Document of

# The World Bank

Report No: ICR00002699

# IMPLEMENTATION COMPLETION AND RESULTS REPORT (IDA-39810 TF-53937)

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# CREDIT IN THE AMOUNT OF SDR 20.6 MILLION (US\$ 29.9 MILLION EQUIVALENT) AND A GLOBAL ENVIRONMENTAL FACILITY GRANT IN THE AMOUNT OF US\$ 5.0 MILLION TO THE REPUBLIC OF SENEGAL FOR AN ELECTRICITY SERVICES FOR RURAL AREAS PROJECT

JUNE 21, 2013

Sustainable Development Department Country Department AFCF1 Africa Region

#### CURRENCY EQUIVALENTS

(Exchange Rate Effective May 28, 2013)

Currency Unit = CFA F SDR 1.00 = US\$ [1.49] US\$ 1.00 = CFA F [507]

# FISCAL YEAR

#### January 1 – December 31

# ABBREVIATIONS AND ACRONYMS

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Vice President: Makhtar Diop Country Director: Vera Songwe Sector Manager: Meike van Ginneken Project Team Leader: Awa Seck ICR Team Leader: Alain Ouedraogo

# SENEGAL

# **Electricity Services for Rural Areas Project**

# **CONTENTS**

Data Sheet

A. Basic Information
B. Key Dates
C. Ratings Summary
D. Sector and Theme Codes
E. Bank Staff
F. Results Framework Analysis

- G. Ratings of Project Performance in ISRsH. RestructuringI. Disbursement Graph

1. Project Context, Development and Global Environment Objectives Design	1
2. Key Factors Affecting Implementation and Outcomes	7
3. Assessment of Outcomes	13
4. Assessment of Risk to Development Outcome and Global Environment Outcome	23
5. Assessment of Bank and Borrower Performance	23
6. Lessons Learned	25
7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners	26
Annex 1. Project Costs and Financing	28
Annex 2. Outputs by Component	29
Annex 3. Economic and Financial Analysis	33
Annex 4. Bank Lending and Implementation Support/Supervision Processes	36
Annex 5. Beneficiary Survey Results	38
Annex 6. Stakeholder Workshop Report and Results	39
Annex 7. Summary of Borrower's ICR	40
Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders	42
Annex 9. List of Supporting Documents	43
MAP	44

## A. Basic Information

Country:	Senegal	Project Name:	SN-Elec. Serv. for Rural Areas (FY05)			
Project ID:	P085708,P070530	L/C/TF Number(s):	IDA-39810,TF-53937			
ICR Date:	02/18/2013	ICR Type:	Core ICR			
Lending Instrument:	APL,SIL	Borrower:	Republic OF SENEGAL			
Original Total	XDR 20.60M,	Dishumad America	XDR 13.28M,			
Commitment:	USD 5.00M	Disbursed Amount:	USD 0.82M			
Revised Amount	XDR 14.2M					
Environmental Category:B Focal Area: C						
Implementing Agencies:						
ASER (Agence Sénégalaise d'Electrification Rurale)						
Direction des Eaux et Forêts						
<b>Cofinanciers and Oth</b>	er External Partners:					
African Development Bank (AfDB)						
Kreditanstalt Fur Wiederaufbau (KFW)						
European Union						
Agence Française de Développement (AFD)						

# **B.** Key Dates

SN-Elec. Serv. for Rural Areas (FY05) - P085708						
Process	Date	Process	Original Date	Revised / Actual Date(s)		
Concept Review:	10/21/2003	Effectiveness:	06/30/2005	06/30/2005		
Appraisal:	06/17/2004	Restructuring(s):		06/30/2009 12/17/2012		
Approval:	09/09/2004	Mid-term Review:	03/12/2007	06/30/2008		
		Closing:	06/30/2009	12/31/2012		

SN-GEF Elec Srvc for Rural Areas (FY05) - P070530						
Process	Original Date	Revised / Actual Date(s)				
Concept Review:	10/21/2003	Effectiveness:	06/29/2005	06/30/2005		
Appraisal:		Restructuring(s):				
Approval:	09/09/2004	Mid-term Review:	07/31/2008	06/30/2008		

		Closing:	06/30/2009	12/31/2012
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C. Ratings Summary			
C.1 Performance Rating by ICR			
Outcomes	Moderately Satisfactory		
GEO Outcomes	Moderately Satisfactory		
Risk to Development Outcome	Moderate		
Risk to GEO Outcome	Moderate		
Bank Performance	Moderately Satisfactory		
Borrower Performance	Moderately Satisfactory		

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

C.3 Quality at Entry and Implementation Performance Indicators					
SN-Elec. Serv. for Rural A	SN-Elec. Serv. for Rural Areas (FY05) - P085708				
Implementation PerformanceIndicatorsQAG Assessments (if any)Rating:					
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	MS		
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA)	MU		
DO rating before Closing/Inactive status	Moderately Satisfactory				

SN-GEF Elec Srvc for Rural Areas (FY05) - P070530				
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	Moderately			
Closing/Inactive Status	Satisfactory			

D. Sector and Theme Codes		
SN-Elec. Serv. for Rural Areas (FY05) - P085708		
	Original	Actual
Sector Code (as % of total Bank financing)		
Central government administration	27	27
General agriculture, fishing and forestry sector	9	9
General energy sector	57	57
General finance sector	4	4
Water supply	3	3
Theme Code (as % of total Bank financing)		
Climate change	28	28
Infrastructure services for private sector development	29	29
Micro, Small and Medium Enterprise support	14	14
Rural services and infrastructure	29	29

SN-GEF Elec Srvc for Rural Areas (FY05) - P070530					
	Original	Actual			
Sector Code (as % of total Bank financing)					
Central government administration	14	14			
Transmission and Distribution of Electricity	86	86			
Theme Code (as % of total Bank financing)					
Micro, Small and Medium Enterprise support	33	33			
Rural services and infrastructure	67	67			

E. Bank Staff						
SN-Elec. Serv. for Rural Areas (FY05) - P085708						
Positions	At ICR	At Approval				
Vice President:	Makhtar Diop	Callisto E. Madavo				
Country Director:	Vera Songwe	Madani M. Tall				
Sector Manager:	Meike van Ginneken	Yusupha B. Crookes				
Project Team Leader:	Awa Seck	Michel E. Layec				
ICR Team Leader:	Alain Ouedraogo					
ICR Primary Author:	Alain Ouedraogo					

SN-GEF Elec Srvc for Rural Areas (FY05) - P070530					
Positions	At ICR	At Approval			
Vice President:	Makhtar Diop	Callisto E. Madavo			
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ICR Team Leader:	Alain Ouedraogo				
ICR Primary Author:	Alain Ouedraogo				

#### F. Results Framework Analysis

#### Project Development Objectives (from Project Appraisal Document)

The project's development objective is to increase the access of Senegal's rural population to modern energy services and to ensure the environmental and social sustainability of wood fuels in urban and peri-urban areas.

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

Not applicable

#### Global Environment Objectives (from Project Appraisal Document)

The program will have a positive environmental impact at the global and local levels. At the global level, it will help reduce net CO2 emissions. At the local level, it will promote conservation by encouraging the use of: (i) renewable sources of energy; (ii) efficient lamps and improved cooking stoves; (iii) improved carbonization methods and improved wood fuel stoves. It will also continue implementation of sustainable forest and natural resource management which will also reduce deforestation.

#### Revised Global Environment Objectives (as approved by original approving authority) Not applicable

Not applicable

# (a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years			
Indicator 1:	Increase in the number of households benefiting directly from electricity						
Value (quantitative or qualitative)	0	35,000		20,386			
Date	June 30, 2004	December 31, 2012 December 3					
Comments (incl. % achievement)	As indicated in the project credit agreement, the indicator refers to the number of households and productive users benefiting from electricity access through interventions from both the World Bank and other donors. By project closing date, 58% of the targeted connections were realized. The target is, however expected to be achieved by the end of 2014 and exceeded as concessionaires committed in their concession contracts to reach 107,799 connections by 2030.						

Indicator 2:	Volume of annual sustainable wood fuel production for marketing in the urban and peri-urban energy markets (tons of charcoal produced per year)					
Value (quantitative or qualitative)	0	60,000		65,817		
Date	January 1, 2005	December 31, 2008		December 31, 2008		
Comments (incl. % achievement)	Original target exceeded (110%	5)	1			
Indicator 3	Number of hectares brought un implementation zone	der community-based s	ustainable manag	ement within the project		
Value (quantitative or qualitative)	0	230,000		289,116		
Date	January 1, 2005	December 31, 2008		December 31, 2008		
Comments (incl. % achievement)	Original target exceeded (126%	5)	·			
Indicator 4	Number of improved carboniza	tion units installed				
Value (quantitative or qualitative)	0	150		250		
Date	January 1, 2005	December 31, 2008		December 31, 2008		
Comments (incl. % achievement)	Original target exceeded (167%)					
Indicator 5	Number of improved wood fue	l stoves disseminated				
Value (quantitative or qualitative)	0	120,000		205,728		
Date	January 1, 2005	December 31, 2008		December 31, 2008		
Comments (incl. % achievement)	Original target exceeded (171%	5)				
Indicator 6	Number of improved alternativ	e fuel stoves disseminat	ted			
Value (quantitative or qualitative)	0	30,000	14,740	49%		
Date	January 1, 2005	Date	January 1, 2005	Date		
Comments (incl. % achievement)	<sup>6</sup> The project promoted kerosene stoves but attained only 49% of the original target , mainly because kerosene price increased dramatically, making it less competitive than stoves using LPG, which was subsidized.					
Indicator 7	Total sustainable incremental re	evenue generation capa	city among partic	pating villages		
Value (quantitative or qualitative)	0	US\$6 million/year		US\$14.6 million/year		
Date	January 1, 2005	December 31, 2008 December 31, 2008				
Comments (incl. % achievement)	The original target was exceeded (244%).					

# (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	Reduce net CO2 emissions and promote conservation by encouraging use of renewable sources of energy, efficient lamps and improved cookstoves, improved carbonization methods and improved wood fuel stoves					
Value (quantitative or qualitative)	0	8,000 tons of $CO_2$		604,045 tons of CO <sub>2</sub>		
Date	June 30, 2004	December 31, 2012		December 31, 2012		
Comments (incl. % achievement)	The original target was exceeded. The target value originally considered the CO2 reduction through renewable sources and energy efficient lamps. The amount achieved is comprise of: (1) 587,045 tons of CO2 through the reduction of deforestation, the use of 205,728 improved wood stoves, and 250 higher energy-efficient carbonization units; and (2) 17,000 tons of CO2 through the use of 105,768 CFLs and 1.1 MW of solar PV systems.					

# (c) Intermediate Outcome Indicator(s)

Indicator	<b>Baseline Value</b>	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years		
Indicator 1:	Awarding private concessions for the provision of electricity services in rural areas.					
Value (quantitative or qualitative)	No rural concession awarded	Six (06) private rural concessions awarded through financing from IDA/GEF and other donors.		Six (6) private rural concessions awarded, including two from IDA Credit and GEF Grant.		
Date	30-Jun-2004	December 31, 2012		December 31, 2012		
Comments (incl. % achievement)	Original target achieved.					

