Archived	DO	GEO	IP	Actual Disbursements (USD millions)	
					Project 1	Project 2
1	05/28/2004	S	S	S	0.00	0.00
2	12/02/2004	S	S	S	1.28	0.00
3	06/13/2005	S	S	S	3.17	0.15
4	12/13/2005	MS	MS	MS	4.39	0.15
5	06/30/2006		S	S	7.84	0.41
6	12/23/2006	S	S	S	15.11	1.14
7	06/25/2007	S	MS	S	22.30	2.65
8	12/14/2007	S	MS	S	29.97	3.37
9	05/29/2008	S	MS	S	29.97	3.37
10	12/19/2008	S	MS	S	34.86	3.37
11	06/26/2009	S	MS	S	40.37	3.37
12	12/18/2009	S	MS	S	45.52	3.37
13	06/30/2010	S	MS	S	49.90	2.52
14	03/28/2011	S	MS	S	55.20	2.52
15	10/27/2011	S	MS	S	58.94	2.52
16	06/12/2012	MS	MS	MS	62.15	2.52

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	
09/04/2008			S		S	33.08		

I. Disbursement Profile

P073036



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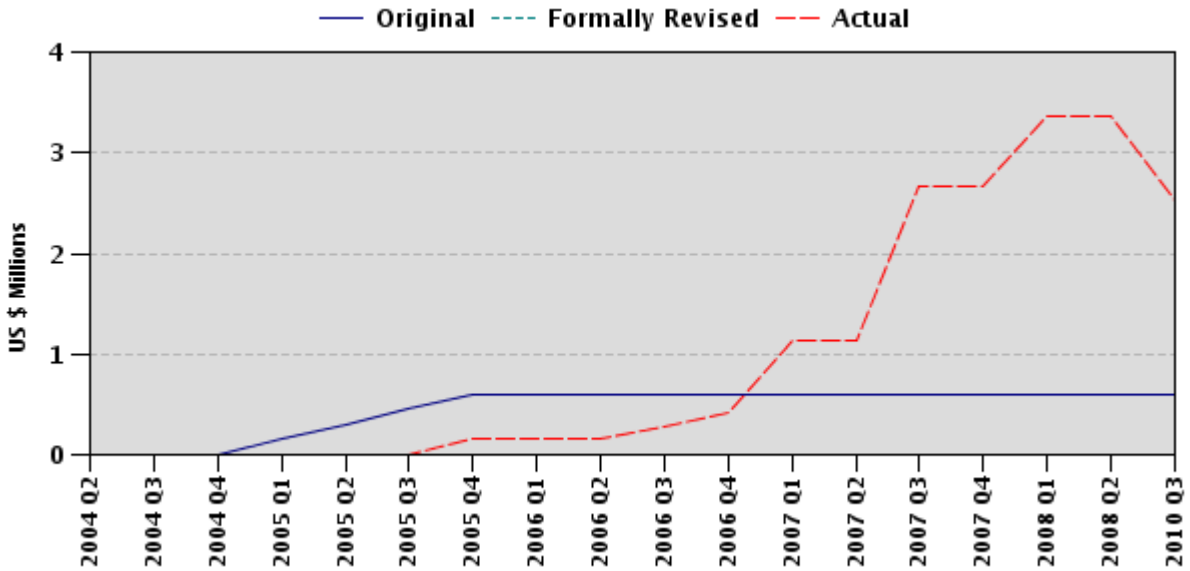

1. Project Context, Development and Global Environment Objectives Design

1.1 Context at Appraisal

Country Context

1. At the time of project preparation, Mali with its 11.3 million inhabitants was one of the poorest countries in the world due to its limited resource base, land-locked status, vulnerability to external shocks, poor infrastructure, low levels of human development and weak administrative capacity. Over the previous decade and despite these constraints, Mali had made commendable progress on the economic, political and social fronts. Annual real growth rates for 1994-2002 averaged about 5 percent. The private sector was increasingly playing a much larger role in the economy, and civil society and stakeholders were strengthening partnerships with Government of Mali (GoM) and having a more active role in development activities.

2. In parallel with this progress, Mali achieved a remarkable political transformation with an increasingly strong democratic process, taking root throughout the 1990s, culminating in the peaceful transfer of power between two democratically elected leaders in 2002. While governance, capacity and institutions still needed strengthening, the overall framework for a more effective, transparent and decentralized administration seemed to be gradually taking shape.

Sector Context

3. In the early 2000´s when the project was prepared, the limited reach of the electric grid was a major constraint for business expansion in Mali. Tariffs were also below the economic cost of supply. Moreover, the state-owned power utility, *Energie du Mali* (EDM), was poorly managed and lacked investment funds to ensure adequate quality and reliability of service to consumers as well as extend access to a growing number of households in need of electricity. The GoM undertook important reforms to improve the efficiency and management of the grid-based electricity sector with the privatization of EDM and the privately managed Manantali Dam. Under the closed IDA-financed Selingue Rehabilitation Project, the Government set up a new legal and regulatory framework, establishing an independent regulatory authority, *Commission de Regulation d'Eau et d'Electricité* (CREE), in March 2000, prior to transferring EDM's assets to a private concessionaire selected through competitive bidding.

4. *Energy in Rural Areas.* In Mali, barely 1 percent of the rural population had access to electricity at the time of appraisal in 2003. Most rural households met their lighting and small energy needs with kerosene, dry cell and car batteries. The government planned to create national institutions with responsibility for scaling up successful programs (such as the private decentralized services companies (DSCs), multi-functional platforms, and household energy initiatives). The Government was also aware that any rural energy program had to address severe technical and economic constraints, which were a direct consequence of the intrinsic characteristics of rural areas and hampered the profitability prospects of such programs. These constraints were the high investment costs and wide dispersion of loads, which discouraged power network expansion, the low capacity-to-pay, and irregular income of rural populations.

5. Moreover, reform processes and institutions that provided energy for rural populations still needed to be strengthened in order to foster a competitive business environment that was attractive to private investors and operators. To accelerate energy access in rural areas in a sustainable manner, it

was thus critical to develop a good combination of an institutional (legal and regulatory) framework and tools (technical, economic and financial) - in order to address the above-listed constraints as well as to attract private investors/operators. The GoM had already taken steps towards this goal and had decided to create: (i) a rural energy services agency, *l´Agence Malienne pour le Développement de I´Energie Domestique et de l´Electrification Rurale* (AMADER)*;* and (ii) a financial instrument, a rural energy fund, *Fonds d' Electrification Rurale* (REF).

6. *Wood Energy*. Traditional biomass energy in the form of fuelwood, charcoal, and dung represented about 90 percent of the final energy consumption in Mali. The use of charcoal for cooking was widespread in rural as well as urban areas and growing rapidly, unhampered by urbanization. The use of firewood and charcoal by households had substantial detrimental effects on health and on the environment affecting mostly women and children. Increasing use of wood for energy also constituted a serious threat to the environment, especially in fragile ecosystems such as those found in Mali. Pressure on forest resources was exacerbated due to the growing reliance of urban populations on charcoal for cooking. Community-based forest management initiatives and the introduction of efficient charcoal kilns and improved wood and charcoal stoves which increase fuel efficiency by at least 30 percent and 25 percent respectively were deemed necessary since they provided health and environmental benefits in the short to medium term, as well as social and economic benefits. Moreover, by improving income levels in communities such initiatives were likely to prepare the ground for the affordability of modern energy services.

Rationale for Bank Assistance:

7. At the time of appraisal, the World Bank Group's work in Mali was focused on the following strategic axes in line with the PRSP adopted in May 2002 and reconfirmed in October 2002 by the new Government, including: (i) accelerated and re-distributive growth to continue macroeconomic and structural reforms to facilitate diversification of production and exports; (ii) institutional development while improving governance and participation in a context of decentralization; (iii) human resources development and improvement of access to quality basic services; and (iv) development of basic infrastructure services. The objectives of the Bank's Country Assistance Strategy (FY04-06) in Mali were aligned to support the PRSP pillars. The CAS intended to help the Government improve economic competitiveness and to carry out key legal, regulatory and institutional reforms to create an enabling environment for an increased private sector participation in productive economic sectors.

8. The Bank was in a unique position to assist the government as it had been a major partner in the energy sector with support for the Selingue Rehabilitation Project and the Household Energy Project (HEP). Its continued support was considered crucial in revitalizing the rural electrification efforts, which were showing obvious signs of stagnation as donor funding was depleted. The Bank's involvement not only would bring its international experience and knowledge in supporting rural energy and household energy programs in over 30 developing countries but it would also help leverage new commitments from the international donor community.

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

9. As stated in the Credit Agreement, "The objective of the Project is to support the Borrower's efforts in increasing access to modern energy services for its population through: (a) increasing energy supply to small and medium enterprises and health and education centers in rural and peri-urban areas; (b) promoting community based woodland management; and (c) strengthening of energy sector reform processes towards increased private sector participation in decentralized energy services delivery." This PDO is a simplified version of the PDO included in the project appraisal document " (i) accelerating the use of modern energy in rural and peri-urban areas in order to increase productivity of

small and medium enterprises, to enhance the quality and efficiency of health and education centers, and to improve living standards; (ii) promoting further community-based woodland management to reduce un-sustainable pressure on forest resources while simultaneously encouraging interfuel substitution and energy efficiency initiatives; and, (iii) strengthening energy sector reform processes and related institutions to create a favorable investment environment for increased private sector participation in decentralized energy services delivery in rural and peri-urban areas." This evaluation is based on the simplified PDO reflected in the Credit Agreement.

10. Key outcome indicators were: (i) increased employment in rural areas facilitated through the provision of decentralized delivery services to small productive enterprises; (ii) increased hours spent in education and productive activities due to improved access to energy; and (iii) increased rural awareness of energy, health, and environment-related issues. These key outcomes defined in the original PAD were not monitored through the results framework. However, the impact assessment study carried out in 2009/2010 gives evidence of the sizeable beneficial impact of electricity provision on income-generating activities and employment creation.

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

11. The Global Environment Objective (GEO) was to initiate a program aimed at removing the barriers to adoption of renewable energy technologies (RETs) under GEF Operational Program 6 in order to reduce gross calculated greenhouse gas (GHG) emissions, primarily those of carbon dioxide (CO2).

12. The key output indicator for the GEO was the number of Solar Photovoltaic Systems Installed.

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

13. The PDO, as stated in the legal agreement, remained unchanged and relevant throughout project implementation. In the preparation of the Additional Financing in September 2008 it was agreed that the original outcome indicators in the Project's results framework for the *Capacity Development and Institutional Strengthening Component* were not sufficiently result-oriented and precisely formulated. Emphasis was then placed on the quality of Capacity Development and Institutional Strengthening rather than the quantity of training outputs and equipment.

14. Most of the indicators of *Energy Services Delivery Component* showed that they were on track to reach their targets when the Additional Financing was being prepared; however, they were revised to reflect the expected results from the Additional Financing. Regarding the *Household Energy Component* some indicators of the original project revealed overly ambitious and unrealistic target values in view of the complexity of the activities and the number of stakeholders involved – such as numerous community stakeholders as well as central and regional government directorates. Therefore, the targets of this component were revised to be more realistic.

15. With the approval of the Trust Funded Additional Financing in 2011 some of the outcome indicators related to components 1 and 2 were revised to include the new targets to be funded with the new financing and the new energy core indicators were introduced.

16. See Annex 2 for a description of the changes and results achieved in the Results Framework.

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

17. The GEO and key indicator remained unchanged throughout project implementation.

1.6 Main Beneficiaries

18. As stated in the PAD, the project was expected to have direct and indirect benefits associated with different project interventions that would have a positive impact on poverty reduction targets as well as links to the Millennium Development Goals (MDGs).

19. *Direct benefits.* These included access to, and an improved quality of, energy services that would directly increase the ability to generate income, and enhance the well-being and sense of empowerment of the poor; enhancing labor productivity; improving illumination; reducing health risks; improving access to information and markets; and empowerment of village communities by transferring control of local wood fuel resources to them, thereby helping them become independent players in the market while ensuring environmental sustainability of the forest resources.

20. *Indirect Benefits.* These included improvements in the availability and quality of energy services to small enterprises and communities which could indirectly benefit the poor by creating jobs and easing pressures on destructive natural resource exploitation, particularly depletion of natural forests for wood fuel.

21. *Empowerment of Women:* Women are major actors in fuelwood production, transformation and trade. Interventions in these areas were likely to change their working habits by providing them with more time to devote to other productive and educational activities. Household energy interventions focused on improved cook stoves would also provide direct benefits to women and children given their traditional roles in cooking and woodfuel collection. Women's associations are also playing an important role in remote communities as providers of energy services.