Indicator 2:	Implementing Multi-Sectorial Energy Programs (PREMs).					
Value (quantitative or qualitative)	No Multi-Sectorial Energy Programs (PREMs) as of end 2004.	6 PREMs implemented in the 3 IDA/GEF financed 29 PREMS financed		29 PREMS financed under IDA/GEF		
Date	30-Jun-2004	December 31, 2012		December 31, 2012		
Comments (incl. % achievement)	Under IDA/GEF financing, 28 health centers and an agro-business (pumping stations) were selected for connection. The network is being constructed to connect the 29 selected PREMs. (incl. % Other targeted IDA/GEF financed PREMs, for which the first tranche of funds was already disbursed are 39 schools. For other donors and government funding (GVEP, AFD, GoS), targeted PREMs are 138 social infrastructures (schools and health centers), 26 productive uses (multi-functional platforms, micro ace tourism, agro forestry product transformation, etc.)					
Indicator 3	Supporting and implementing 1	ocal initiatives (ERILs)	for the provision	of electricity services		
Value (quantitative or qualitative)	No ERIL signed.	40 ERILs signed		7 ERILs signed		
Date	30-Jun-2004	December 31, 2012		December 31, 2012		
Comments (incl. % achievement) Indicator 4	7 ERILs were signed. Out of th ASER (request for proposals). 1 approving the guidelines gover Building preparation-implement Electricity Sector Regulatory C committees and private sector	e 7; 3 were from Bank Fewer ERILs than expe ning the ERILs. atation capacities for Ru commission (CRSE), E	financing, 2, from cted were signed l rral Electrification nergy Ministry, M	KFW/GIZ, and 2 from because of delays in Agency (ASER), ulti-sectorial		
Value (quantitative or qualitative)	Capacity of ASER, CRSE, Energy Ministry, Multisectoral Committees and private sector to implement the RE program to be improved	Full autonomy of ASER, CRSE, Ministry of Energy and other institutions to implement RE program		ASER, CRSE, and MEM were able to implement the program		
Date	30-Jun-2004	December 31, 2012		December 31, 2012		
Comments (incl. % achievement)	ASER, CRSE, and MEM were They have, however, demonstra	able to implement the pated autonomy in running	brogram but delays	s were experienced.		
Indicator 5	Carrying studies and providing project monitoring and evaluati	technical assistance to on and information and	ASER and ERIL's	sponsors; Carrying		
Value (quantitative or qualitative)	No concessions contracts signed. Local electrification plans for phase not prepared, and no monitoring in place	At least 3 concession contracts signed; d, Local electrification d, Program monitoring in place At least 3 concession were signed concession awarded bu signed. 6 lo electrification were finalized.		5 concession contracts were signed. A sixth concession was awarded but not yet signed. 6 local electrification plans were finalized. A M&E mechanism was developed		
Date	30-Jun-2004	December 31, 2012		December 31, 2012		
Comments (incl. % achievement)	The targets for concessions sign plans were developed, even the	ned and M&E developn bugh Phase 2 of the API	nent were achieved was dropped.	d. 6 local electrification		
Indicator 6	Implementation sustainable wo substitution options	od fuels supply and der	nand management	and inter-fuel		
Value (quantitative or qualitative)	Not implemented	Implemented		Implemented		

Date	30-Jun-2004	December 31, 2008	December 31, 2008
Comments (incl. % achievement)	The component was fully imple		

# G. Ratings of Project Performance in ISRs

-						
No.	Date ISR DO	DO	GEO	IP	Actual Disbursements (USD millions)	
	Archived				Project 1	Project 2
1	06/15/2005	S	S	S	0.00	0.00
2	12/21/2005	S	S	S	3.25	0.19
3	06/30/2006	S	S	S	4.19	0.19
4	12/29/2006	S	S	S	5.70	0.19
5	06/18/2007	S	S	S	6.88	0.19
6	12/17/2007	MS	MS	MS	8.12	0.19
7	06/03/2008	MS	MS	MS	9.56	0.25
8	12/19/2008	MS	MS	MS	10.62	0.25
9	05/29/2009	MS	MS	MS	12.49	0.25
10	12/18/2009	MS	MS	MS	12.61	0.25
11	06/27/2010	MS	MS	MS	12.66	0.29
12	03/28/2011	MS	MS	MU	12.71	0.33
13	04/01/2012	MU	MU	MU	13.67	0.37
14	01/15/2013	MS	MS	MS	16.14	0.82

# H. Restructuring (if any)

Restructuring	Board A	Approved	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions		Reason for Restructuring & Key	
Date(s)	PDO Change	GEO Change	DO	GEO	IP	Project1	Project 2	Changes Made
06/30/2009			MS		MS	12.49		Closing date extension
12/17/2012			MS		MS	16.14		Partial credit cancellation

# I. Disbursement Profile





P070530



# 1. Project Context, Development and Global Environment Objectives Design

#### **1.1 Context at Appraisal**

#### Country background

1. During project preparation, Senegal's economy was growing steadily but with unequal poverty reduction impacts in urban and rural areas. Compared to an average growth rate of 6 percent in the rest of Sub-Saharan Africa (SSA), growth in Senegal averaged 4 percent between 2000 and 2005. However, the impact of the economic growth was inequitable. Significant gaps existed between rural and urban Senegal in terms of income, education, health, and access to modern services. Poverty incidence ranged from 44 to 59 percent of the population in urban areas but was higher in rural areas, varying from 72 to 88 percent.

## Sector background

2. Electricity access was low in rural areas and unreliable in urban areas. Less than 4 percent of Senegal's villages were estimated to have electricity, and in the electrified villages, less than 30 percent of households have electricity connections. An electricity network was mainly available in the capital city, Dakar, and four urban centers: St-Louis, Kaolack, Ziguinchor and Tambacounda. But supply in these cities was sometimes interrupted during peak demand periods, as the low installed power capacity, running mostly on costly imported fuel, was struggling to meet the electricity demand growing at a pace of 25 - 30 MW a year.

3. Recognizing the electricity access challenges and limited financing, the Government of Senegal (GoS) pursued reforms to promote private sector participation. The foundation of these reforms rests on the 1998 Electricity Law (98-29), which provided the sector legal, regulatory, and institutional framework. The law promotes private sector involvement in electricity generation and distribution through delivery of concessions and licenses under the oversight of an independent electricity sector regulator, established later as the *Commission de Régulation du Secteur de l'Electricité* (CRSE). The law also calls for scaling up rural electrification by transferring responsibility to service rural areas from SENELEC - the national power utility who used to have a monopoly in electricity generation, transmission, and distribution - to a dedicated rural electrification agency, set up in 1999 as the *Agence Sénégalaise d'Electrification Rurale* (ASER).

4. The government's commitment to rural electrification was later reinforced in the 2004 Rural Electrification Development Policy Letter. The policy letter sets a target to increase rural electrification rate to 30 percent by 2015 and clarified ASER's operating mechanisms. Two main mechanisms for involving the private sector in rural electricity generation and distribution were identified: large-scale concessions and locally sponsored electrification initiatives, known as ERIL (Electrification Rurale par Initiatives Locales) or smaller concessions. To facilitate the implementation of concessions, the country was divided in 18 geographical areas, corresponding to 18 large-scale concessions.

5. In the energy-for-cooking subsector, wood fuel harvest for charcoal production was unsustainable, despite encouraging results from community-based forest management. The World Bank-financed Sustainable and Participatory Energy Management Project, known as PROGEDE I, effective since 1997, was being implemented and nearing completion. The project had successfully initiated community-based forest management practices to reduce widespread rural wood fuel exploitation for charcoal production and sales by urban-based traders. It closed in December 2004 with a highly satisfactory rating.

## Rationale for Bank involvement

6. The main rationale for the Bank's involvement was to bring international experience and trust to set up a public-private partnership framework for providing electricity services to rural areas. Given the government's two unsuccessful attempts to privatize SENELEC in 2000 and 2002, and its strategy to implement concessions in rural areas, the involvement of the Bank, as an "honest broker", was thought to be critical to establishing a framework that could leverage investments from the private sector and multilateral/bilateral development agencies. The project was the first of its kind that helped pioneer the public –private sector partnerships in the delivery rural electrification services in Sub Saharan countries.

7. The project contributed to achieving the 2003 Country Assistance Strategy (CAS)'s third objective: to improve living conditions among the poor and vulnerable groups. It sought to increase access to electricity services in rural areas, support productive uses for income generation, and scale up community-based wood fuel management, which constituted a means for improving the living conditions of the poor. The project's focus on involving private operators also contributed to developing a private market and associated employment sector, thereby facilitating wealth creation, another strategic pillar of the CAS.

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

8. The project's development objective is to increase the access of Senegal's rural population to modern energy services and to ensure the environmental and social sustainability of wood fuels in urban and peri-urban areas.

9. The key project development objective indicators, as presented in the credit agreement, covered not only IDA/GEF financing but also other participating donors. The indicators are:

Outcome indicators	Target	Comments / units
Increase in the number of households benefiting	35,000	The 35,000 connections are broken
directly from electricity		down as follow:
		IDA/GEF 16,000
		(concessions)
		Other donors 14,000
		(concessions)
		ERILs 5,000
		(all donors)
		<i>Total</i> 35,000
Volume of annual sustainable wood fuel production	60,000	tons of charcoal per year
capacity for marketing in the urban and peri-urban		
energy markets		
Number of hectares brought under community-based	230,000	hectares
sustainable management systems within the project		
implementation zone		
Number of improved carbonization units installed	150	carbonization units
Number of improved wood fuels stoves	120,000	wood fuel stoves
disseminated		
Number of improved alternatives fuel stoves	30,000	alternative fuel stoves
disseminated		
Total sustainable incremental revenue generation	US\$6	million per year
capacity among participating villages		

10. The outcome indicator target for electricity access (35,000 connections) includes connections to be achieved through parallel financing. The original financing plan of the project involves IDA/GEF financing and parallel financing from other donors and the GoS. The parallel financing was to materialize through separate financing agreements between other donors and ASER. At appraisal, the African Development Bank (AfDB) and KFW/GIZ confirmed parallel financing. Other parallel financing was expected from the French Development Agency (AFD) and the European Union. The GoS was also expected to not only provide counterpart financing but also parallel financing in a form of budget for programmatic village electrification.

11. The project was designed as the first of a three-phase adaptable program, whose objective was to support the transformation and improvement in the living conditions of rural Senegal by: (i) providing lighting and access to modern communication to rural households, (ii) improving delivery of social services by providing electricity to potable water delivery systems, health clinics, schools, etc., and (iii) enhancing economic productivity through the provision of electricity for productive purposes. Moving from the project (phase 1 or APL1) to subsequent phases (APL2 and APL3) was subject to a number of conditions including timely completion of the concessions. Because the project (phase 1)'s implementation was delayed and the number of concessions was later reduced from 18 to 10, the subsequent phases were dropped. It should, however, be noted that the project (phase 1) is being followed up by a technical assistance operation under the Sustainable Energy for All initiative.

12. For this ICR, the analysis and evaluation will be conducted against the development objective of the project (phase 1 of the program or APL1).

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

13. The program will have a positive environmental impact at the global and local levels. At the global level, it will help reduce net CO2 emissions. At the local level, it will promote conservation by encouraging the use of: (i) renewable sources of energy; (ii) efficient lamps and improved cooking stoves; (iii) improved carbonization methods and improved wood fuel stoves. It will also continue implementation of sustainable forest and natural resource management that will also reduce deforestation.

14. Although no GEO indicators were explicitly included in the GEF Trust Fund Agreement, the results framework indicates the following key GEO indicator:

• Net CO<sub>2</sub> emissions reduction and conservation promotion by encouraging the use of renewable sources of energy, efficient lamps and improved cookstoves, improved carbonization methods, and improved wood fuel stoves. The indicator target is 8,000 tons of CO<sub>2</sub> emissions reduced.

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

15. The project development objective was not revised.

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

16. The global environment objective was not revised.

#### **1.6 Main Beneficiaries**

17. The project's main expected beneficiaries, grouped by intervention areas, were:

Rural electrification (Component 1, 2, and 3)

- Households, small businesses, health centers, and schools located in the three concessions areas financed by IDA ((i) Dagana-Podor-St-Louis, (ii) Mbour, (iii) Kolda-Velingara): would gain access to on-grid and off-grid electricity, supplied by private operators that will be awarded large or small-scale (ERIL) concessions
- ASER: would be provided with four new staff, training, information technology equipment, vehicles, and technical assistance in a number of activities including the development of local electrification plans, multi-sectorial energy programs (PREMs), monitoring & evaluation system and the implementation of a communication and education plan.
- CRSE: would receive support for study tours to countries with relevant regulatory experience and for participation in regional and international regulatory forums. It

was also expected to receive assistance in carrying out studies on specific rural electrification regulatory aspects.

• The Ministry of Energy and Mines (MEM): would receive support for training and workshop participation or organization and technical assistance in conducting specific studies.