22. *Communes:* By recognizing their key role in energy services delivery processes and woodfuel management, the project was expected to contribute significantly to the empowerment of communes, in their relationship with government bodies as well as with their local constituents.

1.7 Original Components (as approved)

23. The project had three main components - which were financed by IDA with US$35.65 million, GEF with US$3.5 million, the GoM with US$5.25 million and the private sector with US$8.95 million:

24. **Component 1: Capacity Development and Institutional Strengthening (US$ 11.64 million).** Component 1 included four sub-components aimed at (A) supporting the capacity development of the Regulatory Commission staff (CREE) to enable them to carry out their responsibilities of contract oversight, monitoring and compliance more effectively; (B) supporting institutional strengthening of the National Directorate of Energy (DNE) to monitor implementation progress of energy sector strategy and reform; (C) supporting institutional strengthening of the National Directorate of Nature Conservation (DNCN) to play an active role in the management of the household energy sector; and (D) supporting the capacity development of the Rural Energy Agency

(AMADER) to become an operational institution.

25. At appraisal, the CREE, the DNE, and the DNCN were poorly equipped and lacked the critical expertise needed to carry out their functions. AMADER, as a newly created institutional, needed support to become operational and efficient.

26. **Component 2: Energy Services Delivery (US$ 28.24).** This component had 3 sub-components:

27. *A. Promotion of Rural Electrification Investments (US$24.64 million).* This sub-component included: (i) establishment of Rural Electrification Fund (REF) - to be used to promote rural electrification investments undertaken by private operators; as well as related studies to prepare and evaluate bids; (ii) study to assess the need for the special financing instruments to help mobilize the required financing from commercial banks; and (iii) monitoring and evaluation studies of individual investments.

28. *B. Promotion of Multi-functional Platforms (US$1.55 million).* This sub-component financed (i) a study to assess the sustainability of existing multifunctional platforms; and (ii) provided micro-financing to support the equipment start-up costs of multifunctional platforms to be operated by community associations, women's associations, NGOs, and the private sector.

29. *C. Information, Education, and Communication (US$2.05 million).* This sub-component was aimed at helping communities to be aware of energy services schemes by providing support to extensive information and promotional campaigns through existing media in rural areas; field trips to neighboring villages where services are installed and working; organization of focus groups to have feedback from users and to register concerns from prospective users; and organization of workshops for private operators, NGOs, and other civil society.

30. **Component 3: Household Energy (US$13.47 million)**. The household energy component was built on achievements of the previous Household Energy Project (HEP) and supported the scaling-up of initiatives of the national strategy on household energy. It had three main subcomponents:

31. *A. Community-based Woodland Management (US$8.31).* The subcomponent, which was developed in coordination with the Ministry of Environment and Sanitation, supported the development of standard contracts for use by communities and local governments for management and exploitation of wood resources.

32. *B. Interfuel Substitution and Energy Efficiency (US$2.89).* The promotion of efficient wood energy and alternative products was a continuation and extension of the HEP project demand-side component. Its main thrust was the promotion of efficient charcoal stoves and substitution by kerosene, LPG and alternative biomass fuels and the penetration of low-energy consumption lamps and energy efficient evaporative air-coolers to reduce the peak power demand curve and to reduce the electricity bill for end-users.

33. *C. Information, Education, and Communication (US$2.27).* This sub-component financed (i) extensive information and promotional campaigns through existing media in rural areas (radio, institutional, grassroots) in order to raise interest and formal requests from rural communities in support of the community-based woodland management, interfuel substitution and household energy efficiency activities; and (ii) woodfuel sector training, planning and monitoring.

1.8 Revised Components

34. The components remained the same throughout project implementation.

1.9 Other significant changes

35. The HEURA project, in the amount of SDR 25.20 million (US$35.65 million equivalent) with a GEF Trust Fund of US$3.50 million was approved on November 4, 2003. The Credit became effective on October 13, 2004. The project benefited from an additional IDA credit in the amount of SDR21.60 million (US$35.00 million equivalent) which became effective on January 5, 2009 and a Trust Funded Additional Financing in an amount of US$8.50 million approved by the Country Director in August, 2011.

36. These additional financings did not change the development objectives and implementation modalities of the HEURA but were intended to facilitate the *scaling-up of activities aimed at achieving a greater impact on the ground*.

37. ***Additional Financing:*** With the additional financing which was signed on October 3, 2008 and became effective on January 6, 2009, the following additional activities were financed under the three components:

38. **Component 1: Capacity Development and Institutional Strengthening (US$2.4 million).** This component included additional capacity building and institutional strengthening support to CREE, DNE, DNCN, and AMADER to better perform their responsibilities and mandates.

39. **Component 2: Energy Services Delivery (US$30.3 million)**. The Energy Services Delivery Component financed the scale up of rural electrification projects. The successful experience of the spontaneous bottom up projects proposed by local private sector operators during the implementation of the HEURA demonstrated the potential of a large-scale energy access project in Mali.

40. *Sub-component A: Scale up of Rural Electrification Projects.* The original project attracted an impressive number of local private sector operators through small-scale projects. Therefore, through the Additional Financing, the energy services delivery investments were scaled up through the extension of existing bottom up projects, the development of new bottom up projects, and the development of one top down project. The original project envisaged support to larger rural electrification schemes. The concerned areas had already been identified through a planned "top-down" approach. It was anticipated that the larger size of the areas could attract international operators and as such develop five to seven large schemes, including the extension of two pre-existing rural electrification concessions. It turned out that the development of these top-down projects was difficult and very slow. In addition, they required the participation of foreign private sector investors to engage in ventures in rural areas of Mali. The extension of the two existing larger decentralized concessions was eventually implemented through a separate financing from KfW.

41. *Sub-component B: Scale up of Multi-Functional Platforms Investments.* The original project demonstrated that the multifunctional platforms were helping communities have access to basic pre-electrification and helping to develop productive uses of energy. The additional financing aimed at scaling-up the number of multi-functional platforms in remote communities. A particular emphasis was placed on partnerships with the local banking system to develop micro-financing schemes to support the women's associations managing these platforms.

42. *Sub-component C: Information, Education, and Communication (IEC).* Implementation experience with IEC through the original project indicated that a deepening of the initiatives, their relevance to local communities, and demonstration workshops were important. The Additional financing supported tailor-made IEC initiatives mostly in remote communities to support energy services delivery initiatives.

43. **Component 3: Household Energy (US$2.3 million)**. The rate of physical progress of the woodland management initiatives of the original project was slow as many actors both local and central were involved and considerable amount of time was needed to build and maintain participatory consensus on activities. Moreover, sustainability of these initiatives was linked to the enforcement of forestry legislation. A strategic choice was made to consolidate initiatives of the original project and to scale up only those that have proven satisfactory in their implementation.

44. *Sub-component A: Community-based Woodland Management.* This sub-component financed: (i) the consolidation of woodland management plans; (ii) small woodfuels management activities by local communities and private operators; and (iii) a forestry information system. This sub-component also financed specific activities initiated in partnership with the DNCN to strengthen the legal and regulatory framework sustaining the woodfuel sector.

45. *Sub-component B: Interfuel Substitution and Household Energy Efficiency.* This sub-component financed: (i) the scale up of improved stoves dissemination; (ii) the scale up of low consumption lamps; and (iii) an information system on energy efficiency. A review of the implementation of the original project indicated that initiatives on kerosene stoves, LPG, wood briquettes, and evaporative air-coolers did not get an adequate response from users. The additional financing funded studies to further understand barriers to the adoption of these devices.

46. *Sub-component C: Information, Education, and Communication.* This sub-component financed promotional campaigns to support the consolidation of woodland energy management initiatives, interfuel substitution and energy efficiency initiatives.

47. ***Trust Funded Additional Financing:*** Financing for the Trust Funded Additional Financing were provided from the following two trust funds: (i) US$2.00 million from the AFREA TF (Africa Renewable Energy Access Trust Fund) from the Kingdom of the Netherlands contribution to the ESMAP Clean Energy Investment Framework Multi Donor Trust Fund, and (ii) US$6.50 million from the recipient executed window of the ESME TF (Trust Fund to support Energy Small and Medium Size Enterprises in Sub-Saharan Africa) donated by the Government of Russia. These funds were accompanied by two parallel co-financings in the amount of US$0.9 million[1]. The Trust Funded Additional Financing was aimed at strengthening Component 1 (US$1.60 million) and Component 2 (US$6.90 million) of the original project. No new trust funded activities were planned under Component 3.

48. **Results Framework**. As mentioned in section 1.4 above, at the time of the preparation of the Additional Financing in 2009, the original outcome indicators in some of the project components were modified to better capture the expected results and be more realistic or were revised to reflect the

[1] This included a parallel co-financing in the amount of US$0.5 million provided from the ESME TF through a recipient executed grant to Global Village Energy Partnership International (GVEP-I) for technical assistance. A second parallel co-financing in the amount of US$0.4 million was provided from the AFREA TF in the context of the ESMAP Gender & Energy Development Strategies Program.

expected results from the Additional Financing. With the Trust Funded Additional Financing in 2011, some indicators were revised to reflect the expected outcomes from the additional financing and to include the new energy core indicators. See Annex 2 for a summary of the changes undertaken in the Results Framework.

49. ***Other changes.*** The legal agreement for the Additional Financing amended the legal agreement for the original Credit in the following manner:

- It extended the closing date of the original Credit from June 30, 2009 to June 30, 2012 resulting in a cumulative project lifetime of about 8 years from Board approval in November 4, 2003;
- The percentage of expenditures financed under the table in Part A of Schedule 1 of the Original Financing Agreement was increased to a 100 percent for categories (1), (2), and (4) of said table; and
- It reallocated the original Credit disbursement categories to reflect the financing requirements of the project. The GoM requested this reallocation to mainly allow adequate financing to the Energy Services Delivery Component consistent with its performance and to keep momentum generated among local private operators.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

50. There was no Quality at Entry assessment undertaken by the Bank's Quality Assurance Group (QAG).

51. ***Project preparation***: Project preparation was done in close coordination with the Malian Directorate of Energy, which included staff from the previous Household Energy Project. Key background analysis consisted of a stocktaking of rural electrification and household energy access experiences in the country. This stocktaking provided inputs to two main documents: (i) a National Rural Electrification Framework; and (ii) a National Household Energy Framework. These documents were formally adopted by the Government in 2003.

52. A key issue identified in the sector by the project preparation team was the lack of coordination of many actors involved in rural electrification and household energy in the country. The project through Component 1 included joint training and coordination between the key players in rural electrification (i.e. AMADER, CREE, DNE, and DNCN). It was acknowledged that strong institutional arrangements and funding mechanisms were necessary to support the countries energy access expansion agenda. The Bank was expected to assist the Government with knowledge in addition to financing.

53. ***Project Design.*** Based on experience and available information at the time of appraisal, HEURA can be considered as appropriately designed. The Project Development Objectives, components, and organization were in general realistic and responded to the needs identified in previous projects and background analysis, however, for certain sub-components under components 2 and 3, the expected outcomes over-estimated the demand of the stakeholders for some type of technologies as well as the number of hectares under sustainable woodland management and the number of new operational wood energy markets. There were also some deficiencies in the design of the M&E Framework especially lack of clarity (value and definition) on some of the targets to be measured.

54. Component 1 successfully identified and supported capacity building activities for key sector institutions, especially the newly created AMADER and promoted the coordination among those institutions.

55. Component 2 promoted an innovative approach to rural electrification based on two main elements: i) attracting the private sector to invest in and manage different schemes within the framework of public-private partnerships; and ii) adopting a 'concession' approach for priority rural electrification schemes but with the flexibility to support smaller initiatives, within the concession area, proposed by cooperatives, consumer groups, village organizations or local operators. The commercial and socioeconomic viability of the new approach to rural electrification had been demonstrated convincingly by two different schemes that were operating successfully in different regional areas of the country. This component also financed the promotion of multi-functional platforms that were supported by the local communities under an ongoing UNIDO, IFAD and UNDP initiative.

56. Component 3 was designed to scale-up and strengthen activities initiated by the previous Household Energy Project (HEP) that closed in 2000, in the areas of woodland management and demand side management. It´s design was based on a thorough analysis of the main issues associated with household energy in the country and the operational conditions and sustainability of community-based woodland management.

57. The project relied on one implementing agency – AMADER – for the overall implementation of the three components with fiduciary and safeguards responsibility. The team took a cautious approach to implementation expecting a slow implementation progress during the first year of project implementation, which proved realistic since AMADER was a newly created institution that required time and resources to become operational. In that context, emphasis was also placed both on selecting experienced operators and reaching agreement on sound contractual frameworks for components 2 and 3. The project design met Bank fiduciary, social and environmental safeguard policies, including public disclosure of all required documents.