Sustainable and participatory wood fuels management (PROGEDE transition component: component 4)

- 100 village-level communities in the Sedhiou, Bakel, and Kedougou sub-regions would receive small tools and field equipment to put 230,000 ha of forest under sustainable community-based management. They would benefit from the proceeds of fuel wood, charcoal sales, and other income-generating activities supported by the project.
- Forest services covering the 100 villages, where community-based forest management will be practiced, would receive office and field equipment to support the communities in their activities (carbonization units, agro-forestry enterprises, fuel wood markets)
- Energy Directorate and Forestry Directorate: both would receive office supplies including computers and energy database software (household cooking energy data, forestry data).

#### **1.7 Original Components (as approved)**

18. The project comprises four components: Three of the four components support rural electrification and the fourth component supports sustainable access to wood fuels for cooking.

*Component 1 - Financing of investments (IDA: US\$16.25 million; GEF: US\$3.6 million)* 19. The component was to provide output-based capital subsidies, refinancing and guarantees to support both rural electrification, and multi-sectorial energy sub-projects (promoting productive uses of electricity) in three rural concession areas - Dagana-Podor, Mbour, and Kolda-Velingara. Providing capital subsidies was deemed necessary to ensure sustainability of rural electrification. The component was also to finance the preparation of rural electrification proposals from community-based organizations.

# Component 2 - Capacity development and institutional strengthening (IDA: US\$2.55 million; GEF: US\$0.4 million)

20. The component was to strengthen the capacities of institutions involved in the implementation of the project to enable them to play their role efficiently. It was to provide training and technical assistance to ASER (including the administration of the Rural Electrification Fund), CRSE, MEM, and a Multi-Sectorial Committee in charge of promoting productive uses of electricity.

Component 3 – Implementation, Communication, Monitoring & Evaluation (IDA: US\$2.25 million; GEF: US\$0.55 million)

21. The component was to support productive and social uses of electrification, local electrification initiatives, outreach and monitoring. The support was to cover:

- Establishment of a committee responsible for promoting productive uses of electricity in the three rural areas to be electrified (CIMES); and preparation and implementation of productive uses activities.
- Preparation of community-based electrification initiatives and piloting some of the prepared initiatives.
- Information, education, and communication campaigns on the rural electrification project
- Monitoring and evaluation activities including auditing and reporting

# Component 4 – Sustainable Wood Fuel Supply Management, Demand Management and Inter-fuel Substitution Options (IDA: US\$4.1 million)

22. The component, known as PROGEDE transition phase, was to support supply and demand-side interventions to improve access to sustainable wood fuels for cooking. On the supply side, the component was to finance activities to consolidate gains from the PROGEDE I, such as (i) community-based management of 230,000 ha of forest in the Sedhiou, Bakel and Kedougou departments, and (ii) acquisition of small tools, field and office equipment, and other materials for the rural communities, the regional offices of the Forest Service/Directorate, and agro-forestry enterprises. On the demand side, the component was to provide technical assistance and office equipment for the Directorate of Energy and the Directorate of Water and Forests, as well as finance selected studies; demonstration pilots (i.e. charcoal briquettes, biofuels, etc.); interfuel substitution; and publicity/communication services for the promotion of improved cookstoves.

# **1.8 Revised Components**

23. Although the number and headings of the project components were unchanged, the first and fourth components' scope was slightly modified, following the mid-term review:

- Component 1: two sub-components were added. The first to finance in-house electrical wiring, meters, and other equipment necessary to connect new rural customers to power grid recently constructed through the government emergency rural electrification program. The second to finance small diesel generators and transformers to provide back up. The additions were requested by the Government to address pressing demands for electricity given delays in the concessions implementation. About US\$1.25 million was reallocated to finance the additions.
- Component 4: the component's closing date (initially December 2007) was extended to continue the consolidation of community-based forest management activities until the preparation of a separate PROGEDE II project. US\$ 2.7 million were reallocated to the component.

# **1.9 Other significant changes**

24. The project was restructured twice. The first restructuring extended the project closing date for three and a half years, from June 30, 2009, to December 31, 2012 to account for delays in awarding rural concessions. The second restructuring cancelled SDR 6.4 million from the original credit and changed the delivery of output-based subsidies to improve disbursement. The partial cancellation was done as part of a comprehensive performance improvement plan developed after change of project supervision leadership. It was informed by both implementation progress on the ground and detailed disbursement forecasts that considered concessionaires' investment schedules. The cancellation allowed the reallocation of predicted undisbursed funds to the energy sector financing in Senegal.

# 2. Key Factors Affecting Implementation and Outcomes

#### 2.1 Project Preparation, Design and Quality at Entry

25. The project was prepared based on a comprehensive background analysis involving different stakeholders. Over 15 studies were conducted mainly to inform the design of the concession approach. The studies included, among others, the definition of the geographic limits of rural concession areas, the development of electrification plans for three concession areas to provide private operators with background information for bid preparation, the preparation of concession award procedures, the design of the rural electrification fund, and the analysis of international and local private sector's interest in the concession approach. Emphasis was put on the design of the large-scale concessions with the consideration that small-scale concessions constitute short-term mechanisms to address electrification needs in villages that were not in the large-scale concession's electrification priority plan for the first three years. Small-scale concessions were to be later transferred under the management of large-scale concessions owners. The studies' findings were shared and discussed through workshops with key government agencies (ASER, MEM, and CRSE) and multilateral and bilateral development agencies including the AfDB, KFW, GTZ, and AFD.

26. The project was the first ever large-scale electricity concession project in rural areas, financed by the Bank in Sub-Saharan Africa, and its design incorporated innovative features and lessons learned. The rural electrification approach based on concessions was the first ever public-private partnership model to be implemented in rural areas in Senegal. The rationale for its adoption lies on the strong need for complementing limited funding from the government and development agencies with significant investments from the private sector, and on the private sector's greater capacity and expertise to ensure cost-effectiveness in rural electrification and operate and maintain the network. The government and donors' funding was provided as subsidies tied to the concession bidding process, making it an output-based delivery of investment subsidies. The design of the output-based scheme was informed by lessons that pointed out that investment subsidies to private sector are more effective when they are provided based on service output. The project also included a subcomponent, known as PREMs, to

promote productive and social uses of electricity, reflecting lessons learned from impacts assessments of rural electrification programs that revealed the importance of complementing rural electrification programs with multi-sector measures to increase income, and thereby contributing to ensure financial viability of rural electrification.

27. The government's commitment to the project's concession-based approach was adequate overall. During the project preparation, the government divided rural areas into 18 geographic areas to facilitate the implementation of rural concessions. It continued to provide ASER with an operating budget and fulfilled conditions required to establish the rural electrification fund. The government reiterated its commitment to the concession approach in the Rural Electrification Development Policy Letter, issued in July 2004, and signed by both the Minister of Energy and Mines and the Minister of Economy and Finance. The letter confirms the adoption of both large-scale and small-scale concession approaches, establishes a rural electrification fund as the main financing mechanism, and separates the geographic service areas of ASER from that of SENELEC. The letter sets out the government's plan to pursue an emergency rural electrification program to help increase the rural electrification rate to 62 percent by 2022 from 12.5 percent in 2003. It also authorizes SENELEC to create a separate subsidiary utility that is allowed to compete with international private operators for concessions.

28. Although the project rightly identified a number of risks, some were overlooked. International and local private sector's interest in rural concessions was rated high and the implementation of the proposed mitigation measure-extensive consultations with potential private operators—successfully addressed the risk. In contrast, ASER's capacity to implement the project and CRSE's capacity to regulate private operator interventions were rightly rated high. However, the mitigation measure-ensure that key institutionbuilding elements for ASER and CRSE are in place during the project-lacked specifics. Also, two risks were overlooked. The first is failure from SENELEC to cooperate in the concession award process. Though SENELEC was not an implementing agency, its agreement to let private operators extend its medium voltage network to connect rural households was required at the concession contract negotiation stage. Also, SENELEC did not react well to the end of its monopoly in rural areas, making it reluctant to engage in the rural electrification project. Not accounting for SENELEC's engagement risk contributed to implementation delays. The second risk is the inability of various stakeholders to work in a collaborative manner leading to timely decision-making. Key inputs in the concession award were provided by not only ASER, CRSE, and SENELEC, but also MEM, MEF's procurement control unit, and private operators. Such multiple interventions raise coordination and collaboration challenges that should have been considered in the risk analysis. In sum, given the innovative nature of the project, the risk analysis should have been more comprehensive and the mitigation measures should have provided for a longer implementation timeframe.

#### 2.2 Implementation

29. The project implementation was significantly delayed as the time for concession awards and putting in place the appropriate regulatory framework was greatly underestimated. Award of the first concession took three years, instead of one year as initially planned. Award of the second and third concessions also took longer, due to an unsuccessful first biding. After the first concession award, approving service regulations, which govern electricity delivery to consumers including tariffs, metering, and service quality aspects took 22 months. Also, the implementation of the ERIL component (small-scale concession) was delayed for about two years.

30. The delays were caused by a combination of factors including the innovative nature of the project, stakeholders' reluctance to compromise, and ASER's stretched implementation capacity. The innovative and untested nature of the project gave rise to implementation challenges. Procuring a rural concession was a first time experience for government agencies and the World Bank supervision team. Therefore, thorough and lengthy reviews involving ASER, CRSE, MEM, MEF's procurement control unit, and the WB were conducted to short list the firms and to evaluate the technical and financial bids. SENELEC had to approve, for the first time, unfamiliar proposals of least-cost electrification techniques (smaller section of wires, lighter electricity poles, Single Wire Earth Return - SWER) from private operators. Approving, for instance, the SWER technique, required a study tour in Tunisia. CRSE, who used to regulate only on urban electricity production and distribution, lacked sample models for rural electrification, and had to develop them.

31. Stakeholders' reluctance to compromise exacerbated delays. Collaboration weakened as implementation difficulties arose. For instance, ASER, and CRSE, hosted in the same building, had to go through the MEM to communicate and hold meetings. SENELEC held strong resistance against least-cost electrification proposals, taking, for example, six months to approve simplified standards proposed by the first concessionaire. MEM's commitment also weakened. It took two years to approve and issue procedures guiding subsidy provision to promoters of small-scale electrification initiatives, which delayed the implementation of the ERIL sub-component. MEM's weakened commitment was mainly due to its greater focus to urban electricity issues, with the 2009-2011 electricity sector crises, which increased in intensity in 2010-2011, causing widespread load shedding in urban areas.

32. The implementation of the government-funded emergency rural electrification program distracted ASER from the concession approach and contributed to deterioration in its financial health and institutional efficiency. From 2002 to 2009, ASER had been receiving government funding through agreements to electrify about 560 villages, known as the emergency rural electrification program. The program's implementation did not follow Bank fiduciary procedures<sup>1</sup>, but was however, considered as a complement to the

<sup>&</sup>lt;sup>1</sup> Bank fiduciary procedures were applicable to IDA/GEF financing stipulated in the credit agreement. Separate co-financing agreements were signed between other donors and ASER. Also, MEM and ASER have agreements for implementing the emergency rural electrification program.

World Bank-financed project<sup>2</sup>. Mismanagement occurred in the use of the government's budget for the emergency rural electrification program (Bank financing was not affected). A number of villages were electrified without appropriate government budget, and not following national procurement guidelines, leading to ASER's annual operating expenses exceeding the government funding. This led to ASER's debts amounting to 1.3 billion CFA (about US\$ 2.6 million). On the organizational side, since project effectiveness, ASER's staff has more than doubled - from 30 to 82 staff members – with recruitment not related to the achievement of its mission. ASER's management has changed three times. Beyond the negative financial, organizational, and reputational impact, implementing the emergency rural electrification program has distracted ASER focus from the concession activities.

33. The recent management change at ASER and MEM has brought positive developments in the project implementation. Following the March 2012 elections, new management was appointed at ASER and MEM. The new government reiterated rural electrification as one of the top energy sector priorities. MEM has, since, demonstrated strong leadership. It set up timelines for stakeholders to reach compromises, speeding up implementation. For instance, under MEM's oversight, CRSE and ONE, the first concessionaire, agreed on the service regulation terms, that were initiated in 2011. MEM also approved and issued the ERIL procedures and guidelines, prepared by ASER and CRSE. MEM requested the review of the number of years that private operators should guarantee their investments and the request was addressed in 3 weeks. It has been proactive in addressing requests from ASER to accelerate implementation, and is monitoring closely implementation progress with regular meetings with involved stakeholders, which facilitates collaboration and problem solving. ASER's new management is making efforts to improve the agency's financial health and efficiency. A financial recovery and internal re-organization plan, prepared by an independent consulting firm, is being finalized.