58. Project preparation benefited from the experience gained in the previous projects supported by the Bank in Mali and made efforts to identify and incorporate key lessons learned, as follows:

- ***Regulation:*** To sustainably bring decentralized energy initiatives in rural areas into effect and to create an enabling climate for private sector and local government involvement, the project supported the drafting of key legislation and operational policies through various project sub-components. Within the new regulatory framework, AMADER was mandated to promote electrification in “un-served areas” (i.e. areas outside EDM-SA’s concession areas).
- ***Sound Contractual Framework:*** The project design envisaged a slow initial buildup of new operators of decentralized energy services, not only to ensure qualified operators but also to ensure that new contracts were satisfactory to all parties and reflected the early operating experience of ongoing schemes.
- ***Strong Community Ownership, Participation, and Entrepreneurial Contribution:*** Participatory approaches were strongly encouraged in project implementation, especially under Components 2 and 3 which in the end resulted in some implementation delays on the community based woodland management sub-component under Component 3.
- ***Adequate Capacity at Central and Decentralized Levels:*** The capacity building component of the HEURA project addressed existing capacity weaknesses at centralized and decentralized levels and organized extensive training activities for private sector operators, NGOs, and staff of the concerned ministries and agencies.

- ***Reduce Barriers for the Promotion of renewable energy technologies (RETS):*** The project built on the prior project experience of other donors and developed a coherent and strong program of knowledge and financing support for the promotion of these technologies (e.g. the subsidies provided by AMADER to bring down up-front costs, support training and awareness activities to reduce knowledge barriers, etc.), which for some technologies was very successful and for others did not reach the expected outcomes.
- ***Profitability of schemes:*** From a sustainability perspective, it was important to ensure sufficient operating profitability of rural electrification schemes, which justified the choice to set them up on a commercially viable basis. At initial stages, capital subsidies were required, but recurrent operating cost subsidies would have undermined sustainability. Based on the current situation (post-closing), this objective seems to have been achieved and the most of the rural electrification concessions supported by the project are operating without operating subsidies. However, given that the concessions remain relatively recent, there is still uncertainty regarding longer term sustainability, especially at the time were replacement of generation equipment will become necessary.

59. The Government´s commitment to promoting rural electrification, sustainable wood energy management and energy conservation at the time of project preparation was evident by the conception and implementation of the legislative and regulatory framework for rural electrification and energy conservation in the Government's policy letter of November 1999 and embodied in the new legislative framework for electricity of 2000. In addition, a decision was taken to allow private generation and open the possibility of private participation in the national power utility EDM-SA. The new policy framework also promoted rural electrification, in association with private enterprises and local governments. Regarding wood energy, the GoM had already changed significantly the woodfuel law *(1996)* & decree *(1998)* governing woodfuel taxation, in order to incorporate concepts such as rural markets, village wood lots management, and differential taxation depending on the mode of management and efficiency of commercialization.

60. ***Stakeholder involvement and/or participatory processes in project preparation:*** The process of validation and adoption of the National Rural Electrification Framework and the National Household Energy Framework during project preparation involved many stakeholders such as NGOs, private sector operators, community associations, and consumer associations.

61. ***Assessment of risks.*** The project risk was rated as Substantial at appraisal. Several risk factors were assessed and mitigation measures considered as follows:

- *Difficult municipal empowerment for rural energy services contracting.* Risk was rated as modest. This risk did not materialize. AMADER proceeded systematically with an involvement of local administrative institutions and ensured that operators worked closely with municipalities.
- *Resistance to delegation of tax system to rural communities and privatization of flow control.* The risk was rated substantial. This risk materialized even though the mitigation measures were implemented throughout project implementation. There were delays in the adoption of the tax regulation. Most importantly, the enforcement of the regulations was difficult, as the forestry department did not always have the necessary equipment and staff to play its role.
- *AMADER not autonomous or not self-financing or not sufficiently efficient.* Rated as substantial during appraisal. In spite of some minor issues expected from a newly created institution, AMADER performed well throughout project implementation and this risk did not materialize. Results on the ground earned AMADER its autonomy in executing its assigned mandate. However, financial autonomy remains an issue.
- *Financial Sustainability of AMADER.* Risk was rated substantial. Delays in mobilization of

Government counterpart funds at times slowed down project implementation. Despite the delays, counterpart funds financed AMADER's staff costs and part of its operational costs throughout project implementation. At the time of approval of the Additional Financing of 2008, the legal agreement for the original credit was amended to reflect the 100 percent financing under the Country Financing Parameters in order to minimize the counterpart risk.

- *Financial Management of AMADER.* Risk was rated as modest. Financial management ratings were consistently rated satisfactory or moderately satisfactory and recommendations on the financial management were followed and implemented by AMADER.
- *Insufficient private sector interest in decentralized energy schemes.* Rated as substantial during appraisal. The interest of the local private sector in decentralized rural schemes was greater than expected. On the other side, the interest of the international private sector in larger scale energy schemes was lower than anticipated.
- *Difficulty for household and institutional market for solar PV to develop significantly due to weak financial markets and small market size for the development of solar PV initiatives.* These risks were rated as modest but turned out to be significant and resulted in the cancellation of a portion of the GEF grant that was financing the solar PV activity - operated under a fee-for-service model. Private operators were not as interested as expected in adopting solar technologies. Also, consumers wanted multiple uses of energy services that were difficult to provide with solar home systems which usually only offer basic electricity services adequate for lighting, mobile phone charging, radio and limited TV viewing.
- *Problems in energy distribution operation and maintenance, political interferences.* Rated as modest. This risk did not materialize during the implementation of the original project. However, during the implementation of the IDA Additional Financing, the growing number of rural energy schemes managed by local operators under different tariff regimes, usually much higher than regulated tariffs for grid connected customers, created strong political demand for (i) electrification of more localities, and (ii) tariff harmonization which would render rural concessions immediately non-viable financially. In total, about 10 mini-grids located close to the grid around Bamako were connected to the network and incorporated into EDM-SA perimeter in 2011/2012.
- *Insufficient involvement of stakeholders in rural energy schemes.* Rated Modest during appraisal. This risk did not materialize.
- *Kerosene, LPG stoves or new biomass fuels not accepted*. Risk was rated as modest. This risk partially materialized, even though the mitigation measures were implemented. On one side, the LPG stoves and low-consumption lamps were a huge success. Interest in kerosene, wood briquettes, and evaporative coolers was much lower than expected.

62. In addition to the risks identified above, the Project Appraisal Document also identified two constraining elements in the sector context, which had to be taken account during project implementation, but which the Project was not designed to address or even significantly mitigate:

- *Tariffs.* The strategic choice of the GoM to promote rural electrification through local private operators, who benefit from investment subsidies, but have to cover their operating costs with revenue collected from consumers, has resulted in a very large differential in electricity prices, between, on the one hand, areas supplied by private local operators, and on the other hand, rural, peri-urban, and urban areas supplied by the utility EDM-SA under regulated national uniforms tariffs. The application of differentiated prices is critical to maintain the financial viability of electricity provision in rural areas. Micro grids will remain for a long time the only viable solution to provide electricity services in most of the Malian territory. For the micro-grids, electricity prices will likely remain significantly higher than the regulated grid tariffs applied by EDM-SA, even if the regulated tariffs are readjusted to cost-recovering levels. In order to achieve a sustained expansion of isolated micro-grids, capital investments subsidies

are needed. However, putting in place operating subsidies to harmonize prices with the areas covered by the national utility would likely prove financially unsustainable and require complex and unproven cross-subsidization mechanisms.

- *Enforcement of tax collection for woodfuels*. Woodfuel exploitation, production and trade remain largely informal rendering sustainable management and tax-collection difficult. Some steps have been taken towards improved structuring and increased professionalization of the sector which have contributed to better tax collection enforcement. Examples are the creation of associations for the transport of wood and charcoal, and, on the production side, the establishment of managing structures in rural areas.

2.2 Implementation

63. Implementation of the project was consistently rated satisfactory in project ISRs throughout the eight years of project implementation (except for December 2005 and June 2012). The two additional financings provided additional resources mainly for the two components (1 and 2) that were performing well allowing the project to build on the good performance of those components and to expand on the benefits that they were providing (i.e. additional connections for a larger number of households). An armed rebellion in Northern Mali in January 2012 increased political instability and led to the March 2012 Military Coup. The coup triggered Bank policy OP and BP 7.30 ("dealing with de facto government"). A Management decision was made on May 16, 2012 instructing task managers to close administratively all operations due to end by June 30, 2012. This situation affected AMADER´s ability to execute its work program during the first semester of 2012. This was reflected in the last project ISR which downgraded overall implementation progress from satisfactory to moderately satisfactory. Similarly the progress towards the achievement of the development objective was downgraded to moderately satisfactory.

64. As of December 31, 2012 100 percent of the Original Credit, 72 percent of the GEF Grant, 80 percent of the Additional Financing, and 68 percent of the Trust Funded Additional Financing were disbursed. While OP 7.30 remained in application for the Mali portfolio, teams were allowed resumption of disbursement for ongoing projects with specific procedures to address potential fiduciary risks in September 2012. In the case of the HEURA Project, the August 2012 fiduciary review of the Mali portfolio recommended to carry out on the ground physical verifications before processing outstanding requests for payment. To allow for the verification and the processing of payments, Bank management - in application of OP/BP 12.00 paragraph 9 – approved a two-month extension of the four-month period after the Closing Date during which eligible applications for withdrawal could be processed. In that context, outstanding payments for activities undertaken before the Military Coup were made by the extended end of the grace period on December 31, 2012.

65. ***Overall Implementation.*** The project succeeded in strengthening technical and managerial capacities at AMADER and in the main sector institutions (DNE, CREE and DNCN) supported by Component 1. Under the original project and the IDA Additional Financing, DNE, CREE, DNCN, and AMADER have completed more than 648.2 staff weeks of training (target was 600).

66. The *Energy Services Delivery Component* (Component 2) was the driving force of the project both in terms of outcomes and budget (approximately 67.5% of all project funds). It has succeeded in developing an adaptive and multi-layered approach to rural energy - combining bottom up spontaneous small concessions with top down planned large concessions. With the bottom up approach, 83 sub-projects proposed by local private operators are functional. Local private operators have provided an average matching co-financing of 25 percent of the financed schemes. As of June 30, 2012, a cumulative number of about 74,787 connections had been made, exceeding the target of 68,896 connections. A cumulative number of 1,295 public and community institutions and centers have

access to electricity including 218 schools and 168 health centers, achieving 71% of the targeted 1,809 public and community institutions and centers. Also, a significant proportion of the connections (above 10%) supply electricity to revenue-generating activities (broadly defined and including informal economic activities). This customer category was not identified and reported separately in the original project. However, the 2009-2010 impact survey revealed the weight of these economic activities in rural electricity consumption.

67. Women's associations also played an important role in remote communities as providers of energy services. They manage multifunctional platforms[2] electrification initiatives after receiving training in basic accounting in local languages provided by NGOs financed through the project. Multifunctional platforms have been installed in 81 communities just shy of the target of 86 communities[3].

68. Implementation of key activities under the *Household Energy Component* (Component 3) occurred at a slower pace. The rate of physical progress of the woodland management initiatives was slow compared to that of rural electrification initiatives. However, towards the end of the project, an encouraging trend associated with the household energy component was seen with an increased collection of forest revenues due to better law enforcement by both forestry officials and local communities. Through the Wood Fuels Supply Master Plan, about 1.14 million hectares of the planned 1.40 million were placed under sustainable management and 282 rural wood markets of the planned 300 markets were created as of June 30, 2012. The experience with rural wood markets under the project indicated that emphasis should be placed on ensuring their efficiency and sustainability rather than increasing their numbers.

69. Highly satisfactory implementation was made in the dissemination of improved stoves, low consumption lamps and evaporative coolers. At project closing, 1.29 million (approximately 18% higher than the target of 1.09 million) improved stoves had been disseminated. Similarly, 1.30 million efficient light bulbs (CFLs) were disseminated (approximately 186% more than the an initial target of 454,000[4]). Also, 2,847 evaporative coolers (target was 2,000) have been disseminated. However, adoption of LPG stoves, briquettes, and kerosene stoves followed a lower than anticipated curve, due to affordability and convenience reasons (e.g. only a limited number of manufacturers included the new stoves in their array of products, storage and distribution networks were not as elaborated as needed and households were not as interested in certain technologies as expected, etc.).