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

34. **M&E design**: The project's M&E system consisted of various platforms including Excel-based database and geographic information system (GIS). The Excel-based database integrates the results framework indicators and M&E guidance that were defined at project appraisal, as well as information collected through baseline surveys and post surveys of electrified villages. The GIS incorporates socio-economic data on villages and is used to map out transmission and distribution lines as they are constructed. The M&E system was enhanced with Bank financing to consolidate existing M&E platforms into one system and make it web-based and more user-friendly. ASER led the M&E system modernization in a participative manner, incorporating inputs from a task force made up of representatives from ASER, CRSE, Department of Electricity, planning division of MEM, CIMES (multi-sectorial committee), and GIZ. The M&E enhancement was delayed by: (i) slow approval of the M&E operational plan by the World Bank

<sup>&</sup>lt;sup>2</sup> The Bank financed in-house wiring for 2,639 households, enabling their connection to grid constructed under the emergency rural electrification program. Also the project appraisal document indicates that the government was expected to contribute to the project through parallel co-financing.

(about 6 months<sup>3</sup>), (ii) replacement of the first recruited M&E consultant who passed away, and (iii) integration of gender and emissions reduction aspects that were not initially planned.

35. **M&E implementation**: The enhanced M&E system includes a result framework anchored by 50 indicators at different levels - inputs, outputs, outcomes, and development objective – and appropriate for monitoring progress towards the project and environment development objective. For each indicator, means of verification, assumptions & risks, data collection methods, and institutional responsibility are defined. The M&E system goes beyond the PDO to track rural electrification impacts on economic and social development as well as on achieving MDGs. It is being set up, which involves upgrading the former M&E and linking the GIS platform to the recently developed version. After completing the M&E upgrade, ASER plans to link it to data platforms from concessionaires and SENELEC, providing a real-time M&E platform capable to provide data on the project's outputs and outcomes.

36. **M&E utilization**: The former M&E system was used to monitor the project and the enhanced system will be the primary M&E tool moving forward. ASER used Excel spreadsheets to monitor progress against indicator targets and prepare progress reports and action plans for accelerated implementation. With the GIS, ASER captured progress in network construction, household connections, and new socio-economic infrastructure. Moving forward, the upgraded M&E system will constitute the main tool for monitoring carbon reduction, under the Emission Reduction Purchase Agreement signed with the World Bank-Carbon Finance. The system will also provide ASER with a monitoring and impact assessment tool that will inform the government's overall M&E system put in place to monitor progress towards targets set in the 2012 Energy Sector Development Policy Letter.

# 2.4 Safeguard and Fiduciary Compliance

37. **Safeguards**: Project implementation complied with safeguards requirements despite minor shortcomings. The Bank supervision team lacked a Safeguards Specialist during the first four implementation years. This did not however impact safeguards compliance as no concessions were officially awarded during that period and ASER's Director of Studies and Information Systems, who is a trained social and environmental specialist, has been handling safeguards aspects. Since 2009, supervision missions included a WB Safeguards Specialist who delivered on-the-ground training to ASER staff and monitored safeguard aspects. ASER, with World Bank assistance, successfully conducted public consultations and supported concessionaires in preparing environmental & social management plans (ESMP). ONE included environmental and social clauses in contracts with contractors. ASER attempted to develop a guidance note on the preparation and implementation of ESMPs, and to hire an Environmental and Social

<sup>&</sup>lt;sup>3</sup> World Bank supervision team was heavily involved in assisting the government to address the severe electricity crisis striking urban centers. This affected prompt response to no-objection requests.

Specialist, but has lacked sufficient budget. These are however planned under the ongoing organizational restructuring.

38. **Financial management:** A comprehensive assessment of ASER's financial management capacities was conducted at project preparation and led to enhancements by project effectiveness. ASER maintained financial management satisfactorily the first two project implementation years. But, since 2008, financial management has deteriorated with difficulties in mobilizing timely government co-financing and insufficient government budget. ASER had been using IDA financing to pre-finance services, goods and works that should have been funded by the government co-financing (US\$50,000 in 2011). It also used IDA financing to pre-finance its operating expenses (US\$164,000 in 2011), despite World Bank advance warning not to. ASER had, however, regularly reimbursed ineligible expenses. Another issue was ASER's weak internal control mechanisms for the government budget, which is being addressed as part of the financial recovery and internal re-organization plan.

39. It should be noted that the 2010 Quality Assessment of Lending Portfolio (QALP) indicated that financial management should have been rated unsatisfactory. The ICR team acknowledges the seriousness of financial management issues, but suggests a balanced assessment, taking into consideration financial management improvements. Project's accounting was regularly updated; interim financial reports were submitted on time and their quality was satisfactory; and the financial recovery and internal re-organization plan is being implemented.

40. **Procurement**: Although procurement complied with Bank requirements, it was significantly delayed. Procuring the first concession financed by the Bank took about three years due to: (i) high learning curve – first time for all involved stakeholders – for firms short listing and bids evaluation; (ii) slow approval from the Ministry of Economy and Finance; and (iii) lengthy negotiations between SENELEC and pre-selected operators over technical network standards. Also the procurement of the second and third concessions were delayed by unsuccessful first bids and had to be re-launched. ASER's project procurement staff was also involved in procuring works and services under the government-funded emergency rural electrification program.

#### 2.5 Post-completion Operation/Next Phase

41. The experience gained has paved the way for an accelerated implementation and completion of the rural concessions. Despite the delays, six concessions, as initially planned, were awarded to international private operators, who constructed on-grid and mini-grid networks covering 186 villages. With the recent approval of electricity service regulations, one operator, ONE, is ramping up in-house wiring and meter installation to connect 8,836 households starting in August 2013. The approved regulations were applied to two World Bank-financed concessions, and will be applicable to the remaining four awarded concessions, saving considerable time. Also, least-cost electrification techniques are now well accepted by SENELEC, which will avoid delays in negotiating

the remaining four concessions not yet financed. The ERILs assistance guidelines and procedures have been issued and will facilitate the acceleration of the sub-component.

42. Besides the network construction and regulatory gains, MEM is monitoring the project closely. The Minister of Energy and Mines' cabinet is setting up a coordination committee, under his leadership, and comprising the heads of ASER, CRSE, and SENELEC. The committee will meet monthly or as needed, to discuss emerging issues and work out solutions. This will provide a platform to quickly address emerging issues and facilitate the operationalization of the concessions.

43. The project continues to be financed by a number of multi-lateral and bilateral development agencies, including AfDB, KfW, AFD and the European Union. The European Union extended its financing closing date for two years and planned to scale up the scope of their activities in rural electrification in Senegal. The AfDB also plans to grant a closing date extension. KFW envisions scaling up its support in the ERIL component.

44. Moving forward, the World Bank is providing technical assistance to strengthen rural electrification operations and plans. Under the Sustainable Energy for All initiative, funding was mobilized to assist ASER in a number of areas including: (i) improvement of ASER's financial health and operational efficiency through the implementation of the financial recovery and reorganization plan, and (ii) planning for universal energy access by 2030, through the development of local electrification plans for two concessions areas lacking financing, and the preparation of long-term energy access plans along with an investment prospectus to facilitate leveraging financing. The Bank will consider a new IDA operation once the management and performance of ASER has been strengthened.

# **3.** Assessment of Outcomes

# 3.1 Relevance of Objectives, Design and Implementation

45. The project's objective, design and implementation are highly relevant to current country and global priorities and to the Bank's FY2013-2017 Country Partnership Strategy.

46. **Relevance of design:** The project's approach and implementation arrangements build on the regulatory and institutional framework provided in the Electricity Law (98-24). Considering the law's provision to increase electricity access through delivery of concessions to private operators and the need for complementing limited funding from donors and the government with capital from the private sector, the project opted to provide investment subsidies to attract private operators to invest in designed concession areas. The components for implementing the concessions were well designed, based on comprehensive studies and thorough analysis of private sector as well as bilateral development agencies. Instead of establishing a separate, external unit to implement rural

electrification activities, the project gave implementing responsibilities to ASER, which was mandated by the Electricity Law to promote rural electrification with regulatory inputs from CRSE, and included capacity building and institutional strengthening activities. This allowed trained staff to remain in place after project end, sustaining capacity enhancements.

47. **Relevance of objective and design to country priorities:** The project's objective to increase access to electricity and sustainable cooking fuels for rural population remains a priority for the government. The October 2012 Energy Sector Development Policy Letter, issued by the President, sets the objective to ensure sustainable supply of household cooking fuels-which was part of the project objective-and set the target of 50 percent of rural electrification rate by 2017, which builds on the project objective to increase electricity access. To reach the objective and target, the letter calls for expanding community-based forest management systems and addressing constraints that led to delays in implementing the project-designed concessions, highlighting the relevance of the project's approach to both community-based forest management and rural concessions. The policy letter's action plan consistently includes activities to increase forest areas under community-based sustainable management and complete the implementation of concessions awarded through the project.

48. **Relevance of objective and design to global priorities:** The project-initiated publicprivate partnership to dramatically increase rural electricity access contributes to achieving Senegal's universal energy access by 2030, one of the three goals of the Sustainable Energy for All, a global initiative launched in September 2011 by the UN Secretary General, and strongly supported by the World Bank Group, whose President now co-chaired the initiative's high-level Advisory Group. As part of the World Bank Group's commitment to the initiative, the Bank's Energy Sector Management Assistance Program (ESMAP) has set up a Sustainable Energy for All Facility that provide resources to World Bank regional energy units to assist selected countries-including Senegal-to move towards universal energy access by 2030.

49. **Relevance of objective and design to Bank partnership strategy:** The project's increased rural electricity access objective is one of the expected outcomes (outcome 9B) from the Bank's FY2013-2017 Country Partnership Strategy, under the first pillar – accelerating growth and generating employment. The Bank strategy mentions support for both sustainable management of household cooking fuels, which was facilitated by the project's PROGEDE transition component, and for rural electrification through assistance from the Sustainable Energy for All. The assistance has been launched and builds on the project's concession approach and results to assess remaining gaps towards universal rural electricity access, and develop an investment prospectus. The project's objective and design, therefore, provides a strong basis upon which current lending and assistance is provided, which indicates its relevance to Bank strategy and interventions.

50. **Relevance of implementation:** Project implementation responded to changing circumstances. Acknowledging delays in awarding and implementing concessions, the Bank restructured the project component 1 to finance in-house wiring and meter

installation, allowing thousands of households to be connected to electricity network constructed with the government parallel financing. The Bank also changed project supervision leadership to enable closer monitoring and guidance. A second restructuring changed the investment subsidy delivery mechanisms, and contributed to increased disbursement and accelerated implementation. Besides, the inclusion of the PROGEDE transition phase component was a sound strategic move that responded to government's needs and enabled it to continue key successful activities, maintaining momentum generated by the PROGEDE I till the preparation of a separate investment lending operation (PROGEDE II). The project also showed responsiveness in reallocating proceeds to provide an additional US\$2.7 million to implement remaining activities and consolidate the achievements of PROGEDE I.

# 3.2 Achievement of Project Development Objectives and Global Environment Objectives

51. This section analyses the project's overall efficacy by breaking down the development objective in two parts (PDO - (a) and PDO - (b)) and evaluating the GEF objective separately. The analysis revealed an overall moderately satisfactory achievement of development and GEF objectives.

# <u>PDO – (a) to increase the access of Senegal's rural population to modern energy</u> <u>services</u>

52. **Outcome**: 20,386 households, productive and social users gained access to electricity by project closing; below the initial target of 35,000 households to be reached through financing from all donors including the GoS, as presented in the credit agreement. Out of the 20,386 connections:

- 16,089 households and productive users gained electricity access through the implementation of the government of Senegal's emergency rural electrification program (which is similar to the ERIL approach) by ASER
- 2,639 households gained electricity access with World Bank financing in-house wiring and meters acquisition and installation to enable connection to electricity network constructed under the Government-funded emergency program.
- 1,503 households and productive users received electricity connections through a the implementation of a small-scale concession (ERIL) financed by KFW/GIZ that enabled the installation of solar home systems (SHS) and the construction of hybrid (diesel-solar) power plants and mini grids in 73 villages.
- 131 households and community facilities gained electricity through three smallscale concessions (ERIL) financed jointly by the World Bank and the Netherlands cooperation.
- 24 solar home systems where installed as part of tests in a large-scale concession financed by the AFD

53. **Outputs from the Bank and Co-financiers**: Excluding the GoS-supported emergency program, the project led to 6 awarded concessions—as initially targeted—resulting in the construction of a network covering 186 villages by the closing date (please see more details in Table 1). The village breakdown by source of financing is:

- 66 villages through the first Bank-financed concession. The concessionaire, ONE, rapidly expanded the network construction, covering 116 villages by April 2013. During the ICR mission, ONE was installing first solar homes systems (SHS) through the concession approach, and successfully tested the operation of public lighting in 9 villages. The second Bank-financed concession was recently awarded to STEG, the Tunisian power utility, and network construction has not yet begun.
- 47 villages through the AfDB-financed concession
- 73 villages through KFW/GIZ-supported ERIL

Financing source	Approach	Outputs
(amount)		
World Bank	Concession	Network covering 66 villages by December 2012: 88 km of
(US\$21.16 M)		transmission line, 184 km of distribution line, and 57
		transformer sub-stations constructed
		By April 2013, network covered 116 villages; public lighting
		available in 9 villages
		2 concessions awarded to ONE, and STEG
		Transmission line being constructed to connect 28 health
		centers and pumping stations for an agro-business (PREM)
	ERIL (small	131 SHS installed
	concession)	10 micro-power plants (10-25 kW) being constructed
African	Concession	Network covering 47 villages: 32 km of transmission line, 59
Development		km of distribution line, and 35 sub-stations
Bank		Concession awarded to ONE
(US\$14.27 M)		
KFW/GIZ	Concession	Concession awarded. Construction has not yet started
(US\$6.84 M)	ERIL	Hybrid (diesel-solar) power plants constructed with network
		covering 73 villages
		1503 connections realized
AFD	Concession	24 SHS installed
(US\$10.10 M)		Network construction has not yet begun
		Concession awarded
European Union	Concession	Concession recently awarded
(US\$10.60 M)		

Table 1: Outputs from the Bank and Co-financiers

54. **Expected outcome**: The project's initial access target is, however, expected to be exceeded. The private operators that were awarded the six concessions and three small-scale concessions (ERIL) committed in their concession contracts to provide electricity to 107,799 customers. ICR ratings are based on the number of 20,386 customers that were connected by project close. However, the 35,000 connections target is expected to be reached by December 31, 2014 and over 100,000 customers are expected to be connected by 2030.

Table 2: connection commitments in the concession contracts

Concessionaire	Concession	Source of	Connection commitments in the concession
	area	financing	contracts
ONE	Dagana -	IDA -	14,885 <sup>*</sup> on-grid/mini connections
	Podor-Saint	GEF	5719 SHS
	Louis		28 health clinics and 1 agro-business
STEG	Mbour	IDA –	9,700 on-grid connections
		GEF	
ONE	Louga-	AfDB	9,974 on-grid connections. 1852 SHS
	Kébemer-		
	Linguère		
ISOFOTON	Fatick-Gossas-	KfW/GIZ	27,000 connections
	Kaolack-Nioro		
EDF	Kaffrine-	AFD	18001 household connections
	Tambacounda-		61 heath centers and schools
	Kedougou		
ISOFOTON	Kolda-	European	20,500 connections
	Vélingara	Union /	78 schools, health centers, and SMEs
		GoS	
TOTAL			107,799 connections

\*: The 14,885 connections include 1,000 connections through ERIL that will be transferred in the concessions.

#### <u>PDO – (b) and to ensure the environmental and social sustainability of wood fuels in</u> <u>urban and peri-urban areas</u>.

55. The project's PROGEDE transition component ensured environmental sustainability of wood fuel provision to urban and peri-urban areas through the establishment of participatory management of wood fuel production, afforestation, and biodiversity conservation. The component developed community-based forest management plans whose implementation brought 289,116 ha of forest under the management of village organizations, exceeding the initial target of 230,000 ha. The community-based forest management involved harvesting an amount of wood fuel, for charcoal production, that can be replaced through natural forest growth and afforestation, ensuring the sustainability of wood fuel production to meet the energy-for-cooking needs of urban and peri-urban households. 65,817 tons of charcoal was produced per year in a sustainable manner; exceeding the target of 60,000 tons. Also, 81,908 ha of community-based biodiversity conservation reserves were established in three villages along the perimeter of the National Niokolo Kobal Park, contributing to fight against the loss of specific vegetal and animal species.

56. The social sustainability was ensured through the empowerment of communitybased organizations leading to increased revenues in villages. Charcoal production from wood fuel collection has shifted from commercial exploitation by urban-based traders to participatory management by 465 village and inter-village organizations. The community-based management involved pre-defined revenue sharing schemes that enabled charcoal proceeds to trickle down to village inhabitants. In addition to charcoal production, the component supported various income generation activities including intensive farming, gardening, animal breeding, and enhanced apiculture that resulted to additional income. The total income increase was estimated at US\$14.6 million per year, over the double of the initial target of US\$6 million – and contributed significantly to reducing poverty in the participating villages.

57. The implementation of the PROGEDE transition component has led to three key reforms undertaken by the government in the household cooking energy sub-sector. First, the GoS eliminated charcoal quota system that favored wholesale traders from urban areas. Second, it restricted charcoal production only in sustainability managed forests. Third, it revised the 1998 forestry code, in order to adapt tax regulations and provide higher returns to local communities. These reforms were informed by: (i) the knowledge of sustainable wood fuel harvesting volume, now available thanks to the implementation of community-based forest management plans in the PROGEDE component, and (ii) the realization of poverty reduction potential from revenues made by village organizations. The reforms have been "game-changers" in wood fuel management and supply and are very important achievements as biomass continues to dominate national energy consumption patterns.

Table 3: The project's PROGEDE transition	component exceeded	most of its original
targets		

Outcome indicators for the	Targets	Achieved	Efficacy index
PROGEDE component			
Volume of annual sustainable wood	60,000	65,817 tons/year of	110%
fuel production capacity for marketing	tons/year of	charcoal	
in the urban and peri-urban energy	charcoal		
markets			
Number of hectares brought under	230,000	289,116	126%
community-based sustainable			
management			
Number of improved carbonization	150	250	167%
units installed			
Number of improved wood fuels	120,000	205,728	171%
stoves disseminated			
Number of improved alternatives fuel	30,000	14,740	49%
stoves disseminated			
Total sustainable incremental revenue	US\$6	US\$14.6million/year	244%
generation capacity among	million/year		
participating villages			

GEO: The program will have a positive environmental impact at the global and local levels. At the global level, it will help reduce net CO2 emissions. At the local level, it will promote conservation by encouraging the use of: (i) renewable sources of energy; (ii) efficient lamps and improved cooking stoves; (iii) improved carbonization methods and improved wood fuel stoves. It will also continue implementation of sustainable forest and natural resource management which will also reduce deforestation. 58. **Outcome:** The project has helped reduce 604,045 tons of CO<sub>2</sub> emissions, exceeding the project's target of 8,000 tons. The emission reduction can be broken down as follows:

- 587,045 tons of CO<sub>2</sub> reduction achieved through the reduction of deforestation, the use of 205,728 improved wood fuels stoves, and of 250 higher energy-efficient kilns for charcoal production.
- 17,000 tons of CO<sub>2</sub> reduction achieved through the installation of 105,768 compact fluorescent lamps and 1.1 MW of solar PV systems through the implementation of the Government of Senegal's emergency rural electrification program including support from bilateral development agencies and through the small-scale concession (ERIL) financed by KFW/GIZ.

59. **Expected outcome:** Further  $CO_2$  emissions reduction is expected. ASER and the Community Development Carbon Fund, managed by the World Bank's Carbon Finance unit, have signed Emissions Reduction Purchase Agreements for a maximum of 175,000 certified emissions reductions (by 2018) that will happened through the installation and use of compact fluorescent lamps under the World Bank-financed rural concessions. The CDM Program of Activities (PoA) relative to the energy efficiency component of the rural electrification program was registered in January 2013 by the UNFCCC Secretariat.

# **Overall project's efficacy**

60. Based on the above analysis the achievement of PDO and GEO is moderately satisfactory. The table below summarizes the analysis.

	<b>PDO</b> – (a)	<b>PDO</b> – (b)	GEO
Initial target	itial target 35,000 electricity		8,000 tons of CO2
	connections	indicators	emissions reduction
Achieved	20,386 electricity	Most of the	604,045 tons of CO2
	connections	indicators exceeded	emissions reduction
Efficacy	Moderately Satisfactory Highly S		Highly Satisfactory
	Satisfactory		
<b>Overall Efficacy</b>	Moderately Satisfactory		

# 3.3 Efficiency

61. A re-evaluation of the cost-benefit analysis, using the appraisal methodology, revealed substantial project efficiency. The economic internal rate of return (EIRR) increased to 16.08 percent from the appraisal rate of 13.4 percent. The higher rate is due to substantial increase in project benefits, which offsets the increase in economic costs. The benefits for the users have more than doubled because the number of connected users will triple over the concession period (25 years) with concessionaires committing to 107,799 connections against an appraisal target of 35,000 connections. Also, the environmental benefits have surged as the amount of CO2 emissions reduction increased 75 times, though the current carbon price has declined (about US $2/tCO_2$  against US $4.5/tCO_2$  at appraisal). In contrast, the construction cost of 1 km of transmission and

distribution line has doubled and more financing was received from co-financiers, leading to a 223 percent increase in the total economic costs. Nonetheless, the increase in economic benefits from both the users and the environment significantly surpasses the increase in economic costs—present value of net benefits estimated at US\$40.50 million—resulting to a high EIRR. Annex 3 provides more details on the re-evaluation of the cost-benefit analysis.

62. Concessions remained financially viable despite construction cost increase. A financial analysis was conducted to assess the viability of the concession from the concessionaire's perspective. The analysis used the same Excel-based software that performed the financial analysis of three WB-financed concessions at the project appraisal. It was limited to the first Bank-financed concession, in which network construction is well advanced and data on construction costs and expected revenues are available. The electricity tariff used for the analysis is lower (the one approved in 2008) as CRSE is studying a tariffs increase to reflect higher costs. The analysis revealed that the financial internal rate of return (FIRR) is lower than that at appraisal but remains higher than the discount rate. The financial internal rate is 12.22 percent, far below the PAD's FIRR of 25.46 percent for the three expected concessions, and slightly below the concessionaire's initial FIRR of 15.84 percent in 2008 when bid proposals were submitted. The FIRR remained, however, higher than the discount rate (12 percent). The FIRR decrease is mainly due to the dramatic increase of electricity network construction costs, with the cost of 1 km of transmission and distribution line almost doubling over the project implementation period. The FIRR is expected to be higher as CRSE is considering a tariff increase to reflect the cost increase.

#### **3.4 Justification of Overall Outcome and Global Environment Outcome Rating Rating:** Moderately Satisfactory

63. The combination of high relevance, moderately satisfactory achievement of objectives, and substantial efficiency leads to an overall moderately satisfactory outcome rating. Such rating is higher than that of the July 2010 QALP for the following reasons. First, the QALP did not incorporate the PROGEDE transition component's achievements, which ensured the environmental and social sustainability of wood fuels, including three major reforms in the household energy sub-sector, a key part of the overall project development objective. Second, the QALP overlooked the emissions reduction from avoided deforestation, energy-efficient production of charcoal, and use of improve wood stoves, which contributed to meeting the Global environment objective highly satisfactorily. Third, the assessment did not account for electricity connections realized through Bank financing in-house wiring in support of the government-funded emergency rural electrification program. Fourth, network construction has expanded after the 2010 QALP and ERILs supported by KFW/GIZ provided electricity to 1,503 households and productive users by project closure.