70. ***GEO Implementation.*** The Grant for the Global Environmental Facility became effective in May 2004 and closed in June 2009, as originally planned. The original grant amount was US$3.5 million but at closing, a portion of the grant was cancelled (US$0.98 million). Total disbursement of GEF funds was US$2.52 million.

71. With the installation of 8,141 solar photovoltaic systems, only 69% of the original end target was achieved. The decision to do not extend the GEF Grant was due to the fact that at that time private operators were not interested in adopting as much as expected solar technologies and beneficiaries also wanted multiple uses of energy services that were difficult to be provide with solar home systems. The team made a strategic decision to concentrate efforts in facilitating the implementation of other project

[2] A multifunctional platform is composed of a small 10 kW diesel engine coupled to a generator. The platform can be connected to income generating equipment, such as cereal grinding mills, battery charger, dehuskers, and water pumps, or generates electricity that can be distributed through a micro-grid to households.
[3] According to AMADER, no such target was set.
[4] According to AMADER, the target was 200,000.

activities that had more stakeholder demand and thus, were more likely to materialize.

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

72. The original M&E framework could have been better designed in terms of selecting appropriate indicators and targets. Not all of the indicators had effective collection methods, available baselines, or were relevant to monitor progress to achievement of PDOs. In particular, the key outcome indicators defined in the original PAD (increased employment in rural areas thanks to connection of small productive enterprises; increased hours spent in education and productive activities…) could not be monitored during project evaluation. However, this does not imply that the expected benefits did not materialize. On the contrary, the impact assessment study carried out in 2009/2010 points to sizable beneficial impact of electricity provision on income-generating activities and employment creation.

73. As mentioned in section 1.4 above, at the time of the preparation of the Additional Financing, the original outcome indicators in some of the project components were modified to facilitate more effective monitoring. Also, the value of targets was revised to reflect actual progress with project implementation as well as the incremental benefits expected from the Additional Financing. Despite the changes introduced to the M&E framework, some indicators (i.e. methodology to report on individual vs. household connections; methodology to provide a summarized indicator of institutions connected (incl. schools, health centers, other public institutions) still lacked clarity. It should be noted that indicators and expected targets were not always consistent between the Bank and AMADER reports.

74. The M&E was useful for following the progress on the implementation of the different components and served two main purposes: (i) to target successful activities that would receive additional funding through the two additional financings, and (ii) to identify under achieving activities and to take actions that would encourage the progress on the implementation of those activities (as was the case in Component 3 that had a slow initial progress but improved overtime).

2.4 Safeguard and Fiduciary Compliance

75. **Safeguards.** The original project and the associated additional financings were classified as a Category B (Partial assessment) project. That is, the potential environmental and social impacts of envisioned activities, for the most part, were projected to be minimal, site-specific and manageable to an accepted level. The safeguard policies applicable to these operations were OP/BP 4.01, OP/BP 4.36, and OP/BP 4.12, defined as Environmental Assessment, Forests and Involuntary Resettlement. An Environment and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) were prepared and disclosed on May 2, 2003 before the appraisal of the original project. During the preparation of the IDA Additional Financing, ESMF and RPF were updated, reviewed and approved by World Bank safeguard specialists in 2008. Both frameworks, the project's ESMF and RPF, were re-disclosed in-country and in the Info Shop on April 2009. Before the Trust Funded Additional Financing for Mali HEURA was approved, as the original project remained a Category B operation.

76. The purpose of the ESMF was: (i) to establish the mechanism to determine and assess future potential environmental and social impacts of sub-projects that were to be identified; and (ii) to set out mitigation, monitoring and institutional measures to be taken during implementation and operation of the sub-projects to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

77. The RPF was prepared to establish the resettlement and compensation principles, organizational arrangements and design criteria to be applied when compensating people who may be affected by the project. The scaling up of the activities under the additional financing did not trigger any new social safeguards policy.

78. AMADER, through their Environmental and Social Safeguard Unit, was the main entity responsible for carrying the environmental and social function of this operation. The main responsibility of AMADER's Environmental and Social Unit was to ensure that environmental and social measures were adequately taken into consideration in the processing of business plans proposed by ESCOs and other local initiatives for rural energy services delivery activities. In addition, the *Direction Nationale des Eaux et Forêts* (DNEF) and the *Direction Nationale de Contrôle des Pollutions et des Nuisances* (DNACPN) ensured effectiveness of the implementation of proposed safeguards measures and compliance with national and Bank safeguard policies. Safeguards compliance is rated moderately satisfactory.

79. **Fiduciary.** Financial management and procurement aspects of the project were continuously rated Satisfactory or Moderately Satisfactory and the related FM risk was rated moderate throughout project implementation. Overall, financial management covered adequately the project's accounting and reporting arrangements, internal control procedures, planning and budgeting, counterpart funding, funds flow arrangement, external audit reporting arrangements, and project accounting staff issues.

80. Staffing remained adequate and proper books of accounts and supporting documents were kept in respect of all expenditures. Most of the audits were submitted on time, and were unqualified. The interim un-audited financial reports were also submitted on time and the quality of those reports improved throughout project implementation.

81. It is worth noting that in its last semester of implementation, as a result of the political and security context in Mali, the project faced significant problems restricting its ability to process disbursements. In application of its rules regarding dealings with de facto government, the Bank momentarily froze disbursements on the projects in Mali after the Military Coup of which occurred in March 2012. The freeze on disbursement remained in place until the project closing date on June 30, 2012.

82. This issue was eventually addressed after Project closing. Following a Bank management decision to resume disbursement on the Mali portfolio with strengthened fiduciary diligence, outstanding disbursement requests were all processed in December 2012. The disbursement rate of the project detailed hereafter is 90 % and the project's 2012 budget was executed at a satisfactory rate of 88 %.

Disbursement table (million US $)

Financing	**Allocated**	**Disbursed**	**Undisbursed**	**Rate**
IDA-3828-ML	35.65	38.02	-2.37	107%
IDA-4503-ML	35	28.05	6.95	80%
GEF TF 052958	3.5	2.52	0.98	72%
TF 98148	6.5	4.92	1.58	76%
TF 99253	2	0.89	1.11	45%
TOTAL	**82.65**	**74.4**	**8.25**	**90%**

83. All project components were implemented following the Bank's applicable procurement guidelines for works, goods and services. The procurement unit of AMADER was staffed with a Procurement Specialist who followed the Bank's procedures since 2002, for the procurement operations of the HEURA project. Planning problems in the *Energy Services Delivery Component* occurred during the last year of project implementation that affected the starting of some contracts. This posed a risk especially in the case of sub-projects, which included a financial contribution of the operator that promoted the project.

2.5 Post-completion Operation/Next Phase

84. Mainly due to the political situation in the country, there is an important level of uncertainty on the institutional and financial sustainability of AMADER, which depends significantly on donor support. It will need to work with the Government to create the necessary conditions and mechanisms for its sustainability.

85. Regarding the sustainability of the energy services delivery sub-projects, weak managerial expertise on the part of certain operators and low return on investment mainly due to the high cost of diesel could reduce the momentum among local private operators in those schemes. In this respect, specific capacity reinforcement could help them improve on their business plans preparation and implementation. Another way to strengthen rural operators would be to encourage the emergence of larger more professional operators, through a combination of larger individual concessions and multiple concessions per operators. With regard to the high cost of diesel-based generation, a promising solution is to diversify the generation mix through the introduction of renewables (see next paragraph). In addition, the GoM would need to develop a viable electricity tariff mechanism in rural, peri-urban, and urban areas, to ensure cost recovery and profitability while taking into account affordability issues.

86. ***Follow-up operation.*** The Climate Investment Funds committee approved in principle in its November 2011 session the Scaling Up Renewable Energy Program in Low Income Countries (SREP) program for Mali (with comments). The SREP Investment Plan was fully approved in March 2012. The main objective of SREP-Mali is to develop renewable energies with transformative impacts, to effectively contribute to poverty reduction and sustainable development in Mali – together with stakeholders and the private sector. Next steps entail the preparation of three project components of which two are led by the AfDB (Solar Photovoltaic IPP, Micro/Mini Hydroelectricity Development) and one by the World Bank (Rural Electrification Hybrid Systems). The overall SREP funding amounts to US$40 million - of which US$15.5 million of SREP funding are designated to the Bank's component. Within the restructuring of the Energy Support Project (PASE), US$20-30 million of IDA could be reallocated to a new rural energy project, to go to the Board in FY14-Q2 which will be combined with the SREP allocation. This would contribute to a scaling up and increased financial viability of existing hybrid mini-grid schemes in isolated off-grid areas in Mali. The aim is to increase renewable energy capacity – mainly solar PV and possibly biofuel – in the existing off-grid rural concessions and to make existing diesel power isolated grids hybrid through a standardized approach, so as to gradually increase the penetration of renewable energy in the rural generation mix. This could be complemented by testing small-scale SHS and modern PV lighting products as well as a well-designed maintenance and monitoring schedule. The activities will be based on AMADER's past and on-going rural electrification program and the lessons learned from the Household Energy and Universal Access (HEURA) project.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

87. The project is assessed as highly relevant to the development priorities of the Government of Mali both at outset and at completion. It is considered that the project has made a significant difference to the country´s poverty reduction strategy and the MDGs by facilitating the increase in the rate of rural electrification from 1 to 2 percent during appraisal to an estimated 17 percent in 2012. Over the same period, the number of electricity connections in urban areas more than doubled, increasing the rate of access above 50% in urban areas. The estimated overall rate of access to electricity services is above 30% which considering the challenges the country is facing (low density, landlocked location, reliance on imported oil products, low GDP per capita), is significant.

88. The project's objectives, design and implementation remain highly relevant to the GoM today. The project is consistent with the strategic priorities set out in the latest Country Assistance Strategy (CAS, Report No. 41746, December 12, 2007) for FY08-11 and the PRSP II. An Interim Strategy Note (ISN) is currently being prepared. The project supported the long-term country development objective set out in the first pillar of the CAS - "developing infrastructure and strengthening productive sectors". The project also fitted well within the CAS and PRSPII objectives by aiming to put in place policy, institutional and financing frameworks to increase access of energy services in rural and peri-urban areas with the participation of private entrepreneurs. Indeed, access to energy services was crucial in the enhancement of quality of social sectors as well as the competitiveness of productive sectors.

89. The continuing high relevance of the objectives throughout project implementation, as demonstrated by the GoM's request for two additional financings, also reflects positively on the overall design of the project which remained unchanged in the eight years of project implementation. The innovative approach for the promotion of rural electrification investments that was supported under Component 2 was highly successful.

3.2 Achievement of Project Development Objectives and Global Environment Objectives

90. The achievement of the PDO is rated as Moderately Satisfactory considering that some of the PDO indicators have been achieved or exceeded and significant progress was made on achieving the targets for the remaining ones. The achievement of the GEO is Moderately Satisfactory considering that the GEO indicator was only partially achieved, as explained below.

91. The outcomes achieved with regard to the project's objective of accelerating the use of modern energy in rural and peri-urban areas in order to increase productivity of small and medium enterprises, to enhance the quality and efficiency of health and education centers, and to improve living standards is rated as moderately satisfactory considering that the target 69,603 new households with access to modern energy services was exceeded reaching at project closing 74,787 households. At closing, the project reached 1,295 institutions (including schools and health clinics) achieving 71% of the revised target value after the two additional financings of 1,809 institutions with access to electricity services. The number of communities with installed multifunctional platforms was 81 at project closing which was very close to the end target of 88. Overall, AMADER's multifunctional platforms have performed satisfactorily. They were part of a broader national multifunctional platforms program. AMADER expanded the platforms with a public lighting system of an average of 2 kilometers. The public lighting was developed around market places allowing business hours to be extended to nighttime. The number of private operators providing energy services was 86 at project closing, which was below the end target of 125. Based on the above, and considering the high positive

impact on rural and peri-urban electrification achieved through this component, the achievement of this objective of the project is rated as moderately satisfactory.

92. The second objective of promoting further community-based woodland management to reduce un-sustainable pressure on forest resources while simultaneously encouraging interfuel substitution and energy efficiency initiatives had mixed results. The targeted number of hectares under woodfuel management program (1,400,000) was partially reached at project closing with 1,142,033 hectares under sustainable management. The number of new wood energy markets operational with an end target of 500 was not reached at project closing with 282 operational markets. The targeted number of improved stoves purchased by households (a total of 1.29 million improved stoves had been distributed, above the 1.09 million target) and low consumption lamps (1.30 million low consumption lamps distributed exceeding the target of 454,000) purchased by households and institutions greatly exceeded the end targets. The achievement of this objective is considered moderately satisfactory.