#### 3.5 Overarching Themes, Other Outcomes and Impacts

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

64. **Poverty impacts**: The project contributed to reduce rural poverty through increased income and local job creation. As mentioned under the PDO analysis, the PROGEDE component-supported community-based forest management and incomegenerating activities enabled inhabitants in the 465 participating villages to earn additional income estimated at US\$14.6 million per year, which significantly contributes to reduce poverty. In addition, rural electrification interventions have created and will create local jobs. ONE has already recruited 12 Senegalese staff at St-Louis, a city in its concession area, and envisions hiring 29 more in other cities. Other jobs will be indirectly created with ONE's plan to hire local contractors/companies to execute in-house wiring, collect bills, and provide after-sales services for SHS customers. Similarly, as other concessionaires roll out their operations, more direct and indirect jobs are expected to be generated.

65. Gender aspects: The project was gender-informed. The beneficiaries of the PROGEDE transition component included women who were mostly involved in gardening, small ruminants and improved poultry rising as part of the supported incomegenerating activities. Although the monitoring arrangements for that component did not explicitly include gender-related indicators, gender aspects were considered, as in the previous phase. A retrospective gender analysis was later conducted to document gender considerations. The analysis informed the design of the follow-on separate PROGEDE II project, which explicitly included gender dimension at the development objective level. Gender was also considered in the rural electrification components in two ways. First, ASER included, in the M&E system, a gender-related indicator: *the percentage of women groups with productive equipment using electricity provided through the project*. Second, an assessment of gender considerations in rural electrification was conducted in 2012 and proposed recommendations whose implementation will help mainstream gender in ongoing activities.

66. **Social development**: The project contributed positively to social development. In the villages where community-based forest management was introduced, emigration to Europe has declined, as youth has experienced a dramatic income increase and were able to improve their living conditions<sup>4</sup>. The ICR mission team visited villages electrified through the government emergency rural electrification, and villages being electrified under WB financing (public lighting was on, under operational tests) and perceived the impacts of rural electrification on social development: new businesses and incomegenerating activities have sprung up; new health centers were constructed that provide better quality services for longer hours; a number of schools have introduced computer-based courses; and students have better home study conditions. Village chiefs or representatives have strongly requested network densification and the acceleration of household connections under the World Bank financing.

#### (b) Institutional Change/Strengthening

<sup>&</sup>lt;sup>4</sup> From personal communications with the head of the coordination unit for the PROGEDE transition component.

67. CRSE, SENELEC, and ASER have matured over the project implementation. CRSE has acquired expertise in developing electricity tariffs schemes for rural areas and is now well equipped to regulate rural electrification operations. SENELEC has learned about least cost-electrification techniques. ASER has led the awarding process of six (6) multiple donor-funded rural electrification concessions out of ten and has completed the required studies for two out of the remaining four (4) concessions. However, there is a need to improve its internal organization to make the agency more efficient as it continues to implement its program of activities.

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

68. **Private investment leverage**: The project leveraged significant private investments. Concessions were awarded to international power utilities: (i) ONE, the Moroccan national power utility, (ii) STEG, the Tunisian national power utility, (iii) EDF, France's power utility, and ISOFOTON, a Spain-founded global company involved in solar energy products design, manufacturing, and supply. The concessionaires have committed, in the concession contracts, to invest US\$51.1 million, against US\$11 million of investment subsidies from the World Bank, US\$4.5 million from the GoS, and US\$42 million from co-financiers (African Development Bank, European Union, KfW/GIZ, Agence Française de Devéloppement). US\$1 subsidy from the World Bank has, therefore, leveraged US\$0.4 from the GoS, US\$3.8 from co-financiers, and US\$4.6 from the private sector. This level of leverage was not expected at the project design.

69. **Expertise transfer:** In addition, least-cost rural electrification techniques and know-how are being transferred in Senegal. SENELEC has adopted simplified standards (smaller wire section, lighter electricity poles), proposed by ONE, for constructing secondary network for which future expansions are not planned. It planned to incorporate this technique in its network development master plan. SENELEC and ASER undertook a study tour to Tunisia to learn more about the Single Wire Earth Return (SWER) electrification, a safe, reliable, and less costly method for distributing electricity to sparsely populated areas. ASER plans to adopt the method in electrifying villages through the government-funded emergency rural electrification program. Local electricity sector contractors are also benefiting from the private sector know-how in network construction and in-house wiring. The transfer of know-how and least-cost electrification in Senegal.

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

70. Not applicable

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

## **Rating: Moderate**

71. A number of factors point out to a moderate risk to development and global environment outcome. Key positive factors include: (i) currently high government commitment to the project's concession approach related to recognition of its importance in achieving the target of 50% rural electrification rate by 2017, (ii) strong leadership from the Ministry of Energy and Mines as demonstrated by recent fast processing of rural operators requests, and (iii) continued support from multilateral and bilateral development agencies. The moderate risk lies on ASER's ability to improve its financial health with expected support from the Ministry of Economy and Finance. Risks related to tariffs are not expected as the law (98-29) requires CRSE to ensure the financial viability of private operators, through tariff revisions to recover investment and operating costs.

# 5. Assessment of Bank and Borrower Performance

## 5.1 Bank Performance

## (a) Bank Performance in Ensuring Quality at Entry

## **Rating: Moderately Satisfactory**

72. Bank performance in ensuring quality at entry was moderately satisfactory. The project's large and small-scale concession approach was innovative and consistent with the government's vision, legal and policy framework. The design was based on comprehensive background analysis involving key government agencies. Significant efforts were deployed to look for co-financiers and coordinate their involvement. However, the inability of government agencies to work in a synergic manner was a considerable risk that was overlooked, and the project's proposed implementation timeframe did not properly reflect (i) the initial weak financial, procurement, and technical capacities of ASER, and (ii) the innovative design features. Also, the project preparation left some uncertainties on the coordination of financing from various donors and how results would be attributed.

# (b) Quality of Supervision

(including of fiduciary and safeguards policies) Rating: Moderately Satisfactory

73. Quality of supervision was moderately satisfactory. Since 2007, most of the project supervision team members-including the task team leader-were based in Senegal, facilitating continuous support and monitoring. Financial management was regular and diligently performed. Environmental and social safeguards skills were lacking during the first four years but were addressed. However, project supervision leadership attention was diverted towards urban electricity needs to address Senegal's 2009-2011 energy crisis that led to massive load shedding. This negatively affected pro-activity in advising on implementation issues and timely response to requests for no-objection. QALP also

pointed out a lack of candor in rating development objective and implementation progress during a certain period, and therefore rated quality of supervision as moderately unsatisfactory in 2010. However, a change of project leadership occured in 2011, and government counterparts have noticed closer monitoring. Project implementation also accelerated; a number of concessions were awarded; and disbursement improved.

# (c) Justification of Rating for Overall Bank Performance

#### **Rating: Moderately Satisfactory**

74. Because of the moderately satisfactory performance in ensuring quality at entry and moderately satisfactory performance during supervision, Bank's overall performance is rated moderately satisfactory.

#### **5.2 Borrower Performance** (a) Government Performance

# Rating: Moderately Satisfactory

75. Performance of the government – specially the Ministry of Economy and Finance and the Ministry of Energy and Mines – was moderately satisfactory. The Ministry of Economy and Finance did not timely provide counterpart financing, resulting in ASER using WB loan to pre-finance expenses that should have been incurred by counterpart financing. At the Ministry of Energy and Mines level, project implementation had been delayed due to the past administration's (i) failure to set timeframes within which involved parties—CRSE, ASER, SENELEC and ONE—have to reach compromises and (ii) slow endorsement—about two years—of guidelines governing the delivery of ERIL subsidies, prepared jointly by ASER and CRSE. However, the situation has changed since 2012. The new high-level officials in place at the Ministry of Energy and Mines have demonstrated strong leadership and succeeded in speeding up resolution of a number of issues. Considering the recent MEM's strong achievement and commitment, the government performance is rated moderately satisfactory.

# (b) Implementing Agency or Agencies Performance

## **Rating: Moderately Satisfactory**

76. Implementing agencies' performance was overall moderately satisfactory.

77. The performance of ASER, who implemented three out of the project's four components, was moderately satisfactory. Although some implementation delays – related to inputs from CRSE and SENELEC - were out of ASER's span of control, the agency's execution of the government emergency program over 2008-2010, took away human resources that may have helped speed up the rural concession implementation.

78. In contrast, the performance of the implementing agencies for the PROGEDE transition phase component was satisfactory. The agencies (project coordination unit, National Water and Forest Directorate, and the Energy Directorate), who highly successfully implemented the first phase of the PROGEDE project, were the same ones who executed the PROGEDE transition phase component. The component activities were

carried out as planned. An additional funding was allocated and completely disbursed by the extended timeframe with results exceeding initial targets.

# (c) Justification of Rating for Overall Borrower Performance

# **Rating: Moderately Satisfactory**

79. The combination of the government's moderately satisfactory performance and the implementing agencies' strong moderately satisfactory performance leads to overall borrower's moderately satisfactory performance.

# 6. Lessons Learned

80. Leveraging private sector investments for rural electrification is possible if the legal and regulatory framework includes certain incentives. Among the factors that drove interest from international power utilities are fiscal incentives and legal insurance included in the 1998 Electricity Law (98-29) and the investment code. The law emphasizes CRSE's mandate to regulate in a manner to protect consumer's rights, while ensuring the financial viability of private operators, and proposes factors to be considered in determining private operators' financial internal rate of return. The investment code and the agreement signed between ASER and the Ministry of Finance provide private operators with valued added tax cuts, duty free imports of selected new network equipment, and legal provisions to repatriate benefits and certain assets. Such legal, fiscal, and regulatory incentives have been critical to attracting international power utilities to invest in rural electrification in Senegal.

81. Implementation of projects with innovative features takes time which should be properly accounted for at the design stage. Given the novelty of the approach for the involved government stakeholders, the lack of a number of sample documents – particularly in the regulation aspects – the initial weak capacity of the main implementing agency, setting an implementation timeframe of four years, similar to that of repeater projects, was over ambitious and unrealistic. A longer implementation timeframe should have been provided to account for the high learning curve and potential implementation challenges.

82. Flexibility or pragmatism is needed in certain contexts to achieve results. The World Bank has required the approval of the regulatory framework governing the provision of subsidies for ERILs projects (village electrification projects initiated by community-based organizations or local private operators), prior to allowing the procurement of ERIL projects. With delays in approving the ERIL regulatory framework, only 131 electricity connections were achieved through the WB-supported ERIL approach. In contrast, KfW/GIZ allowed the procurement of ERILs to go through even though the regulatory framework was unclear. By project closing date, KFW/GIZ-supported ERIL project realized 1,503 electricity connections, though the electricity tariffs were later defined in collaboration with CRSE. The difference between the WB's approach and that of KFW/GIZ highlights the necessity of flexibility in a certain context in order to achieve results in limited timeframe.

83. Having a permanent dialogue/consultation platform is critical in accelerating the implementation of projects with multiple involved stakeholders. The project involved a relatively high number of stakeholders: ASER, CRSE, MEM, MEF, SENELEC, WB, AfDB, KfW/GIZ, AFD, and EU. Addressing implementation issues through exchanges of official correspondence turned was inefficient as compared with bringing together all involved stakeholders around the same table for discussion. Recognizing the positive impacts of such form of exchange, the MEM is institutionalizing it by setting up a permanent consultation platform. This experience highlights the importance of a physical consultation platform, especially for projects involving multiple stakeholders and implemented by an agency that is not a ring-fenced, coordination unit.

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

## (a) Borrower/implementing agencies

84. ASER, the implementing agency for the rural electrification components, sent comments on the ICR. ASER's comments consisted of (i) edits that were incorporated in the present report and (ii) a proposal for a new rural electrification project.