93. The third objective of strengthening energy sector reform processes and related institutions to create a favorable investment environment for increased private sector participation in decentralized energy services delivery in rural and peri-urban areas was achieved through comprehensive capacity building activities for key sector institutions, in particular for AMADER, responsible for drafting and/or operationalizing key legislation (See Annex 2 for a detailed list of outputs reached under this component). The achievement of this objective is considered satisfactory. The HEURA project has supported the Government of Mali to establish AMADER as a national institution to design and manage rural electrification and household energy programs. Two main supporting frameworks were produced and adopted by the Government: (i) *Cadre de Référence pour le Développement de l'Electrification Rurale au Mali*; (ii) *Cadre de Référence Pour le Développement de l'Energie Domestique au Mali*. These documents discussed the role and responsibilities of main actors involved with rural electrification and household energy. They discussed the vision and objectives of the Government and particularly the importance of public-private partnerships in the development of these sub-sectors. The significant participation of private sector operators to HEURA is an important result of the sector reform process.

94. The achievement of the GEOs is overall rated Moderately Satisfactory. The GEF grant was closed in 2009 with US$0.98 million of undisbursed funds. The GEO indicator with an end target of 11,736 installed PV systems was partially achieved (8,748 PV systems installed).

3.3 Efficiency

95. *Efficiency* is rated as "substantial". An economic reevaluation of the project has been performed using the original methodology but updating the assumptions regarding the valuation of the costs and benefits. On this basis, the revised Economic Internal Rate of Return (EIRR) of the project is 17.2% (against 33.2% in the original analysis) and the Net present Value US$ 9.3 million against US$ 29.0 million in the PAD (based on a 12% discount rate in both cases). The major factor behind the reduction in EIRR is the increase in fuel prices which has substantially impacted the profitability of the Energy services Delivery component (by far the largest). During project implementation, the cost of diesel fuel more than doubled compared to what was assumed during project preparation, mechanically increasing the operating costs of electricity provision in rural areas and reducing the net benefits even though the activities were successfully implemented. The benefits from the smaller Household Energy Component were also lower than expected, but in this case this is related to the partial implementation of the activities, compared to the original targets. Overall, the project economic justifications appear to remain solid in spite of the increase in oil prices. Going forward, the high cost of diesel fuel should lead to consider the introduction of more solar generation for rural

electrification (probably in hybrid diesel / PV system to provide guaranteed generation). In addition, a significant portion of project costs is related to capacity building and institutional development, which for the most part should not be recurrent costs. Future operations would use existing institutions and capacity and could be implemented with lower upfront costs for capacity building. (See Annex 3 for the detailed Economic Analysis)

3.4 Justification of Overall Outcome and Global Environment Outcome Rating

(combining relevance, achievement of PDO/GEOs, and efficiency)

Rating: Satisfactory

Taking into consideration the high relevance of the project, the moderately satisfactory PDO achievement, moderately satisfactory GEO achievement and substantial efficiency, the outcome is rated satisfactory.

3.5 Overarching Themes, Other Outcomes and Impacts

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

96. *Poverty impacts*. The impressive growth in access to electricity from 2003 to 2012 appears to have brought concrete benefits to the concerned populations. An impact assessment study was carried out in 2009-2010 ("*Enquête d'Impacts du Projet Energie Domestique et Accès aux Services de Base en Milieu Rural sur les Conditions de Vie de Populations Bénéficiaires: Composante Fourniture des Services Energétiques" Rapport final*, February 2010) by consultants supervised by AMADER. The objective of the study was to identify and measure the economic impacts of Component 2 on the livelihoods of the targeted beneficiaries. The study covered 23 electrified localities in total (including 7 multifunctional platforms) from which a sample of 2000 connected beneficiaries responded. Predictably, most of the beneficiaries were households (86%) but the proportion of income-generating activities in the beneficiaries was significant (12%) and in fact higher than previously assumed. Among the many findings of the impact assessment, the following can be highlighted:

- Rural electrification contributed to the creation or expansion of income generating activities in many areas (e.g. welding workshops, ice making shop, tailoring workshop, bakery and other food processing, internet café, rural telephony, charging stations…).
- Based on indications from respondents, rural electrification contributed to the creation of 735 permanent and 1,689 temporary jobs. Rural electrification contributed to an increase in activity and daily working hours in the concerned businesses (4 hours on average per productive unit [5]). The estimates are impressive given the size of the sample (2000 connections) but should obviously be used with caution and from a methodological standpoint cannot be considered as net job creation (additional economic activity in newly electrified localities could in part substitute for activities elsewhere).
- Education: Electrification of villages resulted in an increased of the time devoted to homework especially in the evenings. In this context, all 33 interviewed headmasters indicated that attendance improved and that the average academic performance of pupils increased significantly. In addition, half of the respondents reported the use of IT equipment.

[5] Examples are internet café 9 additional working hours, Ice-making company 8 hours, public phone 4 hours, bakery 5 hours, tailor 3 hours.

- Public lighting: Villagers are able to carry out whole range activities that were previously limited. Shops and markets can be open in the evening for business, social ceremonies and events can be extended to the nighttime. On factor appears to be the perception of improved public safety: more than 81% of respondents indicated that electrification had reduced the frequency of thefts (41% for physical aggressions) facilitating circulation in the evening.
- Health Services: In the health facilities surveyed, the number of prenatal visits increased by 12% after electrification. Given the small sample size and absence of control group, this cannot be considered as definite conclusive evidence.

97. *Gender Aspects*. Rural electrification benefits all residents but women in particular. The reduction in the extensive time and effort spent gathering woodfuels spent mainly by women allow them to devote more time to educational, productive and recreational activities and/or for doing other household chores. Moreover, women's associations played an important role in remote communities as providers of energy services. They manage some multifunctional platforms electrification initiatives after receiving training in basic accounting in local languages provided by NGOs financed through the project. At project closing, multifunctional platforms have been installed in 81 communities. As part of the additional financing, a gender assessment was carried out by the World Bank with support of ESMAP and AFREA. This included a desk review of AMADER's projects, field visits and consultations with the private operators and communities involved in AMADER's projects in 12 localities. 200 household surveys were collected to provide information on access to energy, household activities, and perceptions on the access and control of energy services among women and men. This information could then be used as proxy indicators to assess the impact of interventions. The gender assessment identified and surveyed several women owned small businesses benefiting from electricity, such as sewing shops, beauty parlors, restaurants and the selling of chilled drinks or ice through refrigeration. However, in proportion of total use for income-generating activities, women owned businesses remained a minority. This points out to a potential for increased direct participation of women in electrification programs. In this context, integrating gender considerations in the design of electrification programs, for instance by making sure that both men and women are involved in design and consultations, and by identifying ways to overcome barriers such as access to credit or technology for women and men, could further extend the benefits of electrification of rural communities.

98. Based on the findings and recommendations of the assessment, a time bound gender and energy action plan for AMADER was developed together with the staff and management to pilot activities within specific villages and develop capacity within AMADER on gender issues. Within AMADER a gender focal point was formally appointed in August 2011 to help define the activities together with staff and serve as the key person to follow up, engage and monitor activities. To help implement these activities, AMADER developed a partnership with UN WOMEN to work jointly on promotion of income generating activities for individuals through the rational use of energy sources and technologies, and on increasing the availability of functional equipment tailored to needs of women and men. The findings of the gender assessment were also integrated in the preparation of the SREP investment plan and have served as a case study for knowledge exchange globally and within the Africa region on how to conduct gender assessments, developing action plans and building the capacity to implement targeted activities.

99. *Social Development.* On the whole, the project was of high significance in terms of social capital building. The project served as an inclusive tool bringing villages and communities together to organize themselves around common goals and manage their resources more sustainably. It promoted collective decision-making at the community level. The participatory approach fostered self-confidence and a sense of empowerment among beneficiaries and provided them an opportunity to make their voices heard. Also, organized fuel wood markets are helping beneficiaries to have additional and predictable income. The use of improved stoves is reducing indoor air pollution

associated with acute respiratory diseases, conjunctivitis, and low birth weight in participating households.

100. Benefits of access to modern energy services in rural and peri-urban areas are wide-ranging and have generated positive impacts not anticipated. The availability of modern energy services in rural communities is allowing children to do their homework at night, women to be able to deliver babies in better conditions, villagers to have a security of movement at night, and a whole range of income generating activities are emerging from ice making, food processing, bakery, tailoring, rural telephony, and commercial banking. Markets can now be open for business at night and social ceremonies can be extended to the nighttime.

(b) Institutional Change/Strengthening

101. The project has succeeded in strengthening technical and managerial capacities in particular at AMADER and in a more differentiated way in main sector institutions such as DNE, CREE, DNCN and provided a valuable framework to bring together staff from different agencies to work together on rural electrification and forestry management issues. By participating in in-country formal and informal training sessions as well as international study tours and workshops, key implementing agency staff increased their competencies and know-how in critical areas of energy policy formulation, energy regulation, energy efficiency, environmental and social aspects, rural electrification, project evaluation, etc. At the time of project completion, AMADER was a well-functioning Agency with a clear structure and capable staff in technical, financial management, procurement and environmental and social areas. This represents a great achievement of the project. The strategic choice of the project to support the establishment of a new institution was a bold one. By design, it was also agreed with the Government that core staff of AMADER should be supported by the national budget for sustainability of the institution. The fact that AMADER is still operational after the closing of the project and the existing partnerships between AMADER and other donors such as EDF and KfW are encouraging signs regarding the sustainability of the results achieved in the strengthening of institutions.

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

102. There was neither a beneficiary survey nor a stakeholder workshop done at completion in the context of this ICR (see above for summary findings of 2009-2010 impact evaluation survey).

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

Rating: Significant

103. This ICR rates risks to the sustainability of the development outcomes as Significant. This rating is related to the political situation of the country following the March 2012 Military Coup that has created an environment of instability and uncertainty. The project‘s accomplishments in key areas such as strengthening of regulatory aspects, increase in capacity building in key sector institutions and at the local community level are to some extent irreversible. The main risk is that the political crises deepen further, or reach a steady state, which would dilute the motivation of the civil service, compel leading staff to search for opportunities abroad, worsen governance in regulatory agencies, and bring the reform process that Mali embarked upon in the 1990s to an indefinite standstill. Also, uncertainties remain with regard to the institutional and financial sustainability of AMADER which depends significantly on donor support.

104. On capacity building, the establishment and/or the investments in activities to strengthen AMADER, CREE, DNE, and DNCN have helped build significant technical expertise, mainly at

AMADER. A key challenge for GoM is to continue to improve sector governance, by in particular clarifying the responsibilities of each institution so as to make them more effective and accountable.

105. As mentioned in section 2.5, the sustainability of the energy services delivery sub-projects will depend in part on the diversification of the generation mix through the introduction of renewables to mitigate the high cost of diesel-based generation.

106. Finally, the continued enforcement of tax collection on the exploitation, production, and trade of woodfuels is critical to sustain the achievements under component 3.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: Satisfactory

107. Bank's performance during preparation was satisfactory. The team built on the good work already performed under previous projects such as HEP and Selingué Power Rehabilitation project and reflected the lessons learned in project design. It went a step further by supporting an innovative approach for rural electrification sought by the government and welcomed by local beneficiaries. There was adequate due diligence in identifying the project components and sub-components even though some of the expected end targets were far too ambitious and/or some of the proposed technologies did not receive the expected interest. There was good cooperation with the counterparts at the national and local level, which resulted in smooth preparation at every stage. Regular stakeholder consultations ensured that there were full agreements on project design, scope and activities. Some shortcomings on the Monitoring and Evaluation were discussed in Section 2.3 above.

(b) Quality of Supervision

Rating: Moderately Satisfactory

108. The Bank team closely supervised project implementation, including fiduciary and safeguards issues. Supervision missions were conducted on average twice a year until January 2012, which allowed for fairly regular face-to-face interaction on project issues with the implementing agency and key sector institutions. Next steps and follow up actions were agreed upon in detail with counterparts. These were included in the mission Aide Memoires, Mid-Terms Reviews (for both the original credit and the additional financing) and Implementation Status and Results Reports (ISRs) and were closely tracked. After the Military Coup in March 2012 and until the closing date in June 2012, due to the political situation of the country, no supervision missions could be conducted.

109. Throughout the duration of the project, the team maintained a regular and constructive dialogue with the implementing agency AMADER, and other relevant agencies such as DNE, CREE and DNCN. Its pro-active approach in managing and resolving issues that arose during implementation helped to keep project activities on schedule.

110. As mentioned in other sections, the M&E framework had some deficiencies (also noted by the project team in various documents and ISRs) that, if adequately addressed, could have further improved the quality of project supervision. It is important to note that the Results Framework was partially modified twice - through the Additional Financing and the Trust Funded Additional Financing – but despite the team´s efforts to address the shortcomings of the original M&E framework, some gaps in reporting and uncertainties on definitions persisted.

(c) Justification of Rating for Overall Bank Performance
Rating: Moderately Satisfactory

111. Overall Bank performance is rated moderately satisfactory. The team worked closely with client counterparts as well as target communities all through preparation and supervision of the project. Its pragmatic and flexible approach contributed to a well-designed project as well as successful project implementation. Throughout the project, the task team followed the overall project status, with attention to the status of the subprojects implemented under component 2. It worked closely with AMADER to address lagging subcomponents and activities. In addition to regular technical support, the project had good fiduciary, environment and social safeguards monitoring and compliance reporting. It is worth noting that the same Task Team Leader was involved in the project throughout project preparation and implementation ensuring continuity and thorough knowledge of project issues. The moderately satisfactory rating is related to the shortcomings in the M&E framework which were not fully addressed by the modification introduced in the two additional financings.

5.2 Borrower Performance
(a) Government Performance
Rating: Moderately Satisfactory

112. The government performance hereunder is assessed based on the performance by central government stakeholders of the project, mainly the Ministry of Mines, Energy and Water Resources (MoMEWR) but also the Ministry of Finance (MoF) as borrower on behalf of the Republic of Mali.

113. At the central level, both the MoMEWR and MoF supported the design, PDO and GEO of the project. MoMEWR also showed strong commitment to rural electrification through approval and operationalization of key regulations. Delays in the mobilization of Government counterpart funds were an issue at some points of project implementation resulting in downgrade of Government performance from satisfactory to moderately satisfactory. Despite the issues related to counterpart financing, the commitment of the GoM remained strong during the eight years of project implementation until January 2012. In the semester preceding the closing date, political instability derailed project implementation.

(b) Implementing Agency or Agencies Performance
Rating: Satisfactory

114. AMADER was committed to achieving the PDO and GEO. Focus on capacity building was apparent as staff often participated in training activities to enhance their skills in carrying out their financial management and procurement functions. Several shortcomings were noted during early project implementation, e.g. it had been pointed out that the procurement files were not always complete and also sometimes introduction of changes to the procurement methods were not accompanied by corresponding amendments to the plans. Similar issues in financial documentation were also identified and rectified during the implementation period. However, AMADER's performance improved overtime after training, TA and technical support from the Bank in standardizing the processes and documentation.

(c) Justification of Rating for Overall Borrower Performance
Rating: Moderately Satisfactory

115. As indicated above, rating for the Government Performance is rated Moderately Satisfactory and rating for the Implementing Agency is rated Satisfactory. Hence, the rating for overall Borrower Performance is moderately satisfactory.

6. Lessons Learned

116. *Need for simple and robust monitoring arrangements to be complemented by one-off evaluation:* Rural energy projects should adopt simple easy to monitor indicators for project implementation, and to complement this monitoring by a more comprehensive impact evaluation near the end of the project life.

117. *High engagement of local private sector in rural electrification schemes concessions and low appetite from international private sector in large concessions.* It was initially estimated that under the HEURA project, 5 "large" rural electricity concessions would be developed. These concessions had been planned through a top down approach. Two such concessions had started prior to the project. It turned out that the development of these top-down projects was difficult. In particular, the required participation of foreign private sector investors in the development of larger concessions proved problematic and potential foreign operators were slow and reluctant to engage in ventures in rural areas of Mali. Only the completion and extension of the two existing large decentralized concessions was effectively implemented. On the other hand, the bottom-up approach to electrification, based on "spontaneous" proposals presented by private operators, and supported by AMADER after screening and analysis of the proposals (technical analysis, business plan), was successful, and attracted an impressive number of local private sector operators.

118. *AMADER's bottom up rural electrification approach needs to be complemented by projects of larger scale, including renewable energy technologies.* The majority of energy service companies (ESCOs) have implemented business models based on isolated solar home systems (SHS) and conventional diesel fueled micro-grids with installed generation capacities mainly below 20kW. While considerable momentum has been created by these small scale energy service delivery projects, further interventions are needed which - by delivering higher amounts of power - have a potential to accelerate rural energy access and productive energy uses and may as well attract new sources of financing. It is essential for AMADER to start developing - in addition to small-scale energy service delivery schemes – projects of larger scale in villages where off-grid customers are concentrated enough to be economically interconnected.

119. *Low demand for stand-alone Photovoltaics (PVs).* As explained above, the appetite from the communities for photovoltaic technology, here solar home systems, was lower than expected and the main reason identified for this low interest is related to the electricity demand of communities that could not be satisfied by solar home systems which have a limited electricity generation capacity. Other issues included the lack of engagement from the industry and technology promoters in improving the performance of the equipment and the lack of regulation in ensuring a minimum quality of the equipment. In order to increase the demand for PVs under a fee-for-service model for instance strengthening and improving maintenance services is needed.

120. *Partnerships with the local banking sector need to be strengthened to stimulate income generating activities following electrification.* Experiences from the HEURA Project have shown that the availability of energy services rural initiatives are highly interested in expanding economic activities, resulting in higher revenues. Experiences in rural electrification in Mali have however demonstrated that productive energy uses are not spontaneously induced, when energy services start to be delivered in an off-grid area. One main barrier is access to finance for local ESCOs and microenterprises, in case these do not have sufficient investment capital, and a lack of end-user finance schemes for households to accelerate access to basic energy services. A financial sector review (World Bank/IMF 2008) and a study on financing in rural areas of Mali (World Bank, 2008) concluded that the availability of funds for investments and productive activities is one of the key limitations for rural households and SMEs.

121. *Active and sustained participation of community leaders* are needed for successful community-based woodfuel management initiatives. The development of community-based woodfuel management initiatives showed the important role played by community leaders in the mobilization and the organization of actors to develop and execute woodfuel management plans.

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

(a) Borrower/implementing agencies

122. Draft copies of this ICR were discussed and comments from the Borrower/Implementing Agency were received and included in this Report.

123. A Borrower's Final Report was received. For the Borrower, the outputs of the Components 1 and 2 of the project were rated overall satisfactory, especially regarding the increase in the rural electrification rates in the country and Component 3 was considered moderately satisfactory (See annex 7 for detailed comments)..

(b) Cofinanciers

124. All co-financing was channeled through the Bank project.

(c) Other partners and stakeholders

N/A.

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent) (or b.)

HEURA Project Components	Original IDA	GEF Grant	IDA Additional Financing	TF Additional Financing	Total
Capacity Development	6.67	-	2.40	1.60	10.67
Energy Services Delivery	18.42	3.50	30.30	6.90	59.12
Household Energy	10.56	-	2.30	-	12.86
Total	**35.65**	**3.50**	**35.00**	**8.50**	**82.56**

(b) Financing (in USD Million equivalent)

Source of Funds	Original IDA	IDA Additional Financing	TF Additional Financing	Total
Borrower	5.25	3.40	0.00	8.65
Global Environment Facility (GEF)	3.50	0.00	0.00	3.50
International Development Association (IDA)	35.65	35.00	0.00	70.65
AFREA Trust Fund	0.00	0.00	2.00	2.00
ESME Trust Fund	0.00	0.00	6.50	6.50
Private Commercial Sources (unidentified)	8.95	0.00	4.30	13.25
Total	53.35	38.40	12.80	104.55

Annex 2. Outputs by Component

1. Component 1: Capacity Development and Institutional Strengthening: This component supported the Water and Electricity Regulatory Commission (CREE), the Directorate of Energy (DNE), the National Directorate of Nature Conservation (DNCN) and AMADER. Under the original IDA project, the IDA additional financing, and the Trust Funded Financing, DNE, CREE, DNCN, and AMADER have completed more than 640.0 staff weeks of training.

2. For CREE, the project supported a training and capacity building program for 5 Commissioners and 8 technical specialists in the areas of financial regulation, analytical accounting, financial management, contract monitoring and tariff design. It also supported the following studies: (i) tariff study for electricity and water, (ii) preparation of regulatory accounting guidelines for electricity and water, (iii) the preparation of guidelines to complete the legal and regulatory framework for electricity and potable water, and (iv) the implementation of the CREE website. Finally, the project supported CREE by providing office equipment, vehicles, etc. needed for the adequate functioning of the Commission.

3. For the DNE, the HEURA project supported a training and capacity building program in the areas of policy formulation, monitoring, evaluation and impact assessment; and demand side management and energy efficiency. It also supported key studies such as (i) a demand and master plan study for the electricity sector, (ii) a feasibility study for the Bily micro hydro, and (iii) the preparation of operation manuals and administrative and financial guidelines. The project also allowed the recruitment of key consultants for the PASE. Finally, the project supported DNE by providing office equipment, vehicles, etc. needed for the adequate functioning of the Directorate.

4. For DNCN, the HEURA project supported a training and capacity building program in the areas of policy formulation, monitoring, evaluation and impact assessment; and supply-side wood energy management. HEURA also funded technical assistance for the preparation of guidelines for wood management, forest control, evaluation system, the establishment of rural markets and their evaluation, and support and preparation of regulatory aspects regarding forestry management. The project supported DNCE by providing key office equipment and vehicles.

5. The HEURA Project financed capacity development of AMADER and equipment to enable it to become an operational Agency. The project supported AMADER (i) to improve on its monitoring of local private sector operators involved in energy services delivery; (ii) to develop more innovative technical and managerial schemes to promote lower cost electrification solutions; (iii) to promote additional productive uses of energy services in partnership with the local banking system; (iv) to continue to remove barriers to the development of renewable energy in line with the objectives of the GEF co-financed activities of the original project; and (v) to reinforce output based mechanisms related to the energy services delivery component. This subcomponent also financed outreach and partnerships initiatives at the national, regional, and global levels to attract more financing for scaling up in a sustainable manner energy access expansion in Mali. A strategic capacity development program was financed as well as technical studies, equipment, and workshops.

6. The project's strategic capacity development program financed amongst others technical studies, consultants, equipment, and workshops, with a particular focus on renewable energies and productive energy uses. This component also financed rural energy outreach and partnerships initiatives between AMADER and other energy sector institutions at the national, regional, and global levels to attract future financing to scale up, in a sustainable manner, energy access expansion and productive energy uses in Mali.

7. The sustainability of the energy service delivery projects depended on a solid grounding of economic, technical and management principles. Under the HEURA Project, AMADER's technical staff attended training sessions to strengthen economic skills, such as business management and accounting, and technical skills, such as lay out design, operation, maintenance, and repair of conventional and renewable energy technologies. Building on these skills, the emphasis of Trust Funded Additional Financing was on upgrading economic and technical skills to plan, operate, and repair renewable and hybrid mini-grids as well as managing an increased number of customers.

8. Component 2: Energy Services Delivery: The Energy Services Delivery Component financed the scale up of rural electrification projects throughout the country. This component was the driving force of the project both in terms of outcomes and budget (approximately 67.5% of all project funds).

9. *Sub-component A. Promotion of Rural Electrification Investments.* This sub-component included: (i) establishing of a Rural Electrification Fund (REF) used to promote rural electrification investments undertaken by private operators; as well as related studies to prepare and evaluate bids; (ii) study to assess the need for the special financing instruments to help mobilize the required financing from commercial banks; and (iii) monitoring and evaluation studies of individual investments. This component succeeded in developing an adaptive and multi-layered approach to rural energy - combining bottom up spontaneous small concessions [6] with top down planned large concessions. With the bottom up approach, 83 sub-projects proposed by local private operators are functional (see table 1 below). Local private operators have provided an average matching co-financing of 25 percent of the financed schemes.

Table 1: Bottom-up projects

Bottom-up projects	**Total (As of June 30, 2012)**
Permit requests	260
Permits published	257
Permits under business plan preparation	91
Business plans considered by AMADER	86
Project financed by AMADER	83

10. With the top-down approach, the country was divided in ten multisectoral electrification zones for which Request for Proposals are available. Financing was secured for three zones – for Mopti and Ségou financing is available from KfW and for Bamako financing was secured from IDA, however, due to problems with the operators in the Mopti and Ségou zones, the projects were cancelled. For the Bamako zone, the cancellation of the HEURA project also resulted in the non-execution of this sub-project.