85. To consolidate and scale up gains realized with the WB financing, the GoS invites its multilateral and bilateral development agencies – including the World Bank - to support a new rural electrification project. The new project will build on the large and small-scale concession approach designed with WB financing. It will continue the implementation of the six awarded concessions as well as launch and implement the remaining four concessions without current financing. Other activities that could be financed under the new project include:

- Scaling up the implementation of ERILs
- Implementing more PREMs, which is critical to reducing poverty and contributing to economic and social development in rural areas
- Densifying electricity networks within concessions to increase electricity access
- Providing ASER with technical assistance to implementing the project. Such assistance should include logistics and staff support, which was insufficient in the Bank-financed project, but impacts performance.

#### (b) Cofinanciers

86. KFW/GIZ provided written comments that were incorporated. KFW/GIZ indicated that the number of household connections achieved through its financed ERIL sub-project (known as ERSEN 1) has reached 3,500 connections by April 2013, with the network covering 150 villages. This was included in the Annex 2—project outputs by component—of the ICR.

87. In addition to KFW/GIZ's written comments, both KFW/GIZ and AFD shared their views on the project during the ICR mission held in April 2013. They reiterated

their support to the project and highlighted that the project achievements are significant given its innovative nature and the initial weak capacity of ASER and CRSE. They also mentioned the need for ASER to improve its financial situation and organizational efficiency. In this regard, the World Bank and the co-financiers agreed to follow up very closely the implementation of the ESMAP SE4ALL Technical Assistance for Senegal, in which ASER strengthening and financial restructuring will be addressed.

#### (c) Other partners and stakeholders

88. Not applicable.

# Annex 1. Project Costs and Financing

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

SN-Elec. Serv. for Rural Areas (FY05) - P085708 // P070530					
Components	Appraisal Estimate (US\$ million)	Actual Estimate (US\$ million)	Percentage of Appraisal		
Component 1 – Financing of	69,30	20,12	29%		
Investments					
Component 2 – Capacity	13,58	9,80	72%		
development and Institutional					
Strengthening					
Component 3 – Implementation,	5,64	2,45	43,4%		
Communication, Monitoring &					
Evaluation					
Component 4 - PROGEDE	4.10	7,12	174%		
transition phase					
Sub Total	92,62	39,49	43%		
Physical contingencies					
Price contingencies					
Project preparation Facility					
Total Project Costs	92,62	39,49			

# (b) Financing from World Bank

Source of funds	Appraisal Estimate (US\$ million)	Actual Estimate (US\$ million)	Percentage of Appraisal
IDA	25,15	19,27	77%
GEF	4,55	0,00	0%
BAD	15,33	14,27	93%
KFW/GIZ	8,14	6,84	84%
AFD	10,49*	10,10	96%
European Union	17,25*	10,60	61%
Government of Senegal (counterpart funding for Bank financing)	8,58	8,58	100%
Government of Senegal (counterpart funding for other donors' financing)	3,13	0,42	13,42%
Total	92,62	70,08	

\*: Parallel financing from AFD and European Union were confirmed in 2007, two years after project appraisal.

# Annex 2. Outputs by Component

## **Component 1: Financing of investments**

The component provided output-based investment subsidies to private operators, who were awarded large and small scale concessions for electrification. It also financed inhouse wiring to connect households to electricity network constructed under the emergency rural electrification program, funded by the GoS. The emergency program complemented the Bank-financed project as connections realized under the emergency program will be transferred to concessionaires. The table below presents the component's outputs.

Financing source (amount)	Approach	Outputs
World Bank (US\$21.16 M)	Concession	<ul> <li>2 concessions awarded : the 1<sup>st</sup> (Dagana-Podor-St Louis) to ONE and the 2<sup>nd</sup> (Mbour) to STEG</li> <li>Constructed network covered 66 villages in December 2012: 88 km of transmission line, 184 km of distribution line, and 57 transformer sub-stations constructed. The network was expanded and covered 116 villages in April 2013; public lighting is available in 9 villages.</li> <li>Transmission line under construction to connect 28 health centers and pumping stations of an agro-business (PREM)</li> </ul>
	ERIL (small concession)	<ul> <li>1 ERIL project financed by both World Bank (with co-financing from the Netherlands Cooperation)</li> <li>131 solar home systems (SHS) installed</li> <li>10 micro power plants (10-25 kW) being constructed</li> </ul>
	Emergency program	• in-house wiring and meter installation for 2,639 households
African Development Bank (US\$14.27 M)	Concession	<ul> <li>1 concession awarded (Louga-Linguère-Kébémer) to ONE</li> <li>Constructed network covered 47 villages: 32 km of transmission line, 59 km of distribution line, and 35 substations</li> </ul>
KFW/GIZ (US\$6.84 M)	Concession	<ul> <li>1 concession awarded (Kaolack-Nioro-Factick-Gossas).</li> <li>Construction has not yet started</li> </ul>
	ERIL	<ul> <li>1 ERIL project implemented (known as ERSEN 1); Hybrid (diesel-solar) power plants constructed with network covering 73 villages. Network coverage expanded to 150 villages by April 2013.</li> <li>1,503 household connections. This rose to 3,500 connections by April 2013.</li> <li>2<sup>nd</sup> ERIL project under implementation (ERSEN 2) with co-financing from the European Union and the Netherlands. Expected to cover 201 villages.</li> </ul>
AFD (US\$10.10 M)	Concession	<ul> <li>1 concession awarded (Kaffrine-Tambacounda-Kédougou) to EDF. Network construction has not yet started</li> <li>24 SHS installed</li> </ul>

European Union (US\$10.60 M)	Concession	• 1 concession recently awarded (Kolda-Vélingara)
Government of	Emergency	• 18,728 households and productive uses gained access to
Senegal	program	electricity

# **Component 2 - Capacity development and institutional strengthening**

The component strengthened the capacities of ASER, CRSE, MEM, and a Multi-Sectorial Committee, in charge of promoting productive uses of electricity. Specific outputs include:

ASER	
٠	Additional staff recruited including a financial management specialist, a procurement specialist, a specialist in rural electrification concessions, and a consultant to improve the organizational effectiveness and update the project operational manual
•	Three vehicles acquired and information and communication technologies (ICT)
	installed. ICT included computers, geographic information system software, and financial and accounting management software
•	Staff trained on a number of areas including: procurement, rural electrification
	regulations, geographic information systems, monitoring & evaluation, and project management
•	Study tours conducted in Tunisia and attendance to international workshops
•	Consultations done with international and local private operators on the concession design, and on the preparation of documents for pre-qualification and proposal requests. The consultations were supported by recruited international experts in rural concessions who assisted ASER
CRSE	
٠	Regulatory recommendations issued to inform decision making by MEM on the six concession awards
•	Approved electricity service regulations governing electricity delivery to consumers including tariffs, metering, service quality aspects
•	Operational rights delivered to private operators
MEM	
٠	No-objections to concession awards
٠	Decrees governing subsidy provision for village electrification initiatives promoted by community-based organizations or local private entrepreneurs (ERILs).
•	Counterpart financing mobilized for project implementation
•	Inputs to the preparation of the 2012 Energy Sector Development Policy Letter.
•	Monitoring of project implementation (consultations/meetings held)
Multi-	Sectoral Committee
•	Established Multi-Sectorial Committee, under the presidency of the Directorate of
	Electricity, with ASER ensuring the secretariat. The Multi-Sectorial Committee involves
	14 local committees, out of which 8 were officially created.
•	Selected PREM sub-projects for ASER financing
•	Approved action plan for promoting productive and social uses of electricity
•	National investment program for increased electricity uses for production and social
	applications. Program prepared in collaboration with UNDP.
•	inputs into the preparation of the poverty reduction strategy
•	Attendance to national and international workshops on productive uses promotion

# Component 3 – Implementation, Communication, Monitoring & Evaluation

The component supported planning for productive and social uses of electricity, preparation of local electrification plans, outreach activities, and the development of the M&E. Outputs include:

Productive and social uses of electricity	
• Eight PREM sub-projects designed, of which half to be implemented in the Bank-	
financed concession and the remaining half in the European Union-supported concession	n.
• Approved action plan for promoting productive and social uses of electricity	
• National investment program for increased electricity uses for production and social	
applications. Program prepared in collaboration with UNDP.	
• Study conducted to analyze micro-finance provision in support of the implementation	
productive uses of electricity sub-projects.	
• Inputs into the preparation of the poverty reduction strategy	
• Participation in national and international workshops on productive uses promotion	
Local electrification plans	
• Eight local electrification plans prepared. The plans provided background information	
required by private operators for preparing technical and financial bids. Three local	
electrification plans were later updated	
• Map of a concession area (Rufisque-Thiès-Mbacké) using satellite imaging	
GIS-based map of Senegal electricity network	
Outreach	
Consultations with local authorities and population in the Dagana-Podor-St Louis	
concession area on the concession implementation process	
• Sensibilization campaigns on the priority electrification plans of ONE for two concession	on
areas	
• Consultations of local population on the environmental and social aspects of concession	ıs
implementation	
• Organization of international workshop on rural electrification in collaboration with the	;
World Bank – Africa Electrification Initiative	
• TV ads, video, flyers, and brochures on ASER's mission, operations, and achievements	
• Purchase of communication tools (cameras, software, TV) for ASER's communication	
unit.	
M&E	
Developed M&E system	
• Purchase and Installation of GIS, and ArcGIS and tools for monitoring CO2 reduction	
under the Carbon Finance agreement	

#### **Component 4: PROGEDE transition phase**

The component supported supply and demand-side interventions to improve access to sustainable wood fuels for cooking. The support led to the following outputs:

## Supply-side

- 65,817 tons of charcoal produced per year in a sustainable manner
- Forest inventory and mapping realized
- Updated forestry data for the forestry information software (SIEF)

- Trained staff from the PROGEDE coordination unit and the Forestry unit.
- 289,116 ha of forest under the management of 465 village and inter-village organizations.
- 81,908 ha of biodiversity conservation reserve established in three villages along the perimeter of the National Niokolo Kobal Park
- 611 ha afforested
- Revenues sharing and management schemes established
- Income-generating activities practiced by village communities. This has led to increased income estimated at US\$ 14.6 million per year.

#### Demand-side

- 205,728 improved biomass cookstoves sold
- 14,740 kerosene cookstoves sold
- 250 improved carbonization units installed
- Ads to promote cookstoves dissemination
- Household energy information system developed and installed at the Directorate of Energy. The system constitutes an important planning tool.
- Updated study on LPG promotion
- Office equipment acquired for the Directorate of Energy and the Directorate of Water and Forests

# Annex 3. Economic and Financial Analysis

At appraisal, the project's efficiency was examined by analyzing costs and benefits of the entire rural electrification program (the project and two additional phases). Fewer data were provided for the cost-benefit analysis of the program's first phase (the project). The first phase (the project)'s benefits for the users were significantly underestimated. Excluded benefits include:

- Benefits from productive and social users of electricity
- Benefits from rural communities in charge of forest management under the PROGEDE transition component. Rural communities have earned US\$14.6 million per year.
- Benefits from urban and peri-urban households who acquired 205,728 higher energy-efficient biomass stoves, resulting to savings in household energy expenditures.

The cost-analysis of the project was revisited following the methodology used at appraisal:

- Economic benefits consist of the benefits for the users and the global environmental benefits. The benefits for the users are estimated using the gross consumer surplus method, which evaluates incremental benefits resulting from lighting and use of TV/audio based on willingness to pay. Given the lack of recent data on willingness to pay, the same level of benefits per user was assumed.
- Economic costs comprise (i) investments from both financiers (Bank and other donors) and private operators, (ii) operation and maintenance (O&M) costs from private operators, and (iii) costs for capacity building, communication, and technical assistance provided under the project components 2 and 3.
- Global environmental benefits are estimated using a reduced carbon price of US\$2/tCO2 to account for the current decline of the carbon market. The carbon price used at appraisal was US\$4.5/tCO2.
- The economic analysis is done over 25 years, the duration of a concession contract.

Based on the appraisal methodology, the re-evaluation of the project costs and benefits revealed an economic internal rate of return (EIRR) of 16.08 percent, higher than the appraisal rate of 13.4 percent. The higher rate is due to the following factors (see table below):

• Economic costs have doubled. The cost increase comes from investments from private operators. ONE, who was awarded two concession areas, and whose network construction is the most advanced, has documented that the cost of 1 km of transmission and distribution line has almost doubled. Other concessionaires are expected to also face construction cost increases. In addition to the construction cost increase, more financing than that considered at appraisal was provided (financing from AFD and European Union). Because of the construction

cost increase and the increased financing, the actual economic costs of the project have increased by 223 percent.