11. AMADER did an extensive follow-up of the projects being implemented through site visits and through the recruitment of consultants to follow-up on problematic projects. It is worth noting that the investment costs for rural electrification projects supported by AMADER is lower than similar

[6] Following the bottom up rural electrification approach spontaneous private initiative projects are selected based on promoters' ability to develop and operate a viable project with a fixed investment subsidy (between 75-80 percent, limited to US$500,000). Subsidies are established on the basis of (i) the number of customers to be connected during the first two years; (ii) the average tariff and (iii) subsidy by customer connected (total investment per number of customers).

projects executed by other agencies and in other countries. As of June 30, 2012, a cumulative number of about 74,787 connections had been made, exceeding the target of 68,896 connections. A cumulative number of 1295 public and community institutions and centers are connected including 218 schools and 168 health centers. The target of 1,275 for the original Project and Additional financing was achieved but not the target of 1,809 set for the Trust Funded Additional Financing.

12. *Sub-component B. Promotion of Multi-functional Platforms.* This sub-component financed (i) a study to assess the sustainability of existing multifunctional platforms; and (ii) provided micro-financing to support the equipment start-up costs of multifunctional platforms[7] that are operated by community associations, women's associations, NGOs, and the private sector. Initially, women's associations played an important role in remote communities as providers of energy services. They managed multifunctional platforms electrification initiatives after receiving training in basic accounting in local languages provided by NGOs financed through the project. Multifunctional platforms have been installed in 81 communities. Approximately 4,700 users are overall connected to the platforms. However, some difficulties with the communal model of managing the platforms (i.e. the income received by the associations from the sale of electricity that were supposed to cover for the costs of diesel, the salary of the technician operating the equipment, and resources for maintenance and repairs were used for other purposes, illegal connections, etc.) resulted in AMADER transferring the management of the platforms to the private sector. At present, 61 multi-functional platforms have been transferred to the private sector.

13. The HEURA project is one of the pilot projects involved in the Africa region's gender and energy program, supported by ESMAP/AFREA trust funds. This pilot entailed a gender assessment carried out within AMADER's project areas - 12 villages were visited, with field data and surveys conducted. A gender focal point was appointed within AMADER's organizational structure to monitor and support gender specific activities within both renewable and rural electrification projects. Based on this assessment, a gender action plan was developed with AMADER to pilot interventions in five villages in collaboration with UNWomen. Training and sensitization on productive uses of energy services and access to new energy technologies were going to be conducted at the village level for both women and men. Due to the military coup, these pilots were put on hold, but the partnership with AMADER and UNWomen continued which showed the sustainable partnership that was developed. To capture the efforts and initial results that have taken place within the HEURA project the team planned to produce several knowledge products - a case study which is under review and a video, which has since been canceled due to security issues around filming.

14. *Sub-component C. Information, Education, and Communication.* This sub-component helped communities to be aware of energy services schemes by providing support to extensive information and promotional campaigns through existing media in rural areas; field trips to neighboring villages where services are installed and working; organization of focus groups to have feedback from users and to register concerns from prospective users; and organization of workshops for private operators, NGOs, and other civil society. Below is a list of key outputs of this sub-component:

- Production of short informational commercials on rural electrification disseminated in

[7] A multifunctional platform is composed of a small 10 kW diesel engine coupled to a generator. The platform can be connected to income generating equipment, such as cereal grinding mills, battery charger, dehuskers, and water pumps, or generate electricity that can be distributed through a micro-grid to households.

magazines and TV;

- Preparation of annual institutional films of AMADER´s activities in three languages (French, Bamanan and English);
- Regional workshops on rural electrification; and
- Participation of AMADER in key public activities that facilitated the promotion of rural electrification;

15. GEO Implementation: The Grant for the Global Environmental Facility became effective in May 2004 and closed in June 2009, as originally planned. The original grant amount was US$3.5 million but at closing, a portion of the grant was cancelled (US$0.98 million). Total disbursement of GEF funds was US$2.52 million.

16. The original end target of installing 11,726 solar photovoltaic systems was partially achieved. A total of 8,141 systems were installed by the GEF grant closing date of June 30, 2009. The decision not to extend the GEF Grant was due to the fact that at that time private operators were not interested in adopting as much as expected solar technologies and beneficiaries also wanted multiple uses of energy services that were difficult to be provided by solar home systems. The project team made a strategic decision to concentrate efforts in facilitating the implementation of other project activities that were more likely to materialize and had more stakeholder demand.

17. Component 3: Household Energy: The household energy component was built on achievements of the previous Household Energy Project (HEP) and supported the scaling-up of initiatives of the national strategy on household energy. It had three main subcomponents:

18. *Sub-component A. Community-based Woodland Management.* The subcomponent, which was developed in coordination with the Ministry of Finance and the Ministry of Interior, supported the development of standard contracts for use by communities and local governments for management and exploitation of wood resources. It provided support for (i) the development of rural markets and village woodland management systems in 10 woodfuels supply basins that were already partly covered with rural markets as well as in 5 new ones; (ii) created and supported the development of 1000 rural woodfuel markets; (iii) implemented management systems for community forests in the Bamako, Ségou, Mopti, Koutiala, Niono, Kayes, and Sikasso basins for a total of approximately 1.14 million hectares that support approximately 70 percent of the urban woodfuel consumption; (iv) the creation of more than 282 associations of modem charcoal production with efficient techniques and adequate management capacity; and (v) provided support to the central and regional government institutions for the preparation of forestry and water legislation applicable to the communities. The most important legislative acts supported by AMADER include:

- Law n° 10.028 of July 2010 establishing the conditions for the management of forestry resources at the national level;
- Decree n° 10-387/P-RM of July 26, 2010 establishing the collection of forest revenues (taxes) for the national forests.
- Decree n° 10-388/P-RM of July 26, 2010 establishing the list of protected areas.

19. Thanks in part to the activities supported by this sub-component, an increasing collection of forest revenues occurred in the last years of project implementation, due to better law enforcement by both forestry officials and local communities.

20. *Sub-component B. Interfuel Substitution and Energy Efficiency*. The promotion of efficient wood energy and alternative products was a continuation and extension of the HEP project demand-side component. Initially, its main thrust was the promotion of efficient charcoal stoves and

substitution by kerosene, LPG and alternative biomass fuels and the penetration of low-energy consumption lamps and energy efficient evaporative air-coolers to reduce the peak power demand curve and to reduce the electricity bill for end-users. By 2008, when the Additional Financing was being prepared, it was clear than some of the proposed technologies were not as successful as others among the potential users. In that context, it was decided to consolidate the support on the following activities: (i) the scale up of improved stoves dissemination; (ii) the scale up of low consumption lamps; (iii) the scale-up of evaporative air-coolers and (iv) an information system on energy efficiency. Studies were also conducted to understand barriers to the adoption of kerosene stoves, LPG, wood briquettes that did not receive enough interest from the potential users.

21. Highly satisfactory implementation was made in the dissemination of improved stoves (128 percent of initial target), low consumption lamps (651 percent of initial target) and evaporative coolers (142 percent of initial target. At project closing, 1,296,488 improved stoves, 1,303,004 low consumption lamps and 2847 evaporative coolers were disseminated.

22. *Sub-component C. Information, Education, and Communication.* This sub-component financed (i) extensive information and promotional campaigns through existing media in rural areas (radio, institutional, grassroots) in order to raise interest and formal requests from rural communities in support of the community-based woodland management, interfuel substitution and household energy efficiency activities; and (ii) woodfuel sector training, planning and monitoring.

23. It is important to note that the implementation of the household energy component occurred at a slower pace than the other two components and also resulted in the reallocation of some funds originally destined for Component 3 to Component 2. However, towards the end of the project, an encouraging trend associated with the household energy component was seen with an increased collection of forest revenues due to better law enforcement by both forestry officials and local communities. Through the woodfuel supply master plan, about 1,142,033 hectares were placed under sustainable management and 282 rural wood markets were created as of June 30, 2012.

Revisions to the Results Framework

Original IDA Project	IDA Additional Financing	Trust Funded Additional Financing	Comments/Rationale for Change
PDO			
The development objectives are: (i) accelerating the use of modern energy in rural and peri-urban areas in order to increase productivity of small and medium enterprises, to enhance the quality and efficiency of health and education centers, and to improve living standards; (ii) promoting further community-based woodland management to reduce un-sustainable pressure on forest resources while simultaneously encouraging interfuel substitution and energy efficiency initiatives; and, (iii) strengthening energy sector reform processes and related institutions to create a favorable investment environment for increased private sector participation in decentralized energy services delivery in rural and peri-urban areas.	The development objectives are: (i) accelerating the use of modern energy in rural and peri-urban areas in order to increase productivity of small and medium enterprises, to enhance the quality and efficiency of health and education centers, and to improve living standards; (ii) promoting further community-based woodland management to reduce un-sustainable pressure on forest resources while simultaneously encouraging interfuel substitution and energy efficiency initiatives; and, (iii) strengthening energy sector reform processes and related institutions to create a favorable investment environment for increased private sector participation in decentralized energy services delivery in rural and peri-urban areas.	The development objectives are: (i) accelerating the use of modern energy in rural and peri-urban areas in order to increase productivity of small and medium enterprises, to enhance the quality and efficiency of health and education centers, and to improve living standards; (ii) promoting further community-based woodland management to reduce un-sustainable pressure on forest resources while simultaneously encouraging interfuel substitution and energy efficiency initiatives; and, (iii) strengthening energy sector reform processes and related institutions to create a favorable investment environment for increased private sector participation in decentralized energy services delivery in rural and peri-urban areas.	**Maintained.** The (PDO) remains unchanged.
PDO Indicators			
Approximately 40,000 new subscribers receive electricity services within five years from Effective Date	Number of households with access to electricity services (target 69,603)	Households connected to electricity (Cumulative target 70,768)	**Maintained.** Change in end of project target values. Language revised to be consistent with Africa CORE Indicators.
1,312 public institutions in rural and peri-urban areas to receive electricity services within five years from Effective Date (including approximately 125 schools and 107 health clinics)	Number of institutions with access to electricity services (target 1,275)	Public institutions connected to electricity (Cumulative target 1,809)	**Maintained.** Change in end of project target values. Language revised to be consistent with Africa CORE Indicators.
Number of communities with installed multifunctional platforms (67)	Number of communities with installed multifunctional platforms (target 88)	*Not applicable*	**Maintained** under the IDA AF. No change in target values. The TF AF will not finance platforms.
Not applicable	Number of improved stoves purchased by households (target 1,091,261)	*Not applicable*	**Maintained**

Intermediate outcome indicators			
Number of staff in DNE, CREE and DNCN trained in policy formulation, program monitoring and impact assessment.	About 600 staff weeks of training undertook by DNE, CREE, DNCN and AMADER (target 600 staff-weeks of training)	About 600 staff weeks of training undertook by DNE, CREE, DNCN and AMADER	**Maintained**
The establishment of the AMADER capable of managing state and donor resources to improve access to energy services.			
Increase in the number of private operators providing decentralized electricity services from the existing two operators to about ten. (target 10 operators)	Number of private operators providing energy services (target 125)	*Not applicable*	**Maintained** under the IDA AF. No change in target values. The TF AF will finance rural energy service delivery projects in cooperation with already established operators.
9650 solar photovoltaic systems installed	*Not applicable (GEF Grant Closed)*	Solar photovoltaic systems installed (Cumulative target 7,810)	**Added in TF AF.** Change in end of project target values.
Increase in the forest area under community management from about 350,000 hectares to about 1.4 million hectares.	Number of hectares under woodfuel management (target 1,410,817)	*Not applicable*	**Not applicable for the TF AF.**
Reduction in the volume of wood harvested, converted and consumed (a reduction of 400,000 tons per year).	Deleted		
Increase in the use of improved charcoal stoves (210,000), improved wood stoves (300,000), kerosene stoves (61,000).	Number of low consumption lamps purchased by households and institutions (target 235,000)	*Not applicable*	**Not applicable for the TF AF.**
Increase in the penetration of LPG as a household fuel (from 4000 tons in 2002 to 20,000 tons by 2008).			
Not applicable	*Not applicable*	Generation capacity of off-grid renewable energy technologies constructed (target 900 kW)	**New.** To monitor deployment of RET minigrids. IDA CORE indicator
Not applicable	*Not applicable*	Direct project beneficiaries (Number, total target of 424,608), of which female (50%)	**New.** IDA CORE indicator
Not applicable	*Not applicable*	Business electricity connections (target 475)	**New.** To monitor progress on productive energy uses. Africa CORE Indicator

Annex 3. Economic Analysis

(including assumptions in the analysis)

1. The original estimated Economic Internal Rate of Return (EIRR) of the entire project was 33.2%. This included the three project components including the Capacity Development and Institutional Strengthening, Energy Service Delivery and the Household Energy Component. The economic reevaluation results in a revision of the overall project EIRR to 17.2%. In the case of Energy Services Delivery, the lower EIRR is mostly the result of higher fuel prices, which have increased the operating costs of electricity provisions in rural areas. With regard to Household Energy, the lower EIRR result from the fact that the quantitative objectives of the project have only been partially achieved, and the expected benefits were therefore reduced proportionally. On the other hand, the increase in energy prices has actually increased the value of some of benefits (reduced fuel consumption). The economic reevaluation does not take into consideration the environmental benefits of the project (reduced CO2 emissions).

2. Overall, the economic justification for the project remains solid. It should be noted that a significant portion of project costs is related to capacity building and institutional development, which for the most part should not be recurrent costs. Future operations would use existing institutions and capacity and require lower upfront costs.

3. Any estimated economic rate of return, even ex post, has a speculative element, in the absence of complete data, especially regarding the economic benefits. Still, most of the activities supported by the project had concrete and measurable outcomes (e.g. reduced fuel consumption from woodstoves or efficient lamps). For instance, the diffusion of improved stoves (charcoal stoves, wood stoves, kerosene stoves) has very tangible benefits under the form of reduced fuel consumption. Since the diffusion of improved stoves under the project has been implemented successfully (and energy prices have gone up), the expected economic benefits have logically materialized.

4. For other activities (e.g. communication regarding energy efficiency), there is anecdotal evidence of positive impact but insufficient data to quantify the impact ex post. The economic return of institutional strengthening and capacity building is also difficult to quantify, and for this reason, for the purpose of the economic analysis, these costs have been allocated to the two other components (Energy Service Delivery, Household Energy).

Economic reevaluation methodology

5. *Energy Services Delivery:* The majority of project resources were devoted to this component. Under the original project economic analysis, project costs included:

- Investments (either financed by the project or the operators)
- Training, Capacity Building, communication expenses financed under the component.
- Operating costs borne by the operators (fuel and O&M for the most part).

6. The project benefits were estimated based on the willingness to pay of energy users, assessed based on the uses of electricity by rural populations (lighting, water pumping….). The EIRR for the component was originally estimated at 30.0% and the Economic Net Present Value (with a 12% discount rate) at US$ 22.0 million.

7. The project economic reevaluation is based on the original methodology with updated costs and benefits assumptions as allowed by available data. The significant changes in modeling assumptions are:

- Reevaluation of investments costs
- Reevaluation of fuel costs: the increase in oil prices is by far the most significant change: the original cost assumption for the economic cost of diesel oil was 0.3 USD per liter and has been increased to 0.8USD.
- Economic benefits: there was not sufficient basis to re-estimate the willingness to pay for each customer category. The original assumptions of economic benefits have therefore been left unchanged for 80%. For the remainder 20% of consumption, it was assumed that it would come in substitution to petroleum product use (e.g. kerosene lamps) and the economic benefits were increased by the same percentage as diesel costs.
- The project benefits were considered over a period of 15 years (instead of 30) to reflect the uncertainty regarding generation equipment renewal when they become obsolete.

8. Based on the above, the revised project EIRR is 16.4% and the Net Present Value (base on the original 12% discount rate which is probably excessive) US$ 6.3 million.

9. The component economic justifications appear to remain solid in the spite of the increase in oil prices. Going forward, the increase in diesel cost should lead to consider the introduction of more solar generation for rural electrification (probably in hybrid diesel / PV system to provide guaranteed generation).

10. *Household Energy*: As per the original economic analysis, the economic benefits from this component came primarily from reduced energy costs, through reduced energy consumption or fuel substitution.

11. The economic reevaluation has adjusted the estimated benefits to reflect the rate of implementation of the original objectives. The implementation rates used are as follows:

- Forestry management: 68% (based on areas under sustainable management and functioning wood fuel markets),
- Fuel Substitution: 50% (on rate of target achievement for gas stoves and “briquettes”)
- Better carbonization: 101% (based on diffusion of improved stoves)
- Energy Efficiency-electricity: 150% (estimate reflecting much better than expected results for CFLs and better than expected for water coolers).

12. Energy prices increased considerably after project preparation. For this reason, the estimated benefits from fuel substitution and improved carbonization have been increased by 50%.

13. On this basis, the estimated EIRR for Household energy component is 20.6% and the Net Present Value (with a 12% discount rate) US$ 3.0 million.

Economic Reevaluation – Total project

	Year	1	2	3	4	5	6	10	15
Household Energy (including forestry management)									
Costs (invest , operations, capacity)		3659	5401	7740	11448	14503	8375	8942	8027
Benefits		2490	4588	6754	9295	12385	10646	11112	11747
Net benefits (costs)	KUSD	-1169	-813	-987	-2153	-2118	2271	2170	3720
	EIRR	20.6%	NPV	3,034					
Energy Services Delivery									
Costs (invest , operations, capacity)		8321	8846	10883	13080	15938	3678	4596	5954
benefits		1161	2923	5298	8295	11926	12139	13033	14248
Net benefits (costs)	KUSD	-7160	-5922	-5585	-4785	-4012	8461	8437	8294
	EIRR	16.4%	NPV	6,279					
Total Project									
Costs (invest , operations, capacity)		11980	14246	18623	24528	30440	12053	13538	13981
benefits		3652	7511	12051	17590	24311	22786	24145	25995
Total Net benefits (costs)	KUSD	-8329	-6735	-6572	-6938	-6130	10732	10607	12014

Net present Value	9,314	@	12%
Economic rate of return	**17.2%**		

Note: the costs of Component 1, capacity building, have been allocated to the other two components who have more measurable benefits

Economic Reevaluation – Energy Services Delivery Component

Original economic evaluation

	year	1	2	3	4	5	6	10	15	20	29
Project and investment costs	KUSD	4205	4886	5987	6903	8018					
Rural electrification		2808	3853	5040	6191	7289					
Multifunctional platforms		367	205	274	342	411					
Information - communication - training		1030	828	674	370	318					
Operating costs		125	361	688	1147	1895	2401	3120	4186	5644	2731
Rural electrification		115	331	632	1056	1739	2213	2901	3937	5340	2514
Multifunctional platforms		11	30	57	91	157	188	219	249	304	217
Economic Benefits		907	2284	4139	6480	9317	9484	10180	11128	12168	4176
Rural electrification		846	2131	3862	6048	8696	8853	9509	10403	11384	3911
Multifunctional platforms		61	153	276	432	621	631	671	725	784	265
Net Benefits (+) / Costs (-)		-3423	-2963	-2537	-1569	-596	7083	7060	6942	6523	1445

Net present Value	12%	22,030
Economic rate of return		**30.0%**

Economic reevaluation

	year	1	2	3	4	5	6	10	15
Project and investment costs	KUSD	8079	8189	9654	11082	12810			
Rural electrification		3089	4238	5543	6810	8018			
Multifunctional platforms		404	226	301	376	452			
Information - communication - training		1030	828	674	370	318			
Operating costs		242	657	1228	1998	3128	3678	4596	5954
Rural electrification		217	591	1107	1806	2824	3338	4203	5498
Multifunctional platforms		25	66	121	193	304	340	393	456
Economic Benefits		1161	2923	5298	8295	11926	12139	13033	14248
Rural electrification		1100	2771	5021	7862	11305	11508	12362	13523
Multifunctional platforms		61	153	276	432	621	631	671	725
Net Benefits (+) / Costs (-)		-7160	-5922	-5585	-4785	-4012	8461	8437	8294

Net present Value	12%	6,279
Economic rate of return		**16.4%**

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Koffi Ekouevi	Senior Economist	AFTEG	Task Team Leader
Kwawu Gaba	Senior Power Engineer	AFTEG	
Stephan Gamier	Power Engineer	AFTEG	
Pierre Vieillescazes	Senior Financial Officer	AFTEG	
Amadou Tidiane Toure	Senior Procurement Specialist	AFTPC	
Siaka Bakayoko	Sr. Financial Management Specialist	AFTFM	
Wolfgang Chadab	Finance Officer	LOAG1	
Nestor Coffi	Financial Management Specialist	AFTFM	
Mamadou Sevede	Consultant/Procurement	AFTPC	
Eugene McCarthy	Consultant/Quality Control		
Cheick Traore	Procurement Specialist	AFTPC	
Serigne Omar Fye	Senior Environmental Specialist	AFTS 1	
Kristine Ivarstodder	Senior Social Development Specialist	AFTS 1	
Amadou Konare	Consultant/Environmental Safeguards	AFTS 1	
Yvette Djachechi	Social Development Specialist	AFTS3	
John Boyle	Senior Environment Specialist	AFTS 1	
James Monday	Consultant/Environmental Safeguards	AFTS2	
Aly Sy	Consultant/Financial Management	WBIHD	
Dawit Yohannes	Language Team Assistant	AFTEG	
Hidehito Wakabayashi	Consultant		
Ibrahim Dione	Consultant	AFTH2	
Nina Doetinchem	Junior Professional Associate	AFTS4	
Hans Wabnitz	Senior Counsel	LEGAF	
Supervision/ICR			
Fabrice Karl Bertholet	Senior Financial Analyst	AFTG2	Task Team Leader
Koffi Ekouevi	Sr. Economist	SEGEN	
Leopold Sedogo	Energy Specialist	AFTG2	
Alexandra Planas	ICR Consultant	AFTG2	
Stephanie Nsom	Energy Specialist	AFTG1	
Marie-Paule Ngaleu	Program Assistant	AFTG2	
Aoua Toure Sow	Program Assistant	AFCW3	
Ruxandra Costache	Counsel	LEGAM	
Juliet Pumpuni	Senior Energy Specialist	GPOBA	
Vanessa Lopez Janik	Operations Analyst	SEGES	
Sebastian Rodriguez	Consultant	SEGEN	
Awa Seck	Senior Economist	AFTG2	
Cheick Traore	Senior Procurement Specialist	AFTPW	
Gnoleba Mathieu Meguhe	Consultant	AFTPE	

Hugues Agossou	Senior Auditor	IADVP	
Kwawu Mensan Gaba	Lead Energy Specialist	SASDE	
Mahine Diop	Senior Municipal Engineer	AFTU2	
Maimouna Mbow Fam	Sr. Financial Management Specialist	AFTMW	
Nestor Coffi	Country Manager	AFMNE	
Pierre C. Vieillescazes	Consultant	MNSF1	
Rahmoune Essalhi	Procurement Assistant	AFTG1	
Regine Mpoyi Longila	Program Assistant	GEFEX	
Stephan Claude Garnier	Senior Energy Specialist	AFTG2	
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	USD Thousands (including travel and consultant costs)
Lending		
FY02	4.77	16.79
FY03	32.51	236.36
FY04	5.69	34.72
Total:	42.97	287.89
Supervision/ICR		
FY05	26.66	104.57
FY06	21.50	69.66
FY07	20.26	72.52
FY08	17.83	106.70
FY09	18.18	64.53
FY10	25.24	115.63
FY11	21.85	98.20
FY12	14.65	60.82
FY13	3.72	14.49
Total:	169.89	707.17

Annex 5. Beneficiary Survey Results *(if any)*

N/A

Annex 6. Stakeholder Workshop Report and Results *(if any)*

N/A

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

1. A Borrower's Final Report was received. For the Borrower, the outputs of the Components 1 and 2 of the project were rated overall satisfactory, especially regarding the increase in the rural electrification rates in the country and Component 3 was considered moderately satisfactory.

2. Regarding the difficulties and obstacles faced during the implementation of the project, the main issues raised by AMADER are:

- The anticipated closing of the IDA credits due to the military coup of March 2012 that resulted in a slowdown of the implementation of the project and not achieving some of the targets;
- The lack of funding from the GoM to continue with the electrification program and the household energy program without external financing;
- The lack of funding from the GoM for the sector institutions such as AMADER;
- Some approvals by the World Bank on procurement were not granted in time, thus contributing to delays in project implementation;
- For the *Energy Services Delivery Component*:
    - Lack of human resources in AMADER for an adequate follow-up of the sub-projects;
    - Lack of capacity of some of the private sector operators which affected the technical, commercial and financial operations of the projects;
    - Difficulties in securing fuel in some regions;
    - Mismanagement of funds by some operators;
    - Inadequate maintenance and management of the equipment; and
    - Low number of customers in some areas.
- For the *Household Energy Component*:
    - The high cost and difficulty in securing the supply of materials for the fabrication of improved stoves;
    - Low budget allocated for subsidies of butane gas; and
    - Absence of kerosene stoves market.

Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

N/A

Annex 9. List of Supporting Documents

- Project Appraisal Document
- Additional Financing Paper
- Trust Funded Additional Financing Paper
- Mid-term Review HEURA
- Mid-Term Review Additional Financing
- Project Legal Agreements
- WB Implementation Status Reports
- Aide Memoires
- WB Memos
- Progress Report submitted by Borrower
- Final Report submitted by AMADER