- Economic benefits for the users have more than doubled. Concessionaires committed to achieve 107,799 connections—the triple of the appraisal target of 35,000 connections—over the next 25 years. Although the benefits will be realized later than expected at appraisal, the present value of economic benefits for the users have increased by 250 percent within the concession timeframe.
- Environmental benefits have surged. Though the carbon price decreased, the reduced  $CO_2$  emissions (604,045 tons) are 75 times more than the amount targeted at appraisal (8,000 tons). Hence, the environmental benefits have increased 33.5 fold.
- Increase in the total economic benefits (benefits for the users and environment benefits) exceeds the increase in the economic costs, leading to a higher NPV of net benefits.

Cost-benefit analysis at		Appraisal	Closing
Present Value of costs (invest. + O&M +	US\$ million	81.63	181.92
capacity building and TA)			
Present Value of benefits for the users	US\$ million	83.90	209.67
Present Value of global environment benefits	US\$ million	0.38	12.75
Net Present Value of net benefits	US\$ million	2.65	40.50
EIRR	%	13.4	16.08

A financial analysis was conducted for one concession to assess the financial viability from the concessionaire perspective, using the same Excel-based software that performed the financial analysis of three WB-financed concessions at the project appraisal. The costs and expected revenues used for the analysis were received from ONE, the concessionaire of the first Bank-financed concession. However, the electricity tariff used (2008 tariff) is lower as CRSE is studying a tariff increase to reflect higher costs. The analysis resulted in a financial internal rate of 12.22 percent, far below the PAD's FIRR of 25.46 percent for the three expected concessions, and slightly below the concessionaire's initial FIRR of 15.84 percent in 2008 when bid proposal was submitted. The FIRR remained, however, higher than the discount rate (12 percent). The decrease is mainly due to the dramatic increase of electricity network construction costs, with the cost of 1 km of transmission and distribution line almost doubling over the project implementation period. The FIRR is expected to be higher as CRSE is considering a tariff increase to reflect the costs increase.

# Table: Re-evaluation of the cost-benefit analysis

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Investments + 0 & M costs (US\$ million)	10.30	47.76	66.12	18.19	22.63	19.46	21.31	23.32	25.68	28.29															
Capacity building costs (US\$ million)	1	2	2	2	3	3	1	-	-																
Technical assistance costs (US\$ million)	3	2	1	1	1	1	1																		
Total economic costs (US\$ million)	14	52	69	21	27	23	23	23	26	28															
Total Benefits for the users (US\$ million)	1.3	4.5	12.0	23.8	34.0	37.8	37.5	37.8	37.8	38.0	38.0	38.3	38.3	38.5	38.5	38.8	38.8	39.0	39.0	39.3	39.3	39.5	39.8	39.8	40.0
Total environmental benefits (US\$ million)	0.07	0.28	0.74	1.46	2.07	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32
Net Benefits (US\$ million)	-13.07	-46.98	-56.38	4.02	9.45	16.61	16.93	16.75	14.39	12.03	40.32	40.57	40.57	40.82	40.82	41.07	41.07	41.32	41.32	41.57	41.57	41.82	42.07	42.07	42.32
Discount rate	12%																								
Net Present Value (US\$ million)	40.50																								
EIRR	16.08%																								

# Annex 4. Bank Lending and Implementation Support/Supervision Processes

Names	Title	Unit	Responsibility/ Specialty		
Lending					
~ ~					
Christophe de Gouvello	Senior Energy Specialist	LCSEG			
Stephan Claude Frederic Garni	erSector Leader	AFTSN			
Thanh Lu Ha	Senior Program Assistant	AFTG2			
Supervision/ICR					
Amadou Konare	Consultant	AFTEW			
Awa Seck	Senior Economist	AFTG2			
Bertrand P. Marchais	Consultant	MIGEA			
Bourama Diaite	Senior Procurement Specialist	AFTPW			
Cheick Traore	Senior Procurement Specialist	AFTPW			
Cheikh A. T. Sagna	Senior Social Development Spec	AFTCS			
Christophe de Gouvello	Senior Energy Specialist	LCSEG			
Eric Jean Yoboue	Senior Procurement Specialist	AFTPE			
Fatouma Toure Ibrahima Wane	Senior Financial Specialist	AFTG2			
Fily Sissoko	Lead Financial Management Spec	AFTMW			
Ibrah Rahamane Sanoussi	Senior Procurement Specialist	AFTPW			
Maimouna Mbow Fam	Sr Financial Management Specia	AFTMW			
Michel E. Layec	Consultant	AFTG1			
Moez Cherif	Senior Energy Economist	AFTG2			
Saidou Diop	Sr Financial Management Specia	AFTMW			
Seynabou Thiaw Seye	Program Assistant	AFCF1			
Stephan Claude Frederic Garnier	Sector Leader	AFTSN			
Thanh Lu Ha	Senior Program Assistant	AFTG2			
Alain Ouedraogo	Energy Specialist	SEGES			

# (a) Task Team members

(b) Staff Time and Cost

	Staff Time and Cost (Bank Budget Only)									
Stage of Project Cycle	No. of staff weeks	USD Thousands (including travel and consultant costs)								
Lending										
FY04	40	0.00								
FY05	14	0.00								
Total:	54	0.00								
Supervision/ICR										
FY05	8	0.00								
FY06	26	0.00								
FY07	30	0.00								
FY08	33	0.00								
FY09	34	0.00								
Total:	131	0.00								

# Annex 5. Beneficiary Survey Results

Not Applicable.

# Annex 6. Stakeholder Workshop Report and Results

Not applicable.

### Annex 7. Summary of Borrower's ICR

ASER, the agency that implemented the rural electrification components of the project, submitted an Implementation Completion Report. The report covers the project activities in both rural electrification and household cooking energy. The report sets the project context, presents outputs and impacts in each component, re-assesses the project risks, reviews the project financing and disbursements, evaluates the performance of the Bank and the borrower, draws areas for improvement, and makes the case for a follow-up rural electrification project. The paragraphs below highlights some key points of the borrower ICR.

The project was designed based on the framework set by the 98-24 Electricity Law, which created ASER and defined its operating approach—large and small-scale concessions and support to productive uses of electricity. It was prepared as the first of a three-phase program. The project objective is to increase access of Senegal's rural population to modern energy services and to ensure the environmental and social sustainability of wood fuels in urban and peri-urban areas. The objective was to be reached through the implementation of four components of which three focused on rural electrification. On the rural electrification area, the objective target was to reach 35,000 connections with contribution from all donors and the Government of Senegal.

The project led to a number of outputs that are consistent with those described in the Bank ICR. The implementation of the investments component led to the award of 6 concessions—out of 10 concessions—to internationally-known private operators who committed to providing electricity to 107,799 households and productive users over the concession period. The awarded concessions are at different implementation stages with two concessions at advanced construction stage. Besides the awarded large-scale concessions, a number of small-scale concessions (ERILs) were implemented, including (i) KFW/GIZ-financed ERSEN 1 and 2 projects, and (ii) the joint World Bank/Netherlands cooperation ERIL. The KFW/GIZ-financed ERSEN 1 led to 1,503 household connections by project closure and to 3,500 connections by April 2013.

The performance of the Bank and the borrower is mixed. Overall, the World Bank played a key technical and financial role. The Bank supervision team supported the implementing agencies and the government and extended the project closing date at the request of the Government. However, some shortcomings were noticed: (i) slow approval of requests for no-objection to award two concessions (Mbour and Kolda-Velingara) and ERIL sub-projects, (ii) slow approval of disbursement requests, and (iii) lack of flexibility in the selection of the concessionaire for the Kolda-Velingara concession, leading to the cancellation of the allotted investment subsidy. On the borrower side, ASER faced a number of barriers that affected its performance. This was mainly due to the innovative nature of the project and the lack of readiness of the institutional framework.

Analyzing the project implementation experience, a number of areas for improvement were found. Key improvement areas include the following:

- ASER's rural electrification approach: there is a need to re-focus ASER interventions only on the large-scale concessions and small-scale concessions (ERIL).
- Concession award and effectiveness timeframe: To accelerate the concession award and effectiveness timeframe, the following can be done: (i) eliminate the prequalification step, (ii) reduce the timeframe for evaluating the bids, (iii) set deadlines for approvals, and (iv) enhance collaboration between intervening stakeholders.
- Bank's financing areas: Bank financing allotted for ASER operations and logistic equipment was insufficient. In addition, staff salaries were not covered by Bank financing. This affected project implementation and should be taken into account if there is a follow up project.

A follow-up Bank-financed project would be relevant. The project has led to significant regulatory, institutional, and private sector involvement gains. ASER has acquired tremendous experience and learned from the implementation challenges. In addition, the government is strongly committed to increasing rural electrification. Based on these factors, the government invites its development partners to support a follow-up rural electrification project. The follow-up project will build on the large and small-scale concession approach designed with WB financing. It will continue the implementation of the six awarded concessions as well as launch and implement the remaining four concessions without current financing. Other activities that could be financed under the new project include:

- Scaling up the implementation of ERILs
- Implementing more PREMs, which is critical to reducing poverty and contributing to economic and social development in rural areas
- Densifying electricity networks within concessions to increase electricity access
- Providing ASER with technical assistance to implementing the project. Such assistance should include logistics and staff support, which was insufficient in the Bank-financed project, but impacts performance

## Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

KFW/GIZ provided written comments that were incorporated. KFW/GIZ indicated that the number of household connections achieved through its financed ERIL sub-project (known as ERSEN 1) has reached 3,500 connections by April 2013, with the network covering 150 villages. This was included in the Annex 2—project outputs by component—of the ICR.

In addition to KFW/GIZ's written comments, both KFW/GIZ and AFD shared their views on the project during the ICR mission held in April 2013. Below are some key take-away views:

- Both KFW/GIZ and AFD strongly support the project and continue to monitor closely project implementation progress. KFW/GIZ financed the ERSEN 1 ERIL and is scaling up its support with the financing of ERSEN 2, which aims to electrify 201 villages. Besides the ERILs, KFW/GIZ financed one large-scale concession (Kaolack-Nioro-Factick-Gossas) that was awarded. AFD financed one concession (Kafrinne-Tambacounda-Kedougou) that was awarded to EDF.
- Both co-financiers highlighted that the project is innovative and constitutes a learning-by-doing experience for all involved stakeholders, including ASER, CRSE, and the World Bank.
- KFW/GIZ indicated that given the innovative nature of the project and the initial lack of capacity, the project achievements are significant.
- Both co-financiers look forward to ASER improving its financial situation and organizational efficiency.

# **Annex 9. List of Supporting Documents**

République du Sénégal

- Loi sur le Secteur de L'Electricité 98-24. 1998
- Amendement à la loi 98-24. 2002
- Lettre de Politique de Développement du Secteur de l'Energie. 2003
- Lettre de Politique de Développement de l'Electrification Rurale. 2004
- Lettre de Politique de Développement du Secteur de l'Energie. 2012
- Projet de Règlement de Service de COMASEL pour la concession Dagana-Podor-St Louis
- Préparation du Rapport d'Achèvement. Avril 2013
- Rapport d'Achèvement du Projet DASER. ASER. Juin 2013
- Rapport d'achèvement de la phase transitoire du PROGEDE. 2008

World Bank

- Project Appraisal Document
- Credit Agreement
- Mid-term Review Report
- Minutes of project concept note review meeting
- Restructuring papers and memorandums
- Mission aide-memoires from 2003 to 2013
- Financial Management Supervision reports
- Implementation Status Report from 2004 to 2013
- Project update reports
- 2003 Country Assistance Strategy
- FY2013-2017 Country Partnership Strategy
- 2010 Quality Assessment of Lending Portfolio (QALP-2)
- 2005 Implementation Completion Report for the Sustainable and Participatory Energy Management Project (PROGED I)
- 2010 Project Appraisal Document for a Second Sustainable and Participatory Energy Management Project (PROGED II)
- 2011 OPCS's Guidelines on Implementation Completion and Results Report

